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Abstracts

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PLENARY SESSIONS

Thursday, 7 May, 2015

T1:PL

Mammalian circadian clock and metabolism: The epigenetic link

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Circadian rhythms govern a number of fundamental physiological functions in almost all organisms, from prokaryotes to humans. The circadian clocks are intrinsic time-tracking systems with which organisms can anticipate environmental changes and adapt to the appropriate time of day. Disruption of these rhythms can have a profound influence on human health and has been linked to depression, insomnia, coronary heart disease, metabolic disorders and cancer. At the heart of circadian regulatory pathways is the clock machinery, a remarkably coordinated transcription-translation system that utilizes dynamic changes in chromatin transitions and epigenetic control. Recent findings show that regulation goes also the other way: specific elements of the clock are able to sense changes in cellular metabolism. Importantly, dynamic transitions in the epigenome have been associated with regulated patterns of nuclear organization. The accumulating evidence that chromatin remodeling is implicated in circadian function prompted us to explore whether the clock may control nuclear architecture. We applied the 3C-derived 4C technology (Chromosome Conformation Capture on Chip) to demonstrate the presence of circadian long-range interactions using the clock-controlled dbp gene as bait. The circadian genomic interactions with dbp are highly specific and are absent in cells whose clock is disrupted by ablation of the Bmal1 gene. We establish that the dbp circadian interactome contains a wide variety of genes and clock-related DNA elements. While revealing a previously unappreciated role of the circadian clock, these findings pave the way towards the elucidation of how nutrition may impact the shaping of the nuclear landscape.

T3:PL

Modulation of inflammation and metabolism by dietary fatty acids

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Both inflammation and dysmetabolism contribute to a range of human diseases. These two processes are linked since inflammation alters metabolism, while metabolism can produce compounds that induce or modulate inflammatory processes. Lipids and their fatty acid components play key roles in regulation of inflammatory and metabolic processes. Different fatty acid classes, and within the classes, different individual fatty acids have different effects. This is because they act through both general and specific molecular and cellular mechanisms. Consequently one fatty acid, or class of fatty acids, may oppose the action(s) of another. Within metabolism, saturated and polyunsaturated fatty acids often oppose one another's actions, while within inflammation omega-3 fatty acids (O3FA) often oppose different actions of saturated and omega-6 polyunsaturated fatty acids. Among the O3FA, the most biologically active are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). EPA and DHA are found in oily fish, fish oil supplements and a small number of pharmaceutical grade preparations. They are able to reduce inflammatory responses and modify metabolism. Key effects of EPA and DHA include reduced production of eicosanoids from the omega-6 fatty acid arachidonic acid; increased production of anti-inflammatory and inflammation resolving mediators (resolvins, protectins and maresins); altered activity of several transcription factors (NFkB, AP-1, PPARa, PPARg) so acting to reduce production of pro-inflammatory chemicals and to promote fatty acid b-oxidation, insulin sensitivity and reduction in circulating and hepatic triglycerides; and signalling through GPR120 in inflammatory cells and adipocytes. Through these molecular and cellular actions, O3FA counter several effects of saturated and omega-6 polyunsaturated fatty acids. The resulting improvements in cell and tissue function are associated with improved health and well-being.

Friday, 8 May, 2015

T2:PL

Molecular mechanisms linking inflammation and adipocyte de novo lipogenesis to insulin resistance in obesity

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Regulatory mechanisms that control fatty acid synthesis and oxidization under various physiological conditions contribute to overall body weight changes during nutrient overload. Insulin stimulates synthesis of fatty acids (de novo lipogenesis) and their esterification into triglycerides in liver and white adipocytes, which can secondarily modulate systemic glucose tolerance. Paradoxically, hepatic de novo lipogenesis is greatly increased in obesity while in white adipocytes it is markedly decreased, even though both tissues exhibit insulin resistance. Parallel to these effects of obesity on lipogenesis and insulin resistance, expansion of immune cells and inflammation of these tissues occurs. Although it is clear that inflammation contributes to insulin resistance, it has not however been technically possible to determine whether immune cells within a given tissue cause insulin resistance within that specific tissue. Using newly developed siRNA gene silencing technology selectively directed to either resident liver macrophages, denoted as Kupffer cells, or selectively to adipose tissue macrophages, we show these tissue immune cells do directly and locally contribute to the insulin resistance in both hepatocytes and adipocytes, respectively, in obese mice. The downregulation of lipogenic genes in adipocytes caused by obesity is also mediated in part by adipose macrophage cytokines. New data on questions that remain open will be presented: Do the cytokines that adipocytes release contribute to metabolic regulation in vivo, as do macrophage-derived cytokines? How do rates of adipocyte lipogenesis appatently modulate whole body glucose tolerance?

Acknowledgement: We gratefully acknowledge funding for our studies from NIH grant DK030898 and from the International Research Alliance at Novo Nordisk Foundation Center for Metabolic Research.

T5:PL

It is a Parental Responsibility

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Although changes in society are important for the obesity epidemic, parental factors are of major importance for childhood obesity development

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– especially for younger children. Before 10 years of age parents decide almost everything regarding their children's type of food, meal patterns physical activity and snacking. Already during pregnancy parental behavior is of importance. Maternal weight gain is associated with children's long-term weight development at least until 6–12 years of age. Genetic factors are of importance for obesity development but obesity genes do not make anyone obese without overeating. The temporal pattern for how and when parental obesity affects childhood obesity is not the same as that for the obesity genes. Parental education is associated with children's weight already at one year of age. Taken together, all these facts clearly indicate that the mechanisms behind the strong association between parental and offspring obesity primarily is of social and/or epigenetic origin, i.e., factors parents should have the capacity to modify in an obesity-preventive direction. Thus, the most important measures to be taken are to increase the awareness of the parents regarding their importance and support the parents as role-models and decision-makers for their children. If the parents shoulder these responsibilities, their children will have optimal chances to handle both a potential genetic vulnerability and the obesogenic society!

Acknowledgement: Swedish Research Council

T5:PL

Obesity: A societal responsibility

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The debate on the relative importance of genes and environment in obesity is now largely redundant. It is accepted that obesity like all conditions reflects a complex interplay of both genetic and environmental factors and that efforts to partition the origins of this condition between genes and environment are futile. This issue will be briefly reviewed. The relative contributions of personal agency versus societal conditioning will also be addressed. It will be argued that although efforts to empower individuals and families are not futile they are likely to play a relatively small part in tacking the epidemic of overweigh and obesity in children and adults. Rudolf Virchow in his Report on the 1848 typhus epidemic in Upper Silesia stated "If disease is an expression of individual life under favorable conditions, then epidemics must be indicative of mass disturbances of mass life." The global epidemic of overweight and obesity is undoubtedly "indicative of mass disturbances of mass life" – a societal issue that requires a societal level response. All of us who work in the area of overweight and obesity face difficult challenges in addressing societal level issues, in particular the need to confront powerful commercial interests on the over-supply of cheap calories and inappropriate/unethical marketing of processed, calorie dense foods.

Acknowledgement: Irish Health Research Board (HRB)

Saturday, 9 May, 2015

T6:PL

Ecological Public Health: A new approach to 21st century public health dilemmas

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The main lines of the modern public health approach were established in Europe's major cities from the mid-19th century. Sanitary measures focused on unhealthy urban environments, health education applied new behavioural rules to personal hygiene, and mass immunisation spread the first of many bio-medical measures, with bio-medicine later coming to dominate the public health field. Only from the mid- 20th century was attention given to the importance of economic factors in driving health improvement. In the 1960s, the epidemiologist Thomas McKeown controversially claimed that rising living standards and nutritional improvement mattered far more than medicine as an explanation for rising health trends, an assessment extended by Nobel Laureate Robert Fogel in his proposition of 'techno-physio' evolution. Rather than improving health, aspects of technological and economic advance in the 21st century – the revolution in farming production and food systems, private motor transport and a burgeoning culture industry – seem only to have confounded it, contributing to population weight gain and also, via links to climate change and biodiversity loss, threatening the ecological platform of human existence. In an age of complex and increasingly conjoint public health and environmental dilemmas once successful models of public health no appear either adequate or able to command public support. Our proposition of Ecological Public Health is hardly new. Its past supporters ranged from French biologist Rene Dubos to US public health official John Hanlon. In my presentation I will argue that in the 21st century public health advocates must embrace the Ecological Public Health perspective. I further demonstrate how such thinking might contribute to the establishment of a 'healthy weight' society.

Acknowledgement: The presentation is drawn from the book, Ecological Public Health: Reshaping the Conditions for Good Health, Routledge 2012, with Tim Lang.

T8:PL

Long term outcomes of bariatric and metabolic surgery. What can bariatric / metabolic surgery offer ?

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Bariatric / Metabolic surgery (BMS) is the only form of treatment for severe obesity that provides significant long-term weight loss and maintenance. With current technology and a laparoscopic approach, BMS can be performed safely with low early morbidity and very low mortality. BMS results in significant long-term weight loss of between 10 and 30% of total body weight. Results depend on the procedure, and generally are superior with procedures that alter the enteral route and/or result in malabsorption. Along with weight loss, BMS induces remission/improvement of many obesity-related comorbidities, improves quality of life, and prevents the development of obesity-related complications. These effects result in improved survival, especially in relation to a reduction in cardiovascular risk factors and in the incidence of malignant tumors. Whatever the surgical option, but depending on the patients' discipline, some weight regain occurs over time. According to its magnitude, and together with aging, it can result in progressive recurrence of comorbidities. Due to its remarkable effects on Type 2 diabetes (T2D) in the severely obese patients, BMS is also considered for the treatment of poorly controlled T2D in less obese patients who would not qualify for surgery based on their weight, with promising early and mid-term results. The main long-term side effects of BMS are nutritional deficiencies requiring mineral/vitamin supplementations. Depending on the procedure, other long-term complications, usually benign but occasionally severe, may develop. While absolutely necessary, BMS is only part of the treatment for severe obesity. Long-lasting dietary and behavioral modifications are essential, usually facilitated by the surgical procedure. A specialized multidisciplinary approach is key to success, and long-term patient follow-up by the bariatric team is essential, not only to help achieving good results, but also to prevent and treat complications in a timely manner.

REVIEW SESSIONS / WORKSHOP

Wednesday, 6 May, 2015

T1:RS1 – Secretory Factors in Non-Adipose Tissues

T1:RS1.1

Ectopic fat and organ steatosis

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Insulin resistance may be detected up to 20 years before the development of actual hyperglycemia and it represents a pivotal event into the pathogenesis of type 2 diabetes. Insulin resistance is also widely present into the population and mechanistically it may represent a defensive mechanism against the sedentary life style and overfeeding. In fact, insulin resistance is also largely prevalent in overweight and obese individuals. In this context, there is the hypothesis that insulin resistance at the level of the skeletal muscle, liver and the heart may be secondary to the excessive amount of fatty acids released by the adipocytes because of a dysfunctional adipose tissue or simply because of an excessive amount of calories in the diet which may push the ri-esterification of these fatty acids also in ectopic sites and not only in the subcutaneous and visceral adipose tissue with metabolic and functional deleterious effects on this sites of ectopic accumulation. On the opposite view accumulation of fat in ectopic sites may mediate deleterious effects in remote organs and tissue. For example NAFLD/NASH has been consistently associated with increased risk of future development of diabetes and cardiovascular disease. Whether this association is simply a simultaneous manifestation of the features of the metabolic syndrome or whether ectopic fat accumulation is truly causative of metabolic and cardiovascular diseases potentially mediated through the release of mediators acting on distant organs is still to be firmly established.

T1:RS1.2

Novel myokines

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The capacity of skeletal muscle to release regulatory factors with endocrine and autocrine action in response to physio-pathological stimuli has been recognized for long, and has led to the "myokine" concept. Possibly interleukin-6 (IL-6) is a paradigmatic example of myokine, highlighting the complexities of myokines action. IL-6 is released by muscle in response to exercise and contributes to the insulin-sensitizing effects of exercise, whereas IL-6 is also considered a pro-inflammatory cytokine increased as consequence of obesity. Recently, multiple novel regulatory factors acting as myokines have been identified. Irisin, a cleaved product of the FNDC5 protein, is produced by muscle under exercise and has a major biological action by promoting the browning of fat. Fibroblast growth factor-21 (FGF21), another endocrine factor capable of inducing brown fat activity, white adipose tissue browning and a metabolic health profile, has been also recognized as a myokine. FGF21 is released in response to muscle mitochondrial activity and, in fact, it is considered a circulating biomarker of muscle mitochondrial disease. Molecules acting as myokines are also often adipokines, and it is specially remarkable that many of them (i.e. IL-6, FGF21) are released by muscle in conditions of enhanced muscular activity (i.e. exercise) and also by brown adipose tissue in conditions of brown fat activation (i.e. cold), which raises the point about similarities between the muscle and brown fat signalling secretome. Identification of myokines and their biological action provide tools to be influenced by nutritional or pharmacological means in order to promote healthy metabolism.

Acknowledgement: Support by MINECO, Spain and Generalitat de Catalunya is acknowledged

T1:RS1.3

Beyond intestinal soap – role of bile acids in control of adipose tissue function and development of obesity

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Over the past decade, it has become apparent that bile acids are involved in a host of activities beyond their classic functions in bile formation and fat absorption. The identification of the farnesoid X receptor (FXR, encoded by Nr1h4) as a nuclear receptor directly activated by bile acids and the discovery that bile acids are also ligands for the membrane-bound, G-protein coupled bile acid receptor 1 (also known as TGR5) have opened new avenues of research. Both FXR and TGR5 are expressed in various tissues and organs and have been found to regulate various elements of glucose, lipid and energy metabolism. Consequently, a picture has emerged of bile acids acting as modulators of (postprandial) metabolism. Therefore, strategies that interfere with either bile acid metabolism or signaling cascades mediated by bile acids may represent novel therapeutic approaches for metabolic diseases. Synthetic modulators of FXR have been designed and tested, primarily in animal models, and have revealed that organ-selective FXR agonism may provide new approaches in the treatment of obesity and certain components of the metabolic syndrome. Furthermore, the use of bile acid sequestrants to reduce plasma cholesterol levels has unexpected benefits. For example, treatment of patients with type 2 diabetes mellitus (T2DM) with sequestrants causes substantial reductions in plasma levels of glucose and HbA1c. An overview of the molecular mechanisms by which bile acids through FXR and/or TGR5 modulate glucose and energy metabolism, particularly focusing on adipose tissue biology and development of obesity.

T3:RS1 – Changing Behaviors

T3:RS1.1

Developing theory- and evidence-based interventions. Logic modelling for behaviour modification

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Health behaviours, such as physical activity or dieting, are associated with body weight. Being physically active and following a healthy diet have been shown to reduce the risk of premature death or morbidity. Despite those positive outcomes, prevalence studies report that only a small number of people follow a healthy lifestyle. People's behaviour is multi-determined, often guided by routines and habits and is therefore difficult to change. Theory-driven and evidence-based interventions aim to support people in their lifestyle changes. The development of a theory-driven and evidence-based intervention contains several steps that relate tailored (or targeted) intervention inputs with intended outputs: the intervention goal(s). Theory-driven interventions postulate assumptions why the

intervention would lead to the intended outcome by specifying, for instance, modifiable behavioural predictors and 'active ingredients' (Michie & Johnston, 2012) that are linked to the behaviour and which should be changed within the intervention program by applying behaviour change techniques and tools. Systematic reviews and meta-analyses help to identify evidence-based predictors and intervention components. The implementation of the intervention as well as a concept of evaluation is also part of the development process.

T3:RS1.2

What behaviour changetechniques and theory work best for population-based nutrition & physicalactivity interventions?

Michie S.[1]

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Interventions to change nutrition and physical activity have had modest and variable success. To some extent, this reflects limitations in the scientific methods we use to study and change behaviour. Interventions are complex in that they are usually made up of several interacting component behaviour change techniques (BCTs). In order to improve interventions, we need to be able to identify the effective BCTs within complex interventions and understand their mechanisms of action. This talk will present BCT Taxonomy v1, a method for specifying interventions in terms of their BCTs using standardised terms and definitions developed by cross-disciplinary and international consensus. The talk will also report results of applying this to identifying effective BCTs within interventions aimed at increasing physical activity and healthy eating and illustrate the power of using theory to guide such analyses. It will also present a method for designing effective interventions, starting with a model of behaviour (COM-B) which allows an analysis of the target behaviour in context. This model forms the "hub" of the Behaviour Change Wheel, which integrates 19 frameworks of behaviour change into 9 intervention functions and 7 policy categories. The talk will show how this can be used to develop population- based interventions, selecting intervention functions, relevant BCTs and policies to support their implementation.

T3:RS1.3

Public acceptability in the UK and USA of nudging to reduce obesity: The example of reducing sugar-sweetened beverages consumption

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Introduction: The consumption of sugar-sweetened beverages is a major contributor to obesity particularly in children. Recent systematic reviews provide good evidence that reducing portion size reduces consumption. The public acceptability of such an intervention is unknown. Here we compare the acceptability in UK and USA samples of government interventions to reduce consumption of sugar-sweetened beverages: three nudge interventions (limiting portion size, changing container shape, and changing shelf location) and two traditional interventions (increased taxation and an education campaign). We also tested the hypothesis that informing participants that interventions affect behaviour via non-conscious processes decreases acceptability.
Methods: 1093 UK and 1082 USA participants rated their support for all interventions. The information they received was varied across three experimental conditions. Each intervention was said to affect behaviour: (a) via conscious processes; (b) via non-conscious processes; (c) no process stated.
Results: For the majority of both samples, the education campaign and the three nudge interventions were acceptable, with education attracting most support. By contrast, only a minority of participants supported taxation. There was no support for the study hypothesis: stating that the interventions worked via non-conscious processes did not decrease acceptability for nudge interventions.
Conclusion: Nudge interventions to reduce consumption of sugary drinks appear to be acceptable to the public. Contrary to expectation, highlighting the non-conscious mechanisms via which nudge interventions work does not decrease their acceptability.

T3:RS1.4

TV Junkie or PC Freak? – Associations of screen-time with eating and drinking habits

Milder I.E.[1], *Geurts M.*[1], *Dekkers A.L.*[1], *Temme E.H.*[1], *Proper K.I.*[1], *Wendel-Vos G.C.*[1], *van den Berg M.*[1]

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Background: Screen-time is associated with higher weight and adverse health outcomes. This might be due to an influence of TV/PC use on physical activity and dietary habits, e.g. due to (mindless) snacking and exposure to food advertisements. Indeed some studies (mainly in children) have found associations between screen-time, particularly TV, and higher consumption of snacks and drinks and energy intake. **Aim:** To assess the associations between TV and PC screen-time and diet in adults
Methods: Dietary data of 2100 adults were collected in the Dutch National Food Consumption Survey 2007–2010 with a repeated 24-h recall. Data on leisure screen-time were self-reported. Habitual intakes of several food groups and nutrients were estimated and compared between people with low, intermediate and high screen-time using confidence intervals obtained by bootstrapping. All analyses were carried out with the SPADE statistical program (www.spade.nl); adjusting for potential confounders.
Results: Both PC and TV use tended to be associated with lower intake of fruit, vegetables and vitamin C. For PC differences were larger than for TV; but still small. Median intakes in the highest (≥ 3 hours/day), vs the lowest (≤1 h/d) category of PC time were 66 vs 102 g/day for fruit, 110 vs 124 g/d for vegetables, and 84 vs 94 mg/d for vitamin C. With high PC use, intake of sugar-sweetened beverages was higher (233 vs 145 g/d). On the contrary, in the highest category of TV viewing (≥3h/d) intakes of sugar-sweetened beverages (151 vs 216 g/d) and mono- and disaccharides (90 vs 100 g/d) were lower than for people viewing less than 3 h/d.
Conclusion: Both TV and PC time were associated with some elements of an unhealthy dietary pattern. However, overall our study does not support the link between screen-time and diet.

T5:RS1 – Screening and Intervening Early for Healthy Growth

T5:RS1.1

Screening and intervening early for healthy growth: Interventions in high risk children

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Previous interventions have generally not been effective in preventing development of overweight, and at the same time studies suggest that some subgroups are more predisposed to future obesity. Obesity runs in families and the subgroup of children with obese parents is at a much higher risk of becoming obese than children of normal weight parents. Likewise, there is a several fold higher risk of obesity among children from lower than higher socioeconomic status familes, and among those children born with a higher birth weight, those born to mothers who smoked during pregnancy, or those of Hispanic or African American orgin. Generally, the studies targeting predisposed individuals seems more effective in

preventing obesity than the studies targeting general populations. However, most previous studies on high risk groups focused on ethnicity or socioeconomic status, only, and hence, there is a need for more studies. The Danish Healthy Start Primary Intervention Study included a total of 963 2–6 year old high risk children, all normal weight at baseline. The intervention, which focused on healthy diet, activity, sleep and stress management, included individual as well as group counselling and teaching in practical skills. The study was recently completed and the preliminary results, which suggest that the intervention was effective in preventing excessive weight development over the 18 months intervention period, will be presented.

T5:RS1.2

The World Health Organization's global target for ending the increase in childhood overweight by 2025

de Onis M.[1]

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In 2012, the World Health Organization adopted a comprehensive plan for maternal, infant and young child nutrition which specified six global nutrition targets (1). One of the targets aims to achieve no increase in childhood overweight by 2025.This target implies that the global prevalence of 7% in 2012 should not rise to 11% in 2025 as current trends would predict (2). In addition, the number of overweight children under 5 years of age should not increase from the estimated 44 million in 2012 to 70 million in 2025 as forecasted. Achievement of the target to halt the increase in overweight in children under 5 years of age would be possible through the right mix of policies and actions. This presentation will review examples of evidence-based actions that have a strong potential for preventing childhood overweight. The policies and actions will require considerable political commitment, along with investment of resources and participation of a wide variety of sectors and stakeholders. In addition, childhood overweight is interlinked with the five other global nutrition targets of increasing the rate of exclusive breastfeeding and reducing stunting, anaemia in women of reproductive age, wasting and low birth weight. This presents opportunities for synergistic policy and programmatic approaches to address multiple targets simultaneously, using multisectoral platforms that are being established in a growing number of countries to improve maternal, infant and young child nutrition.

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T5:RS1.3

The Early Prevention of Obesity in Children (EPOCH) Collaboration – results of an Individual Participant Data Prospective Meta-Analysis

Baur L.A.[1], *Askie L.M.*[1], *Rissel C.*[1], *Espinoza D.*[1], *Martin A.*[1], *Wen L.*[1], *Magarey A.*[2], *Daniels L.A.*[3], *Campbell K.*[4], *Hesketh K.*[4], *Taylor R.*[5], *Taylor B.*[5]

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Introduction: Obesity prevention efforts have increasingly focused early in life. RCTs of interventions are more powerful when they are synthesised into an individual participant data (IPD) prospective meta-analysis.
Methods: EPOCH comprises 4 RCTs of obesity prevention strategies commencing before age 6 mths. Its main objective was to determine if early intervention to prevent childhood obesity influences BMI z-scores at age 18–24 mths. There are a range of secondary endpoints. Data from the studies were prospectively planned to be combined. Data across the trials were aggregated using a one-step linear modelling approach that included treatment effect as a fixed effect and accommodated clustering in one trial. Multiple-imputation was used to evaluate the impact of missing data.
Results: The 4 trials comprised 2196 women/infants. Primary outcome data were available for 78% of infants. Mean BMI-z score at 18–24 mths was 0.67 (95% CI: 0.60 to 0.74) for intervention group, 0.80 (95% CI: 0.73 to 0.87) for control group (estimated diff –0.13 [95% CI: –0.23 to –0.03; p = 0.012]). Multiple-imputation analysis estimated the difference at –0.10 (95% CI: –0.20 to 0.00; p = 0.04). Median breastfeeding duration was significantly longer in intervention arm (35 wks [95% CI: 30 to 37] vs 28 wks [95% CI: 26 to 30]; HR=0.89 [95% CI: 0.8 to 0.98]; p = 0.022). Children viewing TV for >1 hr/day was significantly lower in intervention arm (24% vs 35%; OR=0.63 [95% CI: 0.49 to 0.81; p < .001]). There were no significant differences in overweight/obesity, sleeping patterns or physical activity.
Conclusion: Early interventions for preventing childhood obesity appear effective in reducing BMI z-scores at 18–24 mths to a moderate degree, as well as prolonging breast feeding and reducing TV viewing time.

Acknowledgement: Australian National Health & Medical Research Council

T5:RS1.4

The role of early nutrition in programming of the adult body composition – The Helsinki Study of Very Low Birth Weight Adults

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Introduction: Animal studies have shown that early nutrition plays an important role in programming long-term health. Direct human evidence is however scarce. We tested the hypothesis that higher early intake of protein and other macronutrients predicts adult adiposity in our natural experiment of adults born preterm with very low birth weight (VLBW, <1500g).
Methods: Mean gestational age (GA) of the 127 VLBW participants was 29.0 (SD 2.1) weeks and mean birth weight (BWT) 1105 (SD 218) g. We collected detailed information on their nutritional intake during initial hospital stay from the hospital records. Mean intakes of energy (94.1 kcal/kg/day, SD 15.5), protein (1.4 g/kg/d, SD 0.4) and fat (4.3 g/kg/d, SD 1.1) during the first three weeks of life were calculated. At the mean age of 22.5 (SD 2.1) years the subjects underwent a clinical examination including measurements of weight, height, body composition (dual x-ray absorptiometry) and resting energy expenditure (indirect calorimetry).
Results: We found that neonatal energy, protein and fat intakes predicted adult body composition. When adjusted for sex, age, BWT SD score and GA, a one g/kg/d higher protein intake predicted 11.1% higher lean body mass (LBM) (95% CI 3.7 to 18.9) and 8.5% higher resting energy expenditure (0.2 to 17.0)(Figure 1). Similar associations were seen with higher early intake of fat but not of carbohydrate. Adjustments for highest parental education or preand postnatal medical complications had little effect on our results.
Conclusions: At relatively low neonatal protein intake levels, additional protein intake is reflected by healthier body composition, accompanied by a higher metabolic rate, twenty years later.

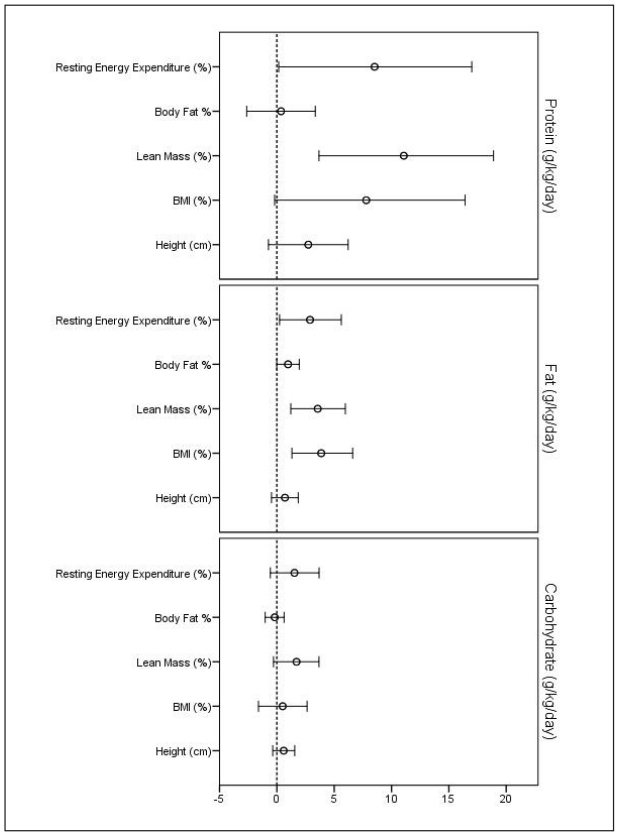

Fig. 1. Results from linear regression analyses with measurements of body composition as dependent variables and early nutritional intakes as independent variables. Each line represents the unadjusted regression coefficient with 95% CI. All models were adjusted for sex, age, birthweight SD score and gestational age.

T8:RS1 – Ethics of Medico-Surgical Management

T8:RS1.2

Novel mechanisms of metabolic improvements after bariatric surgery

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Overweight and obesity in European adults are responsible for about 80% of cases of T2DM, 35% of ischaemic heart disease and 55% of hypertension. Additionally osteoarthritis, respiratory difficulties, infertility, psychosocial problems and other factors which reduce life expectancy, quality of life and disability, are extremely costly in terms of both absence from work and use of health resources. Bariatric surgery has proven to be the most effective treatment for morbidly obese patients, with long-term studies providing evidence of a substantial reduction of mortality and a decreased risk of developing new health-related comorbidities. A BMI reduction of 5 points leads to T2DM reduction of 33%, 27% for hypertension, 20% for hyperlipidemia. Obesity is accompanied by increased arterial stiffness, left ventricular hypertrophy, and diastolic dysfunction, all associated with a marked improvement even as early as 6 months after bariatric surgery. In addition to its significant benefits on weight, surgery has tremendous effects on glucose homeostasis and may lead to complete remission of T2D, due to the significant improvement in hepatic and muscular insulin sensitivity. Although lifestyle and pharmacological interventions can control glucidic metabolism, they do not reduce the incidence of cardiovascular events in obese individuals with diabetes or in other high-risk groups with increased body weight. Apart from its malabsorptive effects, bariatric surgery reduces the long-term incidence of diabetes by about 80% (Swedish Obese Subjects study) by modifying some gut hormones pattern (GLP-1, GIP, PYY and ghrelin) and their metabolic effects. Experimental studies suggest that changes in gut microbiota are associated to body weight gain and fat accumulation by the mucosal production of RELMß, a key factor in glucose homeostasis. At last, the increasing level of inflammatory factors (IL-1, IL-6 and TNF) in obese people represents a future promising field of research.

T8:RS1.3

Targeted therapy in obesity

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Introduction: The term targeted therapy is used for the use of antibodies against different humoral factors or receptors. This therapy is successful in oncology, rheumatology, dermatology, ophtalmology and gastroenterology. Many experimental and clinical studies were performed in diabetes with controversial results. A review was prepared concerning possible effects of targeted therapy on obesity. As in diabetes there are three possible ways how targeted therapy can be analysed : 1. Discussion about factors which can be targeted in obesity therapy. 2. The effect on body weight in clinical trials and clinical use of targeted therapy in medicine. 3. Experiments with targeted therapy in obesity treatment.
Results: 1. There are many possible targets for antibody treatment in obesitology- e.g. proinflammatory factors or some adipokines. The elevation of these factors was described in obesity and related diseases. Only few of this factors were targeted by antibodies in animal or clinical studies. 2. Only few studies of use of targeted therapy in different fields of medicine include data about weight or BMI. The use of targeted therapy in rheumatology can decrease the risk of type 2 diabetes to 0.5. It is independent of BMI. 3. Very few studies in experimental animals use targeted therapy in obesity treatment with promising results. The use of antibodies against FGFR1 (receptor for growth factor FGF21) decreased weight in animals by 10%, decreassed insulin resistence, decreassed hepatic lipid content and serum lipid levels. The energy expenditure was increased. Promising are also experiments with blocking of soluble activin type II receptors-protecting against diet induced obesity.
Conclusion: Limited data are available on antibody based of obesity and its complication except diabetes. The use of targeted therapy in type 2 diabetes treatment has a long history with limited results.The history of experiments in obesity is shorter but it also starts to be promising.

T8:RS1.4

Fecal transplantation in obesity and metabolic syndrome

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Alterations in (small) intestinal microbiota are associated with obesity and insulin resistance, with the latter usually characterized by low grade endotoxemia. We recently showed that fecal transplantation (infusing intestinal microbiota from lean donors) in male recipients with metabolic syndrome has beneficial effects on the recipients' microbiota composition and glucose metabolism via lowering plasma endotoxin levels (Vrieze, Gastroenterology 2012). Moreover, preliminary data suggest that 4 weeks daily oral gavage with one of the identified small intestinal bacterial strains (butyrate producer Eubacterium hallii) has dose dependent beneficial effects on insulin sensitivity and liversteatosis in male db/db mice. Moreover, we found that intestinal bacterial strains are involved in visceral adipose tissue inflammation. Combined our data suggest that specific intestinal bacterial strains might be developed as therapeutic targets to normalize inflammatory tone and insulin sensitivity in humans.

Thursday, 7 May, 2015

T2:RS1 – Remodelling, Fibrosis and Inflammation

T2:RS1.1

Weight loss and changes in the inflammatory cells in adipose tissue

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Adipose tissue lies at the crossroad of nutrition, metabolism and immunity and adipose tissue inflammation was proposed as one of the central mechanisms connecting obesity with its metabolic and vascular complications. Resident immune cells constitute the second largest adipose tissue cellular component after adipocytes and as such play important roles in maintaining adipose tissue homeostasis. Obesity-induced changes in their number and function result in activation of local and later systemic inflammatory response marking the transition from simple adiposity to diseases like type 2 diabetes mellitus, arterial hypertension and ischemic heart disease. Although the exact mechanisms responsible for the initiation of adipose tissue inflammation are still only poorly understood, accumulation of body fat leads to increased recruitment of several types of proinflammatory immune cells into the adipose tissue, including macrophages, lymphocytes, dendritic and mast cells and neutrophils. Conversely, other immune cell subtypes involved in anti-inflammatory reactions as eosinophils or M2 macrophages are decreased. Weight reduction is associated with profound changes in the amount and characteristics of adipose tissue immune cells; however, the exact roles of diverse subtypes of immune cells in the beneficial effects of different weight reducing procedures remain to be elucidated. Even though we only begin to unravel the complex and dynamic network of immune cells in the adipose tissue, the study of their phenotypes and interactions under different conditions might help discover new immunometabolic pathways and regulatory reactions potentially enabling the development of novel strategies in the treatment of obesity and its complications.

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T2:RS1.2

Human adipocyte function is impacted by mechanical cues

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In obesity, adipose tissue undergoes chronic inflammation with deposition of fibrotic depots organized in rigid collagen fibers around adipocytes which could impact on adipocyte metabolism through both mechanical constraints and biochemical stimuli. To reproduce the fibrotic environment of obese adipose tissue, we developed an experimental 3D model where human mature adipocytes are included in a peptidic hydrogel with decellularized material of adipose tissue (dMAT) from obese subjects. Functional consequences on adipocyte metabolism and inflammatory profile were followed during one week and transcriptional profile of these "fibrotic" adipocytes was screened to determine putative mechanotransduction pathways implicated. The Incorporation of dMAT induced alteration of adipocyte metabolism through a decrease in adipokine secretions (-60% for leptin and –40% for adiponectin), insulin response and lipolytic activity (-30% of glycerol and FFA release). In addition, dMAT increased expression/production of cytokines (IL-6, G-CSF) and fibrotic mediators (LOXL2 and the matricellular proteins THSB2 and CTGF) in adipocytes. CTGF expression levels correlated with the amount of peri-adipocyte fibrosis in WAT from obese individuals. Moreover, dMAT-dependent CTGF promoter activity, which depends on β1-integrin/cytoskeleton pathways, was enhanced in the presence of YAP, a mechanosensitive co-activator of TEAD transcription factors. Mutation of TEAD binding sites abolished the dMAT-induced promoter activity. By reproducing a fibrotic microenvironment, we showed that adipocytes appear as mechanosensitive cells with an inflammatory and metabolic altered phenotype. Fibrosis may negatively affect human adipocyte function via mechanosensitive molecules, in part stimulated by cell deformation. Identification of the molecular actors could give novel insights into adipocyte mechano-transduction and possible link with adipose tissue dysfunctions.

Acknowledgement: Emergence program 2010 UPMC, National Agency of Research (ANR Adipofib), Fondation pour la Recherche Medicale (FRM team), European Community seventh framework program ADAPT(grant agreement no. 201100) and Assistance Publique des Hôpitaux de Paris (APHP; Programs of Clinical Investigation [PHRC] no. 0702) for human data collection.

T2:RS1.3

Impaired mitochondrial biogenesis in adipose tissue in acquired obesity

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Introduction: Low mitochondrial number and activity have been suggested as underlying factors in obesity, type 2 diabetes, and metabolic syndrome. However, the stage at which mitochondrial dysfunction manifests in adipose tissue after the onset of obesity remains unknown.
Methods : Here we examined subcutaneous adipose tissue samples from healthy monozygotic twin pairs who were discordant (n = 26, ΔBMI >3 kg/m^2) and concordant (n = 14, ΔBMI <3 kg/m^2) for body weight and assessed their detailed mitochondrial metabolic characteristics: mitochondrial-related transcriptomes with dysregulated pathways, mitochondrial DNA (mtDNA) amount, mtDNA-encoded transcripts, and mitochondrial oxidative phosphorylation protein levels.
Results: We report global expressional downregulation of mitochondrial oxidative pathways, with concomitant downregulation of mitochondrial amount, mtDNA-dependent translation system, and protein levels of the oxidative phosphorylation machinery in the obese compared with the lean co-twins. Pathway analysis indicated downshifting of fatty acid oxidation, ketone body production and breakdown, and the tricarboxylic acid cycle, which inversely correlated with adiposity, insulin resistance, and C-reactive protein levels.
Conclusion: Our results suggest that increased caloric intake downregulates mitochondrial mass and oxidative metabolic activity in the sub-

cutaneous adipose tissue, promoting metabolic glucose dependence and causing mild signs of systemic inflammation even at the early stages of acquired obesity.

T2:RS1.4

Bone Marrow is an Important Contributor to Human Adipogenesis

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Introduction: Human white adipocytes display a high turnover throughout adulthood. This implies that a continuous supply of precursor cells is required to maintain adipogenesis. Adipose progenitor cells reside in the stroma of white adipose tissue (WAT), but their origins are unclear. As adipocytes can differentiate from bone marrow (BM)-derived mesenchymal stem cells (MSCs) in vitro, it has been proposed that BM may contribute to mammalian adipogenesis but results in animal models have been conflicting.
Methods: Subcutaneous abdominal WAT biopsies were obtained from 65 subjects that had undergone allogeneic BM or peripheral blood stem cell (PBSC) transplantation 3–31 years ago. Donor cell contribution was determined at the bulk and single cell level. Results Over the entire life span, BM/PBSC-derived progenitor cells contribute with ~10% to the subcutaneous adipocyte population. While this is independent of gender, age and different transplantation-related parameters, body fat mass exerts a strong influence with up to 2.5-fold increased donor cell contribution in obese individuals. Exome-sequencing of single adipocytes suggests that BM/PBSC-derived progenitor cells contribute to WAT via either differentiation or cell fusion. This and the continuous, time-dependent, increase in donor cell incorporation in recipients without on-going immunosuppressive treatment, demonstrate that BM/PBSC-infiltration into WAT is not transient, and indicate that BM may contribute to WAT plasticity also under physiological conditions.
Conclusion: Our findings highlight the role of BM as a reservoir for adipocyte progenitors, particularly in conditions of excess WAT mass and suggest that BM/PBSC transplantation could be explored to treat conditions with severe adipose dysfunction.

T3:RS2 – Physical Fitness

T3:RS2.1

Epidemiology of Physical Fitness – Badge of Sports Versatility of Olympic Champions (OVOV) – one of possible effective tools for improving the recent situation

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Problem to be solved: A survey of obesity prevalence, complications and obese patient habits was performed 5 times during 2000–2013 in standardized random sample of population of the CzechRepublic with more then 2000 subjects from all regions and ages. Physical inactivity was found as an important risk marker of obesity and its complications. According to our data more than two thirds obese have no intensive physical activity. All 3 metabolic diseases – obesity, hypertension and type 2 diabetes are strongly related to the reported low physical activity in childhood. Sportsmen in all age are less obese. There are less patient with diabetes and hypertension among those who are active in sport. Moreover physical activity in childhood determines the low incidence of diabetes and hypertension for the rest of life. **Suggested solution:** Olympic gold medalists in the decathlon Robert Změlík (1992 in Barcelona) and Roman Šebrle (2004 in Athens) initiated the creation of an attractive motoric program called Badge of Sports Versatility of Olympic Champions – (Czech abbreviation – OVOV). They set a very ambitious goal – to increase a personal physical activity of girls and boys aged 10 to 15 years to improve their physical fitness and motivate them to begin their possible sports career in a similar way, what has proven themselves. After the successful launch of the project in 2010, the program was expanded. Recently rules, instructions and an evaluation of performances are adapted for the all people in the age span from 7 to 66 plus. Exercise programme OVOV consists of 60 m run, long jump, ball throw,1000 m run, shuttle basketball dribbling, swimming, rope-skipping, medicine ball throw, two-legs triple jump, pull ups on sloped bench, push-ups and sit-ups.
Results: Comparison and analysis of data from the period 2010 – 2014 will be presented.

T3:RS2.2

Musculoskeletal Health and Function: Effect of obesity

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Conditions: Clermont University.,2Regional Center for Human Nutrition (CRNH Auvergne) For years researched have been focused on the link between obesity and physical activity level. Although this remains an important area that definitely needs deeper explorations, physical fitness appears as one of the most important health indicator in our patients (more than physical activity itself). Yet aerobic fitness has long been considered as the primary factor supporting good health, musculoskeletal fitness is now recognized as a crucial parameter in maintaining overall health and fitness (Armstrong & Welsma, 1997). Basically, musculoskeletal fitness may represent the individual overall capacity to conduct daily tasks that rely on muscle strength, gait, flexibility, balance or posture. Is obese patients' musculoskeletal fitness impaired? How does obesity exactly impact musculoskeletal health and function? What about weight loss? Does it favor improved musculoskeletal fitness parameters? This talk will first try to identify the exact link between MSK function and obesity and how it affects overall health in adults and kids with obesity. We will then try to question the impact of different weight loss strategies (dietary intervention, physical activity programs or bariatric surgery) on MSK fitness in obese adults and youth

T7:RS2 – Lifecourse Perspective

T7:RS2.1

Overweight and obesity: Life course and multigenerational studies

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Introduction: Optimal birth size and good health in early life is an important health outcome in its own right and is also one predictor of subsequent health and education. Current methodological developments in life course epidemiology create unique opportunities to investigate how early circumstances and exposures shape later outcomes and how parental

and grandparental characteristics influence health and social outcomes of descendant generations.
Methods: We attempt to model continuities in birth outcome and body size across generations together with social mobility patterns in a dynamic way that allows for bidirectional and time changing effects. In this way, we aim to examine the scope for breaking the "chains of risk" between generations, and to highlight new potential ways to reduce long term inequalities. We mainly use data from the Uppsala Birth Cohort Multigenerational Study (www.chess.su.se/ubcosmg/) and other linked register data where we can apply a life course and intergenerational approach to analysis.
Results: Multiple sub-studies demonstrate associations between social and health characteristics across more than two generations. Examples include social patterning of pre-pregnancy body mass index, weight gain in pregnancy, size at birth, childhood overweight and obesity as well as incidence of diagnosed eating disorders.
Conclusion: When mechanisms by which poor health and adverse parental (and grandparental) socioeconomic position translate into social and health disadvantage in the offspring and following generations (and which thus lead to re-emergence and reproduction of health inequalities in subsequent generations) are better understood, new opportunities for more effective health equity interventions and policies will emerge.

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T7:RS2.2

Lifecourse Epidemiology and Obesity

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There has been mounting interest in the developmental and lifecourse origins of adult chronic disease, including the role played in the current global burden of overweight and obesity. Body weight may be influenced during critical periods such as pregnancy, growth and adolescence and in healthy ageing. There may be latent, cumulative or trajectory factors at play at different time points and the interplay between social, environmental and constitutional factors has to be understood, not just from a mechanistic perspective, but also to identify most effective interventions. Maternal and child health provides an important context with two separate potentially pathological processes; factors leading to microsomia may later be associated with central adiposity and insulin resistance, whereas those associated with macrosomia lead to adiposity, and beta-cell dysfunction1. There is increasing interest in how environmental stressors may modify genetically inherited traits through epigenetic processes across the lifecourse, necessitating increasingly sophisticated cohort study designs with appropriate biopsychosocial data to evaluate these pathways. Data from the Lifeways cross-generation cohort study in Ireland for instance show consistently stronger influences in the maternal than the paternal family lines on childhood growth and development, followed from pregnancy until 9 years of age2. This presentation will review current relevant International literature.

Acknowledgement: The Lifeways cross-generation cohort study is funded by the Health Research Board in the Republic of Ireland. The National Nutrition surveillance Centre is funded by the Health Service Executive.

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T7:RS2.3

Specific associations of maternal and paternal obesity risk-allele scores with offspring early growth

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Introduction: Early postnatal growth has been suggested to be influenced by paternal corpulence. We aimed to investigate the respective role of maternal and paternal genetic susceptibility to obesity in offspring body size and fat mass from birth to 5 years.
Methods: 833 mother-father-offspring trios from the EDEN mother-child cohort were genotyped for a set of 16 polymorphisms previously identified by genome-wide-association studies of adult BMI. A genetic susceptibility score was built by summing the number of alleles carried. Outcomes were age- and sex-adjusted SD scores (SDS) for weight, length, BMI and skinfolds at birth, 1, 3 and 5 years, and fat mass percent (FM% obtained from bioelectric impedance) at 5 years. Maternal and paternal scores were investigated in association with these outcomes in repeated cross-sectional analyses using linear regression models allowing adjustment for sex, maternal height and breastfeeding.
Results: There was no association between maternal genetic score and any anthropometric outcome ($p > 0.13$), whereas paternal genetic score was significantly associated with weight (ß = 0.053 ± 0.014 SDS per allele; $p < 0.0001$), height (ß = 0.035 ± 0.014; $p < 0.016$) and BMI (ß = 0.047 ± 0.014; $p < 0.001$) as early as 3 years. Patterns of associations were similar at 5 years, when paternal score was also significantly associated with skinfolds SD-scores (ß = 0.041 ± 0.015; $p = 0.007$), and FM% (ß = 0.032 ± 0.016; $p = 0.043$).
Conclusion: Paternal and maternal genetic susceptibilities to obesity seem to play distinct roles in offspring early postnatal growth. Further investigations are needed to explain these differences, and especially to find out whether environmental constraints during fetal life could be responsible for the absence of genetic effect from the maternal side.

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T7:RS2.4

Does education influence the overweight tracking from adolescence to early adulthood?

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We aimed to study how social factors, such as participants' and parental education, influences overweight tracking from adolescence to early adulthood. We analysed data from 1236 adolescents evaluated at 13, 17 and 21 years under the EPITeen cohort (Porto, Portugal). Education was evaluated as complete years of schooling, and parental education was defined according to the parent with highest education. Weight and height were measured at each moment and overweight was defined as BMI>+1SD from WHO growth reference (at 13y) or BMI≥25.0 kg/m^2 (at 21y). The tracking of overweight was summarized in 4 categories: 'stable normal'-normal BMI at both moments; 'decreasing'-overweight at 13y/normal at 21y; 'increasing'-normal at 13y/overweight at 21y; 'stable overweight'-overweight at both moments. The associations were summarized

by odds ratio (OR; 95%CI) adjusted for sex and physical activity at 13y, through multinomial regression (reference 'stable normal'). From 13 to 21y, 16.3% of participants remained overweight; 7.8% were classified in the category 'increasing' and 10.8% in the 'decreasing'. In comparison to highly educated (>12y), participants with 10–12y of education were more likely to increase their BMI (OR = 2.37; 95% CI:1.44–3.88) or to remain overweight (1.70; 1.17–2.47). The same trend was observed for parental education; participants whose parents completed≤6y of schooling were 2.3 times (95%CI: 1.23–4.24) more likely to be in the 'increasing' and 2.0 times (95%CI: 1.21–3.33) more likely to be in the 'stable overweight'. Similar trends were observed in those participants more deprived using perceived social class and income adequacy. Besides the effect on overweight at 13y, education and unfavourable social conditions also impacts on overweight tracking to adulthood.

T4:RS1 – Addiction

T4:RS1.1

Brain imaging and phenotyping

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Human food intake is not only under the control of the hypothalamus but, mainly by hedonic mechanisms, also influenced by cortical and subcortical areas related to cognition and reward. The activation of the brain in response to food or food cues in animals and in humans is under intense scrutiny by using neuroimaging methods as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI). Neuroimaging studies conformed and highlighted the involvement of multiple brain areas as prefrontal, orbitofrontal, somatosensory cortices, insula, thalamus, hypothalamus, amygdala and others in the reward properties of food. However, important phenotypic differences in the interaction between external food related stimuli and brain regions activated have been found when lean/normal subjects were compared to overweight/obese patients. Somatosensory response to food cues seems to be hyper-responsive in obese individuals; moreover brain areas controlling executive drive seem to over-react to the anticipation of pleasure during cue exposure in obese compared to lean subjects, furthermore the areas of the brain in obese individuals involved in cognitive control and inhibitory behaviour seem to be more resistant to the perception of reward after food exposure in comparison to what observed in the brain of lean subjects. All these alterations in the neuronal response to food cues may stimulate the ingestion of energy rich foods and the propensity to become obese.However, functional imaging studies are still limited by a number of still unsolved methodological issues that determine different and very often contrasting results. In particular, differences in the stimuli used and the conditions of presentation during functional imaging and even more importantly, differences in the population sampling may explain the large fragmentation of the results obtained.

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T4:RS1.2

Eating disorders and obesity: Shared comorbidities, risk factors and therapy response

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Eating disorders (ED) and obesity share some biological and environmental risk factors, behaviors and intermediate neurocognitive phenotypes. A controversial theory postulates that ED and obesity form part of a broad spectrum of eating-related and weight-related disorders. Nevertheless, contradictory findings in the literature do not allow differentiating ED according to weight-related phenotypes. Obese patients with a comorbid ED [mainly binge-eating disorder (BED)] have higher eating, general and personality psychopathology and a poorer prognosis. The estimated rate of lifetime obesity in ED is nearly 30%, particularly in BED/BN, and it seems to become more and more prevalent among ED patients (as preceding, coexisting or consequent condition). Patients with lifetime obesity are characterized by later age of onset, higher ED severity and greater general psychopathology when compared with patients without lifetime obesity. Furthermore, a number of clinical and personality differences between obese patients with and without a comorbid ED have been observed. As in the case of obesity, in ED findings from neuroimaging studies suggest that similar neuronal circuits, modulated by dopamine, are activated in addiction and ED by either drugs or hyperpalatable food. These studies have postulated a Food/Eating addiction model. In ED patients, higher food addiction is associated with the bingeing ED subtype (namely ANBP, BN and BED), with more severe eating pathology and overall psychopathology and a greater BMI, but also with specific personality vulnerabilities. The presence of ED in obese patients, and mainly binge and/or purge symptomatology, must be taken into account in clinical practice and research. Although the 'Food Addiction' construct is able to differentiate between ED/Obese subjects and Healthy Eating/Weight controls, it needs to be further explored and tested to understand its implication.

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Friday, 8 May, 2015

T1:RS2 – Lipid Metabolism

T1:RS2.2

Anatomy of adipose organ: News and views

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Gross anatomy dissections of adult mice revealed that subcutaneous and visceral fat depots are joined together to form a unique structure. The anterior subcutaneous part of the organ is quite complex and composed by interconnected depots located in the interscapular, subscapular, deep dorsal cervical, deep ventral cervical and axillo-thoracic areas. The axillo-thoracic area is joined with mediastinic depot by projections following aortic arch arterial branches. Mediastinic fat surrounds aorta and its main branches and, by passing the aortic hiatus, forms a continuum with the inter-renal, perirenal and retroperitoneal areas surrounding the abdominal aorta. Inter-renal fat is continuous with mesenteric fat and periovarian, parametrial and perivesical fat in females and with periureteral and perivesical fat in males. Perivesical fat is connected with the gluteal area of the posterior subcutaneous depot. This last depot is composed also by inguinal and dorso-lumbar areas. Anterior and posterior subcutaneous depots are joined by a thin fat bridge along the lateral parts of the body. Omental depot is separated by the rest of the abdominal fat by the peritoneal ligaments including the spleen. White and brown adipocytes are the main parenchymal cell type of this organ and their prevalence at different sites depend mainly on age, genetic background, nutritional state and environmental conditions. These new anatomical observations, reinforce the concept of adipose organ and open new perspectives on the plasticity of this organ with particular reference to the browning phenomenon and its therapeutic implications.

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T1:RS2.3

Inducibility of triglyceride turnover in white fat– a marker of lean phenotype

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Introduction: White adipose tissue (WAT) is essential for energy storage, while energy expenditure in this tissue normally contributes relatively little to total energy balance. Nevertheless, UCP1-independent activation of lipolysis of triglycerides (TG) and fatty acids (FA) re-esterification (futile TG/FA cycle) in adipocytes in abdominal fat could be involved in prevention of dietary obesity by calorie restriction combined with n-3 FA intake (Flachs et al, Diabetologia 2011), as well as in activation of whole-body lipid catabolism in response to β3-adrenergic agonist (Motillo et al, J. Lip. Res. 2014) in mice.
Methods: To further characterize the role of TG/FA cycle in WAT, we studied its possible activation in response to cold-exposure using obesity-resistant A/J and obesity-prone C57BL/6J mice. Male mice were maintained and killed at 30oC, or after 2 days or 7 days of exposure to 6oC. TG turnover in WAT was assessed using 2H-NMR (see Zouhar et al at this meeting).
Results: Cold-exposure resulted in lower weight of both subcutaneous and gonadal (g) WAT and in decreased TG and NEFA plasma levels at day 2, which normalized at day 7. qRT-PCR analysis of gWAT indicated induction of genes involved in lipolysis, glyceroneogenesis, FA oxidation, and mitochondrial biogenesis at day 2, and increased incorporation of 2H (from 2H2O administered for 40 hrs before killing) into tissue TG at day 7. All these changes were more pronounced in A/J mice, in the absence of detectable induction of UCP1 at the protein level.
Conclusion: Our results support the view that regulated TG/FA cycle activity in gWAT is essential for adrenergically-activated non-shivering thermogenesis and could contribute to genetically-determined differences in propensity to obesity in mice.

T1:RS2.4

ATGL and HSL deficiency contribute to mitochondrial dysfunction and insulin resistance in human adipocytes

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Introduction: The mobilization of fat stored in adipose tissue is mediated by adipose triglyceride lipase (ATGL) and hormone-sensitive lipase (HSL). We have previously shown that adipose tissue lipase expression is reduced in obese insulin resistant versus obese insulin sensitive subjects. Subsequently, we hypothesized that reduced adipose tissue lipase expression may provide less lipid ligands for peroxisome proliferator-activated receptor (PPAR) activation, which in turn disrupts mitochondrial oxidation, contributes to lipid accumulation and insulin resistance in human adipocytes.
Methods: Cell culture experiments were performed, using siRNA-mediated knock-down and pharmacological inhibition, to investigate the role of ATGL and HSL in mitochondrial substrate oxidation, lipid accumulation and insulin sensitivity in human primary adipocytes.
Results: In human adipocytes, ATGL and HSL knock-down decreased mitochondrial respiration and oxidative phosphorylation (OXPHOS) protein content and attenuated palmitate oxidation, which was accompanied by reduced expression of the PPAR target CPT1a. Interestingly, HSL and ATGL gene silencing increased lipid accumulation and reduced insulin-stimulated glucose uptake, which was attributable to disrupted insulin signalling at Ser1101 of the insulin receptor substrate-1 and downstream Akt activation at Ser473. PPAR agonist treatment partly restored these defects.
Conclusion: We demonstrated that reduced ATGL and HSL expression and activity in human adipocytes results in mitochondrial dysfunction and insulin resistance in human adipocytes, which is at least partly mediated by impaired PPAR signalling. Targeting adipocyte lipases may be a promising strategy to improve insulin sensitivity in obesity and type 2 diabetes.

T3:RS3 – Nutrients and Diet Patterns

T3:RS3.1

The impact of food reformulation

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This presentation will offer a public health perspective on the importance of and potential effects of food reformulation with respect to the overall diet of a population. In particular, its potential impact on overweight and obesity rates will be addressed. Review of available research and experiences and policy measures from three different areas with implications for food reformulation will be presented: food symbol labelling, nutrient profiling guiding policies designed to reduce marketing of unhealthy foods and drinks to children, and efforts to mobilize the private sector to take a leading role in health promoting food reformulation. Specifically, this presentation will draw on the experiences from the Nordic Keyhole food symbol designed to make it easier for the public to select healthy products. The symbol, which recently had its criteria revised, identifies food items within given food categories that meet specific criteria with respect to the content of added sugar, salt, fiber and the quality of the fat. In Europe, the WHO Euro Action Network on reducing marketing pressure on children consists of countries having a joint interest in reducing the marketing pressure of high salt, energy-dense, micronutrient-poor foods and beverages towards children. Nutrient profiling systems have been developed in a number of countries in order to assist national policies to identify foods and drinks that should be subject to reduced marketing. The feasibility and potential impact of such schemes will be addressed. An increasing number of countries have introduced initiatives with industry to reduce the use of salt in processed foods. A number of lessons can be learned from these efforts, also with respect to overweight and obesity prevention. In particular, the current experience from Norway where the Minster of Health and Care has established a high level group of business leaders to spearhead the efforts will be presented.

T3:RS3.2

Diets, obesity and metabolic health: Gene-environment interactions

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Gene–environment interaction means that each genotype is responding to environmental variation in a different way. This implies that some people are more susceptible to weight gain than others with similar diets because of genetic differences. It is also possible, that caloric restriction produces a larger weight-loss to a certain group of people. Data pointing to this direction are available from overfeeding and energy deficit experiments in monozygotic twin pairs. However, the subject is still under debate and the molecular mechanisms of it are incompletely understood. We have recently studied a rare sample of obesity-discordant monozygotic twins and observed that development of metabolic disorders due to obesity varies widely. It is possible that the large interindividual differences in

metabolic health in obesity are due to lifestyle. For example, physical activity can contribute to a better metabolic state despite obesity. However, it is not excluded that the differences arise because of genetic reasons. The gene-environment interaction can also be intertwined with epigenetics. This review discusses the gene-environment interactions and touches on epigenetics in the context of diet, obesity and metabolic health. The main focus is on twin studies.

T3:RS3.3

Meal frequency and type 2 diabetes

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Large prospective studies demonstrated that frequent snacking may lead to weight gain and increased risk of type 2 diabetes. The aim of our study was to compare the effect of six (A6) vs. two meals a day, breakfast and lunch (B2) on body weight, hepatic fat content, insulin resistance and beta cell function.

Methods: In a randomized, open, crossover, single-centre study (conducted in Prague, the Czech Republic), we assigned 54 patients with type 2 diabetes treated by oral hypoglycaemic agents (mean diabetes duration 8.1 ± 5.8 years) to follow two regimens of a hypocaloric diet, each for 12 weeks: A6, and B2. Randomization and allocation to trial groups (n=27 and n=27) were carried out by a central computer system. Individual calculations of energy requirements for both regimens were based on the formula: [resting energy expenditure (REE) x 1.5] – 500 kcal. The diet in both regimens had the same macronutrient and energy content. Hepatic fat content (HFC) was measured by proton magnetic resonance spectroscopy. For statistical analysis, 2×2 crossover ANOVA was used.

Results: The intention-to-treat analysis included all participants (n=54). Body weight decreased in both regimens ($p < 0.001$), more in B2 (-2.3; 95% CI: –2.7, –2.0 kg in A6 vs. –3.7; 95% CI: –4.1, –3.4 kg in B2; $p < 0.001$). HFC decreased in response to both regimens ($p < 0.001$), more in B2 (-0.03; 95% CI: –0.033, –0.027% in A6 vs. –0.04; 95% CI: –0.041, –0.035% in B2; $p = 0.009$). Fasting plasma glucose and C-peptide decreased in both regimens ($p < 0.001$), more in B2 ($p = 0.004$ and $p = 0.04$, respectively). Fasting plasma glucagon decreased in B2 ($p < 0.001$), while it increased ($p = 0.04$) in A6 ($p < 0.001$).

Conclusions: Our results suggest that for type 2 diabetic patients on a hypocaloric diet eating larger breakfast and lunch may be more beneficial than six smaller meals during the day.

T4:RS2 – Extreme Weight Loss and Psychological Support

T4:RS2.1

Large weight loss and psychological support

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Significant weight loss and comorbidity improvement after bariatric surgery has unquestionable, positive and substantial effect on several psychological, social and psychopathological issues. However there are certain side effects which may emerge after surgery. Complex psychosocial matters, such as trauma survivorship; severe distress; dissatisfaction with own body after weight loss; blaming obesity for negative life events; problems persistence after surgery in spite of weight loss; social prejudice towards bariatric patients; regime adherence "saboteurs" in social environment. These bothersome events may result into increase or new onset of substance abuse, psychiatric hospitalization, antidepressant use, suicidal attempt, maladaptive eating and emotional eating. The risk period is about 2 years after surgery, during weight loss plateau and regain or after excessive and rapid weight loss. The suitable prevention of mental health worsening after surgery is to submit every patient to psychological assessment before operation. Therefore every candidate has an opportunity to easily reach the psychological or psychiatric support pre- and post- surgery.

T4:RS2.3

Bariatric surgery and hiv

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Background: Performance of bariatric surgery in patients with human immunodeficiency virus (HIV) infection is not well known. The advent of Antiretroviral treatment (ART) has dramatically reduced the progression of HIV/AIDS, so that these patients live longer, with nearly undetectable viral loads , and thus may develop obesity and obesity-related comorbidities. However few data are available regarding HIV-related outcomes after bariatric surgery and its impact in ART tolerability.

Methods: we present here a retrospective of all subjects with HIV infection who underwent the different kinds of bariatric surgery that were usually performed in our University Public Hospital since twenty years. We compared these data to the few reported in the literature.

Results: Between 1996 and 2014 5018 bariatric procedures have been performed in our University Hospital. 12 were performed on HIV-infected patients (0.2%). Among 2905 band placements (LAGB) six have been implanted in HIV patients(3 men, 3 women, mean age 43 years, mean preop weight 119 kg , mean BMI 44 kg/m^2). 5 HIV-infected patients (3 women, one man, mean age 48, mean weight 125 kg, mean BMI 43.25 kg/m^2) underwent Omega loop or Mini -gastric bypass (MGB) among 1779 bypasses. Finally one HIV –infected man had a sleeve in 2014 among 123. Preoperative comorbidities included type 2 diabetes (N=3), hypertension (N=6), dyslipidemia (N=2), sleep apnea (N=5), joint pain (N=3). There were no death but 4 out of the six bands had to be removed for infection, which is much higher rate of band infection than the overall population (1%). At 5 years mean percent EBMIL was 46% after LAGB, 66% after MGB.

Conclusion: On HIV-infected patients Adjustable gastric banding is not advisable. MGB can be safely performed. Results appear to be comparable to those of noninfected patients. Well-controlled HIV infection should not be a contraindication to bariatric surgery. Larger studies will need multicentric trials to have sufficient numbers of HIV- infected patients.

T5:RS2 – Genetics. Epigenetics and Early Feeding Practices

T5:RS2.1

From monogenic to polygenic obesities

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Body weight is a highly heritable trait and genetics of obesity has intensively been studied for decades. A discovery of leptin in 1994 and subsequent molecular genetic studies led to identification of mutations in a few genes with profound effect on body weight. Analyses of these genes have helped to unravel important system maintaining homeostatic control of energy balance. An overview of molecular-genetic and clinical research in the field of rare cases of monogenic obesities will be presented. However, in most individuals, genetic variation plays a major role in determining

individual susceptibility or resistance to environmental factors which influence energy intake and expenditure. Molecular genetic research has focused on the identification of common gene variants affecting body weight. Genome-wide association studies of body mass index using large sample sets have found numerous susceptibility genetic variants and loci. The cumulative effect of these variants is relatively small and could only explain up to 5% of obesity heritability. Rare gene variants, copy number variants, and epigenetic changes have also been suggested as other mechanisms contributing to the heritability of obesity. Fat mass and obesity associated gene is still the strongest known genetic susceptibility locus for obesity. The role of polygenic effects in the mechanism of obesity has been investigated in relation to different possible aspects (e.g. dietary intake, food preferences, eating behaviour, weight changes in response to altered energy balance) but mostly remains unclear. Discovering underlying mechanisms and insights into the biology of polygenic effects on body weight is further needed as it would help target novel preventive and therapeutic strategies.

T5:RS2.2

Intervening early for healthy growth during pregnancy and infancy

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Pregnancy presents a unique époque in life with considerable potential to influence not only maternal health but also the health of the next generation. Maternal nutrition is essential to ensure normal fetal development. Glucose is the main energy substrate for fetal growth and it is now apparent that there is a strong, continuous association between maternal glucose levels below those diagnostic of diabetes and the incidence of macrosomia and its inherent complications. Maternal diet, and particularly its carbohydrate type and content, influences maternal blood glucose concentrations. However, different carbohydrate foods produce different glycaemic responses. The glycaemic index is a method for assessing the glycaemic responses of different carbohydrates. It has been shown that a low glycaemic diet blunts the mid and late pregnancy increase in insulin resistance typically seen in westernized societies. It is postulated that eating primarily high glycaemic carbohydrate foods results in feto-placental overgrowth, excessive maternal weight gain and leads to a predisposition to fetal macrosomia, while intake of low-glycaemic carbohydrates predisposes to normal infant birth weight and normal maternal weight gain. In addition maternal behaviour, lifestyle such as exercise and nutritional supplements can be modified to promote an optimal in utero environment for the fetus. The ROLO study, which was a large RCT of low glycaemic index diet in pregnancy, did not impact birthweight but significant maternal benefits in terms of gestational weight gain and glucose tolerance were observed. The PROPS RCT examined the impact of a probiotic supplement in women with gestational diabetes and found that probiotics attenuated the normal third trimester rise in lipids. These types of pregnancy interventions hold potential to improve pregnancy outcome for the fetus and infant and may even have beneficial effects on childhood health.

T5:RS2.3

Protective and obesogenic early feeding practices

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Objective: To review the protective and obesogenic early feeding practices in the literature and present finding from the Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS (IDEFICS) study.
Methods: Findings from IDEFICS study, including exclusive breastfeeding and introduction of complementary foods will be presented along with a current review of the literature on early feeding practices. IDEFICS is a multi-centre study in eight countries examining risks for overweight/obesity in over 16,000 children. In the IDEFICS cohort, exclusive breastfeeding across the eight countries was examined in relation to overweight. In the Swedish IDEFICS cohort (n=1837) we examined introduction to välling, a uniquely Swedish milk cereal drink (MCD). In both studies, children for whom early feeding practices were described at baseline and weight and height were recorded are included. In the välling study, we included children who had both baseline and two year follow-up anthropometric measures. The children were 2–9 years old at the 2007–2008 baseline and 4–11 years old at follow-up.
Results: Exclusively breastfeeding for 4–6 months was protective against future overweight. Combination feeding was not protective. In Sweden, MCD was consumed by the majority (68.7%) of Swedish children, especially those born to native Swedish parents. MCD consumption was associated with an increased mean BMI-z-score over two years and overweight at follow-up survey.
Conclusions: Early feeding practices contribute to future overweight. Both the type of food and the timing of introduction are important factors.

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T2:RS2 – Adipose Tissue Oxygen Tension and Angiogenesis

T2:RS2.1

Adipose tissue oxygenation in obesity

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Subcutaneous white adipose tissue is a complex metabolic organ that responds rapidly and dynamically to alterations in nutritional state. With an increasing degree of obesity there is a concomitant increase in white adipose tissue dysfunction, moving the tissue toward a proinflammatory phenotype. Low oxygenation (also referred to as hypoxia) of subcutaneous white adipose tissue has been proposed as a key underlying mechanism triggering tissue dysfunction; evidence for this to exist is more compelling in rodent, than human models. Factors that may play a pivotal role in this transition include an increase in cell size (diffusion distance) and a decrease in blood flow per unit tissue mass. Subcutaneous white adipose tissue blood flow is markedly lower in obese than non-obese subjects in both the fasted and fed states. Tissue oxygen partial pressure (pO2) reflects the balance between oxygen delivery and consumption, therefore the supply of oxygen to the tissue plays an integral role in tissue oxygenation. It would be reasonable to anticipate that oxygen delivery to the tissue is compromised in obesity. In humans, subcutaneous adipose tissue oxygenation has been assessed by expression of hypoxia-sensitive genes/protein or direct assessment of oxygen tension and the effects on intermediary metabolism, in lean and obese subjects; findings are inconsistent. Here, I will discuss the different approaches used and the importance of integrative physiological techniques to try and elucidate what defines subcutaneous white adipose tissue hypoxia in humans.

T2:RS2.2

Adipose tissue angiogenesis and metabolic disorders

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The adipose tissue endothelium plays a major role as an active surface of exchange of cells, hormones, nutrients and oxygen between blood and adipocytes. The adipose tissue (AT) produces a large number of adipokines exhibiting angiogenic activity. With obesity, the global angiogenic state of AT rises, an effect to be related to potential hypoxic modulation and/or accumulation of proangiogenic macrophages. This capacity certainly plays an important role to maintain adipose tissue buffering capacity against lipids. It will allow adequate metabolic responses as well as accurate extraction of lipids from the blood but also might be linked to adipogenesis and the formation of new adipocytes. The adipose micro-environment exhibits distinct angiogenic states depending on the anatomic location of the fat mass. An elevated and chronic pro-angiogenic pressure in the visceral adipose tissue could trigger an accelerated aging process or senescence of endothelial cells leading to a pro-inflammatory phenotype together with endothelial dysfunction. Therefore, angiogenesis in adipose tissue may be considered as a beneficial event which in long term could drive metabolic disorders.

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T2:RS2.3

Moderate normobaric hypoxia, a new paradigm for metabolic flexibility

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Tools to quantify health status are required for substantiation of health improvement by nutrition. Health can be defined as being metabolic flexible. Metabolic flexibility can be assessed by challenging homeostasis. This can be done invasively, as is done in the oral glucose tolerance test. It can also be done non-invasively, using indirect calorimetry. We used indirect calorimetry to examine the fasting-refeeding response of mice as a tool to assess the health effect of interventions with diets with varying lipid composition. We also developed a mild oxygen restriction (OxR) challenge to assess metabolic health. In the OxR challenge oxygen availability is reduced from 21% O2 (normoxia) to 12% O2 for a limited period of time and the metabolic effects are examined. OxR was able to reveal a difference in response between adult and old mice that were otherwise healthy. OxR was also applied after short term (5 day) feeding of high fat and low fat diets to mice and showed diet dependent differences in OxR response in liver and white adipose tissue and in serum. While 90% of body oxygen is used in mitochondria and adipose tissue is an important metabolic organ, little is known about the response of white adipose tissue mitochondria to decreased body oxygen availability. This was examined using the OxR challenge and our results will be presented.

Acknowledgement: Several parts of the research presented has been published: Horakova et al (2012) PLoS One. 7:e43764; Duivenvoorde et al (2014) Journal of Gerontology Biological Sciences. DOI: 10.1093/gerona/glu027; Duivenvoorde et al (2014) Pflügers Archiv – European Journal of Physiology, DOI 10.1007/s00424-014-1553-8. This work was supported by EU FP-7 grant agreement no. 244995 (BIOCLAIMS Project).

T8:RS2 – Multidisciplinary Clinical Management

T8:RS2.1

Diabetes management in obesity

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Obesity is tightly linked to type 2 and type 4, but increasingly also to type 1 diabetes, and generally worsens the course of disease by favoring insulin resistance and vascular complications. This requires simultaneous management of diabetes and obesity in most cases. Lifestyle modification aiming at prolonged weight loss and does not only prevents or delays, but can even cause remission of diabetes. Despite ongoing debates on the optimal dietary intervention, overall caloric restriction seems more important than specific nutrient modulation. In overweight and obese patients, glucose lowering treatment should therefore also aim at avoiding weight gain. Metformin, the first-line drug for type 2 diabetes treatment, induces some weight loss, which is more pronounced with GLP-1 analogs and SGLT-2 inhibitors. Novel drugs such as 11ß-hydroxysteroid dehydrogenase inhibitors can specifically reduce nonalcoholic fatty liver along with minor weight loss in patients at high risk of diabetes. Finally, bariatric surgery not only markedly improves obesity, but also proves successful in reversing type 2 diabetes.

T8:RS2.2

Management of obesity-associated arterial hypertension

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Obesity and arterial hypertension are additive in terms or cardiovascular risk. There is hope that new vascular biomarkers may prove useful in individual risk prediction in these patients. Obese patients require more medications to have their blood pressure controlled and are prone to treatment resistant arterial hypertension. Data from good quality clinical trials on the utility of weight loss in the management of hypertension is surprisingly scarce and the available data is rarely translated into clinical practice. Information on how to combine weight loss interventions with antihypertensive medications, which are ultimately required in many patients, is virtually non-existent. Antihypertensive treatment recommendations for lean hypertensives may not be simply extrapolated to obese hypertensives and have to take into account the metabolic comorbidities, particularly insulin resistance and dyslipidemia. Given their positive metabolic profile, renin angiotensin system inhibitors are a good choice for the treatment of obese hypertensive patients. Yet, most patients will require antihypertensive combination therapy. Dihydropyridine calcium channel blockers are a good choice as combination partner. From an antihypertensive point of view, low dose thiazide diuretics are an excellent combination partner for renin angiotensin system inhibitors while potential metabolic side effects may occur. Beta-blockers while efficiently lowering blood pressure can lead to significant weight gain. In obese patients not achieving target blood pressure with first line drugs, mineralocorticoid receptor antagonists may be particularly useful. However, there is a substantial risk for hyperkalemia, particularly in patients with type 2 diabetes mellitus.

T8:RS2.3

Lipids

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University and University General Hospital, Prague, Czech Republic Hyperlipoproteinemias and dyslipidemias (HLP and DLP), representing one from the most important risk factors for cardiovascular diseases (CVD), occur very often in patients with obesity. However, there is no equation between HLP and DLP and obesity. Many patients with severe HLP (before all patients with familial hypercholesterolemia) are even slim. (The hypercholesterolemia in patients with anorexia is a different story). The lipid disorder in patients with obesity is characterized by hypertriglyceridemia, low HDL-C and increased concentration of small dense LDL particles. It is named atherogenic dyslipidemia (ADLP), lipid triad or atherogenic lipid phenotype. ADLP occurs very often in combination not only with obesity, but also with hypertension and diabetes mellitus type 2. This combination of several risk factors is often described as a "Metabolic Syndrome" which is connected with elevated cardiometabolic risk. The treatment of the patient with obesity and ADLP has to be complex, it is necessary to influence all risk factors. The non-pharmacological treatment represents the first step in the therapy of ADLP. Pharmacological treatment is based on statins and it is supported by evidence based medicine. The combination of statins with fibrates is also recommended in patients with ADLP. Niacin is no more available in Europe and the data for omega-3 fatty acids are not very convincing. Despite the fact, that ADLP represents a very important risk factor for CVD, the first and main target for the HLP/DLP treatment is LDL-C. For the treatment of elevated LDL-C levels high dose statins are drugs of choice. The future of the lipid lowering therapy is closely connected with very promising group of PCSK-9 inhibitors. Mipomersen and lomitapide are already approved for the treatment of homozygotes of familial hypercholesterolemia. CETP inhibitors and also alfa/delta PPAR agonists have to be evaluated in clinical trials.

T8:RS2.6

Obstructive sleep apnea and obesity

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Obstructive sleep apnea (OSA) is characterized by load snoring and repetitive closure of the upper airway during sleep with increased respiratory efforts to overcome airway closure, leading to arousals and sleep fragmentation. Risk factors for OSA include male sex, age, genetic predisposition, cranio-facial anatomical differences, menopause and namely obesity. In the Wisconsin Sleep Cohort, one standard deviation increase in BMI was associated with a four-fold increase in OSA prevalence. Longitudinal observations have confirmed both that weight gain predisposes to a worsening apnea/hypopnea index and that weight loss works in the opposite direction. Obesity is thought to cause OSA through a number of mechanisms: a) Increased parapharyngeal fat can change airway anatomy, b) changes in neural compensation and the stability of the respiratory control centers can reduce airway patency and increase collapsibility, c) reduction of lung volume caused by abdominal obesity can reduce upper airway traction and increase collapsibility, d) obesity may be involved in chemoreflex regulation through mediators such as leptin. On the other hand, there are several reasons why subjects suffering from OSA have more difficulties losing excess weight. The current treatment of OSA focuses on alleviation of symptoms by increasing airway patency during sleep through positive airway pressure, oral appliances, surgery of the throat and maxillo-mandibular bones, changes in sleep position and reduction of the overweight. Intensive dietary and lifestyle intervention is effective in both weight loss and improving OSA. Data supporting bariatric surgery is less methodologically robust but indicates substantial weight loss usually followed by improvement in OSA. There is no doubt that obesity is the major modifiable risk for OSA and offers an excellent target intervention from both a clinical and public health point of view.

Acknowledgement: Supported by Charles University grant PRVOUK P26/LF1/4

Saturday, 9 May, 2015

T6:RS1 – Societal and health economics (taxation)

T6:RS1.1

Lessons from denmark

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Recently, in 2011, Denmark introduced a tax on saturated fat, abandoned again in late 2012.

The fat tax distinguished itself from health promoting taxes in general by targeting a nutrient which occurs naturally in foods. In this presentation we cast light on some important aspects that have to be considered when food taxation is used as a health promoting tool; substitution, price-setting structures and in-equality. Substitution: Based on household scanner data we estimate the impact of the tax on consumption of saturated fat and other non-targeted dietary measures (e.g. salt intake, fruit and vegetable consumption). The resultant changes in dietary quality are then used as inputs into a comparative risk assessment model to estimate the effect of these changes on Non-Communicable Disease and mortality in Denmark. We also consider the substitution patterns between different types of foods and supermarkets and discount stores. Price-setting structures: The retail sector might use the tax as a tool to improve their competitiveness or to increase revenue, which might either increase or decrease the effect of the instrument. We consider patterns in the price-setting structures for selected foods within different types of stores. In-equality: Due to higher prevalence of NCD's, lower social classes will gain the most health benefits if they change behaviour and reduce their intake of detrimental nutrients. But despite higher price-sensitivity in this group, the resources and/or knowledge to change behaviour might be lacking, which would imply a higher tax-burden. We use the above mentioned household scanner data to assess whether the fat tax was regressive/progressive in health and economically for different social classes, genders and age groups. In conclusion we consider the main reasons for the abolishment of the Danish fat tax in late 2012 despite clear evidence of positive health effects.

T6:RS1.3

Price policy for healthy diet-lessons from hungary

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Dietary habits and the general health status of the Hungarian population are among the worst in Europe. Public health product tax (PHPT) was introduced in 2011 taxing non-staple food products that carry proven health risks when consumed. The objectives of PHPT were to promote healthier nutrition, encourage food reformulation and to increase revenues for public health. The first impact assessment referred to the one year period after the introduction of taxation, it included a representative survey of 1000 people, an on-line manufacturers' survey and analysis of economic statistical data. 26–32% of the consumers decreased the intake of the products subject to PHPT. The price increase was the major driving force behind the intake reduction although high percentage of the consumers (22–38%) reduced the intake because increased health consciousness. People with bad self-perceived health status were on average twice as likely to decrease consumption of foods subject to PHPT compared to

people with good health. 40% of the responding food producers carried out reformulation, 30% of them totally removed the unfavourable components. In conclusion PHPT has achieved its public health aims as the population reduced the consumption of product subject to PHPT, food manufacturers started reformulation, and the estimated tax revenue was almost fully realized. Several questions remained unanswered regarding the consumption changes after the first impact assessment. As part of the National Nutrition and Nutrition Status Survey, 2014, the second impact assessment seeks to answer whether the consumption changes are maintained long term and influenced by nutritional and socioeconomic status and obtains information on the substitution of some products affected by PHPT.

Acknowledgement: Research related to this abstract was funded by the WHO Regional Office for Europe

T8:WS1 – Multidisciplinary Treatment in Children and Adults

T8:WS1.2

Multidisciplinary treatment in adults

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Obesity is a chronic disease with multifactorial etiology and complex mechanisms, associated with a high rate of morbidity and mortality. The main principle of the clinical management is the long-term patient-centered intervention, aiming to reduce the global health risk through weight loss and its maintenance over time, lifestyle optimization and the control of associated co-morbidity. The success of the intervention implies a multifactorial and thus a multidisciplinary approach represented by structured programs that include optimal hypocaloric diet, sustained physical activity, cognitive-behavioural psychotherapy, specific pharmacotherapy (where available) and bariatric surgery. Existing data supports the effectiveness and clinical utility of using the multidisciplinary approach. A trained medical team, a functional obesity treatment network, common protocol and financial support, are important requirements for a succesful intervention. Besides the medical treatment individualized to each patient, any intervention aiming to reduce the social and environmental determinants of obesity, including factors related to the physical environment, social values, technology and the economy, is beneficial. Therefore, health care providers should colaborate with political and social departments in order to ensure an optimal multidisciplinary treatment of people with obesity.

Keywords: obesity, multidisciplinary treatment

T8:WS1.3

Pregnancy and obesity: The experiences of obese women receiving antenatal care

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Introduction: Maternal obesity has implications for both mother and baby including increased health risks from gestational hypertensive disorders, caesarean section and stillbirth. Despite the increasing prevalence of maternal obesity, little is known of the experiences of these women within the health care system. The aim of this research was to investigate the views and attitudes of obese pregnant women receiving antenatal care.
Methods: A qualitative study using individual interviews was undertaken at a large teaching hospital in South-eastern Australia after obtaining approval from the relevant Human Research Ethics Committees. Women were recruited through the antenatal clinic at the major public hospital, and sixteen pregnant women with a BMI of 30 kg/m^2 or above agreed to participate. The semi-structured interview protocol was developed after a review of the literature and after conducting focus group interviews with obstetricians and midwives. Questions explored the lived experiences of the women around being pregnant at their body size, and their perceptions of how this affected their antenatal care. Interviews were audio recorded, transcribed verbatim and data analysed for recurrent themes using Interpretative Phenomenological Analysis.
Results: While the experiences of each participant differed, four themes emerged: Judgemental attitudes of staff; Poor communication exists; More resources required; Maternal motivation is the key.
Conclusion: Obese pregnant women lack knowledge of the health risks associated with their pregnancy, and there was no consistent approach to the issue by health professionals. Consistent but non-judgemental support is required to assist obese pregnant women achieve recommended nutrition and weight gain goals.

Acknowledgement: Rebecca Shepherd, Alice Downing and Kathryn Lawson assisted with recruitment and conducted some of the interviews as part requirement of the research component of the Master of Nutrition and Dietetics at the University of Canberra.

T8:WS1.4

Bariatric surgeon´s qualification – how important is it

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Introduction: Differences in requirements for bariatric surgeon qualification may be noted among countries & different obesity/bariatric scientific societies. Clinical outcomes after bariatric procedures vary widely across hospitals and surgeons and proficiency of the operating surgeon may be an important factor underlying such variation.
Methods: Overview of qualification requirements of the American / ASMBS/ society, and the International Federation /IFSO/ are confronted with „real life" results reported from large centres.
Results: The ASMBS requirements vary due to individual US State policy. There´s a treshold of min.100 stapled procedures.The IFSO requires min. of 200 procedures to warrant surgeon´s qualification. In our high volume bariatric center >600 ops./year, close correlation between surgeon´s qualification/years of experience/volume and re-admission/complication rates was found. Surgeons with >10 years bariatric experience and with >50 complex operations/year exhibit significantly lower /1.1 +- 0.2% vs 11.2 +-7.8% $P < 0.001$) re-admissinon/complication rates. Similar data were reported by the Michigan group (Birkmeyer et al.).The bottom quartile of surgical skill, as compared with the top quartile, was associated with higher complication rates (14.5%vs.5.2%, $P < 0.001$) and higher mortality (0.26%vs.0.05%, $P = 0.01$).
Conclusion: The official bariatric qualification requirements, as well as the practical skills vary widely. The findings suggest that greater surgical skills are associated with fewer postoperative complications and lower rates of reoperation and readmissions after bariatric surgery.

SPECIAL SESSIONS

Wednesday, 6 May, 2015

EASO OMTF Teaching Course: Multidisciplinary Treatment in Adults

Anti-obesity drugs today

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There are five anti-obesity drugs for long-term use that are approved by FDA in USA: orlistat; lorcaserin; phentermine/topiramate; bupropion/naltrexone and liraglutide while in Europe EMEA approved orlistat and recommended use of bupropion/naltrexone. Orlistat is a potent and selective inhibitor of pancreatic lipase that reduces the intestinal digestion of fat. Lorcaserin is a selective 5-HT 2C receptor agonist that specifically activates 5-HT 2C receptors relative to other 5-HT receptor subtypes. Activation of the serotonin-2C receptors in the hypothalamus reduces the food intake. Phentermine and extended–release topiramate was approved in September 2012. Primary mechanism of phentermine is appetite suppresion while topiramate has an effect on energy-balance. Fixed-dose combination of naltrexone (opioid receptor antagonist) and bupropion (dopamine and norepinephrine reuptake inhibitor) has a synergistic effect in reducing appetite and induction of weight loss. Liraglutide in a dose of 3 mg is a once-daily injectable glucagon-like peptide-1 (GLP-1) analogue that regulates appetite and food intake by decreasing hunger and increasing feelings of fulness and satiety after eating. Liraglutide was approved in USA by FDA at the end of December 2014 for treating obese subjects with BMI of 30 or a BMI of 27 with weight-related comorbidities, together with exercise and a reduced-calorie diet. Recently it was reported a discovery of unimolecular, dual incretin coagonist (GIP and GLP-1) with proven efficacy across animal and human models of obesity and diabetes. It was suggested that the polytherapeutic drug strategy in the future could possibly rival bariatric surgery concerning efficacy, safety, achievement and duration of weight loss.

EASO PPHTF and WHO Europe Join Workshop: Primary Prevention of Overweight and Obesity

WHO plans for action on primary prevention of obesity

Breda J.[1]

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Promotion Through the Life-course, WHO Regional Office for Europe Unhealthy diets and excess body weight are leading risk factors for NCDs. Of the six WHO regions, the European Region is the most severely affected by NCDs; cardiovascular disease, diabetes, cancer and respiratory diseases together account for 77% of the burden of disease and almost 86% of premature mortality.A new European Food and Nutrition action plan has been adopted and a Physical Activity Strategy is being developed for the European region; where on average 1 in 3 children are overweight or obese. Among adults, more than half of the population is obese in 46 of the 53 countries. There is a strong social gradient observed within countries in overweight, obesity and NCDs, with low socio-economic groups most affected. In terms of regional disparities, the challenge is universal but more rapid changes (e.g. in obesity prevalence) are now observed in eastern European countries. Childhood obesity is also particularly prevalent in southern European countries. Priority concerns include an overall excess consumption of energy, but also excessive consumption of saturated fat, trans-fats, sugar and salt. The new action plans on diet and PA thus aims to provide guidance to Member States on the types of policy options available. This is informed by the rapidly expanding evidence base to inform policy development. Action has tended to be taken in the area of providing information rather than making changes to day-to-day environments (e.g. nutrition labelling; price of food; marketing to children, environment and PA). The overall neede comprehensive approach will be discussed togehter, with a core package of policies likely to be most effective.

WHO Session: Population Trends

WHO.1

Childhood obesity trends in bulgaria

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Introduction: Given the high recent prevalence of childhood overweight and obesity in Bulgaria we aimed to investigate their trends among children aged 0–18 years from 1998 to 2013.
Methods: Data were analysed from 5 cross-sectional studies conducted on nationally representative samples of children in different age: 7–18 years old (1998 and 2011); of age 7 years (2008 and 2013) and children 0–5 years (2007). Height and weight were measured in the all surveys, in some studies waist circumferences (WC) were measured. BMI-for-age were estimated using IOTF cut-offs and WHO definitions. Percentile distributions of WC in sex-gender groups were calculated.
Results: Using IOTF cut-offs, the prevalence of overall overweight of children 7–18 years old showed an increasing from 11.8% in 1998 to 23.4% in 2011, as obesity has raised from 3.2% to 8.4%, The highest rising in overweight rate was observed in 7–9 years children (overweight 14.1%, incl. obesity 3.5% in 1998 vs. overweight 30.2%, incl. 11.8% obesity in 2011). It was observed a parallel significant increasing in the median values of WC in both genders. The overweight aroused still in early childhood – in children aged 1–4 years it was 10.8%, incl. 2.8% obesity. Data for 7 years old children recorded a trend for significant increasing of overweight and obesity in the 3 survey periods (1998, 2008, 2011) but the study in 2013 showed a stabilization of the rates in boys and decreasing of those among girls (overweight 29% in 2011 vs. 25.3% in 2013, obesity 13.2% vs. 9.7%). The medians of WC have decreased in both genders. The rates of overweight and obesity defined by WHO references were much higher in all age-gender groups but the trends were the same.
Conclusion: The prevalence of overweight and obesity among children of age 7–18 years were more than doubled in the period 1998–2011. The findings from a study on 7 years old children in 2013 suggested that childhood obesity levels were starting to plateau or even fall.

WHO.2

Obesity in the 21st century in czech republic

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Prevalence of obesity is changing in last last years. We have analyzed data from five surveys from 2000 to 2014 – using the same methods in representative population sample of Czech Republic. We have found the evidence of progression in obese and overweight group from 2000 to 2008 and later stabilization. . There are more than 34% overweight and 22% of obese in Czech population in 2014. No statistically significant difference according to place where people live was found. It seems that number of obese and overweight is stable during last five years. Number of underweight (BMI under 18) increases in 18–20 years old female group. Waist circumference increases in male – more than 60% are in high (102 cm) or moderate (94 cm) risk of metabolic complications. The average increase of weight gain is 0.25 kg per year from the age of 18 years. The most critical period for weight gain is in 7th decade of life. Although the weight is stable at last five year, physical activity decreased more than we expected but consistently with increase of waist circumference. Prevalence of diabetes is 6 x times more than in lean subjects. (18% vs. 3%). Hypertension 5 times (45% vs 8%) but 86% overweight and 27% obese male do not perceive it as problem. The most important predictor of low BMI in adults are regularly physical activity in adolescent age, regularly meal and consumption of fruits and vegetable. Otherwise most important predictor of high BMI are fastfood consumption , car ownership and consumption of sausages. Physical activity reduces incidence of diabetes 21% vs 6% and hypertension 50% vs.33% regardless to BMI.

Conclusion: There are several explanations of stabilization of population BMI respectively incidence obesity and overweight. Obese people die sooner than overweight and lean and life expectancy increased about 7–8 year in Czech republic and old people often increase weight . May be, that also our recommendations and actions deliver first results…

Acknowledgement: Supported of project „Live Healthy“ of General Health Insurance Company

WHO.3

Childhood overweight in Norway: A nationally representative study

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Introduction: The Norwegian Child Growth Study provides unique opportunities for monitoring trends in childhood overweight by social class and other demographic characteristics in Norway.

Methods: Nurses at 125 schools measured height, weight and waist circumference in 10221 8 year-olds during three waves of data collection in 2008/2010/2012. Overweight (incl. obesity) was classified according to IOTF cut-offs for children. Abdominal obesity was defined as weight-to-height ratio ≥0.5. Additionally, the study have a longitudinal dataset with 13 repeated measurements from birth of children born in 2002 until 2010 (N=3172).

Results: For sexes combined, the overall prevalence of overweight (incl. obesity) was 16.2% and abdominal obesity was 8.4%. In total, there was no increase during the period 2008–2012. However, significant differences in childhood overweight were found by geographic areas, maternal education and parental marital status. The analysis of the longitudinal dataset showed that the risk of being overweight at 8 years starts at a very early age.

Conclusions: The prevalence of overweight among children aged 8 in Norway have stabilized in recent years. In order to encourage good child health, prevention should start at an early age, and be aware of vulnerable groups to prevent social inequality.

WHO.4

WHO projections in adults to 2030

Breda J.[1], *Jewell J.*[1], *Webber L.*[2], *Galea G.*[1]

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[2]UK Health Forum

The prevalence of obesity has increased dramatically across Europe over the past 3 decades. Because obesity is a major risk factor for prevailing NCDs such as coronary heart disease and type 2 diabetes have become one of the biggest public health challenges of this century. How this epidemic will unfold in the next twenty years is uncertain since surveillance and monitoring data are often lacking and future projections in each country have not been carried out. Using available data on adult Body Mass Index prevalence, normal weight, pre-obese overweight and obesity trends were projected to 2030 for all 53 World Health Organization Euro-region. By 2030, overweight was predicted to increase in 41 of the 53 Euro-region countries. For obesity, increases were predicted in 47 and 34 countries for males and females respectively by 2030. The initiative also highlights the value of statistical modelling of trends and makes the case for good quality national surveillance data by which to make more accurate estimates, since the majority of data were self-reported so obesity rates are likely to be underestimated.

Thursday, 7 May, 2015

T8: CS1 – Should Children, Elderly and Adults who are Moderately Obese be Offered Surgery?

T8:CS1.1

Should children, elderly and adults who are moderately obese be offered surgery?

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The published literature documents the effectiveness of bariatric surgery in adult patients with a BMI <35. According to the IFSO Position Statement about Bariatric Surgery in Class I obesity the use of surgery should not be extended in children/adolescents or elderly with BMI<35 kg/m^2. Data about efficacy and safety of surgery in class I obese adolescents are lacking. As recommended by the ASMBS pediatric committee best practice guidelines, the selection criteria for adolescents being considered for bariatric procedure should include a BMI≥35 kg/m^2 with major co-morbidities or with a BMI ≥40 kg/m^2 with minor co-morbidities. The optimal weight for lowest mortality appear to be in the overweight/class I obesity range in the elderly and there is no clear guidance regarding intentional weight loss in older adults, as it is unclear that benefits outweigh risks. However, the BMI with its failure to account for gender, fitness, age or race, is not a reliable and fair approach to the denial of surgery to patients for whom this is the only effective treatment. These surgical decisions should be guided, as for other diseases, by the patients' states of health and the risk/benefits of the operation.

T8:CS1.2

Bariatric surgery in children, elderly, and moderately obese: No

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The major arguments favoring bariatric surgery against lifestyle intervention are the much greater success rate and the better improvement of obesity associated comorbidities. On the other hand bariatric surgery is associated with relevant side effects in the short-term (e.g. preoperative mortality, necessity of re-surgery) and in the long term (e.g. irreversible side effects such as polyneuropathy without supplementation). Therefore the pros and cons of bariatric surgery have to be judged in every case and the following issues should be considered: a) General The number of obese adults is too high to be treated by bariatric surgery. Therefore, this cost-intensive intervention should be offered primarily to the high risk group of extreme obese humans. Treatment adherence after bariatric surgery is necessary to avoid side-effects. Eating behavior has to be changed after bariatric surgery otherwise relevant side effects occur and the long-term effect of bariatric surgery is limited. Lifestyle intervention has no proven side effects. b) Specific concerns in different age ranges: 1) Children The success rate of lifestyle intervention in children is higher than in adults. Quality of life improves even without success in lifestyle intervention. Children cannot judge the consequences of an irreversible bariatric surgery procedure. The responsibility for an irreversible surgery procedure has forensic aspects. There is an increased risk of suicide and unwanted pregnancy after bariatric surgery in adolescents. Bariatric surgery is not suitable in most extreme obese adolescents due to low treatment adherence. 2) Elderly Obesity in the elderly is not associated with a decreased life span. Comorbidities of obesity likely have no life span reducing effect.

T1/T2:CS1 – Central or Peripheral Regulation in Obesity and Insulin Sensitivity?

T1/T2:CS1.1

Central or Peripheral Regulation in Obesity and Insulin Sensitivity: The need to Focus on Central Regulations

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In general, research directed at the 'periphery' should be considered as equally important as that directed at 'central regulations'. The issue here is about relative focus in a time window that represents the forthcoming years – say till 2020 at least. It is argued that in order to understand the mechanisms leading to obesity, insulin resistance and cardiometabolic diseases that will eventually have the greatest therapeutic impact, the major focus over the coming years should be directed at 'central regulations'. The case is put forward that cellular and molecular information gathered at the 'periphery' has been spectacular over the past two decades, but there has been no significant advances in the identification of key components of the several control systems that regulate body weight, body composition and insulin sensitivity. Knowledge relative to 'central regulations' need to catch-up since lessons from the past suggest that major advancements pertaining to our understanding of the pathogenesis of obesity and its cardiometabolic risks only occur when research at the periphery has been fully integrated with that of 'central regulations', rather than focused only at the periphery per se.

T1/T2:CS1.2

We need to focus on peripheral mechanisms/insulin sensitivity

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Obesity is a complex disease with an abnormal adipose tissue expansion because of an alteration of energy balance due either to an impaired CNS control of food intake or to a reduction of energy expenditure due to a reduction of muscle insulin sensitivity and oxidative capacity with a channelling of fuel substrates towards adipose tissue. Insulin resistance could therefore appear with a different time sequence in the different tissues accordingly with the origin of caloric overflow. In both situations the expansion of adipose tissue due to energy excess could be limited by the appearance of insulin resistance. A failure in the capacity to store energy efficiently is the major cause of ectopic lipid accumulation, inflammation and insulin resistance because of the capacity of muscle and liver to fully metabolize fatty acids is insufficient to match the excessive fatty acid uptake by cells. Adipose cells could be found also within skeletal muscle bundles and fibres and this inter-muscular adipose depot (IMAT) is increased in obesity and is strongly related with the appearance of insulin resistance. Moreover, in obesity IMAT is infiltrated with macrophages which produce pro-inflammatory cytokines that affect skeletal muscle insulin sensitivity in a paracrine way. The expanding adipose tissue mass and the related metabolic abnormalities linked with insulin resistance and inflammation could cause muscle insulin resistance. The majority of insulin-stimulated glucose uptake occurs in muscle and therefore factors that acutely modulate insulin sensitivity, anticipating weight gain are cantered primarily on nutrient sensing mechanisms within muscle and their interactions with the insulin-signalling. These sensing mechanisms can detect changes in nutrient availability and provide a means of regulating mitochondria function and insulin sensitivity. Defects in the sensing of energy status, and the ability to respond appropriately, result in metabolic diseases such as obesity.

Controversy Session: Should Weight/ Adipose Tissue Loss or General Health be the Treatment Goal?

CS.1

Controversy session: We should focus on body composition

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Obesity is a chronic disease defined by body fat excess. BMI is usually considered as a measurement of obesity magnitude in clinical practice. Nevertheless, BMI is not a good indicator of body fat on an individual basis. When body composition is compared with BMI values it becomes evident that up to 80% of overweight patients and 29% of those with normal BMI results exhibit body fat excess, and should be considered as obese. Patients with non-obese BMI but with high fat mass display a pattern of cardiovascular risk factors similar to that of those anthropometrically obese, indicating that body composition represents an essential factor to diagnose obesity having clinical consequences. Therefore, we are missing a significant number of obese patients if we only base the diagnosis in BMI calculation. On the other hand, fat distribution also plays an important role in mediating not only cardiovascular, but also other complications such as sleep apnoea, diabetes, hormonal dysfunction and cancer, emphasizing the importance of measuring waist circumference to detect abdominal obesity. According to this, visceral adipose tissue excess is related to mortality, indicating that represents a source of many mediators involved in the pathophysiology of obesity complications and life expectancy. Fur-

thermore, body composition measurement is a very useful tool to evaluate the quality of weight loss, and this is especially evident following bariatric surgery, when some patients achieve significant reductions in BMI but increasing fat percentage at the same time. Discrepancies between body weight and body composition also takes place in aging, where sarcopenia and fat excess are clinically relevant. These findings prove that evaluating body composition and fat distribution should be incorporated to clinical practice in order to better diagnose obesity and to improve the assessment of risks, treatment indications and therapeutic outcomes.

Acknowledgement: Collaboration of all components of the Obesity Unit is very much appreciated.

CS.2

Should weight/adipose tissue loss or general health be the goal? We should focus on general health

Tsigos C.[1]

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Obesity is a global epidemic that is associated with a large spectrum of negative health outcomes, many of which can be improved by weight loss. Hence the current guidelines for weight management recommend weight loss for all obese adults. However, there may be subpopulations of obese persons, such as the elderly and the metabolically healthy or highly fit, that may not be adversely affected by their excess adiposity or may not necessarily benefit from weight loss. Also, despite the established association between obesity and cardiovascular risk, obese individuals with cardiovascular disease tend to have better prognosis than normal weight individuals, presenting an "obesity paradox". Furthermore, weight loss in obese elderly or patients with established cardiovascular disease and type 2 diabetes appears to increase mortality risk. Also, given the difficulty to maintain weight loss in the long-term, it is not clear whether the benefits of weight loss outweigh the potential detrimental effects of weight cycling. Thus, obesity is a complex condition that is not always associated with adverse health outcomes and weight loss by itself may not be the most appropriate recommendation for all obese individuals. Therefore, setting the goal of maintaining a healthy lifestyle with improved diet quality and high level physical activity and cardiorespiratory fitness may be more appropriate in some groups of obese individuals, than focusing on weight loss alone.

EASO/IFSO-EC Young Investigators United (YIU) Scientific and Awards Session

YI.1

Bariatric operations that do not work

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Over the 50-year lifetime of bariatric surgery operative procedures have become obsolete, either because they were ineffective and based on a wrong (or absent) disease model, or because they were hazardous, whether effective or not. New hopefuls have come and gone. Yet other procedures have persisted, despite an initial basis on a wrong model. The paradoxical success of these procedures has led to revisions of the disease model and to new understandings of their mechanism of action – for example the "regulatory" effects of various bypass procedures. Nonetheless there are also failures of apparently understood operations. Among them the most intriguing paradigm is that of weight regain after regulatory surgery, partly because it implies an adaptive homeostatic response, expressed by some individuals more than others. As obesity grows and as bariatric surgery enters middle age these failures challenge us to better research into physiological responses, into the perceived role of behavioural factors and into the relationship between the two.

YI.2

Prevention and management of obesity united

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Nearly 400 years after William Harvey discovered the blood circulation, we are still discovering the field of prevention. It is only less then 40 years ago that Sir. Geoffrey Rose argued that a population-based approach targets the real, underlying determinants of impaired health. Only less than 20 years ago, Swinburn and Egger described the obesogenic environment with their ANGELO-framework, and about 10 years ago, Kremers described his EnRG-framework hypothesizing an interaction between individual en environmental determinants of energy-balance related behaviours. To date there is no doubt regarding the impact of obesity prevention. Evidence is increasing on the successes of community-based programs, including EU-programs, counteracting the real underlying determinants, supporting professionals and individuals, and leading to decreases in obesity. At the same time evidence shows the success of obesity management approaches. But, those successes are hard to maintain, especially when attention for health promotion is lacking. To have a real impact on the population's health, the field of prevention and the field of management should be united. Hence, obesity management is only successful within healthy environments. And, as health behaviour is also the key element in obesity management, obesity management approaches should benefit from prevention expertise. Whereas our parents are trained to treat the disease, our new generation of clinicians is (or should be) trained to deal with the individuals' own responsibility to live healthily. Uniting obesity prevention and management is an extremely important direction for Young Investigators United.

Friday, 8 May, 2015

Special Session: Stigma, Discrimination and Health Related QoL

SS.1

The psychology of anti-fat bias in an obesogenic environment. Is behavioural justice required?

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The rise in interest in anti-fat bias parallels the recognition of obesity as a public health problem and a general failure to bring about change. Calls to 'wage war' on obesity and using stigma to change obesity-relevant behaviour have been challenged on human rights and social justice grounds. This presentation will address a series of questions. Namely, what is anti-fat bias? Who holds anti-fat attitudes? What is the resultant experience of those who are obese? What are the consequences of anti-fat bias? What is behavioural justice and how could it be applied to obesity? Anti-fat bias is apparent in the prevailing attitudes to and beliefs about obesity and the people who are obese. The main components are dislike (the aesthetics of appearance), judgements of health (weight as a metric of health; weight change indicative of health improvement/decline), and morality (blame, lack of willpower). The overarching emotion is fear, as the stereotyping of fat is a mainly negative portrayal of character, social exclusion, and poor health. Such views are widely held, implicitly by all, and explicitly by the majority of general public, health professionals and people who are obese. Anticipated and actual discrimination and victimization experiences are evidenced in questionnaires, diary records and qualitative interviews with children and adults who are obese. The associated disparity and disadvan-

tage is evidenced in all areas of life; education, the workplace, health care, socially, and in increased psychological distress. Behavioural justice sits within a broader social justice view of equality and valuing diversity. Specifically, it points to inequalities in access to health-promoting resources. The obesogenic environment requires attitudinal as well as physical adjustment.

SS.3
Familial weight talk and obesity stigma

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An important part of interventions in childhood obesity is the engagement of family members and open discussion about children's weight. However, parents are often reluctant to talk about their children's weight, with health care professionals and with children themselves. One potential reason for parental reluctance to discuss children's body weights is the pervasiveness of stigmatizing attitudes towards obesity, which encompass blame directed at the parents of obese children. Stigmatizing attitudes are transmitted directly and indirectly through multiple channels, including the media, family members, peers, school policies, and even clinicians. The aim of this talk is to review the literature on obesity stigma as transmitted within the family. The talk centres on adults' framings of links between their childhood experiences of becoming aware of their own weights, and their attitudes and practices concerning weight talk as adults. Specifically, this presentation examines whether their own childhood experiences of weight talk influence parents' and grandparents' decisions not to talk to their children or grandchildren about weight. The talk concludes with a review of recent research on effective childhood obesity prevention and intervention messages that protect children's self-esteem.

SS.4
Is stigmatization getting worse as overweight becomes the norm?

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Weight stigma increased over the last decades of the 20th century as prevalence rates of obesity rose substantially. However, for the recent years, when prevalence rates of obesity showed smaller gains, time trends of weight stigma are unclear. Weight stigma includes pervasive negative stereotypes and attitudes about obesity that can extend to actual discrimination, evidenced in multiple domains of life. Furthermore, stigmatized overweight and obese individuals often have the tendency to internalize weight stigma, and thus stigmatize themselves. Such a self-stigma has been found to be highly psychopathologically relevant and associated with lowered quality of life. This study sought to examine time trends of stigmatizing attitudes and, for the first time, of self-stigma. Data from four representative surveys of the German population (N = 7000) were analyzed for time trends between 2005 and 2015. The results did not show any change in stigmatizing attitudes from 2005 to 2012. A total of 23% of the population held definitive stigmatizing attitudes toward obesity, with higher proportions in those with less education and higher age. Similarly, the extent of self-stigma did not show any variations from 2012 to 2015 and was found in 13% of overweight and obese individuals, especially in women and in those of lower age. These results suggest a temporal stability of stigmatization and self-stigma over the recent years, as overweight and obesity show only slight increases. Levels of stigmatizing attitudes and self-stigma are substantial as overweight remains to be the norm.

Saturday, 9 May, 2015

T2:CS2 – Lipotoxicity and Skeletal Muscle: Are Ceramides to Blame?

T2:CS2.1
Lipotoxicity and Skeletal Muscle: Are Ceramides to Blame? YES

Amati F.[1]

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Switzerland Lipotoxicity is one of the hypotheses being explored to explain the mechanisms by which obesity leads to insulin resistance (IR). Also known as the lipid metabolite theory, lipotoxicity occurs when fatty acid in excess of the oxidative needs spillover into harmful pathways of non-oxidative metabolism. Within the muscle fibers, it has been shown that it is not intramyocellular triglicerides that confer IR but particular lipids intermediates, among which ceramides and diacylglycerols (DAG). Since the 90s, animal models established these relationships and presented mechanisms to explain the deleterious effect of these metabolites. Indeed, distinct disruptions of the insulin-signaling cascade have been found for DAG and for ceramides. Recent human studies are still not agreeing on the role of DAG, with controversies and dissimilar results among different studies. At the contrary, the negative effect of ceramides and their role in the induction of skeletal muscle IR seems to be consistent across human studies.

T2:CS2.2
Lipotoxicity and Skeletal Muscle: Are Ceramides to Blame? No

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Fat accumulation in skeletal muscle is an early hallmark in the development of type 2 diabetes mellitus. Indeed, type 2 diabetic patients have elevated levels of intramyocellular triglycerides (IMTG), which is highly correlated with insulin resistance. However, endurance trained athletes also have high amounts of IMTG despite being very insulin sensitive. This so-called athletes paradox has learned that it is not the triglyceride accumulation in the muscle cell per se that induces insulin resistance. Rather, research in the last decade has revealed several mechanisms by which fatty acid intermediates can interfere with insulin signaling. These fatty acid intermediates include diacylglycerol, fatty acyl-CoA, acylcarnitines and ceramides, but so far no uniform mechanism is availalbe that explains how fat accumulation in the muscle leads to insulin resistance. More recent data also point towards an important role for lipid droplet dynamics in skeletal muscle insulin sensitivity. Thus, in skeletal muscle lipid droplets are coated with PLINs, which are involved in regulating turnover of lipid. Overexpression of PLINs in muscle can prevent lipid-induced insulin resistance, and endurance trained athletes have high PLINs levels. It can therefore be concluded that not one single fatty acid intermediate – including ceramides – is responsible for skeletal muscle lipotoxicity, but rather a complex regulation of lipid droplet turnover determines lipotoxicity.

T2:CS2.3

Leptin administration stimulates the myogenic action of irisin through nitric oxide-dependent mechanisms, but reduces its browning effect on subcutaneous fat in mice

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Introduction: Obese leptin-deficient ob/ob mice show high adiposity and reduced muscle mass with leptin administration promoting weight loss and inducing muscle accretion through PGC-1α-dependent mechanisms.
Objective: Our goal was to analyze in vivo and in vitro the effect of leptin on FNDC5, a novel PGC-1α-dependent myokine that is synthesized and cleaved to form irisin that induces white adipose browning.
Methods: Twelve-week-old male wild type and ob/ob mice were divided in three groups as follows: control, leptin-treated (1 mg/kg/d) and pair-fed.
Results: Leptin administration was associated with increased gastrocnemius weight and cell surface area, higher Pgc1a and Fndc5 transcript levels and a modest increase in serum irisin. Leptin stimulated Fndc5 mRNA expression through nitric oxide (NO)-dependent mechanisms in murine C2C12 myocytes and activated both basal and irisin-stimulated myogenesis, as evidenced by increased myocyte proliferation, higher myogenin and myonectin transcript levels together with lower mRNA expression of myostatin and dystrophin and the muscle atrophy-related factors MuRF1 and MAFbx. Interestingly, leptin reduced Fndc5 expression in a NO-independent manner in murine differentiated subcutaneous adipocytes. Furthermore, leptin counteracted the irisin-induced up-regulation of both brown (Ucp1 and Cidec) and beige (Tmem26) adipocyte-specific genes and the increase in UCP1-positive cells.
Conclusion: Taken together, our results provide evidence for a regulatory role of leptin on FNDC5/irisin, favoring muscle accretion but reducing fat browning.

T2:CS2.4

Impact of high fructose diet on skeletal muscle metabolism in healthy men

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Introduction: Changes in lifestyle, characterized by increased consumption of calorie-rich foods and reduced energy expenditure are major determinants of the current epidemic of obesity. Also the increase of fructose intake representing about 8% of total energy intake in Europe and USA seems to reinforce obesity status.
Methods: Ten healthy normal weight first-degree relatives of type 2 diabetic patients were submitted to two different diets during 7 days: (a) control diet and (b) high fructose diet (3.5g fructose/kg fat-free mass/day). Insulin sensitivity was determined after each diet using a euglycemic hyperinsulinemic clamp. Energy metabolism and skeletal muscle gene expression were evaluated after each diet.
Results: High fructose diet increased significantly body weight (+0.9kg), intrahepatocellular lipids content (+79%), intramyocellular lipids content (+26%) concomitantly with a shift in the use of substrates as energy fuel toward preferential oxidation of carbohydrates instead of lipids. Hepatic insulin sensitivity index significantly decreased. Transcriptomic analyses on skeletal muscle highlighted profound effects on mitochondria potentially involved in the metabolic shift.
Conclusion: A short term fructose overfeeding diet leads to deleterious metabolic alterations classically observed in metabolic syndrome. Deciphering the mechanisms responsible for the rapid metabolic shift and mitochondrial damage is currently under investigation using a combination of human hepatocytes and myotubes cell models.

Special Session: EASO/EFAD Roundtable, Dietary guidelines for the prevention and treatment of Obesity in Europe – What do the dietitians use?

An overview of dietary guidelines used in europe for obesity management

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Several European countries have introduced multidisciplinary evidence based guidelines for obesity management over the past decade. An important part of these guidelines concerns dietary guidelines. On the other hand, general guidelines for healthy nutrition for the population are widely used as a treatment tool in obesity management. Our research question was: which dietary guidelines are used in obesity management in European countries, and how specific are they? We carried out a survey among the EFAD members and asked them to send in the multidisciplinary guideline that is in use. Guidelines in English, French, German, and Dutch/Flemish were studied. For guidelines in different languages we asked a summary in English. We studied the guidelines to find: which countries have guidelines; do these guidelines contain dietary guidelines; are these used by health professionals for obesity management; how specific are the dietary guidelines; how do these guidelines differ from the general guidelines? Finally, conclusions are drawn on the content: do all guidelines emphasize the same nutritional aspects, for instance on fat, fibre, alcohol? And, if not are these differences based on evidence?

Acknowledgement: We wish to thank all associations of dietitians and dietitians in national obesity networks for their contribution to the collection of data.

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ORAL SESSONS

Wednesday, 6 May, 2015

T1/T2:OS1 – Organ Cross Talk

T1/T2:OS1.1

Effects of gut microbiota manipulation by antibiotics on host metabolism in obese humans

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Background: Recent studies indicate that gut microbiota manipulation affect metabolic health but human data are scarce. Here, we investigated the effects of gut microbiota knock-down by antibiotics on insulin sensitivity, metabolic parameters and inflammation in obese humans.
Methods: 57 male subjects (BMI 31.2 ± 2.6kg/m^2, age 59 ± 7y, HOMA-IR 4.5 ± 0.2) with impaired glucose metabolism were allocated randomly to amoxicillin (AMOX; broad-spectrum), vancomycin (VANCO; aimed at gram positive bacteria) or placebo (PLA) for 7 days, 1500mg/d. Hepatic and peripheral insulin sensitivity (hyperinsulinemic-euglycemic clamp, [6,6–2H2]-glucose), postprandial energy expenditure and substrate oxidation, gut permeability, systemic inflammation, plasma leptin and GLP-1 concentrations were measured. Adipose tissue and skeletal muscle biopsies were collected for microarrays. Feces was collected for analysis of microbiota composition and energy excretion.
Results: AMOX and VANCO had no significant effect on insulin-mediated suppression of endogenous glucose production and insulin-stimulated glucose disposal compared to PLA. However, insulin-stimulated non-oxidative glucose disposal (glycogen storage) significantly decreased after AMOX compared to PLA (-3.2 ± 1.5 vs. 2.6 ± 1.6µmol/kg/min, p = 0.017). Antibiotics did not affect energy intake and expenditure, substrate oxidation, gut permeability, plasma LPS-binding protein, IL-6, IL-8, TNF-a, leptin and GLP-1 concentrations. Feces and biopsy analyses are currently ongoing.
Conclusion: The present study demonstrates for the first time that robust knock-down of intestinal bacteria by antibiotics has no significant effects on insulin sensitivity, host energy metabolism and systemic inflammation, but decreases insulin-stimulated glycogen storage in obese men.

T1/T2:OS1.2

Dose-dependent effects of thiazolidinediones in dietary obese mice

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Introduction: Thiazolidinediones (TZD) are used for treatment of insulin resistance in diabetic patients; however, the therapy is associated with unwanted side effects. The insulin-sensitizing action of TZD is thought to result from activation of PPARg in white adipose tissue, associated with the secretion of adiponectin and consequent stimulation of AMP-activated protein kinase (AMPK) in other tissues. Our results suggested that the effects of TZD, administered at sub-optimal doses with respect to the improvement of insulin sensitivity in mice, may involve a change in plasma lipid profile resulting from modulation of hepatic lipid metabolism, independent of the adiponectin–AMPK axis. The aim of the present study was to further characterize the dose-dependent mechanism of TZD action.
Methods: C57BL/6 mice were assigned to dietary treatment using: (i) a high fat diet (HF); (ii) HF diet with "low" dose of rosiglitazone –10 mg/kg diet (HF+R10); (iii) HF diet with "high" dose of rosiglitazone – 100 mg/kg diet (HF+R100).
Results: Rosiglitazone in a dose-dependent manner induced high molecular weight form of adiponectin in plasma. Only the R100 mice exhibited significantly higher activity of the hepatic AMPK a2 isoform. Conversely, the R10 mice showed elevated hepatic lipid content, upregulated expression of genes associated with de novo lipogenesis, namely FAS and SCD-1. These mice also exhibited specific enrichment of palmitoleate in plasma lipids.
Conclusion: Different mechanisms contribute to the insulin-sensitizing effect of TZD, depending on the dose of the drug. New strategies for treatment of diabetic patients may be based on the use of sub-optimal doses of TZD in combination with other interventions.

T1/T2:OS1.3

Insulin regulates hepatic triglyceride secretion and lipid content via the brain

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Introduction: Hepatic lipogenesis is increased in obesity and insulin resistance. Thus, a key mechanism of the liver to prevent steatosis is its ability to increase the export of triglycerides (TG) packaged as very low–density lipoproteins (VLDL). Insulin action comprises of direct effects on peripheral organs, but also of indirect effects that are mediated via the CNS (1). Systemic hyperinsulinemia decreases VLDL production by the liver, yet it is unknown whether brain insulin can independently regulate TG flux.
Methods: To study the role of brain vs. systemic insulin signaling on hepatic TG secretion, we performed tyloxapol infusion studies in male Sprague Dawley rats during systemic or isolated brain hyperinsulinemia. The latter was accomplished by infusing insulin or vehicle for 4 hrs into the 3rd ventricle (ICV).

Results: ICV insulin infusion increased hepatic TG secretion compared to controls (2.59 ± 0.28 vs. 1.80 ± 0.2 μmol/kg/min; P = 0.039; n≥11 per group). To the contrary, a hyperinsulinemic euglycemic clamp decreased TG flux (0.85 ± 0.05 μmol/kg/min; P = 0.020; n=4), which is in agreement with prior reports (2). Furthermore, prolonged ICV insulin infusion in rats via osmotic minipumps reduced hepatic lipid content as assessed by non–invasive ^{1}H–magnetic resonance spectroscopy (1.25 ± 0.15 vs. 0.75 ± 0.12; % water signal; P = 0.018; n=8 per group) and lipid profiling independent of changes in hepatic de novo lipogenesis. Conversely, mice that lack the insulin receptor in the whole brain had reduced hepatic TG flux compared to littermate controls, which was again assessed by tyloxapol studies (154 ± 6 vs. 126 ± 12 μmol/kg/h; P = 0.038; n≥9 per group).
Conclusion: These studies identify brain insulin signaling as an important permissive factor in hepatic VLDL secretion that may protect against hepatic steatosis.

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T1/T2:OS1.4

High-fat diet causes early cardiac effects before the onset of obesity. Sirt1 is involved in cardiac responsiveness to high-fat diet.

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Introduction: High-fat diet-induced obesity leads to development of cardiac dysfunction through molecular mechanisms poorly known. The aim of this study is to elucidate the early events in cardiac dysfunction caused by a high-fat diet, before massive alterations due to obesity and indirect mechanisms of heart damage take place. Moreover, we analyzed the role of Sirt1, a major mediator of gene regulation in response to metabolism, in this process.
Methods: Wild-type (wt) and Sirt1+/- mice were fed a high-fat diet for a short (5 weeks) term. Systemic metabolic and hormonal profile and cardiac molecular alterations were determined.
Results: Short-time high-fat feeding caused a similar mild increase in body weight and triglyceridemia in wt and Sirt1+/- mice. The high-fat diet suppressed the expression of lipid catabolism (PPARα target) gene expression in the hearts of wt mice, but not Sirt1+/- mice. Pro-inflammatory genes were induced and estrogen-related receptor-alpha (ERRα) target genes were suppressed in the hearts of wt fed the high-fat diet, but not in Sirt1+/- mice. We found the formation of a complex between PPARα and Sirt1 in wt mice under high-fat diet conditions which might account for suppression of the ERRα pathway. Sirt1 reduction impairs the formation of this complex and potentiates the binding of PPARα to NF-kB p65 subunit thereby mediating inhibition of pro-inflammatory pathways and induction of PPARα target genes.
Conclusion: Short-term high-fat diet causes metabolic and inflammatory alterations in heart, and Sirt1 is critical for mediating these early cardiac alterations. The capacity of Sirt1 to interact with transcriptional regulators such as NF-kB and PPARα appears to be involved in the early cardiac responsiveness to a high-fat diet.

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T1/T2:OS1.5

Colonic short-chain fatty acids infusions promote fat oxidation and improve metabolic parameters in overweight males

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Short-chain fatty acids (SCFA), formed by microbial fermentation of dietary fiber, are believed to be involved in the etiology of obesity and diabetes. The aim of this study was to investigate effects of colonic administration of physiologically relevant mixtures of SCFA on human substrate and energy metabolism. In this randomized, double-blind, crossover study, twelve overweight males (BMI ≥ 25 kg/m^2 ≤ 34.9 kg/m^2) were included. Subjects underwent four test days, with rectal administration of a SCFA mixture high in acetate (HA), high in propionate (HP), high in butyrate (HB) and a placebo (PLA). The primary outcomes fat oxidation and energy expenditure (EE) were measured via an open-circuit ventilated hood system. Blood samples were collected during fasting and after a 75g glucose drink (postprandial), before and 30, 60, 90 and 120 minutes after colonic infusions. Distal colonic infusions with all SCFA mixtures increased fasting fat oxidation, compared to PLA ($p < 0.001$). Fasting EE increased after HA and HP, compared to PLA ($p < 0.05$). HP and HB enhanced fasting PPY concentrations ($p < 0.05$); and all SCFA mixtures increased postprandial PYY concentrations ($p < 0.01$). Fasting free glycerol concentrations were reduced after HB, compared to PLA ($p < 0.05$). Fasting plasma IL-1β concentrations decreased after HA, compared to HP and PLA ($p < 0.05$). Colonic infusions did not affect plasma glucose, GLP-1, TAG and FFA concentrations. This study showed that colonic infusions of SCFA mixtures, in concentrations and ratios reached after dietary fiber intake, beneficially modulate whole body substrate metabolism, with a pronounced increase in fat oxidation, EE and plasma PYY. Increasing colonic SCFA concentrations may yield new mechanisms for treating or preventing metabolic disorders.

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T1/T2:OS1.6

Restoration of insulin sensitivity in obese condition by chronic stimulation of the abdominal vagus nerves.

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Introduction: Alternatives therapies to improve insulin resistance in obese patients are eagerly investigated because of the relative failure of the behavioral approaches and the irreversibility of bariatric surgery. Since the vagus regulates the afferent limb of insulin secretion (Blat et al, 2002), vagal stimulation represents an attractive tool. Surprisingly, vagal nerve stimulation (VNS) has never been investigated for restoration of insulin sensitivity in obese.
Methods: 16 adults mini-pigs were made obese (87 ± 5.3 kg) by 3 months obesogenic diet supplied at 200% of the metabolic requirement. Once obese, silicon cuff incorporating two electrodes were implanted around the dorsal and ventral abdominal vagus using laparoscopy. In half of the

animals, these electrodes were connected to a double channel current stimulator placed under the skin (stimulated group) while the other half received only a sham device (sham). After 6 months of VNS (Val-Laillet et al, 2010), the animals were tested for insulin sensitivity using an euglycemic-hyperinsulinemic clamp. Body composition was also investigated using CT scan. Vagal tone was extracted from heart rate variability in conscious animals.
Results: Insulin sensitivity index was significantly larger in stimulated versus sham group (3.8 ± 0.51 vs 2.3 ± 0.24, $p < 0.01$) as a result of larger glucose infusion rate (1.9 ± 016 vs 1.4 ± 0.16, $p < 0.01$). The glycemia was not different between groups at the onset of the clamp. The increased insulin sensitivity was not associated with changes in body composition neither for the subcutaneous nor the abdominal fat contents. Similarly, the LF/HF ratio indicative for vagal tone was not significantly different between groups (2.1 ± 0.03 vs 2.0 ± 0.07 for Stimulated vs Sham, $p > 0.05$).
Conclusions: Insulin sensitivity was improved in obese animals after VNS. This improvement is not associated with changes in body composition or in vagal tone.

Acknowledgement: We acknowledge the technical support of R Comte (UMR Pegase) for the insulin dosage.

T3:OS1 – Eating Behaviour and Patterns

T3:OS1.1

Uncontrolled and emotional eating as behavioural pathways in genetic susceptibility to obesity

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Introduction: Appetite has been hypothesized to be one mechanism mediating the effects of genes on weight. We examined whether two appetitive traits, uncontrolled and emotional eating, mediated the associations between known obesity-related genetic variants and adiposity.
Methods: Participants were from two population-based Finnish cohorts: 25–74 year-olds (DILGOM, N=3834) and 21–26 year-old twins (FinnTwin12, N=985). Genotyping was performed using the cardio-metabochip in DILGOM and the Illumina 670 chip in FinnTwin. A weighted polygenic risk score (PRS) of 90 BMI-related loci was calculated based on a recent meta-analysis of the GIANT consortium. BMI and waist circumference (WC) were measured in a health examination. The TFEQ-R18 was used to assess uncontrolled eating (UE) and emotional eating (EE). Age and sex adjusted analyses were first conducted separately in each cohort and the results were then combined using fixed-effects meta-analysis.
Results: The combined estimates indicated that the PRS was positively associated with BMI (β=0.16, $P < 0.001$), WC (β=0.13, $P < 0.001$) and appetitive traits (β=0.08 for UE; β=0.06 for EE, $P < 0.001$). The highest PRS quartile was related to 1.40 (95%CI 1.12–1.74) and 1.36 (95%CI 1.09–1.71) increased odds of reporting high UE and EE compared with the lowest quartile. Mediation models indicated that UE and EE partly mediated (βindirect=0.023–0.024, $P < 0.001$) the associations between the PRS and BMI, with similar effects for WC.
Conclusion: Genetic predisposition to obesity may partly exert its effects through two appetitive traits reflecting lack of control over eating and eating in response to negative emotions. Targeting these eating behaviours, as well as the food environment, may increase success in obesity prevention and treatment.

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T3:OS1.2

Appetite and food intake patterns in children

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Introduction: Food responsiveness (FR) and satiety responsiveness (SR) are genetically influenced appetitive traits that are implicated in excess weight gain. They are hypothesised to act through energy intake, but no studies have examined associations with food intake in daily life. We predicted that higher FR would be associated with more frequent activation of the urge to eat and hence higher meal frequency, and lower SR with slower meal offset and hence larger meal size.
Methods: Data were from 1102 families (n=2203 children) from the Gemini twin birth cohort. Appetite was assessed with the FR and SR scales from Child Eating Behaviour Questionnaire when children were 16 months. Diet diaries (3 days) were completed by parents when children were 21 months. Diary analysis was done using the 'Diet In Nutrients Out' (DINO) programme by the Medical Research Council Human Nutrition Research Unit (Cambridge, UK). Meal size (total kcals per eating occasion) and meal frequency (eating occasions per day) were determined from analysis of timed diary data. Associations between appetite and meal size/frequency were analysed adjusting for age, gender, gestational age, and clustering by family.
Results: Higher FR was associated with more frequent meals (B=0.13; SE=0.04, $p = 0.001$) but not with meal size ($p = 0.42$) or total daily energy intake (-0.55). Lower SR was associated with larger meal size (B=-11.38; SE= 2.10, $p < 0.001$) but not with meal frequency ($p = 0.15$). Lower SR was associated with higher total energy intake (B=-19.40; SE= 8.52, $p < 0.02$).
Conclusion: SR and FR predicted different consumption patterns, both of which potentially predispose to overeating. Food-responsive children eat more frequently, and less satiety-responsive children eat more on each eating occasion. Different strategies may be required for reducing the impact of FR and SR on overconsumption and weight gain.

Acknowledgement: Recruitment and data collection was funded by Cancer Research UK. Food diary analysis was carried out by MRC Human Nutrition Research (Cambridge, UK) and funded by Danone, UK

T3:OS1.3

Impact of high plasma acyl ghrelin level on eating behaviour in obese women

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Introduction: Acyl ghrelin, a stomach 28-amino acid peptide, is an orexigenic hormone stimulating appetite and food intake. In obesity, circulating plasma ghrelin levels are lower than in lean population. Surprisingly, some of obese subjects exhibit high ghrelin levels (HGL). We hypothesized that HGL in obesity could enhance hunger and induce eating disorders compared to low ghrelin levels (LGL). The aim of that study is to assess the association between ghrelin levels, hunger, and eating behaviour in obese women.
Methods: 55 obese women were selected and divided into 2 groups according to their acyl ghrelin levels (7.51 ± 5.85 pg.mL^{-1} in LGL and 65.77 ± 45.04 pg.mL^{-1} in HGL; $p < 0.0001$). We assessed eating disorders using the EDI-2 (Eating Disorders Inventory-2) and TFEQ (Three Factor Eating Questionnaire). Anxiety and depression were assessed by HAD scale. Biological and anthropometric profiles were also investigated.
Results: Anthropometric and metabolic parameters were not different between groups. Anxiety and depression scores were similar. Cognitive restraint, uncontrolled eating and emotional eating scores were no statistically different between groups. Hunger score was similar (3.38 ± 0.43

vs. 4.51 ± 0.46; p > 0.05; VAS), respectively between LGL and HGL groups. Among the 11 subscales of the EDI-2 questionnaire, 10 were not different between HGL and LGL groups, notably the impulse regulation (2.37 ± 0.79 vs. 2.43 ± 0.61, respectively; p > 0.05) and the bulimia (2.22 ± 0.53 vs. 1.93 ± 0.61 respectively) subscales. However, HGL group scored significantly higher than LGL group on Drive for Thinness (9.30 ± 0.99 vs. 6.46 ± 0.83 respectively; p = 0.03).
Conclusion: A higher plasma ghrelin level in obesity is not associated with altered eating behaviour phenotype.

T3:OS1.4

Timeline over which compensatory mechanisms are activated during weight loss with a very-low calorie diet

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Introduction: Diet-induced weight loss (WL) activates several compensatory mechanisms, such as increased hunger and reduced fullness feelings, reduced resting metabolic rate (RMR) and increased exercise efficiency (Ef). Little is known regarding when these mechanisms are activated and how they respond with progressive WL. The aim of this study was to determine the timeline over which compensatory mechanisms (changes in subjective feelings of appetite, RMR, Ef) are activated during WL with a very-low calorie diet (VLCD).
Methods: Twenty-two adult participants (11 men), with an average BMI of 38 ± 4.4 kg/m^2 underwent 8 weeks of VLCD followed by 4 weeks of weight maintenance. Body weight, RMR, Ef (10, 25 and 50W) and subjective feelings of appetite (in fasting and for 2.5h after a meal) were measured at baseline, day 3, when participants lost 5% and 10% of their baseline weight, at week 9 and at week 13.
Results: Significant WL (1.8 ± 1.7kg) was seen by day 3, and progressively at each subsequent time point, with an average reduction in body weight of 19 ± 4% at week 9, which then stabilized. RMR fell significantly after 5% WL, but then stabilized. Ef (all intensities) increased significantly for the first time at week 9 and then stabilized. A significant increase in fasting hunger and desire to eat was observed by day 3, but not at other time points. AUC for prospective food consumption was significantly reduced at week 9, but not other time points.
Conclusion: The magnitude of WL required to activate the different compensatory mechanisms in response to a VLCD seems to differ: 5% WL for a reduction in RMR and 19% WL for an increase in Ef. Fasting hunger and desire to eat changed only transiently at day 3 and AUC for prospective food consumption transiently with 19% WL.

Acknowledgement: Funding: Liaison Committee between the Central Norway Regional Health Authority (RHA) and the Norwegian University of Science and Technology (NTNU). Regional Center for Morbid Obesity, Department of Surgery, St. Olav Hospital (Trondheim, Norway).

T3:OS1.5

Normal weight obesity in adolescents – associations with health behaviours and metabolic risk factors

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Introduction: Adolescents often focus on physical appearance rather than health. This may affect their health behaviours. Normal weigh obesity (NWO) applies to individuals with normal body mass index (BMI), but excessive body fat. Our aim was to explore metabolic disorders and lifestyle in this group.
Methods: Randomly selected 18 year old students (n = 191) from three highschools in the capital area in Iceland, with BMI within normal range (18.5–24.9 kg/m^2) participated. Waist circumference was measured and bodycomposition assessed with dual energy X-ray absorptiometry (DXA). Aerobic fitness was measured with maximum oxygen uptake test on treadmill. Dietary habits were evaluated with 24-hour recall and questionnaires about diet and lifestyle, and blood samples were taken. NWO was defined, according to Lohman's criteria; BMI within normal range and percentage body fat above 17.6% in males and above 31.6% in females.
Results: In total 40% (n=76) were defined as NWO, thereof 60% (n=46) were male participants. Fewer participants with NWO ate breakfast on a regular basis, consumed vegetables frequently, slept enough, and were physically active compared with participants without NWO. No difference was detected between the two groups in energy-, macronutrientor micronutrient intake. Mean difference in aerobic fitness was 3.4 ml/kg/min between the groups in favor of the non-NWO group (P = 0.01). NWO was positively associated with having one or more risk factors for metabolic syndrome (Odds Ratio OR=2.2; 95% confidence interval CI: 1.2, 3.9) and high waist circumference (OR=7.4; 95%CI: 2.1, 25.9).
Conclusion: High prevalence of NWO was observed in the study group. Promoting healthy lifestyle with regard to nutrition, sleep and physical activity in early life should be emphasized.

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T6/T7:OS1 – Working with Perception and Stigma

T6/T7:OS1.1

Obesity and Discrimination – A Systematic Review

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Background: Research on obesity has shown that stigma often accompanies obesity on different societal levels. Obese individuals are often faced by a variety of prejudice and stereotypes. It has not been systematically evaluated, whether and to what extent negative attitudes translate into objective determinants of inequality, e.g. discrimination.
Methods: A systematic literature search was conducted, using Medline, ISI Web of Knowledge and The Cochrane Library without time limits. Studies pertaining to (a) prevalence estimates and (b) forms of weight-based discrimination towards obese individuals were included.
Results: 19 studies were included, indicating that weight discrimination is common and pervades many aspects of life for individuals with obesity. Often, no conceptual distinction between attitudes and discrimination were made. Experimental findings were in accordance with non-experimental findings, documenting that disparate treatment was visible on a behavioural level and not only a subjective perception. Findings from community-based studies reported prevalence estimates between 6.1% and 60.7%. A female gender and an increased body weight (BMI>35) were associated with higher rates of weight-based discrimination.
Conclusions: The results provide evidence that discrimination in obesity and its negative consequences are highly relevant issues within society and need to be the focus of potential legislative interventions.

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T6/T7:OS1.2

The impact of labelling on acceptance of obesity

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Introduction: Visual exposure to obese body weights has been shown to increase acceptance of heavier forms. However, despite rates of obesity increasing dramatically since 1972, acceptance of heavier body weights has not become common, as obesity is still a widely stigmatised condition. The way in which obesity is typically portrayed could explain why increased exposure to obesity may not have resulted in a greater acceptance of heavier body weights. The aim of the present work was to examine whether labelling heavier body weights as 'obese' has an effect on whether exposure to heavier body weights reduces negative attitudes towards the obese.
Methods: 276 Participants were visually exposed to obese or healthy weight males with either no attached label, a label describing the males' weight status or a condition in which attention was drawn to the males' weight, before being asked to make judgements about the acceptability of an obese person's weight.
Results: Exposure to obese males in the absence of a label increased acceptance of the obese person's weight, relative to exposure to healthy weight males ($p < .05$). There was also a significant interaction, whereby exposure to obese males labelled as obese did not increase acceptance of the obese person's weight. There was little evidence that exposure to obese males increased acceptance of an obese person's weight when attention had been drawn to weight during visual exposure.
Conclusion: Visual exposure to obese body weights reduces negative attitudes towards the obese. However, the context in which exposure occurs is of importance. These findings support the theory that the way in which obesity is typically portrayed in popular media will not increase acceptance of heavier body weights as a result of visual exposure.

T6/T7:OS1.3

The weight of knowing you are overweight: Perceived weight status and risk of future weight gain in us and uk adults

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Introduction: Identifying oneself as overweight is presumed to act as a prerequisite to successful weight management efforts. However, the psychological burden attached to the label of 'overweight' may actually propagate further weight gain. Our objective was to determine the effect that perceiving oneself as 'overweight' has on risk of future weight gain.

Methods: Three longitudinal cohort studies were used; National longitudinal study of adolescent health (Add Health), Midlife in the United States (MIDUS) and the National Child Development Study (UK cohort). 3,899 US adults (Add Health), 3,372 US adults (MIDUS) and 6,740 UK adults participated. Primary measures were body mass index (BMI) and perceived weight status.
Results: Perceiving oneself as being 'overweight' at baseline was significantly associated (both before and after adjusting for potential confounders) with an increased risk of weight gain in the Add Health cohort ($B = 1.056$, $SE = .175$, $p < .0001$), the MIDUS sample ($B = .376$, $SE = .134$, $p = .005$) and the UK sample ($B = .802$, $SE = .117$, $p < .001$). The association between perceived overweight and weight gain was mediated by stress induced over-eating; perceiving oneself as overweight was associated with a greater likelihood of over-eating in response to stress, which in turn predicted weight gain.
Conclusion: Perceiving oneself as being 'overweight' is counter-intuitively associated with an increased risk of further weight gain. The stress and stigma associated with perceiving oneself as 'overweight' may be more detrimental than beneficial to weight management in our current social climate.

T6/T7:OS1.4

Outcomes of a Health-At-Every-Size intervention in local health centers across the province of Quebec

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Introduction: Health-At-Every-Size (HAES), a non-dieting approach, promotes the regulation of eating based on the decrease of dietary restraint, and the appropriation of internal cues of hunger and satiety (intuitive eating), as well as self-acceptance. Controlled studies have demonstrated that HAES interventions improve physiological and psychological functioning of participants. The Québec government recently implemented a HAES intervention called "Choisir de Maigrir?" in local health and social services centers (HSSC). In the context of scarce resources devoted to public health, the aims of the present study are to document the efficacy of this intervention and to verify whether the core dimensions of HAES are actually associated with putative benefits. Outcomes were core dimensions of the HAES approach (restraint, intuitive eating, body esteem), eating behaviors, psychological distress, and body mass index (BMI).
Methods: Within 33 HSSC, 216 women receiving the HAES intervention and 110 women on a waiting list were tested. Participants completed self-reported questionnaires before and after the intervention, as well as one year later.
Results: Linear mixed models analyses computed according to a group (HAES vs. control) by time (baseline, post-test, follow-up) design revealed significant group by time effects for restraint, intuitive eating, body esteem, eating behaviors, and psychological distress but not for BMI. Positive changes were maintained in the long-term in the HAES group. Increase in intuitive eating was associated with generalized improvement among HAES participants in the short and the long term, whereas changes in restraint were related only to short-term changes in eating behaviors.
Conclusion: The HAES intervention showed sustained improvement on core HAES dimensions, psychological profile and eating behaviors. Intuitive eating seems to play a central role in the beneficial changes that were observed among participants.

T6/T7:OS1.5

Changing adolescent health behaviours: Empirical evidence and practical ways forward

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Introduction: Adolescents are a key target for intervention programmes. However, adolescents are very difficult to reach. This paper asks what we might consider when designing more effective interventions in the future and, coming from an ethical and philosophical perspective, suggests that interventions ought to focus on adolescent self-understanding and decision-making rather than focussing on particular health behaviours.
Methods: The paper draws on empirical studies and meta-analyses to identify features of successful interventions, models from developmental and health psychology, research into positive youth development, and philosophical insights into value formation and autonomy development.
Results: There are many influences on adolescents that mean health considerations are unlikely to weigh heavily in their decisions: the invisibility of future health, adolescents' interactions with others and the environment, social practices, and their attitudes and values. Adolescents prioritise many things over health, for example, worries about fitting in. They operate within systems of consumerist norms, in the grip of marketing and brand culture. They have heightened body image, self-consciousness and a desire to make autonomous choices. Parental influence gives way to the influence of peer networks. These factors are often bound up with risk-taking behaviour. Adolescence is a distinctive part of development

that requires specific intervention design strategies. The paper argues that an ecological approach enables deeper understanding of the challenges that intervention designers face, and suggests ways to improve intervention strategies. **Conclusions:** Consideration of the complex influences on adolescent health behaviours offers a better understanding of why they are hard to reach. Indications are that interventions should focus less on individual health behaviour outcomes. Instead, successful interventions may include those that focus on personal and social skills.

T6/T7:OS1.6

Governing 'obesities' – interdisciplinary obesity research in practice

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Background: Obesity is a complex problem demanding complex solutions. This proposal stands at the centre of the large interdisciplinary research consortia "Governing Obesity" at the University of Copenhagen. Researchers from different parts of biomedicine, the social sciences and the humanities seek to develop novel means and methods to treat and prevent obesity and its consequences.The expectation is that these interdisciplinary collaborations will lead to effective interventions at the societal and individual level. A part of our involvement in this initiative has been to investigate how interdisciplinary obesity research is done in practice and how scientific claims and translational aspirations are interpretated and negotiated across disciplines. **Method:** Through ethnographic fieldwork including focus groups and interviews, it is explored how obesity as a research object is operationalised in interdisciplinary research collaboration.
Results: Interdisciplinary collaboration does not necessarily work upon a common perception of what obesity is, epistemological openness or data integration. Rather, we argue that complexity-oriented interdisciplinary collaboration raise questions about where to locate the "interdisciplinarity" and its effects. We find that an qualification of interdisciplinary obesity research requires an attendance to of how different "obesities" come to co-exist in different and new ways through collaboration. Interdisciplinary obesity research in practice demands: 1. strategic balancing of academic investments between individual, collective goals. 2. the ability to embody and maintain monodisciplinary identities and indexes. 3. a clear articulation of what constitutes research practice standards for each participant. These points can guide the development of evaluation measures for intersdiciplinary research.

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Thursday, 7 May, 2015

T1/T2:OS2 – Adipose Tissue Plasticity and Oxidative Phenotype

T1/T2:OS2.1

Targeting miR-125b-5p to fight obesity via browning of white adipose tissue

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The recent discovery of functional brown adipocytes in adult humans has led to the consideration of their use to increase energy expenditure in the treatment of obesity. Furthermore, in rodents and humans, islands of brown adipocytes, termed "brite" (brown-in-white) adipocytes, emerge within white adipose tissue (WAT) after cold exposure or β3-adrenergic receptor stimulation. The identification of factors which trigger an increased mass/activity of human brite adipocyte is of great interest for the treatment of obesity. One of these factors is microRNA known to interfere with the translation of messengers in proteins. Using hMADS cells, able to differentiate into human white adipocytes and convert into functional brite adipocytes, we identified miR-125b as down regulated upon this conversion. In human and rodent, miR-125b expression was down regulated in BAT compared to WAT. miR-125b mimic transfection in hMADS brite adipocytes decreased basal oxygen consumption and maximal mitochondrial respiration (figure 1). We showed that miR-125b levels were down regulated in sub-cutaneous (sc) WAT and in BAT upon both in vivo β3-adrenergic receptor stimulation and cold exposure, and thus associated with BAT activation and brite recruitment. Finally, we found that miR-125b mimic injection in scWAT inhibited β3-adrenergically-induced UCP1 expression and mitochondriogenesis (figure 2). Our observations are in favor of an important role of miR-125b in the control of white to brite adipocyte conversion via regulation of mitochondriogenesis. miR-125b loss of function should allow a better understanding of the mechanisms underlying the role of this miRNA in the browning of white adipocytes, paving a way for the development of new therapies.

Acknowledgement: DIABAT

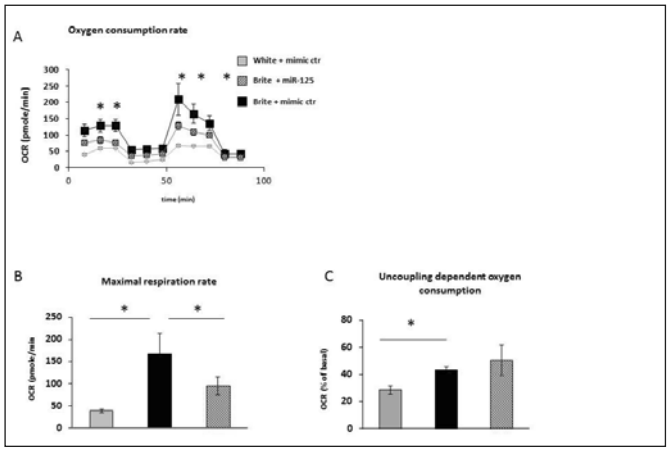

Fig. 1. Figure 1: Effect of miR-125b-5p overexpression in differentiated hMADS. Oxigen consumption (A) maximal respiration and uncoupling dependent oxygen consumption mesurment during the conversion of white to brite hMADS adipocytes. * , $p < 0.05$

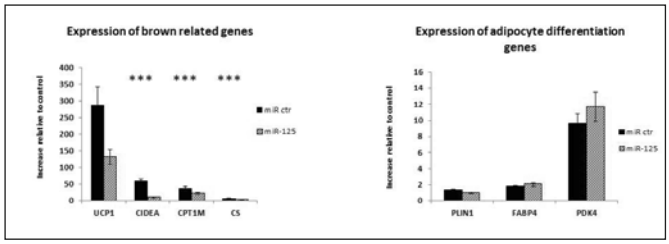

Fig. 2. Figure 2: Gene expression in sub-cuteanous WAT miR-125b-5p injected mice. Gene expression was analyzed in mice sc-WAT maintained at thermoneutratility and treated with the beta 3 adrenergenic receptor agonist (CL316 243) or with NaCL (control) for 7 days. ***, $p < 0.0005$

T1/T2:OS2.2

Long-term weight loss is associated with increased NAD+ biosynthesis and SIRT1 expression but reduced PARP activity in human white adipose tissue

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Background and aims: Mitochondrial dysfunction is one of the hallmarks of obesity. Sirtuin [1] (SIRT1) and poly(ADP-ribose) polymerases (PARPs) are NAD+-dependent enzymes that regulate mitochondria and energy metabolism. In animal studies, calorie shortage increases NAD+ biosynthesis and subsequently SIRT1 activity but inhibit PARP activity. We aim to study whether long-term weight loss mimics mechanistic responses of calorie shortage to boost mitochondria function in human white adipose tissue (WAT). **Materials and methods:** Nineteen obese subjects with body mass index (BMI) ranges 29–39 enrolled in a 12-month weight loss program. As controls, 19 healthy lean subjects with BMI ranges 21–24 were studied. Total RNA was extracted from subcutaneous WAT biopsies, taken at 0, 5 and 12-month time points. The whole genome-scale expression profiles of WAT were analyzed using Affymetrix U133 Plus 2.0 chips. Total PARP activity in WAT was measured using PARP Assay kit. Expression of nicotinamide phosphoribosyltransferase (NAMPT), was analyzed in WAT using quantitative RT-PCR.

Results: All obese subjects lost weight (11.6 ± 1.3 kg) between 0 and 5 months. By 12 months, 1/3 of the subjects continued to loose weight (17.5 ± 2.6 kg), while 2/3 maintained or slightly regained body weight (5.0 ± 1.2 kg). Between 0 and 5 months, WAT NAMPT and SIRT[1] expression levels significantly increased in all subjects. SIRT1 expression levels followed inversely BMI trend. Also, WAT PARP activity trended to decline in all subjects at 12 months while in the continuous weight loss group, PARP activity significantly decreased.
Conclusion: Here we showed for the first time that long-term weight loss is associated with increased WAT NAD+ biosynthesis and SIRT1 expression but lowered total PARPs activity in humans.

T1/T2:OS2.3

Short chain fatty acid acetate induces browning of white adipose tissue

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Introduction: Acetate is the most abundant short chain fatty acid produced in the colon from the fermentation of dietary fibres [1] and was recently shown to reduce appetite [2]. Acetate has also been shown to reduce adiposity [3]. To assess the peripheral mechanism of acetate we have developed a novel nanoparticle delivery method which passively targets acetate to the periphery. We have investigated the effects of this treatment on body adiposity, inflammation and mitochondrial metabolism.
Methods: Adult C57BL/6 mice were treated with either acetate encapsulated liposomes or control (3/week for 6 weeks). Whole body and liver lipid content were assed by magnetic resonance spectroscopy. Blood and tissue samples were collected for glucose, insulin, liver enzymes, lipids and inflammatory markers and for gene expression analysis.
Results: Acetate treatment led to a reduction in body adiposity through the process of "browning" of white adipose tissue, including significant increase in UCP1 expression. Furthermore liver fat was reduced while liver function was improved, inflammation was reduced and insulin sensitivity was increased by acetate treatment. Reduced liver fat arose from a reduction in lipolysis and de-novo lipogenesis. At cellular level mitochondria showed increased protein expression of electron transport chain complexes in liver, which was associated with increased ATP production in THLE-2 hepatocytes.
Conclusion: This study provides new insights into the peripheral action of acetate on lipid metabolism and shows that acetate has the potential to be used in the management of obesity and fatty liver disease.

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T1/T2:OS2.4

Paradoxical dissociation between metabolic improvements albeit increased adipose tissue collagens after bariatric surgery induced weight loss

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Introduction: During metabolic improvements after weight loss induced by bariatric surgery (BS) in morbid obesity, the extracellular matrix (ECM) of subcutaneous white adipose tissue (scWAT) shows important remodelling. However the latter and its links with metabolic improvements need to be further studied. Here we kinetically characterized scWAT changes at expression level and collagen accumulation after BS and their relationships with metabolic improvements.
Methods: 102 obese candidates for BS were recruited. Gene expression levels of scWAT were evaluated by microarray in 42 women before (T0) and 12 months (T12) after BS. Collagen accumulation was evaluated by histochemistry (picrosirius red) in samples collected during BS (T0) and 3 (T3), 12 (T12) months after. scWAT stiffness was evaluated by the new medical tool (Adiposcan). Degraded collagen I was evaluated by immunohistochemistry and, procollagens and degraded collagens measured in tissue explants.
Results: Expression levels of major ECM genes, e.g. COL3A1, COL6A1, COL6A2, ELN, CTGF, MMPs and their inhibitors, and cross-linking enzyme (LOX) drastically changed at T12, confirming important remodelling. Intriguingly, these changes were accompanied by an increased accumulation in total and pericellular collagen (collagen I and III) at T3, T12. Pericellular collagen accumulation remained significant after adjustment for adipocyte size variation and was not associated with metabolic improvements. At T12, we observed no significant change of scWAT stiffness. We also found more degraded collagen I around adipocytes after BS.
Conclusion: Major ECM remodelling at expression levels one year after BS is accompanied by increased pericellular collagens accumulation in scWAT. This feature might be a witness of ECM adaptation after weight loss and of an accumulation of degraded collagens. Studies are ongoing to confirm whether this accumulation corresponds to degraded or newly synthesized collagens.

T1/T2:OS2.5

Lack of mitochondrial endonuclease g enhances brown adipocyte recruitment in white adipose tissue and improves glucose homeostasis

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Introduction: Compelling evidence suggests that mitochondrial function in white adipose tissue (WAT) is a determinant of whole body insulin sensitivity. Also, increased energy expenditure and improved insulin sensitivity elicited by calorie restriction or thiazolidinediones is associated to an increased recruitment of brown adipocyte-like cells in WAT. Full differentiation and thermogenic activity of brown adipocytes highly depends on the PGC-1α/ERRα tandem of transcriptional regulators. Recently, it has been reported that endonuclease G (EndoG), a mitochondrial endonuclease, regulates cardiac mitochondrial biogenesis in a PGC-1α/ERRα-dependent manner. However, the role of EndoG in adipose tissues remains unexplored.
Methods: To study the function of EndoG in adipose tissues EndoG knockout (EndoG KO) mice were used.
Results: In brown adipose tissue (BAT), lack of EndoG did not result in any noticeable reduction in the expression of mitochondrial OxPhos genes. However, we found an increase in the expression of thermogenic genes (UCP1, DIO2) that was associated to reduced lipid accumulation in brown adipocytes. Moreover, EndoG KO mice had a 40% reduction in the mass of major WAT depots. The analysis of WAT revealed that, as in BAT, expression of mitochondrial genes was not affected by the lack of EndoG. Interestingly, we found a noticeable increase (2–4 fold) in the expression of UCP1, DIO2 and PGC-1α that correlated with the appearance of brown adipocyte-like cells interspersed among white adipocytes. The increased browning of WAT elicited by the lack of EndoG was associated to a better glucose tolerance.
Conclusion: We demonstrate that lack of EndoG is associated to an increased browning of WAT that correlates with decreased fat mass and improved glucose tolerance.

T1/T2:OS2.6

Diet-induced weight loss decreases adipose tissue oxygen tension and is accompanied by improved insulin sensitivity in overweight and obese individuals

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Introduction: Recent studies have indicated that adipose tissue (AT) oxygen partial pressure (pO2) may underlie AT dysfunction. Although AT hypoxia is present in rodent models of obesity, we have demonstrated that AT pO2 was increased in obese insulin resistant compared to lean insulin sensitive individuals, and was inversely associated with peripheral insulin sensitivity. Therefore, the objective of this study was to investigate the effects of diet-induced weight loss on abdominal subcutaneous AT pO2, AT blood flow (ATBF), AT inflammation and oxidative markers, systemic inflammation and insulin sensitivity in overweight and obese individuals.
Methods: Fifteen overweight and obese individuals underwent a 5-week very-low-caloric diet (VLCD, 500 kcal/d) and a subsequent 4-week weight-stable diet. Body weight, adiposity, AT pO2 (optochemical measurement system), ATBF (133Xe wash-out), plasma insulin and glucose concentrations, and HOMA-IR were determined and an AT biopsy was collected (fat cell size and micro-array analysis) at baseline and at the end of the weight-stable period.
Results: As expected, the VLCD significantly decreased body weight (-9.7%, $p < 0.001$) and adiposity (-6.0%, $p < 0.001$). Furthermore, AT pO2 (-19.7%, $p = 0.002$, Figure 1 & 2) and HOMA-IR (-36.4%, $p = 0.001$) were markedly decreased after the VLCD. Fasting ATBF did not change significantly ($p = 0.54$). Micro-array and fat cell size analyses are ongoing and will be available at the time of the congress.
Conclusion: The present study demonstrated for the first time that VLCD-induced weight loss markedly reduced AT pO2, which was accompanied by improved insulin sensitivity. We are currently investigating whether the VLCD-induced decrease in AT pO2 is related to alterations in AT inflammation and oxidative phenotype.

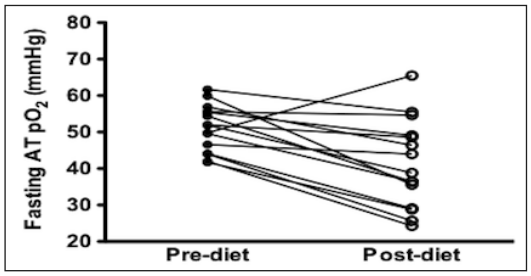

Fig. 1. The fasting adipose tissue oxygen partial pressure (AT pO2) decreased in 14 out of 15 participants due to the dietary intervention.

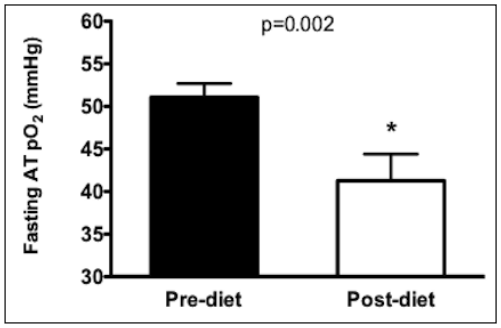

Fig. 2. The average fasting adipose tissue oxygen partial pressure (AT pO2) decreased significantly due to the dietary intervention (N= 15). Values are mean ± SEM.

T8:OS1 – Co-Morbidities

T8:OS1.1

Insufficient weight loss after bariatric surgery: Does it presage metabolic treatment failure

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Introduction: Post-bariatric %EWL, BMI changes and other criteria may be considered as relative indicators of treatment success/failure: Metabolic outcomes in patients who did not reach surgically defined success ful weight loss (50% EW) are rarely reported.
Methods: 2781 bariatric patients were analysed. Out of them 541 (19.5%) did not maintain 50%EWL in 5 year follow-up. 251 (9.02%) required re-operation. 290 (10.4%) we not reoperated.Both groups were correlated as to metabolic and other outcomes.
Results: Reoperation group: pre-bariatric BMI 42.8 ± 6.7, and mean %EWL at re-do 21.5 ± 3.6 were significantly ($p < 0.001$) reduced at 3,6,12,18 mths after reop by 10.2% ± 2.1, 23.4% ± 3.5, 8.9% ± 4.1, and 27.8 ± 3.9% respectively. Overall %EWL was 51.3%. In 32 (77.7%) diabetics FPG, Hb1A dropped to (5.1 ± 1.5 mmol/l) and (4.2 ± 0.7%) respectively ($p < 0.001$). In 10 (22.7%) patients their diabetes improved, and in two (4.5%) no post reop. changes were noted. In the non reoperation group: the still existing 16.5 ± 7.5%EWL was associated with maintenance of lowered glycaemia, from pre-bariatric (7.6 ± 2.1 to 5.9 ± 1.3 mmol/l, $p < 0.01$), and significant ($p < 0.001$) decrease in anti-diabetes medication, in systolic BP (10.2 ± 20.1 mmHg, $p = 0.01$) and triglycerides (36.4 ± 51.3 mg/dL, $p = 0.03$).
Conclusion: Bariatric reoperations are effective on WL and T2DM. Patients with long-term EWL ≤25% after primary bariatric surgery, still exhibited significant improvement in multiple cardiometabolic parameters (diabetes, hypertension, hyperlipidemia) compared to pre-surgical values. This may further support the weight independent anti-diabetic/metabolic effect of bariatric operations.

T8:OS1.2

Randomized, double-blind, placebo controlled 4 week proof of concept trial of beloranib resulted in rapid and significant weight loss in patients with hypothalamic injury associated obesity

Malloy J.L., Haugen T., Taylor K., Hughes T.E., Kim D.D.
Zafgen, Inc. Boston, MA USA

Beloranib is a methionine aminopeptidase 2 inhibitor that potently reduces body weight (BW), hunger, and restores balance to the production/utilization of fat; prior studies have shown ~11 % BW loss over 12 wks in exogenously obese patients. Patients with hypothalamic injury associated obesity (HIAO) fail to regulate metabolism and food intake, resulting in rapid intractable BW gain, treatment resistant severe obesity, and associated comorbidities. This was a randomized, double-blind, placebo-controlled study in 14 adults with HIAO. Patients were randomized to receive twice weekly SC doses of 1.8 mg of beloranib (n = 8) or placebo (n = 6) for 4 wks followed by 4 additional wks where all patients received 1.8 mg of beloranib twice weekly. Thirteen out of 14 patients (9 females, age 31.9 yr, BMI 42.8 kg/m^2, BW 126.4 kg) completed 8 wks of follow up, with 12 patients comprising the pre-specified per protocol population. After 4 wks of randomized blinded therapy, patients on 1.8 mg of beloranib (n = 8) lost an average (±SEM) of 3.40 ± 0.6 kg of BW vs. a reduction of 0.25 ± 0.9 kg for PBO (n = 4; $p = 0.01$). After 8 wks of treatment, beloranib group lost a total of 6.15 ± 0.9 kg of BW, while placebo group lost 3.0 ± 0.9 kg during the 4-wk open label extension. Lipid profile and markers of inflammation were improved at 4 and 8 wks with beloranib treatment. There were no serious adverse events and 1 adverse event leading to withdrawal (placebo; allergic reaction). All safety measures (laboratory, vital signs, ECGs) were unremarkable. This Phase 2 study demonstrated beloranib was well tolerated and effective in HIAO and supports a novel non-hypothalamic mode of action of beloranib to mediate improvements in BW and cardiometabolic profile.

T8:OS1.3

Improvements in sleep apnoea endpoints and quality of life are related to the degree of weight loss: Results from the randomized, double-blind scale sleep apnoea trial

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This is a post hoc analysis of the relationship between weight loss (WL) and endpoints related to sleep apnoea and quality of life (QoL) in the SCALE Sleep Apnoea trial. Clinicaltrials.gov NCT01557166. Obese adults (72% male, mean age 49 y, apnoea-hypopnoea index [AHI] 49.2 events/h, body weight [BW] 117.6 kg) with moderate or severe obstructive sleep apnoea (OSA) and unable/unwilling to use continuous positive airway pressure therapy were treated with liraglutide 3.0 mg (n=180) or placebo (n=179), both as adjunct to diet & exercise counselling, for 32 weeks. A pre-specified ANCOVA model included treatment, country and gender as fixed effects and baseline age and BMI parameter values as covariates. Post hoc analyses also included % weight change as a covariate and examined its interactions with other effects. Liraglutide 3.0 mg reduced AHI (–12.2 vs –6.1 events/h, $p = 0.015$) and BW (-5.7 vs –1.6%, $p < 0.0001$) vs placebo after 32 weeks. AHI reduction was significantly associated with WL, irrespective of treatment. The reduction in AHI per %WL depended on baseline AHI, with reductions of 0.7, 1.4 and 2.8 events/h for baseline AHI cohorts <30, 30–59 and ≥60 events/h, respectively (all groups, $p < 0.0001$). Greater WL was also significantly associated with greater im-

provement in QoL endpoint measures, including the Epworth Sleepiness Scale (Fig), oxygen saturation and sleep architecture (change in total sleep time) ($p < 0.01$ for all). In conclusion, greater WL and improvement of AHI were more likely with liraglutide 3.0 mg than placebo. Greater improvements in sleep apnoea endpoints and QoL were significantly associated with greater WL, irrespective of treatment. The safety profile for liraglutide 3.0 mg was generally consistent with that seen with liraglutide in type 2 diabetes.

Acknowledgement: Supported by Novo Nordisk

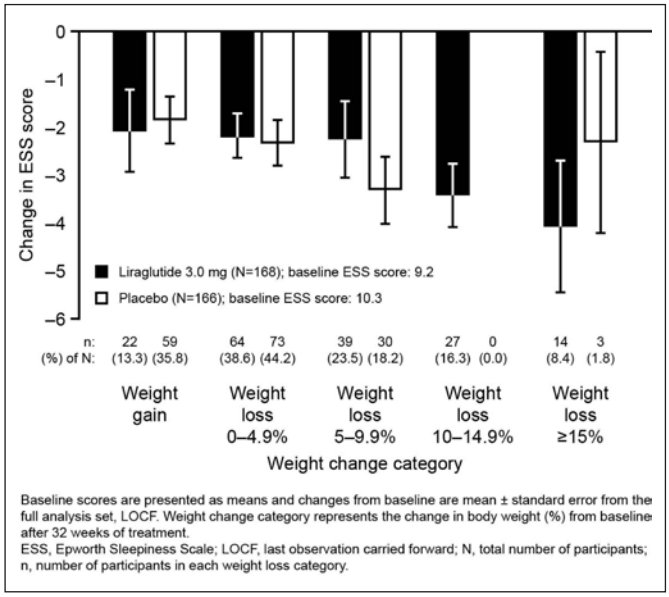

Fig. 1. Change in Epworth Sleepiness Scale score by weight change category

T8:OS1.4

High remission rate of prediabetes in patients after bariatric surgery

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Introduction: A long term follow up of the Swedish Obese Subject study indicated a relative risk reduction for the development of diabetes by 80%. However, no data are available for patients with prediabetes. Therefore we investigated the remission of prediabetes after BS in a large cohort of patients with morbid obesity (MO).
Methods: In total 404 patients with MO (mean age 41 ± 11 years, mean BMI 40.8 ± 16.1 kg/m¸) were included before and after BS. All patients with unknown type 2 diabetes (T2D) underwent an oral glucose tolerance test (OGTT; 75g glucose). The thresholds of diagnostic criteria for prediabetes were fasting plasma glucose (FPG) ≥100mg/dl and ≤126mg/dl or 2 hour post-challenge glucose ≥140mg/dl and ≤200mg/dl. HOMA-Insulin resistance (IR) was calculated.
Results: The prevalence of prediabetes was 23.5% (n=95). The prevalence of patients with normal glucose tolerance was 60.2% (n= 243) and of patients with T2D was 16.3% (n=66). Two years after BS the remission rate was 94% (89 patients with pre-surgery prediabetes were in remission, only 6 patients still had prediabetes). Patients with prediabetes before BS were significantly older (43 ± 11 vs 38 ± 10 years; $p < 0.001$), had higher triglyceride levels (173 ± 84 mg/dl vs 139 ± 64 mg/dl; $p < 0.001$), had a higher HOMA-IR (7.6 ± 4.9 vs 4.7 ± 2.8; $p < 0.001$). There weren't any differences in BMI. Interestingly the only difference in patients with prediabetes compared to T2D was HOMA-IR (7.6 ± 4.9 vs 10.5 ± 6.8; $p = 0.012$).
Conclusion: This is the first study evaluating prediabetes in a large cohort of patients before and after BS. Apart from a difference in HOMA-IR, we couldn't find any significant differences in patients with prediabetes compared to T2D, indicating that prediabetes could be important to assess in patients with MO.

T8:OS1.5

What is the effect of wine intake in type 2 diabetes and does the wine color matter? A 2-year randomized controlled trial

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Background: Recommendations for moderate alcohol consumption remains controversial, particularly in type-2-Diabetes (T2D). Long-term randomized-controlled-trials (RCT) are lacking.
Objective: To assess risk/cardiometabolic effects of initiating moderate alcohol in T2D, and if wine-type matters.
Methods: In a 2-year RCT, 224 well-controlled alcohol-abstaining adult diabetics patients were randomized to mineral-water, white-wine and red-wine (150ml/dinner/2-year). Wines and mineral-water were provided. All groups followed a non-calorie restricted Mediterranean diet.
Results: Retention was 94% after one year and 87% after two. Red-wine was superior in modestly increasing HDL-c, and apoA1 with an overall decrease of cholesterol/HDL-c, triglycerides/HDL-c, and apoB100/apoA1 ratios ($p < 0{\cdot}05$ for all; vs. mineral-water). Both wine groups modestly improved glucose metabolism. Slow-ethanol-metabolizers [wild-type alcohol-dehydrogenase homozygotes; ADH1B*1] had favorable wine effects on glycemic control parameters as compared to fast-ethanol-metabolizers [ADH1B*2(Arg48His; rs1229984) carriers]. Wine did not alter medication usage, blood pressure, or liver function biomarkers. Overall, decreased metabolic syndrome components were mainly attributed to red-wine ($p = 0.039$ vs. mineral-water].
Conclusions: This first long-term large scale alcohol trial suggests that initiating moderate wine intake, especially red-wine, among well-controlled T2D, and as part of healthy diet, is apparently safe and decreases cardiometabolic risk. While the genetic interaction supports specific causal roles for ethanol, the red-wine's superiority suggests further synergy with non-alcoholic constituents. Clinical Trial Registration: NCT00784433

T8:OS1.6

Change in adipose fatty acid composition in obese diabetic women after bariatric surgery

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Introduction: Bariatric surgery is the most effective method in obesity and type 2 diabetes management. Fatty acid composition of adipose tissue reflects composition of fat in food but also metabolic processing of fatty acids including oxidation and lipogenesis. Effect of different types of bariatric surgery on fatty acid composition in subcutaneous adipose tissue was examined.
Methods: Severely obese women underwent one of the three bariatric methods- biliopancreatic diversion (BPD), laparoscopic gastric banding (LAGB) and laparoscopic greater curvature plication (LGCP). Anthro-

pometric characteristics and fatty acid composition of adipose tissue was analysed before the treatment, after 6 months and after 2 year follow up. Fatty acid (FA) composition was analysed by gas chromatography. Results were evaluated by bidirectional orthogonal projections to latent structures (O2PLS).
Results: Women in BPD group (n=8), LAGB (n=9), LGCP (n=12) were not significantly different in age, basal weight and body fat per cent. The highest weight loss was found after BPD. Weight loss was predicted by higher decrease in alpha linolenic acid (18:3n-3) and n-3 polyunsaturated FA (PUFA) after 6 months and by lower decrease in n-6 PUFA -dihomogamma-linolenic (20:3n-6) and arachidonic (20:4n-6). In comparison with initial levels significant decrease in percentage of n-3 PUFA was found after 6 months ($p < 0.05$). After 2 years increase in percentage of monounsaturated FA (MFA), ($p < 0.05$) and decrease in n-6 PUFA ($p < 0.05$) in comparison with initial levels was found,
Conclusion: Bariatric surgery lead to significant changes of fatty acid composition in adipose tissue in severely obese diabetic women after two year follow-up. Lower decrease of n-6 PUFA predicted higher weight loss.

Acknowledgement: Research relating to this abstract was funded by grant IGA NT-13735-4 and MZ, 00023761 Ministry of Health Czech Rep.

T5:OS1 – Childhood Growth

T5:OS1.1

Pre and post-natal growth canalisation: Does prenatal growth predict the pattern of postnatal growth?

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Introduction: Identify any evidence of weight growth tracking between intra & extra-uterine life and determine whether patterns of prenatal growth predict patterns of postnatal growth.
Methods: Multilevel models were used to model fetal and postnatal growth from the Born in Bradford (BiB) cohort. Fitted values and Z-scores were produced at 20, 30, 40 prenatal weeks & 1, 3, 6, 9, 12, 24 postnatal months. Restricted and rapid growth were defined as a change in conditional Z-score in the fetal period of <-0.67 and >0.67, respectively. Catch-down and catch-up growth were defined in the same way, except in the postnatal period. ANOVAs were used to test for differences in size and growth by type of prenatal growth. Log regression and a sensitivity and specificity analysis were employed to examine the predictive ability of the type of prenatal growth.
Results: Infants experiencing restricted fetal growth remained significantly lighter than those who had not, for the duration of infancy. In this group however, there was a pattern of greater growth than expected during infancy. This was opposite to the pattern observed in infants who had experienced rapid fetal growth, who exhibited less growth than expected during infancy. However, the ability of the type of prenatal growth to predict the pattern of postnatal growth was minimal, with only rapid fetal growth being significantly associated with increased odds of catch-down growth in infancy.
Conclusion: That neither restricted nor rapid fetal growth predicted postnatal catch-up growth may suggest that the timing of canalisation is outside of the fetal period. If infant catch-up and down growth are not associated with periods of restricted or rapid fetal growth, definitions of these growth patterns may need reconsidering.

T5:OS1.2

Growth trajectories of body mass index during childhood: Determinants and health outcome at adulthood

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Evidence is currently lacking concerning the development of BMI during childhood, as well as its determinants and health consequences at adulthood. Our aims were: to identify BMI trajectories between 0 and10 years of age; to assess their determinants; and to elucidate the association between these trajectories and metabolic risk factors at adulthood. A total of 1,668 subjects aged 20–60 participated in this retrospective cohort study. Height, weight, waist circumference, fasting blood glucose and lipids and blood pressure were measured at adulthood. Growth was assessed using measured weight and height data from 0–10 years, collected retrospectively from health booklets. Participants reported gestational age, birth weight, early nutrition and parental silhouette. Group-based trajectory modelling was applied to identify BMI trajectories. Associations were assessed using ANOVA and multiple logistic regression. Six distinct patterns of growth trajectory emerged, including three stable (stable-25th, stable-50th, stable-75th) and three ascending (ascending-75th, ascending-overweight, ascending-obesity) trajectories. Determinants of growth trajectory were sex, parental silhouette, gestational age and birth weight (all $P < 0.001$). Trajectory groups were associated with adult BMI and waist circumference ($P < 0.0001$). Subjects in the ascending-overweight (OR (95%CI): 2.71 (1.50–4.90)) and ascending-obesity (OR (95%CI): 3.35 (1.16–9.62)) groups were more likely to present metabolic syndrome during adulthood. This study enabled us to illustrate heterogeneity in patterns of growth trajectories. Child and parental determinants were identified that can be used in overweight surveillance. Trajectories were associated with BMI, waist circumference and metabolic syndrome during adulthood.

T5:OS1.3

Higher childhood BMI is associated with less pubertal gain

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Objective: Our objective was to investigate the impact of body mass index (BMI) in childhood on the pattern of growth during puberty.
Methods: The longitudinally followed Grow up 1990 Gothenburg birth cohort, with growth data from birth until adult height was analyzed, using the QEPS growth model (describing total height as a combination of four mathematical functions; Quadratic -Q, Exponential -E, Pubertal -P and Stop –S, Fig 1.), for calculation of estimates for pubertal growth (1). Individual BMI-SDS values, from 3.5–8 years of age (n = 1908) were calculated for linear and subgroup analyses (low/normal- nw, overweight – ow, obese – ob), based on the IOTF 2012 reference.

Results: Ow/ob children already at birth were heavier and grew faster in height in the pre pubertal period compared to nw, due to an increased Q function. Ow/ob children of both genders had 3.4–4.3 months earlier puberty, reduced growth during puberty, boys and girls had 3 cm and 2 cm, respectively, less pubertal gain from the specific pubertal growth function (P) compared to their nw peers. We saw a negative dose-response effect of childhood BMI on pubertal gain, across the whole BMI spectrum (Fig 2–3.). The adult height was not related to BMI in childhood.
Conclusion: For the first time, the result of the present study has shown that; the higher the BMI is in childhood, the less is the pubertal gain. Higher childhood BMI was also associated with increased pre pubertal growth due to an increased Q-function and the resulting adult height was similar for ow/ob and nw children.

Reference

1. Holmgren A et al.: Horm. res. in paed. 2013;80(suppl. 1):177.

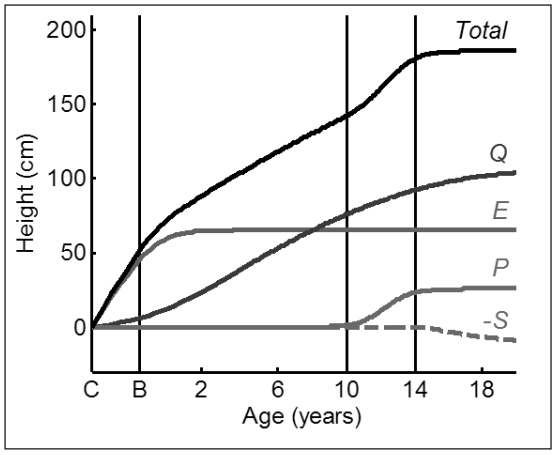

Fig. 1. The QEPS-model. The total height (T) is the sum of four growth functions: a quadratic growth function (Q), a negative exponential growth function (E), a pubertal growth function (P) and a stop function (S). B =birth, C =about 6 weeks after conception. Birth, onset and end of pubertal growth are marked with vertical lines.

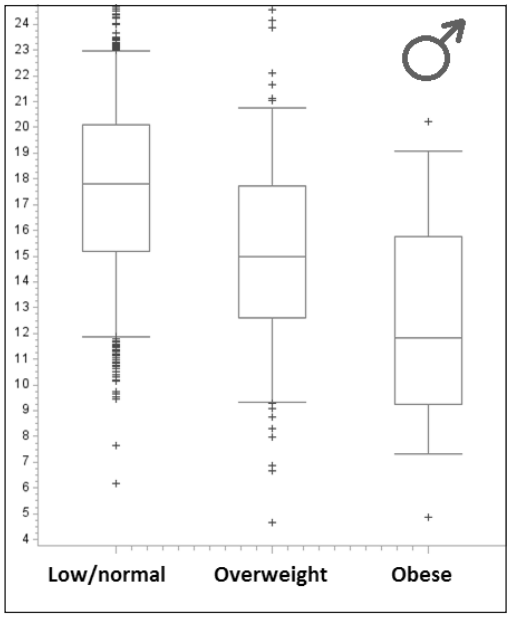

Fig. 2. Boxplot for Pmax of low/normal, overweight and obese boys. Pubertal gain as Pmax (the pubertal part of the total growth during puberty) related to the highest individual BMI SDS at 3.5–8 years of age. Showing the distribution for nw, ow and ob boys, withmean values of; 17.8, 15.2 and 12.6 cm.

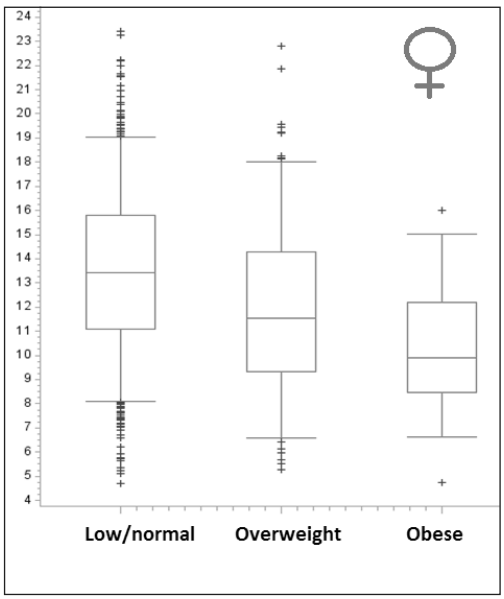

Fig. 3. Boxplot for Pmax of low/normal, overweight and obese girls. Pubertal gain as Pmax (the pubertal part of the total growth during puberty) related to the highest individual BMI SDS at 3.5–8 years of age. Showing the distribution for nw, ow and ob girls, with mean values of; 13.5, 11.8 and 9.9 cm.

T5:OS1.4

Impact of long-chain polyunsaturated fatty acids during pregnancy and lactation on infant body composition up to 5 years of life – results of the infat-study

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Aim: The ratio of long-chain polyunsaturated fatty acids (LCPUFAs) in the maternal diet may have an impact on offspring body composition. The effect of reducing the n-6/n-3 LCPUFA ratio in maternal diet during pregnancy and lactation on offspring growth and body composition up to 5 years postpartum (pp) was investigated.
Methods: In an open-label, randomized controlled trial, 208 healthy pregnant women received a dietary intervention (supplementation of 1.2g n-3 LCPUFAs/day and dietary counseling to reduce arachidonic acid intake) from the 15th week of gestation until 4 months of lactation (intervention group) or follow their habitual diet (control group). We investigated infant fat mass with skinfold thickness (SFT) and abdominal sonographic measurements and child growth. For comparison, multiple linear regression models adjusting for sex, pregnancy duration, ponderal index at birth and breastfeeding status at 4 months were performed.
Results: At 5 years of age, anthropometric data of n=114 infants were available.
Results: showed no difference between groups, neither for the sum of 4 SFT [intervention: 23.9 ± 4.7mm; control: 24.5 ± 5.0mm; mean difference: –0.7mm (95% CI: –2.5; 1.1mm); p = 0.453], nor for other anthropometric measurements. Findings are consistent with results at earlier timepoints except for BMI at 4 years pp. Sonographic data were analyzed up to 4 years: area of subcutaneous fat layers differed significantly at 2 and 4 years pp in the adjusted model, showing slightly higher rates in the control group. Preperitoneal fat did not differ significantly between groups at any time point of investigation.

Conclusion: Results do not provide evidence that a dietary intervention to reduce the n-6/n-3 ratio during early life relevantly affects fat mass in the offspring.

T5:OS1.5

Early growth patterns in normal weight and overweight pre-school children from different socioeconomic and ethnic background: Results from the abcd-study

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Introduction: Children with a low socioeconomic status (SES) or from non-Western origin are at increased risk for overweight. We explored early growth patterns of children from different SES and ethnic background, who became overweight at age 5.
Methods: Term born singletons without fetal growth retardation were included (n=3387). Weight status at age 5 was determined by international guidelines. BMI-SDS growth patterns between birth and 5 years were created using LMS method and compared between normal and overweight children, stratified by ethnicity (Western/non-Western) and SES (low/mid/high maternal education level, only Western included, n=2437).
Results: At age 5 years, 12.1% of the children were overweight. This was higher in non-Western (23.5%) and low SES children (16.3%). Growth patterns of normal weight and overweight children at age 5 differed from birth onwards ($p < 0.001$). Overweight children had a high birth weight and a relative large increase in BMI-SDS during the first 6 months. Differences in the overall growth pattern of Western and non-Western children were both found for normal weight ($p < 0.001$) and overweight children ($p < 0.001$). BMI-SDS of non-Western normal weight children was significantly higher on almost all ages compared to Western normal weight children. The overweight non-Western children had only a higher BMI-SDS at birth (Δ:0.233, $p = 0.044$ and 3 months (Δ:0.221, $p = 0.021$) compared to overweight Western children. A difference in the overall growth patterns by SES was only apparent in overweight children ($p = 0.003$). Overweight low SES children had a significantly higher mean BMI-SDS at age 5 compared to overweight high SES children (ΔBMI-SDS:0.431, $p = 0.010$).
Conclusion: Overall BMI growth patterns of normal weight and overweight children at age 5 differ from birth onwards. Intervention strategies to prevent childhood overweight should focus on children with high birth weight and early accelerated growth, especially from non-Western origin.

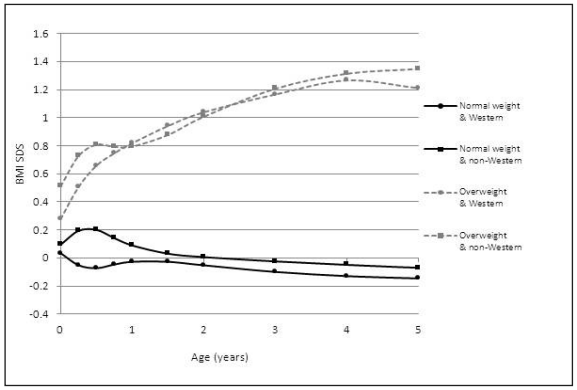

Fig. 1. Patterns of mean BMI-SDS in normal weight and overweight pre-school children by ethnicity.

T5:OS1.6

Concurrent stunting and obesity in children aged 2.0 – 4.9 Years in indonesia: The double burden of malnutrition

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Introduction: The prevalence of obesity has risen in low and middle-income countries. This study aimed to determine: a) temporal trends in the prevalence of underweight, stunting, and at risk of overweight/obesity in young Indonesian children; and b) whether those who are stunted are at greater risk of being overweight/obese compared to those of healthy height.
Methods: This was a repeated cross sectional study of children aged 2.0–4.9 years in waves 1 (1993), 2 (1997), 3 (2000), and 4 (2007) of the Indonesian Family Life Survey, a nationally representative survey of households involving questionnaires and anthropometric measurements. Height/length, weight and BMI were expressed as z-scores (2006 WHO Child Growth Standards). A weight-for-age-z-score <-2 was categorised as underweight, height-for-age-z-score <-2 as stunted, and BMI-z-score >+1, >+2, >+3 as at risk, overweight and obese, respectively.
Results: There were 1385, 1461, 2089, and 2676 separate children aged 2.0–4.9 years in the four waves, respectively. The prevalence of stunting decreased from waves 1 to 4: from 50.1% (95% CI: 47.5–52.7) to 35.7% (95% CI: 33.9–37.5) ($P < 0.01$) – as did the prevalence of underweight – from 33.8% (95% CI: 31.3–36.3) to 20.9% (95% CI: 19.4–22.5) ($P < 0.01$). In contrast, the prevalence of 'at risk'/overweight/obesity increased from 10.8% (95% CI: 9.2–12.5) to 17.6% (95% CI: 16.2–19.1) ($P < 0.01$). At all time points, those who were stunted were significantly more likely to be 'at risk' of overweight/obese compared to those of healthy height (odds ratio 1.35 to 2.28) ($P < 0.05$).
Conclusion: There is strong evidence that the double burden of malnutrition occurs in Indonesian children. A coordinated approach to overcome both chronic under-nutrition and over-nutrition is required.

Friday, 8 May, 2015

T6/T7:OS2 – Drivers of Difference

T6/T7:OS2.1

Living at higher altitude and incidence of overweight/obesity: Prospective analysis of the SUN cohort

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Introduction: Residence at high altitude has been associated with lower obesity rates due to hypoxia conditions. However, there is no evidence of this association in a free-living population. Therefore, our objective was to assess the association between the altitude where each participant of the SUN Project is living and the incidence of overweight/obesity.
Methods: The SUN Project is a dynamic, prospective, multipurpose cohort of Spanish university graduates with a retention rate of 90%. We included in the analysis 9,302 participants free of overweight/obesity at baseline. At the baseline questionnaire participants report their postal code and the time they are been living in their city/village. We imputed the altitude of each postal code according to the data of the Spanish Na-

tional Cartographic Institute and categorized participants in tertiles. We used Cox regression models to adjust for potential confounding variables.
Results: During a median follow-up of 8.5 years, we identified 2,099 incident cases of overweight/obesity. After adjusting for age, sex, baseline body mass index, time of residence, physical activity (quartiles), sedentary behaviours (quartiles), smoking (non-smokers, current smokers, former smokers), snacking, follow a special diet, total energy intake, and adherence to the Mediterranean dietary pattern, those participants in the third tertile (>456 m) exhibited a statistically significant 13% reduction risk for the development of overweight/obesity in comparison to those in the first tertile (<124 m) (adjusted HR: 0.87; 95% CI: 0.77–0.98).
Conclusion: Living in cities of higher altitude was associated with a lower risk of developing overweight/obesity in a cohort of Spanish university graduates.

Acknowledgement: The SUN Project is funded by the Spanish Government and the Regional Government of Navarra.

T6/T7:OS2.2

Does the importance of dietary costs for fruit and vegetable intake vary by socioeconomic position?

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Introduction: Lower intake of fruit and vegetables (F&V) among populations of low socioeconomic position (SEP) has been attributed to lower psychological, behavioural, social and material resources. Dietary cost may be a stronger determinant of F&V intake in low-SEP groups than in higher-SEP groups. The aim of this study was to examine the association between F&V intake and dietary costs, testing for effect modification by SEP.
Methods: We used data from the Fenland Study, a population based, cross-sectional study of 10,020 British adults. F&V intake was derived from a semi-quantitative 130 item Food Frequency Questionnaire (FFQ). Retail food prices for each of the foods in the FFQ were combined with intake to estimate dietary costs (GBP/day). General linear models were used to assess associations between SEP, quartiles of dietary costs, and F&V intake. Effect modification of SEP gradients (based on education and income) by dietary costs was examined with interaction terms.
Results: Individuals in the lowest quartile of dietary costs, with low income and low education consumed less F&V than individuals with higher dietary costs, high income or education. There was significant interaction between SEP and dietary costs, such that socioeconomic differences in F&V intake were magnified among individuals who consumed lowest-cost diets.
Conclusion: Amplification of socioeconomic inequalities in diet among those consuming low-cost diets indicates the need to address food costs in strategies to promote healthy diets. The lack of socioeconomic inequalities for individuals on high dietary costs suggests that high dietary costs may compensate for lack of other resources such as nutrition knowledge or attitudes towards healthy eating.

T6/T7:OS2.3

Neighbourhood built environment typologies and adiposity in school age children

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Background: Neighborhoods are complex multidimensional systems. However, the interrelation between multiple neighborhood dimensions is seldom taken into account in relation to childhood adiposity. We created a neighborhood typology using a wide range of built environment features and examined associations with adiposity in children aged 8–10 years.
Methods: Data include 512 Montreal-area youth from the first wave of QUALITY, an ongoing study on the natural history of obesity in 630 Quebec youth (8–10 years at baseline) with a history of parental obesity. Anthropometrics and body composition based on dual energy x-ray absorptiometry were obtained. Multiple neighborhood features obtained through in-person neighborhood assessments and geocoded administrative data were summarized using principal components analysis, and contrasting neighborhood types were identified using cluster analysis. We examined associations between specific neighborhood typologies and indicators of total (body mass index z-score and fat mass index) and central (waist circumference and central fat mass %) adiposity using multivariable linear regressions.
Results: Cluster analysis resulted in a 5 distinct neighborhood types characterized by high, moderate or low levels of walkability and safety from vehicular traffic. Children living in neighborhoods characterized by lower levels of safety from vehicular traffic had significantly higher levels of both overall and central adiposity.
Conclusions: Neighborhoods characterized by heavy road traffic with fewer traffic calming measures appear to be the most obesogenic to children, regardless of other features that are associated with walkability. Policies targeting the improved walkability of neighborhoods for children may need to prioritize safety from vehicular traffic.

Acknowledgement: The QUALITY cohort is funded by the Canadian Institutes of Health Research, the Heart and Stroke Foundation of Canada and the Fonds de la recherche en santé du Québec. The QUALITY Residential study was funded by the Heart and Stroke Foundation of Canada.

T6/T7:OS2.4

Obesity as a predictor of impaired physical performance in the elderly: Results of a longitudinal epidemiological study.

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Aim: To evaluate the influence of obesity on muscle strength and physical performance, in a follow-up of 6 years.
Methods: 2911 Italian subjects aged ≥65 years from the Progetto Veneto Anziani (ProVA), were analyzed. Physical performance, and leg muscular strength were measured both at baseline and at the end of follow-up. Study population was stratified by six BMI classes in according with who classification of obesity. Associations between BMI physical performance and muscular strength were evaluated.
Results: At baseline the normal weight subjects had the best results in tests of physical performance (8:29 ± 0.03), with significant differences compared with underweight (7:50 ± 0:15, P <0.001), overweight (8:12 ± 0.02, p <0.001), obese I level (7.72 ± 0:04, P <0.001), obese II level (6.67 ± 0:09, P <0.001) and obese III level (5.88 ± 0:24, P <0.001). This association was not modified by further adjustment for leg muscular strength, age, sex, smoking, income, education, physical activity and chronic diseases.

At the end of follow-up, a statistically significant reduction in physical performance and muscle strength was observed in underweight, normal weight, overweight, I and II obese subjects, while in obese III level there was a statistically significant reduction only in physical performance and not in muscle strength. In a multiple logistic analysis, adjusting for age, sex, smoking, income, education, physical activity and chronic disease, a significant increased risk of a statistically significant reduction in SPPB test was observed for overweight and obese subjects.
Conclusion: In our elderly population, high BMI values affect negatively physical performance and expose the elderly to a risk of a further decline in physical performance with consequent disability

T6/T7:OS2.5

Effect modification by obesity on the association between serum 25(OH)D and blood pressure: Results from NHANES 2001–2006

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Introduction: The joint effect of low 25(OH)D levels and obesity on hypertension has rarely been examined. We explored a possible effect modification by obesity on the association between 25(OH)D and blood pressure in participants of the US National Health and Nutrition Examination Surveys (NHANES) 2001–2006.
Methods: The present study included 10 313 participants aged ≥ 20 years. The association of serum 25(OH)D [ng/mL] with systolic and diastolic blood pressure was examined with linear regression. All models were adjusted for age, sex, ethnicity, physical activity, alcohol consumption, smoking status, education, diabetes and kidney disease and prescribed medication for hypertension. Additive interaction was assessed through a cross-product interaction term between 25(OH)D and body mass index [BMI] as well as waist circumference [WC] category (overweight: BMI of 25 – 30 kg/m^2 / WC of 80 – 88 cm in females or 94 – 102 cm in males; obesity: BMI ≥ 30 kg/m^2 / WC ≥ 88 cm in females or ≥ 102 cm in males).
Results: 25(OH)D was significantly inversely associated with both systolic and diastolic blood pressure in obese but not in non-obese participants. While the interaction between 25(OH)D and overweight was not significant in any of the models, a significant interaction between 25(OH)D and obesity was found in the systolic blood pressure models (BMI: β = -0.15, p-value = 0.006; WC: β = -0.14, p-value = 0.004) as well as a smaller, non-significant interaction in the diastolic blood pressure models (BMI: β = -0.09, p-value = 0.03; WC: β = -0.03, p-value = 0.42).
Conclusion: Results from this large, cross-sectional sample indicate that obesity modifies the association between 25(OH)D and blood pressure, suggesting a stronger association with 25(OH)D in obese participants.

T6/T7:OS2.6

Are aga-born obese adults more metabolically healhty than sga-born obese individuals?

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Introduction: Recently it has been shown that not all obese individuals display cardiometabolic abnormalities and a "metabolically healthy obese (MHO)" phenotype has been sought. No data on the inverse favorable risk of MHO in adults born appropriate for gestational age (AGA) compared to adults born small for gestational age (SGA) exist. Objective: Assess the risk of metabolically healthy obesity in AGA versus SGA.
Methods: Individuals were derived from a registry in the city of Haguenau, France. 132 out of 1,308 participants aged 29.5 ± 4.1 years were identified as obese (BMI≥30 kg/m^2) and were divided into two groups: SGA (n=74) and AGA (n=58). Metabolic variables such as total cholesterol, HDL-cholesterol, triglycerides, fasting glucose, insulin and blood pressure were obtained and compared by t-test. MHO phenotype was determined using the HOMA-IR index which requires determination of fasting plasma glucose and insulin concentrations. Relative risk (RR) and 95% CI was computed for the probability of metabolically healthy obesity in AGA versus SGA after correction for age, sex and socioeconomic status.
Results: SGA obese subjects had higher total cholesterol levels (4.9 ± 1.5 vs. 4.2 ± 1.5, p = 0.03) and fasting insulin levels (11.0 ± 4.5 vs. 9.4 ± 3.8, p = 0.04) compared to AGA obese subjects. AGA obese group had a higher favorable risk of metabolic healthy obesity versus SGA obese group RR=1.95 (95% CI 1.06–3.58) independently of age, sex and socioeconomic status.
Conclusion: Appropriateness for gestational age confers a higher favorable risk of metabolically healthy obesity compared to smallness for gestational age.

Acknowledgement: Funding: Fondation Francophone pour la Recherche sur le Diabčte

T3:OS2 – Macro and Micro Nutrients

T3:OS2.1

Association of high dietary protein intake with the risk of weight gain and total death in subjects at high risk of cardiovascular disease

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Introduction: Although diets high in dietary protein are widely used to manage overweight and obesity, there is a lack of consensus about their long-term efficacy and safety. The aim of this study was to simultaneously assess the association of long-term high-protein consumption on body weight changes and death outcomes in subjects at high cardiovascular risk.
Methods: A secondary analysis of the PREDIMED (PREvención con DIeta MEDiterránea) trial was conducted. Dietary protein was assessed using a food-frequency questionnaire during the follow-up. Cox proportional hazard models, including macronutrient substitution models, were used to calculate the multivariate relative risk of protein intake in body weight and waist circumference changes, and the incidence of cardiovascular outcomes, total, cardiovascular and cancer death.
Results: Higher total protein intake was significantly associated with a greater risk of weight gain when protein replaced carbohydrates (HR: 1.90; 95%CI: 1.05, 3.46) but not when replaced fat (HR: 1.69; 95%CI: 0.94, 3.03). However, no association was found between protein intake and waist circumference. Contrary, higher total protein intake was associated with a greater risk of all-cause death in both carbohydrate and fat substitution models (HR: 1.59; 95%CI: 1.08, 2.35; and HR: 1.66; 95%CI: 1.13, 2.43, respectively). Animal protein was associated with an increased risk of fatal and non-fatal outcomes when protein substituted carbohydrates or fat.

Conclusion: Higher dietary protein intake is associated with long-term increased risk of body weight gain and overall death in a Mediterranean population at high cardiovascular risk.

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T3:OS2.2

Micronutrient and protein deficiencies after gastric bypass and sleeve gastrectomy: A one year follow-up

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Background: Roux-en-Y gastric bypass (GBP) and sleeve gastrectomy (SG) have increased dramatically, potentially increasing nutritional deficiencies prevalence even in purely restrictive procedures. **Objective:** analyze the effect of food restriction through bariatric surgery (BS) on nutritional parameters. **Design:** 23 and 29 obese patients undergoing GBP and SG were prospectively followed at baseline and3, 6 and 12 months after BS (N=14 and N=19 at T12). We evaluated food intake both using both a self-administered web-based 24h dietary record, and the PANDiet score (T0, T3, T12), as well as measured serum vitamins and minerals concentration (T0, T3, T6, T12).
Results: We observed suboptimal food intakes with low probabilities of adequacy for protein, fiber, vitamin D and magnesium at T0. The drastic energy and food reduction lead to very low and similar probabilities of adequacy for nutrients at T3 and T12 in both procedures. Serum analyses demonstrated a continuous decrease in prealbumin along the follow-up indicating moderate protein malnutrition in 30% and 35% of GBP patients and 48% and 75% of SG patients, respectively at T3 and T12. Conversely, despite the low probabilities of adequacy observed at T3 and T12, systematic vitamin and mineral supplementation after GBP and SG prevented most nutritional deficiencies except for iron, where 5% of patients displayed iron deficiency at T12 in both procedures.
Conclusion: GBP and SG have comparable effects in terms of energy and food restriction, and risk of micronutrient and protein deficiencies in the first year post BS. Such results suggest that (i) cautious monitoring of protein intake after GPB and SG is mandatory and (ii) systematic vitamin and mineral supplementation in the first year after SG may be beneficial.

Acknowledgement: CRC fibrota valetine lemoine for technical help and agathe arloti as project manager

T3:OS2.3

Serum vitamin d levels in middle-aged women predict lasting stable differences in BMI and waist-hip ratio: Follow-up over three decades

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Introduction: The chronology of the association between low serum vitamin D (25(OH)D) and obesity is unclear. We assessed 25(OH)D in relation to longitudinal development of BMI, waist-hip ratio (WHR) and height in 38–60 year old women for up to 35 years.
Methods: The Population Study of Women in Gothenburg started in 1968/69 in Gothenburg, Sweden. Anthropometric measures were taken at baseline and at 4 follow-up visits; the latest in 2000/03. Levels of 25(OH)D were analyzed in serum drawn and stored since the baseline in 1227 (84%) women. Linear regression and repeated measures models (SAS PROC MIXED), respectively, were used to model the baseline and the longitudinal associations between 25(OH)D (dichotomized, cutpoint 51.45 nmol/L) and BMI, WHR and height, adjusting for covariates.
Results: At baseline, mean BMI was 25.2 kg/m^2 in women with low 25(OH)D and 23.8 kg/m^2 in the other women ($p < 0.001$). The respective figures for WHR were 0.75 and 0.74 ($p < 0.001$). Adjusted for covariates, low 25(OH)D was associated with higher BMI at baseline (β=1.45, 95%CI 0.97;1.92) and in the longitudinal analyses at all visits (β=1.47, 95%CI 0.99;1.94). When considering only the follow-up visits adjusted for baseline BMI, the association was negligible (β=0.01, 95%CI –0.27;0.24). Similarly, low 25(OH)D was associated with higher WHR at baseline (β=0.012, 95%CI 0.006;0.019) and longitudinally when all visits were included (β=0.011, 95%CI 0.005;0.018), but not when baseline WHR was taken into account in the repeated measures model (β=-0.001, 95%CI –0.007;0.005). No differences in height were observed at baseline or longitudinally.
Conclusion: Lower 25(OH)D was associated with higher BMI and WHR at baseline and this difference was maintained (but not increased) over the 35-year follow-up.

T3:OS2.4

Carbohydrate quantity and quality in relation to body composition among children and adolescents in South China

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Introduction: It has been suggested that both quantity and quality of carbohydrate have profound effects on long-term health. We aimed to investigate the relation of dietary carbohydrate quantity and quality to body composition among Chinese children and adolescents, who habitually have high carbohydrate consumption, along with an increasing prevalence of obesity.
Methods: Cross-sectional data on 1721 Chinese children (52.7% girls) aged 7–15 years were analyzed. Using 3-day 24 hour dietary recalls, total carbohydrate intake and carbohydrate quality characterized with dietary fiber, the glycemic index (GI) and the glycemic load (GL) were considered. Body weight, height as well as skin-fold thicknesses were measured to obtain body mass index standard deviation score (BMI SDS), percentage body fat (%BF), fat mass index (FMI) and fat-free mass index (FFMI), as measures of body composition in the present study. Multivariate linear regression models were used to explore the relevance of carbohydrate quantity and quality to body composition.
Results: Among girls, fiber intake and dietary GI were related to %BF and FMI ($p \leq 0.04$): girls with lower fiber intake or higher dietary GI had 8.9% or 15.2% higher %BF and 9.5% or 12.7% higher FMI than girls with higher fiber intake or lower dietary GI (adjusted for birth weight, maternal overweight and physical activity). Furthermore, these associations were more pronounced in girls aged 10–12 years. Among boys, higher carbohydrate intake and higher dietary GL were positively related to BMI SDS ($p \leq 0.03$; adjusted for birth weight, maternal educational level, and physical activity).
Conclusion: Our data suggest that high carbohydrate quality is positively related to lower body fat mass among children in South China, especially in girls.

T3:OS2.5

No differences in appetite sensations after animal protein (pork/veal, eggs) vs vegetable protein (beans/peas) when adjusting for dietary fibre

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Introduction: There is no consensus yet on whether appetite sensations differ between animal and vegetable protein.The aim of this study was to investigate if meals with vegetable protein affect appetite sensations and ad libitum energy intake differently compared to isocaloric meals with animal protein and similar amounts of macronutrients.
Methods: In a randomized, controlled, single-blinded, 4-way crossover study on 33 healthy males (mean±SD age: 25.8 ± 5.1 y; BMI: 23.2 ± 1.9 kg/m^2) appetite sensations and spontaneous energy intake were studied on separate occasions using four different tests meals (3.5 MJ, 18.5 E% from protein). Meals consisted of pork/veal, fava beans/split peas, eggs adjusted for dietary fibres (28.5 g), or eggs without adjustment for dietary fibres (6.0 g). Appetite sensations were recorded at baseline and every half hour using visual analogue scales until the ad libitum meal.
Results: There were no significant differences in subjective appetite sensations or ad libitum intake after vegetable or animal protein sources. However, spontaneous energy intake was lower after egg with fibre compared to egg alone (247 ± 175 kJ, $P < 0.05$). Further, tendencies were observed towards higher satiety following egg with fibre compared to egg alone and decreased hunger sensations after egg with fibre compared to pork/veal ($p < 0.1$).
Conclusion: Vegetable and animal protein did not affect appetite sensations or spontaneous energy intake differently, when adjusting for dietary fibre content.

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T3:OS2.6

No effect of glycemic index (low vs. High) on ghrelin and leptin in obesity

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Introduction: Ghrelin and leptin are major players in the regulation of appetite and metabolism. However, there are not enough data in the literature on the effect of different exogenous factors (drugs, diet, glycemic index) on the ghrelin and leptin secretion in obesity. Aim: Thereafter, the purpose of our study was to determine the effect of glycemic index (low vs. high) on plasma levels of ghrelin and leptin, and on the anthropometric parameters in obese subjects. Materials and methods: A 16-week randomised, controlled, dietary intervention was performed in obese adult subjects (n= 30, men and women) with the following mean baseline characteristics: age 46 years, body mass index (BMI) of 32.8 кг/-, waist circumference 110 cm, hip circumference 125 cm, etc. At the begining and at the end of the study the anthropometric and body tissue parameters were measured. Blood samples were taken for biochemical analyses. Plasma levels of ghrelin and leptin were determined by ELISA methodology. Result:. The results showed higher reduction in body weight in the group on a low glycemic index (LGI) diet in comparison with the group on a high glycemic index (HGI) diet. No effect of the GI on the plasma levels of ghrelin and leptin was determined. However, in the group on LGI diet a slight decrease in leptin concentrations was detected.
Conclusion: The LGI diet has a beneficial effect on the parameters of obesity. More studies are needed to demonstrate the long-term effect of these diets in the regulation of appetite and metabolism.

T5:OS2 – Childhood Obesity

T5:OS2.1

Multidisciplinary treatment of children with leptin receptor deficiency

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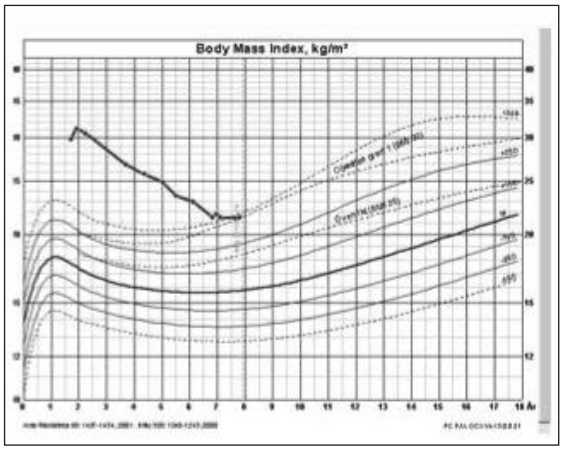
Introduction: Two brothers, born to normal-weight parents of Turkish origin who were first cousins, presented with severe obesity at early age. They were referred to the National Childhood Obesity Centre (NCOC) at age 2 years and were diagnosed with leptin receptor (LEPR) mutations (c.1226C>A) at age 5 and 4 years. This diagnosis is known to be associated with hyperphagia, severe obesity and hypogonadism. Unlike for children with leptin deficiency, there are currently no treatment options other than lifestyle intervention for children with LEPR mutations.
Methods: The children were investigated for hormonal deficiencies. The NCOC used a multidisciplinary approach to support the parents and personnel at daycare and school in making lifestyle adjustments.
Results: Growth hormone (GH) was analyzed overnight in the younger brother and levels were very low with acceptable linear growth. Both children were given thyroxine, and the older underwent surgery for retractile testes. Leptin levels were 22 and 31 µg/L (ref <7,5 µg/L). Caloric intake was markedly reduced by a dietician and at least one hour of physical activity daily was encouraged in collaboration with a physiotherapist. Additional support was given to the parents by a psychologist. The NCOC staff visited day-care and school facilities to reinforce recommendations on food and physical activity. The family visited the NCOC 6–8 times/year. Body Mass Index (BMI) decreased from 31.2 kg·m-2 at age 1 years 11 mo to 21.5 kg·m-2 at age 7 years 9 mo, and from 27.9 kg·m-2 at age 2 years 10 mo to 22.3 kg·m-2 at age 6 years 3 mo (Fig 1).
Discussion: Lifestyle adjustments by a multidisciplinary team can decrease the degree of obesity in children with LEPR mutations. In these children, the intervention was started before the diagnosis of LEPR mutation was set. Successful treatment was accomplished by a strong therapeutic alliance with the parents and networking with persons and personnel involved in the daily lives of the children.



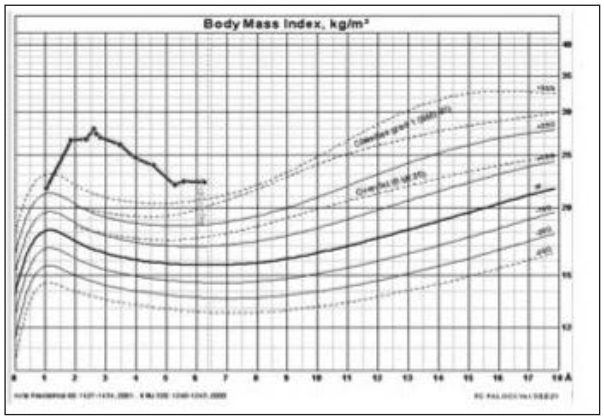


Fig. 1. BMI-charts of two brothers with leptin receptor mutations.

T5:OS2.2

"What happens at Grandma's stays at Grandma's": Explaining differences between parental and grandparental feeding of preschool aged children.

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Introduction: While extensive evidence shows that family involvement is important in the prevention and treatment of childhood obesity, grandparental feeding of young children remains understudied. This is notable since nearly one quarter of UK and US families rely on grandparents as the main providers of informal childcare. Informal care has been linked to increased risk of overweight in preschoolers.
Methods: 22 parents and 27 grandparents (60% overweight/obese) from 16 families of children aged 3–5 years (56% overweight/obese) were interviewed. The interviews were transcribed and analyzed qualitatively to assess differences between parental and grandparental feeding, and how such differences are negotiated in families.
Results: Parents and grandparents consistently identified sugary foods/beverages and fast foods as problematic. However, in most families, regardless of child weight, grandparents engaged in indulgent feeding practices despite the parents' stated wishes. The analysis yielded 3 thematic categories: (1) disagreements about feeding stem from parents' and grandparents' differing definitions of healthy feeding; (2) differences between parents' and grandparents' feeding practices reflect differences in perceived caretaking roles; (3) parents and grandparents negotiate differences in feeding practices through grandparental compliance and parental compromise.
Conclusion: Differences between parents' and grandparents' feeding practices are related to concepts of healthy feeding, perceptions of caretaking roles, and extent of time spent with the child. Specifically, the findings suggest that in childhood obesity interventions, clinicians should evaluate to what extent grandparents provide childcare, and ask to involve them in treatment-related discussions.

T5:OS2.3

Is obesity in early childhood associated with impaired cognition? – Findings form the uk millennium cohort study

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Introduction: Obesity is associated with marked deficits in educational attainment in adolescence. The issue of when these obesity-related deficits appear is unclear. The present study tested the hypothesis that obesity is associated with impaired cognitive outcomes in early childhood.
Methods: Associations between weight status in early childhood (3–5years) and cognitive performance assessed by British Ability Scale II tests of Pattern Construction (visuo-spatial skills), Naming Vocabulary (expressive language skills), and Picture Similarity (reasoning skills) at age 5years were examined in the UK Millennium Cohort Study (MCS). Data from 12,349 participants with objectively measured weight status were examined: 76.5% were healthy weight, 18% overweight and 5.5% obese, relative to UK 1990 reference data.
Results: Obese children at 3years had significantly lower performance in Pattern Construction at age 5years compared to those of a healthy weight, even after controlling for a wide range of confounders ($\beta = -0.026$, $p = 0.03$). Controlling for confounders, boys who became obese between the age of 3 and 5years had lower scores in Pattern Construction ($\beta = -0.029$, $p = 0.03$). However, becoming non-obese had a beneficial impact on Picture Similarity performance in girls ($\beta = 0.028$, $p = 0.04$).
Conclusions: Obesity in early childhood showed adverse relationships for some cognitive outcomes but it is unclear if the magnitude of the relationship is of practical importance. Stronger relationships may emerge later in childhood. Study findings might provide education and public health stakeholders with greater motivation to engage with initiatives to both treat and prevent pediatric obesity in future.

Acknowledgement: We are grateful to The Centre for Longitudinal Studies, Institute of Education for the use of these data and to the UK Data Archive and Economic and Social Data Service for making them available. However, they bear no responsibility for the analysis or interpretation of these data.

T5:OS2.4

Circulating mirnas are deregulated in overweight/obese children: Preliminary results of the ifamily study

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MicroRNAs (miRNA) are small non-coding RNAs involved in the modulation of gene expression and in the control of cell functions. Alterations of miRNA patterns often occur in cancer and metabolic disorders, including obesity. Recent studies showed remarkable stability of miRNAs in both plasma and serum making miRNAs potential circulating biomarkers for a variety of diseases. The aim of this pilot study is to evaluate whether circulating miRNAs were differentially expressed in plasma samples of overweight/obese and normal weight children belonging to the Italian cohort of the IFamily project (www.ifamilystudy.eu). The IFamily project builds on the IDEFICS cohort (www.ideficsstudy.eu), established in 2006. It aims to assess the determinants of eating behaviour in children and adolescents from eight European countries Ten overweight/obese (age 11.2 ± 1.5 years, BMI 28.2 ± 1.5 kg/m^2) and ten normal weight (age 11.9 ± 1.7 years, BMI 16.4 ± 1.7 kg/m^2) children were selected for the pilot study from the Italian participants. MiScript miRNA PCR Array Human Serum/Plasma panels were employed to screen and compare the expression of 384 miR-

NAs in pooled plasma samples from the two groups. Validation of selected miRNAs was carried out using RT-qPCR. The validation study showed that five specific circulating miRNAs were significantly deregulated in overweight/obese children. Our preliminary results indicate that circulating miRNAs are significantly deregulated in overweight/obese children. The planned completion of the miRNA analyses in selected samples of the eight European countries participating to the IFamily project will allow to assess whether miRNA profiling is a promising strategy to identify children who may suffer from metabolic abnormalities during growth.

T5:OS2.5

The alterations in advanced glycation end products, their receptors and adipokines in centrally obese vs. lean adolescents

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Introduction: In adults, central obesity associates with altered levels of adipokines and dysregulated AGE/RAGE pathway (advanced glycation end products/receptor for AGE), which contribute to complications of obesity, such as insulin resistance. We asked whether these alterations are manifested in centrally obese (CO) aparently healthy adolescents.
Methods: Plasma samples from 669 adolescents aged 14–21 years, obtained in the cross-sectional study „Respect for Health" were analyzed for adiponectin, leptin, CML (carboxymethyl lysine, most abundant AGE), RAGE, esRAGE (endogenuos secretory RAGE) and sVAP-1 (soluble vascular adhesion protein-1) levels using commercial ELISA kits. CO was defined as waist-to-height ratio ≥0.50. To compare groups of lean and CO, we used Mann-Whitney test, $p < 0.05$ was considered significant.
Results: In both genders, levels of leptin were significantly higher, and those of adiponectin and both forms of RAGE lower in CO subjects. Concentration of CML was lower in CO girls, with same trend in boys. sVAP-1 levels did not differ between the groups. Data are given in table (mean±SD).
Conclusion: Alterations in AGE/RAGE pathway and adipokine levels are manifested already in centrally obese adolescents, and thus may potentially play a role in development of central obesity-associated cardiometabolic complications in later life.

	Boys		Girls	
	Lean	CO	Lean	CO
Adiponectin (ug/ml)	24.1±1.6	16.5±2.3	45.1±31.4	32.5±22.9
	p=0.002		p=0.037	
Leptin (ng/ml)	2.0±2.8	7.5±7.6	7.7±7.0	18.3±15.6
	p<0.001		p<0.001	
CML (ng/ml)	716±241	641±140	772±167	670±142
	NS		p=0.008	
RAGE (pg/ml)	1750±668	1 496±515	1 686±633	1 368±430
	p=0.008		p=0.002	
esRAGE (pg/ml)	375±203	112±16	364±156	313±133
	p=0.010		p=0.043	
sVAP-1 (ng/ml)	507±238	508±222	538±247	539±247
	NS		NS	

Fig. 1. Data are given as mean±SD. NS – not significant, p≥0.05.

T5:OS2.6

Birth weight as a predictor of blood pressure in children aged 5 to 6 years

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Introduction: Previous research on the relationship between birth weight (BW) and children's blood pressure (BP) shows conflicting outcomes. Studies have been criticised for failing to account for potential confounding factors and/or use of unstandardised BP values. This study considers the relationship between BW and a standardized measure of BP in British children aged 5–6 years having adjusted for potential confounding factors. The relationship is considered overall and also by sex/ethnicity using data from the WAVES study.
Methods: Measured BP and parent reported BW together with age, sex and objectively measured height data were available for 767 children. Based on age, sex and height-standardised US definitions of high BP children were classified as having normal or elevated (pre, stage 1 and stage 2 hypertensive) BP. Multilevel logistic regression (adjusted for weight status, socioeconomic status, sex, ethnicity and age) was used to explore the relationship between BW (in 100g units) and BP.
Results: Overall there was an inverse relationship between BW and current BP. For every 100g increase in BW the odds of having an elevated BP were reduced by 4.2% for SBP (OR=0.958, 95% CIs 0.922–0.994) and 4.7% for DBP (OR=0.953, 95%CIs 0.925–0.982). The outcome for SBP was more evident in girls (OR=0.946, 95%CIs 0.896–0.999) and South Asian (SA) children (OR=0.885, 95%CIs, 0.786–0.996). The outcome for DBP was more evident in boys (OR=0.949, 95%CIs 0.909–0.989) and SA children (OR=0.929, 95%CIs 0.857–0.987).
Conclusion: After adjusting for weight status and other potential demographic confounding factors, higher BW was associated with reduced odds of having elevated systolic or diastolic BP. The association varied by subgroup with both relationships more marked among SA children.

T8:OS2 – Multidisciplinary Treatment

T8:OS2.1

Liraglutide 3.0 Mg: Weight-loss dependent and independent effects

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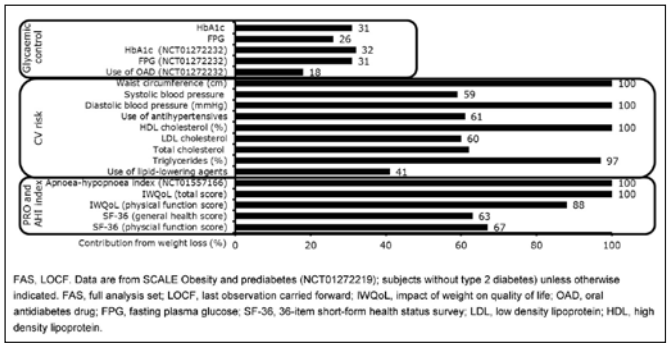
The SCALE trials examined the efficacy and safety of liraglutide 3.0 mg in overweight or obese adults (n=5,358) with or without prediabetes (NCT01272219); with type 2 diabetes (NCT01272232); or with obstructive sleep apnoea (NCT01557166). Liraglutide 3.0 mg resulted in greater reductions in mean body weight (BW) (5.7–8.0% vs 0.2–2.6%) and waist circumference (WC) (4.7–8.2 cm vs 1.2–4.0 cm) compared with placebo (both $p < 0.0001$) and also significantly improved secondary endpoints such as HbA1c, fasting plasma glucose (FPG), blood pressure (BP), lipid profile and use of oral antidiabetic drugs (OADs). Impact of weight on Quality of Life-Lite© (IWQoL-Lite©) scores and the apnoea-hypopnea index (AHI) also improved. This post hoc analysis examined the relative contribution of weight loss (WL) to the treatment effect of liraglutide 3.0 mg on key secondary efficacy endpoints. A mediation model was applied to explain the dependent and independent relationship between WL and secondary efficacy endpoints. The degree to which liraglutide 3.0

mg-induced WL mediated its effects on secondary efficacy endpoints was ranked from 0–100%, where 100% indicated the highest likelihood of a WL-dependent effect. Endpoints predominantly driven by WL with liraglutide included WC, diastolic BP, triglycerides, high density lipoprotein cholesterol levels, AHI and IWQoL-Lite© scores (all ranked 88–100%). Endpoints mainly independent of WL included glycaemic outcomes and use of OADs (ranked 18–32%) (Figure). Importantly, for each endpoint, including those largely independent of WL, lowered BW was a significant contributor to the treatment effect. In conclusion, in individuals that are overweight or have obesity, liraglutide 3.0 mg mediates its effects via both WL-dependent and -independent mechanisms.

Acknowledgement: Supported by Novo Nordisk



FAS, LOCF. Data are from SCALE Obesity and prediabetes (NCT01272219); subjects without type 2 diabetes) unless otherwise indicated. FAS, full analysis set; LOCF, last observation carried forward; IWQoL, impact of weight on quality of life; OAD, oral antidiabetes drug; FPG, fasting plasma glucose; SF-36, 36-item short-form health status survey; LDL, low density lipoprotein; HDL, high density lipoprotein.

Fig. 1: Relative contribution of weight loss on secondary efficacy endpoints with liraglutide 3.0 mg

T8:OS2.2

Efficacy and safety of liraglutide 3.0 Mg in adult overweight and obese weight loss responders without diabetes: Results of the 56-week randomised, controlled, scale obesity and prediabetes trial

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The SCALE Obesity and Prediabetes trial evaluated the efficacy and safety of liraglutide 3.0 mg for weight management in patients without T2D (NCT01272219). This subgroup analysis compared key efficacy and safety outcomes of responders (≥5% weight loss [WL] from baseline) vs non-responders (<5% WL from baseline) for liraglutide 3.0 mg and placebo (PBO) at 56 wks. Overweight/obese individuals (BMI ≥27 kg/m$_{\text{¸}}$ with ≥1 comorbidity or BMI ≥30 kg/m$_{\text{¸}}$) were randomized 2:1 to liraglutide 3.0 mg (n=2487) or PBO (n=1244) as adjuncts to diet and exercise. Mean baseline characteristics were age 45 years, 79% female, body weight 106 kg, BMI 38 kg/m^2, 61% prediabetes. Change from baseline data are LS means with LOCF. At wk 56, more individuals on liraglutide vs PBO were WL responders (63.2% vs 27.1%; p < 0.0001). WL was greater in responders vs non-responders for both liraglutide and PBO (Table). Responders on liraglutide had greater improvements than non-responders across a range of efficacy outcomes. Reductions in FPG and SBP were greater with liraglutide vs PBO for responders and non-responders (Table). Of reported adverse events (AEs), GI AEs were most common and occurred with similar frequency in responders (liraglutide 69.2%; PBO 44.4%) and non-responders (liraglutide 67.2%; PBO 39.6%). Except for gallbladder AEs, AE profiles were similar for responders and non-responders (Table). Mean change in pulse rate from baseline was similar for liraglutide responders and non-responders (Table). In conclusion, more patients on liraglutide 3.0 mg achieved WL ≥5%, with a greater WL seen in the responder population. In both groups, responders had greater improvements in glycaemic, cardiometabolic and health-related QoL outcomes. AE rates were largely equivalent in responders and non-responders.

Acknowledgement: Supported by Novo Nordisk

	Liraglutide 3.0 mg		Placebo	
Efficacy endpoints: change from baseline to week 56	**Responders (N=1536)**	**Non-responders (N=896)**	**Responders (N=331)**	**Non-responders (N=536)**
Weight loss, %	-11.7	-1.7	-10.0	0.1
Weight loss, kg	-12.2	-1.8	-10.8	0.1
Waist circumference cm	-11.1	-3.0	-10.0	-1.8
Body mass index, kg/m^2	-4.4	-0.7	-3.9	0.1
Fasting plasma glucose, mmol/L	-0.5	-0.3	-0.2	0.1
Systolic blood pressure, mmHg	-5.5	-2.0	-3.4	-0.8
Diastolic blood pressure, mmHg	-3.4	-1.3	-3.5	-1.3
IWQoL-Lite, total score	12.7	6.8	13.0	5.9
SF-36 – overall physical health score	4.3	2.1	4.1	1.3
Safety endpoints:	**Responders (N=1536)**	**Non-responders (N=896)**	**Responders (N=331)**	**Non-responders (N=536)**
Pulse rate, bpm (SD)	2.4 (9.9)	2.8 (9.8)	-1.5 (9.2)	0.7 (9.6)
Adverse events, %	93.4	91.4	90.0	82.6
Serious adverse events, %	6.7	5.2	5.7	4.8
Gallbladder Disorders (events/100 PYE)	3.4	1.2	1.2	1.1

Responders, subjects who achieved ≥5% weight loss; Non-responders, subjects who achieved <5% weight loss or who experienced weight gain. Efficacy endpoints are least squared means estimates, LOCF. Pulse data are observed means (SD), LOCF. AEs/SAEs are expressed as proportions of patients reporting treatment emergent events from baseline to week 56 and gallbladder disorders are expressed as events/100 PYE. AE, adverse event; bpm, beats per minute; LOCF, last observation carried forward; PYE, patient years of exposure; SAE, serious adverse event.

Fig. 1. Selected efficacy and safety endpoints for responders and non-responders in the SCALE Obesity and Prediabetes trial.

T8:OS2.3

Adipose tissue morphology predicts improved insulin sensitivity following moderate or pronounced weight loss

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Introduction: Subcutaneous adipocyte size and adipose tissue morphology (adipocyte size in relation to fat mass) associate with insulin resistance. Subjects with adipose tissue morphology characterized by few but large adipocytes (hypertrophy) display reduced insulin sensitivity. We investigated if baseline subcutaneous adipocyte size or adipose tissue morphology predicts improved insulin sensitivity after weight loss.
Methods: Subcutaneous abdominal adipose tissue biopsies were examined in 100 overweight or obese individuals before and ten weeks after a hypo caloric diet (resulting in 7 ± 3% weight loss), and in 61 obese subjects before and two years after gastric by-pass surgery (33 ± 9% weight loss). Adipocyte size was measured by light microscopy and degree of adipose tissue hypertrophy or hyperplasia was calculated in each subject based on the relationship between adipocyte volume and total fat mass. Insulin sensitivity was determined by homeostasis model assessment of insulin resistance (HOMAIR).
Results: At baseline, subjects with hypertrophy had higher HOMAIR values than those with hyperplasia (p < 0.0001). HOMAIR were normalized in both cohorts following weight loss. However, the improvement was more pronounced in subjects with baseline hypertrophy (p = 0.0002–0.027). Adipocyte size predicted HOMAIR improvement only in the surgery cohort. Baseline anthropometric measures such as fat mass, body mass index, waist-to-hip ratio or waist circumference showed no significant association with improved HOMAIR.
Conclusion: Subcutaneous adipose tissue morphology, but not anthropometric measures, predicts improved insulin sensitivity following moderate or pronounced weight loss.

T8:OS2.4

Rate of weight loss does not affect long-term weight regain

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Introduction: Dietary guidelines recommend 'slow'- over 'rapid'-weight loss for the management of obesity. This is based on the belief that slow weight loss is preferential for long-term weight management. However, this notion has not been confirmed by scientific studies in which weight loss in the slow- and rapid-weight loss group was similar. Therefore, the objective of this study was to investigate the effect of rate of weight loss, with similar total weight loss, on long-term weight regain in overweight and obese individuals.

Methods: Fifty-seven participants (BMI: 28–35 kg/m^2) were randomized to a low-calorie-diet (LCD; 1250 kcal/d) for 12 weeks or a very-low-calorie-diet (VLCD; 500 kcal/d) for 5 weeks. Both groups subsequently underwent a 4-week weight-stable period followed by a 9-month follow-up. Weight and body composition (BodPod) were determined at 4 time points (Figure 1).

Results: Diet-induced weight loss was similar in both groups (LCD: –9.1% and VLCD: –10.0%, p = 0.26, Figure 2). Interestingly, regain of lost weight after follow-up was not significantly different between groups (LCD: +58.6% and VLCD: +54.7%, p = 0.78). Fat-free mass (FFM) loss induced by the diet was higher in the VLCD-group compared to the LCD-group (p < 0.05) and was associated with weight regain during follow-up (whole group: r=0.325, p = 0.018). However, the difference in mean FFM loss between the groups was too small to translate into differences in mean weight regain.

Conclusion: The present study showed that, with similar total weight loss of approximately 10% of initial weight, the rate of weight loss did not affect long-term weight regain. Dietary recommendations concerning the rapidity of weight loss should be critically reviewed in light of recent scientific evidence.

Fig. 1. Study overview. Body weight and body composition were determined before and after the diet (T1 and T2 respectively), after the weight-stable period (T3) and after 9-month follow-up (T4). LCD: low-calorie-diet, VLCD: very-low-calorie-diet.

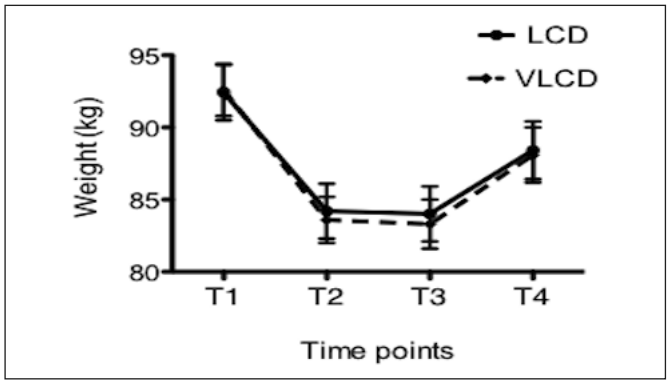

Fig. 2. Body weight at time points T1, T2, T3 and T4 (same as indicated in Figure 1) in the LCD-group and VLCD-group. LCD: low-calorie-diet, VLCD: very-low-calorie-diet.

T8:OS2.5

Weight loss under treatment of hypogonadal men with testosterone undecanoate injections (TU): Long-term experience of 21.678 patient-months from a single urologist's office registry

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Introduction: This registry assesses long-term effectiveness and safety of TU in a urological setting. **Material and**

Methods: Observational, prospective, cumulative registry study: 347 men (age: 57.32 ± 7.12 years) with total testosterone (T) levels ≤12.1 nmol/L and hypogonadal symptoms received TU 1000 mg/12 weeks following an initial 6-week interval for up to 7 years. Anthropometric parameters were measured every 3 months.

Results: This cohort represented a mixed population with a variety of comorbidities: type 2 diabetes mellitus (n=126, 36.3%), cardiovascular disease (n=68, 19.6%), inflammatory bowel diseases (IBD; n=61, 17.6%), osteoporosis (n=61, 17.6%), Klinefelter's syndrome (n=36, 10.4%), psoriasis (n=15, 4.3%). 4.3% had normal waist circumference (WC; <94 cm), 30.8% elevated (94 to 102), and 64.8% substantially elevated (≥102 cm). 7.5% had normal weight, 22.8% were overweight, and 69.7% obese. WC decreased progressively from 105.77 ± 8.6 to 97.74 ± 7.05 cm, weight from 103.87 ± 16.38 to 87.82 ± 8.99 kg, and BMI from 33.18 ± 5.35 to 28.42 ± 2.95 kg/m^2 with statistical significance vs previous year for all three measures over the entire observation period. Weight loss was 16.67 ± 7.7% at 7 years. During the first treatment year and before joining the registry, approximately 5% of patients decided against continuing TRT. Once in the registry, no further dropouts were recorded. During the entire observation time, no major adverse cardiovascular event occurred.

Conclusions: Long-term TRT with TU in an unselected cohort of hypogonadal men resulted in improvements in a variety of anthropometric and metabolic parameters. Long-term TU was well tolerated and excellent adherence suggested a high level of patient satisfaction.

T8:OS2.6

The utility of obesity staging classification systems in selecting persons for bariatric surgery

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Introduction: Increasing numbers of obese people calls for development of evidence based criteria to prioritize the right type of treatment to those that can benefit most. The King's Obesity Staging Criteria (KOSC) comprises a set of health related domains graded into stage 0, 1, 2, or 3. We aimed to examine whether patients undergoing bariatric surgery differed from those opting for conservative treatment, according to KOSC.

Methods: 2188 consecutive morbidly obese patients who attended our tertiary care center from 2005–10 were graded in the following KOSC domains; airway/apnoea, BMI, CVD-risk, diabetes, economic complications, functional and gonadal axis, perceived health status, body image and eating behavior. Stages 0–1 represent minor health risk, while stages 2–3 represent established clinical, metabolic, and socio-psychological states linked to obesity.

Results: Out of 2188 patients, a total of 1213 (55%) patients received lifestyle intervention only, 816 (37%) bariatric surgery only and 159 (7%)

patients received lifestyle intervention and subsequent bariatric surgery. Compared to those who received lifestyle intervention, the patients treated with bariatric surgery were younger (42 vs. 44 years, $p < 0.001$), had a higher BMI (45.3 vs. 43.3 kg/m^2, $p < 0.001$) and had a lower 10 year estimated CVD-risk (10 vs. 12%, $p = 0.01$). The treatment groups were not statistically different in the obesity staging categories (Figure). Compared to those with the reference BMI of 35–50 kg/m^2, participants with BMI 50–60 kg/m^2 had higher odds (OR 1.64, 95% CI 1.26–2.10) of being selected for bariatric surgery.
Conclusion: Our data indicate that increasing BMI, rather than an individual patient's health risks and manifest morbidity, predicted treatment choice in morbidly obese patients.

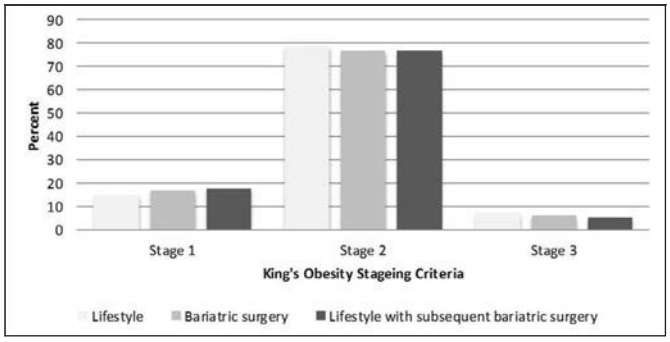

Fig. 1. Obesity treatment by the King's Obesity Staging Criteria. None of the study participants were categorized in stage 0.

Saturday, 9 May, 2015

T1/T2:OS3 – Adipose Tissue Mass and Function

T1/T2:OS3.1

Effects of 5-year growth hormone supplementation therapy on subcutaneous adipose tissue phenotype and adipokine profile in adult growth hormone deficiency

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Introduction: Adult growth hormone deficiency (GHD) is associated with central adiposity, enlarged adipocytes and shifts in adipose tissue adipokine profile that might contribute to the whole body metabolic derangements (dyslipidemia, glucose intolerance, insulin resistance). We investigated effects of 5-year GH supplementation on subcutaneous adipose tissue (SAT) phenotype (n=17) and adipokine profile (n=11) in GHD adults in comparison to age, BMI & gender-matched controls (n=17/11).
Methods: Metabolic phenotyping included euglycemic hyperinsulinemic clamp (EHC), oral glucose tolerance test (oGTT) & MRI (abdominal fat distribution). Samples of subcutaneous abdominal adipose tissue (SAT) were obtained by needle biopsy and adipokine profile was determined by protein cytokine arrays (RayBio). Fat cell size was measured morphometrically.
Results: GH supplementation decreased fat cell size by 13,3% (114,0 vs 98,8μM) and improved adipose tissue insulin sensitivity (EHC: insulin-induced suppression of FFA; 0,35 vs 0,04mM) and whole body glucose tolerance (oGTT: 2h glycemia; 7,94 vs 6,02mM) by 88,6 and 24,2% , resp., without affecting whole body insulin sensitivity or adiposity. Over two-fold changes in SAT adipokine proteins expression included proteins involved in adipocyte proliferation and differentiation (BMP4, EGF, M-CSF, SCF), angiogenesis (BDNF, angiogenin, SDF1, GCP2), neurogenesis (BDNF, CNTF, GDNF, SDF1), browning (BMP4), metabolism (IGF1) and inflammation (MCP1, MCP4, IL2, IL3, IL5, IL10, IL13, M-CSF, MDC, eotaxin, IFNγ).
Conclusion: Five-year growth hormone supplementation to GHD adults modulated subcutaneous adipose tissue adipokine profile, with beneficial effects for adipose tissue growth, differentiation and metabolism.

Acknowledgement: Pfizer Investigator Initiated Research Grant, EFSD New Horizons

T1/T2:OS3.2

A role for Wnt signaling in the reversal of metabolic disturbances after gastric bypass in obese mice

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Introduction: Gastric bypass surgery has beneficial effects on obesity-induced metabolic disturbances, but the underlying mechanisms remain unclear. As Wnt genes are positively and negatively correlated with obesity, diabetes, insulin resistance and beta cell dysfunction, our main aim is to reveal a potential role for Wnt signaling in the reversal of these metabolic consequences after gastric bypass surgery in mice.
Methods: 8-weeks old male C57Bl/6 mice were fed a high fat diet (60 kcal% fat) for 14 weeks, followed by either Roux-en-Y gastric bypass (RYGB; n=13) or Sham surgery (Sham; n=10). After surgery, mice were maintained on a high fat diet for another 8 weeks (Sham group was pair fed with the RYGB group). Using RNA-Seq and qRT-PCR, the mRNA expression profile of Wnt ligands and its antagonists (i.e. secreted Frizzled-related proteins (sFRP)) was determined in pancreatic islets and epididymal white adipose tissue of RYGB and Sham mice.
Results: 8 weeks post-surgery, Sham mice returned to their pre-surgery weight (43.4 g ± 6.9), whereas RYGB mice showed a 43% reduction in body weight, accompanied by improved metabolic parameters, as compared to Sham mice ($P < 0.01$). Despite a 3-fold reduction in fasting insulin levels in RYGB as compared to Sham mice ($P < 0.05$), the mRNA expression level of Wnt ligands and sFRP was similar in pancreatic islets. In contrast, epididymal adipose tissue of RYGB mice showed a 75% and 94% decrease in sFRP4 and sFRP5 mRNA expression levels respectively as compared to Sham mice ($P < 0.01$). Additionally, a trend towards decreased mRNA expression of Wnt5a and Wnt5b could be detected in RYGB as compared to Sham mice ($P = 0.1$).
Conclusion: RYGB surgery strongly reduced the expression level of the secreted Wnt antagonists sFRP4 and sFRP5 in white adipocyte tissue. As secreted proteins are interesting drug targets, a potential role for these secreted proteins in the reversal of metabolic disturbances after RYGB surgery will be studied more in depth.

Acknowledgement: Research relating to this abstract was funded by the Flemish Research Foundation (FWO G085713N). M.M. is a postdoctoral fellow supported by the Flemish Research Foundation (FWO).

T1/T2:OS3.3

Dysregulation of lipid droplet-associated rab proteins in adipocytes as a novel pathogenic component in the development of insulin resistance in obesity

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Introduction: Lipid droplets (LDs) are essential subcellular organelles responsible for lipid storage in adipocytes. LDs are surrounded by a phospholipid monolayer that harbors a variety of proteins, including several members of the Rab family of GTPases such as Rab18, which regulates lipid traffic to and from LDs. Investigating how LD-associated Rabs are regulated is pivotal to the understanding of the regulation of lipid storage and mobilization in adipocytes and their contribution to lipotoxicity and metabolic disease.
Methods: Data from two comparative proteomic studies [LDs isolated from control vs. insulin-stimulated 3T3-L1 cells; omental adipose tissue of lean subjects vs. normoglycemic (NIR) or insulin resistant (IR) obese subjects] were screened to identify potential regulators of Rab proteins. One protein was selected (Rab-GDP dissociation inhibitor 2, GDI2) and further characterized.
Results: GDIs inhibit the dissociation of GDP from Rabs, thus preventing their activation and recruitment to target membranes. Accordingly, overexpression of GDI2 in 3T3-L1 cells reduced both lipogenesis and lipolysis and concomitanty inhibited the association of Rab18 to the LD surface. Notably, the expression of GDI2 and/or the distribution of Rab18 were significantly altered in in vitro models of insulin resistance. Finally, GDI2 was up-regulated in the adipose tissue of IR obese subjects as compared to NIR obese or lean subjects.
Conclusions: Our data suggests that the up-regulation of GDI2 and subsequent impaired recruitment of Rab proteins to the LD surface contribute to the dysregulation of lipid metabolism observed in obese subjects and highlight the relevance of Rab proteins and their regulators as pathogenic components in the development of insulin resistance.

Acknowledgement: This work was supported by MINECO/FEDER (BFU2010-17116; BFU2013-44229-R), J. Andalucía/FEDER (CTS-6606; PI-0200/2013), and CIBERobn (Instituto de Salud Carlos III), Spain.

T1/T2:OS3.4

Metabolipidomical profiling of adipose tissue during lipolysis

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Introduction: Metabolipidomical analysis of adipose tissue covers measurement of both water-soluble metabolites like Krebs cycle intermediates, and water-insoluble metabolites – bioactive and storage lipids. Our goal is to characterize complex metabolism of adipose tissue – lipolysis pathway – and interaction between adipocytes and macrophages.
Methods: Mature adipocytes were isolated using collagenase from epididymal adipose tissue of adult C57BL/6J mice. Adipocytes were incubated in the presence of RAW 246.7 or bone marrow-derived macrophages (0.2 mil cells and 50 µl of adipocyte suspension). Aliquots of the original tissue, as well as cells and medium after the incubation were stored in liquid nitrogen. Free glycerol and fatty acids were measured in media to estimate a rate of re-esterification. Cell, tissue and media samples were extracted for metabolipidomical profiling – levels of oxylipins and endocannabinoids were measured using RP-LC-MS/MS techniques – profiles of glycerolipids and triacylglycerols, were measured using shotgun lipidomical approach – and Krebs cycle intermediates and nucleotides were measure with HILIC-LC-MS/MS method.
Results: Using this metabolipidomical approach, we were able to detect changes related to altered lipolytical rate. Eicosanoids released from adipose tissue, adipocytes, macrophages or the co-culture after isoproterenol stimulation might serve as adipose tissue-derived signals for other cells in vicinity. Changes in glycerolipid / triacylglycerol profiles illustrate remodeling of acyl chains. Levels of Krebs cycle intermediates as well as energetic equivalents demonstrate the flux and demands for energy during lipolysis/ fatty acid re-esterification.

T1/T2:OS3.5

Depot differences in adipose tissue oxygen tension are associated with metabolic and cardiovascular risk in overweight and obese woman

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Background: Upper and lower-body fat depots exhibit opposing associations with obesity-related cardiometabolic diseases. Recent data indicate that adipose tissue (AT) oxygen tension (AT PO2) is related to AT dysfunction. We compared in vivo ATPO2 in abdominal and femoral subcutaneous (sc) AT in overweight/obese women, and examined depot-specific effects of oxygen tension on metabolism and inflammation.
Methods: 8 overweight/obese (BMI 34.2 ± 1.9 kg/m^2) post-menopausal women with impaired glucose metabolism were included. AT PO2 was assessed in abdominal and femoral sc AT using microdialysis-based optochemical measurements. Furthermore, AT blood flow (ATBF) (133Xe wash-out), insulin sensitivity (hyperinsulinemic-euglycemic clamp) and body composition (DEXA) were measured. AT biopsies were collected for gene/protein expression analysis and cell culture experiments to determine effects of AT PO2 (5 vs. 10 vs. 21% O2) on adipogenic differentiation, adipokine expression and secretion, mitochondrial oxygen consumption and glucose uptake.
Results: AT PO2 was significantly higher in abdominal compared to femoral sc AT (62.7 ± 6.6 vs. 50.0 ± 4.5 mmHg, p = 0.017), despite lower ATBF in abdominal than femoral AT (1.8 ± 0.3 vs. 2.8 ± 0.5 ml/100g tissue/min, p = 0.028). Interestingly, abdominal sc AT PO2 was positively associated with BMI (r=0.89, p = 0.01), systolic (r=0.86, p = 0.01) and diastolic (r=0.79, p = 0.03) blood pressure, and 2h-glucose level (r=0.82, p = 0.02). Results of the cell culture experiments will be available at the time of the meeting.
Conclusion: This study demonstrated for the first time that AT PO2 was significantly higher in abdominal than femoral subcutaneous AT of overweight/obese women, despite slightly lower ATBF, and may contribute to increased cardiometabolic disease risk.

T1/T2:OS3.6

Identification and characterization of human adipocyte progenitors by expansion of their vascular niche

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Adipose tissue expandability has conferred evolutionary advantages that are now being undermined by the emergence of obesity and metabolic disease. Major gaps in our understanding of normal and pathogenic human adipose tissue growth are the identity of adipocyte progenitors and the mechanisms that control their proliferation and differentiation. Here

we report that human adipocyte progenitors proliferate in conjunction with adipose tissue capillaries and describe methods whereby they can be clonally isolated from human adipose tissue. These progenitors are amenable to expansion, differentiate in response to classic adipogenic stimuli and survive as adipocytes when implanted into immunodeficient mice. Unexpectedly, adipocytes differentiated from these progenitors strongly (>100-fold) induce the brown adipocyte-specific uncoupling protein-1 in response to adenylate cyclase activation, resulting in a thermogenic phenotype characterized by uncoupled oxygen consumption. These results thus identify human brite/beige progenitor cells associated with expanding adipose tissue vasculature, and suggest that browning of adipose tissue occurs in response to capillary network growth in response to hemodynamic stress.

Acknowledgement: This study was funded by National Institutes of Health grant DK089101.

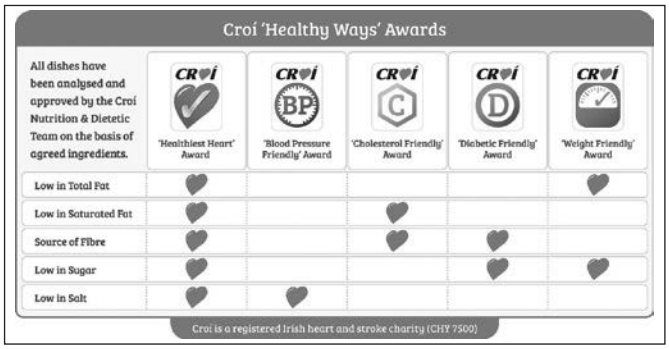

Fig. 1. Heart Healthy Menu Awards

T6/T7:OS3 – Actions for Change

T6/T7:OS3.1

Adressing the obesity epidemic through a novel user-friendly approach to menu labelling in the west of ireland

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Introduction: With eating out-of-home becoming more common, menu labelling has garnered growing public and legislative support as a potential strategy for addressing the obesity epidemic. The aims of this research were to examine the impact of novel and user-friendly heart healthy awards on consumers buying behaviour and to explore perceptions of this initiative from food establishment's perspectives.
Methods: This quasi-experimental study recruited a convenience sample of eight food establishments; all with at least one menu item meeting the heart healthy award criteria. Sales of all menu items sold over an eight week period were tracked; 4 weeks prior to and 4 weeks during display of the awards on their menus. In addition, structured interviews were conducted with staff from each food establishment.
Results: The interviews revealed that consumer demand was the main reason for engaging in the programme. Notably, half of the food establishments made changes to their food practices to improve nutritional profile as a consequence of the programme. The absolute change in menu item sales showed a clear trend towards an increase in heart-healthy menu item selections with an increase of 556 of the healthier menu items sold over the 4 week period. The study was underpowered to detect a statistically significant difference.
Conclusion: The provision of heart-healthy awards on menus may potentially be an important element of a comprehensive obesity prevention strategy. Menu labelling may provide consumers with the information they need to make healthier choices and may also encourage food establishments to improve the nutritional profile of the foods they offer. As the current study used a small convenience sample of food establishments, larger scale studies are warranted.

T6/T7:OS3.2

Can front-of-pack nutrition labelling help consumers choose foods for a healthful diet?

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Introduction: The aim of this study was to find out whether hypothetical aliquots of homogenised healthful diets meet the UK's multiple traffic light (MTL) nutrient profile requirements for green lights for total fat, saturated fat, total sugars and salt.
Methods: The nutrient composition of 7 days' menus for the US MyPlate and DASH Eating Plan were derived using the USDA nutrient database (Release 27). The total diet was expressed either per 100g for foods or per 100ml for beverages. A healthful diet was also developed from packaged foods using MTL labels to help guide selection.
Results: The MyPlate and DASH diets met the WHO guidelines for total fat, saturated fat and salt, while total sugars provided 22.2 ± 7.5, and 23.3 ± 4.1% energy, respectively (n=7 days, mean ± SD). For both diets, the foods achieved MTL green lights for saturated fat and salt, and beverages for total fat, saturated fat, and salt. All other nutrients achieved only amber lights, with the foods in the MyPlate diet providing 4.9 ± 1.6 g total fat/100g and 6.3 ± 2.2 g total sugars/100g, and the beverages providing 4.5 ± 1.8 g total sugars/100ml. The corresponding amber light values in the DASH Eating Plan were 4.5 ± 0.4 g total fat /100g and 5.7 ± 1.3 g total sugars/100g for foods, and 7.0 ± 0.8 g total sugars/100ml for beverages. A "packaged foods" diet with 4 green lights for foods and beverages provided 21.2% energy from total fat, 8.3% from saturated fat, 23.3% from total sugars and 5.4g salt.
Conclusion: The MTL label is intended to help guide product choice for a healthful diet, but in practice this was found to be difficult to achieve because of the strict thresholds for total fat and total sugars.

T6/T7:OS3.3

The effect of calorie-labelling of meals on macro- and micro-nutrients chosen by young-adults over 9-months

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Background: Calorie-labelling has been introduced as a tool to help consumers to control calorie-intake when eating out-of-home. To date, there is limited evidence on whether calorie-labelling has an impact on calories chosen and no evidence on the effect of it on other macro- and micro-nutrients. The aim of this study was to assess the impact of calorie-labelling on energy, macro- and micro-nutrients chosen.
Methods: Young adults were observed when choosing meals over three study-periods, period 1: with calorie-labels (20 weeks), period 2: with-

out calorie-labels (10 weeks), period 3: with calorie-labels and estimated energy requirements (10 weeks). Meal-choices were analysed using a nutritional software (WinDiets, 2011). ANOVA was carried out to test for differences between macro- and micro-nutrients during the three periods (SPSS 21, Chicago inc).
Results: Energy, four macro- and 19 micro-nutrients levels were derived from 4,200 meals. Mean (SE) for key macro- and micro-nutrients were for Period 1: energy = 661 (6.9) kcal, fat = 31.5 (0.4) g, saturated fat = 10.5 (0.2) g, Vit C = 79.8 (2.9) mg, Vit D = 17.1 (2) mg, Ca = 271.5 (29.5) mg, Na = 1,242 (51) mg. Period 2: energy = 723 (7) kcal, fat = 34.7 (0.4) g, saturated fat = 12 (0.2) g, Vit C = 86.6 (3) mg, Vit D = 26.8 (2.6) mg, Ca = 354 (33) mg, Na = 1,351 (50.4) mg. Period 3: energy = 585 (5.9) kcal, fat = 27.3 (0.4) g, saturated fat = 8.6 (0.2) g, Vit C = 77.2 (2.9) mg, Vit D = 14 (1.7) mg, Ca = 271 (32.9) mg, Na = 1,232 (61.7) mg. All macro- and micro-nutrients, except for B1, Vit C, Vit E, Ca and Na, were significantly different between the three periods ($p < 0.001$).
Conclusions: Calorie-labelling resulted in reduced calorie, fat, saturated fat contents of the meals chosen, without compromising the provision of micronutrients, which were all above recommended daily amounts.

Acknowledgement: Authors would like to thank the catering staff for posting the calorie-labels for a period of nine months.

T6/T7:OS3.4

Diet and physical activity interventions to prevent or treat obesity in South Asian children and adults: A systematic review and meta-analysis

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Aim: To assess the effectiveness of interventions to prevent or treat obesity in South Asian populations.
Methods: Systematic review of lifestyle interventions of any duration, in South Asian children or adults in any country that reported an anthropometric measure. There was no restriction on type of comparator; RCTs, CCTs, and before-after studies were included.
Results: 29 studies were included, 7 children, 21 adult and one mixed age. 16 studies were conducted in South Asia, 10 in Europe and 3 in USA. Effective trials included physical activity interventions in South Asian men in Norway and South Asian school children in the UK. Meta-analyses of interventions in children showed no significant difference between intervention and control. Meta-analyses in adults showed improvement in weight in data from two trials adjusted for baseline differences (-1.82 kgs, 95% CI –2.48 to –1.16) and in unadjusted data from three trials following sensitivity analysis (-1.20 kgs, 95% CI –2.23 to –0.17). There was no evidence that interventions were more or less effective by country or socio-economic status. **Conclusions:** Meta-analysis found an unclear picture of the effects of interventions on BMI for South Asian children, but did show an improvement in weight (but not BMI or waist circumference) for adults. Evidence of culturally appropriate approaches to and characteristics of, effective interventions in adults were also identified. The protocol for this systematic review was registered with PROSPERO (registration no. CRD42014008800).

T6/T7:OS3.5

Are weight management programmes cost-effective?

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Objective: As part of the NICE guidance on adult Lifestyle Weight Management programmes, the UK Health Forum used a health and economic model to estimate the potential health and economic consequences of running weight management programmes in UK adults.
Methods: We developed an economic evaluation model capable of considering the impact of future changes in body mass index on health and related healthcare costs for adults. Incremental cost-effectiveness ratios, quality-adjusted life year, savings over several different time horizons were estimated. Five interventions were modelled, for example, comparing individual weight loss programmes lasting either 6, 12 or >12 months in length, a weight loss programme involving group sessions; an individual weight loss programme but with supervision from a health professional and finally a weight loss programme that included a combination of different group and supervision sessions. A sensitivity analysis of the critical parameters was also carried out.
Results: Results (Fig. 1) showed that interventions resulted in between 0.3kg/m^2 (<12month programme) and 3kg/m^2 weight loss (combination programme). Modelling showed that most interventions investigated were cost-effective but only if the rate of regain of BMI was low (<5%, depending on age and sex categories). The sensitivity analysis shows that the critical elements in the likely cost effectiveness are gender, initial BMI, age, rate of regain of BMI and the intervention cost.
Conclusion: Given the impact of 'yoyo dieting' and frequent weight regain following trials, the NICE modelling results suggested that continuous weight management interventions over the lifecourse to help prevent obesity-related diseases and reduce the total cost to health services are necessary.

Parameters of Interest	Intervention 1	Intervention 2	Intervention 3	Intervention 4	Intervention 5
			Female		
BMI 25 kg/m² Age 30-39	5%	10%	10%	15%	15%
BMI 25 kg/m² Age 30-39	5%	10%	10%	20%	20%
BMI 25 kg/m² Age 40-49	5%	20%	25%	25%	30%
BMI 25 kg/m² Age 50-59	30%	>50%	50%	>50%	<50%
BMI 25 kg/m² Age 60-69	50%	>50%	50%	>50%	<50%
BMI 30kg/m² Age 20-29	15%	25%	30%	40%	40%
BMI 30 kg/m² Age 30-39	15%	25%	30%	40%	<50%
BMI 25 kg/m² Age 40-49	15%	25%	30%	40%	<50%
BMI 30 kg/m² Age 50-59	15%	25%	30%	40%	40%
BMI 30 kg/m² Age 60-69	20%	30%	30%	40%	<50%
BMI 35 kg/m² Age 20-29	5%	10%	<50%	10%	<50%
BMI 25 kg/m² Age 30-39	5%	15%	<50%	15%	<50%
BMI 35 kg/m² Age 40-49	10%	20%	<50%	20%	<50%
BMI 35 kg/m² Age 50-59	15%	25%	<50%	25%	<50%
BMI 25 kg/m² Age 60 69	15%	25%	<50%	25%	<50%
BMI 40kg/m² Age 20-29	50%	50%	40%	40%	<50%
BMI 40 kg/m² Age 30-39	30%	30%	40%	50%	<50%
BMI 40 kg/m² Age 40-49	30%	30%	40%	40%	40%
BMI 40 kg/m² Age 50-59	30%	40%	40%	40%	40%
BMI 40 kg/m² Age 60 69	30%	40%	40%	40%	40%
			Male		
BMI 25 kg/m² Age 30-39	5%	5%	10%	10%	10%
BMI 25 kg/m² Age 30-39	5%	5%	10%	15%	15%
BMI 25 kg/m² Age 40-49	5%	10%	15%	30%	30%
BMI 25 kg/m² Age 50-59	5%	25%	40%	>50%	40%
BMI 25 kg/m² Age 60 69	5%	25%	40%	>50%	<50%
BMI 30kg/m² Age 20-29	20%	30%	30%	40%	<50%
BMI 30 kg/m² Age 30-39	20%	30%	30%	40%	<50%
BMI 25 kg/m² Age 40-49	20%	30%	30%	40%	<50%
BMI 30 kg/m² Age 50-59	20%	30%	30%	40%	<50%
BMI 30 kg/m² Age 60-69	25%	50%	50%	40%	<50%
BMI 35 kg/m² Age 20-29	5%	10%	40%	50%	<50%
BMI 35 kg/m² Age 30-39	5%	15%	40%	50%	<50%
BMI 35 kg/m² Age 40-49	10%	20%	40%	50%	<50%
BMI 35 kg/m² Age 50-59	15%	25%	40%	50%	<50%
BMI 35 kg/m² Age 60-69	15%	25%	40%	50%	<50%
BMI 40kg/m² Age 20-29	50%	>50%	<50%	<50%	<50%
BMI 40 kg/m² Age 30-39	30%	40%	<50%	<50%	<50%
BMI 40 kg/m² Age 40-49	30%	>50%	<50%	<50%	<50%
BMI 40 kg/m² Age 50-59	30%	>50%	<50%	<50%	<50%
BMI 40 kg/m² Age 60 69	30%	40%	<50%	<50%	<50%

Fig. 1. The rate of regain of BMI [% per annum] for which the weight management programme is no longer cost effective.

T6/T7:OS3.6

Effect of a childhood obesity prevention programme on blood pressure in uk south asian primary school children: The beaches study

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Introduction: Childhood obesity is associated with increased cardiometabolic risk, including elevated blood pressure (BP). Behavioural interventions in overweight children have been shown to significantly reduce BP, and evidence suggests that school-based obesity prevention programmes have a favourable effect on BP. This study examines the effect of a school-based childhood obesity prevention programme on BP in South Asian (SA) children aged 6–8 years using data from the Birmingham healthy Eating and Active lifestyle for CHildren Study (BEACHeS; a phase II feasibility study). SA are an important target group as they are vulnerable to the cardiometabolic effects of obesity.
Methods: 8 primary schools in Birmingham, UK participated. Children in 4 schools received a 1 yr programme targeting diet and physical activity.

Objectively measured height, weight and BP data were available pre- and post-intervention for 230 and 245 children in the intervention and control arms respectively (89% SA). Multiple linear regression models were developed for systolic and diastolic blood pressure (SBP and DBP) to estimate differences in the study arms post-intervention.
Results: In unadjusted analyses, SBP and DBP were significantly lower in the intervention arm compared with control (-2.48 mmHg for SBP (95%CI: –4.50, –0.45), –1.96 mmHg for DBP (95%CI: –3.72, –0.20)). These differences remained after adjustment for sex, age, ethnicity, height, baseline BP and post-intervention BMI z-score (-2.08 mmHg for SBP (95%CI: –4.00, –0.17), –1.97 mmHg for DBP (95%CI: –3.70, –0.24)).
Conclusions: The BEACHeS programme lowered SBP and DBP in young SA school children by approximately 2 mmHg. This translates into a significant reduction in cardiometabolic risk in this vulnerable population.

Acknowledgement: The NPRI funding partners for the study are: British Heart Foundation; Cancer Research UK; Department of Health; Diabetes UK; Economic and Social Research Council; Medical Research Council; Research and Development Office for the Northern Ireland Health and Social Services; Chief Scientist Office, Scottish Executive Health Department; Welsh Assembly Government and World Cancer Research Fund.

T3:OS3 – Genes and Metabolic Function

T3:OS3.1

Fluoxetine induces plasticity in hypothalamic circuits controlling leptin sensitivity and food intake

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Introduction: Leptin (LEP), a satiety hormone secreted by white adipose tissue, signals to the brain, namely the arcuate nucleus of the hypothalamus (ARC), the status of the energy stores and acts by activating the anorectic POMC neurons and by inhibiting the orexigenic NPY neurons. LEP discovery represented a promising pharmacological therapy for obesity, but treatment of obese patients has substantially failed. Indeed obese patients display high plasmatic LEP levels, suggesting resistance to this hormone. Our previous work has shown that hypothalamic LEP sensitivity can be enhanced in mice via environmental cues, that promote neural plasticity. Fluoxetine (FLX), a selective serotonin reuptake inhibitor, is widely used for treating major depression and is known to induce neural plasticity in the sensory systems of adult rodents. Aim of this study is to investigate FLX effects on hypothalamic plasticity and LEP sensitivity in adult mice.
Methods: Adult mice were treated for 3 wks with FLX added to drinking water. Body weight and food intake were monitored. LEP sensitivity was assessed by monitoring food intake after LEP injection and by calculating the activation level of STAT3 by immunofluorescence. Hypothalamic plasticity was assessed by quantifying the excitatory and the inhibitory inputs on POMC and NPY neurons by immunofluorescence.
Results: We observed a significant reduction in body weight and increased locomotor activity, and a higher sensitivity to LEP anorectic action. We looked for molecular correlates of these modifications: in the ARC, FLX induced a stronger signaling activation in response to LEP and significant rearrangements of synaptic excitation/inhibition ratio on NPY and POMC neurons.
Conclusion: Our results indicate that FLX treatment enhances LEP sensitivity in adulthood by modulating neuronal response and by stimulating neural plasticity in the ARC.

T3:OS3.2

Impact of caloric restriction on gut barrier integrity in obese women

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Introduction: This study addresses the hypothesis that a disrupted gut barrier function contributes to subclinical inflammation in obesity. Specific aim of the study was to investigate whether caloric restriction affects gut permeability and decreases gut-derived inflammatory load in obese women.
Methods: 20 obese women (BMI 34.9 ± 3.8kg/m^2) underwent a caloric restriction protocol of 800 kcal/d (formula diet, kindly provided by MODIFAST®, Nutrition & Santé, France) with additional 200g of vegetables for 28 days. Anthropometric and clinical parameters, gut permeability and insulin sensitivity were analysed before and immediately after intervention. To assess gut permeability we used a standardized four-sugar-test (mannitol, lactulose, sucrose, sucralose) and measured plasma zonulin and lipopolysaccharide binding protein (LBP).
Results: The dietary intervention induced a mean weight loss of 6.9 ± 1.9kg. In parallel, total cholesterol, HDL-cholesterol, LDL-cholesterol, triacylglycerides and fasting blood sugar values showed significant reductions. HOMA-IR, chemerin, leptin, hsCRP and LBP decreased, whereas RANTES and MCP-1 were unaffected. The intestinal permeability marker zonulin was significantly reduced after weight loss, and the sugar absorption test indicated a significant improvement of the intestinal barrier.
Conclusion: Our findings demonstrate that a four-week dietary restriction plus weight loss improves gut barrier integrity in obese women.

T3:OS3.3

Fine mapping of a GWAS-derived obesity candidate region on chromosome 16p11.2

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Large-scale genome-wide association studies (GWASs) have identified 32 chromosomal loci associated with increased body mass index in population-based studies on adults. One of these SNPs, rs7359397, tags a large region (approx. 1MB) with high linkage disequilibrium (r^2>0.7), which comprises five genes (SH2B1, APOBR, sulfotransferases: SULT1A1 and SULT1A2, TUFM). We had previously described a rare mutation in SH2B1 solely identified in extremely obese individuals but not in lean controls. The coding regions of the genes APOBR, SULT1A1, SULT1A2, and TUFM were screened for mutations (dHPLC, SSCP, Sanger re-sequencing) in 95 extremely obese children and adolescents. Detected

non-synonymous variants were genotyped (TaqMan® SNP Genotyping, MALDI TOF, PCR-RFLP) in independent large study groups (up to 3,210 extremely obese/overweight cases, 485 lean controls and 615 obesity trios). In silico tools were used for the prediction of potential functional effects of detected variants. Except for TUFM we detected non-synonymous variants in all screened genes. Two polymorphisms rs180743 (APOBR Pro428Ala) and rs3833080 (APOBR Gly369 Asp370del9) showed nominal association to (extreme) obesity (uncorrected p = 0.003 and p = 0.002, respectively). In silico analyses predicted a functional implication for rs180743 (APOBR Pro428Ala). Both APOBR variants are located in the repetitive region with unknown function. Variants in APOBR contributed as strongly as variants in SH2B1 to the association with extreme obesity in the chromosomal region chr16p11.2. In silico analyses implied no functional effect of several of the detected variants. Further in vitro or in vivo analyses on the functional implications of the obesity associated variants are warranted.

T3:OS3.4

Cardiorespiratory fitness, body composition and health related quality of life 2 years after Roux-en-Y gastric bypass surgery in adolescents

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Introduction: Obesity in adolescents is a worldwide health problem. We have previously shown promising results two years after Roux-en-Y gastric bypass surgery on weight loss, metabolic risk markers and quality of life in adolescents – the AMOS study. The aim of the current study was to describe the two-year outcome in cardiorespiratory fitness, body composition, physical activity and the relationship with health-related quality of life for adolescents in a subset of the AMOS study.
Methods: Forty-one adolescents (10 boys, 31 girls, age 14–18 years, body mass index 35–69 kg•m-2) were included and underwent surgery. In addition to anthropometrical measurements participants performed a sub maximal bicycle test, a six minute walk test, dual-energy X-ray absorptiometry and the Short Form-36 Health Survey as well as a short interview at baseline, one and two years after surgery.
Results: Relative VO2max per kg body mass (+51%) and per kg fat-free mass (+18%) as well as walking distance (+14%) were significantly increased one year and persisting two years after surgery compared to baseline. Despite a reduction of fat-free mass (-9.8 ± 5.2 kg) absolute VO2max was maintained (+9%, ns) and significantly increased in non-smokers. Body mass and fat mass was significantly decreased (-45.4 ± 18.9 kg and –33.6 ± 13.4 kg respectively). Self-reported physical activity was significantly increased and health-related quality of life was improved or unchanged.
Conclusion: Roux-en-Y surgery in obese adolescents significantly improved relative VO2max, functional capacity, physical activity and body composition over two years. Absolute VO2max increased in non-smokers despite a reduction in fat-free mass indicating an improved metabolism and cardiorespiratory function. This has not been observed in adults and indicates that it may be better to perform obesity surgery early in life.

T3:OS3.5

What is the role of fat-free mass and resting metabolic rate in the control of food intake?

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Background: The relationship between body composition, energy expenditure and ad libitum energy intake has rarely been examined under conditions that allow any interplay between these variables to be disclosed. **Objective:** The present study examined the relationships between body composition, energy expenditure and energy intake under controlled laboratory conditions in which the energy density and macronutrient content of the diet varied freely as a function of food choice. **Design:** Fifty nine subjects (30 males: BMI = 26.7 ± 4.0 kg/m^2; 29 females: BMI = 25.4 ± 3.5 kg/m^2) completed a 14 day stay in a residential feeding behaviour suite. During days 1 and 2, subjects consumed a fixed diet designed to maintain energy balance. On days 3–14, food intake was covertly measured in subjects who had ad libitum access to a wide variety of foods typical of their normal diets. Resting metabolic rate (indirect calorimetry), total daily energy expenditure (doubly labelled water) and body composition (deuterium dilution) were measured on days 3–14.
Results: Hierarchical multiple regression models indicated that after controlling for age and sex, fat-free mass ($p < 0.001$) and resting metabolic rate ($p < 0.001$) predicted daily energy intake. Importantly however, a mediation model using path analysis indicated that the effect of fat-free mass (and fat mass) on energy intake was fully mediated by resting metabolic rate ($p < 0.001$). **Conclusions:** These data indicate that resting metabolic rate is a strong determinant of energy intake under controlled laboratory conditions where food choice is allowed to freely vary and subjects are close to energy balance. Therefore, the conventional adipocentric model of appetite control should be revised to reflect the infuence of resting metabolic rate.

Acknowledgement: The present study was funded by the Food Standards Agency, UK.

T3:OS3.6

Isolation of genomic region involved in nutrigenetic and pharmacogenetic interactions affecting adipose tissue depots and metabolic profile in a novel congenic rat strain

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In a process of positional cloning of metabolic-syndrome related locus we derived new congenic strain by introgressing a limited rat chromosome 4 (RNO4) region comprising A2m gene from spontaneously hypertensive rat (SHR) into BN-Lx (Brown Norway) genomic background.
Methods: We mapped the differential segment by using >140 microsatellite markers on RNO4. Male rats (n =6/strain/diet) of BN-Lx and BN-Lx. SHR4(A2m) were fed standard diet for 15 weeks (STD, control groups) or STD followed by 10 days of high-sucrose diet (HSD) or dexamethasone (DEX) for 3 days. We assessed comprehensively the morphometric and metabolic profiles of all groups. Two-way ANOVA with STRAIN and DIET as major factors was used.

Results: The differential segment of RNO4 spans about 9Mb between markers D4Mgh30-D4Mit26. The morphometric analysis showed significant nutrigenetic and pharmacogenetic interactions of the differential segment for relative weights of visceral (p = 0.02) and retroperitoneal (p = 0.01) fat depots. The congenic strain was more sensitive to both HSD-induced increase and dexamethasone-induced decrease of the fat mass. Also, the global insulin resistance indices showed more robust deterioration in BN-Lx.SHR4(A2m) (e.g. area under the glycemic curve rose by 88% compared to 13% in BN-Lx in response to DEX). BN-Lx.SHR4(A2m) exhibited significantly lower levels of PP and PYY in serum. The sequence comparison showed several distinct genes with non-synonymous amino acid changes including Ankrd26, A2m and Pex5.
Conclusion: We have identified a nutrigenetic and pharmacogenetic interaction involving HSD / DEX and RNO4 segment of spontaneously hypertensive rat origin affecting glucose tolerance and fat deposition.

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T8:OS3 – Bariatric and Metabolic Surgery

T8:OS3.1

Remission rates of diabetes mellitus after gastric bypass surgery for obesity

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Background: Bariatric surgery has been suggested to cause remission of diabetes mellitus (DM) in up to 80% of patients operated. However, follow-up is often short (2 years) and many patients are treated in specialised surgical centres. This study aims to assess the rate of remission of DM after Roux-en-Y gastric bypass (RYGB) in a nationwide cohort using the Swedish prescription registry with a four-year follow-up.
Methods: From the nationwide inpatient registry 3099 patients who had undergone a RYGB procedure was identified (ICD codes JDF 10, JDF 11). A general population reference cohort, matched on age and gender, was created with 30990 subjects. Linkage was performed to the nationwide Swedish prescription registry with ATC codes A10A, A10B. The percentage of subjects who had at least one prescription dispensed the year before surgery (or pseudosurgery date) and during 4 years after surgery was calculated. The number of new cases of DM (no prescription dispensed before surgery with a prescription filled after surgery) during follow-up was also assessed.
Results: Mean ±SD age was 41.1 ±10.2 and 76% were females. In the surgical cohort, 15.3% were treated for DM before surgery and 9.0, 6.4, 6.3, 6.3% at 1, 2, 3 and 4 years after surgery. The corresponding proportions in the control cohort were 1.8, 2.0, 2.2, 2.3, 2.5%, before, 1, 2, 3 and 4 years after the pseudosurgical date. There were 3.5% new cases in the control cohort and 1.0% in the surgical cohort during the 4-year follow-up period.
Conclusion: In this nationwide cohort study, RYGB results in a significant reduction of patients treated for DM during a 4-year follow-up period. The number of new cases of DM in patients that have undergone RYGB is comparable that of the general population.

T8:OS3.2

5-year follow-up of omentectomy in addition to bariatric surgery and potential effects on metabolic risk factors

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Background: Visceral obesity is a risk factor for cardiovascular disease. However, removal of a large portion of visceral adipose tissue by omentectomy in addition to gastric bypass operation (GBP) has not shown any additional positive metabolic effects after up to 2 years follow-up. The aim of this study was to investigate the impact of omentectomy on cardio-metabolic risk factors at a longer follow-up time.
Methods: 81 obese women, that had previously been randomized to GBP in conjunction with omentectomy or GBP alone in a previous double blind controlled trial studying the potential effect of omentectomy, were asked to be re-examined with dual-energy X-ray absorptiometry for body composition, blood pressure, fasting glucose, insulin sensitivity measured by homeostasis model assessment of insulin resistance (HOMA-IR) and blood lipids 5 years after surgery.
Results: There were no significant differences between the omentectomy (n=40) and non-omentectomy group (n=41) at baseline in the whole group in any of the measured variables (p = 0.09–0.93). Twenty-six omentectmized and 26 non-omentectomized women completed the examination five years postoperatively. There were no significant differences between the omentectomy and non-omentectomy group regarding HOMA-IR (1.42 ± 0.72 mmol/l x mU/l and 1.15 ± 0.55 mmol/l x mU/l respectively), cholesterol (4.28 ± 0.76 mmol/l and 4.20 ± 0.86 mmol/l respectively), HDL-cholesterol (1.64 ± 0.52 mmol/l and 1.56 ± 0.43 mmol/l respectively), triglycerides (0.92 ± 0.32 mmol/l and 0.99 ± 0.61 mmol/l respectively) or BMI (31.4 ± 6.0 kg/m^2 and 30.7 ± 5.2 kg/m^2 respectively) (p = 0.16–0.73).
Conclusion: In our cohort, removal of the greater omentum in addition to GBP does not result in any enhanced positive effects 5 years post-operatively.

T8:OS3.3

Bariatric surgery increases the risk of osteoporosis and fractures in women in the Swedish Obese Subjects study

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Introduction: Bariatric surgery is an effective treatment to achieve long-term weight loss but less is known about the long-term effects of bariatric surgery on bone health. The aim of this study is to report the outcome of osteoporosis and fracture risk in the Swedish Obese Subject (SOS) study.
Methods: The SOS study is a controlled, prospective intervention trial including 2010 patients that have undergone bariatric surgery and 2037 matched controls. Study participants were recruited between 1987 and 2001. Information on osteoporosis and fractures was obtained by cross checking social security numbers from the SOS database with ICD9/ICD10 codes for osteoporosis and fractures in national health registers. Information on smoking, age for menopause and physical activity was received from questionnaires at pre-specified time points.

Results: Women in the surgery group had a significantly higher risk of osteoporosis compared to controls. The incidence rate of osteoporosis was 16.5 per 10000 person-years (95% confidence interval; CI: 12.2–22.4) for women in the surgery group and 6.5 per 10000 person-years (95% CI: 4.0–10.6) for women in the control group (hazard ratio [HR] 2.48; 95% CI: 1.38–4.44; p = 0.002). Women in the surgery group also had a significantly higher risk of fracture. The incidence rate of fracture was 55.1 per 10000 person-years (95% CI: 46.4–65.3) for women in the surgery group and 33.9 per 10000 person-years (95% CI: 27.3–42.1) for women in the control group (HR 1.62; 95%: CI 1.23–2.13; p = 0.001). Men in the surgery group had no significantly elevated risks of osteoporosis and fractures compared to controls.
Conclusion: Results from the SOS study indicate that bariatric surgery increases the risk of osteoporosis and fractures in women.

T8:OS3.4

Pregnancy after gastric banding:a prospective study on the impact of gestation on weight loss and quality of life

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Background: longitudinal evidence on weight evolution, optimal conception period to assure optimal weight loss and antenatal quality of life (QOL) for pregnancies after Laparoscopic Adjustable Gastric Banding (LAGB) is sparse.
Methods: this is a non-randomised, prospective, multi-center cohort. Data from 467 obese women that underwent LAGB and were of childbearing age were compared to data from 94 women who became pregnant. Excess weight loss (%EBL), weight loss evolution, band related complications and QOL scores were monitored at 6-month intervals for 3 years. Outcomes of:
1) gestating women and women that did not get pregnant
2) women who became pregnant during the first 18 months post-operatively and women that gestated afterwards, were compared.
Results: pregnant women achieved lesser improvements on weight loss compared to their peers (BMI 35.4 kg/m^2 vs 31.1 kg/m^2, P < 0.0001,%EBL 43.6% vs 64.7%, P < 0.0001). There was no significant difference between them in the physical component summary (PCS), (median value 51.1 vs 53.0, P:0.59) and mental component summary (MCS)(45.1vs 45.0, P:0.79). There was no significant impact of the timing of gestation between women conceiving in the first 18 months compared to those who conceived afterwards(BMI 46.6 kg/m^2 vs 41.7 kg/m^2, P:0.47,% EBL 35.2% vs 35.5%, P:0.67, MCS 47.1 vs 43.8, P:0.72, PCS 50.4 vs 51.5, P:0.41), but the first group developed digestion problems significantly more (41.7% vs 10.8%, P:0.01). In our longitudinal model utilized to determine the independent factors of BMI evolution, pregnancy significantly and independently influenced weight loss (P < 0.0001) but had no significant impact on QOL.
Conclusions: LAGB provides a significant and sustainable improvement on weight loss and QOL measures. Pregnancy influences the extent of weight loss and its evolution, but these effects are independent of the conception timing. QOL after gastric banding and pregnancy is not altered and it's not predictive of the weight loss evolution.

T8:OS3.5

Prevalence and Predictors of Nutritional and Medical Complications after Roux-en-Y Gastric Bypass in the Treatment for Obesity – a Retrospective Cohort Study

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Introduction: Medical and nutritional complications after Roux-en-Y gastric bypass (RYGB) are an increasing clinical problem. The prevalence of these complications is not fully elucidated and their impact on quality of life (QoL) is unknown. In a population-based cohort of RYGB patients, we aim to estimate the prevalence and possible predictors of these complications, and their association with QoL.
Methods: A questionnaire on medical and nutritional complications and QoL (SF-12) was mailed to all RYGB-operated patients in the Central Denmark Region 2006–2011. By Poisson regression, we calculated risk ratios of complications comparing different predictors. The association between number of complications and QoL was investigated by Spearman rank coefficient.
Results: The response-rate was 64% (1429/2242 patients; 80% women, median follow-up 5 years). Complications leading to contact with the health care system were reported by 68%, most commonly fatigue (34%), abdominal pain (34%), and anemia (28%). The risk of complications was higher in women than men (Incidence Rate Ratio (IRR):1.2, 95% confidence interval (CI); 1.1, 1.4), for smokers (IRR:1.1, 95% CI: 1.0, 1.2) and for patients with symptoms before RYGB (IRR:1.3, 95% CI: 1.5, 1.4), while the risk was lower for older patients (>45 years vs <35 years, IRR 0.8, 95% CI: 0.7, 0.9). QoL decreased with amount of complications (0 = median score 44; 5+ =median score 31; r= 0.30). While 8% answered their wellbeing was worse after RYGB, 85% felt better.
Conclusion: Overall, 68% experienced one or more medical or nutritional complications. Risk of complications differed by gender, age and smoking status. The majority reported improved wellbeing after RYGB, but increased number of complications was associated with lower QoL.

The idefics intervention: What can we learn for public policy?

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Introduction: This presentation considers how far findings from IDEFICS and similar interventions are relevant to the policy process and political decision-making.
Methods: The presentation offers theoretical and normative arguments concerning the evaluation of evidence and its implications for policy. The presentation is divided into three parts. The first considers problems in the nature and applicability of evidence gained from school- and community-level obesity interventions. The second part considers whether such interventions might represent a model that policy-makers could implement. The third part considers how we should think about policy measures given the limited evidence we can obtain and the many different goals that public policy must take account of.
Results: The presentation argues that: (1) there are clear reasons why we are not obtaining very solid evidence for effective school- and community-level interventions; (2) public policy is not in a good position to mandate larger-scale, long-term versions of these interventions; and (3) there are clear problems in obtaining 'evidence' for most public policy options, but this should not deter us from pursuing options which tackle systemic problems and hold a good likelihood of delivering benefits on several dimensions.
Conclusion: Research on school- and community-level obesity interventions has not produced much evidence that is directly relevant to policy. Instead, it shows how difficult it is to affect obesity rates without changing wider social and economic factors. Public policy should focus on these.

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POSTER SESSIONS

Thursday, 7 May, 2015

T1 – Organ cross-talk

T1:PO.001

Narciclasine attenuates diet-induced obesity and associated dysfunctions by promoting oxidative metabolism in skeletal muscle in mice and humans

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Introduction: Given that only 20% of individuals with dietary restrictions are able to maintain long-term weight loss, increasing energy expenditure is becoming an attractive approach to combat obesity. Physical exercise is the ideal way to expend extra energy, but physical activity unfortunately continues to decline in the modern lifestyle and is even prevented in some cases. Thus, there is a need for novel pharmacological approaches that enhance energy expenditure by introducing the same beneficial metabolic effects as exercise in humans.
Methods: Herein, we employ diet-induced obesity mouse model and human myotube cells; and various approaches such as Indirect calorimetry, RNAseq, Seahorse, quantitative RT-PCR, Digital Infrared Thermal Imaging to decipher the effects of narciclasine on bioenergetics.
Results: Narciclasine (ncls)-treated mice fed a high-fat diet (HFD) showed significantly increased energy expenditure and voluntary physical activity, along with a marked reduction of fat accumulation in liver, skeletal muscle and adipose tissues as compared with vehicle treated control mice. In addition, ncls promoted Pgc1a gene expression, oxidative metabolism and a shift from glycolytic to oxidative fibers in the skeletal muscle of diet-induced obese mice. Intriguingly, ncls also enhanced heat production in vivo as well as in vitro in both murine and human primary myotubes, suggesting a role for this compound in muscle thermogenesis.
Conclusion: Here, we report a novel pharmacological strategy that attenuates diet-induced obesity in mice by mimicking the beneficial metabolic effects of endurance training. Our current study demonstrates that narciclasine has promising potential for the prevention and the treatment of obesity in humans.

Acknowledgement: We thank Drs. Vincent Mouly, Gillian Butler-Browne and Ravi Kambadur for providing the human primary myoblasts (36C15Q).

T1:PO.002

Longitudinal changes of serum levels of angiopoietin-like protein 6 and selenoprotein P after gastric bypass surgery

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Background: Bariatric surgery has proven to have benefit for weight loss and metabolic profiles. Recent evidences suggest that the liver-derived hepatokines play a role in the pathophysiology of metabolic diseases. However, there are few studies on longitudinal changes in hepatokines after gastric bypass. Here, we investigated changes in serum levels of angiopoetin-like protein 6(Angptl6) and selenoprotein P after gastric bypass.
Methods: We recruited 10 patients who were preformed gastric bypass surgery for weight loss. We measured metabolic parameters and serum levels of Angptl6 and selenoprotein P before and after surgery(1 month and 9 month). We evaluated changes of two hepatokines after surgery and correlation between degree of changes in Angptl6/selenoprotein P level and metabolic parameters.
Results: Body mass index linearly decreased after bariatric surgery. HbA1C, AST, ALT, GGT, total cholesterol, triglyceride, LDL-cholesterol, and Angptl6 significantly decreased at the point of 1 month after surgery and then maintained over 9 months. However, significant reducing effect of fasting insulin and HOMA-IR which is apparent at 1 month after surgery was reversed at 9 months after surgery. Regarding hepatokines, selenoprotein P level linearly increased. Angptl6 showed significant correlation with LDL-cholesterol and fasting insulin. Change in Angptl6 was significantly correlated with changes in total cholesterol and LDL-cholesterol. Selenoprotein P was inversely correlated with GGT and change in selenoprotein P was also inversely correlated with changes in HOMA-IR.
Conclusion: Our results suggest that gastric bypass surgery could alter serum levels of hepatokines independent of weight loss, and that these changes might be related to hepatic metabolic changes.

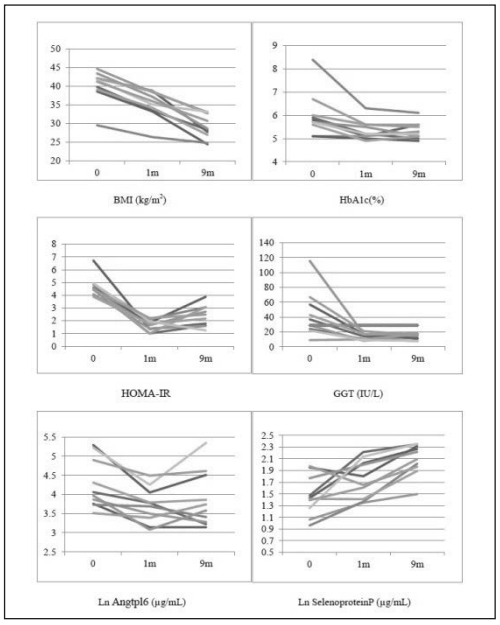

Fig. 1. Longitudinal changes in BMI, HbA1c, HOMA-IR, GGT, serum levels of Angtpl6, and selenoprotein P on 1 moth and 9 month after gastric bypass surgery in 10 study subjects.

T1:PO.003

Impact of high-fat diet composition on development of obesity in mice with whole-body deletion of ampk α2-subunit

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Introduction: Published data have shown both rise (Villena et al, Diabetes 2004) and reduction (Jelenik et al, Diabetes 2010) in body weight (BW) gain in mice fed high-fat (HF) diet in response to whole-body deletion of AMPK α2-subunit (AMPK α2-/-). We hypothesized that the differences

between studies could be related to the composition of HF diet used in different experiments. The aims of the our study were to (i) characterize the effect of the AMPK α2-/- in the context of dietary obesity induced by either by corn-oil based (cHF) or lard-based (HSD) diet, and (ii) check possible role of genetic background of the mice.
Methods: Adult male AMPK α2-/- mice (Viollet, et al, J Clin Invest 2003) on either obesity-prone C57BL/6J (B6) or obesity-resistant A/J background, and their wild-type littermates, were fed either cHF or HSD (both 60% energy as fat) for 10 weeks.
Results: Both cHF and HSD induced BW gain with a stronger effect in B6 mice and with potent effect of HSD as compared with cHF. In B6 mice, BW gain correlated with adiposity and hepatic accumulation of lipids and the reduction of BW gain was observed only in AMPK α2-/- mice fed cHF diet. In the A/J mice, with a relatively small induction of dietary obesity, the stronger effect of HSD on BW was observed again, but without impact of AMPK α2-/-. Only in AMPK α2-/- mice on A/J background higher accumulation of lipids in skeletal muscle, and lower weight of the muscle as compared with the wild-type littermates, independent on the type of the diet, was detected.
Conclusion: Only in the B6 mice fed corn-oil based HF diet but not lard-based HF diet, the paradoxical anti-obesity effect of whole-body deletion of AMPK α2-subunit could be detected.

T1:PO.004

Effects of fat distribution on hypertrophic cardiomyopathy phenotype

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Introduction: Hypertrophic cardiomyopathy (HCM) is the most common genetic heart disease, characterized by heterogeneous phenotypic expression with extreme diversity in the pattern and extent of left ventricular (LV) hypertrophy. Among extrinsic factors, body mass index (BMI) and male sex were found independently associated with LV mass increase and progression of heart failure symptoms in HCM. The aim of our study was to assess whether adipose tissue distribution may influence cardiac morphology and function in HCM patients with respect to gender.
Methods: We studied 24 overweight/obese subjects (age 59.4 ± 12 yrs, 9F/14M, BMI 29.3 ± 3.7 kg/m^2) with echocardiography- and cardiovascular magnetic resonance-based diagnosis of HCM, confirmed by genetic analysis. Dual-energy X-ray absorptiometry was used to evaluate body composition and regional (trunk and appendicular) fat distribution.
Results: Age- and gender-adjusted analysis revealed that maximum interventricular septum thickness but not LV mass index was positively associated with trunk adipose tissue percentage (β=0.41, $p < 0.05$). However, septum thickness showed a stronger association with male gender (β=0.61, $p < 0.01$) compared to abdominal adiposity. In constrast, total and appendicular fat percentages were not related to any measure of LV mass, volume and function. Instead, BMI was associated with left atrium area (β=0.45, $p < 0.05$), an indirect measure of LV dysfunction, irrespective of both age and gender.
Conclusion: In our cohort of HCM patients, septum hypertrophy extent was independently associated with abdominal but not total fat. We also confirmed that male gender represents another important feature associated to the magnitude of hypertrophy.

T1:PO.005

Early differences in metabolic flexibility between obesity-resistant and obesity-prone mice

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Introduction: Decreased metabolic flexibility supports development of adverse consequences of obesity. Metabolic flexibility to glucose is traditionally assessed using indirect calorimetry (INCA), which also allows for measuring energy expenditure. The aims of this study were to (i) characterize metabolic flexibility of obesity-resistant A/J and obesity-prone C57BL/6J mice at weaning, i.e. during the switch from lipid to carbohydrate intake and before the dissociation in body weight; (ii) to compare INCA with glucose tolerance test (GTT) approach.
Methods: A/J and C57BL/6J mice were maintained at 20°C and weaned to chow diet at 30 days of age. During the first day after weaning, using separate subgroups of fasted mice (n=8), either GTT (oral, OGTT; and intraperitoneal, IGTT; using 1–3 mg glucose/g body weight, BW) or INCA oral gavage with 1–7.5 mg glucose/g BW; or a fasting/refeeding protocol) were performed, either at 20°C or 34°C (to exclude interference of thermogenesis), using mice of both genders.
Results: Comparable results were obtained using (i) both OGTT and IGTT with 1 mg glucose/g BW at 20°C; (ii) INCA with 7.5 mg glucose/g BW at 34°C; and (iii) INCA during fasted/re-fed transition at 34°C. Results furthermore indicated lower ability to switch between metabolic substrates associated with low glucose tolerance and relative hyperglycemia in C57BL/6J as compared with A/J mice.
Conclusion: We have found lower glucose tolerance using GTT and lower metabolic flexibility using INCA in C57BL/6J versus A/J mice. These differences between strains may be linked to the differential genetically-determined propensity to obesity of the mice.

T1:PO.006

Association between nafld severity and body composition in obese subjects

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Introduction: Nonalcoholic fatty liver disease (NAFLD) is considered the hepatic manifestation of the metabolic syndrome. NAFLD prevalence in obese patients increases with the worldwide epidemic of obesity and could be higher than 70%. The link between overweight or obesity and liver disease is well known, however, little evidence exists on the relationship between body composition and the severity of NAFLD.
Methods: Fifteen overweight or obese patients (age=51.4 ± 8.0, BMI=35.1 ± 5.0 kg/m^2) with NAFLD (alcohol consumption < 20 gr/week) were investigated. NAFLD activity score (NAS) was used to assess disease severity based on steatosis (0–3), lobular inflammation (0–3) and hepatocyte ballooning (0–2). Subjects with NAS ≥ 2 were included in the study (NAS=3.5 ± 1.7). Body fat was assessed by bioelectrical impedance analysis (BIA) and liver fat content was measured by magnetic resonance imaging (MRI). Linear relationships among variables were computed by Spearman's correlations. Multivariable analysis was performed with the linear regression model.
Results: A positive association between percent fat mass and NAS score (Spearman's coefficient=0.72, p = 0.002) was found and persists after add-

ing BMI to the model in multiple regression analysis (β=0.22, p = 0.002). There was a positive association between serum CRP levels and liver steatosis as evaluated by MRI (Spearman's coefficient=0.63, p = 0.01). We found no association between body fat evaluated by BIA and liver fat content measured by MRI.
Conclusion: NAFLD severity is associated with body composition. Increased fat mass is linked to higher NAS in obese patients. Body composition assessed by BIA could be a complementary method of NAFLD assessment before liver biopsy. This approach should be investigated in larger cohorts.

T1:PO.007

Lard vs. Corn-oil feeding in mice: Metabolic effects of obesogenic diets with different composition of fatty acids

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Introduction: Saturated fatty acids (SFA), mainly palmitic acid, could aggravate insulin resistance by triggering proinflammatory responses and endoplasmic reticulum stress. Here we compared long-term metabolic effects of two high-fat diets (35% fat; wt/wt); one with a high content of SFA in a form of pork lard (HL) and the other with a high content of n-6 polyunsaturated fatty acids in a form of corn-oil (HO).
Methods: Subgroups (n = 8) of male C57BL/6N mice were fed the experimental diets for 8 weeks. Tissue and plasma samples were collected for the assessment of lipid composition and gene expression analysis by qPCR. Insulin sensitivity was assessed by hyperinsulinaemic-euglycaemic clamp in a separate experiment.
Results: No differences in body weight gain and energy intake were observed between the HL and HO group. Neutral lipids accumulated significantly less in plasma of HL mice (HO 64 ± 6 mg/dl; HL 53 ± 4 mg/dl), which was, however, at the expense of severe hepatic steatosis (liver triglycerides: HO 133 ± 6 mg/g; HL 225 ± 15 mg/g). This was accompanied by a substantial increase (1,7-fold) in hepatic expression of stearoyl-CoA desaturase-1 (SCD-1) gene in HL group. Hepatic as well as whole-body insulin sensitivity were impaired to a similar extent in both groups.
Conclusion: Our results suggest that high intake of SFA induces adaptive increases in hepatic SCD-1 gene expression in order to transform SFA into less toxic monounsaturated fatty acids, which are more willingly re-esterified to neutral triglycerides in the liver, thus causing hepatic steatosis. Therefore, despite significantly different level of hepatic steatosis, insulin sensitivity of HO- and HL-fed animals remaines comparable.

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T1:PO.008

Rat intestine urea cycle is geared to produce ornithine and citruline in detriment of arginine

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Male adult lean Zucker rats fed standard chow or a hyperproteic diet for 30 days, were killed, and their small intestine was dissected, cleaned and cut in three equal-length segments. They were weighed and frozen. Later, the samples were used for the measurement of enzyme activities: AMP-deaminase, carbamoyl-P-synthases and Orn transcarbamylase. The samples were also used for the analysis of gene expression of these enzymes, plus glutaminase, Gln synthase, N-acetyl-Glu synthase, arginase 2, argininosuccinate synthase and lyase, and nitric oxide synthase. There were significant differences in activity (Orn transcarbamylase) and gene expression (carbamoyl-p- synthase 1, AMP deaminase, argininosuccinate synthase, arginase 2 and endothelial nitric oxide synthase) along the 3 intestine segments. The level of gene expression for urea cycle enzymes was highest for carbamoyl-P synthases (mainly type 1) and arginase 2. The lowest number of transcript copies per mg protein was for argininosuccinate synthase, probably the cycle controlling enzyme. High expression of glutaminase (vs. Gln synthase) and AMP deaminase, combined with high expression (and total activity) of carbamoyl-P-synthases ensured the smooth generation of carbamoyl-P. The high number of transcript copies (and enzyme activity) of Orn-transcarbamylase and N-acetyl-Glu synthase ensued a rapid flow of both Orn and Cit. On the other side, an active arginase also could, potentially, help increase the levels of Orn (and thus Cit). These changes agree with the known production of urea cycle intermediates in the intestine. There were no changes in the overall panorama described when the rats were fed a hyperproteic diet.

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T1:PO.009

Analysis of npy expression in peripheral blood mononuclear cells as a biomarker of recovery of fasting sensitivity associated to weight loss

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Introduction: Peripheral blood mononuclear cells (PBMC) are considered as a good source of biomarkers to define health/disease. We have reported that PBMC can reflect, at transcriptomic level, metabolic alterations related to obesity, as fasting insensitivity, even in early stages of weight gain. We aimed to evaluate if PBMC were also able to reflect metabolic recovery related to weight loss.
Methods: Expression of key energy metabolism genes (Fasn, Srebp[1], Pparg, Cpt1a and Npy) was measured by real-time RT-PCR in PBMC samples of normoweight, cafeteria-obese rats and rats fed a control balanced diet after the intake of a cafeteria diet (post-cafeteria model) in fed and fasted conditions. Groups with different periods of diet administration were used.
Results: Genes analysed in PBMC followed the expected fasting regulation which disappeared in obese rats and, interestingly, was recovered in post-cafeteria animals, although results were somehow dependent of time of diet administration and age of the animals. The most robust and outstanding results were obtained for the orexigenic Npy gene. As expected, Npy expression increased with fasting; increased expression was of high magnitude and independent of the age of the animals. This fasting regulation was lost in cafeteria-fed animals and recovered in post-cafeteria rats regardless of time of administration of the balanced diet. A similar regulatory behaviour was observed when analysing Npy expression in hypothalamus.
Conclusion: Gene expression analysis in PBMC could be useful to determine effectiveness of body weight loss programs. Particularly, Npy expression in PBMC appears especially useful as marker of fasting sensitivity recovery in post-cafeteria animals, correlating with body weight loss and metabolic normalization.

T1:PO.010

Fibroblast-like de-differentiation of adipocytes co-cultured with pancreatic adenocarcinoma cells

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Introduction: The epidemiological association between excess adipose tissue and pancreatic cancer has been demonstrated. However the role of adipose tissue in pancreatic cancer microenvironment has not been studied.
Methods: 3T3-L1 adipocytes and pancreatic tumor cells (MiaPaCa2) were co-cultured using a transwell culture system. After 5 days from adipocyte induction (post-induction day=PID 5, MiaPaCa2 were seeded in the top chamber and maintained in co-culture for 6 (PID 11) and 9 (PID 14) days. 3T3-L1 adipocytes in co-culture or not were stained with Oil Red O and observed at photomicroscope; electron microscope images were obtained for 3T3-L1 adipocytes in co-culture or not. RT-PCR analyses were performed in 3T3-L1 adipocytes in co-culture and in controls for the main genes of interest. EMSA was used on nuclear protein extraction.
Results: After 6 and 9 days of co-culture we observed the appearance of cells with simil-fibroblast aspect, not present in control conditions (Figure 1). Moreover in co-culture, adipocytes were significantly reduced in number, size and lipid droplets content. After 9 days of co-culture, we found a decrease in gene expression of GLUT-4, HSL, adiponectin and leptin, compared with controls, as well as an increase in the expression of MMP11, OCT 3/4, SOX 2, C-MYC, KLF4, suggesting a de-differentiation phenomenon (Figure 2). Moreover glycerol release in culture medium significantly decreased after co-culture. In MiaPaCa2 the expression of WnT 5a increased early in co-culture with 3T3-L1. EMSA of c-JUN and AP1 in 3T3-L1 demonstrated an increased signal in adipocytes in co-culture at PID 11 and 14.
Conclusions: These data first showed the de-differentiation of adipocytes after co-culture with pancreatic cells toward a fibroblast-like phenotype. The cross talk between adipocytes and cancer cells may profoundly influence tumor microenvironment, growth and invasion.

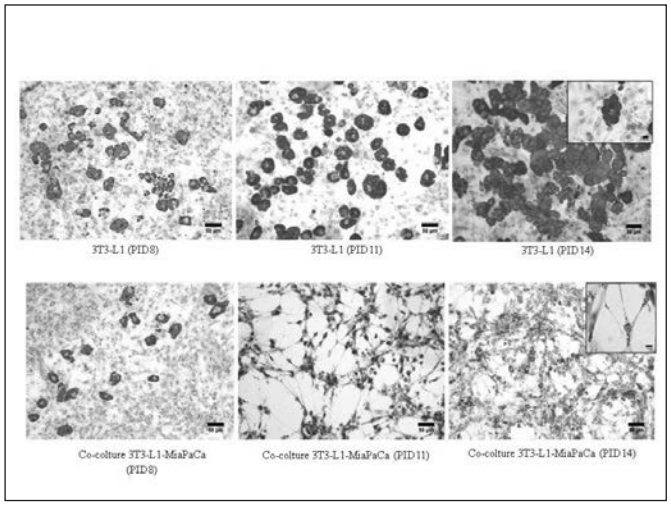

Fig. 1. Images of red-oil staining of 3T3-L1 in co-culture with MiaPaCa2 and as controls, at PID (Post-induction day) 8, 11, 14.

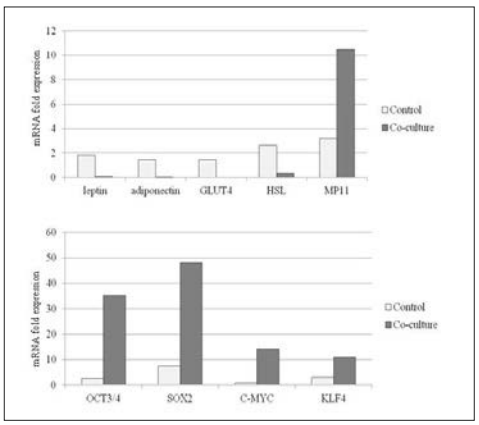

Fig. 2. Real-time PCR gene expression analyses in 3T3-L1 after 9 days of co-culture (PID 14) with MiaPaCa2 cells and in controls (PID 14).

T1:PO.011

Seipin is necessary for normal brain development and spermatogenesis in addition to adipogenesis

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Seipin, encoded by BSCL2 gene, is a protein whose physiological functions remain unclear. Mutations of BSCL2 cause the most-severe form of congenital generalized lipodystrophy (CGL). BSCL2 mRNA is highly expressed in the brain and testis in addition to the adipose tissue in human, suggesting physiological roles of seipin in non-adipose tissues. Since we found BSCL2 mRNA expression pattern among organs in rat is similar to human while BSCL2 mRNA is not highly expressed in mouse brain, we generated a Bscl2/seipin knockout (SKO) rat using the method with ENU (N-ethyl-N-nitrosourea) mutagenesis. SKO rats showed total lack of white adipose tissues including mechanical fat such as bone marrow and retro-orbital fats, while physiologically functional brown adipose tissue was preserved. Besides the lipodystrophic phenotypes, SKO rats also showed impairment of spatial working memory with brain weight reduction and infertility with azoospermia. We confirmed reduction of brain volume and number of sperm in human patients with BSCL2 mutation. This is the first report demonstrating that seipin is necessary for normal brain development and spermatogenesis in addition to white adipose tissue development.

T1:PO.012

Cardiotrophin-1 decreases intestinal sugar absorption

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Introduction: Cardiotrophin-1 (CT-1) is a member of the IL-6 family of cytokines with a key role in glucose and lipid metabolism. We have previously reported the anti-obesity properties of chronic CT-1 treatment in genetic and dietary models of obesity. In the present study, we aim to examine the in vitro and in vivo effects of CT-1 on intestinal sugar absorption in mice.
Methods: Small intestine everted rings were used to evaluate the in vitro effects of different concentrations of CT-1 (1–100 ng/ml) on alpha-methylglucoside (alpha-MG) uptake. Rings were preincubated during 1 h with the cytokine and then alpha-MG (1 mM) uptake was measured for 15 min. In addition, the effects of acute (single dose) and chronic (6 days) CT-1 administration (5 μg/mice, i.v.) on alpha-MG uptake were also evaluated in wild type and CT-1 knock-out mice. At the end of the treatment, intestinal everted rings were obtained and the uptake of alpha-MG (1 mM, 15 min) was also measured.
Results: In vitro CT-1 treatment caused a significant decrease on alpha-MG absorption at different doses (1–50 ng/ml). This effect was not observed with CNTF, another cytokine of the same family. Interestingly, both acute and chronic CT-1 administration to mice also induced a significant reduction on alpha-MG uptake in intestinal everted rings.

Conclusion: The present data demonstrate the ability of CT-1 to inhibit intestinal sugar absorption both in vivo and in vitro, which could contribute to the hypoglycemic and anti-obesity properties of this cytokine. **Acknowledgement:** This study was supported by grants from the Government of Navarra (Department of Health); Mutua Madrileña Foundation; FIS (PI10/01516 and PI13/01851); Línea Especial "Nutrición, Obesidad y Salud Universidad de Navarra"; and by the agreement between FIMA and the "UTE project CIMA". M.L-Y. was supported by a doctoral grant from Asociación de Amigos University of Navarra.

T1 – Genetics, epigenetics and omics

T1:PO.013

New alleys to tackle obesity: Understanding naturally occurring weight resistance inconstitutionally thin individuals

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Introduction: Constitutional thinness (CT) is a metabolically normal, weight gain resistant phenotype that mirrors obesity. CT individuals present low BMI (< 18.5 kg/m$_{\text{،}}$), with normal metabolic profile and no eating disorders. A pilot study on 10 CT versus 10 controls overfed for one month showed that CT individuals are resistant to weight gain and present an increased basal metabolism, a gap between energy intake and expenditure, an increase in anorexigenic hormonal profile and a specific change in urine metabolomics. The basis for this is not known but gene expression patterns in adipose tissue showed significant differences in CTs versus controls at baseline. These preliminary data pointing towards a human weight gain resistant phenotype prompted us to design a larger intervention trial to study these individuals exhaustively.
Methods: We designed a clinical study to investigate the molecular and physiological differences between 35 CT and 35 controls, before and after 15 days of overfeeding providing an extra daily 600 kcal with Renutryl Booster®. The main outcomes are the changes in transcriptomics, lipidomics, proteomics and metabolomics of biopsies (abdominal fat and muscle), plasma and urines before and after the overnutrition period. Changes in anthropometric parameters, energy metabolism, muscle and fat histology, fecal microbiota and bone quality are also assessed.
Results: Here we will present an introduction to constitutional thinness and the design of the clinical study for in-depth characterization of this interesting phenotype.
Conclusion: Results will provide an extensive characterization of CT and new insights about the pathways and mechanisms involved in resistance to weight gain. This may lead to new, more efficient strategies for treating obesity.

T1:PO.014

The role of Plzf (Promyelocytic leukemia zinc finger) gene in regulation of metabolic and hemodynamic traits in the spontaneously hypertensive rat

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Introduction: The spontaneously hypertensive rat (SHR) is the most widely used model of essential hypertension and is predisposed to left ventricular hypertrophy, myocardial fibrosis, and metabolic disturbances. Recently, a quantitative trait locus (QTL) influencing blood pressure, left ventricular mass and heart interstitial fibrosis was genetically isolated within 788 kb on chromosome 8 segment of SHR-PD5 congenic strain that contains only 7 genes, including mutant Plzf gene.
Methods: To identify Plzf as a quantitative trait gene (QTG), we targeted Plzf in the SHR using the TALEN technique and obtained SHR line harboring mutant Plzf gene with a premature stop codon at position of amino acid 58.
Results: The Plzf mutant allele is semi-lethal since approximately 95% of newborn homozygous animals die perinatally due to a caudal regression syndrome. Heterozygous rats were grossly normal and were used for metabolic and hemodynamic analyses. SHR-Plzf+/- versus SHR wild type controls exhibited reduced body weight and relative weight of epididymal fat, lower serum and liver triglycerides, as well as lower serum and liver cholesterol. In addition, SHR-Plzf+/- rats exhibited significantly increased sensitivity of adipose and muscle tissue to insulin action when compared to wild type controls. The SHR-Plzf+/- heterozygous rats vs. wild type controls showed significant amelioration of cardiomyocyte hypertrophy and fibrosis. Gene expression profiles revealed differential expression of genes with the role in cell cycle.
Conclusion: These results provide evidence for important role of Plzf in regulation of metabolic and hemodynamic traits in the rat and suggest cross-talk between cell cycle regulators, metabolism, cardiac hypertrophy and fibrosis.

T1:PO.015

Biotin (vitamin b7) biology is altered and linked to inflammation in obesity – a study of monozygotic twins

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Introduction: Biotin modifies chromatin structure by biotinylation, and functions as a coenzyme for carboxylases regulating fatty acid metabolism, amino acid catabolism and gluconeogenesis. We investigated if these biotin-dependent functions are altered in obesity. Subjects: Monozygotic (MZ) twins, n= 14–26 weight discordant pairs (deltaBMI>3), depending on analysis
Methods: DNA methylation from blood leukocytes and adipose tissue (AT) was analyzed by Infinium Human Methylation 450 Bead Chip Array, gene expression from AT and adipocytes (A) by Affymetrix U133 Plus 2.0 and of leucocytes with RT-qPCR. Serum biotin, CRP and triglycerides (TG) were measured by standard methods. Human adipocytes were cultured in low and high biotin concentrations, and analyzed by Affymetrix U133 Plus 2.0 and imaging methods.
Results: In the leucocytes of the obese co-twins the biotin pathway was less methylated, biotin-dependent carboxylase PCCB and MCCC1 gene expressions were upregulated and correlated positively with CRP (PCCB 0.91; p = 0.0046 and MCCC1 0.79; p = 0.036). Serum biotin levels were lower in the obese (274 ng/l) than the lean co-twin (390 ng/l, p = 0.034), and the levels correlated negatively with TG (-0.56, p = 0.045). In AT and A gene expression arrays, biotin-dependent carboxylases (ACACA, ACACB, PCCB, MCC2) were downregulated (p < 0,05) in the obese co-twins. In adipocytes cultured in low biotin, normal differentiation and lipid accumulation, but altered gene expression in lipid metabolism pathways was observed.
Conclusion: Biotin biology is modified by obesity. Systemic inflammation and expansion of adipose tissue may lead to increased need of biotin for normal adipose tissue function.

T1:PO.016

Blocking endothelial expression of megalin results in a novel model system of obesity

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Megalin, a low-density lipoprotein receptor-related protein-2, mediates blood brain barrier (BBB) transport of multiple ligands, including leptin or insulin, which are fundamental for brain development, function and protection against injury. We recently generated a mutant mouse strain lacking endothelial megalin, named EMD mice, resulting in an Alzheimer´s-like impaired the behavioral model. Next, we tested the hypothesis that blocking megalin expression at the BBB confers other metabolic alterations associated with BBB-transport. We found that EMD mice result in a mouse model of obesity with elevated body mass, mainly due to an increase in adipose tissue, and associated with higher blood levels of insulin, leptin and triglycerides. Curiously, these findings were observed in male whereas no such difference was observed in female mice. In summary, EMD mice represent a novel model system to determine molecular signaling in inflammatory processes involved in neurodegeneration and metabolic syndrome.

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T1:PO.017

Association of human adenovirus 36 with common obesity gene variants

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Introduction: Both, obesity candidate genes and human adenovirus 36 (Adv36) infection are involved in the pathogenesis of obesity. We studied potential interaction of these pathogenetic factors and their relation to obesity in Czech adolescents.
Methods: Genotyping of variants in/near genes PCSK1 (rs6232, rs6235), BDNF (rs925946, rs4923461), SEC16B (rs10913469), TMEM18 (rs7561317), SH2B1 (rs7498665), KCTD15 (rs29941), MC4R (rs17782313), FTO (rs9939609) and analysis of Adv36 antibodies by enzyme-linked immunosorbent assay was performed in 616 normal weight (BMI < 90th percentile for sex and age of the Czech reference) and 628 overweight adolescents (BMI ≥ 90th percentile) aged 13–18 years.
Results: In the whole cohort of 1,244 adolescents a significantly higher prevalence of Adv36 positivity was observed in the risk allele carriers of PCSK1 rs6232 vs. non-carriers ($\chi 2$=4.07, p = 0.04). Similar difference was observed for BDNF rs925946 in normal weight boys ($\chi 2$=5.86, p = 0.02). Regardless BMI, the risk allele homozygotes for BDNF rs4923461 had increased risk of Adv36 positivity compared to the wild-type homozygotes (OR=2.29, 95%CI 1.06–4.91, p = 0.04). Moreover, overweight girls carrying risk BDNF allele rs4923461 exhibited significantly higher levels of Adv36 antibodies compared to the non-carriers (p = 0.01). Adv36 antibodies were significantly higher in overweight boys carrying obesity risk allele for SEC16B (p = 0.03). Interestingly, MC4R risk allele was related to lower levels Adv36 antibodies in overweight adolescents (p = 0.03).
Conclusion: Some of the investigated obesity gene variants exhibited significant associations with Adv36 infection. Based on our results it should be considered whether candidate gene variation may have an impact on susceptibility to Adv36 infection.

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T1:PO.018

The impact of differential alternative splicing in a model of adipocyte insulin resistance

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Differential alternative splicing (DAS) quantifies differences in splice isoforms between two conditions, uncovering functional variations and regulator complexity that are missed by traditional gene expression analysis. Insulin resistance is a precursor to adipose tissue dysfunction, but the extent to which alternative splicing might play a role in this process remains largely unknown. To address this need, we have investigated alternative

splicing in differentiated 3T3-L1 adipocytes treated with 2.5 nM tumour necrosis factor alpha (TNF-α) for 24 hrs. Insulin resistance was verified by reduced Akt-Ser473 phosphorylation and reduced 2-deoxyglucose uptake. RNASeq was performed on triplicate cell samples, before and after TNF-α treatment. Reads were mapped by TopHat 2.0 and isoform quantification was performed by Cufflinks 2.2 and WemIQ, using the mouse reference genome (mm10 build). Transcript isoforms were classified into 12 categories based on the nature of differential expression in response to TNF-α. Exon skipping and alternative promoter usage were the two most common splicing events observed among genes displaying DAS (each at 27%). The splicing regulators Qk, Mbnl1, Mbnl2 were down-regulated, whereas the Hnrnp, Srsf and Rbfox family of regulators were up-regulated in TNF-α treated cells (absolute fold-change ≥ 1.5-fold, false discovery rate ≤ 10%). Several of the DAS isoforms corresponded to transcripts with known effects on cellular functions, including subcellular localization (Ing4, Lpin1, Gtf2i), protein-protein interactions (Kif1b, Cxcl12), and enzyme activity levels (Fmr1, Agrn, Sat1). Gene-set enrichment analysis identified over-representation of DAS genes in several biological pathways related to 'acute phase response signaling', 'iNOS signaling', 'IL-6 signaling', etc. (Fisher's p-value < 1e-06). These results allow us to develop new and testable hypotheses on the role of alternative splicing in the development of adipocyte insulin resistance.

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T1:PO.019

Genetic susceptibility factor as a predictor of weight loss after bariatric surgery

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Background: Obesity is directly related to an increased risk of diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease, and overall mortality. Weight loss is effective in decreasing these risks and reducing disease severity. Bariatric surgery is an effective therapy for sustained weight loss in most of the morbidly obese patients. But there is also a significant number of individuals with an inappropriate response to bariatric surgery. Two recent retrospective studies assessed the role of genetic load as a predictor of this response, but the results are still unelucidated.
Objectives: To assess whether a selection of genetic variants may allow us to identify individuals who will have an unsatisfactory response after bariatric surgery.
Methods: A retrospective case-control study of 100 women who underwent bariatric surgery (Roux-en-Y laparoscopic gastric bypass): 30 cases with less than 40% of the excess weight loss and 70 controls who showed more than 75% of the excess weight loss after one year. All individuals were analyzed with a genetic score from Nutri inCode. The relevance of each variant was considered (rs7566605, rs9939609, rs2229616, rs17782313, rs6235, rs1801282, rs1800795, rs2241766, rs2867215). The predictive ability was analyzed by discrimination (area under the ROC curve), sensitivity and specificity and a score was calculated.
Results: The panel of genetic variants Nutri inCode showed a significant discrimination ability (0.56, 95% CI 0.46, 0.67) with a good sensitivity (88%) in identifying individuals who have a poor response to bariatric surgery. The specificity of this panel is 26%.
Conclusions: The panel of genetic variants Nutri inCode has a good sensitivity in identifying individuals who have a poor response to bariatric surgery. As the response to surgery is a multifactorial process, the inclusion of other variables in order to improve good sensitivity obtained with genetic variables is necessary.

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T1:PO.020

The Zbtb16 gene affects body weight, insulin sensitivity and lipid levels in a single-gene congenic rat model

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We have previously isolated an apparently pleiotropic locus on rat chromosome 8 affecting major features of metabolic syndrome in the congenic SHR.PD-(D8Rat42-D8Arb23)/Cub (SHR-Lx) strain carrying only 7 genes of polydactylous rat strain (PD/Cub) origin on spontaneously hypertensive rat (SHR) genetic background. In this study, we have derived 2 new minimal congenic sublines in order to determine the validate Zbtb16 gene's role in pathogenesis of metabolic disturbances observed in the SHR-Lx strain. Adult male rats of SHR.PD(Zbtb16) and SHR.PD(Htr3) strains were fed standard diet (STD) and subsequently treated with dexamethasone in drinking water (0.026 mg/ml) for 3 days. We contrasted morphometric and metabolic profiles between the two strains. The differential segment of SHR.PD(Zbtb16) minimal congenic subline contains only Zbtb16 gene and spans 254kb, while the one in SHR.PD(Htr3) subline spans 563kb and contains 6 genes: Htr3a, Htr3b, Usp28, Zw10, Tmprss5, and Drd2. SHR.PD(Zbtb16) showed significantly higher fasting levels of glucose and triacylglycerols, increased area under the glycemic curve during oral glucose tolerance test in comparison to SHR.PD(Htr3). We also observed blunted free fatty acid suppression during glucose load in SHR.PD(Zbtb16). The insulin sensitivity of skeletal muscle was substantially impaired in SHR.PD(Zbtb16) skeletal muscle (basal glycogenesis: 173 ± 8 vs. 49 ± 9 nmol glucose/g/120min in SHR.PD(Htr3), p = 0.0007). The metabolic disturbances including dyslipidemia, impaired glucose tolerance and insulin resistance of skeletal muscle observed in the original SHR-Lx strain are present in the single-gene congenic SHR.PD(Zbtb16) strain, establishing the Zbtb16 as a pleiotropic hub of metabolic syndrome features.

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T1:PO.021

Genomic and trascriptomic analysis of adipose tissue in rat recombinant inbred model of metabolic syndrome

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Background: Central obesity is one of main features of metabolic syndrome. It represents a major risk factor for a number of health problems and chronic diseases. We have previously established a model for functional genomic dissection of metabolic syndrome, the recombinant inbred rat strain panel PXO. In the current study, we contrasted two strains (PXO3-1 and PXO3-2) based on the highest divergence in metabolic syndrome features.
Methods: We compared the adult male rats of PXO3-1 and PXO3-2 strains at the level of genome (>20,000 single nucleotide polymorphisms) and visceral adipose tissue transcriptome (Affymetrix® Rat Gene 2.1 ST Array Stripusing Affymetrix GeneAtlas system) followed by gene set enrichment and network analysis (IPA -Ingenuity Pathway Analysis).

Results: In comparison with PXO3-2, the PXO3-1 strain shows increased amount of both visceral and retroperitoneal fat, lower level of triacylglycerols and total cholesterol. Genomic comparison of strains PXO3-1 and PXO3-2 showed the difference to be limited to distinct areas of chromosomes 1, 3, 5, 8, 12, 16 and 19 with only 3.21% polymorphic loci overall. Network analysis of transcripts with significantly changed expression including up-regulated (e.g. APOLD1, p = 4.39E-05; ADIPOR2, p = 1.27-E03) and down-regulated (e.g. RETN, p = 2.34E-04; AEBP1, p = 1.43E-03) transcripts in PXO3-1 compared to PXO3-2, revealed enrichment in metabolic pathways associated with obesity and key upstream regulators such as PPARD, HGF and VEGF.
Conclusion: Based on combined genomic and transcriptomic analysis, we have identified differentially expressed transcripts between genomically close substrains and dysregulated signaling and metabolic pathways associated with obesity.

T1 – Lipid Metabolism

T1:PO.022

Incretins level may reflect disturbed lipid metabolism

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Introduction: Incretins may be associated with not only glucose metabolism but also with fat metabolism. The aim was to investigate plasma GIP level in relation to plasma concentration of 14 different fatty acids in diabetic and non-diabetic subjects.
Methods: A total of 93 subjects, included patients with diabetes type 1 (n=13), diabetes type 2 (n=33) and non-diabetic subjects (n=45). Fasting plasma GIP level as well as concentrations of fatty acids (LC-MS/MS method) were measured.
Results: Fasting GIP plasma level was significantly increased in diabetes type 2 compared to diabetes type 1 (44,45 vs 20,19pg/ml). The highest saturated to unsaturated (SFA/UFA) ratio was found in diabetes 2 (0,52), medium in control (0,49) and lowest in diabetes type 1 (0,45). Diabetes t.2 patients presented lipid profile with increased long chain (C<20) SFA, MUFA and decreased PUFA. The n-3/n-6 ratio was significantly decreased in diabetes t.1. Relative amount of essential PUFA was decreased in diabetes t.2 and increased in diabetes type 1, compared to controls, as the effect of changes only in C18:2 n-6. All diabetic groups revealed decreased relative n-3 PUFA amount related to decreased DHA, not EPA. GIP level positively correlated with (C<20) SFA and MUFA and negatively with (C≥20) FA and PUFA.
Conclusion: The detailed plasma lipids study revealed the associations of GIP secretion with fatty acids profile and suggest, that this gut hormone level may reflect disturbed fatty acids metabolism with ineffective desaturase and elongase action.

T1:PO.023

Development of the uplc-ms/ms method for analysis of acylcarnitines and aminoacids

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Introduction: Acylcarnitine (AC) and amino acid (AA) profile analysis is performed for the biochemical screening of metabolic disorders, mainly in newborns. Changes in AC and AA levels in plasma/serum and organs can serve as an important marker of various metabolic diseases as well as markers of activity of metabolic pathways. AC and AA levels are usually analysed by flow injection-tandem mass spectrometry. This approach is fast and cheap, but isn't able to distinguish between isobaric AC species, which come from different metabolic pathways.
Methods: We have developed a method, which allows us to separate and quantitate the isobaric species. This method is based on hydrophilic interaction chromatography (HILIC) using high efficiency Kinetex chromatographic column coupled to tandem mass spectrometry. Using this technique, sample amount could be reduced up to 1 ul of plasma, while the panel of detectable AC and AA increased up to 57 AC and 21 AA, respectively. We used mouse strain C57Bl/6 and A/J for validation of the method. Samples of plasma from both strains were divided into triplicates and analyzed separately in three days to assess the inter-assay validation, and as a triplicate within one run to assess the intra-assay validation.
Results: Overall average inter-assay precision was 9.43% for AC in Bl/6 and A/J strain, whereas inter-assay precision for AA was 10.79%. Intra assay precision for AC was 8.65% for both mice strains, while intra assay precision for AA was 5.55%.
Conclusion: In summary, we have developed a method, which is very efficient, reasonably fast and sensitive for metabolomics analysis of small volumes. This method is also validated with good precision and accuracy (up to 12%).

T1:PO.024

Combined polyphenols increase fat oxidation and mitochondrial oxidative capacity but do not improve peripheral and hepatic insulin sensitivity in healthy overweight men and women

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Obesity and related cardiometabolic disorders are characterized by insulin resistance and reduced mitochondrial capacity. Recent evidence suggests that dietary polyphenols might improve these deteriorations. Indeed, we have shown that 3-day Epigallocatechin-gallate+Resveratrol supplementation (E+R) increased energy expenditure (EE)[1]. Moreover, metabolic flexibility tended to improve after a high-fat mixed meal (HFMM, 2.6MJ, 61E%fat) in men. These findings may translate into long-term benefits on insulin sensitivity and lipid metabolism. In this double-blind RCT, 42 healthy overweight subjects (age 38 ± 2y, BMI 29.7 ± 0.5kg/m^2, HOMAIR 2.05 ± 0.2) received either E+R (300+80mg/d, respectively) or placebo (PLA) for 12 weeks. Before and after intervention, peripheral and hepatic insulin sensitivity was assessed by 2-step-hyperinsulinemic-euglycemic clamp. Fasting and postprandial (HFMM) lipid handling was measured using indirect calorimetry, blood sampling, microdialysis and adipose tissue and skeletal muscle biopsies. Insulin-stimulated glucose rate of disappearance, respectively suppression of endogenous production, were not affected by the intervention (P > 0.70). In contrast to PLA, postprandial TAG-concentrations did not increase after E+R-supplementation compared with week 0 (p < 0.01). Moreover, E+R increased fasting (p = 0.06) and postprandial fat oxidation (p = 0.03) without changes in EE. This was accompanied by increased oxidative capacity in permeabilized muscle fibers (p < 0.05). Finally, E+R tended to decrease visceral fat mass, while whole-body mass and composition, assessed by DEXA-scan, remained unchanged. 12-wk E+R-supplementation improved lipid handling and oxidative capacity, but this did not translate into increased insulin sensitivity in healthy obese men and women.

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T1:PO.025

Alterations by the association of obesity-hypoestrogenism in cardiovascular parameters in female Wistar rats

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Introduction: Obesity is a public health problem occurring mainly in advanced age individuals1. In females, at the end of reproductive age the lack of hormones originates physiological alterations exacerbating problems caused by obesity in the cardiovascular system [2].
Methods: Female Wistar rats were randomized in 4 groups (n=6). Intact (C: control), intact with obesity (OB: obese), ovariectomized (HE: hypoestrogenic) and ovariectomized-obesity (HE-OB). The OB groups were given hypercaloric diet (30% sucrose in drinking water) and standard chow ad libitum during 32 weeks; at the end of this period, mean arterial pressure (MAP) was measured. It was obtain blood and tissue samples to perform biochemical assays and oxidative stress.
Results: Weight was increased significantly in groups with hypercaloric diet in comparison to C group. MAP was significantly higher in the HE-OB in comparison to the other groups. Plasma glucose, total cholesterol, LDLc, and TGs were significantly higher in the HE-OB in comparison with C, OB and HE, while HDLc levels were significantly lower. We found significant increases in oxidative stress parameters in the groups receiving hypercaloric diet.
Conclusion: The combination of both conditions, hypoestrogenism and obesity significantly alter biochemical, cardiovascular parameters, and increasing the susceptibility of the animals to develop oxidative stress damage.

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T1:PO.026

Postprandial regulation of skeletal muscle lipid metabolism by angiopoietin-like protein 4 in overweight subjects with impaired glucose metabolism

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Introduction: Angiopoietin-like protein 4 (ANGPTL4) decreases plasma triglyceride clearance via inhibition of lipoprotein lipase (LPL), and may thereby contribute to impairments in lipid metabolism in humans. In this study, modulation of circulating ANGPTL4 after high-fat meals with varying dietary fat quality was studied in overweight subjects. Secondly, we examined whether ANGPTL4 acts as a myokine after a high-saturated fat (SFA) meal.
Methods: The effects of a mixed-meal either high in SFA, mono- (MUFA) or polyunsaturated (PUFA) fat on plasma ANGPTL4 levels were studied in ten obese insulin resistant men (BMI 33.8 ± 3.8 kg/m^2). Skeletal muscle fatty acid handling and ANGPTL4 fluxes across muscle (forearm balance technique) were examined in 35 middle-aged overweight subjects (BMI 30.4 ± 0.7 kg/m^2) with impaired glucose metabolism before and during a 4-hour high-SFA mixed-meal test.
Results: Plasma ANGPTL4 concentrations were decreased after intake of the SFA meal (5.2 ± 0.3 vs. 4.2 ± 0.3 ng/ml; $P < 0.01$; n=35). This decrease was evident after the SFA and MUFA meal but not after a PUFA meal in the late postprandial phase ($P = 0.04$, n=10). Under fasting conditions, no release of ANGPTL4 from forearm skeletal muscle was observed (-0.1 ± 0.2 ng·100 ml tissue-1·min-1 vs. zero; $P = 0.53$), while after a high-SFA meal ANGPTL4 was released (-0.3 ± 0.1 ng·100 ml tissue-1·min-1 vs. zero; $P = 0.01$). At ECO2015, data on the relationship between ANGPTL4 and in vivo muscle LPL activity will be available.
Conclusion: A SFA and MUFA but not a PUFA meal decreased plasma ANGPTL4 concentrations, indicating a differential regulation with dietary fat quality in overweight subjects. For the first time, we showed a significant ANGPTL4 release across forearm muscle after a high-SFA meal.

T1:PO.027

Hypolipidemic effects of polydextrose in mouse

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Introduction: Hyperlipidemia is a risk factor for cardiovascular diseases. Polydextrose (PDX, Litesse® Ultra™, DuPont) is a soluble glucose polymer with low caloric value, widely used as a sugar and fat replacer in various foods. PDX has been suggested to improve hyperlipidemia [1,2,3] and have satiety-enhancing effects [4,5]. We investigated the effects of PDX on lipid profiles in mice fed with western diet in an attempt to further characterize lipid-attenuating mechanisms.
Methods: Male C57BL/6 (n=36) mice were fed either fiber-deficient (<0.5% fibre 10% kcal fat) or western-type diet (5% fiber, 41% kcal fat) for 2 weeks. Animals were gavaged twice daily either with water or with PDX 150 mg/day and water. Body weight, food intake and indirect calorimetric were performed in a home cage-based monitoring system (LabMaster®). Fasting blood samples and feces were collected for lipid measurements. Liver gene expression for lipid metabolism genes was performed by real–time PCR.
Results: PDX did not change body weight or indirect calorimetric parameters (heat production, RER and total activity). Plasma cholesterol concentration was reduced by PDX ($p < 0.05$) in fiber-deficient diet. Mice fed with western diet with PDX had significantly reduced food intake, reduced fasting plasma concentrations of cholesterol ($p < 0.05$) and triglyceride ($p < 0.001$). This was reflected by numerically increased fecal total lipid content. The liver gene expression analyses indicate that PDX upregulates LDLr in western diet fed animals.
Conclusion: The results suggest that PDX attenuates food intake and plasma cholesterol and triglyceride under western diets. The increase in fecal output of lipids as well as upregulation of LDLr in the liver might both contribute.

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T1:PO.028

The role of serum content of cyclopropaneoctanoic acid 2-hexyl in obese patients.

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Introduction: Fatty acids containing cyclopropane group are present in a bacteria, protozoa and plants (1). These fatty acids could display some biological activity (2). Recently we have reported the presence of some of cyclopropane fatty acids in adipose tissue of obese women (3), however, the source of cyclopropane FA in human is not known. Cyclopropaneoctanoic acid 2-hexyl, was also detected in serum of obese women (3). The aim of the current study was to verify if the presence of cyclopropaneoctanoic acid 2-hexyl in human serum is associated with obesity and to examine the potential association of serum content of this fatty acid with markers of alterations related to obesity.
Methods: Serum content of cyclopropaneoctanoic acid 2-hexyl were assayed by GCMS in non-obese subjects, morbidly obese patients, morbidly obese patients that were on low calorie diet for 3 months and in patients with chronic kidney disease, which is associated with some lipid alterations.
Results: Serum content of cyclopropaneoctanoic acid 2-hexyl were elevated in morbidly obese patients and patients with chronic kidney disease. Low calorie diet in obese patients resulted in lowering the level of cyclopropaneoctanoic acid 2-hexyl to the level observed in control subjects. Serum triglycerides concentrations displayed similar pattern to serum cyclopropaneoctanoic acid 2-hexyl, and these variables were significantly correlated. There was no correlation between this fatty acid and BMI. The strongest predictor of serum content of cyclopropaneoctanoic acid 2-hexyl was the age of the test subjects.
Conclusion: The serum cyclopropaneoctanoic acid 2-hexyl content is elevated in patients with morbid obesity and chronic kidney disease. Since diet caused decrease of cyclopropaneoctanoic acid 2-hexyl in serum of obese patients, one can suppose that this fatty acid originate from food. Our results suggests that the level of this fatty acid in serum is not associated with obesity but rather with age.

T1:PO.029

Delayed clearance of Triglyceride rich lipoproteins in Young, Healthy Obese Subjects

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Introduction: Obesity is strongly associated to the metabolic syndrome. Detection of early subclinical signs of metabolic disturbances would therefore be of strategic value in the management of obesity. The aims were first to study the postprandial triglyceride (TG) clearance in young and healthy obese subjects; second to investigate if fasting TG can predict delayed postprandial TG clearance.
Methods: Eighteen healthy, obese subjects (BMI >30 kg/m^2), with no clinical signs of metabolic disturbances volunteered to participate. In addition, age- and sex-matched, healthy, normal weight subjects constituted a control group. Subclinical markers of metabolic disturbances were assessed by measuring postprandial TG in serum (SE-TG), and triglycerides in chylomicrons (CM-TG) by oral fat-tolerance-test (OFTT) in both groups. Postprandial TG clearance during 8 hr was measured. Insulin resistance (IR) was measured by the homeostasis model assessment of insulin resistance (HOMA-IR).
Results: Twelve (66%) of the healthy obese individuals had insulin resistance measured by HOMA-IR. There was a delayed SE-TG and CM-TG at 6 hr when compared to the control group, while at 8hr the differences were only detected for the CM-TG clearance. Fasting TG in uppernormal level was found to be a predictor for a delayed postprandial TG clearance (fasting TG>1.02 mmol/L).
Conclusion: In young, obese subjects with no clinical signs of metabolic disturbances, early metabolic disturbances including IR, delayed postprandial TG clearance can be detected. Fasting serum TG in upper- normal level predicted delayed postprandial TG clearance and IR.

T1:PO.030

Afamin and lysophosphatidylcholine 18:2, potential markers of type 2 diabetes risk, are opposingly regulated in obesity.

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Introduction: Serum afamin and lysophosphatidylcholine (LPC) 18:2, two potential markers of increased type 2 diabetes (T2D) risk, were investigated in middle-aged lean (BMI: 22.3 ± 0.5 kg.m-2), obese/overweight, prediabetic & T2D men (31.7 ± 0.6kg.m-2, n=71).
Methods: Metabolic phenotyping included euglycemic hyperinsulinemic clamp (EHC), oGTT, MRI (abdominal fat distribution) & 1H-MRS (hepatic lipid content). Physical activity was monitored by accelerometers. Serum LPC & afamin were analyzed by mass spectrometry & ELISA. Subcutaneous abdominal adipose tissue (SAT) was obtained by biopsy and gene expression was quantified by qPCR. Fat cell size was measured morphometrically.
Results: Serum afamin was higher in obesity (23%, $p < 0.05$), increasing progressively with prediabetes & T2D (38 & 36% respectively, $p < 0.001$). Circulating LPC18:2 decreased by >30% with obesity, prediabetes & T2D ($p < 0.001$). LPC18:2 negatively correlated with afamin ($r=-0.42$, $p < 0.001$). Afamin was negatively associated with whole body & adipose tissue insulin sensitivity ($r=-0.35$, $p < 0.001$; $r=0.31$, $p < 0.01$), ambulatory activity ($r=-0.29$, $p = 0.03$) and adiponectinemia ($r=-0.48$, $p < 0.001$) and positively with insulinemia ($r=0.35$, $p < 0.001$), glycemia ($r=0.29$, $p = 0.01$), TAGs ($r=0.35$, $p = 0.001$) & hepatic lipids ($r=0.35$, $p = 0.001$). Afamin was positively associated with fat cell size ($r=0.52$, $p < 0.001$), and negatively with expression of irisin precursor Fndc5 and lipolysis promoting zinc-α-2-glycoprotein (both $r=-0.48$, $p < 0.001$) in SAT. Association between afamin and insulin sensitivity was in part independent on obesity. Afamin combined with LPC18:2 explained 49% of variability in the whole body insulin sensitivity.
Conclusion: Changes of serum afamin and LPC 18:2 might predict diabetes risk in obese nondiabetic individuals.

Acknowledgement: 7th FP EC 2007-2.1.1-6. LipidomicNET, EFSD New Horizons. Austrian Research Fund P19969-B11

T1:PO.031

Chemerin blood levels are associated with cross-sectional areas of different compartments of adipose tissue at l5 level

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Introduction: Increasing obesity prevalence is of great importance since it is associated with low-grade chronic inflammation. Adypocytes which constitute adipose tissue, among other cells, produce a large number of adipocytokines which are responsible for immunometabolic modulation. Chemerin is a multifunctional protein which primarily acts as a chemotactic cytokine. Chemerin is associated with early stages of low-grade chronic inflammation of adipose tissue possibly through regrutation of immune cells to the adipose tissue, angiogenesis, osteoblastogenesis etc. We aim to investigate the relationship between chemerin blood levels and abdominal region adipose tissues.
Methods: We included 60 volunteers in the study; all participants underwent magnetic resonance (MR) of abdominal region using 2D FLSAH sequence for optimal detection of adipose tissue. MR data was analyzed using open source ImageJ program in order to obtain the adipose tissue surface area. Blood samples were taken from all participants, chemerin serum levels were determined with commercial ELISA kit.
Results: Average participant had BMI of 24.5 ± 4.7 and was 20 [20–30.75] years old. The average area of adipose tissue at L5 level was 281 ± 119 cm^2, subcutaneous adipose tissue 215 ± 91 cm^2 and visceral adipose tissue 65 ± 38 cm^2. Chemerin positively correlated with overall adipose tissue ($r=0.721$, $p < 0.001$), subcutaneous ($r=0.694$, $p < 0.001$) and visceral adipose tissue ($r=0.588$, $p < 0.001$). After age and gender adjustment, overall adipose tissue was the most important predictor of chemerin levels ($R2=0.749$, $p < 0.001$, $\beta=0.27$).
Conclusion: Chemerin blood levels had a strong and medium positive correlation with different compartments of adipose tissue. Visceral and subcutaneous adipose tissue might contribute equally to the chemerim blood levels.

T1:PO.032

Mathematical Modelling of Energy Flux with 'Optimum' Food Micronutrients in Humans

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Introduction: Central obesity related metabolic syndrome (MetS) is associated with the degenerative diseases of type II diabetes mellitus, cardiovascular disease and cancer. It is hypothesised that the nuclear factor-erythroid 2-related factor 2 system (NRF2) uses (phyto)chemicals for energy efficient cell metabolism & in humans became an antioxidant and antitoxicant amplifying cell protection system allowing human longevity. Mathematical systems modelling should show that high micronutrient:macronutrient ratio food diets in humans involve highly efficient energy metabolism and tissue repair via the NRF2 system, and this will prevent both excess central fat accumulation and related MetS.
Aim: To formulate a comprehensive multistep mathematical model of the energy-efficient phytochemical-dependant human antioxidant/antitoxicant cell protection NRF2 system.
Methods: Involve 1) Developing an energy compartment-based equation of energy flux in humans into which a term for micronutrient action can be inserted at a later stage 2) Running metabolomics analysis from tissue/blood samples of various human models, particularly assessing before and after change from westernised (energy dense) to whole food (micronutrient dense) diets 3) Using mathematico-engineering systems modelling of the actual flux of energy in the NRF2 system, and calculating the energy potentials of (Michael) reactions involving plant chemicals 4) Putting the above models of human-specific energy flux equations into the Dynamic Energy Budget (DEB) framework at the DEB2015 school (Apr 2015, Marseille, France *http://deb2015.mio.univ-amu.fr)*
Results: Progress & the DEB2015 project will be presented.
Conclusion: The results will be discussed in the light of human dietary evolution

Acknowledgement: Professors Tim Coulson and Stanley Ulijaszek, Future fo Food Programme, Oxford Martin School, University of Oxford, Oxford UK, and Profosser Bas Kooijman, VU University, Amsterdam, The Netherlands for their encouragement and support

T1:PO.033

Selected polymorphisms of fatty acid desaturase in two phenotypes of metabolic syndrome

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Fatty acid (FA) composition of plasma lipids depends on their dietary intake and FA metabolism. The contents of plasma and tissue polyunsaturated FA (PUFA) influences, several components of metabolic syndrome (MS) like insulin resistance, and atherogenic dyslipidemia. The key enzymes of PUFA metabolism are the fatty acid desaturase1 (FADS1) and FADS2. It is known that patients with MS exhibit a heterogeneous phenotype; however, the relationships of individual FA to MS components have not been studied yet. Using GC, we examined the plasma phosphatidylcholine FA composition of 166 individuals with MS and of 188 controls. Selected polymorphisms of FADS1 and FADS2 were determined by PCR-RFLP. By means of cluster analysis of plasma FA, both groups of subjects were divided into two clusters. In cluster1, there were 65.7% of MS patients; cluster2 contained 34.3% of patients. The patients with MS within cluster1 (MS1) differed from the individual patients within MS2 by waist circumference (104 vs 101 cm, <0.05), glucose (5.99 vs 5.44 mmol/l, $P < 0.05$), NEFA (0.55 vs 0.43 mmol/l, $P < 0.01$), HOMA-IR (3.05 vs 2.23 ratio, $P < 0.05$), and conjugated dienes in LDL (71.5 vs 60.9 μmol/l, $P < 0.01$). The FA composition in the MS1 group differed from the MS2 group by higher contents of palmitoleic, g-linolenic, and dihomo-g-linolenic acids, as well as by a lower content of linoleic acid (all $P < 0.01$). We found the association of some FADS polymorphisms [FADS1 (rs174537, $chi2=7.45$, $P < 0.05$; rs174537, $chi2=7.45$, $P < 0.05$; rs174545, $chi2=8.36$, $P < 0.05$); FADS2 (rs174570, $chi2=8.57$, $P < 0.05$)] with the splitting of MS into cluster1 and cluster2. These clusters differ in the adipose tissue distribution, insulin resistance, lipolysis, oxidative stress, and in the association with some polymorphisms of FADS.

Acknowledgement: The study was supported by the grant NT/13199, IGA, Ministry of Health, the Czech Republic

T1 – Myokines

T1:PO.034

Change of circulating irisin concentrations in morbidly obese patients after roux-en-y gastric bypass

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Background: Irisin, a humoral factor secreted from muscle (myokine), has been known to stimulate the program of brown fat development in adipose tissue ("browning"). Recent animal studies suggested that irisin has possibility to enhance energy expenditure in obese patients. However, we have limited clinical data to understand biology of irisin in human, especially in morbidly obese patients taken bariatric surgery.
Methods: This is a pilot, single center, longitudinal, observational study. We recruited twelve morbidly obese subjects (25–56 years, 29.6~45.9 kg/m^2 of BMI) who underwent Roux-en-Y gastric bypass surgery (RYGBP) and visited the obesity center postoperatively. Fasting serum samples for measuring irisin were collected preoperatively, and one and nine months after RYGBP. We analyzed the association between irisin concentrations and clinical characteristics.
Results: Serum irisin concentrations, 1.0115 ± 0.2282 μg/ml ranging from 0.7347 to 1.4928 pre-operatively, altered bidirectionally on one month after RYGBP. Five out of twelve subjects showed increased irisin levels from 0.9028 ± 0.7387 (range, 0.8393 – 0.9865) μg/ml to 1.6975 ± 0.6593 (range, 1.0439 – 2.5102) μg/ml, while seven of them had decreased irisin levels from 1.0891 ± 0.2738 (range, 0.7347 – 1.4928) μg/ml to 0.8304 ± 0.1855 (range, 0.5535 – 1.1560) μg/ml. Serum irisin concentrations on 9 months were 1.1108 ± 0.1515 μg/ml (range, 0.9158 – 1.3481), and eight had elevated irisin levels by 0.1827 ± 0.1400 μg/ml and four had non-elevated levels by - 0.0675 ± 0.0538 μg/ml compared with pre-operative values.
Conclusions: The alteration of serum irisin level was associated with weight loss effect of Bariatric surgery.

T1 – Gut microbiota

T1:PO.035

Influence of panax ginseng on obesity and gut microbiota in obese middle-aged korean women

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Gut microbiota is regarded as one of the major factors involved in control of body weight. The anti-obesity effects of ginseng and its main constituents have been demonstrated, however, the effects on gut microbiota are still unknown. To investigate the effect of ginseng on gut microbiota, 10 obese middle-aged Korean women took Panax ginseng extracts for eight weeks and assessment of body composition parameters, metabolic biomarkers, and gut microbiota composition was performed using 16S rRNA gene-based pyrosequencing at baseline and at wk 8. Significant changes were observed in body weight and BMI, however, slight changes were observed in gut microbiota. We divided the subjects into two groups, the effective weight loss group (EWG) and the ineffective weight loss group (IWG), depending on weight loss effect, in order to determine whether the anti-obesity effect was influenced by composition of gut microbiota, and the composition of gut microbiota was compared between the two groups. Before ginseng intake, significant differences of gut microbiota were observed between both at phyla and genera and the gut microbiota of the EWG and IWG was segregated on a principal coordinate analysis plot. Results of this study indicate that ginseng exerted a weight loss effect and slight effects on gut microbiota in all subjects. In addition, its anti-obesity effects differed depending on the composition of gut microbiota before ginseng intake.

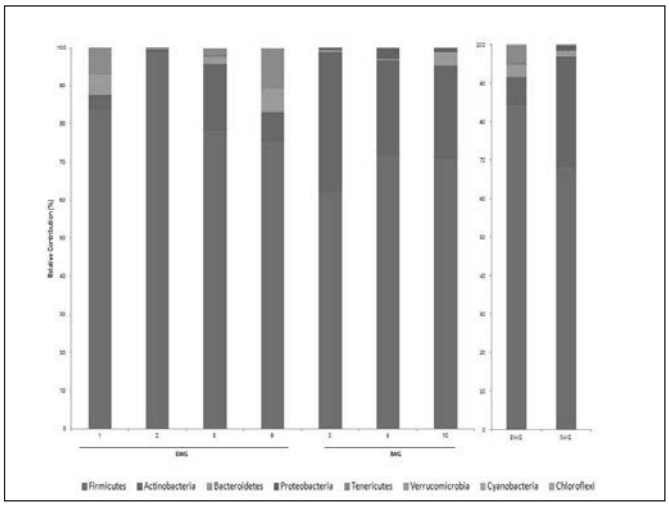

Fig. 1. The phylum compositions of fecal bacteria were compared before treatment in the EWG and IWG. The relative contribution abundance of dominant phyla identified from pyrosequencing data is shown. EWG, effective weight loss group; IWG, ineffective weight loss group.

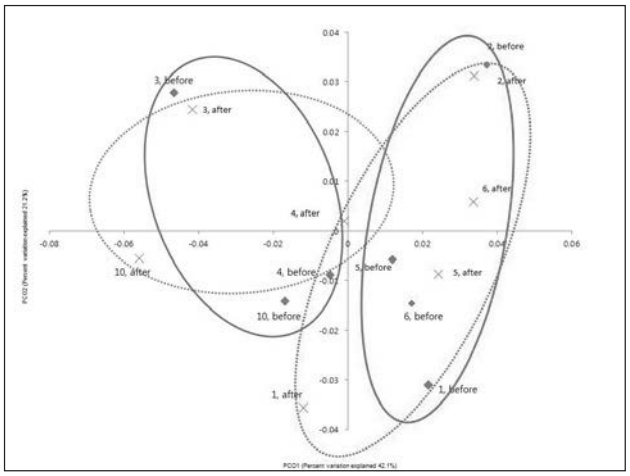

Fig. 2. Principal coordinate analysis (PCoA) plot. The plot showed the clustering pattern between the EWG and IWG based on weighted pairwise Fast UniFrac analysis.Full line circles indicate grouping of the communities in the before ginseng intake and dotted line circles indicate that in the after ginseng intake.

T1:PO.036

High-fat diet-induced obesity rat model: A comparison between wistar and sprague-dawley rat

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Introduction: In the past decades, obesity and associated metabolic complications have reached epidemic proportions. For the study of these pathologies, a number of animal models have been developed. However, a direct comparison between Wistar and SD Rat as models of high-fat (HF) diet-induced obesity has not been adequately evaluated so far.
Methods: Wistar and SD rats were both assigned for two experimental groups for 17 weeks: standard (St) and high-fat (HF) diet groups. To assess some of the features of the metabolic syndrome, oral glucose tolerance tests, systolic blood pressure measurements and blood biochemical analysis were performed throughout the study. The gut microbiota composition of the animals from each group was evaluated at the end of the study by real-time PCR.
Results: HF diet increased weight gain, body fat mass, mesenteric adipocyte's size, adiponectin and leptin plasma levels and decreased oral glucose tolerance in both Wistar and SD rats. However, the majority of these effects were more pronounced or earlier detected in Wistar rats. The gut microbiota of SD rats was less abundant in Bacteroides and Prevotella but richer in Bifidobacterium and Lactobacillus comparatively to the gut microbiota of Wistar rats. Nevertheless, the modulation of the gut microbiota by HF diet was similar in both strains, except for Clostridium leptum that was only reduced in Wistar rats fed with HF diet.
Conclusion: Both Wistar and SD Rat can be used as models of HF diet-induced obesity although the metabolic effects caused by HF diet seemed to be more pronounced in Wistar Rat. Differences in the gut microbial ecology together with other mechanisms, such as increased gut permeability, may account for the worsened metabolic scenario observed in Wistar Rat.

Acknowledgement: This work was supported by Fundação para Ciência e Tecnologia (PTDC/AGR-TEC/2227/2012; SFRH/BPD/75294/2010; SFRH/BD/78367/2011 and SFRH/BD/93073/2013).

T1 – Gut hormones/incretins

T1:PO.037

The relationship between serum amylase and fasting plasma ghrelin, peptide yy3–36 in healthy men

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Objective: Both appetite and carbohydrate metabolism are important in development of obesity. Recently serum amylase has been shown to be associated with obesity as well as metabolic disorder. Here, we investigated the relationship between total amylase, ghrelin and peptide YY (PYY) in healthy men.
Materials and Methods: In this cross-sectional study, twenty-one men were enrolled and all subjects had no symptoms and no any medical history or diseases. Serum total amylase, fasting serum levels of ghrelin and PYY3-36, anthropometry and caloric intake per day were measured. Partial correlation coefficients adjusting for age and linear regression analysis were computed to examine association between serum amylase and ghrelin, PYY3-36.
Results: The mean age, body mass index and waist circumference (WC) of subjects were 51.5 ± 10.9 years, 24.2 ± 1.7 kg/m^2 and 87.0 ± 4.4 cm, respectively. The subjects had no significant difference in serum amylase, ghrelin and PYY3-36 according to presence of obesity. Serum amylase showed significant correlation with WC (r = -0.438, P = 0.054), ghrelin (r = 0.533, P = 0.015) and PYY3-36 (r = -0.511, P = 0.021) after adjusting for age. PYY3-36 showed statistically negatively associated with serum amylase in multivariate linear regression model including age, WC (β = -0.428, P = 0.045). In contrast, positive association between ghrelin and serum amylase became non-significant in multivariate linear regression model including age, WC (β = 0.260, P = 0.146).
Conclusion: Serum amylase levels were related with ghrelin and PYY3-36 in men. Amylase, ghrelin and PYY3-36 together may relate to obesity, although further research is required to find the mechanism behind these associations.

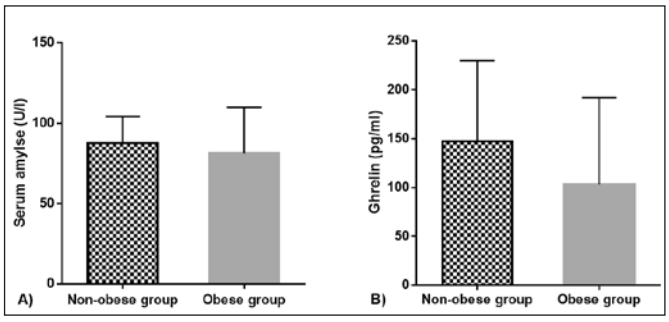

Fig. 1. Serum amylase (A) and Ghrelin levels (B) between obese and non-obese group. Statistical significance test between groups was done by Mann-Whitney U-test

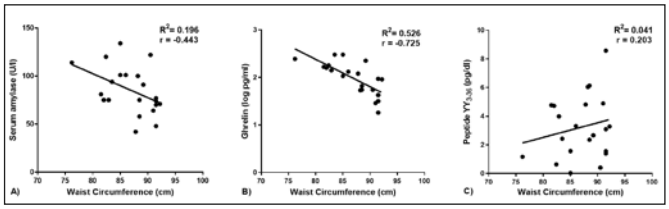

Fig. 2. Correlation between waist circumference and serum amylase (A), ghrelin (B), peptide YY3-36 (C)

T1:PO.038

Differentially nibbling endogenous cannabinoid cb1 and cb2 receptor subtypes in spontaneous and splice variants of ghrelin-induced feeding in rats

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Objective: Dysregulation of endocannabinoid system has been reported leading to the development of obesity and metabolic disorders. Endogenous endocannabinoids act on two cannabinoid receptor subtypes, type 1 (CB1) and type 2 (CB2), to exert their biological actions. However, comprehensive information regarding CB1 and CB2 receptors in modulating feeding behavior is important, but remains less understood.
Methods: We investigated the differential roles of CB1 and CB2 receptors in spontaneous and centrally-administered splice variants of ghrelin, O-n-octanoylated ghrelin and des-Gln14-ghrelin, stimulation of food intake in conscious rats.
Results: Intraperitoneal (IP) injection of different doses of selective CB2 receptor antagonist, AM-630 (0.3, 1.0, and 3.0 mg/kg), enhanced cumulative food intake during the first 12 hours with a dome-shaped dose-response relationship in freely-fed rats, with the most effective dose of 1.0 mg/kg. In contrast, the selective CB1 receptor antagonist, AM-251 (0.3, 1.0, and 3.0 mg/kg, IP) dose-dependently suppressed the cumulative food intake in 16-h food-deprived rats. Centrally-administered O-n-octanoylated ghrelin and des-Gln14-ghrelin-induced hyperphagic effects were counteracted dose-dependently by IP AM-251, but not AM-630.
Conclusions: We showed that endogenous CB2 receptor plays a role in inhibiting food intake in satiated state, whereas CB1 receptor promotes food intake in fasted condition. Central acyl ghrelin induces feeding is

a CB1 receptor-dependent mechanism. Differentially nibbling CB1 and CB2 receptor subtypes may provide a new avenue to treat eating and metabolic disorders.

Acknowledgement: The authors thank the help from Chi Chin-Wen, Ph.D., Hung Mei-Whey, MS, Miss Lee Chia-Jung, and the Clinical Research Core Laboratory, Taipei Veterans General Hospital.

T1:PO.039

A case of anorexia with extreme weight loss after a sleeve gastrectomy due to excessive pyy secretion. Improvement of symptoms with octreotide therapy.

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Background: A 22 yr old lady underwent an uneventful sleeve gastrectomy (SG) [weight (w) 136 kg, BMI 47 kg/m^2]. Her post-operative course was normal until 6 months post-surgery when she developed severe nausea, and reduced caloric intake. This resulted in excessive weight loss (2 yr post-SG w 56 kg, BMI 19.4 kg/m^2). She underwent multiple investigations and organic and psychological causes of her weight loss were excluded. A random plasma gut hormone assessment revealed high circulating PYY levels (1200 pg/ml).
Methods: A 3-hour oral mixed test meal study after an overnight fast was performed to assess circulating PYY levels and subjective appetite at baseline and after 14 days treatment with octreotide 100 mcg subcutaneously three times a day. PYY levels were compared to samples from 10 post-SG 'control' patients.
Results: The patient had abnormally high fasted and nutrient-stimulated (60 min) PYY plasma levels [PYY levels (pg/ml)]: patient fasted =793, control SG fasted =
88 ± 11, patient 60 min = 1326, control SG 60 min = 207 ± 28 coupled with high subjective nausea scores compared to control SG patients. Octreotide treatment suppressed the patient's fasted (227 pg/ml) and nutrient-stimulated PYY levels (299 pg/ml) and markedly increased her appetite. She has remained on octreotide treatment with complete resolution of her nausea, increased caloric intake and 6 kg weight gain.
Conclusion: PYY is implicated in mediating appetite changes post-SG. Our case highlights that patients may develop an exaggerated PYY response following SG leading to nausea, and excessive weight loss Moreover, octreotide therapy offers an effective treatment.

T1:PO.040

Changes in appetite, food intake, and appetite regulating hormones during acute weight loss induced by roux-en-y gastric bypass and low-calorie diet

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Introduction: Roux-en-Y gastric bypass (RYGB) reduces appetite by increasing appetite regulating hormones such as PYY and GLP-1 (1). Although previous studies have compared the effects of RYGB on appetite with energy restriction alone using low-calorie diets (LCD), few studies have been able to match the weight loss induced by RYGB.
Aim: To compare the effect of comparable weight loss achieved by RYGB and LCD on appetite regulation
Methods: Morbidly obese volunteers (n=20, BMI:40–55kg/m^2) awaiting RYGB followed a liquid formula 810kcal/day LCD (Cambridge Weight Plan®, Northants, UK) for 2 weeks. After, they were randomly assigned to RYGB and standard post-operative diet (RYGB) or continuing the LCD (LCD) for another 4 weeks. Fasting and post-prandial ratings of appetite and blood samples were collected at baseline and at 6 weeks. PYY and GLP-1 concentrations were measured by RIA. Food intake was assessed during an ad-libitum meal.
Results: Weight loss at 6 weeks was similar in both groups (RYGB: 14.7 ± 0.6 kg; LCD: 13.5 ± 0.8 kg; NS; n=15). The RYGB group exhibited significant changes in appetite ratings at 6 weeks (table 1, figure 1). This was not observed in the LCD group. At 6 weeks, PYY and GLP-1 concentrations were significantly increased (figure 2) and food intake significantly decreased in the RYGB group only (RYGB baseline: 353g ± 46; RYGB 6 weeks: 57g ± 8, p = 0.0002; LCD baseline: 273g ± 48; LCD 6 weeks: 185g ± 21, p = 0.11).
Conclusion: Despite similar weight loss with LCD and RYGB, only the latter led to significant changes in appetite, in part through changes in GLP-1 and PYY levels. These changes in circulating gut hormones may favour weight loss sustainability in RYGB compared with LCD over the long-term.

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References

1. Vincent and le Roux, 2008

AUC	RYGB			LCD		
	Baseline	6 weeks	p-value	Baseline	6 weeks	p-value
Hunger	3244 (1107-9500)	815 (378-1757)	0.008	4076 (1900-8741)	3139 (1134-8690)	0.81
Nausea	174 ± 62	4105 ± 1068	0.007	817 ± 357	1130 ± 524	0.38
Desire-to-eat	7161 ± 1791	1947 ± 392	0.02	6823 ± 1066	6831 ± 1773	0.99
Prospective food intake	6529 ± 1812	1651 ± 334	0.03	5956 (3961-8958)	3969 (1535-10261)	0.58
Fullness	8152 ± 1153	14502 ± 847	0.01	8664 ± 991	9359 ± 1192	0.60
GLP-1	12044 (6942-20896)	24191 (13813-42369)	0.02	14331 ± 1205	15512 ± 2519	0.69
PYY	4477 ± 870	7154 ± 1716	0.09	4055 ± 1083	4527 ± 815	0.36

Fig. 1. Appetite ratings and gut hormones concentrations (area under the curve) at baseline and at 6 weeks

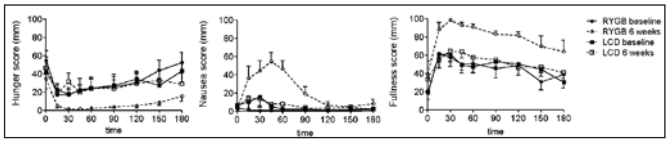

Fig. 2. Appetite ratings at baseline and at 6 weeks

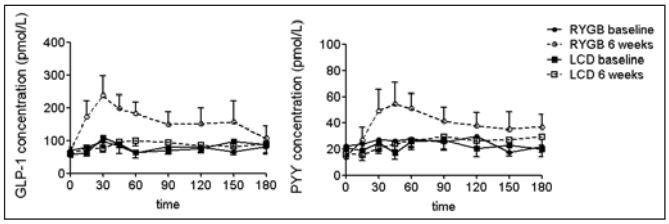

Fig. 3. GLP-1 and PYY concentrations at baseline and at 6 weeks

T1:PO.041

Steviol glycosides from the sweetener stevia induce glp-1 secretion in intestinal organoids and stc-1 cells

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Introduction: Since their approval by EFSA and FDA, steviol glycosides are increasingly used as sweetener in food products (EFSA, 2010). Howev-

er, despite extensive use in our food, their effects on gastrointestinal hormone release have not been investigated in much detail. Here, we studied the effect of steviol glycosides on GLP-1, a key hormone in food intake regulation and insulin secretion.
Methods: Effects of steviol glycosides on gut hormone secretion were first measured in the murine enteroendocrine cell line, STC-1. Next, we used epithelial organoids, prepared from mouse stem cells, which give a better reflection of the normal cellular environment. To reveal the underlying mechanism behind the effect of steviol glycosides on GLP-1 secretion, transcriptomic changes and secondary messengers including intracellular calcium were measured.
Results: Steviol glycosides induced GLP-1 secretion in both ileal organoids and STC-1 cells. Data suggested the involvement of signalling pathways other than the classical sweet taste receptor signalling pathway as rebaudioside A did not increase intracellular calcium levels and G-protein alpha gustducin was absent in these cells. Transcriptome analysis may give rise to new leads for alternative signalling routes.
Conclusion: Steviol glycosides induce secretion of the gut hormone GLP-1 in STC-1 cells and in murine ileum-derived organoids, suggesting that stevia products might influence intestinal food intake regulation and glucose homeostasis.

T1 – Bone & Muscle

T1:PO.042

Is undercarboxylated osteocalcin related with obesity measurements?

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Introduction: Undercarboxyleted osteocalcin (ucOC) is one of a bone formation measure which found in circulating system higher than its fully carboxylated form. In recent years, a few studies found that plasma ucOC levels may be related with body mass index and body fat mass in type 2 diabetes. The aim of this study was investigate the relationship between plasma ucOC levels and some obesity measurements in healthy subjects.
Methods: The study was carried out on 80 healthy male and female participants aged 25–50 years. Body weight (kg), body fat mass (kg) and body fat percentage (%) were taken with a bioelectric impedance analyzer and plasma ucOC levels (ng/mL) were determined with ELISA method. Body mass index (BMI) scores were divided into two groups as normal and overweight according to the WHO classification.
Results: According to BMI, 47.5% of all participants were overweight. Plasma ucOC levels were found lower in overweight participants than normal BMI participants ($p < 0,05$). In all participants, a poor negative correlation was observed between plasma ucOC levels and BMI, body fat mass and body fat percentage ($p < 0,05$). Whereas poor negative correlation was found between plasma ucOC levels and BMI, body fat percentage in female participants ($p < 0,05$); there was not any significant correlation in male participants ($p > 0,05$).
Conclusion: With this study, relationship between ucOC and BMI, body fat mass was shown for the first time in healthy normal and overweight people. Current study will be lead to plan further investigations about underlying mechanisms of these relationships and ucOC may be a potential therapeutic agent for obesity treatment.

T1:PO.043

Effects of body fat mass on bone in normal weight men and women: The Fourth Korean National Health and Nutrition Examination Survey (KNHANES IV).

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Background: Osteoporosis & osteopenia are disorders characterized by reduced bone quality and increased fracture risk. In traditional paradigm, incidence rates of femoral neck and long-bone fractures in the underweight group were higher than the overweight or obese group. But the accumulation of fat (sp, abdominal depot) was found to be a risk factor of bone loss. This study was aimed to evaluate the association between bone health and body fat in normal-weight adult Korean.
Methods: Totally, 5515 adult (mean age 50.3) from the fifth Korean National Health and Nutrition Examination Survey (KNHANES V) were included in this study. Bone mineral densities (BMD) and body fat were measured using dual energy X-ray absorptiometry. Correlation analysis and regression analysis was used to evaluate relationship of body fat %, BMI and BMD. Cut off points of normal weight obesity is male 20.6, female 33.4 for body fat (%).
Results: Correlation analysis showed that BMDs of total femur, trochanter, intertrochanter, femoral neck, and lumbar spine were negatively associated with fat mass and positively associated with BMI in normal weight obesity. There was no statistically significant association between body fat % and BMD in normal weight non-obese men in total femur, intertrochanter, femoral neck, and lumbar spine. Regression analysis has similar results.
Conclusion: Body fat mass have a detrimental effect on BMD in normal weight obesity. But in normal weight non obese man, body fat mass is unclear effect about BMD.

Table 1. Characteristics of participants.*

	MALE	FEMALE	
N	2415	3100	P-VALUE
Age(years)	50.3±0.2	50.3±0.2	0.951
Weight (kg) †	69.9±0.2	58.7±0.2	<.0001
Height (m) †	1.7±0	1.6±0	<.0001
BMI (kg/m²) †	24.3±0.1	23.9±0.1	<.0001
Waist Circumference (cm) †	85.3±0.2	79.5±0.2	<.0001
MUSCLE†	730.2±1.7	621.6±1.5	<.0001
NWO†	33.8(1.4)	45.5(1.3)	<.0001
DX_TFM_BMD†	0.976±0.003	0.874±0.003	<.0001
DX_TR_BMD†	0.696±0.003	0.637±0.002	<.0001
DX_IT_BMD†	1.173±0.004	1.054±0.003	<.0001
DX_NK_BMD†	0.803±0.003	0.72±0.002	<.0001
DX_LSP_BMD†	0.966±0.003	0.927±0.003	<.0001
DW_WBT_BMD†	1.193±0.004	1.11±0.004	<.0001
EDU(>=10) †	69.9(1.2)	54.8(1.3)	<.0001
INCOME(Q1) †	10.8(0.8)	14.4(0.9)	<.0001
PLACE(RURAL)	24.2(2.5)	21.3(2.2)	0.0013
occupation(yes) †	88.8(0.8)	59(1.2)	<.0001
SMOKE†			<.0001
Non	18.3(0.8)	92.9(0.6)	
ex-smoker	35.4(1.2)	2.1(0.3)	
Current	46.3(1.2)	4.9(0.6)	
DRINKE†			<.0001
non-drinker	13.8(0.9)	33.6(1.1)	
mild to moderate-drinker	65.1(1.2)	65.2(1.1)	
heavy-drinker	21.1(1)	1.2(0.2)	
DM†	12.5(0.8)	7.6(0.5)	<.0001
Hypertension†	44.5(1.3)	28.2(1)	<.0001
Metabolic syndrome	37.6(1.1)	31.7(1.0)	0.0002
Osteoporosis†	4.9(0.5)	10.7(0.7)	<.0001
Menopause		45.2(1.3)	.

* ANOVA test was used, in continuous variable, plus-minus values are means±SE
* Chi-square test was used, in categorical variable, bracket are means (%SE)
TFM, total femur; TR, trochanter; IT, intertrochanter; NK, femoral neck; LSP, lumbar spine; WBT, whole body total; EDU, education; NWO, fat(%) more than male 20.6%, female 33.4%.
† p <0.001

Fig. 1. General characteristic of subjects

Table 2 . Association between FAT (%), BMI and BMD.*

	TFM		TR		IT		NK		LSP		WBT	
	r	P	r	P	r	P	r	P	r	P	r	P
FEMALE NW†												
FAT(%)	-0.08817	0.0123	-0.08254	0.0095	-0.07007	0.0495	-0.08373	0.0155	-0.04635	0.1454§	-0.11121	0.0019
BMI	0.47495	<.0001	0.45279	<.0001	0.44973	<.0001	0.39043	<.0001	0.33843	<.0001	0.27466	<.0001
FEMALE NWO‡												
FAT(%)	-0.12881	0.0004	-0.12796	0.0013	-0.10605	0.0033	-0.09579	0.0005	-0.07099	0.0114	-0.10843	0.0017
BMI	0.40858	<.0001	0.38147	<.0001	0.3848	<.0001	0.34086	<.0001	0.28702	<.0001	0.24587	<.0001
MALE NW†												
FAT(%)	-0.05956	0.1599§	-0.09918	0.0325	-0.03966	0.3355§	-0.04659	0.2735§	-0.01808	0.6662§	-0.13023	0.0005
BMI	0.48745	<.0001	0.45077	<.0001	0.46387	<.0001	0.38086	<.0001	0.36233	<.0001	0.36513	<.0001
MALE NWO‡												
FAT(%)	-0.21066	<.0001	-0.18938	<.0001	-0.18246	<.0001	-0.17003	<.0001	-0.11606	0.0003	-0.17775	<.0001
BMI	0.45765	<.0001	0.39476	<.0001	0.41746	<.0001	0.41317	<.0001	0.26089	<.0001	0.31638	<.0001

* correlation analysis was used. Age adjusted

r, Pearson's correlation coefficients; P, P-value

TFM, total femur; TR, trochanter; IT, intertrochanter; NK, femoral neck; LSP, lumbar spine; WBT, whole body total

† NW: Normal Weight with FAT(%) less than male 20.6%, female 33.4%.

‡ NWO: Normal Weight Obesity defined as BMI in normal range (18.5-22.9) with FAT(%) more than male 20.6%, female 33.4%.

§ p-value ≥ 0.05

Fig. 2. BMDs of total femur, trochanter, intertrochanter, femoral neck, and lumbar spine were negatively associated with fat mass and positively associated with BMI in normal weight obesity.

Table 3. Analysis of between FAT (%) and BMD.*

Male	TFM			TR			IT			NK			LSP		
	β	SE	P-value	β	SE	P-value	β	SE	P-value	β	SE	P-value	β	SE	P-value
MODEL1															
NW†	0.0068151	0.0018128	0.0002	0.005455	0.0014416	0.0171	0.0066316	0.0025473	<.0001	0.0052659	0.0018529	0.0016	0.0071269	0.0018568	0.0001
NWO‡	-0.0010149	0.0010780	0.3472§	-0.0009235	0.0009603	0.3382§	-0.0007031	0.0012714	0.5806§	-0.0001795	0.0010474	0.8642§	-0.0005122	0.0012312	0.6777§
MODEL2															
NW†	-0.0025651	0.0018219	0.1599§	-0.0032827	0.0015289	0.0325	-0.0020633	0.0023193	0.3395§	-0.0019569	0.0017841	0.2735§	-0.0008863	0.0020573	0.6662§
NWO‡	-0.0076124	0.0011408	<.0001	-0.0054286	0.0010129	<.0001	-0.0079889	0.0015392	<.0001	-0.0058052	0.0010726	<.0001	-0.0047029	0.0012792	0.0003
MODEL3															
NW†	-0.0025021	0.0018269	0.1715§	-0.0031894	0.0015356	0.0393	-0.0020699	0.0024294	0.5349§	-0.0018589	0.0017861	0.2933§	-0.0009401	0.0020605	0.6478§
NWO‡	-0.0076409	0.0011394	<.0001	-0.005468	0.0010293	<.0001	-0.0080155	0.0015357	<.0001	-0.0058985	0.0010759	<.0001	-0.0048646	0.0012815	0.0001

Female	TFM			TR			IT			NK			LSP		
	β	SE	P-value	β	SE	P-value	β	SE	P-value	β	SE	P-value	β	SE	P-value
MODEL1															
NW†	0.0046867	0.0015021	<.0001	0.0035775	0.0007609	<.0001	0.0046826	0.0014135	<.0001	0.0036372	0.0013472	0.0025	0.0051082	0.0013153	0.0002
NWO‡	0.0017021	0.0013604	0.2116§	0.0006944	0.0009166	0.4482§	0.0027366	0.0013894	0.0497	0.0018227	0.0009474	0.0552§	0.0014774	0.0009496	0.1782§
MODEL2															
NW†	-0.0031209	0.0012982	0.0163	-0.0022264	0.0008359	0.0095	-0.0030072	0.0015804	0.0495	-0.0027799	0.0014288	0.0155	-0.0020713	0.0014162	0.1454§
NWO‡	-0.0004646	0.0012974	0.3004	-0.00351	0.0010819	0.0013	-0.0047001	0.0015809	0.0033	-0.0033054	0.0009457	0.0005	-0.0032915	0.0012959	0.0114
MODEL3															
NW†	-0.0031728	0.0012782	0.0108	-0.0022389	0.0008573	0.0041	-0.0031118	0.0015977	0.0431	-0.0028144	0.0014996	0.0149	-0.0021946	0.0014181	0.1207§
NWO‡	-0.0004566	0.0012946	0.3009	-0.0033774	0.001059	0.0015	-0.0047109	0.0015284	0.0028	-0.0031414	0.0009257	0.0007	-0.0031617	0.0012871	0.0141

* regression analysis was used. SE: standard error

MODEL1: age adjusted MODEL2: MODEL1+BMI adjusted MODEL3: MODEL2 + smoke, drink adjusted

TFM, total femur; TR, trochanter; IT, intertrochanter; NK, femoral neck; LSP, lumbar spine

† NW: Normal Weight with FAT(%) less than male 20.6%, female 33.4%

‡ NWO: Normal Weight Obesity defined as BMI in normal range (18.5-22.9) with FAT(%) more than male 20.6%, female 33.4%.

§ p-value ≥ 0.05

Fig. 3. There was no statistically significant association between body fat % and BMD in normal weight non-obese men in total femur, intertrochanter, femoral neck, and lumbar spine.

T1 – Imaging

T1:PO.044

Uncoupling between striatal dopamine transporter and glucose metabolism in diet induced obesity

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Introduction: Dopamine receptor was down regulated in obese brain (Nummennmaa et al, 2012). Data are conflicting about the density of dopamine transporter in obese striatum. Furthermore, while striatal D2R availability is negatively associated with frontocortical glucose metabolism in obese patient (Volkow et al, 2004), the impact of obesity on striatal metabolism is unknown.

Methods: Fourteen adults mini-pigs were imaged for dopamine transporter and glucose metabolism in lean and obese conditions. Obesity was induced by high fat, high glucose diet supplied at 200% metabolic requirement (measured by indirect calorimetry) during 3 months. Brain glucose metabolism was obtained using PET imaging (HR+ Siemens) after the IV injection of 250 MBq FDG (IBA). The density of dopamine transporter was evaluated using SPECT imaging (Millenium, GE) after the IV injection of 180 MBq DatScan (GE). Sinograms were corrected for attenuation using STIR software. The amount of radioactivity was obtained using Pmod software adapted to our pig brain atlas.

Results: The animals almost doubled their weight during the three months high calorie, high fat/glucose diet (87 ± 4.4 versus 36 ± 3.9 kg). Striatal dopamine transporter density expressed as the ratio between striatum vs occipital cortex was significantly less in the obese than in lean situation (1.8 ± 0.04 vs 1.6 ± 0.02, $p < 0.01$). Inversely, the striatal glucose metabolism expressed as the ratio between striatum vs cerebellum was significantly greater in the obese than in the lean condition (1.4 ± 0.02 vs 2.3 ± 0.02, $p < 0.01$). Identical figures were obtained with statistical parameter mapping analyses.

Conclusions: Our results demonstrated clearly a reduced density of striatal dopamine transporter in morbid obese animal. This was associated with an increased striatal metabolism that might compensate for changes in synaptic dopamine availability. This uncoupling might a critical mechanism to explain overeating in obesity.

T1:PO.045

Associations between biomarkers of subclinical inflammation and early deterioration of glycemia before the diagnosis of type 2 diabetes are partly independent of obesity: Kora s4/f4 study

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Introduction: The role of biomarkers of subclinical inflammation in the early deterioration of glycemia before type 2 diabetes is largely unknown. Therefore, the aim of this study was to test if increased levels of proinflammatory biomarkers and decreased adiponectin in the circulation are associated with 7-year increases of HbA1c in non-diabetic individuals. The second aim was to investigate if baseline levels in waist circumference (WC) and 7-year changes in WC explain these associations.

Methods: This study is based on participants of both the KORA S4 survey (1999–2001) and its 7-year follow-up KORA F4 (2006–2008). Individuals with diabetes at baseline or with a diagnosis of diabetes between both surveys were excluded, which left a sample of 850 men and women. Linear regression analyses were performed to assess associations of baseline values of biomarkers with 7-year changes in HbA1c.

Results: High leukocyte count, high-sensitivity C-reactive protein (hsCRP), serum amyloid A (SAA) and interleukin (IL)-6 were positively associated with changes in HbA1c after adjustment for age, sex, lifestyle factors and baseline HbA1c, whereas adiponectin was inversely associated (P <0.0001 to 0.02). Effect sizes were reduced by 19–56% when baseline data for WC, 7-year changes in WC and lipids (LDL-C, HDL-C and triglycerides) were added to the model, but positive associations between baseline leukocytes, hsCRP and SAA on the one hand and increase in HbA1c during the 7-year follow-up on the other hand remained significant (P 0.004 to 0.045).

Conclusion: An elevated leukocyte count and elevated hsCRP and SAA were associated with early deterioration of glycemia already before the diagnosis of type 2 diabetes. These associations were independent of baseline WC or changes in WC.

T1 – Immunometabolism

T1:PO.046

Acute hyperglycemia increases monocyte and t-lymphocyte content in subcutaneous adipose tissue of healthy obese women

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Background/Objectives: Hyperglycemia represents one of possible mediators for activation of immune system. It may contribute to worsening of inflammatory state of adipose tissue associated with obesity and thus accelerate the development of metabolic syndrome. The aim of our study was to investigate the effect of a short-term hyperglycemia (HG) on the phenotype and relative content of immune cells in subcutaneous abdominal adipose tissue (SAAT) in obese women without metabolic complications.
Subjects/Methods: Three-hour HG clamp combined with infusion of octreotide (to block insulin secretion) and control investigations with infusion of either octreotide or saline were performed in three groups of obese women (n=10 per group). Before and at the end of the interventions, samples of SAAT were obtained by needle biopsy. The relative content of immune cells in SAAT was determined by flow cytometry. Gene expression analysis of immunity-related markers (chemokines/cytokines, markers of macrophages and lymphocytes, Toll like receptors) in SAAT was performed by quantitative real-time PCR.
Results: In SAAT, HG induced an increase in the content of CD206 negative monocytes/macrophages ($4.9 \pm 0.5\%$ vs.$5.6 \pm 0.5\%$. $p < 0.05$) and T lymphocytes (T helper and T cytotoxic lymphocytes; $3.4 \pm 0.3\%$ vs. $5.6 \pm 0.5\%$ and $1.9 \pm 0.2\%$ vs. $3.1 \pm 0.2\%$ respectively, $p < 0.01$). Further, HG promoted an increase of mRNA levels of immune response markers (CCL2, TLR4, TNFα) and lymphocyte markers (CD3g, CD4, CD8a, TBX21, GATA3, FoxP3) in SAAT ($p < 0.05$). Under both control infusions, none of these changes were observed.
Conclusions: Acute HG increased the content of monocytes and lymphocytes in SAAT of healthy obese women. This result suggests that the short-term HG can modulate an immune status of AT in obese subjects.

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T1:PO.047

Role of interleukin 15 in liver fat accumulation in patients with concomitant obesity

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Background: non-alcoholic fatty liver disease (NAFLD) and obesity are associated with low grade inflammation. Experimental data suggest crucial role of interleukin 15 (IL-15) in NAFLD development. Y. Cepero-Donates et al. showed that exceeded secretion of IL-15 promotes fat accumulation in mice. The aim was to investigate IL-15 concentration in patients with NAFLD associated with obesity depending on steatosis degree. The study included 32 patients with NAFLD associated with obesity, 31 normal weight patients with NAFLD and 26 healthy volunteers.
Methods: NAFLD was diagnosed by abdominal ultrasound examination. Steatosis degree was assessed using hepatorenal index (HRI). Obesity was measured using body mass index (BMI) and waist circumference (WC). Concentration of IL-15 were measured using enzyme-linked immunosorbent assay kit. The results showed that IL-15 concentration was significantly increased in patients with NAFLD comparing to control group. Concentrations of IL-15 observed in NAFLD patients with concomitant obesity were significantly higher than those in NAFLD patients with normal weight ($p < 0,05$). In all NAFLD patients IL-15 correlated with HRI supporting its role in hepatic fat accumulation. Furthermore, in patients with NAFLD there was significant correlations of IL-15 concentration with BMI ($p < 0,05$) and WC ($p < 0,05$).
Conclusions: patients with NAFLD and concomitant obesity might have more significant proinflamatory status that could be caused by adipose tissue dysfunction and abnormal adipocytokines synthesis. Exceeded IL-15 observed in NAFLD patients with obesity supports its role in liver lipid accumulation found in experimental studies. Further investigations are needed to explore correlations of IL-15 with histological findings in NAFLD obese patients.

T1:PO.048

Effect of diet and cd36 deficiency on murine mesenteric lymph nodes

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Introduction: Mesenteric lymph nodes (MLN) of diet-induced obese mice are smaller than those of lean mice because of atrophy of lymphoic cells. Cluster of differentiation (CD)36 contributes to high fat diet induced obesity (DIO) and is expressed on lymphocytes.
Methods: Five weeks old male wild-type (WT) and CD36 deficient (CD36-/-) mice were kept on standard fat diet (SFD, lean) or on high fat diet (HFD, obese) for 15 weeks. Macrophage content and lymphocyte populations of MLN were analyzed by FACS.
Results: DIO, as compared to SFD feeding, was associated with significantly smaller MLN in WT mice, but not in CD36-/- mice. MLN of obese versus lean mice showed lower prevalence of cytotoxic T cells (TC; CD8+), helper T cells (TH; CD4+), activated T cells (Tact; CD4+CD25+) and regulatory T cells (Treg; CD4+FoxP3+CD25+). These differences were not observed between MLN of obese and lean CD36-/- mice. Treg cell content in MLN of WT, but not CD36-/-, mice correlated positively with MLN size. MLN macrophage content was lower for lean than obese WT mice, but was significantly higher for lean as compared to obese CD36-/- mice. Overall, MLN of obese CD36-/- mice contained significantly fewer macrophages as compared to obese WT mice. Analysis of apoptotic markers in MLN revealed lower expression of annexin V and caspase 3 (pro-apoptotic) in MLN of obese CD36-/- versus WT mice, and higher expression of annexin V and FasL for lean CD36-/- versus lean WT mice. Caspase 8, Caspase 9, Bax, AIFm2, Bcl2 and XIAP were not affected by either diet or genotype, thus not supporting differences in apoptosis.
Conclusion: DIO in WT mice, as compared to lean mice, is associated with smaller MLN, lower prevalence of TC, TH, Tact and Treg cells. CD36-/- mice appear to be protected against these changes.

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T1:PO.049

Nesfatin-1 levels are significantly increased after weight loss induced by bariatric surgery

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Background and aims: Nesfatin-1 was recognized as a central novel anorexigenic modulator of food intake and body weight.Thus, nesfatin-1 might be a target to influence hunger and satiety. The peripheral mode

of action of nesfatin-1 is less clear, however, it might have an impact on glucose homeostasis. Therefore, it was of interest to investigate nesfatin-1 levels in patients before and after weight loss induced by bariatric surgery (BS) and their respective relation to glucose homeostasis.
Materials and methods: We included 63 non-diabeticpatients (mean age: 42± 11 years, means±SEM; mean BMI: 46.7 ± 7.0 kg/m$_{,}$) with morbid obesity (MO), who were investigated before and 2 years after BS. Glucose tolerance was assessed by an oral glucose tolerance test (75gms). Nesfatin-1 levels were assessed by a commercial ELISA.
Results: BMI was reduced from 46.5 ± 7.7 to 31.9 ± 6.0 ($p < 0.001$). Nesfatin-1 levels increased (3.49 ± 1.26 vs 7.96 ± 2.18 ng/ml; $p < 0.001$) and 2h post challenge blood glucose (BG) levels decreased (110 ± 36 vs 60 ± 19, $p < 0.001$) 2 years after bariatric surgery. Preoperative no correlation could be found. Postoperative fasting nesfatin-1 levels correlated significantly with 2h post challenge BG($r = -0.289$; $p = 0.049$). The change in fasting nesfatin-1 levels correlated with the change in 2h BG levels ($r = -0.502$; $p = 0.001$).The change in nesfatin-1 levels was not correlated with the change in body weight.
Conclusion: This is the first study demonstrating increased nesfatin-1 levels in morbidly obese patients after weight loss induced by BS. The correlation of nesfatin-1 levels with 2h BG, however not with bodyweight, suggests a role of nesfatin-1 in improved glucose tolerance following BS.T2

T3 – Nutrients and diet patterns

T3:PO.001

Systematic Review on the determinants of Fruit and Vegetable consumption in young children (aged 0–6)

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Introduction: A diet rich in fruit and vegetables (F&V) in young children can reduce the risk of obesity. Identifying determinants, including barriers and facilitators, of F&V consumption in young children, is needed to design effective and sustainable interventions.
Methods: A systematic review of both quantitative (prospective cohort and intervention studies) and qualitative evidence was conducted. Eight electronic databases were searched in June 2012.
Results: 49 papers were included (29 intervention, 7 prospective cohort, 13 qualitative). Increased parental knowledge, education, higher socioeconomic status (SES), and children's liking/preference for specific F&V, were all positively associated with an increase in F&V consumption. Maternal feeding practices, particularly modelling of healthful dietary behaviours, were positively associated with a higher F&V consumption. In contrast, parental pressure to eating healthy foods, or restricting the consumption of unhealthy foods, was found to have a detrimental effect on child F&V consumption. A number of barriers and facilitators to F&V consumption in young children were identified; accessibility, cost of food, temperament behaviours of the child, lack of transport, convenience of unhealthy food, and time constraints.
Conclusion: Interventions for the prevention of obesity in young children should include should include a focus on maternal modelling of healthful dietary behaviours, and address the barriers and facilitators to F&V consumption identified in this review.The protocol for this systematic review has been registered with PROSPERO (registration no. CRD42012002881) and published (Lakshman et al. Systematic Reviews 2013, 2:28).

T3:PO.002

Comparing effects of a partial meal replacement diet plan with conventional diet on weight loss, fat mass, chemerin, insulin and peptide yy levels, and inflammation in obese men

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Background: Meal replacements (MR) reduce energy density (ED). Levels of the anorectic gut hormone peptide YY (PYY) increase with high-protein low-ED diets and facilitate weight loss. The adipokine chemerin, which promotes insulin resistance and inflammation, increases in obesity and decreases with weight loss. We compared effects of an MR-based diet and a reduced-fat (< 30% of calories) conventional diet (CD) on weight loss, waist circumference (WC), body fat mass, chemerin, fasting PYY and insulin levels, and inflammation in obese men.
Methods: Obese (mean body mass index 32.9 kg/m^2, range 30.5–42.3) men (mean age 40.2 years, range 30–61) were randomized to a CD (n= 23) or an isocaloric plan including 1–2 MR/day (MR group, n= 23), to reduce intake by 500 kilocalories/day for 12 weeks.
Results: At 12 weeks, weight, WC, fat mass, serum chemerin, insulin and high-sensitivity C-reactive protein (marker of systemic inflammation) reduced more in the MR group (-4.19 ± 3.78 kg; –4.79 ± 3.33 cm; –2.47 ± 3.63 kg; –11.2 ± 12.1 ng/ml; –5.6 ± 5.1 mU/L; –2.20 ± 3.86 mg/L) than in the CD group (-2.63 ± 1.86 kg; –2.52 ± 2.27 cm; –1.59 ± 2.32 kg; –7.6 ± 13.7 ng/ml; –3.4 ± 5.7 mU/L; –1.22 ± 3.60 mg/L). In the MR but not the CD group, serum PYY increased (11.4 ± 19.4 versus –4.6 ± 10.3 pg/ml), and was associated ($r = 0.35$, $p = 0.03$) with a significant increase in proportion of energy intake from protein (3.2 ± 0.9%) which did not occur with CD (0.6 ± 1.0%).
Conclusions: MR-based diets are more effective for inducing reductions in weight, fat mass, chemerin, insulin and systemic inflammation. The use of MR was associated with higher proportion of energy intake from protein, which may increase PYY level and promote weight loss.

Acknowledgement: We thank all the men who participated in the study.

T3:PO.003

Assessment of dietary sodium intake by spot urine and by a food frequency questionnaire: Validation against 24 hour urine collection

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Background: Recent evidence suggests a link between salt intake and increased risk of obesity, but the assessment of dietary salt intake may be limited by several methodological factors. This study aims at evaluating the validity of spot urine sodium (Kawasaki equation) and a short FFQ in assessing sodium intake in Lebanese adults. The 24 hour urine sodium excretion is used as the gold standard.
Methods: A convenience sample of 88 subjects provided a 24 hour urine sample and a spot urine sample (second morning void). Urinary sodium and creatinine levels were determined. Reliability of the FFQ was assessed by its re-administration one month later. Spearman correlation coefficients and Bland Altman tests were calculated to evaluate the relationship between sodium intake as assessed by the FFQ (Na FFQ), spot urine (Na spot) and 24 hour urinary excretion (Na 24h).
Results: The intra class correlation coefficient to evaluate the reliability of the FFQ was of 0.87. A significant correlation was found between Na

24h (mean= 3632.29 ± 1765.13 mg/day) and Na FFQ (4131.13 ± 1566.52 mg/day) (r=0.568), and the mean difference (498.83 ± 1732.06 mg/d) was not significantly different from zero. Classification agreement was of 51% and the weighted kappa value was of 0.416, indicating moderate agreement. Spearman correlation coefficient between Na spot and Na 24h was high and significant (r= 0.647), but the mean difference (736.54 mg/d) was significantly different from zero. Classification agreement was of 57%, weighted kappa value of 0.481, indicating moderate agreement.
Conclusion: These results suggest that there is moderate agreement between the FFQ, spot urine and 24 hour urine collection in estimating sodium intake, but the results may be limited by the small sample size.

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T3:PO.004

Paternal occupation: A socioeconomic factor influence the association between protein intake and body composition among children and adolescents in south china

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Introduction: Paternal occupation is a socioeconomic factor both related to childhood diet and body composition. Our aim was to examine whether protein intake is associated with body composition among children with different paternal occupation in South China.
Methods: 1716 participants (46% girls) aged 6–16 years were cross-sectionally recruited. Daily intakes of protein were obtained by 3-d 24h dietary recalls. Height, weight and skinfold thickness were measured to calculate body mass index SD score (BMI SDS), percentage of body fatness (%BF), fat mass index (FMI) and fat-free mass index (FFMI). Information on socioeconomic status was collected by questionnaire. The associations between total/animal/vegetable protein intake and BMI SDS, %BF, FMI and FFMI were investigated using multiple linear regression analysis for girls and boys with different paternal occupation, respectively.
Results: Girls with higher total/animal protein intake had higher %BF and FMI in paternal occupation group of temperal employment after adjusted for breast-feeding, maternal overweight, carbohydrate intake and physical activity level ($p < 0.05$). Among girls whose fathers were blue-collar workers, animal protein intake was negatively associated with BMI SDS, %BF, FMI and FFMI, while girls with higher vegetable protein intake had higher FMI and FFMI ($p < 0.05$). In addition, animal and vegetable protein intake were positively associated with BMI SDS in girls with paternal occupation of white-collar worker and liberal profession, respectively ($p < 0.05$). There was no relation of protein intake with body composition in boys with different paternal occupation.
Conclusion: Protein intake might be related to body composition among girls in South China, which is largely dependent on paternal occupation.
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T3:PO.005

To investigate the relationship between body mass index and serum vitamin d levels in healthy adults

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Introduction: This study was conducted on 102 female and 40 male participants between 19–50 ages. The participants have not any chronic disease. The aim of the study is to investigate the relationship between body mass index and serum vitamin D levels in adults.
Methods: A questionnaire was administered to the participants in order to determine the general characteristics and physical activity status of them. The energy and nutrient intakes within one day was recorded with 24-hour dietary intake form in a period of three days. Anthropometric measures were taken with a bioelectric impedance analyser. Serum vitamin D levels (ng/mL) were determined.
Results: According to the study result, none of the participants has sufficient (≥30 ng/mL) serum vitamin D level. There is no statistically significant difference ($p > 0,05$) between the groups of the participants with respect to the relationship between serum vitamin D levels and body mass index (kg/m^2), height (cm), body weight (kg), waist circumference (cm), hip circumference (cm), total body water (kg), body muscle mass (kg). The only statistically meaningful ($p < 0,05$) result is that; the ratio of body fat decreases with an increase of serum vitamin D level in female participants. However, this is not the case for male participants ($p > 0,05$).
Conclusion: Vitamin D deficiency and insufficiency is common in participants, especially in females. Due to vitamin D has an important physiological effect for the body, serum vitamin D levels should be within the recommended level.

T3:PO.006

Effect of an acute high carbohydrate diet on body composition using DXA in young men

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Introduction: The use of dual-energy X-ray absorptiometry (DXA) for the measurement of body composition is common in both clinical practice and in research protocols. However, a limitation of the DXA is that it cannot measure total body water content, which could affect the results of lean body mass (LBM) due to a significant change in muscle water content (e.g. changes in glycogen levels). To our knowledge, no study has been conducted to validate or not the need to standardize a diet before using the DXA.
Objective: To investigate the effect of an acute high carbohydrate diet (≥ 75% of total calories) on body composition using DXA.
Methods: Ten young healthy men (age: 23.4 ± 2.8 years; BMI 23.6 ± 2.3 kg / m^2) completed the study. Three DXA (day 0, 3 and 6) were performed for the measurements of fat mass and LBM. Between day 0 and 3, the subjects followed a normal diet. Thereafter, between day 3 and 6, participants were prescribed a high carbohydrate diet for 3 days and completed a food diary to determine the percentage of carbohydrates consumed.
Results: Mean percentage of carbohydrate intake over 3 days was 88.3 ± 13.4%. Mean LBM values for the 3 measurements (day 0 vs. 3 vs. 6) were: 59.4 ± 7.2 vs. 60.0 ± 8.0 vs. 60.4 ± 7.4 kg. Our results show a significant increase in LBM between the first and third DXA measure. In addition, we observed a significant difference in total body weight between the first and third DXA measure. No significant difference was observed between the 3 measures for body fat percentage (13.0 ± 5.4 vs. 12.6 ± 5.4 vs. 12.8 ± 5.5%).
Conclusion: These preliminary results indicate that the effect of an acute high carbohydrate diet seems to affect LBM values using DXA. This study may lead to the need of standardizing a diet prior to using the DXA.

T3:PO.007

Diet quality is associated with obesity risk among adults: A cross-sectional study in South China

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Introduction: The association of overall diet quality with obesity risk has been investigated widely in western countries. However, literature is quite limited among adults in China. Our aim was to identify whether diet quality, characterized by a predefined score, was associated with obesity risk in Chinese adults.
Methods: 572 adults aged 25–65 years were randomly selected in South China. Dietary data from 3-d 24h dietary recalls were used to calculate Chinese Dietary Index for Preventing Non-communicable Chronic Diseases (CDI-NCD), which was developed based on energy requirement level of adults. CDI-NCD comprised 18 components (7 food groups, 7 nutrients and 4 behaviour indictors), with higher score indicating better diet quality. Height, weight, waist and hip circumference were measured to calculate body mass index (BMI) and waist-to-hip ratio (WHR). Multiple linear regression models were used to examine associations between diet quality and BMI, WHR.
Results: Subjects with normal weight had better diet quality than those with excess weight ($p = 0.004$). Higher diet quality was significantly associated with lower obesity prevalence (3.1% for the highest diet quality tertile vs 17.9% for the lowest diet quality tertile, $p = 0.03$). Subjects whose diet quality was in the highest tertile had lower BMI and lower WHR than those diet quality was in the lowest tertile [BMI: median (95% CI): 23.11 (21.42, 24.79) vs 24.61 (22.98, 26.24), respectively; p for trend=0.02; WHR: 0.85 (0.82, 0.88) vs 0.88 (0.85, 0.91), respectively; p for trend=0.04; adjusted for gender, age, physical activity and income level].
Conclusion: A high-quality diet is associated with reduced obesity risk among Chinese adults. This relation should be investigated in further data with longitudinal study design.

T3:PO.008

Do Mexican Parent Preferences of Foods have any effect on their weight status?

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Introduction: Parents food preference (PFP) can determine children food preferences and they have been related to childhood overweight and obesity of both parents and children. The aim of the study was to identify PFP and to examine their associations with family characteristics, and parents overweight (OW) and obesity (OB).
Methodology: 1103 Mexican parents participated in this study. PFP, level of education, income and body mass index were assessed. A list of 53 foods usually consumed by Mexican families was applied at baseline and a year later. The association between baseline PFP and a year later, level of education, income and BMI was assessed with the Chi-square and Fisher correction.
Results: Most parents were female (87%), their average age was 35 ± 7y, and 62% were OW/OB. A year later, people with obesity at baseline were more likely to prefer sweetened beverages ($p = 0.01$) than normal weight and were less likely to prefer vegetable soup ($p = 0.01$). Parents that preferred pears, cucumbers and yogurt at baseline were less likely to have obesity one year later (OR=0.26, IC 95%, 0.12–0.58, $p = 0.001$), and those who preferred coffee were more likely to have obesity (OR=3.72, IC 95%, 1.25–11.04, $p = 0.018$). No association with level of income or years of education was found.
Conclusion: Preference of pears, cucumbers and yogurt decrease the odds of being obese and preference of coffee increase the odds for obesity a year later.

T3:PO.009

Comparison of Diet Quality According to Body Mass Index and Conicity Index in Adults

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Introduction: It is known that adequacy and diversity of nutrients and food groups are important for promoting health. Prevalence of obesity is increasing due to the inadequate and imbalanced or excessive nutrition. In this study, it is aim to compare the diet quality of individuals acording to BMI classification and conicity index.
Methods: This study was caarried out with 494 individuals including 183 female and 311 male adults mean age 32.9 ± 10.80 years. Anthropometric measurements (body weight, height, waist circumference) and 24-hour dietary recall of the individuals were obtained. Dietary qualities of the individuals were evaluated using the Healthy Eating Index 2010 and Mean Adequacy Ratio. The dietary qualities were evaluated according to BMI classifications and conicity index score.
Results: It is found that 54.4% of individuals are normal weight, 30.2% are overweight and 15.4% are obese. It was not determineted significant difference mean MAR values of normal and obese people ($p > 0.05$) while it was obtained significant difference mean HEI 2010 values between groups ($p < 0.05$). There was positive correlation between conicity index value with MAR value (r: 0.132; p: 0.003) and between BMI with HEI 2010 values (r: 0.121; p: 0.007).
Conclusion: Diet quality of individuals are associated with obesity and chronic disease risk in several studies.. Evaluating diet by different perspective and developing suggestions for personel is provided to prevent obesity.

T3:PO.010

Regular consumption of pistachio modulates plasma lipoprotein subclasses in pre-diabetic subjects

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Introduction: The beneficial effect of nut consumption on cardiovascular risk factors is widely known. However, analysis of conventional lipid profiles does not completely explain the atherogenic risk associated with pre-diabetes. We investigated whether chronic consumption of pistachios changes the lipoprotein subclasses to a healthier profile in pre-diabetic subjects.
Methods: A randomized cross-over clinical trial in 54 subjects with pre-diabetes was conducted. Subjects consumed a pistachio-supplemented diet (PD, 50% carbohydrates, 33% fat, including 57g of pistachios daily) and a control diet (CD, 55% carbohydrates, 30% fat) for 4 months each, separated by a 2-week wash-out. Diets were isocaloric and matched for protein, fiber and saturated fatty acids. Nuclear magnetic resonance was performed to determine changes in particle composition and size of plasma lipoproteins through the intervention periods.
Results: Small low-density lipoprotein particles (sLDL-P) significantly decreased after pistachio consumption compared to the nut-free period ($P = 0.023$). The non-high-density lipoprotein particles (i.e. VLDL-P plus LDL-P) significantly decreased under the PD compared to CD ($P = 0.041$). The percentage of sHDL-P increased by 2.23% after the PD compared with a reduction of 0.08% after the CD ($P = 0.014$). Consequently, the overall size of HDL-P significantly decreased in the PD ($P = 0.007$).

Conclusion: These data suggest that regular pistachio intake modifies the lipoprotein particle size and subclass concentrations independently of changes in the total plasma lipid profile. These findings support the need of elucidating alternative mechanisms whereby a pistachio-rich diet could decrease the risk of cardiovascular disease and mortality.

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T3:PO.011

Satiety-promoting green-plant membranes promote weight-loss and decrease risk factors for metabolic diseases

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Current diet and exercise regimes to promote bodyweight loss are not enough, as the global obesity epidemic, and the metabolic diseses continues to increase. Strengthening of inherent satiety signals can be one way to succeed with weight-loss programs. Thylakoids from green plants have satiety-promoting effects, occurring through retardation of fat digestion by interaction of thylakoids with lipid droplets and with lipase/co-lipase [Albertsson et al, Biochem J 2007; Emek et al, Prep Biochem Biotechnol 2010; Köhnke et al, Livestock Science 2010]. Thylakoids also retarded nutrient uptake over the intestinal wall [Montelius et al, Br J Nutr 2011], and decrease circulating levels of ghrelin and elevate CCK-levels [Köhnke et al, Scand J Gastroenterol 2009; Montelius et al, Clin Nutr 2013]. Furthermore, thylakoids prevent postprandial hypoglycaemia and decreased subjective hunger in humans [Stenblom EL et al, Appetite 2013]. Body weight gain, food intake and body fat mass is decreased in animals [Emek et al, Prep Biochem Biotechnol 2010; Köhnke et al, Phytother Res 2009, Montelius et al, J Nutr Sci 2013]. In humans, thylakoid supplement decrease metabolic risk factors and decrease body weight, body-fat mass and waist/hip circumferences [Montelius C et al, Appetite 2014; Stenblom EL et al, Obesity & Weight loss therapy, 2014]. Thylakoids added to food in adjunct to lifestyle intervention may therefore be helpful in enabling overweight subjects to lose weight and improve metabolic parameters.

T3:PO.012

Specific dietary patterns associated with metabolic syndrome in korean adults

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Introduction: Dietary patterns are found to be associated with metabolic risk factors. We explored the association between dietary patterns and the risk of metabolic syndrome in the general Korean population using the most recent nationally representative survey data.
Methods: A total of 13,410 Korean adults (aged ≥ 19 years) who participated in the fifth Korean National Health and Nutrition Examination Survey were studied. Dietary intake was assessed by the 24-hour recall method. Food items were categorized into 24 food groups based on common food groups classified in the Korean Nutrient Database. Metabolic syndrome was defined by the joint interim statement of the International Diabetes Federation and the American Heart Association/National Heart, Lung, and Blood Institute. Data were analysed using SAS software version 9.3.
Results: Three dietary patterns were derived using factor analysis: traditional, westernized, and healthy. The traditional pattern was positively associated with hypertriglyceridemia (P = 0.0169), low high-density lipoprotein-cholesterol (P = 0.0179) and metabolic syndrome (P = 0.0138) after adjusting for age, sex, body mass index, income, smoking status, physical activity, educational level, alcohol intake and energy intake. The westernized pattern was positively associated with fasting plasma glucose (P = 0.0348). In contrast, the healthy pattern was inversely associated with abdominal obesity (P = 0.0094) and hypertriglyceridemia (P = 0.0003) after adjustment for potential confounders.
Conclusions: Specific Korean dietary patterns were associated with the risk of metabolic syndrome and its components in Korean adults.

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T3:PO.013

E to the healthy Nordic diet promotes normal body composition in Finnish men

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Introduction: It has been shown that a healthy diet can be constructed of Nordic foods. We assessed whether the healthy Nordic diet, measured using the Baltic Sea Diet Score (BSDS), is associated with obesity measures (body mass index (BMI), waist circumference (WC) and body fat percentage (BFP)).
Methods: This study included 4812 Finns (25–74 y) from the National FINRISK 2012 Study who filled in a validated food frequency questionnaire. Participants' weight, height, WC, and BFP (TANITA TBF-300MA) were measured. The BSDS was calculated giving higher points for high consumption of Nordic fruits and berries, vegetables, cereals, ratio of polyunsaturated to saturated and trans fatty acids, low-fat milk, and fish, and for low consumption of red and processed meat, total fat (E%), and alcohol. The BSDS ranged from 0–25, higher points indicating higher adherence. Linear regression was used to analyse cross-sectional associations between the BSDS and obesity measures. Logistic regression was used to analyse the risk for having excess BMI (≥25 kg/m^2), WC (men ≥100 cm, women ≥90 cm) or BFP (men >20%, women >30%).
Results: The BSDS had an inverse linear association with WC and BFP in men (P <0.05), but not in women. Furthermore, men and women in the top versus lowest BSDS quintile had lower risk of excess BMI, WC and BFP when age and energy intake were adjusted for. After adjusting for educational level, smoking status, and leisure-time physical activity, only the risk of excess BFP remained significantly lower in men (OR 0.80; 95% CI 0.54-1.00; P <0.05).
Conclusion: These results support the earlier findings that the healthy Nordic diet is associated with lower obesity measures in men and can be promoted as a healthy-weight diet in Finnish population.

T3:PO.014

Effect of meal frequency on glucose levels in women with polycystic ovary syndrome: A randomized trial

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Aims/Hypothesis: The aim of the study was to compare the effect of two meal patterns (threevs six- meals per day) on glucose levels in women with polycystic ovary syndrome (PCOS).

Methods: In a randomized, crossover, 24 weeks study, 40 women with PCOS, aged 27 ± 6 years, body mass index (BMI) 27 ± 6 kg/m^2, followed a weight maintenance diet (%carbohydrates:protein:fat, 40:25:35), consumed either as a three-or a six-meal pattern, with each intervention lasting for 12 weeks. Anthropometric measurements, diet compliance and subjective hunger, satiety and desire to eat were assessed biweekly. All women underwent an oral glucose tolerance test with 75g glucose for measurement of plasma glucose and insulin at the beginning and end of each intervention. HaemoglobinA1c(HbA1c), blood lipids and hepatic enzymes were measured at the beginning and end of each intervention.
Results: Body weight remained stable throughout the study. Six- meals decreased significantly fasting insulin ($p = 0.014$), fasting insulin resistance (HOMA-IR, $p = 0.026$) and post-OGTT insulin sensitivity (Matsuda index, $p = 0.039$) vs three-meals. After incorporation of individual changes over time, with adjustment for potential confounders, the only variable that remained significant was the Matsuda index, which was then used in multivariate analysis and general linear models. Six-meals improved post-OGTT insulin sensitivity, independently of age and body weight vs. three-meals ($p = 0.012$). No significant differences were found between six- or three-meals for glucose, HbA1c, blood lipids, hepatic enzymes, subjective desire to eat and satiety.

Acknowledgement: The authors are grateful to Vasso Fragaki, head nurse of the Diabetes Center of Attikon University Hospital, for conducting the participants' oral glucose tolerance test procedure. The authors are also grateful to Maria-Assimina Gerama, clinical dietitian, for her valuable help with patient nutrition education and for conducting anthropometric measurements.

T3:PO.015

Investigation of Individual Attitudes and Behaviors for Controlling Their Body Weight

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Background and aims: Recently, the dietary solutions which are claiming faster results for controlling body weight spreaded among individuals especially with the influence of the media. This study was conducted to determine weight watching methods which are not advised by a specialist, neither under control of them.
Methods: This study held with 400 adults (83% women, 17% men) who are living Ankara in Turkey, aged average 24.8 ± 7.23 years. A questionnaire done face to face by specialists to determine individuals dietary habits, recent dieting situation. Anthropometric measurements such as body weight (kg) and height (cm) both measured with standard methods.
Results: Three hundred fourth five (86.25%) individuals were university graduates. By the questionnaire it was determined that 57.5% of adults skipped at least one meal and 3.5% of these individuals did this for losing weight. According to WHO's BMI classification, 11.5% of individuals were underweight, 69.9% of them were normal weight and 18.8% of them were obese. Even they were underweight or normal weight 43.8% of samples identified themselves as overweight or obese. Also we determine that samples who were on diet (24.8%) did this at least a year for losing weight. For this reason 70% of them "drinking a lot of water", 65% of them "consuming more fruits and vegetables" for controlling their body weight. More than 3 quarter of samples (78.5%) stated that they didn't do regular exercise for controlling their body weights.
Conclusion: In order to achieve the normal body weight with the protection of health risks and ensure conservation of weight in years, the application of diet program what based on scientific basis and prepared by professionals about nutrition is important.

T3:PO.016

Investigation of the effect of calcium consumption by diet on the body composition and blood values in women with and without metabolic syndrome

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Introduction: This study is executed by totally premenopausal 146 women between 19 and 52 years old who have applied to Başkent University Ankara Hospital Endocrinology Polyclinics between August and December 2012.
Methods: In this study; it is intended to investigate the effect of calcium consumption by diet on the body composition and blood values in women with and without metabolic syndrome. Metabolic syndrome diagnosis is made according to ATP III criteria. A questionnaire form is applied in order to specify the general properties, nutrition habits and physical activity status of the patients. Calcium consumption is determined by using food consumption frequency form.
Results: 82.5% of the women in the case group has <800 mg calcium intake per day and 78.3% in the control group has <800 mg calcium intake. A negative correlation is found between the abdominal fat ($r = -0.175$, $p = 0.034$), diastolic ($r = -0.251$, $p = 0.002$) and systolic ($r = -0.279$, $p < 0.001$) blood pressures via the calcium intake. The difference is statistically found significant. Case and control groups are compared in terms of body fat %, abdominal fat kg, muscle kg, water kg and the differences are found as statistically significant ($p < 0.001$). The serum calcium ($p < 0.001$), parathyroid ($p = 0.244$), phosphor ($p = 0.729$) and vitamin D ($p = 0.222$) levels of case and control groups are examined. The serum calcium level difference between the groups are found statistically significant ($p < 0.001$), but on the other hand the differences in parathyroid, phosphor and vitamin D are statistically found insignificant ($p > 0.05$).
Conclusions: As a result of this study; it is observed that there is an inverse relationship between abdominal fat, tension and HDL cholesterol via calcium intake.

T3:PO.017

Nutritional intervention to improve the quality of lunchboxes in school age children in méxico

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Introduction: In Mexico, it has been shown that most children take unhealthy lunchbox (LB) to schools. The objective of this study was to evaluate a nutritional intervention addressed to improve the nutritional quality of foods contained in the LB of elementary school children.
Methods: Two schools with 522 children were randomly assigned to the intervention group (IG), and two schools with 421 children to the control group (CG). The intervention consisted in the displayed at the schools of posters with healthy food, handout pamphlets with healthy recipes, and letters aimed to parents with nutritional information. In both groups, the LBs content were recorded during three nonconsecutive days before and after the intervention. An adequate LB (ALB) for elementary school children should contained ≤ 270kcal, water and fruit or vegetables and a prepared meal (sandwich, taco); in addition, a healthy LB (HLB) must not contained any soft drink, high fat, sugar, and salt containing snacks or prepared meals.
Results: After the intervention it was shown less content of fat in the LB in the IG ($p = 0.003$), and 19% of children in the IG meet the criteria of ALB compared to 10% from the CG ($p = 0.002$). There was not difference between groups with the HLP criteria. In the IG, the LB of boys and girls increased the content of fruit from 25 to 46% ($p = 03$) and vegetables from 19% to 44% ($p = 0.001$). In the CG, the LB of boys decreased the content

of fruit and vegetable from 46% to 45% (p = 0.025). No changes were seen in the food content of LB among girls in the CG.
Conclusion: A short and feasible intervention improved the quality of the food content of the LBs.

T3:PO.018

Effects of acute native banana starch ingestion on appetite and food intake in healthy subjects.

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Introduction: Previous studies have shown benefits from native banana starch (NBS) supplementation in improving glucose metabolism in experimental models and diabetic patients. Whether this substance could affect appetite regulation is, however, unknown. The aim of this study was to examine the effects of NBS, rich in resistant starch on the subjective measures of appetite and energy intake in healthy subjects. Postprandial glucose and insulin responses were also assessed.
Methods: In a randomized, single-blind, crossover study, 28 young healthy subjects were divided to receive either a beverage containing 40 g of NBS or digestible corn starch (DCS). Effects on appetite were estimated, using visual analogue scales (VAS) for subjective measures and an ad libitum test meal. Blood samples were obtained at 0, 30, 60, 90, 120, 150 and 180 min after beverages and VAS questionnaire was also applied at these times. After a washout period of 6 days subjects received the alternative treatment.
Results: A reduction on energy intake at the ad libitum test meal was observed after NBS supplement compared to DCS. However, there were no significant differences in subjective appetite measures between groups. There was a significant reduction in glucose AUC-180 min and insulin AUC-180 min following the NBS supplement compared to DCS.
Conclusions: NBS supplementation decreased energy food intake and glycemic response in healthy subjects and may have beneficial effects in helping to reduce body weight. Further research to elucidate the mechanism behind these changes is required.

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T3:PO.019

Effect of regular magnesium supplementation on Insulin Resistance in obese patients

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Introduction: Insulin resistance (IR) is one of the most important metabolic disorders associated with obesity. Magnesium supplementation is frequent in use in very low-calorie diets (VLCD) and has shown to be related to the decrease in IR.
Methods: Retrospective review of medical records. Sixty patients were selected (30 female) with BMI > 30, mean age 46 years, with glycemia 100 - 125 mg/dl, insulinemia > 15 mcU / mL and HOMA > 3, without taking antidiabetic drugs, who underwent a VLCD treatment plan alternating with LCD, with multivitamin and potassium. Half of patients received regular supplements of magnesium citrate. All attended cognitive behavioral therapeutic groups oriented to lose weight with physical activity and monthly medical- nutritional monitoring which was reassessed at 6 months.
Results: Both groups had significant decreases in weight and insulin resistance index at 6 months. Patients who regularly took magnesium showed higher statistically decreases than those who did not (weight –21.37 kg vs. –8.43kg HOMA –2.58 vs. –0.7). In a multivariate model, the initial HOMA, the weight loss and the regular supplementation with Mg ++ were independently associated with lower rates of insulin resistance at 6 months.
Conclusions: Regular magnesium supplementation reduces insulin resistance in obese patients regardless of weight loss and the insulin resistance base level

T3:PO.020

A comparison of the nutrient composition of 11 different commercially available formula-based very low calorie diet (fb-vlcd) foods for use as total dietary replacement during weight loss

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Very low calorie diets (VLCD) (<800kcal/d) have been available for use in the UK for 30 years. Developed to create a near-fasting metabolic response without nutrient depletion, there are compositional criteria that should be met so neither the nutritional status nor general health of those on a VLCD is compromised. There is currently no published data comparing the nutritional composition of the different VLCDs available within the UK. As such, we obtained data on the compositional make-up of 11 different commercial VLCDs from information provided either on pack or on individual company websites. A variety of packs from each provider was used to reflect a realistic day's intake and included where possible a shake, a textured meal and a soup. The daily nutrient intake for each VLCD was then compared with that described in Codex Stan 203-1995. 3 providers (27%) failed to meet the minimum daily requirements (MDR) for protein. 6 providers (55%) failed to meet the MDR for Copper and Vitamin B6 with 3 of these additionally failing to meet the MDR for magnesium. Detailed nutrition information from several providers was neither on the packaging nor easily obtained elsewhere (e.g. company website) and was often neither complete nor very clear. Provision of adequate nutrition whilst on a VLCD is vital to ensure good health during weight loss. This cross-sectional analysis of nutrition information provided by commercially produced VLCDs within the UK market shows that not all commercial providers meet either the total MDR required whilst on a VLCD, nor provide appropriate nutritional information for consumers either on the packaging or on their websites. LighterLife complies fully with CODEX Standard 203-1995 and also provides complete transparency of compositional information. This is an important consideration for individuals or Health Care professionals who are considering the use of VLCDs for weight loss.

T3:PO.021

Dairy biomarker response to dairy fat overfeeding

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Introduction: Tetradecanoic acid (C14:0), pentadecanoic acid (C15:0), trans-palmitoleic acid (tC16:1) and heptadecanoic acid (C17:0) are suggested to be biomarkers of dairy consumption. If the four above mentioned fatty acids are true intake markers of dairy fat, the concentration

should increase significantly during dietary supplementation of diary fat the period of the study.
Methods: 26 subjects were submitted to fifty-six days of overfeeding, where they were expected to eat in excess of their usual diet of 760 kcal/day. The additional energy intake was derived from high fat sources, which included 100 grams of Emmental cheese, 20 grams of butter and 40 grams of almonds representing an increase of 70 grams. Plasma phospholipid fraction was obtained by solid phase extraction (SPE) followed by phospholipid fatty acid derivatisation by 14% Boron trifluoride methanol solution, with gas chromatography flame ionisation detection.
Results: The plasma phospholipid fatty acids did not directly correlate with the estimated increase of these in fatty acid in the diet. A significant increase of 17% was found for the trans-palmitoleic acid (tC16:1 ; $p = 0.004$) and a significant increase of 10% for the pentadecanoic acid (C15:0 ; $p = 0.02$) after overfeeding. Nevertheless no differences were found after overfeeding for tetradecanoic acid (C14:0 ; $p = 0.48$) and heptadecanoic acid (C17:0 ; $p = 0.32$).
Conclusions: That trans-palmitoleic acid (tC16:1) and pentadecanoic acid (C15:0) have a good correlation with dietary dairy fat intake, whereas tetradecanoic acid (C14:0) and heptadecanoic acid (C17:0) do not, therefore hinting at either a possible endogenous productions or other dietary sources. Therefore odd chain fatty acids do not exclusively come from ruminant sources.

T3:PO.022

Effect of isoenergetic and ad libitum meals varying in fat and carbohydrate composition on satiation, satiety quotient and suppression of food hedonics

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Introduction: Dietary fat is often regarded as having a weaker action on satiation than carbohydrate. The aim of the present study was to clarify the action of ad libitum and isoenergetic meals varying in fat and carbohydrate content (i.e. HFLC or LFHC) on parameters of appetite and food hedonics.
Methods: Forty-five overweight and obese males (n=15) and females (n=30) were recruited onto this crossover study. Subjects were studied on 2 separate probe days in which they were given access to either HFLC (50vs38% by energy) or LFHC (3vs84%) meals. Satiety was measured using appetite ratings adjusted for energy intake from isoenergetic meals to calculate the satiety quotient (SQ). Satiation was assessed by intake of ad libitum energy meals. Hedonic measures of explicit liking (subjective ratings) and implicit wanting (speed of forced-choice) for an array of HFLC and LFHC foods were tested before and after an isoenergetic meal.
Results: There was a large effect of isoenergetic HFLC/LFHC meals on satiety with a greater SQ after LFHC ($p < 0.001$, $\eta2=0.40$). Furthermore there was a greater intake from ad libitum meals after HFLC ($p < .001$, $\eta2=0.71$). There was an interaction between nutrient content of the test meal and hunger state on explicit liking ($p = 0.049$, $\eta2=0.11$) and implicit wanting ($p = 0.029$, $\eta2=0.14$); with consumption of the LFHC, but not HFLC meal effectively reducing the hedonic bias for HFLC foods.
Conclusion: When consumed ad libitum, these data confirm that HFLC meals have a weaker action on satiation than LFHC. When examined calorie for calorie, consumption of LFHC meals induce a greater satiety (SQ) compared to isoenergetic HFLC meals. Furthermore, HFLC meals do not dampen the subsequent appeal bias for HFLC foods compared to energy, weight and palatability matched LFHC meals.

T3:PO.023

Acute effects of intermittent energy restriction on energy compensation: A pilot study

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Introduction: The intermittent energy restriction (IER) approach to weight loss involves short spells of severe (75–100%) energy restriction (ER) alternated with ad libitum (AL) intake. Little is known about the acute effects of severe ER on energy compensation; overcompensation would limit the long-term efficacy of IER. Aim: To compare the effects of 1 day of total (100%) and partial (75%) ER on energy compensation.
Methods: 6 healthy, overweight males (43 ± 15yrs; 29 ± 3kg/m^2) and 2 females (26 ± 0yrs; 29 ± 3kg/m^2) were recruited into this cross-over study. Subjects completed 3 dietary interventions in a randomized order with a minimum 1 week washout: 1 day of isoenergetic (iso) intake; partial 75% ER using LighterLifeTM FoodPacks; and total 100% ER (i.e. a fast). Subjects completed validated food diaries on dietary intervention days and for 2 subsequent days of AL intake.
Results: Findings are presented in Fig 1. Subjects overconsumed by 28 ± 23% of energy requirements 1 day post total ER and by 14 ± 16% after partial ER (both non-significant vs iso). Cumulative 3-day intakes were significantly lower on both total and partial ER trials, with subjects sustaining comparable energy deficits of –25 ± 16% ($p < 0.05$ vs iso) and –28 ± 10% ($p < 0.001$ vs iso) respectively.
Conclusion: Subjects were unable to compensate for energy deficits incurred during severe ER. Additionally, this is the first cross-over study to show that despite allowing some food intake on ER days, partial ER can produce similar energy deficits to total ER in the short-term. Further investigations into whether these findings pertain with extended weight-loss and maintenance periods are warranted.

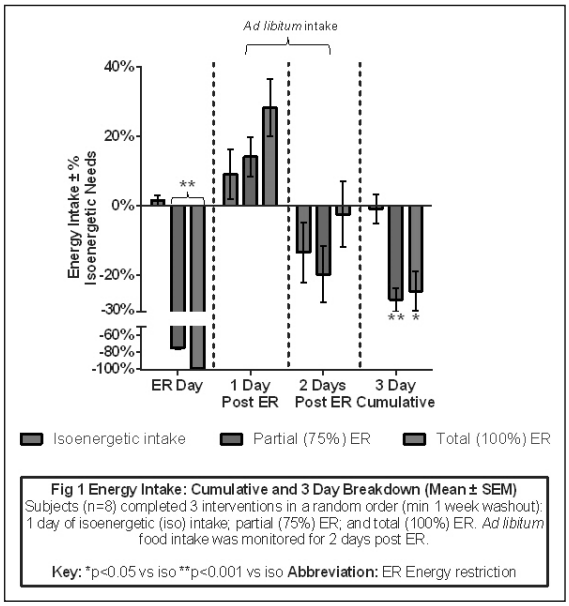

Fig 1 Energy Intake: Cumulative and 3 Day Breakdown (Mean ± SEM)
Subjects (n=8) completed 3 interventions in a random order (min 1 week washout): 1 day of isoenergetic (iso) intake; partial (75%) ER; and total (100%) ER. *Ad libitum* food intake was monitored for 2 days post ER.

Key: *p<0.05 vs iso **p<0.001 vs iso **Abbreviation:** ER Energy restriction

Fig. 1. Energy Intake: Cumulative and 3 Day Breakdown

T3:PO.024

The estimate of overweight students' diet: The imbalance lipid and fat-soluble vitamins

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Introduction: The study aimed to assess and analyze the fat component (including fat-soluble vitamins) of diet students Kazan Federal University with overweight and obese.
Methods: Participants were 151 students aged 19–23. The method of 24-hour recall was used and the nutrient content was further estimated using standard data base.
Results: 32 students were estimate as overweight and obese (21,2% of the target group): 23 people were overweight and 9 people were estimated as obese. In this group the percentage of energy from total fat was higher than RDA: 40,7% and 39,9% in men and women respectively. The sum of essential fatty acids (linoleic and α-linolenic) composed 7,8% and 5,6% of total energy. The consumption of n-3 longer chain polyunsaturated fatty acids (EPA and DHA) was extremely low: 32,4 ± 22,3 mg and 140,2 ± 112,8 mg of respectively for males; 27,7 ± 12,7 mg and 74,9 ± 21,3 mg for females. Cholesterol and plant sterols intake as well as their ratio have been found as negative 1,97/1. As far as fat-soluble vitamins are concerned, the significant deficiency has been shown: an average content of vitamin A is 0,68 ± 0,17 mg, vitamin D – 2,7 ± 0,19 μg, vitamin E – 6,7 ± 4,9 mg and vitamin K – 74 ± 18 μg which is equal to 50–58% of these substances' RDA respectively.
Conclusion: The results have shown that there is significant imbalance within fat component of students' diet. The imbalance revealed within fat component along with deficiency of fat-soluble vitamins may contribute to further weight gain and result in metabolic syndrome development in the future. It is essential to decrease the proportion of total fat as well as to optimize the ratio of different food sources of fatty acids and vitamins by taking some measures including functional products use.

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T3:PO.025

Gelesis100 significantly decreases carbohydrate intake in overweight and obese subjects with high fasting glucose

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Introduction: Changes in macronutrient intake induced by Gelesis100 were assessed in overweight and obese subjects based on fasting glucose at baseline (> or ≤ median of all study subjects) in the FLOW (First Loss Of Weight) study.
Methods: Changes in macronutrient intake (24-h recall) were assessed in 114 overweight and obese adult subjects (38 males, 76 females) including 56 with high (> 5.15 mmol/L) and 58 with low (≤ 5.15 mmol/L) fasting glucose, following Gelesis100 administration (2.25 g, n = 41, and 3.75 g, n = 34, twice daily) vs placebo (n = 39). Gelesis100 was administered orally, before lunch and dinner, in a double-blind fashion, over 12 weeks, together with an energy-restricted diet (-600 kcal/day). Subjects received instructions at baseline, without enforcement thereafter, to optimize caloric intake from macronutrients (carbohydrate 45–50%, fat 30%, protein 20–25%). Statistical comparisons used analysis of covariance adjusting for relevant parameters.
Results: Unlike subjects with low fasting glucose, subjects with high fasting glucose on Gelesis100 2.25 g and 3.75 g had a significant decrease from baseline to the end of treatment in carbohydrate intake compared to those on placebo. Changes for percent calories from carbohydrate intake (mean ± standard deviation) were –4.6 ± 9.1 (P = 0.003), –2.9 ± 11.6 (P = 0.043), and 4.7 ± 11.1, with Gelesis100 2.25 g, Gelesis100 3.75 g, and placebo, respectively.
Conclusion: Chronic administration of Gelesis100 to overweight and obese subjects induces a significant decrease in carbohydrate intake in subjects with high fasting glucose at baseline. This finding may support the glucostatic theory of appetite control as an explanation for the dramatic weight loss results observed in prediabetic subjects in the FLOW study.

T3:PO.026

Prevalence of micronutrient deficiency in pateients with morbid obesity before bariatric surgery

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Background and aims: Postoperative micronutrient deficiency is a known side effect of bariatric surgery. In this study we examined the prevalence of micronutrient deficiency in patients with morbid obesity (M0) preoperatively. **Materials und methods:** 1541 patients with MO wishing to undergo bariatric surgery (age: 40 ± 12 years, mean BMI: 44 ± 9 kg/m¸, means±SEM, 77.3% female) were analyzed in this cross sectional examination. Iron state, vitamin B12, folic acid, 25hydroxy(OH)-vitamin D, vitamin A and vitamin E levels were determined. Subsequently, patients underwent nutritional counseling and were substituted accordingly.
Results: 63.2% (n=974) of the patients had a deficit in folic acid (<5.3ng/ml), 97.5% (n=1502) in 25OHvitamin D (<75nmol/l), 5.1% (n=80) in vitamin B12 (<188pg/ml), and 6.2% (n=96) in vitamin A (<1.05μmol/l). 9.6% (n=148) exhibited iron deficiency (ferritin<15μg/l). None of the patients had a deficit in vitamin E.
Conclusion: Our data show a high prevalence of micronutrient deficiency in patients with morbid obesity preoperatively and emphasize the importance of exact preoperative evaluation and adaequate substitution as well as postoperative surveillance.

T3:PO.027

Evaluation of body fat ratio according to the mediterranean diet quality index

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Objective: Mediterranean diet is a sample nutrition model that help to prevent risk of obesity. This research was planned to identify the body fat ratio according to the Mediterranean diet quality index.
Method: In this study, a total of 313 univesity students (41.5% of males, 58.5% of females), between the ages of 18–26 (mean 21.7 ± 1.90) years were included. Body fat ratio was determined by Tanita MC-980MA Body Composition Analyzer. A questionnaire form was applied to determine general nutrition habits. University students' adherence to the Mediterranean diet was assessed by the 16 item questionnaire Mediterranean Diet Quality Index (KIDMED index). KIDMED index (range 0–12) classified as ≥8 score as optimal diet (high), 4–7 score as improvement need (intermadiate) or ≤3 score as very low diet quality (low) according to the total score.

Results: It was determined that only 48.6% of students took 3 main meals. It was found that 34.4% of the student were skipping breakfast and 18.2% of them skipping lunch. It was found that 43.1% of the students had low KIDMED index, 53.0% of them had intermediate KIDMED index, and only 3.8% of them had high KIDMED index. According to the low, intermediate and high KIDMED index body fat ratio were found to be 23.6 ± 7.28%, 24.1 ± 8.93%, 19.3 ± 6.23%, respectively. Difference of body fat ratio between low and high KIDMED index and between intermediate and high KIDMED index were found to be statistically significant ($p < 0.05$).
Conclusion: In conclusion, there is a need for national plans to encourage university students' adherence to the Meditarrenean Diet, also reducing the risk of high body fat ratio.

T3:PO.028

Trace elements deficiency after gastric bypass surgery: An underestimated complication

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Introduction: Trace elements deficiency is a recognised complication following Roux-en-Y gastric bypass (RYGB) surgery. However, the true prevalence of micronutrient deficiencies is not known as these may go either unrecognised or underreported. Moreover, micronutrients requirements or supplementation following RYGB has not been standardised.
Methods: We audited serum levels of selenium, zinc and copper at 1-year in a cohort of patients who underwent RYGB and who were advised to take multivitamins and trace elements supplementation.
Results: Low serum selenium concentration was detected in 18 out of 33 patients (54.5%), low serum zinc in 26 of 124 patients (21.0%) and none of 28 patients (0%) had low serum copper. In the patients who were deficient in selenium, the mean percentage excess body weight (%EBW) loss at 1-year was 70.6% compared to %EBW loss of 59.2% with those who were not deficient ($p = 0.03$).
Conclusion: Our audit showed that selenium and zinc deficiencies are relatively common following RYGB, despite patients being advised to take a multivitamins with trace elements preparation. Selenium deficiency has been reported in 14 to 22% after RYGB yet no recommendations currently exist for supplementation in these patients Zinc deficiency has been reported in 6–37% of patients following RYGB and, apart from a few case reports, the prevalence of copper deficiency is unknown in this population. Predisposing factors following RYGB may include an imbalanced diet, insufficient supplementation and non-compliance with supplements as these are not usually prescribed but patients are advised to get them over the counter. We conclude that trace elements deficiency is relatively common following RYGB and that supplementation is probably underestimated and often inadequate.

T3:PO.029

Assessment of the children's adherence to the mediterranean diet who study in primary school at famagusta area

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Objective: Children's nutritional status can be changed according to regional differences. This research was planned to identify the children's adherence to the Mediterranean diet, anthropometric measurements, and nutritional status who study in primary schools at Famagusta area in North Cyprus.
Method: In this study, a total of 843 children (47.3% of males, 52.7% of females), between the ages of 8–11 years were included. Dietary intakes of children were determined by a 24-hour dietary recall. Body weight, height and waist circumferences, body fat ratio were performed and body mass index (BMI) was calculated. Children's adherence to the Mediterranean diet was assessed by the 16 item questionnaire Mediterranean Diet Quality Index (KIDMED index).
Results: It was found that mean energy intake of children were 1598.7 ± 468.08 kcal, and that 49.4 ± 9.39% of this total energy intake were from carbohydrates, 15.5 ± 4.17% were from proteins, and 34.9 ± 8.10% were from fats. It was determined that, 46.9% of males and 47.5% of females ware normal weight, 17.3% of males and 17.1% of females were overweight, 18.8% of males and 14.0% of females were obese according to the BMI for age and gender. It was found that only 34.4% of children showed high KIDMED index results, 56.7% had intermediate values and 8.9% had low index results. Children with high KIDMED index have higher calcium intake than those of intermediate and low KIDMED index and that difference was statistical significant ($p < 0.05$).
Conclusion: There is a need for national plans and politicals to increase children's adherence to the Meditarrenean diet, and daily calcium intake in primary schools at Famagusta area.

T3:PO.030

The effect of resistant starch on satiety and weight control

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Food intake is determined by internal and external factors creating different saturation effects (hunger, satiety, desire to eat, satisfaction, etc.). It has been stated that resistant starch (RS) increases postprandial satiety and satisfaction and decreases following food intake and appetite [1, 2, 3, 4]. Resistant starch affects the satiety condition and body weight control through various mechanisms. Upon consuming resistant starch, the first mechanism delays the decrease of blood glucose which creates hunger signals and increase appetite through fixed oscillation of postprandial blood glucose. In the second mechanism, short chain fatty acids formed after the fermentation of RS in large intestine reduce the storage of fatty acids from visceral adipose tissue and increase oscillation of fatty acids from hepatic, portal and venous blood. Therefore, satiety increases and and affects food intake. Decreasing food intake by increasing RS saturation can take a role in body weight control as resistant starch contains less energy than normal starch. In addition, the contribution of taken RS to energy can be between 0–100% and 70% of RS can be metabolized in large intestine depending on the type and products of RS and its process in colon [5]. Further studies are required so that these effects of RS are supported and specific suggestions about RS supplementation can be determined.

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T3:PO.031

Resistant starch: Can it be used for the treatment of diabetic patients?

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It is important to determine the type of carbohydrate used in medical nutrition treatment of diabetes which has increasing prevalence worldwide [1]. It is considered that the amount and quality of carbohydrate is related with postprandial glycaemia and the modification of carbohydrate type of a diet may affect the health of patient in the long run. In addition, glucose and insulin levels can be controlled and the progression of disease can be halted by consuming resistant starch(RS) and low glycemic indexed and highly fibrous food. RS affects postprandial glucose levels by ensur-

ing the inhibition of α-amylase, increasing the viscosity of chyme in small intestine, reducing glucose intake rate, linking glucose and preventing it from diffusing cells [2]. These effects have been found out in slightly overweight, hyperinsulinemic and diabetic adults besides healthy individuals [3]. In addition, it is indicated that RS reduces appetite by skipping from digestion and being fermented in large intestine, and ensures weight control and improves intestine health [4]. Additionally, RS can be used in many foods because it is a natural origin, sweet and white food stuff which contains normal size particles affecting the texture of product at a minimum. RS makes a positive contribution to foods in terms of its appearance, texture and taste in mouth that cannot be found in highly fibrous foods. In this respect, using this type of starch in the products produced for diabetic individuals can increase the life quality of diabetic people.

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T3:PO.032

Interactions between Vitamin D, Magnesium and adipose tissue: A mechanism review and some clinical considerations

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Vitamin D deficiency and obesity are growing public health issues. Evidence suggests that vitamin D deficiency - obesity correlation. Literature also suggests that level of Magnesium is low in Western diet and this may correlate with obesity. Main aims of this mechanism review: • assesses the association between plasma 25(OH)D and fat mass and the potential effects of vitamin D on energy regulation • investigate possible mechanisms linking subclinical Magnesium deficiency and obesity • consider the interaction of vitamin D, Magnesium and adipose tissue. • evaluate Magnesium and Vitamin D supplementation as a possible clinical intervention for obesity.

Methods: Systematic literature review.

Results:

- A robust correlation is confirmed between obesity, reduced 25(OH)D and Magnesium deficiency, but the existence/direction of a causal link is debatable.
- Research is not conclusive if vitamin D and magnesium supplementation may reduce body fat mass.
- The synergistic action hypothesis is supported e.g. via on adipose tissue suboptimal methylation of the vitamin D metabolising enzyme CYP24A1 which may be associated with differing concentrations of serum 25(OH)D.
- Research is partially hampered by the lack accurate of measurements of Magnesium and Vitamin D deficiency. A useful human biomarkers for the latter may be receptors target gene (DUSP10, CYP24A1).

Acknowledgement: Our sincere gratitude to those who have made the completion of this project possible and in particular to Dr. James Neil, Research Director at the CNELM, for his inspiring lectures and research guidance.

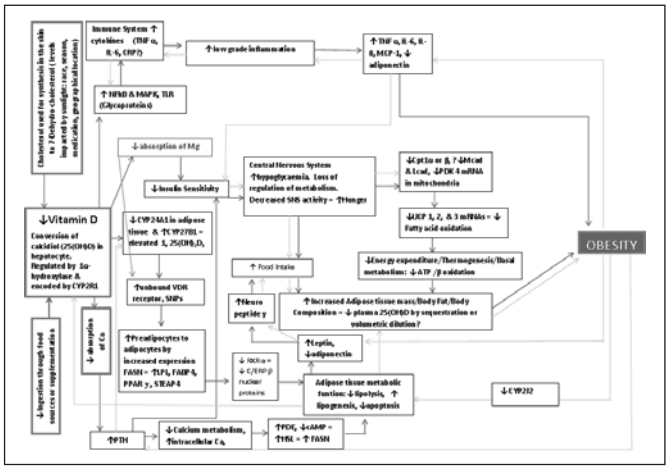

Fig. 1. Vitamin D and Obesity mechanism diagram (Source: C. Kjeldbjerg - CNELM - BSc Research Project)

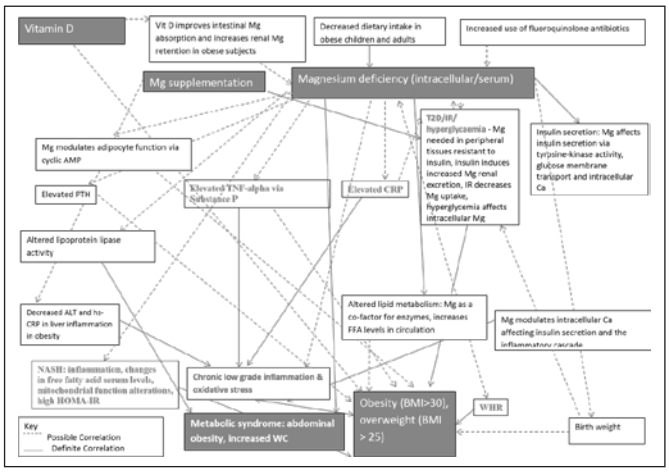

Fig. 2. Magnesium and Obesity mechanism diagram (Source: M. Taylor - CNELM - BSc Research Project)

T3:PO.033

Differences in peptide response to high fat and high carbohydrate foods between obese and lean adults

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Introduction: Exogenous administration of appetite-related peptides has measurable effects on appetite and food intake. However, the relationship between postprandial peptides at circulating physiological levels and short-term appetite control is not well understood. In addition, differences between obese (OG) and lean (OG) postprandial peptide response is not well researched.

Methods: We have compared postprandial profiles of peptides and metabolites in response to fat and CHO in lean (n=12) and obese (n=16) adults (age 45.6 ± 6.2 years). Plasma was collected before and then periodically for 180 minutes after consuming high fat or high CHO meals of equal energy and weight (590kcal; 685g; 50% or 4% energy from fat). Simultaneous ratings of hunger and fullness were tracked for 180 minutes. Next, ad libitum food intake was measured.

Results: OG had significantly higher BMI (29.8 vs 21.8 kg/m^2), body mass, fat mass and waist circum. compared to the LG ($p < 0.05$). Fasting peptides levels for glucose, insulin, triglycerides and leptin were also higher in OG (all $p < 0.05$), but no difference was seen for GLP-1 or PYY. The response to fat and carbohydrate loads were similar in OG and LG for

glucose, triglycerides, GLP-1 and PYY; only insulin response was different between the groups. Insulin responded more strongly to carbohydrate compared to fat in both groups, and there were no interactions. There was however a main effect of group with the OG showing a greater change from baseline in insulin after both food types compared to the LG ($F(1,26)$ 4.597, $p < 0.05$). No differences in hunger, fullness or ad libitum energy intake were revealed ($p > 0.05$).
Conclusion: Whilst body composition was associated with a number of fasting peptide levels (particularly tonic peptides), the response to food was similar in OG and LG; with the exception of insulin. This supports the notion of insulin sensitivity being a main contributor to poor appetite control.

T3:PO.034

Vitamin d status and its association with cardiometabolic risk in a random sample of lebanese adults

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Background: A link between vitamin D deficiency, obesity and increased cardiometabolic risk has been suggested in the literature. This study aims at investigating the association between vitamin D, adiposity markers (BMI, waist circumference WC, percent body fat %BF) and selected cardiometabolic risk factors including lipid profile (TG, TC, HDL, LDL), fasting plasma glucose, hyperinsulinemia, metabolic syndrome (MS) and the inflammatory marker CRP in a random sample of the adult Lebanese population.
Methods: The study sample included 296 subjects aged 20 years and older drawn from the nation-wide Nutrition and Non-Communicable Diseases Risk factors survey. Weight, height, and WC were measured and BMI calculated. MS was defined based on IDF criteria. Body fat was estimated based on multiple skinfold measurements.
Results: Vitamin D deficiency (serum 25-OHD<10 ng/ml) was higher in women compared to men (35.7% and 7.9% respectively) while vitamin D insufficiency (serum 25-OHD between 10–20ng/ml) was higher in men compared to women (59.7% and 49% respectively). Correlation analysis revealed significant negative associations between serum 25OHD and %BF (r= –0.318), BMI (r= –0.217), WC (r= –0.98; $p < 0.05$), insulin (r= –0.202), HOMA (r=-0.200) and MS (r = -0.203) among women. Multivariate logistic regression showed that, across vitamin D tertiles, higher vitamin D levels were associated with lower odds of adiposity as assessed by %BF (p for trend <0.05) and lower odds of the MS (p for trend<0.05) among women.
Conclusion: The high prevalence of low vitamin D status coupled with the suggested association between vitamin D, adiposity and MS highlight an issue of public health concern. The findings of this study should be further investigated in larger population studies.

Acknowledgement: We acknowledge Ms. Nada Adra for her help in statistical analyses and we acknowledge all study subjects for participating in the study.

T3:PO.035

Risk of gaining weight due to eating in the absence of hunger among mexican health sciences college students

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Introduction: Eating in absence of hunger (EAH), is defined as eating in response to the presence of palatable food in the absence of physiological hunger, and is considered a risk factor for overeating during childhood and adolescence.
Objective: To assess the risk of increasing BMI, obesity (O), and abdominal obesity (AO) because of EAH, among college students over a year of follow-up.
Methods:A prospective study was conducted from October2013 to October 2014.Participants were second year medical, dentistry, psychology and nursing students.A previously validated EAH questionnaire was applied at baseline.Factorial analysis was conducted to assess the main components of the EAH score.To assess the risk of increasing weight a binomial logistic regression was conducted.
Results: The study population were 697 college students, and after a year 638 (91.5%) students were assessed.Mean age was 20.3y. At baseline the prevalence of O and AO was 12% and 35% respectively. External stimulli (8.6%), negative feelings (41%), fatigue (12%), and boredom (7.4%) contributed to 69% of the variability for EAH. Normal weight men had higher EAH by external stimulli, fatigue and boredom ($p < 0.05$) than O. Normal weight women had higher EAH by boredom ($p = 0.012$) than O. After a year, the prevalence of O and AO was 15% and 42%, respectvely. Paticipants with an external stimulli score >12 were 1.9 times more likely to increase two or more kg (OR=1.9, CI 95% 1.3-2.9; $p = 0.004$).
Conclusion: O and AO increased over a year period. Due to external stimulli, fatigue and boredom, normal weight men had more EAH than O men. Due to boredom normal weight women had more EAH than O. High external stimulli score increases the risk for weight gain

T3:PO.036

A retrospective analysis of reported alcohol consumption and correlation to BMI in patients attending the Rotherham Institute for Obesity (RIO)

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Introduction: Alcohol consumption has been reported to significantly increase Body Mass Index (BMI) and waist circumference due to being the second most energy dense macronutrient. However, there is a lack of evidence to support a clear interaction between alcohol consumption and BMI, and this study aimed to establish whether there is a clear correlation between reported alcohol intake and BMI in patients attending the Rotherham Institite for Obesity (RIO).
Methods: A retrospective analysis of self-reported alcohol consumption by patients attending RIO during 2012–13 (n=2251, age=50.9 +/- 19.0 yrs, BMI=41.4 +/- 9.6 kg/m^2) was performed. Descriptive statistics were produced including normality tests and Spearman's Rank-Order Correlation was completed.
Results: 54% of patients (n=1236) reported to consume alcohol weekly with the mean female and male drinker consuming 8.0 +/- 10.6 u/wk and 13.7 +/- 16.6 u/wk respectively, both of which fall below national guidelines. However, further analysis demonstrated that 126 (8.1%) female and 92 (13.3%) male patients were consuming up to 6 times the recommended levels, increasing their risk of liver disease. No significant correlation was established between age and units consumed (r=0.002, one-tailed $p > 0.05$) whereas a negative correlation was observed between BMI and units consumed (r=0.84, one tailed $p < 0.001$).
Conclusions: The results are in aligned with previous research that has found an inverse relationship between alcohol consumption and BMI. Some findings suggest that frequent heavy „binge" drinking is more positively associated with BMI, rather than consumption over multiple days. Frequency of alcohol intake was not recorded nor analysed in this study and therefore adds to the study limitations. The relationship between alcohol consumption and BMI remains unclear due to its complexity and the number of associated factors.

T3:PO.037

Clinical inertia in following the rules of diabetic diet in patients with type 2 diabetes mellitus

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Introduction: The aim of the study was to assess the knowledge about the principles of a diabetic diet in patients with type 2 diabetes mellitus (T2DM) hospitalized for various reasons and to correlate the results with the type of medical care, anthropometric measurements and mean A1c value (HbA1c).
Methods: The study included 100 patients (58 women, 42 men) with T2DM hospitalized in 2014 in the Department of Internal Medicine, Diabetology and Clinical Pharmacology, Medical University of Lodz. Patients were asked to fill the questionnaire concerning knowledge about diabetic diet and to indicate the type of medical care, under they reside: Diabetic Outpatient Clinic and/or GP Clinic. In each patient following data were collected: anthropometric measurements (BMI, waist and hip circumference, WHR) and HbA1c test was performed
Results: Patients were in mean age 63.52 ± 12.64 years, mean duration of diabetes 11.89 ± 11.03 years, mean BMI 30.68 ± 6.93 kg / m_{ι}, mean HbA1c value 8.87 ± 1.76%. Patients gave 74.6% correct answers in the test of knowledge about diabetic diet. In the study group, 53 patients were under the care of Diabetic Outpatient Clinic and GP Clinic(A), 47 patients only under GP Clinic (B). Patients in group A had mean BMI 30.57 ± 6.7 kg / m_{ι} (vs. group B 30 8 ± 7.26 kg / m_{ι}), mean HbA1c value 8.36 ± 1.75% (vs. group B 9.46 ± 1.5%) and gave 76.6% correct answers in the test of knowledge about diabetic diet (vs. group B 72.3%).
Conclusion:
1. The majority of patients with T2DM are overweight or obese.
2. Despite the good results of the test of knowledge about diabetic diet, patients did not follow rules of diabetic lifestyle (clinical inertia).
3. Patients under care of GP Clinic and Outpatient Diabetes Clinic had higher knowledge of the diabetic diet and achieved better therapeutic targets than patients only under care of GP Clinic.
4. Patients need permanent education on every medical visit.

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T3:PO.038

Obesity and health-related lifestyle factors in romania – "oro" study

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Introduction: Regional studies have shown around 50% prevalence of adult overweight/obesity in Romania, with limited data on lifestyle patterns. The cross-sectional ORO-Study aimed to evaluate prevalence of obesity and related lifestyle risk factors at national level.
Methods: The study included 8 regional centers. Collected data were: anthropometric, social status, family/personal medical history, lifestyle and eating habits. A 24h food recall diary and two questionnaires were used: Global Physical Activity (WHO) and food frequency Nurses Health Questionnaire, translated and validated.
Results: Representative sample of 2103 individuals were enrolled, mean age 41.5 years, mean BMI 29.9 kg/m^2, 61.9% women, 72.8% from urban area. Prevalence of overweight / obesity was 31.1% / 21.3%; obesity 9.9% in 18–39 years, 30.1% in 40–59 years, 41.6% in 60–79 years age groups ($p < 0.001$). Overweight / obesity in men was 41.6% / 23.0%, in women 24.7% / 20.3% ($p < 0.001$) and higher in rural area: 33.0% vs 30.3% and 25.7% vs 19.7% ($p = 0.004$). Overweight and obese people had ≥ 3 meals/day (36.0% and 38.8% vs 29.8% ($p = 0.002$), most consistent meal after 9 pm (22.8% vs15.4%), large food quantities eaten less than 2h following another meal, less physical activity, less night sleep. Eating while watching TV was more frequent in normal BMI (51.8% vs 41.5%, $p < 0.001$), same for drinking water (56.1% vs 40.8%, $p < 0.001$) and sugar-sweetened carbonated drinks (6.6% vs 6.2%, $p < 0.006$).
Conclusions: High prevalence of overweight and obesity increasing with age was found. Irregular meals, eating while watching TV were the most frequent unhealthy eating habits, although not always related to obesity. Despite some study limitations, the results suggest the complexity of the obesity-related risk factors.

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T3:PO.039

The effect of weight loss on body composition and serum lipid profiles in obese women

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Introduction: Obesity is one of the most important health problems among the advanced and developing countries in recent years. An imbalance of energy intake and energy expenditure leads to obesity which is associated with increased morbidity and mortality. In contrast, persistent weight loss significantly reduces overall mortality. This study was planned to investigate the effects of weight loss on body composition and serum lipid profiles in obese women.
Methods: Obese women with body mass index (BMI)>30.0 kg/m^2 (n:25) and aged 20–43 years were included in this study. According to the needs of each individual, dietary program was maintained to provide a weight loss 0.5–1 kg/week. The body composition was measured using bioelectrical impedance analyzer (BIA). All of the measurements (BIA, serum lipid profiles, and anthropometric measurements) were taken before initial diet and after 12 weeks.
Results: The mean age of women was 31.56 ± 7.3 years. There were significant differences in body composition between initial and at the end of the diet programme. Body weight (kg), BMI, fat mass (kg), fat percentage (%), fat free mass, waist circumference (cm) and waist/hip ratio decrased significantly at the end of the diet programme. ($p = 0.00$). Also, decreasing in the level of serum total cholesterol (TC) and low-density lipoprotein cholesterol (LCL-C) were found significant ($p = 0.001$).
Conclusion: As a result of this study, the diet has positive effects on body composition and serum lipid profiles. And this findings help to decrease mortality and morbidity.

T3:PO.040

Evaluation of iodine defficiency in kazan city studentsthe problem of iodine deficiency in the environment and deterioration of health status associated with it is vital for the tatarstan.

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Introduction: The problem of iodine deficiency in the environment and deterioration of health status associated with it is vital for the Republic of Tatarstan with its geochemical peculiarities of nature and soil structure. The incidence of endocrine diseases, eating disorders, metabolic and immune disorders (ED) under 14 years of age increased 1.6 fold for the period from 1996 to 2012 in the city of Kazan, and the 2,1 – 2,7 fold increase was registered for the period from 2007–2009. All these years, iodine deficiency disorders (IDD) made 23.5—28.0% of ED.
Methods: 220 children aged 12–14 living in Kazan and studying in gymnasiums No.3 and No.7 were examined. Prevention of iodine deficiency is carried out in gymnasium No.7 on a regular basis. Study included clinical

examination, ultrasound scan of thyroid gland, determination of ioduria and the level of the basal thyroid-stimulating hormone (TSH).
Results: The thyroid volume is significantly larger in children of gymnasium No.3, as well as the higher incidence of structure variations: nodular goiter and focal changes of the goiter. The ioduria indices in students of gymnasium No.3 correspond to iodine deficiency (ioduria median made 61 mkg/l), and in gymnasium No.7 – to normal level (ioduria median – 115.5 mkg/l). The indices of TSH in students were within standard values and made 1.4 ± 0,6 mU/l (gymnasium No.7), and 1,6 ± 0,8 mU/l (gymnasium No.3), which is indicative of absence of functional thyroid disorders in children of both gymnasia. Significant difference in the level of iodine supply was directly associated with group prevention of IDD in gymnasia.
Conclusion: Indices in gymnasium No.3 are indicative of demand for prevention of iodine deficiency and existing risk for IDD developing in children living in the territory of Kazan.

Acknowledgement: The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University

T3:PO.041

Effect of phosphorus supplementation on subjective appetite scores

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Introduction: We have previously reported that phosphorus preload was able to reduce energy intake at subsequent meal by about 30%. A study was conducted to investigate the effect of 12 week phosphorus supplementation on subjective appetite scores.
Methods: A double blind randomised placebo controlled study was conducted on 47 overweight and obese subjects. Subjects were asked to ingest 3 tablets [placebo and phosphorus (125mg/tablet)] with each 3 main meals (breakfast, lunch and dinner) for 12 weeks. Subjective appetite scores were taken at baseline, 6 and 12 weeks.
Results: Baseline subjective appetite scores were similar between the groups. Several parameters of subjective appetite scores were found to decrease as the experiment progressed (time) including that of appetite, quantity of food to reach fullness, hunger, and number of snacks. However, changes in appetite, quantity of food to reach fullness (indicator of satiation), taste of food and numbers of snacks were significantly reduced in the phosphorus group as compared to the placebo. While that of hunger (indicator of satiety) was not affected.
Conclusion: Phosphorus supplementation seems to affect food or energy intake through a reduction in satiation rather than satiety.

Acknowledgement: Research relating to this abstract was funded by National Council for Scientific Research, Lebanon

T3 – Changing behaviors

T3:PO.042

The effect of food offered by grandparents on eating habits of their grandchildren

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Introduction: Parents and care-takers play an important role in the development of childhood obesity. In many cultures, grandparents are also involved in child care process. However, studies investigating the effect of grandparents, involved in child care, on the dietary habits of grandchildren are limited. Thus, aim of this study was to investigate whether there was a relationship between the type of foods offered by grandparents and children's consumption of these foods.
Methods: Data from 114 children (aged 8–12 years) were included in this study. From all available data, those regarding the provision of specific foods by grandparents to children and the frequency of consumption of these foods by children were used for the present analysis. For analytic purposes children were split into two group, different for each analysis based on the type of food grandparents brought: a) group "yes" my grandparents offer me "this type of food" and b) group "no" my grandparents do not offer me "this type of food". The types of food children were asked whether they were offered by their grandparents were: salty snacks, sweets, fruits, sodas.
Results: Using Kolmogorov-Smirnoff, test data were found to be not normally distributed; therefore non-parametric statistics were used for all the analysis. Mann-Whitney test revealed that group a consumed more often the food offered by grandparents compared to group b, when the food was fruits ($p = 0.052$), sweets ($p = 0.016$), or salty snacks ($p = 0.015$). No statistically significant difference was found for the frequency of drinking sodas between the two groups ($p = 0.346$).
Conclusion: Findings of this study showed that children offered a food by their grandparents consumed more frequently this food, compared to those not offered this food.

T3:PO.043

Morbid obesity: Study od dietetc and anthropometric profile of patients and a strategy in food education

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Obesity is a health problem that worsens and surgical treatment is indicated when nonsurgical treatment is ineffective and there is high risk of life to the patient. To be successful is important to have a nutritional monitoring in pre and post-surgical as well as awareness of the patient self-care education.
Objective:to formulate nutritional orientation for a group of obese patients and their caregivers; to assess the dietary habits and anthropometric measurements.
Methodology: workshops conducted each 15 days, during 6 months, when were covered: Ideal Menu, Fractionation, Food Variety, Sodium, Fats, Fiber and satiety, Nutritional Labeling, Importance of Calcium, Anxiety and foods; besides tasting and delivering healthy recipe every meeting. The adults morbid obese was the inclusion criterion. The dietetic data were obtained by 24h recall in the beginning of the study. Anthropometric measurements were evaluated. A test about quality from Brazilian Health Minister to evaluated dietary habits, and the software NUTWIN® to nutritional composition were used.
Results: the mean energy intake was 1771 ± 787 kcal (n=15). Fiber (15.5g±9.8g), calcium (424.5 ± 187.8mg) or iron (11.2 ± 4.7mg) were below the recommended amount. The average of Body Mass Index is 46 ± 4. No changes were observed in the patient´s weigh in the end of the study. But after strategic to orientation, the score to Health Minister test improved. The initial was 33 and 46 points at the end, characterizing them in the group of care to food and subsequently in adequate food.
Conclusions: the habits were characterized by low fiber and minerals. This feed pattern of risk is worsening their nutritional status and need educational preparatory actions for surgery. The workshop is a strategy to improve the diets in obesity.

T3:PO.044

Do social norm based messages increase fruit and vegetable intake in children?

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Introduction: Children are influenced by the eating behaviour of their peers. Social norm messages suggesting that others eat healthily are effective at increasing fruit and vegetable intake in adults, but this hasn't been tested in children. The present study tested whether exposure to social norm messages in a board game increased fruit and vegetable intake, relative to health or control messages.
Methods: 164 children (84 males, 80 females) played a game which contained either social norm messages about the fruit and vegetable consumption of their peers, health messages about the benefits of fruit and vegetable consumption, control messages related to fruit and vegetables, or control messages unrelated to food. After exposure to messages in a game, participants consumed snacks from a selection of foods, including fruit and vegetables. The choice and amount of snack food consumed was examined. We examined whether BMI moderated the effect of message type.
Results: There was no significant effect of message type on the amount of fruit and vegetables eaten. There was a significant interaction between condition and BMI; normal weight children ate significantly more fruit and vegetables after seeing health messages than after seeing control messages (unrelated to food). There were no significant differences between the social norm and other conditions.
Conclusions: In this study, health-based messages increased fruit and vegetable consumption in normal weight children relative to control messages (unrelated to food). Social norm messages did not result in a statistically significant increase in fruit and vegetable consumption.

T3:PO.045

Smartphone Usage, Obesity, and Lifestyle Habits of Children and Adolescents in South Korea

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Due to its highly addictive characteristic, smartphone use can reduce physical activities and cause unhealthy lifestyle habits, which leads to obesity. This study aimed to investigate the correlation between smartphone usage and obesity related factors. We visited four primary schools in south korea for the completion of questionnaires for 10 ~ 11 years old students. Out of 667 students, 240 underweight students were excluded, while 427 students were classified into average-weight group and overweight/obese group. The hours of smartphone use, relationship between Smartphone Addiction Scale and obesity, and correlation with obesity related factors were analyzed. T-test was conducted based on the hours of smartphone use. The result showed that the students who used smartphones for 2 or more hours had significantly higher BMI than the students who did not. ($p < 0.05$) The result of the logistic regression analysis showed more students who used smartphones for 2 or more hours daily, watched TV for 120 minutes or more, have taken their last meal later than 7 pm, watched TV while eating, and ate fatty foods. Moreover, the students in the potential risk group among the students who used smartphones tend to have their last meal later than 7 pm, eat excessively, and watch TV while they consume fatty foods, snacks, or drinks. The smartphone usage time and smartphone addiction are significantly related to the obesity factors in children and adolescents

T3:PO.046

Effects of a community-based cardiovascular disease prevention programme on long term weight loss and lifestyle goals in an obese population

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Introduction: Obesity is one of the primary risk factors for cardiovascular disease and type 2 diabetes. We sought to measure the long term changes in anthropometric measures and lifestyle habits in an obese cohort after participation in a preventive cardiology programme.
Methods: High risk patients (Heart SCORE ≥ 5%ą) and their family members were enrolled on a 16-week intensive lifestyle programme, Croí MyAction, delivered by a multidisciplinary team. Body mass index (BMI), waist circumference, physical activity levels and dietary habits were assessed at initial assessment (IA) and at 1 year (1-yr). To calculate the Mediterranean diet score a food habit questionnaire was administered, with the use of a photographic food atlas to estimate portion sizes. Individuals also completed a Chester Step Test, a sub-maximal exercise assessment which determined an estimate of their maximal aerobic capacity.
Results: Of 741 patients enrolled, 390 completed the 1-yr assessment. The mean age of participants was 58 years, with 52.3% being male. Results demonstrated that there was a significant mean improvement in BMI, waist circumference, Mediterranean diet score and functional capacity at 1-yr.
Conclusion: Obesity is a growing epidemic in Ireland and these results demonstrate that long-term weight loss and lifestyle goals can be achieved and sustained as part of a comprehensive community-based cardiovascular disease prevention programme.

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Perk J, De Backer G, Gohlke H, Graham I, Reiner Z, Verschuren WMM, et al.: European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice. Atherosclerosis. 2012. Type of presentation: Poster

T3:PO.047

An adapted cognitive behavioral approch to addressing overweight and obesity among qatari youth

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An Adapted Cognitive Behavioral Approach to Addressing Overweight and Obesity among Qatari Youth
Introduction: The levels of overweight and obesity have reached epidemic proportions in Qatar which stress the need for prevention programs. I can program is designed to manage the weight of overweight/ obese Qatari school children at the vulnerable age of 9–12 years
Methods: Integrate behavioral economics and cognitive behavioral therapy for 83 overweight/obese Qatari children in a multi-cohort prevention/ intervention study which involves three phases: (1) intensive lifestyle and weight loss camp, (2) 12-week after-school clubs as supplement/consolidation of knowledge, skills, and habits learned during the camp while engaging parents for long term sustainability of lifestyle changes, and (3) maintenance for knowledge, skills, habits, and behaviors gained in camp and afterschool clubs through web and social/family support
Results: 100% of participating children lost weight at an average of 2 kg with girls losing more weight than boys. Data from surveys conducted

on dietary habit and physical activity revealed that over 60% did not take enough to fulfill their daily requirements of fruits, vegetables and milk. They predominantly consumed calorie-dense fast foods, soft-drink, and sweets. Furthermore, Over half (53%) did not engage in physical activity in their spare time.
Conclusion: the pilot phase succeeded in accomplishing the Adapt and pilot a school-based intervention that combines behavioral and cognitive approaches to promote healthy lifestyle among 9–12 year old children in select Qatari schools in the first year and laying a strong foundation for the start of the intervention cohorts in Qatari schools in years 2 through 5.

T3:PO.048

Is self-weighing an effective tool for weight loss: A systematic review and meta-analysis

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Background: Finding simple, yet effective, ways in which individuals can be helped to lose weight and sustain weight loss could improve public health. One strategy that has shown promise is self-weighing.
Purpose: To examine the effectiveness of self-weighing for weight management.
Methods: A systematic review and meta-analysis of 19 randomised controlled trials that included self-weighing as an isolated intervention or as a component within an intervention. We also conducted sub group analysis of trials to examine whether there were differences between daily and weekly weighing frequency and trials that included goal setting and accountability versus those that did not.
Results: One study examined self-weighing as a single strategy and it was ineffective (-0.5 kg 95% CI –1.3 to 0.3). Adding self-weighing/self-regulation techniques to programmes resulted in a significant difference of –1.7 kg (95% CI –2.6 to –0.8). Multi-component interventions including self-weighing compared to no/minimal control resulted in significant mean differences of –3.7 kg (95% CI –4.6 to –2.9). There were no differences between trials that asked participants to weigh daily or weekly and those that had goal setting or not. Trials with accountability had significantly (p = 0.007) greater weight loss than trials that did not include this component.
Conclusions: It is inconclusive whether advising self-weighing without other intervention is effective. Adding self-weighing to a behavioural weight loss programme may improve weight loss. Behavioural weight loss programmes that include self-weighing are more effective than minimal interventions. Adding accountability to interventions that include self-weighing may improve effectiveness.

T3:PO.049

Nutrition And Eating Behavior 4 Years After Laparoscopic Sleeve Gastrectomy (LSG)

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Introduction: The outcomes of conservative treatment, especially with severe obesity, are rather poor. In contrast, obesity surgery has been shown to be an effective treatment. LSG is characterized by its limited risk and concomitant substantial weight loss outcome. However, to date, long-term follow-up data on eating and nutrition behaviour are lacking.
Methods: Of 169 patients who had undergone LSG, 148 were contacted. 82 participated in the study (55.4%). 64 were examined at the study centre und 18 by interview via mail and telephone. Symptoms of eating disorders were assessed using a structured interview (EDE) and validated questionnaires (SIAB, EDI, FEV). Data on nutrition intake were acquired by two 24 h recalls and a validated food frequency questionnaire and subsequently analysed using the multiple source method.
Results: On average the LSG lay 4 years ahead of the follow-up examination. The initial BMI prior LSG was 48.6 ± 8.1 kg/m^2 and after 4 years LSG 36.1± 10.8 kg/m^2. The excess weight loss was 49.5 ± 33.2%. Prior LSG n=8 patients had a binge eating disorder, 4 years after LSG only n=1 patient. In the follow-up LSG patients report self-induced vomiting 7.4%, loss-of-control-eating 15.7% und grazing 39.1%. In 10% of the patients the energy intake exceeds the energy requirements needed in order to maintain the actual body weight.
Discussion: The excess weight loss after 4 years LSG was 50%. In the long-term follow-up the whole picture of an eating disorder is seldom. However, some patients display eating disorder symptoms which may be paralleled by an increased energy intake. It is likely that the surgery outcome could be positively influenced if patients at risk were identified in time and supported by targeted intervention.

T3:PO.050

Eating behaviours are strong determinants of obesity risk, independently from socio-economic position

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Introduction: Associations between eating behaviours and body weight are well known. The aim of this study was to assess the influence of socio-economic position (SEP) on this relation.
Methods: We conducted a case-control study with 605 obese patients consulting for obesity (78% women, age=41 yrs, BMI=42 kg/m$_2$) and 403 non-obese controls (77% women, age=40 yrs, BMI=22 kg/m$_2$) recruited in a preventive health center. Eating behaviour was assessed both by TFEQ-R21 and questionnaire about eating circumstances. SEP was established with a score constructed using occupation, education, income and divided in three groups (low/medium/high). Obese and non-obese subjects were compared using multivariate linear and logistic regression analyses.
Results: Compared with a medium SEP, a low or a high SEP were associated respectively, with a higher or a lower risk of obesity (OR=2, p = 0.0002 and OR=0.7, p = 0.014). Concerning TFEQ, cognitive restraint (p = 8×10–9), uncontrolled eating (p = 9×10–20) and emotional eating (p = 5×10–35) were positively associated with obesity, with no interaction with SEP. For eating circumstances, eating at night (p = 3×10–11), in front of TV (p = 1×10–6) or in a large size plate (p = 1×10–108) were associated with obesity. Eating in a large plate was more frequent in low SEP, even in absence of obesity (p = 0.02). Only the association between the plate size and obesity was different according to SEP (inter p = 0.01); the risk of obesity associated with this behaviour was more pronounced in high SEP than in low SEP (OR=71, p = 1×10–35 vs OR=15, p = 10×10–13, respectively).
Conclusion: 1) Eating behaviours are strong determinants of the risk of obesity, mostly independently of SEP. 2) Some obesogenic behaviours such as plate size are more prevalent in low social class.

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T3:PO.051

Associations between habit formation and weight loss in the 10 top tips (10tt) trial: A randomised controlled trial of habit-based advice for weight control in general practice

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Introduction: According to habit-formation theory, habits are automatically-triggered actions, learned through repetition of the action in a consistent context. The 10TT trial tested a novel weight management intervention based explicitly on this theory. Previously presented data showed that patients allocated to 10TT lost significantly more weight over 3 months than those allocated to usual care. The present analysis tested the hypothesis that change in patient-reported frequency and automaticity of target behaviours would be associated with weight loss.
Methods: A two-arm, individually-randomised, controlled trial in obese adults (n=537) in primary care, compared 10TT with usual care. At baseline and 3 months patients were weighed and reported the frequency and automaticity of target behaviours using items from the self-report habit index.
Results: Frequency and automaticity scores for each target behaviour were summed to create total scores. Frequency increased in both groups, but more in the 10TT group (10TT mean Δ=25.5; usual care mean Δ=17.7). There was also a larger increase in automaticity within the 10TT group (10TT mean Δ=26.9; usual care mean Δ=19.5). The amount of change was associated with weight loss for both frequency (r=-0.09,95%CI= [-0.11, –0.06]) and automaticity (r=-0.08,95%CI= [-0.11, –0.06]).
Conclusion: As hypothesised, weight loss was related to change in the automaticity and frequency of target behaviours. This provides some support for the theoretical basis of 10TT; although the size of the associations was small. Formation of targeted habits may not be the only process through which weight loss occurred. Longer term outcomes will indicate if habit formation has a stronger role to play the effectiveness of 10TT for weight loss maintenance.

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T3:PO.052

A longitudinal study of food craving and dieting in adults engaged in weight management

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Background: Research evidence on the relationship between dieting and food cravings is conflicting, and there is little longitudinal research. The present study investigated the frequency and nature of cravings over time in adults engaged in weight management.
Methods: A large national sample of individuals (N=2932; 97% female; BMI=31.6) enrolled with a commercial weight loss organisation completed on-line assessments of craving experiences (Control of Eating Questionnaire), depression/anxiety, and dietary restraint on 2 occasions, 7 weeks apart. These data were analysed by dieting status (controlling for BMI, sex, age) and related to body weight measured at group meetings.
Results: Cross-sectional analysis showed those 'dieting to lose weight' (55% of sample) reported significantly fewer, less intense, more resistible, and more easily controlled food cravings than those 'watching their weight' (35%). There was no group difference in the types of foods craved, daily hunger, or mood. Over time, cravings lessened and weight reduced (-2.0kg). Longitudinal analyses showed this reduction was not accounted for by change in mood or dietary restraint. Frequency of eating in response to food cravings at Time 1 significantly predicted overall weight change; those less likely to eat in response to food cravings lost more weight. There was also a significant positive relationship between participants' sense of control over their food cravings and weight loss.
Conclusions: This is one of the first intentional studies of these relationships. Clinically, these findings are important, showing that dieting (and increased restraint) does not lead to weight gain via increased food cravings. Psychological strategies are available for dieters who do struggle to cope with food cravings.

T3:PO.053

Eating behaviour was associated with prevention of weight gain in varenicline treated overweight or obese smokers during smoking cessation

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Aim: To study the relation between eating behaviour (restraint, disinhibition, hunger, binge eating) and weight change in overweight/obese smokers treated with varenicline for smoking cessation. Subjects and methods: In a randomized clinical trial 122 smokers (≥10 cigarettes/day) with BMI 25–40 kg/m^2 were randomized to moderately energy reduced diets reduced in carbohydrate or fat. The subjects received dietary and motivational counselling at 10 visits over 3 months. Treatment with varenicline was started one week after randomization. At randomization, 4 and 12 weeks after target quit day (TQD), the TFEQ and the BES were used to assess eating behaviour. Food records were used to assess compliance with diet. Subjects with complete assessments of eating behaviour 12 weeks after TQD were included in the current analysis (N=88).
Results: Protein intake in the low-carbohydrate vs fat-reduced diets was 26 E% vs 20 E%, fat was 39 E% vs 31 E% and carbohydrates were 29 E% vs 41 E% (all $p < 0.0001$). No differences in weight changes (-0.1 ± 3.6 kg vs 0.04 ± 2.6 kg, $p > 0.8$) or in eating behaviour scores (all $p > 0.2$) between the dietary groups were seen 12 weeks post-TQD. The groups were combined and a one-way repeated measures ANOVA showed increased restraint ($p < 0.0001$) and decreased disinhibition, hunger and binge eating (all $p < 0.03$) between randomization and 12 weeks. In a general linear model, with change in weight as the dependent factor, change in restraint, disinhibition, hunger and binge eating as cofactors and dietary intervention groups as the fixed factor, increase in dietary restraint ($p = 0.014$) and decrease in binge eating ($p = 0.029$) were associated with lower weight gain (model R2 = 0.14).
Conclusion: In the contex of smoking cessation, dietary restraint and decreased binge eating may be useful in preventing early weight gain independent of the macronutrient composition of the diet.

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T3:PO.054

Association between appetitive traits and weight in adults in britain

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Background: Appetitive traits such as Food Responsiveness (FR), Enjoyment of Food (EF), Satiety Responsiveness (SR) and Slowness in Eating (SE) have been shown to be risk factors for excess weight in children, but there have been few studies in adults. Using the newly developed Adult Eating Behaviour Questionnaire (AEBQ), we assessed FR, EF, SR, and SE, as well as Emotional Over and Under-eating (EOE, EUE), Hunger (H) and Food Fussiness (FF) and examined associations with Body Mass Index

(BMI) and weight status. Four could be termed food approach traits (FR, EF, H, EOE) and four food avoidant traits (SR, SE, EUE, FF).
Methods: Data were from members of an online survey panel who completed the AEBQ and provided weights and heights to calculate BMI. Linear regression was used to examine associations between each appetitive trait and BMI, with gender and age as covariates. ANOVA was used to examine differences by weight status.
Results: Data were available for 964 participants (18–79 years; 416 men, 548 women; 377 normal-weight, 280 overweight, 261 obese). BMI showed significant positive linear associations with three food approach traits (FR, EF and EOE; β: .100 to .309; all p's <.01) but no association with H. There were significant negative associations with SR, SE, and EUE (β: -.106 to -.191; all p's<.05) but not FF. Obese respondents had significantly higher scores than others for FR and EOE and significantly lower scores for SR, SE and EUE ($p < .05$), but did not differ on EF, H or FF.
Conclusions: Results indicate that overweight and obese adults have stronger responses to food cues and weaker responses to satiety cues than normal-weight adults; consistent with data on children. Information on appetitive traits could be used to tailor weight management recommendations.

T3:PO.055

Exploring the influences of the home food environment on primary school children's diet and weight status

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A child's home food environment (HFE) supports or inhibits healthy eating, but its influence on childhood obesity is unclear due to poor understanding of underlying dimensions and mechanisms. This study aimed to investigate the relationship between the HFE and childhood obesity as mediated by child diet. Baseline data collected by questionnaire from parents of children (9–11 years old) participating in the Obesity Prevention and Lifestyle (OPAL) Program were used (n=3323). Exploratory factor analysis using polychoric correlation explored 21 underlying components of the HFE. These components were used to define the overall HFE and linked to child diet (defined as meeting guidelines for fruit, vegetable and non-core food intake, based on parent report of child intake of defined food groups the previous day) and measured child BMI in structural equation modelling, adjusting for confounders. Five components incorporating 10 items were retained to describe HFE. After adjusting for age, gender, socioeconomic status and physical activity, all associations in the model were significant ($p < 0.05$) and explained 9.3% and 4.5% of variance in child diet and BMI respectively. Our model was a good fit and showed that a more positive HFE was directly associated, and indirectly associated through child diet, with a lower BMI in children. Parents are important facilitators of primary school children's healthy eating at home. The robust statistical methodology used provides support for a model of the direct and indirect dynamics between the HFE and childhood obesity. The model can be tested in future longitudinal and intervention studies to identify the most effective HFE component that should be targeted in childhood obesity prevention efforts.

Acknowledgement: Child and parent participants and all staff involved in data collection

T3:PO.056

A nutrition education programme for saudi adolescents involving interactive activities with mothers is more effective for improvement of food intake and nutritional knowledge.

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Introduction: Poor food choice and obesity in Saudi Arabia are of growing concern1. This study aims to examine whether interactive activities at home between mother and daughter, additional to school based nutrition education for daughters, leads to improvement in nutritional knowledge and food intake in homes of Saudi adolescent girls (17–18 yrs).
Methods: Adolescent girls and mothers were recruited from 3 matched high schools. Using a 4 week cluster randomised design adolescents in school A received nutrition education and interactive activities (cooking/recipe modifications to reduce fat intake) to complete with their mothers, adolescents in school B received education only and school C acted as control. Questionnaires on nutrition knowledge and food frequency questionnaires were administered pre and post intervention
Results: 207 girls and their mothers were recruited (72, 69 and 66 schools A, B and C, respectively). There was no significant difference in pre-intervention nutritional knowledge scores for mothers and adolescents between schools. Post intervention adolescents' scores in A and B were significantly higher than school C ($p < 0.05$). Post intervention mothers' scores in school A were significantly higher than schools B and C ($p < 0.05$). Fruit, vegetables, milk and wholemeal bread consumption were positively correlated with nutritional knowledge scores of mother and adolescent in school A only ($p < 0.05$).
Conclusion: Interactive activities effectively support nutritional knowledge transfer from school to home resulting in improvement in adolescent and mothers' nutritional knowledge and food intake.

Acknowledgement: We are grateful to Tabouk University (Saudi Arabia) Schools and families for support.

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T3:PO.057

Study on non-communicable disease related lifestyle and behavior risk factors in west china

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Objective: In China, the resident population of Sichuan province, located in the west, is in the front rank. The proportion of elderly people, who are more likely to suffer from chronic disease, is also very large here.This study is to investigate the prevalence of NCDs and the related risk factors in west China aged 18 and above, and to provide scientific basis for developing NCDs-related intervention strategies.
Methods: A cross-sectional survey conducted in 2013–2014 with random samples using multi-stage stratified clustering sampling method from 12 counties (districts) of Sichuan province. Datas on NCDs and lifestyle risk factors were collected through interviewer-administered questionnaires and physical (biochemical) measurements according to standardized protocol.
Results: A total of 7131 adult residents participated in the survey. The prevalence of hypertension, diabetes, overweight, obesity, central obesity were 28.5%, 10.5%, 32.3%, 9.7%, 38.4% for men and 27.8%, 10.4%, 31.3%, 12.7%, 48.6% for women respectively. Meanwhile, prevalence rate of alcohol drinking (year), current smoking, lower intake of vegetable and fruit, excess consumption of red meat, lack of physical activity were 53.5%, 52.5%, 44.2%, 64.7%, 19.9% for men and 14.9%, 3%, 40.4%, 48.4%, 16.3% for women.
Conclusions: The prevalence rate of NCDs and risk factors was still high in Sichuan. Innovative and effective strategies are needed to prevent further worsening of the situation. The intervention measures should be focus on emphasizing the significance of good lifestyle and behavior.

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per and Cheng Guo gave some very valuable suggestions. Xu Xinyin,Ji Kui,Zhang Ningmei, Yi guanghui carried out and administrated the project. Wu Xianping and Deng Ying organized the study.The authors thank all researchers and respondents.

T3:PO.058

Characteristics of successful weight loss maintainers after very low calorie diet-induced weight loss

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Very low calorie diets (VLCD) induce substantial initial weight loss and continued use of formula-based products may promote improved weight loss maintenance (WLM) thereafter(1). Tackling weight regain remains a key issue for obesity treatment. This study aimed to investigate the factors associated with successful weight loss maintenance after VLCD weight loss, to better support individuals and optimise this crucial stage of the weight loss 'journey'. Individuals registered with Lighterlife (LL) (n=1100), a weight-loss programme comprising a VLCD, behavioural modification and group support, who had lost at least 10% of their starting weight and had spent at least 6 months on the LL maintenance programme, were invited to complete an online questionnaire, assessing diet and activity behaviours, along with an optional food frequency questionnaire (FFQ). Data analysis (n=104) is ongoing and although no one particular approach was associated with greater WLM success, results suggest that participants most commonly employed healthier eating (95%), smaller portions (90%), lower energy drinks (87%) and continued use of meal replacement products (76%) to assist with WLM. However greater WLM was associated with more LL foodpack use and group attendance, with a significantly more frequent attendance when corrected for duration of maintenance (Q1 WLM: 1.03[0.9], Q4 WLM: 1.66[1.2] groups per month; p = 0.04). Psychologically, greater WLM was associated with less external and emotional eating and greater dietary restraint (see Figure 1). Following initial weight loss on a very low calorie programme individuals report employing a range of techniques to maintain their weight loss, most importantly continued group support. Further analysis will address any associations between reported dietary intakes and WLM success.

Acknowledgement: The authors would like to thank Shangari Raviraj for her help with data collection.

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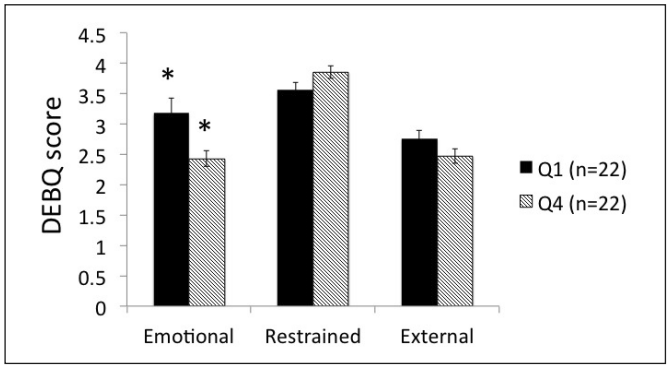

Fig. 1. Figure caption: Eating behaviors as assessed by the Dutch Eating Behavior Questionnaire(3) in high (Q4) and low (Q1) weight loss maintainers who have previously lost weight on a Very Low Calorie Diet. (*p = 0.04, duration corrected)

T3:PO.059

Monitoring of nutritional state and metabolic rate among czech military and civilian medical students

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Introduction: Becoming a student of university leads to significant change of lifestyle, especially eating habits and physical activity. Students of military medicine are supposed to be in good shape in contrast to regular students of medicine. Aim of the study is to find out, how serious is their lifestyle change, how it affects their body composition, mental and physical shape. Study also aims to measure how mentioned parameters change over time. Another goal is to compare military group to civilian.
Methods: To each group we enrolled 30 military students and 30 civil students. We performed assessment of body height and weight, BMI, waist circumference and body composition by multifrequency impedance analyser InBody 720. Resting energy expenditure (REE) was measured by indirect calorimetry with Vmax Encore. Physical fitness was assessed by W170 test during cycle ergometry.
Results: Military vs. civilian group; BMI 23.1 kg/m^2 ± 2.0 vs. 21.9 ± 2.6 kg/m^2 (p = 0.97); percentage of body fat in normal range was in 70% vs. 60%; waist circumference 76.0 ± 6,2 cm vs. 73.6 ± 7.4 cm (p = 0.91); rREE (percentage of predicted REE) 88.3 ± 6.7% vs. 88.2 ± 6.6% (p = 0.52); mean heart rate during W170 test was 138 ± 5 bpm and 141 ± 6 bpm (p = 0.029).
Conclusion: So far, our expectations are being disproved by the fact that there are almost no differences between military and civil students. Except military group performed better on ergometry and we expect the difference to grow bigger. Surprisingly, eating and lifestyle habits were not as bad as we thought they will be. These were only entry measurements. Changes in nutritional state and physical fitness are still to come.

T3:PO.060

Nutritional state and lifestyle of czech military medical students

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Introduction: Becoming a student of university leads to significant change of lifestyle, especially eating habits a physical activity. On the contrary, students of military medicine are supposed to be in good shape to fulfill their military duties. Aim of work was the monitoring of nutritional state and lifestyle of military medical students.
Methods: To evaluation were included 109 (73 men, 36 women) students of Faculty of Military Health Science with the mean age 21.9 ± 2.1 years. Nutritional state of students was evaluated by BMI, waist circumference, skinfold thickness, mid-arm circumference and bioelectrical impedance analysis. Muscle strength was evaluated using the hand grip test. Lifestyle was evaluated by food frequency and physical activity questionnaire.
Results: Men vs. women; BMI 25.6 ± 4.7 kg/m-2 vs. 21.7 ± 3.2 kg/m-2, percentage of body fat 11.8% vs. 21.4%. Prevalence of normal weight according to BMI was 78.8%, of overweight was 18.7% and of obesity was only 2.6%. Percentage of body fat in normal range was in 66.6%, below lower bound was in 28% and above upper bound was in only 5.4%. Frequency of physical activity was on average 5 times vs. 4 times a week. Fruit and vegetables, meat, cereals and dairy products were consumed daily, sweets 4 times a week, alcohol 2 times a week, and coffee daily. Smokers were only 9 men and 4 women.
Conclusion: Military student have lower prevalence of overweight and obesity in comparison with Czech population. According to all of the results is clear that military medical students are kept in very good nutri-

tional state. Mainly thanks to regular physical activity and also to balanced diet which is in accordance with WHO recommendation.

T3:PO.061

Ambulatory health information system for obesity prevention and treatement (pathmate) tailored for teenagers: A preliminary longitudinal study

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Introduction: Multi-professional programs for the management of obesity in teenagers, which combine physical activity, nutritional and psychological components, are well established today. However, due to restricted resources available, only limited number of patients can be included in these programs, considering the low medical coverage and high needs consequent to the generally high prevalence of obesity. The objective was to develop a technical platform with a number of innovative tailored applications allowing an access to interactive interventions via a tablet PC.
Methods: Six adolescents (13–17 years, BMI Percentile 97 for age & gender) participated in a longitudinal field study. Following a baseline measurement, one month, 3 month and 4 month evaluations were organized. The following measurements were made: 1. Well-being, mental health, mood, eating disorders, motivational interview all by validated questionnaires; 2. changes in body weight and BMI_SDS, blood pressure, speed of eating (by sequential photogrammetry), daily physical activity (PA by accelerometer, Fitbit), degree of relaxation (by skin conductance and heart rate), all by objective measurements.
Results: Body weight loss at 4 months averaged as much as 6.2kg (range: 3.8 to 8.0 kg). Although the applications were developed together with the teenagers, a large inter-individual variability of the platform usage (inconspicuously measured) was observed. The applications judged the most useful were mood test, relaxing exercise and PA tracking.
Conclusion: For the MD's, this new tool can provide a useful aid to work and communicate with (pre)obese teenagers during the consultation. A "Tamagoshy like" approach could stimulate the adherence to Pathmate.

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T3:PO.062

Readiness to change body weight and lifestyle factors according to the transtheoretical model in an overweight/obese upper-austrian population

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Introduction: Overweight and obesity is a global public health threat. The willingness to change body weight, nutritional and physical activity behaviour can be assessed with the transtheoretical model (TTM)1. Willingness is divided in 5 stages of change (SOC): precontemplation, contemplation, preparation, action and maintenance. The aim of this study was to assess the readiness for changing lifestyle and body weight in an Upper-Austrian population.
Methods: A computer assisted telephone interview survey was conducted in subjects ≥18 years. SOC were asked and analysed dependent on BMI. For assessing gender specific differences chi-square test was performed.
Results: 453 persons [47 (18) years, 51% women (w), BMI: 24.9 (3.9) kg/m$_{\downarrow}$] were included in the analysis. According to the WHO criteria 3% were underweight, 53% normal weight, 34% overweight and 10% obese. In subjects who were overweight/obese, 23% were in the precontemplation, 7% in the contemplation, 47% in the action and 23% in the maintenance stage concerning body weight. However, only 6% of overweight/obese subjects were changing their nutritional and 7% their physical activity behaviour at the moment (action stage), whereas 72% claimed to maintain nutritional and 54% physical activity changes (maintenance stage), respectively. Compared to obese women, men were more likely to be in the precontemplation stage concerning nutritional ($p = 0.000$) physical activity ($p = 0.037$) changes.
Conclusion: A majority of overweight/obese persons indicate that they are actively changing their body weight. However, most of them are not in the action stage regarding changing nutrition and physical activity habits. Obese men are less ready to perform lifestyle modifications.

Reference:
1. Prochaska JO, et al. Br J Addict, 1992. 87(6):825–828.

T3:PO.063

Images help obese women to memorize nutritional guidance

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Introduction: The association of images with written or oral information facilitates cognitive processes like attention and memory, favoring compliance with information. This study aimed to compare the memorization of eutrophic (n = 18) and obese (n = 15) women about nutritional guidance associated with images.
Methods: Nutritional guidelines were presented during two workshops that dealt with the following themes: sugar content in food and drinks, food with equivalent energy content but distinct nutritional quality, fat content in food and preparations, and healthy food. Five messages were conveyed, accompanied by five images; a total of 20 images were employed. Immediately (T0), 30 days (T30), and 60 days (T60) after the workshops, the participants answered a structured questionnaire with Likert scales to evaluate the degree at which they recalled the messages. The Wilcoxon-Mann-Whitney and McNemar tests were used and the level of significance was set at 5%.
Results: Obese women memorized the messages more than eutrophic women (all p values < 0.03). Only eutrophic women presented diminished recall along time ($p = 0.0004$ between T0 and T30). Memorization was higher than 63.3%, and the average memorization was 86.7% when all the themes, groups, and times were taken into account. The best memorized themes were about the sugar content of foods and drinks (from 85.6 to 97.3%) and healthy food (from 81.1 to 100.0%).
Conclusion: Pictorial instruments can aid obesity treatment and prevention, since it favors memorization that could be accessed before food choices.

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T3:PO.064

Losing weight and maintaining healthy life style with help of cbt and internet

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Introduction: The rate of obesity in population worldwide is rising, therefore we must seek and try new methods. Recently, one of new tools used is internet due to its ability to reach many users of the web with minimal costs. The majority of internet weightloss programs offer only education. That impersonal approach is not successful in installing longterm change of behaviour. Current research is aimed on combining internet with CBT.
Methods: STOB (Stop Obesity), established in 1990, has influenced many hundreds of thousands of people. Its methods are based on CBT. In order to provide longterm support in an individual weight reduction, in 2011 STOB set up a community website www.stobklub.cz, which has 140,000 registered members. STOBklub offers, among other activities, a whole

weightloss program for 4 up to 12 weeks, which has been used by 20,400 members so far (10% of them were men) with an average BMI of 28. Users reduced their weight by 60,000 kgs. STOB prepared a new application, STOBkolo (STOBwheel) that works with an individual measure of readiness and motivation of a given user.
Results: STOBkolo works with patients´ readiness to change their habits. According to the degree of patients´ motivation and other individual needs, the individual stages of STOBkolo offer various materials (e-books, videocourses, self-coaching consisting of food-coaching, fit-coaching and psycho-coaching, the system of „traffic lights" offering an immediate feedback, and other tools). Members of STOBklub form motivational groups with longterm personal support.
Conclusion: STOB combined with its STOBkolo two major approaches: proven methods of CBT with newer medium of internet. This model in accordance with plans of Patients Organization of EASO works with individuality of every patient.

Acknowledgement: This work was supported by the grant N. DOT/O4/03/004277/2014 of Prague City Hall

T3:PO.065

Loops - lund overweight and obesity preschool study: An intervention involving parents of preschool children with obesity has a long-term effect on the weight development of targeted children.

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Introduction: There is still lack of evidence of what are the best interventional strategies to combat childhood obesity for preschool children. Interventions have shown to be more effective, the younger a child is. There is also a positive effect of involving parents of an obese child. Aim To evaluate if a family-based intervention involving exclusively the parents of obese preschool children, had a long-term positive effect on the weight development of targeted children. A secondary aim was to compare two different interventional strategies
Methods: 80 children with obesity (BMI-SD 3.26 ± 0.71) aged 4–6 years were included. All parents were offered a 2-hour lecture and got access to a website with information about diet and exercise. They were also invited to attend group meetings with the purpose of giving support to accomplish lifestyle changes. The parents were randomized into two groups, either to one led by a psychologist or by an occupational therapist. The interventions had in common that they aimed to support parents to make lifestyle changes for healthier eating and more active lifestyle and differed in the theoretical frameworks and ways in which they influenced the parents. The interventions lasted one year and the children were followed up at end of intervention and one year after. 11 children were lost at the one-year follow up.
Results: There was a significant reduction in BMI-SD from the time of referral to the intervention project to the end of intervention ($p = 0.000$) and one year after ($p = 0.003$). There was no significant difference between the two different interventions.
Conclusion: It is important to make interventions in very early life to combat childhood obesity. Supporting parents, without involving the obese child, is a successful strategy.

T3:PO.066

Evaluation of eating habits and lifestyle in obese patients before and after bariatric surgery

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Introduction: The lack of improvement in eating habits and lifestyle in bariatric patients might predict the unsuccessful maintenance of body weight reduction at long term*. We aimed to evaluate eating habits and lifestyle of obese patients who have undergone Gastric Bypass Roux-en-Y (RYGB) and Sleeve Gastrectomy (SG).
Methods: We retrospectively analyzed dietary habits (A), food frequencies (B), physical activity (C) and smoking habits (D) in 50 RYGB (25M; aged: 24–64; BMI: 44.8 ± 6.8 kg/m^2) and 50 SG patients (25M; aged: 22–63; BMI: 44.5 ± 7.4 kg/m^2) by means of a validated questionnaire, before (T0) and after 6 months (T1) from bariatric surgery. A score for each section (A, B, C, D) was calculated. The score assigned to each item ranged 0–3 points; maximum score corresponding to the best response.
Results: ANOVA analysis, age/gender adjusted:

- A and B scores improved significantly at T6 (RYGB and SG: $p < 0.001$),
- C score did not reach the significance,
- D score did not change at T6 neither in RYGB nor in SG. Multilevel models:
- A and C scores did not correlate with independent variables (age, gender, weight, BMI, ideal and relative weight) neither in RYGB nor in SG,
- B score was negatively correlated both with weight (BYPGR: $p = 0.002$) and with BMI (SG: $p = 0.003$),
- D score positively correlated with age, only in SG ($p = 0.002$), being the correlation stronger in females than in males ($p = 0.004$).

Conclusion: Although dietary habits slightly improved, overall patients did not change their physical activity levels and smoking habits at T6. This was probably due to an incorrect perception about bariatric surgery procedures that reduce drastically weight in the short-term but need to be supported by an adequate lifestyle intervention program over the long term.
*Soares FL et al. (2014)

T3:PO.067

Development of the 'adult eating behaviour questionnaire' for appetitive trait measurement.

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Introduction: Appetitive traits such as Food Responsiveness (FR) and Satiety Responsiveness (SR), are stable predispositions towards food, genetically linked to determined phenotypes, which could contribute to an individual's susceptibility to gain weight in the obesogenic environment. In children these traits have been measured using the 'Child Eating Behaviour Questionnaire' (CEBQ) and low 'food avoidance' (SR) and high 'food approach' (FR) traits have been consistently associated with obesity and weight gain. Adult appetite questionnaires tend to incorporate restraint and disinhibition, but no reliable measure of SR exists for use in adult populations.
Methods: We developed a self-report questionnaire, the 'Adult Eating Behaviour Questionnaire' (AEBQ) from the parent report CEBQ. Items for inclusion were derived from the CEBQ and expanded based on a literature review to include items on Hunger. Piloting led to the deletion of some items, including the Desire to Drink scale, due to difficulties in comprehension and an altered response format from 'often/never' to 'agree/disagree'. Responses to items from 708 adults (18 to 81 years, 336 men, 372 women) were analysed to determine the final factor structure of the AEBQ, and its internal and external reliability.

Results: Principal Component Analysis revealed a 35 item scale with eight factors similar to the CEBQ. The factors were internally valid and had good test-retest reliability (all Cronbach alphas >.7).
Conclusions: The AEBQ is a robust measure of four 'food approach' and four 'food avoidant' traits, which is internally and externally reliable. This instrument will enable us to track associations between appetitive traits and weight into adulthood and could potentially identify individuals at risk of weight gain.

AEBQ Scales	Cronbach's alpha	
	Internal reliability (n=708)	External reliability (n=93)
Hunger	0.762	0.821
Food responsiveness	0.766	0.871
Emotional over-eating	0.877	0.732
Enjoyment of food	0.859	0.860
Satiety responsiveness	0.765	0.865
Emotional under-eating	0.881	0.772
Food fussiness	0.852	0.907
Slowness in eating	0.842	0.910

Fig. 1. Fig 1. Internal and external reliability measures of the 'Adult Eating Behaviour Questionnaire'.

T3:PO.068

Barriers to healthy eating among medical students at university hospital and medical school canteens in germany: Results from a cross-sectional study

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Introduction: University, workplace and hospital canteens can play a crucial role in influencing long-term dietary habits of students, staff and patients, and can thus influence the occurrence of obesity and other diet-related conditions. This study aims to identify barriers to healthy eating in university hospital and medical school canteens.
Methods: A cross-sectional survey was conducted among medical students eating in university hospital and medical school canteens in Germany on their consumption patterns, the perceived food environment and adherence to dietary recommendations published by WHO and the German Nutrition Association on six food items (salad, vegetables, fruit, whole grain or potatoes, meat and fish).
Results: 97.3% of respondents (n=1590) indicated non-adherence to at least one of six dietary recommendations. The average number of declared non-adherences was 2.8 (SD=1.5). Reported reasons for non-adherence were lack of variety (49% of respondents), quality (47%), availability (43%), stable dietary preferences (40%), price (32%), lack of awareness/prompting at the point of purchase (31%), non-inclusion in the default menue (29%), craving for salty/fatty food (29%), perceived value-for-money (24%) and impractical serving and vending arrangements (17%). On average, respondents reported eating in a hurry in 51% of cases (SD=26). Reported reasons were the length of the lunch break (63%), general stress level (59%), noise level (38%), low-quality food (30%) and lack of cosiness (27%) in the dining hall.
Conclusion: There is considerable room for improvement and a clear need for action in the product range, food environment and choice architecture provided by university hospital and medical school canteens in Germany, which should lead by example.

Table 1: Characteristics of survey participants and their adherence to dietary recommendations

Participants were asked to indicate the frequency of eating in a hurry with a visual analogue scale ranging from 0 (never) to 100 (always). Standard deviation is given in parentheses.

	% of participants (n=1590)	Average no. of non-adherences per participant	Frequency of eating in a hurry
All participants	100%	2.8 (1.5)	51% (26)
Of which:			
Female	*63%*	*2.6 (1.4)*	*51% (26)*
Male	*36%*	*3.2 (1.5)*	*51% (27)*
Undergraduate	23%	2.7 (1.4)	46% (26)
Graduate	71%	2.8 (1.5)	53% (26)
Omnivor	*78%*	*3.0 (1.5)*	*51% (26)*
Vegetarian	*17%*	*1.9 (1.6)*	*52% (26)*
Vegan	*3%*	*2.2 (1.6)*	*47 (20)*
Eating in university hospital canteen	46%	2.8 (1.3)	52% (27)
Eating in medical faculty canteen	18%	3.0 (1.5)	52% (26)
Eating in general university canteen	30%	2.6 (1.3)	50% (25)

Fig. 1. 1590 students from 38 medical schools across Germany completed a questionnaire with 19 closed and open-ended questions with in total 31 question items. Questions refered, among others, to the adherence to six standard dietary recommendations on salad, vegetable, whole grain and potatoe, and meat und fish intake, and to frequency of hurried eating.

Table 2: Participants' perception of the food environment offered by their canteen

Based on a visual analogue scale ranging from 0 (no agreement at all) to 100 (full agreement)

Food environment characteristic	Mean agreement (median and IQR)
"My canteen allows me to practice the diet I wish to practice."	37 (16-69)
"My canteen is a place where I feel comfortable."	48 (22-72)
"In my canteen, there is often a stressful atmosphere."	64 (36-82)
"In my canteen, the vegetables are always fresh."	28 (9-55)
"My canteens makes it easy for people to have a healthy diet."	28 (10-57)
"Having easy access to healthy food is for me an important part of good study conditions."	83 (66-98)
"My canteens pays attention to the salt content of its food."	37 (14-64)
"My canteen pays attention to the fat content of its food."	25 (8-57)
"I (would) like to eat vegetables and salad in my canteen, because preparing them at home is so burdensome."	72 (36-92)
"In my canteen is a place where I can relax and recover."	28 (11-56)
"If my canteen offered better food and nicer atmosphere, I would eat there more frequently."	80 (46-98)

Fig. 2. In the perception of most students, the canteen they visit most frequently does not offer a food environment supportive of healthy eating. Eating in a stressful atmosphere has been linked to unhealthy eating patterns, but only a minority of students experience their canteen as comfortable and relaxing.

Table 3: Non-adherence to standard dietary recommendations and perceived reasons for non-adherence

	Rate of participants reporting non-adherence or stating reason for non-adherence						
	All items	Salad	Vegetables	Potatoe / whole grain	Meat	Sea fish	Fruit
Rate of adherence	2.6%	60%	82%	56%	56%	26%	21%
Reasons for non-adherence							
Lack of variety	**49%**	24%	**35%**	**24%**	**13%**	**17%**	**29%**
Quality	**47%**	**25%**	**54%**	13%	**10%**	**34%**	13%
Availabiltiy	**43%**	13%	**17%**	**55%**	7%	14%	**21%**
Stable dietary preferences	40%	8%	7%	**13%**	9%	**31%**	3%
Price	32%	**37%**	11%	4%	2%	6%	**19%**
Lack of awareness/prompting at the point of purchase	31%	8%	4%	3%	2%	3%	13%
Non-inclusion in the default menue	29%	**27%**	15%	6%	0%	3%	14%
Craving for salty/fatty food	29%	13%	6%	1%	**13%**	2%	4%
Perceived value-for-money	24%	23%	16%	4%	4%	8%	11%
Impractical serving and vending arrangements	17%	16%	3%	2%	0%	1%	13%

The three most frequently stated reasons are printed in bold for each item.

Fig. 3. Participants whose answers indicated non-adherence to standard dietary recommendations were asked to specifiy perceived barriers to the uptake of healthier eating patterns. Perceived lack of variety, quality and availability are important barriers for most items, whereas the price is particularly important for salad and fruit.

T3:PO.069

Dietary guidance given to patients with diabetes in burkina faso and mali: Content and impact of professional profile.

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Objectives: To assess the recommendations provided by health professionals to persons with diabetes regarding diet, physical activity and weight control, and to examine the relationship between advice given and characteristics of the health professionals.
Methodology: The cross-sectional study was conducted over three months in 2012 in Ouagadougou and Bamako.Interviews with closed and open-ended questions were conducted with a total of 78 health professionals (including 60 MDs) involved in the treatment of persons with diabetes in public hospitals and health centres. Dietary recommendations pertaining to specific food items, meal and snack patterns, cooking methods and meals away from home were rated. Types of recommendations for physical activity and for body weight were rated in a similar fashion.
Results:24% had no specific training in diabetes management, all respondents declared providing some dietetic advice to patients. In general, recommendations focused on foods to avoid, to restrict or to consume ad libitum, and diet sheets were given to patients. Most interviewed practitioners recognized that they did not have enough time or training to provide adequate dietetic guidance. 44% gave specific advice to patients on insulin and 20% talked about cooking methods. Advice given to patients was considered 'acceptable' in 65% of respondents for diet, in 70% for control of body weight, and in 95% for physical activity. Dietary and physical activity guidance scores were significantly higher in professionals with specific training, and in MDs compared with other health professionals.
Conclusion: The study highlights the need to improve dietary counseling , particularly as regards developing specific dietary plans with individual patients for better compliance. Health professionals specialized in nutrition are becoming a priority in Africa to address nutrition-related non-communicable diseases, to train other health professionals and to assist individual patients.

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T3 – Physical fitness

T3:PO.070

Metabolic syndrome treatment with an advanced EMS device

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Objectives: Our study examines the possibility of boosting basal metabolic rates and reducing visceral fat with the AC BODY, an advanced electrical muscle stimulation (EMS) device developed by a domestic medical device maker. We evaluated biochemical and physiological findings, including abdominal computed tomography (CT) images and measurements of blood hormone levels associated with metabolic syndrome.
Methods: We measured body weight, body mass index, and basal metabolic rate before and after treatment. Treatment was applied through a course of 10 weeks using rotation point-energizing EMS. 9 subjects were included in this study. Each treatment period was 30 minutes. Treatment involved the application of variable electrical stimulation with frequencies varying from 200 to 300 Hz to the abdomimal muscles simultaneously from 5 stimulating points of the electrode, through clockwise and counterclockwise rotating stimulation each minute. We observed statistically significant declines after treatment in the following aspects: body weight (60.67 to 58.39 kg), BMI (22.89 to 22.06), body fat percentage (25.94 to 24.01%), abdominal fat percentage (25.04 to 22.46%), total muscle mass (42.23 to 41.80 kg), waist circumference (77.60 to 74.23 cm), and basal metabolic rate (1331to 1280kcal). The area of visceral fat as indicated in CT images decreased by 43.2% and 31.1%, respectively. No dietary or exercise therapy was imposed during the treatment period.
Conclusions: Treatment with the advanced EMS device resulted in significant decrease in visceral and subcutaneous fat while maintaining abdominal muscle mass, which points to the potential efficacy of treating metabolic syndrome by an approach other than exercise or diet.

T3:PO.071

Gender and age-related differences in athletes' health status in individual and team sports

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Introduction: Routine medical examinations are important in determining not only the current health status of athletes, but also potential different responses of males and females to certain athletic activities and gender-related health status differences. The main goal of this study was to determine the differences between athletes who are actively engaged in team vs. individual sports, stratified by age groups and gender, in BMI and other chosen biochemical health indicators.
Methods: The data were collected during routine medical examinations in 2011 and 2012 from 8482 athletes in Zagreb, Croatia. Collected data included height, weight, BMI, blood pressure (diastolic and systolic), pulse rate, hemoglobin, hematocrit, leukocyte, thrombocyte, and sedimentation.
Results: A number of statistically significant differences in BMI and chosen biochemical indicators have been revealed in female athletes (stratified by age groups) between individual and team sports. On the contrary, a minimal number of statistically significant differences in these variables related to the sport type have been detected in male athletes. Moreover, these differences indicate health status in male and female athletes across different age groups.
Conclusions: Possible explanations for such results could be the specific features of different sport types, different gender-related motivation for choosing a sport type or greater general importance of physical activity for males, which is then also reflected in their health status. BMI and other

chosen health indicators collected during routine medical examinations, according to a sport type, could be a useful proxy for detecting gender and age-related differences in athletes' health status.

T3:PO.072

Body mass index and six-minute step test predict cardiorespiratory fitness in lean and obese sedentary young women

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Introduction: Physical inactivity leads to impaired cardiorespiratory fitness (CRF) as well as it render sedentary people more susceptible to reduced functional capacity and higher mortality risk. Obesity is quite prevalent in women and it is usually associated to sedentary lifestyle, contributing to increase bad outcomes. The six-minute step test (6MST) has been proposed to evaluate functional capacity in this population in clinical centers when the maximal cardiopulmonary exercise testing (CPX) is not available due to limited space and staff. However, it is not of our knowledge the existence of predictive equations of metabolic responses to CPX from demographic and anthropometric variables and from performance in the 6MST. Our aims were to assess the number of step cycles (NSC) obtained by 6MST as well as BMI and age ability to predict maximal oxygen uptake (VO2) achieved during CPX in sedentary young women.
Methods: Thirty-three sedentary women (20–45y; 18.5<BMI<24.9 or BMI>30 kg.m-2) underwent a clinical evaluation (including body composition), a CPX, and a 6MST. To assess the ability to predict peak VO2 achieved during CPX we applied stepwise multiple linear regression analysis and to verify relationships between metabolic and body composition variables we used the Pearson´s correlation coefficients ($p < 0.05$).
Results: BMI, NSC and age were selected and entered the reference equation explaining 83% of the total variance in peak VO2 obtained during CPX. Strong correlations were found between VO2 and both BMI and body fat ($r = -0.85$) as well as VO2 and 6MST performance ($r=0.81$).
Conclusion: Concomitantly, BMI, 6MST and age are able to predict maximal VO2 in sedentary young lean and obese women, including a simple and inexpensive functional evaluation tool.

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T3:PO.073

Marital status and educational level in greek obese adults

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Introduction: A series of studies have stated associations among marital status, educational level and obesity. The aim of this study was to assess whether these associations were observed in Greek obese adults.
Methods: Demographic and anthropometric data from a total number of 153 obese outpatients were analyzed (mean age 47.3 ± 11.8 years and mean BMI 39.6± 7.4 kg/m^2, 113 women, 40 men). WHO cut-offs were used to define obesity subgroups - Class I, II & III. Marital status and educational level were obtained using a validated questionnaire.
Results: Regarding the overall population 25%, 33% and 42% belonged to the obesity subgroups I, II & III respectively. More than half outpatients (60.5%) were married. Subgroups of obesity and marital status were significantly associated in overall ($p < 0.01$) as well as in female ($p < 0.05$) population. In obesity classes I & II there were more married individuals, while in class III the majority was unmarried. According to their educational level, 11% attended primary school, 49% high school and 40% had a university degree. Outpatients, mainly men, who attended only primary school had significantly higher BMI than those who attended high school ($p < 0.01$) or/and university ($p < 0.05$).
Conclusions: Marital status seems to influence development of obesity both in men and women. Furthermore, this study indicates the need for higher educational level along with health education programs, especially for the early school leavers.

T3:PO.074

The impact of feeding status on the adipose tissue responses to exercise in overweight men

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Background: Feeding profoundly affects metabolic responses to exercise in various tissues but it is unclear whether feeding status influences the way adipose tissue responds to exercise.
Methods: Ten healthy overweight males aged 26 ± 5 years (mean ± SD) with waist circumferences between 105 ± 10 cm completed a walking protocol at 60% of maximum oxygen uptake under either FASTED or FED conditions in a randomised, counterbalanced design separated by a 3–4 week wash-out period. Blood samples were collected at regular intervals to examine changes in metabolic parameters. Adipose tissue samples were obtained at baseline and one hour post exercise to examine changes in adipose tissue gene expression and secretion of selected adipokines ex-vivo.
Results: Incremental glucose and insulin area under the curves were significantly higher in FED than FASTED conditions (156 ± 43 vs. 14 ± 6 mmol.300 min.l-1, $p = 0.015$ and 37.8 ± 8.2 vs.0.7 ± 0.3 nmol.300 min.l-1, $p = 0.002$, respectively). Significant trial × time interaction effects were found for adipose tissue expression of GLUT4, HSL, PDK4 and IRS2 (all $p < 0.05$) when exercising under diverse dietary conditions; with expression of HSL (2.09-fold) and PDK4 (1.68-fold) up-regulated under FASTED conditions and expression of PDK4 (0.77-fold) and IRS2 (0.81-fold) down-regulated under FED conditions. Feeding did not impact upon serum and ex-vivo adipose secretion of IL-6, leptin and adiponectin.
Conclusions: This study shows that feeding prior to acute exercise affects adipose tissue gene expression responses. Given the potential role of adipose tissue in metabolic health, choosing to exercise whilst in a fed or fasted state will potentially impact the long-term responses to an exercise programme.
Key words: Gene expression, obesity, walking

T3:PO.075

Structured, supervised physical training after gastric bypass has positive impact on weight reduction and aerobic capacity

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Introduction: Bariatric surgery is the most efficacious treatment for severe obesity. Evidence regarding effects of physical training post-surgery is lacking. The purpose of this study was: 1) to evaluate the effect of gastric bypass (GB) on weight loss, VO2max, and muscle strength and 2) to evaluate the effect of 26 weeks supervised physical training on same variables.

Methods: Sixty patients with morbid obesity, qualified for GB, were 6 months post-surgery randomized 1:1 to 26 weeks intervention (I) or a control group (C).The intervention consisted of 2 x 40 min training sessions per week each involving training of aerobic capacity and muscle strength, instructed and supervised by physiotherapists. Measurements on anthropometry, VO2max, and muscle strength were performed pre-surgery, 6, and 12 months post-surgery.
Results: Preliminary results from 42 of the 60 patients are presented (mean (SD)). At baseline the body weight (kg) was: 126.3(8.9), BMI (kg/m^2): 43.1(6.0), VO2max (l/min): 2.6(0.7), and muscle strength for hip extension (N): 219.0(58.3). GB resulted in reduced body weight (Δ: –27.7 (1.0), $p < 0.001$) and BMI (Δ: - 9.4(0.4), $p < 0.001$), no changes in VO2max, and a significant decrease in muscle strength (Δ: –17.4(30.3), $p < 0.007$). Physical training caused an additional significant reduction in bodyweight (Δ:-1.5(1.5), $p < 0.03$), in BMI (Δ:-0.6(0.4), $p < 0.003$), and an increase in VO2max in I compared to C (Δ:0.5(0.1) $p < 0,002$).There was no significant effect on muscle strength.
Conclusion: Post-bariatric patients undergoing structured supervised physical training loose more weight and increase their aerobic capacity compared to control. The reduced muscle strength during the initial phase of weight loss emphasizes the need of post-surgery specific strength training.

T3:PO.076

Effects of aerobic training, resistance training or both in obese adolescents with the metabolic syndrome: The hearty randomized controlled trial

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Introduction: There is little evidence regarding the effect of exercise training in obese adolescents with Metabolic Syndrome (MetS). We aimed to determine the effects of Aerobic, Resistance, and Combined training on the prevalence of MetS in obese adolescents enrolled in the HEARTY (Healthy Eating, Aerobic and Resistance Training in Youth) trial.
Methods: After a 4 weeks run-in, previously-inactive post-pubertal adolescents (N=304) aged 14–18 years old (Tanner Stage IV-V) with Body Mass Index ≥ 85th percentile for age & sex were randomized to 4 groups for 22-weeks. Of these, a sub-sample (n=49) was identified as having MetS based on the International Diabetes Federation definition. All participants [Aerobic training (N=11), Resistance training (N=12), Combined aerobic and resistance training (N=10), or non-exercising Control (N=16) received dietary counseling with a daily energy deficit of 250 kcal. This is a secondary analysis of the HEARTY trial.
Results: There were no significant changes in the prevalence of MetS between groups, however, significant improvements in MetS parameters were observed within groups; with Aerobic training, there was a decrease in waist circumference (-3 cm) and systolic (-11 mmHg) and diastolic (-5 mmHg) blood pressure from baseline to post-intervention. Resistance training decreased body mass index (-1.5 kg/m^2), percentage body fat (-2%), waist circumference (-5 cm) and systolic (-10 mmHg) and diastolic (-6 mmHg) blood pressure from baseline to post-intervention. Combined aerobic and resistance training decreased triglyceride concentrations (-0.7 mmol/L) and increased high density lipoprotein concentration (+0.04 mmol/L) compared to baseline. The Control-diet group significantly decreased systolic blood pressure (-7 mmHg) and fasting insulin (-24.9 μIU/mL) when comparing pre- and post-intervention.
Conclusions: Exercise, regardless of modality, did not reduce the prevalence of MetS but did improve MetS components in obese adolescents.

Acknowledgement: Funded by the Canadian Institutes of Health Research (ClinicalTrials.Gov NCT00195858)

Parameter	Aerobic		Resistance		Combined		Control	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Waist circumference ≥ 90th percentile	11 (100%)	10 (91.7%)	12 (100%)	10 (83.3%)	10 (100%)	9 (90%)	16 (100%)	16 (100%)
Blood pressure (SBP ≥ 130 mmHg and DBP ≥ 85 mmHg)	7 (63.6%)	1 (9.1%)	8 (66.7%)	4 (33.3%)	2 (20%)	0 (0%)	5 (31.3%)	3 (18.8%)
Triglycerides (≥ 150 mg/dL)	6 (54.6%)	5 (45.5%)	7 (58.3%)	6 (50%)	9 (90%)	2 (20%)	13 (81.3%)	9 (56.3%)
High density lipoprotein cholesterol (< 40 mg/dL)	8 (72.7%)	7 (63.6%)	9 (75%)	5 (41.7%)	9 (90%)	8 (80%)	15 (93.8%)	13 (81.3%)
Fasting glucose (≥ 100 mg/dL)	3 (27.3%)	1 (9.1%)	3 (25%)	1 (8.3%)	1 (10%)	1 (10%)	2 (12.5%)	0 (0%)
Subjects with MetS (WC + ≥ 2 components)	11 (100%)	4 (36.4%)	12 (100%)	4 (33.3%)	10 (100%)	2 (20%)	16 (100%)	9 (56.3%)

Data are number and percentage
Note: SBP, systolic blood pressure; DBP, diastolic blood pressure; WC, waist circumference; MetS, metabolic syndrome

Fig. 1. Prevalence of Metabolic Syndrome at baseline and post-intervention based on the International Diabetes Federation

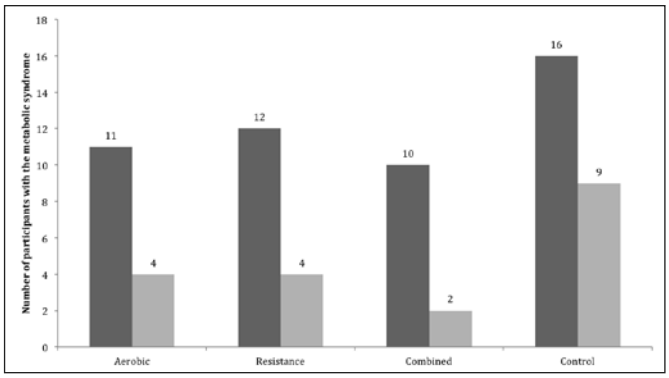

Fig. 2. Number of participants with the metabolic syndrome at baseline and post-intervention based on the International Diabetes Federation

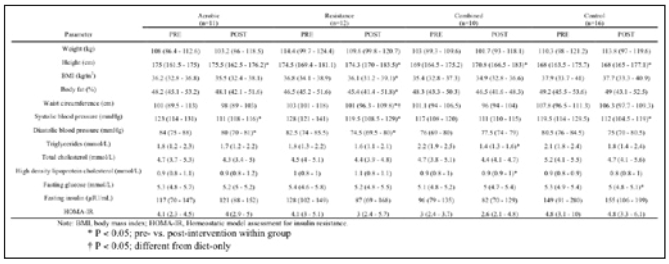

Fig. 3. HEARTY Participants' anthropometric and metabolic parameters at baseline and post-intervention Data are medians (IQR)

T3:PO.077

Obese children and adolescents who skip breakfast present abnormalities in the lipid profile and blood pressure

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Objective: To analyze the effect of weekly breakfast intake frequency on metabolic changes in obese children and adolescents.
Methods: The study included 285 obese children and adolescents, aged six to 16 years (10.9 ± 2.7). Body composition (percentage of body fat and trunk fat), blood samples (glucose, triglycerides, total cholesterol and its fractions HDL-Cholesterol, LDL-Cholesterol e VLDL-Cholesterol), blood pressure and food intake were assessed. The subjects were distributed in two groups: Breakfast Skippers and Non-Skippers. Non-skippers were just those who answered taking breakfast every day.
Results: In overall sample, 50.9% (n=145) subjects reported daily consumption of breakfast at least once a week. Skippers presented higher mean values of systolic blood pressure (117.3 mmHg and 112.7 mmHg [$p = 0.038$]), triglycerides (106 mg/dL and 92.5 mg/dL [$p = 0.037$]). On the other hand, higher mean values of HDL-cholesterol (44.0 mg/dL and 41.5 mg/dL [$p = 0.018$]) were observed in non-skippers.

Conclusion: Obese children and adolescents who skip breakfast presented abnormalities in plasma lipid concentrations and in systolic blood pressure.

Acknowledgement: UNESP, CAPES, CNPq

T3:PO.078

Optimal cutoffs for defining physical fitness in sedentary obese women

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Introduction: Obesity is linked to reduced functional capacity and increased health risk and has been diagnosed using the body mass index (BMI) to stratify its severity. Nevertheless, its use is limited once it does not reflect body composition either physical fitness. Our aim was to identify optimal cutoffs for body composition and performance measurements that predict functional capacity better than BMI does. We hypothesized that a stratification based on oxygen uptake (VO2) and body composition data could identify levels of obesity severity.
Methods: This is a cross-sectional study. Fifty-eight sedentary obese women (20–45 y) were assessed and they were allocated in three groups, accordingly to BMI (kg.m-2): GI (n = 18), GII (n = 19), and GIII (n = 21). Subjects underwent body composition analysis (to obtain body fat (BF%) and lean mass (LM%) percent) and cardiopulmonary exercise testing (CPX). We applied ANOVA one-way with Tukey post-hoc to verify between-group differences and receiver operating characteristic (ROC) curve analyses to find out optimal cutoffs to identify appropriate physical fitness.
Results: Demographic, anthropometric, and body composition data and CPX variables are presented in table 1. The areas under the ROC curve determined for BMI, BF%, LM% and CPX distance were 0.9 (0.8–1), 0.9 (0.7–0.9), 0.9 (0.8–1) and 0.8 (0.7–0.9) as well as the cutoffs points were ≤ 34.5kg/m^2, ≤ 43.6%, ≥ 53.3%, > 546m, respectively.
Conclusions: BMI, BF%, LM% and CPX distance were accurate to determine cutoffs discriminating obese women with adequate physical fitness from those with poor one. Regarding the BMI, the best tradeoff found to discriminate the physical fitness in obese women has a superior value than the usually accepted value for obesity classification.

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Table 1. Demographic, anthropometric, and body composition characteristics and variables at the peak of maximal treadmill cardiopulmonary exercise test.

	GI (n=18)	GII (n=19)	GIII (n=21)
Characteristics			
Age (years)	36 ± 1.8	33 ± 1.5	35 ± 1.3
Weight (kg)	85.8 ± 1.6	98.6 ± 1.5 [a]	124.9 ± 4.7 [b,c]
Height (m)	1.61 ± 0.01	1.62 ± 0.01	1.62 ± 0.01
Body mass index (kg·m^{-2})	33.0 ± 0.4	37.3 ± 0.3 [a]	47.2 ± 1.7 [b,c]
Body composition			
Body fat (%)	41.9 ± 0.8	46.6 ± 0.4 [a]	50.5 ± 1.2 [b,c]
Lean mass (%)	55.4 ± 0.7	50.7 ± 0.4 [a]	47.2 ± 1.0 [b,c]
CPX			
VO_2 (ml·kg^{-1}·min^{-1})	26.4 ± 1.0	21.3 ± 0.9 [a]	20.4 ± 0.7 [b]
Distance (m)	637.2 ± 26.5	549.7 ± 23.8	422.1 ± 32.1 [b,c]
Heart rate (bpm)	178 ± 2.5	177 ± 3.1	176 ± 2.7
Baecke Questionnaire	6.8 ± 0.3	6.6 ± 0.4	6.3 ± 0.2

Data are expressed in mean ± SEM. GI: subjects presenting BMI between 30.0 to 34.9 kg·m^2; GII: subjects presenting BMI between 35.0 to 39.9 kg·m^{-2}; and, GIII: subjects presenting BMI equal or higher than 40.0 kg·m^{-2}. [a] GI different from GII, [b] GI different from level GIII, [c] GII different from GIII. Significance level adopted was p<0.05.

Fig. 1. Table of demographic, anthropometric, and body composition characteristics and variables at the peak of maximal treadmill cardiopulmonary exercise test.

T3:PO.079

Relationships between physical function, strength and obesity in children: Implications for physical fitness and activity

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Physical fitness, activity, musculoskeletal function and strength are reportedly lower in obese children compared to their healthy weight peers. However, little information exists on the relationships between these variables. This research aims to investigate the relationships between childhood obesity with physical function and strength. Nine overweight/obese (OWB) and nine sex-, age- and height-matched healthy weight (HW) children (mean age 9.69 ± 0.63 years) participated in the study. Dynamic medial/lateral (ML) and anterior/posterior (AP) centre of pressure (CoP) excursions were assessed using a Tekscan HR Mat pressure measurement system. Excursions were measured through the stance phase of gait at; first contact (FC), metatarsal contact (MC), foot flat (FF), heel off (HO), last contact (LC). Muscle strength was measured by hand held dynamometer. Six minute walk time (6MWT) and chair rise tests were performed. Between group differences were determined by independent t-tests. Variables shown to correlate with BMI z-score (dependent variable) were entered into multivariable linear regression as predictor variables. Figure 1 presents CoP data during stance, demonstrating significantly greater lateral and anterior excursion in the OWB group compared to HW. Maximal strength data is presented in Table 1. OWB group demonstrated significantly weaker hip and knee flexor strength compared to the HW group. Six minute walk distance was significantly greater in the HW group (451.33 ± 69.13m) compared to the OWB group (379.11 ± 65.01m). Multiple regression results presented in Table 2 show BMI z-score was significantly associated with; CoP ML displacement between MC and FF, CoP AP displacement between FC and MC, and maximal hip flexion force. The findings indicate that physical function and strength are reduced in OWB children compared to HW peers. This has implications for physical fitness and activity programmes to reduce childhood obesity.

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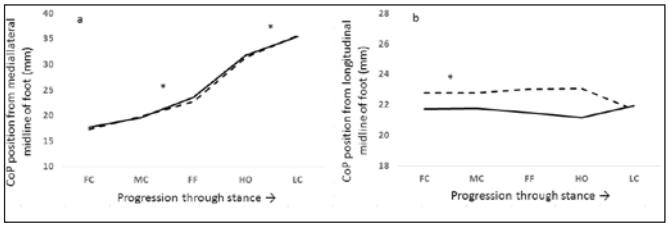

Fig. 1. Figure 1. Group mean Foot Centre of Pressure (mm) through stance; (a) medial/lateral position, (b) anterioposterior position. * significant difference between OWB (dash line) and HW (solid line)

	OWB	HW
Hip extension	1.27 ± 0.17	1.31 ± 0.47
Hip flexion	1.01 ± 0.13*	1.49 ± 0.64*
Knee extension	1.24 ± 0.27	1.63 ± 0.62
Knee flexion	1.14 ± 0.42*	1.91 ± 0.65*
Ankle dorsiflexion	1.14 ± 0.16	1.19 ± 0.51
Ankle plantarflexion	1.75 ± 0.32	1.74 ± 0.80

Fig. 2. Table 1. Group mean ± standard deviation of maximal force (N•kg.^67). * significant deference between OWB and HW groups (p < .05)

Predictor	Beta	SE	*p* (predictor)	Model R^2	*p* (model)
CoP ML displacement between MC and FF	-0.84	0.28	0.11	0.66	0.04
CoP AP displacement between FC and MC	-0.76	0.29	0.24		
Maximal hip flexion force	-0.78	0.36	0.37		

Fig. 3. Table 2. Multiple linear regression of Centre of Pressure, strength and physical function variables with BMI z-score (dependent variable).

T3:PO.080

Weight-supported (anti-gravity) treadmill exercise in caribbean-black obese women

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Background: Diabesity is prevalent in Caribbean-Black women in US inner-city environments with limited access to physical activity. Weight-bearing exercise is time-consuming, painful and difficult for obese people. In this pilot study 16 Caribbean-Black women aged 41 ± 11 y (mean ± SD), mean BMI 35 kg/m^2 (range: 28–49.5) performed twice weekly 30-minute bouts of moderate exercise on an AlterG Anti-Gravity Treadmill™ at 70%, 65%, and 60% weight support and increasing levels of incline.
Methods: Anthropometry, oral glucose tolerance tests with plasma insulin, C-Protein and GLP-1, fasting adiponectin, ghrelin and Il-6, accelerometer testing with FitBit™ and socio-economic stress questionnaires. Treadmill distance and expended calories were recorded for each exercise session. Treadmill speed was the only parameter that was variable and adjusted by the participant depending on fatigue. Responders were defined as having improved 2-hr plasma glucose levels.
Results: Mean participation was 11 weeks (range: 8–20) amounting to mean 23 bouts (range 18–24). Three subjects had impaired glucose tolerance at entry (1 DM, 2 IGT), all of whom improved their area-under-the curve (AUC). 11/16 responders significantly reduced their AUC ($p = 0.0032$). Mean s-triglycerides in the 16 subjects decreased from 71.0 ± 27 mg/dl to 62.9 ± 22.4 mg/dl ± 22.4 ($p = 0.029$). There were no statistically significant differences in before-after BMI.
Conclusion: An innovative and convenient moderate weight-supported (anti-gravity) treadmill exercise program improving mobility in this population is a feasible approach to improve metabolic fitness.

T3 – Food reformulation

T3:PO.081

Nutriose®, a resistant dextrin, displays low glycemic and insulinemic responses: Combining technological, organoleptical and nutritional attributes for obesity and diabetes prevention

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Worldwide obesity has nearly doubled since 1980, with 35% of adults overweight and 11% obese in 2008, and 42 million children under 5 years overweight or obese in 2013. There are also 347 million people with diabetes, among which over 60 and 90 millions in India and China, respectively1. In this context, dietary fibers, such as the resistant dextrin NUTRIOSE®, offer unmatched advantages to the food balance equation. To evaluate the glycemic and insulinemic responses of NUTRIOSE®, 6 different cross-over trials were conducted in 5 countries. 6 to 24 healthy human volunteers randomly consumed either 50g NUTRIOSE® or 50g anhydrous dextrose or glucose (controls), during experimental sessions of 120 to 240 minutes each. Blood glucose and insulin responses were calculated based on regular sampling, either from capillary or venous origin, and expressed as percent (AUC concentrations for NUTRIOSE® / mean AUC concentrations for control). Depending on the methodologies used, glucose responses for NUTRIOSE® ranged from 25 to 48, insulin responses from 13 to 20, both being very low responses. Previously, a 12-week supplementation with NUTRIOSE® had already demonstrated its ability to lower insulin resistance, improve determinants of metabolic syndrome2 and induce improvements in body composition and weight, energy intake and hunger in overweight men3. Therefore, NUTRIOSE® soluble fiber may be a good candidate for sugar and energy substitution or reduction, and for fiber content improvement of food, possibly helping consumers to reach the dietary recommendations worldwide and contributing to obesity and diabetes prevention. 1. WHO, 2014, Factsheets 311 and 312. 2. Applied Physiology, Nutrition and Metabolism, 2010 3. International Journal of Food Sciences and Nutrition, 2011

T3 – Genetic susceptibility

T3:PO.082

Genetic variation at three chromosomal loci potentially involved in both anorexia nervosa and body mass index

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Regulation of body weight is disrupted in patients with anorexia nervosa (AN). Prior to the onset of AN body weight covers the whole BMI range. Since the genetic contribution to the etiology of AN is high, we hypothesised overlapping genetic loci for AN and BMI. We performed a cross-trait analysis of the 1000 SNPs with the lowest p-values from a genome wide association study (GWAS) of AN (GCAN, Boraska et al. Mol Psych 2014) for evidence of association in the largest published GWAS meta-analysis for BMI (GIANT; Speliotes et al. Nat Genet 2010). We detected Bonferroni corrected significant associations for 9 SNPs at 3 independent chromosomal loci (chr. 2, 10 and 19). None of the nearest genes to these SNPs has previously been associated with AN or BMI. Information on the function of most of these genes is sparse. One gene is biologically plausible as it is involved in the BDNF signaling pathway. GWAS did not reveal a genome wide significant locus for AN. A cross trait analysis for AN and BMI revealed three independent chromosomal loci with potential relevance for both. In depth molecular genetic and biological analyses are warranted to unravel the relevance of these loci and the genes they contain for AN and BMI.

Acknowledgement: NGFN, EDNET, WTCCC, GCAN, GIANT

T3:PO.083

Interactive effects of the irx3 and fto polymorphisms on obesity in a mediterranean population

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Obesity-associated variants within the FTO gene are functionally connected with regulation of the IRX3 (Iroquois related homeobox 3) gene expression. Irx3-knockout male mice have reduced adiposity. Although the IRX3 gene has been identified as the target of the FTO SNPs, epidemiological studies demonstrating associations between IRX3 SNPs and obesity are lacking. Our aim was to analyze the association of IRX3 variants with obesity-related measurement as well as their interactive effects with the FTO. We studied participants in the PREDIMED-Valencia Study (n=1094). SNPs in the Chr. 16 (rs3751723 in the UTR 5 IRX3: 54320197; rs12445085 intergenic IRX3: 54322319 and rs9939609-FTO: 53820527) were determined. DNA methylation was analyzed by MALDI-TOF mass spectrometry in 195 subjects (CpG sites surrounding the rs9939609-FTO SNP: Chr16:53817859-53822719). Multivariate regression models were used. rs12445085 C>A was associated with body-weight (77.1+/-0.6 in CC; 79.3+/-0.7 in CA and 80.8+/-1.3 kg in AA; P = 0.007) and BMI (30.0+/-0.2 in CC; 30.9+/-0.3 in CA and 31.2+/-0.5 kg/m^2 in AA; P = 0.008). Similar results we found for rs3751723-IRX3. Moreover we found a strong interactive effect of the rs9939609-FTO SNP and rs12445085 (P-interaction: 0.043 for body-weight). The association between IRX3 SNPs and BMI were only significant in carriers of the FTO-associated (A) allele (P < 0.001 for rs12445085). No significant associations were found for IRX3 SNPs in homozygous subjects for the rs9939609-FTO T-allele (P = 0.692). Also significant associations between rs12445085-IRX3 and FTO-methylation levels were detected. In conclusion, we found interactive effects of the IRX3 and FTO polymorphisms on obesity-related parameters.

Acknowledgement: Study co-financed by CIBERobn, University of Valencia, and research grants from FIS (PI11/02505), CNIC (CNIC06) and Generalitat Valenciana (ACOMP/2013/165 and ACOMP/2013/159)

T3:PO.084

TNF-α methylation is positively correlated with waist circumference in young and apparently healthy individuals.

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Introduction: The aim of this study was to investigate the associations between the methylation and expression of inflammatory genes with anthropometric, biochemical, clinical, and dietary measurements in young and apparently healthy individuals.
Methods: We evaluated 156 individuals (91 women and 65 men; ages 23.1 ± 3.5 y; body mass index 22 ± 2.9 kg/m^2) for anthropometrics, biochemical, clinical, dietary, antioxidant and inflammatory markers. DNA methylation and mRNA levels of IL-6 and TNF-α were assessed in peripheral blood mononuclear cells. A statistical analysis was performed to detect differences among subjects by the median of methylation of these genes. Spearman correlation coefficients were also used.
Results: Subjects with higher TNF-α methylation levels showed higher waist circumference and waist-hip ratio, circulating levels of oxidized low-density lipoprotein, and erythrocyte glutathione peroxidase activity values, but lower nail concentrations of selenium, and lower dietary intake of potassium, magnesium and copper (P < 0.05). The methylation of TNF-α was negatively associated with the relative expression of this gene in the same cells (r=-0.333; p < 0.001). However, IL-6 methylation levels were not statistically associated with IL-6 expression, neither relationships were observed between TNF-α and IL-6 plasma levels with the methylation and expression of these genes. The relative expression of TNF-α statistically correlated with the expression of other genes related with the inflammatory process such as ICAM, IL-6, IL-18 and RIL-1.
Conclusions: In young and apparently healthy individuals, the methylation of TNF-α was significantly associated with waist circumference and waist-hip ratio and other important biomarkers related with obesity.

Acknowledgement: We wish to thank the CAPES Foundation, Ministry of Education of Brazil (process nş 6409-13-0). This work has been funded by the Spanish Government (CIBERon and Nutrigenio project, ref. AGL2013-45554-R) and the Government of Navarra (Resmena project; ref. 48/2009).

T3:PO.085

Tas1r3 and Ucn2 transcript levels in peripheral blood cells are associated with sugary and fatty food consumption and with excess of fat accumulation in children

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Introduction: New types of robust biomarkers of dietary exposure and function are needed to implement strategies for obesity prevention in children. Of special interest are those biomarkers of consumption of food rich in simple sugars and fat, as their intake has been associated with obesity development. Peripheral blood cells (PBCs) represent a new promising tool for identifying novel transcript-based biomarkers. We studied the potential associations between the expression levels of Tas1r3 and Ucn2 genes in PBCs and the frequency of sugary, fatty, and junk food consumption.
Methods: 463 children aged 2–9 from the IDEFICS cohort were studied. Expression levels of Tas1r3 and Ucn2 genes were analyzed by RT-qPCR.
Results: Children with low frequency of consumption of sugary foods displayed higher Tas1r3 expression levels with respect to those with intermediate or high frequency; furthermore, children with high consumption frequency of junk food showed lower transcript levels of this gene with respect to those with low or intermediate frequency. In turn, children with high frequency of consumption of fatty foods showed lower Ucn2 expression levels with respect to those with low or intermediate frequency. Moreover, expression levels of Tas1r3 were related with BMI and fat mass changes during a two-year follow-up period, with low expression levels being related with increased fat accumulation over time.
Conclusion: Transcript levels of Tas1r3 and Ucn2 in PBCs may be considered as potential biomarkers of consumption of sugary, fatty, or junk food, to complement data of food intake questionnaires.

Acknowledgement: Research relating to this abstract was funded by the EC within the 7th RTD Framework Programme Contract No. 266044 (I. Family Study).

T3 – Taste, hedonics and appetite

T3:PO.086

Food 'Wanting' and 'Liking' in free-living lean and obese participants using a novel smartphone application: Mindeating

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Introduction: In laboratory-based measures of food reward, differences have been detected between lean and obese individuals. We investigated food reward in free-living participants using a new smartphone application (Mindeating), which has been developed to allow recording of real time food 'wanting' (anticipatory reward) and 'liking' (consummatory reward).
Methods: Participants were adult smartphone users recruited via invitations sent to Bangor University and Betsi Cadwaladr University Health Board staff, students and patients in North Wales. Following collection of baseline characteristics participants were given access to the Mindeating mobile phone application and were asked to record food 'wanting' on a scale of 0 (not at all) –10 (very strongly) each time food 'wanting' was perceived and 'liking' of food immediately after each eating episode using the same scale, continuously for 14 days.
Results: 59 participants were recruited in the required BMI categories. 22 lean and 19 obese participants (BMI 22.1 ± 1.87 vs 35.3 ± 5.10, age 37.5 ± 11.05 vs 39.7 ± 8.65 years) provided complete data. Obese participants ate less often (lean 4.35 ± 1.32 vs. obese 3.67 ± 0.77 times per day, $p = 0.05$). There was no significant difference in wanting scores between groups (lean 7.03 ± 1.08 vs obese 6.88 ± 1.11, $p = 0.68$). However, obese participants recorded significantly lower liking scores (lean 7.76 ± 0.77 vs. obese 7.11 ± 1.10, $p = 0.03$) and the difference between food liking and wanting scores (food reward gain) was reduced in obese participants (lean +0.73 ± 0.83 vs obese +0.22 ± 0.72, $p = 0.045$).
Conclusion: In daily life, obese participants gained a lower reward from eating in comparison to lean participants. This finding is in agreement with a reward-deficient response to food in obese individuals.

Fig. 1. Example of Mindeating Smartphone Application user interface.

T3:PO.087

Consumption of green-plant membranes suppresses wanting and hedonic hunger in emotional eaters

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Introduction: Membranes from green leaves have previously been found to affect appetite-regulating hormones in humans. The aim of this study was to investigate how treatment with green-plant membranes affects hunger, satiety, liking and wanting for palatable food.
Methods: 22 female participants were included, receiving either a green-plant supplement (5 g) or placebo on two separate days, before breakfast. VAS-questionnaires about hunger, satiety and cravings were filled out hourly, until an ad libitum snack buffet was served at 16:00, and once after, including questions about liking. The participants also filled out an eating behaviour questionnaire (TFEQR18-V2) with questions regarding emotional eating (EE), cognitive restraint (CR) and uncontrolled eating (UE). The study was a randomised, placebo-controlled, double blind, meal intervention study with a cross over design.
Results: Intake of green-plant membranes increased subjective ratings of satiety ($p < 0.01$, two-way RM ANOVA) and decreased ratings of hunger ($p < 0.05$, two-way RM ANOVA) and cravings for all snacks and sweets during the day compared to placebo (Fig. 1). In addition, there was a decreased subjective liking for sweet after treatment (Fig. 2). Food intake was not affected significantly. When correlated to eating behaviour scores, we found that the treatment effect of green-plant membranes on wanting for all snacks (Fig. 3), sweet-and-fat snacks in particular (Fig. 4), was positively correlated to emotional eating.
Conclusion: Green-plant membranes may be used as a food supplement to reduce wanting and hedonic hunger, associated with overeating and obesity. Individuals scoring high for emotional eating behaviour may have enhanced treatment effect.

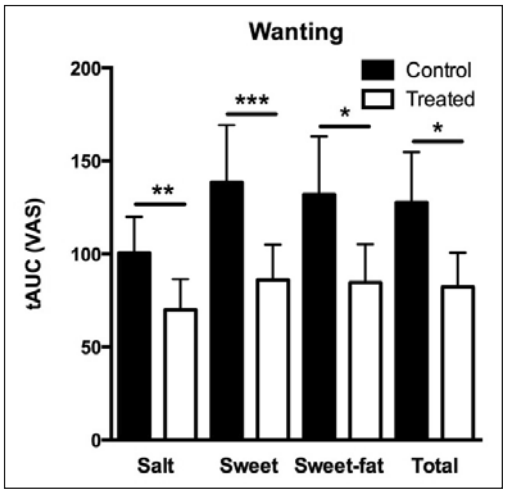

Fig. 1. VAS-ratings on wanting palatable foods. Treatment with green-plant membranes before breakfast decreased rated feelings of wanting for all categories of snacks respectively (salty, sweet and sweet-and-fat), and all snacks combined, compared to control during rest of the day (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, tAUC, Wilcoxon signed rank test).

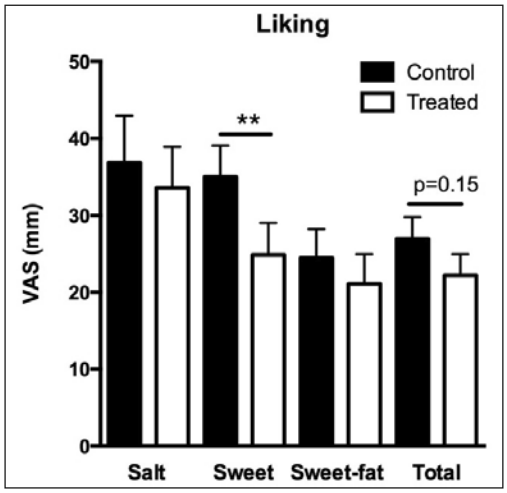

Fig. 2. VAS-ratings on liking palatable foods. Treatment with green-plant membranes before breakfast decreased ratings of liking for sweet snacks after consumption from the afternoon snack buffet compared to control (**$p < 0.0^1$, VAS, Wilcoxon signed rank test). ($n=1^8$ for liking salt, $n=1^8$ for sweet, $n=^20$ for sweet-and-fat, and $n=^21$ for total liking).

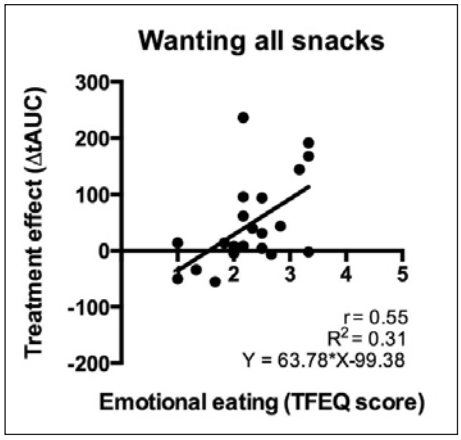

Fig. 3. Correlation between treatment effect on wanting all snacks and eating behaviour. The difference in tAUC for VAS (control minus treatment conditions) showed positive correlation with emotional eating scores (EE). Higher scores for EE were correlated to more treatment effect by green-plant membranes on wanting all snacks ($p < 0.0^1$, Pearson r).

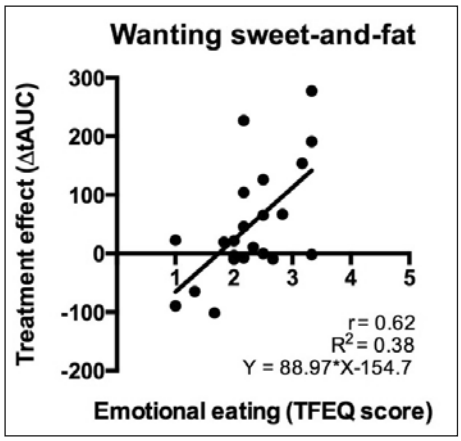

Fig. 4. Correlation between treatment effect on wanting sweet-and-fat and eating behaviour. The difference in tAUC for VAS for wanting sweet-and-fat snacks (control minus treatment conditions) showed positive correlation with emotional eating scores (EE). Higher EE was correlated to more treatment effect by green-plant membranes ($p < 0.0^1$, Pearson r).

T3:PO.088

Effect of animal and vegetable sources of protein on acute appetite sensation and energy intake

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Introduction: High protein intake is associated with reduced hunger and increased satiety when compared to normal or low protein intake. However, there is no consensus that one protein source is more satiating than others. We examine whether protein from legumes (beans/peas) is comparable to protein from animal sources (pork/veal) regarding acute meal-induced satiety.
Methods: 43 healthy men (mean ± SD age: 24.4 ± 4.8 y, BMI: 23.0 ± 2.1 kg/m^2) completed this randomized, double-blind, placebo-controlled, three-way cross-over meal test. Meals differed in protein content at the expense of carbohydrates and differed in fibre content, but had the same fat content. The meals consisted of high-protein meat (HP-Meat, 18 protein E%, 6 g fibre/100 g), high-protein legumes (HP-Legume, 19 protein E%, 25 g fibre/100 g) and low-protein legumes (LP-Legume, 9 protein E%, 10 g fibre/100 g). Subjective appetite sensations were recorded at baseline and every half hour using visual analogue scales (VAS) until the ad libitum meal was served 3 h after the test meal.
Results: Ratings for VAS showed lower hunger, prospective food consumption and composite appetite score, and higher fullness for HP-Legume compared to HP-Meat or LP-Legume ($P < 0.05$ for all), and higher satiety for the HP-Legume meal compared to HP-Meat meal ($P < 0.05$). A 12–13% lower energy intake was seen after consumption of HP-Legume compared to HP-Meat or LP-Legume ($P < 0.01$).
Conclusion: Protein from legumes produces increased satiety and reduced hunger and ad libitum energy intake compared to protein from meat. However, the comparison may be confounded due to higher fibre content of legumes. The public health and clinical implication is that high-protein legumes provide high satiety, and may be beneficial for weight control.

Acknowledgement: We are grateful to the kitchen staff at the Department Nutrition, Exercise and Sports for their assistance and to the volunteers who participated in this study.

T3:PO.089

Neuroendocrine appetite regulation across the menstrual cycle

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Background: The female menstrual cycle is characterized by variable eating patterns. We tested brain responses to visual food cues during the menstrual cycle and correlated them with sex hormones.
Methodology: Brain activity was assessed by functional magnetic resonance imaging (fMRI) to explore activation of homeostatic and reward brain regions in response to pictures of high calorie foods in 18 healthy normal weight females in follicular and luteal phase during fasting and fed states.
Results: In the hypothalamus and the reward system regions, increased activity in response to food images was significantly greater in the luteal phase compared to follicular phase regardless of prandial state. Specifically, in the amygdala- fasting activation in luteal vs. follicular $p = 0.006$ and fed activation in luteal vs. follicular, $p = 0.02$; with a similar significant trend in the arcuate cingulate cortex (ACC) and striatum. Importantly, in the reward areas the response in the fed luteal state was greater than the response in the fasting of the follicular state (amygdala $p = 0.06$, ACC $p = 0.01$). The response in reward areas was correlated with progesterone concentrations ($r=0.40$, $p = 0.02$ for amygdala and $r=0.48$, $p = 0.003$ for ACC). In visual regions, activation was present in both menstrual phases, with greater activation in fast than fed states (follicular $p = 0.003$, luteal $p = 0.005$).

Conclusions: The effect of the menstrual phase on brain activity in reward regions is more robust then the fed/fasting condition and correlates with progesterone concentrations. Unraveling the hormonal and molecular mechanisms driving these phenomena may identify novel interventional approaches to female obesity.

T3:PO.090

The effects of food perception on energy compensation following exercise in sedentary women

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Background: An effect of food labeling on energy intake (EI) has been previously reported and may partly explain the large inter-individual responses in EI previously noted following exercise (Ex).
Objectives: To assess how labeling and exercise interact to influence food perception and EI following physical activity. Design: In this randomized cross-over design, 14 inactive women took part in 4 experimental conditions: Ex (300kcal at 70% of their individual VO2peak) and lunch labeled as low in fat (LF), Ex and lunch labeled as high in fat (HF), sedentary control (Ctl) and LF, and Ctl and HF. The lunch was compose of a pasta plate, a yogurt and oatmeal cookies with the same nutritional composition throughout sessions. EI at lunch and for the following 34 hours (validated food menu), as well as healthiness perception of the meal, appetite ratings (visual analogue scales) and level of stress were assessed.
Results: No significant difference was observed in EI at lunch and for the following 34 hours across sessions. However, participants with high vs. low scores on a perceived stress scale showed opposite responses to the exercise and labeling manipulation. The food items presented as LF were perceived as healthier ($p < 0.001$), but this distinction was more consistently significant across food item when no exercise was performed. Healthiness ratings correlated positively with the amount of food consumed ($\rho=0.339$, $p < 0.001$). The labeling manipulation showed stronger influence on food item associated healthier initial beliefs.
Conclusion: Despite no effects of exercise and food labeling on acute EI (lunch and total 48h), healthiness perception was influenced by labeling and initials beliefs and linked with the amount of different food item consumed.

Acknowledgement: The authors would like to thank the participant for their devoted contribution in this project.

T3:PO.091

Disrupted normal ingestion during glucose intake modulate glucosekinetics in humans

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Introduction: Tastes and flavors that are appreciated during ingestion are thought to induce various physiological effects on energy homeostasis. This study aims to reveal the importance of these chemical senses in glucose kinetics and autonomic nervous activity by imposing interventions during glucose intake.
Methods: The conventional glucose-loading test was applied to seven healthy male and females (age, 24 - 32 y) under various experimental conditions together with a self-reporting questionnaire about satisfaction. We then assessed blood glucose curves (BGC), serum insulin response curves (IRC), and salivary α-amylase (s-AMY) activity.
Results: Three successive oral glucose-loadings induced a gradual downward shift in the BGC together with increased s-AMY activity, which is a stress marker; whereas adding a pleasant flavor to the glucose solution given during the third trial increased the BGC to the same level as that during the first loading with increased satisfaction. Direct delivery of glucose into the stomach without oral sensory stimulation or clipping the nose to interfere with smooth nasal air-flow induced a downward shift in both BGC and IRC, resulting in a decrease of the area under the BGC, together with an increase in the s-AMY level that negatively correlated with satisfaction scores.
Conclusion: The present study demonstrates that favorable chemical senses are important in enhancing glucose absorption from the gastrointestinal tract, insulin release and reducing sympathetic nervous activity.

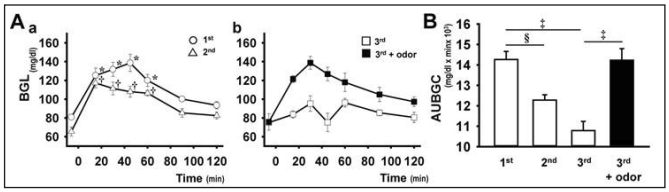

Fig. 1. Time-course changes in bloodglucose levels after successive glucose-loadings.

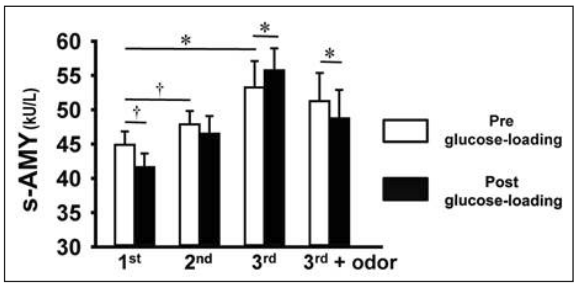

Fig. 2. Changes in salivary α-amylaseactivities before and after successive glucose loadings.

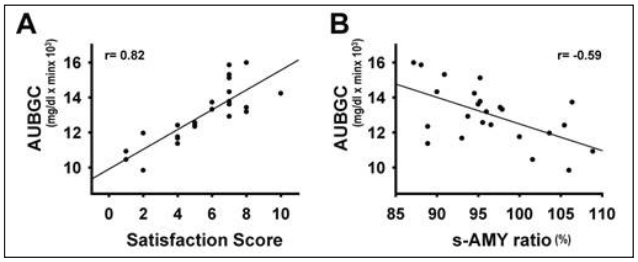

Fig. 3. Correlations among area underblood glucose curves, salivary α-amylase activity and satisfaction scores.

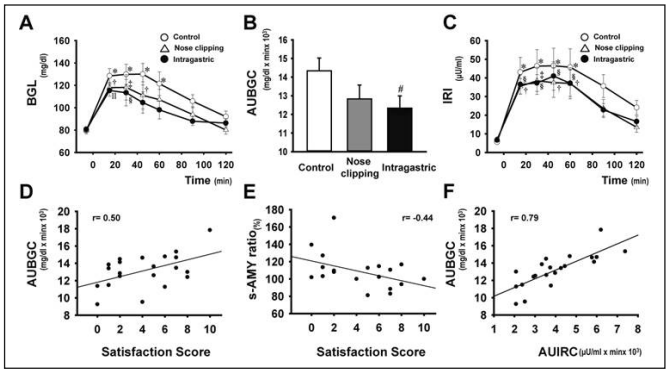

Fig. 4. Effects of nose clipping andintragastric glucose loading on blood glucose levels (BGL), serumimmunoreactive insulin (IRI), salivary α-amylase (s-AMY) activity andsatisfaction scores.

T3:PO.092

Changes in smell function, satiety quotient and food reward in response to a weight loss intervention

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Introduction: Acute energy deficits increase smell function. It is unknown whether long-term energy deficits induce similar changes in smell function, and whether these potential changes are related to diet-induced changes in body composition, food reward and intake.
Methods: Sixteen overweight menopausal women (age: 52.9 ± 3.3 y; BMI: 32.8 ± 4.6 kg/m^2) completed a 12-month intervention. Five and 11 women formed the control and intervention (700kcal/day energy deficit) groups, respectively. Body composition (DEXA), smell function (Sniffin' Sticks), appetite (visual analogue scales), food reward (Leeds Food Preference Questionnaire) and food intake (ad libitum food menu) were measured at baseline and 12 months later. Satiety quotient (SQ; mm/100kcal) following a meal was also calculated.
Results: Lower BMI (32.8 ± 4.6, 30.8 ± 5.6 kg/m^2; P = 0.01), fat mass (39.4 ± 10.4, 34.8 ± 12.5 kg; P = 0.004) and odor discrimination scores (13.1 ± 1.0, 11.7 ± 2.0; P = 0.04), and greater SQ (4.9 ± 3.6, 7.6 ± 3.9; P = 0.0001), were noted in all participants at 12 months. No differences in food reward and intake were noted across time, but lipid intake was lower in the control vs. intervention group (603.7 ± 205.7, 314.2.6 ± 200.4; P = 0.02). Changes (Δ) in discrimination scores were negatively linked with Δimplicit wanting (ρ= –0.63; P = 0.04) and Δpreference (ρ= –0.74; P = 0.01) for high-fat vs. low-fat foods between baseline and 12 months later.
Conclusion: Lower BMI, fat mass and smell function, and greater SQ, were noted post-intervention. However, changes in these variables were not related. Δodor discrimination scores were negatively linked with Δhigh-fat food reward, suggesting that women with greater decreases in smell function post-intervention saw greater increases in high-fat food reward.

T3:PO.093

Investigation of the effects metformin and metformin with insuline on food choices and taste changes of the patients applied to dietary polyclinic of an hospital in istanbul

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Introduction: The previous research suggest that using metformine causes increase in sweet taste sensation and decrease in consumption of some foods.
Methods: This study was conducted on 50 individuals started on insulin+metformin for the first time by the endocrinologist and 50 individuals started on just metformin, again for the first time. The individuals included in the study were subjected to both questionnaire and taste tests before starting on the medication (begining) and one month later (control). During the study, the individuals were subjected to taste tests on four basic tastes to test their perceptions at the start of the research (begining) and one month after they started on antidiabetic agents (control).
Results: During the research, it has been determined that among the individuals using metformin, 50% had diabetes, 44% insulin resistance, and 26% obesity, while among the individuals using metformin + insulin, 100% had diabetes, 8% insulin resistance and 16% obesity. Furthermore, 18% of the individuals on metformin had hyperlipidemia, 12% hypertension and 4%, hypothyroidism incidence, while 28% of the individuals on metformin + insulin had hyperlipidemia, 20% hypertension and 4%, hypothyroidism incidence. The body weights of the group using only metformin recorded at the begining showed an average of 3.8 kg decrease in the control ($p < 0,05$). No significant difference has been observed in the begining and control weights of the group using insulin+metformin ($p > 0,05$).
Conclusions: As a conclusion, results indicate that increase in sensitivity in the perception of sweet taste, the sensitivity in the perception of the other basic tastes, salty, bitter and sour, has also increased after the use of antidiabetic agent/agents.

T3:PO.094

Exploring the relationship between cognitive, sensory and nutritional food attributes and the perceived satiety potential of food.

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Introduction: Identifying and promoting foods that enhance satiety may improve appetite control and weight management. However little is known about consumers' perceptions of the cognitive, sensory and nutritional attributes which underpin the satiety enhancing potential of foods.
Methods: Using online surveys, 887 consumers rated 75 individual foods based on cognitive (e.g. satiating capacity), sensory (e.g. taste) and nutritional (e.g. energy content) dimensions. Objective nutrient and cost (£/kcal) information per food was sourced from manufacturer packaging and nutrition databases.
Results: Bivariate correlations showed foods perceived as satiating were associated with lower energy and fat content and with percieved higher healthiness, frequency of consumption and with greater perceived control over eating. More satiating foods were associated with higher cost (£/kcal), %protein and lower %fat and energy density. %Carbohydrate was not associated with satiating capacity. Linear regression models showed low energy content (as rated by consumers) (β=-.89, $p < .001$), low energy density (β=-.54, $p < .001$), low %fat (β=.23, $p = .04$) and high cost (β=.23, $p = .01$) were the strongest correlates of satiating capacity.
Conclusion: Consumer cognitive, sensory and nutrient perceptions alongside objective nutritional attributes are important factors underpinning the perceived satiety potential of foods. Foods rated as most satiating by consumers were low in energy density, low %fat and more expensive (per calorie). These findings have implications for the development and marketing of satiety enhancing foods.

T3:PO.095

The relationship between binge eating status and hormone profiles of obese patients undergoing weight loss intervention

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Objective: Some obese patients seeking weight loss treatment have a binge eating problem; however, the psychological and biological mechanisms of the development of their binge eating are not clear. This study was done

to determine which hormones are related to the binge eating of female, obese patients who participated in a weight loss intervention (WLI) based on cognitive behavioral treatment.
Methods: Ninety female, obese patients completed seven months of WLI. Body fat percentage (BFP) was measured using dual energy x-ray absorptiometry and serum levels of the biomarkers ghrelin, leptin, adiponectin, interleukin-6 (IL-6), IGF-1, and insulin were assessed before and after the treatment. Binge eating status was assessed by the Binge Eating Scale (BES). BES scores were classified by tertile value; the group in the highest third of the distribution, "high BES", was compared to that in the lowest third of the distribution, "low BES".
Results: No significant difference was found in BFP at baseline or after the treatment between the high and low BES groups. However, high BES had a higher leptin level than low BES at baseline, and the difference became significantly stronger after adjusting for confounding factors such as BFP and age. IGF-1 was also significantly higher in the high BES group at baseline, but the difference disappeared after adjustment for confounding factors. The binge eating symptoms decreased significantly after treatment in the high BES compared to the low BES group, independent of the change of BFP. Leptin and IL-6 also decreased significantly after treatment, but only leptin maintained significance after adjustment for confounding factors such as the change of BFP. The serum levels of other biomarkers were not significantly changed between the groups.
Conclusion: The present study suggests that binge eating status is related to the serum leptin level, regardless of the degree of body fat loss by obese patients during WLI.

Acknowledgement: This study was supported by a Research Grant (23-2) for Nervous and Mental Disorders from the Ministry of Health, Labour and Welfare of Japan and a Grant-in-Aid for Scientific Research (25460902) from the Japan Society for the Promotion of Science, and a Budget for clinical research base development project (GAQQ250001) from the Ministry of Health, Labour and Welfare of Japan.

T3:PO.096

Marital stress and food intake: An examination of the moderating role of BMI and restraint

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Introduction: Stress has been commonly associated with obesity through its disinhibiting effect on food intake (Sominsky & Spencer, 2014). Ego-threatening stressors, particularly relational ones, have been shown to increase food intake among restrained eaters and overweight individuals (Tanofsky et al., 2000).The aim of the present study was to examine the impact of a stressful marital discussion on food intake in both spouses, while taking into account the effect of BMI and restraint on this relationship.
Methods: Eighty heterosexual couples were recruited via email. In laboratory, couples discussed for 15 minutes an aspect that they want their partner to change, after what they completed individually a bogus taste test (to assess food intake). The following variables were also assessed: mood states, BMI, and restraint. Using PROCESS macro (Hayes, 2013), a three-way interaction between mood change (measured before and after the discussion), BMI, and restraint was tested with multiple regression analyses among both men and women, controlling for hunger (Fig. 1).
Results: Among women, the model was significant, $F(8, 70)=3.46$, $p = 0.002$. The three-way interaction was significant ($p = 0.039$). Restrained women with high BMI ate more when their mood worsened, as opposed to unrestrained women with high or average BMI who ate significantly less (Fig. 2). Among men, although the overall model was significant, $F(8, 70)=3.99$, $p = 0.001$, only hunger predicted significantly food intake ($p < .001$).
Conclusion: These results suggest that the impact of a relational stress on food intake is different among genders. For women, higher BMI and restraint score are associated with more disinhibited eating, thus supporting the importance to address restraint and BMI when studying stress-induced eating.

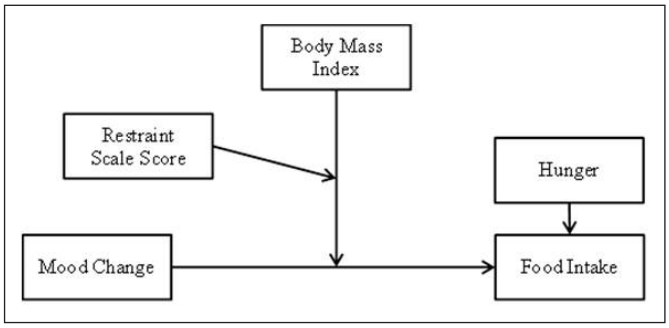

Fig. 1. Conceptual model of conditional, direct and indirect effects.

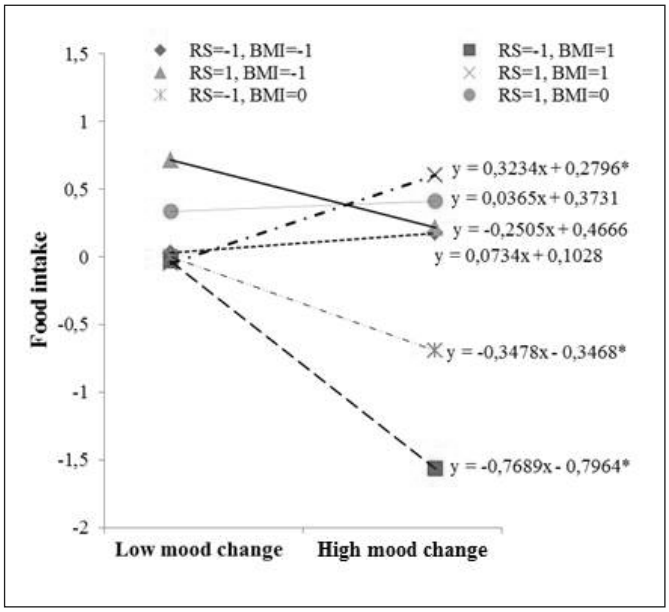

Fig. 2. Interaction plot showing associations between mood change and food intake in grams for women at different values of restraint (RS) and body mass index (BMI). All variables are z-standardized.

T3:PO.097

Visual analogue scales to assess appetite sensation – good agreement between 100 mm pen and paper vs tablet-based scores

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Introduction: Different electronic visual analogue scales (eVAS) using handheld devices have already been validated. These devices have, however, most often not the same scale length as the pen and paper (P&P) version. Furthermore, with the introduction of different tablet computers, new possibilities for assessing appetite sensations are opening up since tablets are found in most homes and work places. The aim of this study was to verify whether appetite sensation scores obtained from 100 mm visual analogue scales (VAS) using an e VAS (eVAS) can be compared to those obtained from the traditional P&P method.
Methods: On a single occasion, using a within-subject design, 21 healthy participants recorded their appetite sensations before lunch, and at five additional time points during the postprandial period. At each time point, both P&P and eVAS were used to record desire to eat, hunger, fullness,

satiety, and prospective food consumption, but the order of the two methods was randomized.
Results: We observed that the immediate, successive completion of questionnaires from the two methods resulted in no significant difference in results on appetite sensations as also indicated by a strong linear relationship between the two (r from 0.71 to 0.98, P < 0.01). A Bland-Altman plot of the calculated composite score at baseline revealed good agreement between the mean value between eVAS and P&P and the difference between the methods.
Conclusion: We conclude that VAS scores obtained from a tablet-based electronic VAS and the gold standard P&P method with similar scale length are interchangeable, both before and in response to a meal.

T3:PO.098

The control of eating questionnaire is predictive of weight loss in an integrated analysis of phase 3, randomized, double-blind, placebo-controlled, trials of prolonged-release naltrexone/bupropion

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Food cravings are associated with overeating and obesity, and may have implications for successful weight loss. Gaining control over food craving is a component of the management of obesity and the development of healthy eating habits. The present analysis evaluated the psychometric properties of Control of Eating Questionnaire (CoEQ) and tested its predictive validity by examining its association with weight loss in four Phase 3 clinical trials that examined the effect of treatment with a prolonged-release combination of naltrexone/bupropion (NB) on weight loss in obese adults. In an integrated analysis of four Phase 3 trials, subjects completed the CoEQ at baseline and Weeks 8, 16, 28, and 56. All analyses were conducted on subjects who had complete weight and CoEQ measurements at baseline and Week 56, and had completed 56 weeks of NB (n=1238) or Placebo (n=720). Confirmatory Factor Analysis (CFA) was used to determine the psychometric properties of the CoEQ. CFA supported a four-factor solution of the CoEQ. Factors identified were: Craving Control (CRAV), Craving for Sweet (SWT); Craving for Savoury (SAV); and Positive Mood (MOOD). The CoEQ was important in predicting the weight loss response to drug treatment. Improvement in CRAV at each time point was associated with Week 56 weight loss. Further, improvement in CRAV at Week 8 was associated with a greater fat mass loss at Week 56. The CoEQ has good psychometric properties and internal consistency. Food craving is closely associated with drug-induced changes in body fat. Early improvements in CRAV and SWT were predictive of lower body fat and BMI at Week 56. Therefore, the CoEQ is a valid measure for the experience of food cravings and has applications for research and the clinical management of obesity.

T3 – Protective foods

T3:PO.099

Superior metabolic efficiency of phosphatidylcholine-rich omega-3 phospholipids compared to soy- or egg yolk-derived phosphatidylcholine in dietary obese mice

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Introduction: Studies in animal models of obesity demonstrated that the metabolic effects of dietary omega-3 fatty acids (EPA and DHA) depend on their lipid form, with marine phospholipids (PL) showing better efficacy than fish oils. However, PL themselves could have beneficial metabolic action. We aimed to compare herring-derived omega-3 PL rich in phosphatidylcholine with phosphatidylcholine-rich preparations from soy or egg yolk in dietary obese mice.
Methods: Male C57BL/6N mice were fed for 9 weeks a control high-fat diet (cHF; lipids ~35 wt%) or cHF-based experimental diets: (i) cHF with 10% lipids replaced by herring-derived omega-3 PL (PC-M), (ii) cHF with 10% lipids replaced by phosphatidylcholine-rich concentrate from soy (PC-S), or (iii) cHF with 6% lipids replaced by phosphatidylcholine-rich concentrate from egg yolk (PC-E). Experimental diets were matched for phosphatidylcholine content.
Results: Feeding mice cHF diet resulted in obesity (increased adiposity), glucose intolerance, insulin resistance, hypertriacylglycerolemia, adipocyte hypertrophy and hepatic steatosis. All these abnormalities were ameliorated to different extents in mice fed PC-M, while PC-S and PC-E were both ineffective except for their marginal effect on hepatic steatosis. In the liver, the complex down-regulation of lipogenic and cholesterol biosynthesis genes was observed in the PC-M group, while less pronounced decreases in the expression of lipogenic genes were also observed in the PC-S and PC-E group.
Conclusion: Dietary intervention with omega-3 PL elicited superior effects compared not only to fish oils, but also to other PL-based preparations lacking EPA/DHA. Thus, the combination of both EPA/DHA and the phosphatidylcholine molecule seems to confer the highest metabolic effects.

T3:PO.100

Effect of a dietary portfolio on metabolic syndrome in patients with morbid obesity

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Introduction: Obesity and metabolic syndrome are recognized as one of the most important health public challenges. Recently, it has been used the implementation of dietary strategies using specific dietary portfolios (DP; combination 2 or more functional foods) to control circulating levels of lipids and glucose. The aim of this study was to assess the effect of a DP containing nopal, soy protein, oats, chia seed and inulin in subjects with morbid obesity on components of metabolic syndrome and the concentration of total cholesterol, LDL cholesterol, glucose, HOMA-IR and PCR.
Methods: This was a single center, randomized, placebo-controlled, double-blind parallel-arm study. Patients with morbid obesity (BMI ≥40 kg/m^2) and metabolic syndrome received a diet low in saturated fat, according to ATPIII program, with a reduction of 500 Kcal to their usual diet during two months with a moderate physical activity plan, along with the consumption of DP or placebo (control group).
Results: A total of 53 Mexican subjects with a mean age of 36 ±10.9 years and BMI of 43 ± 2.71 kg/m^2 were studied. There was a significant decrease in serum triglycerides in the DP group (from 184 ± 65.4 to 152 ± 42.6, P < 0.011) compared to the control group. In addition, there was a decrease in serum total cholesterol (from 191 ± 33.8 to 176 ± 32.0, P < 0.010) and LDL cholesterol (126 ±3 1.7 to 113 ± 37.7, P < 0.014). DP and control groups had a significant decrease in body weight, waist circumference, glucose and HOMA-IR.
Conclusion: These results indicate that DP consumption produced a favorable effect on blood lipids in morbid obese with metabolic syndrome and can be used as an important strategy in the prevention of cardiovascular disease.

T3:PO.101

Effect of probiotic/prebiotic supplements containing bifidobacterium lactis and chicory inulin to the body composition in obese individuals

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This study was conducted to demonstrate the impacts of the probiotic/prebiotic addition which contains bifidobacterium lactis and chicory inulin on body composition in obese individuals. A total of 66 obese participants (BMI: 25–40 kg/m2) aged 18–55 years were divided into two groups and dietary treatment was applied for 12 weeks. A general questionnaire was applied to the participants. In addition to the dietary treatment, study group (n = 45) were given 1 sachet probiotic containing live and active 5 billion CFU Bifidobacterium lactis and prebiotic containing 900 mg chicory inulin. Placebo was given to the control group (n = 21). Height, waist and hip circumference were measured, height and body composition were assessed by Inbody 230 BIA. The mean age of participants were 32,25 ± 9,51 years. 75.5% of individuals were women while 24.5% were male. At the end of the study, body weight decreased –4.79% ± 2.46 kg of the study group, it was found –9.4% ± 4.79 in the control group ($p < 0.001$). Reduction in BMI of study group (-4.91% ± 2.5) was lower than controls (-9.38% ± 4.8) ($p < 0.001$). No significant decreases were found in muscle mass of both groups ($p > 0,05$). Fat weight loss were more statistically significant in the study group (-8.68% ±5.73) compare with the control group (-19.26%±9.89) ($p < 0.001$). Differences in fat content of the study group (-4.59% ± 4.55) was statistically significant lower compared with the control group (-11.16 ± 6.79%). Reduction in waist/hip ratio in the control group was determined higher than the study group (p,001). A significant decreases were found in body weight and fat, BMI, waist/hip ratio and fat ratio in both groups except muscle weight ($p < 0,01$). At the end of the study, there wasn't found effectiveness of prebiotic/probiotic supplements to the dietary treatment. For this reason, it would be useful to conduct further research on this topic.

Key words: Obesity, prebiotic, probiotic.

T3 – Energy balance

T3:PO.102

Differential sympathetic nervous system outflow to skeletal muscle in lean vs obesity-prone rats.

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Rats selectively bred for high intrinsic aerobic capacity (HCR) are lean, resistant to obesity, and consistently more active than low-capacity runners (LCR), which are more prone to metabolic syndrome. We have shown that HCR have elevated daily energy expenditure (EE), primarily due to activity-EE rather than to resting EE. This high activity-EE stems from heightened daily activity plus low economy of activity in HCR wherein those excess calories are dissipated by skeletal muscle as heat. We primarily focus on the ventromedial hypothalamus (VMH), part of a pathway regulating energy balance (EB) through its actions on peripheral glucose and lipid allocation, modulating respiratory quotient and thermogenesis. We have also shown that activation of receptors for melanocortins (MC), a system involved in controlling EB, in the VMH more effectively impacts metabolism in HCR compared to LCR. We hypothesize that this difference in metabolism is due to differential activation of the sympathetic nervous system (SNS), impacting molecular mediators of energy expenditure. Norepinephrine turnover was used to asses SNS drive. Rats received intra-VMH microinjections of MC receptor agonist Melanotan-II (MT-II) or vehicle (aCSF) to measure MC-induced enhancement of SNS outflow to muscle. Compared to vehicle, intra-VMH MT-II induced a significant increase in SNS activity in most of the tissues analyzed, including muscle; moreover, HCR were significantly more affected than LCR. These results support the hypothesis that pathway modulated by MC receptors in the VMH more effectively impacts metabolism in HCR compared to LCR; this may be due to differences in SNS activation. This likely results in differential alterations in mechanisms impacting muscle metabolism.

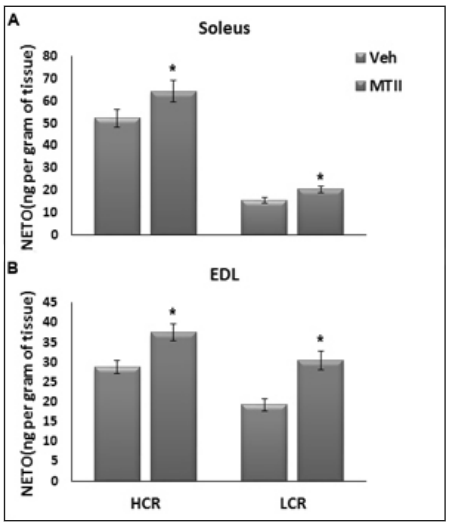

Fig. 1. Figure1: Norepinephrine turnover (NETO) in skeletal muscle of HCR and LCR, A) Soleus, B) EDL. Compared to vehicle, intra-VMH MT-II induced a significant increase in NETO in both HCR and LCR. Change in NETO was higher for HCR in soleus and for LCR in EDL. (*$p < 0.05$).

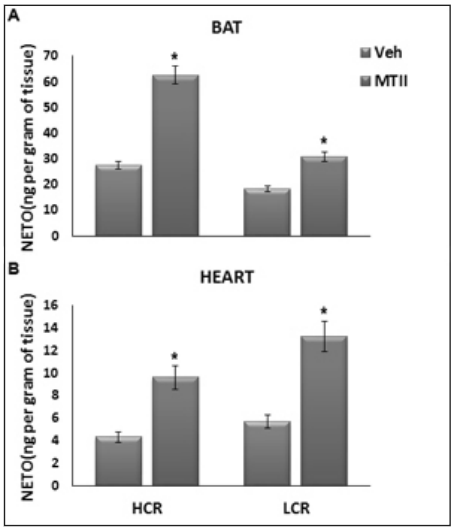

Fig. 2. Figure2: Norepinephrine turnover (NETO) of HCR and LCR in A) BAT, B) Heart. Compared to vehicle, intra-VMH MT-II induced a significant increase in NETO in both HCR and LCR. Change in NETO was higher for HCR in BAT and for LCR in Heart. (*$p < 0.05$).

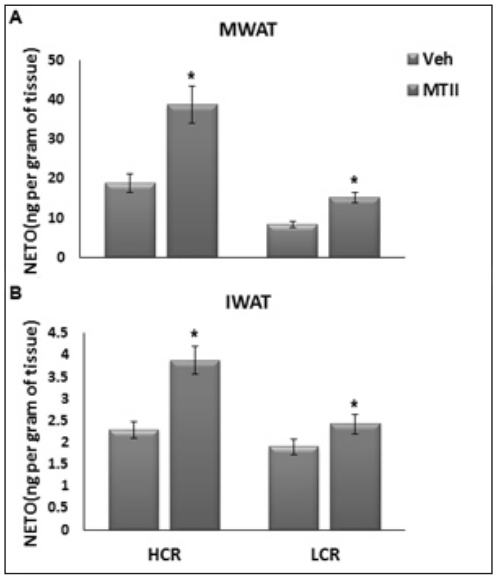

Fig. 3. Figure3: Norepinephrine turnover (NETO) of HCR and LCR in different white adipose depots (WAT), A) Mesenteric WAT (MWAT), B) Inguinal WAT (IWAT) . Compared to vehicle, intra-VMH MT-II induced a significant increase in NETO in both HCR and LCR; HCR were more affected than LCR in both WAT. (*p < 0.05).

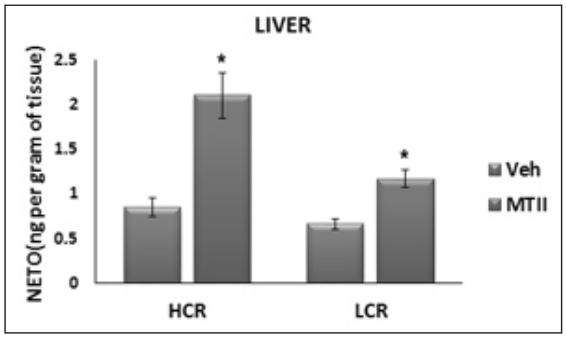

Fig. 4. Figure4: Norepinephrine turnover (NETO) in liver of HCR and LCR. Compared to vehicle, intra-VMH MT-II induced a significant increase in NETO in both HCR and LCR; HCR were significantly more affected than LCR. (*p < 0.05).

T3:PO.103

Children and adolescents with obesity and with physical activities out of school have unbalanced diet risk

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Introduction: For obesity prevention of children and adolescents is very important to keep balanced diet and have regular physical activities.
Methods: Data about anthropometric parameters (weight, height, body-mass index (BMI), waist circumference), eating habits and physical activities was collected and analyzed by a multidisciplinary team in Children's Clinical University Hospital (Riga, Latvia) between August and November 2014.
Results: 31 children participated in study, 14 girls and 17 boys. Mean age (years± SD) was 13.25 ± 2.45, weight (kg ± SD) 86.93 ± 23.68, height (cm ± SD) 165.93 ± 12.40, BMI (kg/m¸ ± SD) 31.06 ± 5.22, waist circumference (cm ± SD) 104.53 ± 14.10. 7.1% (n=1) of girls and 41.2% (n=7) of boys admitted regular eating in front of TV and 42.9% (n=6) of girls and 23.5% (n=4) of boys admitted occasional eating in front of TV (p = 0.04). We find also statistically significant difference between children with physical activities out of school and without it relation to overeating and eating in fast food restaurants. 55.5% (n=5) of children with physical activities out of school answered that they have had overeating feeling 1 time per day or more and only 5.9% (n=1) those children, who do not have physical activities out of school have had overeating feeling regularly (p = 0.008). 33.3% (n=3) of physically active children mentioned that they eat in fast food restaurant at least 1 time per 2 weeks or more and 11.8% (n=2) of children who is not physically active (p = 0.043).
Conclusion: Physically active children and adolescents have to pay more attention to balanced diet and regular meal out of school.

T3:PO.104

Differential regulation of metabolic parameters by energy deficit and hunger

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Introduction: Hypocaloric diet is known to decrease both energy expenditure (EE) and respiratory exchange rate (RER), affecting the efficacy of dieting oppositely. Energy deficit and subjective hunger may be modulated separately both in human and animal studies by drug treatment (only energy deficit) or food restriction (both energy deficit and hunger). Thus it would be important to separate the effects of energy deficit and hunger on EE and RER.
Methods: Three parallel and analogous experiments were performed using three pharmacologically distinct anorexigenic drugs: rimonabant, sibutramine and tramadol. Metabolic parameters of vehicle-, drug-treated and pair-fed diet-induced obese mice were recorded. The three experiments underwent common statistical analysis to identify effects independent from the mechanisms of action.
Results: RER was similarly decreased by drug treatments and paired feeding throughout the experiment. Contrarily, EE was decreased by paired feeding compared to both vehicle- and drug-treatment in the passive phase. In the active phase, EE was influenced by the pharmacological mechanisms of action.
Conclusion: Our results suggest that RER is mainly affected by the actual state of energy balance and unaffected by hunger. In contrast, EE is rather influenced by subjective feelings of hunger. Therefore, pharmacological medications that decrease hunger may enhance the efficacy of a hypocaloric diet by maintaining metabolic rate. Furthermore, our results yield the proposal that effects of anorexigenic drugs on EE and RER should be determined compared to vehicle and pair-fed groups, respectively, in animal models.

Acknowledgement: The study was partially supported by a grant from the ERNYŐ 2013 of the Hungarian Government.

T3:PO.105

The effect of life-style interventions on weight reduction and weight maintenance

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Aim: To study the effectiveness of life-style interventions in weight management.
Method: The life-style interventions were based on calory restricted diet, increased physical activity, education, and regular control. The weight reduction program (a) duration 3 weeks in hospitalisation n:146, BMI:41.6 kg/m¸ daily underwater exercise, gymnastic, brisk walking, LCD. The weight maintenance (b) was supported in self-helped group during 2 years n:129, BMI:30.2 kg/m¸ weekly organised dietetic consultation, gymnastic with music, education.
Results: (a) Body-weight kg 119.4 (SD:25.8)- 112.9 (SD:24.2) body fat kg 52.2 (SD:18.2) - 47.8 (SD:18.2) Cardiovascular risk factors VFA cm¸ 177.2

(SD:37) – 165.4 (SD:49.1) systolic blood pressure Hgmm 147.8 (SD:19.6) - 123.5 (SD:11.9) diastolic BP Hgmm 90.4 (SD:12.6) - 76.9 (SD:7.4) cholesterol mmol/l 5.3 (SD:1.1) - 4.34 (SD:1) LDL-cholesterol 3.1 (SD:0.9) - 2.6 (SD:0.8) HDL-cholesterol 1.3 (SD:0.3) - 1.1 (SD:0.2) triglyceride 2.4 (SD:2.7) - 1.6 (SD:1.1) hCRP 8.8 (SD:8.2) - 4.9 (SD:4.4) $p < 0.001$. Walking distance km/day 4.5 (SD:3.2) - 10.2 (SD:5.7) $p < 0.001$. Mean of energy expenditure by walking 514.1 (SD: 366.9) kcal/day. (b) Body-weight Δ-1.5 kg $p < 0.001$, body fat Δ-1.2 kg $p < 0.001$, decreased BMI, waist circ $p < 0.001$, hip circ $p < 0.05$, dyastolic BP $p < 0.05$, systolic BP NS.
Conclusion: The inpatient program was effective in weight reduction and risk factors normalization. The self-helped group program was suitable for long term weight maintenance either in prevention of weight gain or in post-obese condition. Effectiveness is feasible with compliance and the aid of organized follow-up.

T3:PO.106

The relation between the menstrual cycle with food craving and eating attitudes

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Introduction: A food craving is a desire "so strong that it will cause a person to go far out of his or her way to satisfy [it]" and leads to the subjective experience of a compulsive urge to eat, and are associated with higher Body Mass Index (BMI) as well as eating disorders. In retrospective studies, women have commonly experience an increase in food cravings during the days prior to menses (i.e., the late luteal phase), with some studies also finding elevations in food cravings during menses.
Methods: The participants in this study consisted of 678 female university students in Istanbul. The questionnaire was included asked about the socio-demographic items, including age; weight, height and BMI was based on self-report. The participants completed the Dutch Eating Behaviours Questionnaire (DEBQ), Daily Symptom Rating Scale (DSR), Eating Attitudes Test - 26 (EAT-26) and The Attitudes to Chocolate Questionnaire (ACQ).
Results: Participants' mean age was 20.14 ± 2.04 years. The average BMI was 21.29 ± 2.92 kg/m^2. Ninety-six participant were in the underweight range, 9.0% of participants were in the overweight range, and 1.2% % of participants were in the obese range. Disturbed eating behaviours was found in 25.2%, and binge eating behaviours was found in 19.2% of the total sample. Results indicated that there was significant correlate between BMI and DSR ($r=0.083$; $p = 0.030$), DEBQ-restraint ($r=0.357$; $p = 0.000$), DEBQ-emotional ($r=0.278$; $p = 0.000$), EAT-26 ($r=0.083$; $p = 0.031$) and ACQ ($r=0.255$; $p = 0.000$). Also, luteal phase was associated with higher DSR, ACQ and DEBQ-emotional scores ($p < 0.05$).
Conclusions: In conclusion, the luteal phase contributed to a higher chocolate craving response to food and high-sweet-fat food, and there was significant relation between the body mass index and chocolate craving. A large body of research has demonstrated that individual factors may have specific influences on chocolate craving.

T3:PO.107

Weight cycling and psychological correlates among dieters in turkey

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Introduction: Weight cycling refers to losses and subsequent regaining of body weight that often occurs in association with dieting. Weight cycling (WC) is independently associated with adverse health outcomes such as increased cardiovascular morbidity/mortality and psychological problems.
Methods: The sample was composed of patients who had been consulted at a private obesity clinic in Ankara between May 2014 and December 2014 with the intention of losing weight. The participants in this study consisted of 116 people (90 women and 26 men). The participants completed the Dutch Eating Behaviours Questionnaire (DEBQ), Beck Depression Scale (BECK), Thinness and Restricting Expectancy Inventory (TREI) and the questionnaire to assess weight cycling.
Results: In the whole study group ($n = 116$), the prevalence of reported WC was 42.2% (46.7% of women, %26.9 of men). Results indicated that there was significant correlation between body mass index and TREI ($r=0.295$; $p = 0.005$), DEBQ-restraint ($r=0.374$; $p = 0.000$) and DEBQ-emotional ($r=0.400$; $p = 0.000$) for women, BECK ($r=0.404$; $p = 0.041$) for men. In addition, results from indicated that there was significant correlate between body mass index and TREI ($r=0.332$; $p = 0.032$), DEBQ-restraint ($r=0.503$; $p = 0.001$) and DEBQ-emotional ($r=0.447$; $p = 0.003$) for cycler women, but no cycler men. There was a significant difference between TREI scores of individuals with WC compared to non-WC. There was also a significant difference in the BECK and DEBQ-emotional scores of women compared to men.
Conclusion: As a conclusion, weight cycling prevalence is higher in women than men. Also, weight cycling status is related with thinness and restricting expectancy, emotional eating and depression level among women, but not among men. More efforts are needed by clinicians to focus on better management of weight-loss programs, in order to avoid multiple weight fluctuations and to achieve long-term weight maintenance.

T3:PO108

Is dietary restraint deserving of its poor reputation in obesity management?

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Introduction: Dietary restraint (DR) has been implicated in both the aetiology and treatment of obesity. While DR is necessary for weight loss, high DR may lead to disinhibition, disordered eating, binge eating, and weight gain. The present study aimed to evaluate the role of DR in a sample of obese weight loss subjects. It was hypothesised that compared to low and high DR, moderate DR would protect against weight gain, poor eating pattern and psychopathology.
Method: Baseline anthropometry, psychological measures (DASS, BDI), eating and exercise behaviour (Food habits questionnaire and Modified Beacke), medical profiles and weight loss outcomes were assessed according to degree of DR as measured by the TFEQ in 2496 patients (1731 female) who had attended an outpatient obesity management clinic between 1992 and 2013.
Results: Subjects with higher DR had lower baseline weight, BMI and waist circumference. These subjects did not report increased symptoms of depression or anxiety and reported lower fat score and higher better habits score. In women, high DR was also associated with higher activity levels. Although linear regression showed that DR was a predictor of baseline weight secondary to self-esteem, it only accounted for 1.9% of the variance in baseline weight. DR did not remain predictive in men after adjusting for self-esteem. Higher baseline DR did not predict short or long term weight loss.
Conclusion: Contrary to the hypothesis, higher DR is associated with lower body weight and healthier eating and physical activity behaviours in an obese treatment seeking population with no adverse effect on depression or anxiety. Although DR is not predictive of weight loss in the short term, it may be important for everyday weight maintenance.

T3 – Popular diets

T3:PO.109

Determination of Relationship Between Obesity and Alkaline Diet in School Aged Children

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Introduction: This study was aimed to evaluate relationship between obesity and alkaline diet in school aged children.
Methods: This study was conducted 96 girls and 92 boys totally 188 children. Anthropometric measurements of children were taken and body fat percentage (%) was measured by bioelectric impedance analyzer that can be used for children and 24-hour dietary recall of children was collected. Potential Renal Acid Load (PRAL) value formulated by Remer ile Manz was used for evaluating alkalinity of diet.
Results: According to the children's body composition it was not detected children who have low body fat percentage while 39.9% of children have high body fat percentage. Mean body fat percentage of girls (27.6 ± 4.94) were found more than boys (24.3 ± 7.17) and the difference is significant between groups ($p < 0.05$). It was determined that diet alkalinities of children are positive associated with fruit and vegetable consumption but negative associated with meat and meat products and grain consumption ($p < 0.01$). It was found there is no relationship between dietary PRAL values and height, weight, waist circumference, waist / height ratio, body mass index but there is a negative correlation with body fat percentage which is an indicator of body composition ($r = -0.215$; $p < 0.01$)
Conclusion: Increasing of diet alkalinity can be an indicator of a healthy diet in the prevention of many diseases. Nowadays increasing of fruit and vegetable consumption increase diet alkalinity and it will have an important role in prevention of childhood obesity and chronic diseases in adulthood.

T3:PO.110

Pharmacokinetics of quercetin which reduce body fat humans.

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Introduction: Quercetin is one of the most abundant polyphenols in vegetables and fruits. It has been reported that quercetin induces lipolysis. We demonstrated that the beverage containing quercetin glucoside (QG) reduces body fat of obese humans last year. **Objective:**The objective of this study was to investigate the pharmacokinetics of quercetin on healthy humans and mild obese humans ingesting a beverage containing QG 110mg as isoquercitrin (QG1).
Methods: A total of 20 volunteers composed of 10 healthy humans ($18.5 \leqq$ body mass index < 25 kg/ m^2) and 10 mild obese humans ($25 \leqq$ body mass index < 30 kg/m^2) participated in this study. Test beverage was packaged a bottle of 350 ml containing QG 110mg as QG1. After an overnight fast, each study participant ingested a test beverage without breakfast. Blood samples were collected at 0.25,0.5,1, 1.5,2, 4,8, 12,24,36,48 and 60 hr after test beverage ingestion.
Results: The mean area under the curve of plasma total quercetin from baseline to 60 hr [AUC 0-60 hr] was 2.8 μg hr/mL, maximum plasma concentration (Cmax) was 997 ng/mL, and time to reach Cmax (Tmax) was 0.5 hr. There was no difference between healthy humans and mild obese humans in the respective pharmacokinetics parameters.
Conclusions: The beverage containing QG is absorbed promptly within an hour and is an excellent way to reduce body fat in humans effectively.

T3:PO.111

Evaluation of Knowledge, Attitude and Behavior on Popular Weight-Loss Diets in Adults

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Turkey **Introduction:** Recently, unhealthy and popular weight-loss diet solutions, which are not personally designed and claiming faster results on weight loss, spreaded among individuals especially with the influence of the media. The aim of this study to determine knowledge, attitude and behavior of popular weight loss diets among adults.
Methods: Total 400 (332 female, 68 male) adults (mean age of participance 24.8 ± 23.7 years) participated this study between October 2013-May 2014. A questionnaire examined face to face by specialists.
Results: According to WHO's BMI classification, it is determined that 69.9% of individuals had a normal body weight, 11.5% were underweight, 18.8% were obese. Also, 58.9% of normal weight individuals, 54.7% of obese individuals believed obese themselves ($p < 0.05$) and 31.8% of the participants stated that they had knowledge about the contents of the popular diets. It is determined that they had knowledge about popular diets from internet (34.1%), newspapers and magazines (25.5%), friends, neighbors and relatives (22.2%), books (11.4%) and dieticians (2.5%). Participants, which were indicated that popular weight-loss diets are effective and useful, were 28.3%. It was found that 4% of individuals applied popular diet and 80% of individuals applying popular diet have preferred high protein diets.
Conclusions and Recommendations: Popular weight-loss diets are becoming increasingly widespread use under influence of media often includes incorrect and inappropriate to principles of healthy eating practices. Educational and informative programs prepared by experts should be given more space in the media for people's consciousness.

T3:PO.112

Weight loss with a modified Mediterranean type diet using fat modification through neutral and butter flavored canola oil, walnuts and walnut oil

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Objective: Mediterranean diets with a high proportion of olive oil and nuts can be effective for weight management and the prevention of cardiovascular disease. For populations with different eating habits and preferences it might be difficult to follow such diets. Therefore, a modified Mediterranean type diet using fat modification through neutral and butter flavored canola oil, walnuts and walnut oil, and with two portion-controlled sweet daily snacks, was tested in Germany.
Methods: Randomized waiting-list control study with overweight/grade 1 obese subjects: 12-week self-help modified Mediterranean type diet with 6 weeks of modified Mediterranean type diet plans (approx. 1300 kcal/d) and 6 weeks of weight loss maintenance training. 40-week follow-up. Trial duration 12 months. Oils and nuts were provided free of charge. Subjects: See Fig. 1.
Results: Per protocol weight loss after 12 weeks was 5.2kg in IG vs. 0.4kg in CG ($p \leq 0.0001$), BMI change –1.8 kg/m^2 vs. –0.1 kg/m^2 ($p \leq 0.0001$), waist circumference change –4.7cm vs. –0.9cm ($p \leq 0.0001$). Weight loss after 12 months: 4.2kg (pooled data). Triglycerides, total cholesterol and LDL-cholesterol were significantly improved in IG but not in CG after 12 weeks, for 1-year-data see Fig. 2. 1-year-dropouts: 44% in IG, 53% in CG.
Conclusion: A five meal modified Mediterranean type diet with two daily portion-controlled sweet snacks was effective for weight management in a self-help setting for overweight and grade 1 obese subjects. Fat modification through canola oil, walnuts and walnut oil improved blood lipids

even at 12 months. Such adaptions to local eating habits do not seem to compromise important outcomes of Mediterranean diets for weight loss.

Group	IG	CG	P
n	100	112	
Gender m/f	21/79	17/95	
Age in years	52.36 ± 0.89	52.64 ± 1.06	n.s.
Weight in kg	85.06 ± 1.23	84.07 ± 1.09	n.s.
Height in m	1.68 ± 0.01	1.67 ± 0.01	n.s.
BMI in kg/m²	30.05 ± 0.27	30.12 ± 0.25	n.s.
Waist circumference in cm	102.16 ± 1.39	103.17 ± 0.91	n.s.

Fig. 1. Baseline characteristics of the participants in groups IG and CG (mean ± s.e.m.)

	Week 0	Week 12	Week 52	p
N	109	109	109	
Total cholesterol (mg/dl)	210.34 ± 38.26	200.26 ± 39.68	213.05 ± 41.82	+++, **
LDL cholesterol (mg/dl)	138,60 ± 31,38	129,58 ± 33,63	134,37 ± 30,36	+++, #
HDL cholesterol (mg/dl)	60.18 ± 14.80	57.44 ± 13.56	62.03 ± 15.12	+++, ##, ***
Triglycerides (mg/dl)	142,95 ± 71,75	113,14 ± 46,17	114,39 ± 54,05	+++, ###

Fig. 2. Changes in blood lipids over 1 year (completers; pooled data); Legend. +: Week 0 vs Week 1[2] ($p \leq 0.0^5$); ++ $p \leq 0.01$; +++ $p \leq 0.00^1$, #: Week 0 vs Week [52] ($p \leq 0.0^5$); ## $p \leq 0.01$; ### $p \leq 0.00^1$, *: Week 1[2] vs Week [52] ($p \leq 0.0^5$); ** $p \leq 0.01$; *** $p \leq 0.00^1$

T3:PO.113

Effect of intermittent versus continuous energy restriction on compensatory mechanisms activated during weight reduction

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Introduction: Intermittent energy restriction (IER) is a popular weight loss (WL) strategy. The effects of IER vs continuous energy restriction (CER) on body composition and compensatory mechanisms (reduction in resting metabolic rate (RMR), increase in exercise efficiency (Ef) and increase in hunger/reduction in fullness) activated during WL remain unknown. The aims of this study were to compare the impact of IER vs CER, inducing a similar WL, on the above mentioned mechanisms.
Methods: 34 obese (BMI: 36 ± 4kg/m²) individuals (26 females, age: 38.9 ± 9.4y) were randomized to IER or CER for 12 weeks. Each dietary pattern was designed to have an overall 33% energy deficit and a similar macronutrient composition. The IER group underwent 3 nonconsecutive days of very-low calorie diet/week. The CER group had daily energy restriction. Body weight, composition, RMR, Ef and subjective appetite were measured pre and post intervention.
Results: WL (~13%) and body composition changes were similar in both groups. A significant reduction in RMR was observed in IER, but not CER group. Ef increased significantly in IER, but not CER group at 25 and 50watts. Fasting prospective food consumption decreased significantly with CER but not IER. Differences between groups were not significant for any of the above. No significant changes occurred in other appetite feelings, either fasting or postprandially, within or between groups.
Conclusion: A similar WL, achieved either by IER or CER, induces the same changes in body composition, RMR, Ef and appetite sensations, but CER prevents the reduction in RMR and the increase in Ef observed with IER. However, the continuous or intermittent nature of energy restriction does not appear, on it own, to modulate the compensatory mechanisms activated with WL.

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T3:PO.114

Comparison of a low calorie-high protein diet and moderate calorie-high protein diet with a standard diet in the treatment of obesity

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Introduction: Obesity has been defined as a global epidemic, and its prevalence is now maintained or even accelerated in most industrialized countries. The leading non-pharmacological approach is the use of diets, particularly low-calorie and very low-calorie diets. In the last few years, the low-carbohydrate diet has gained progressive recognition over other dietary treatments, and the low-carbohydrate ketogenic diet in particular has been closely examined.
Methods: In brief, 45 overweight or obese non-diabetic men and women (age 34.4 ± 4.5 years) undertook a low calorie-high protein diet (LC), moderate calorie-high protein diet (MC) and standard diet (SD) for 4 weeks, during which some meals were replaced with a SDM formulation (S.D.M. - Societŕ Dietetica Medica, Italy). Bioelectrical impedance was used to measure body weight and composition using the standard adult mode of measurement. A baseline and final blood sample was collected. All groups received counseling by dietitian, no perform physical activity and adhered to the diet.
Results: At 4 weeks, the weight reductions in the LC diet, MC diet and SD diet groups were 7.5 ± 32.1,5.9 ± 1.3 and 4.5 ± 1.8 kg, respectively ($p < 0.05$). At the end of the study, at 4 weeks, the body fat reductions were 6.9 ±1.8, 5.4 ± 1.4 and 3,5± 1.8 kg, respectively ($p < 0.05$). Also, the fasting insulin level reductions were 8.9 ± 6.7, 5.9 ± 3.5 and 3.5 ± 0.7 µIU/mL, respectively ($p < 0.05$). Lean mass was unaffected, especially LC diet and MC diet groups.
Conclusions: In summary, the present work demonstrated that a LC diet and MC diet were significantly superior in the induction of weight loss and body composition in otherwise healthy obese patients compared with a SD diet. The prescription of a standard diet in the post weight loss phase was important for achieving weight loss success. Further research is needed to determine the precise mechanism of this effect.

T3 – Physical (in)/activity

T3:PO.115

Sedentary behavior is related to fat distribution among children in South China

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Introduction: Little is known whether sedentary behaviors (SBs) are related to body fatness independent of physical activity (PA) among Chinese children. The purpose of this study was to explore the independent associations of SBs (including TV/DVD viewing, computer use and doing homework) with body fatness among Chinese children.
Methods: A cross-sectional study was conducted in 1586 Chinese children (50.3% girls) aged 7–15 years. Height, weight, skin-fold thickness were measured and indicators of body fat distribution including percentage body fat (%BF), fat mass index (FMI) and fat-free mass index (FFMI) were calculated. Information of parental anthropometric measurements etc., as well as socio-demographic data were collected. Data on SBs, PA and dietary intake were assessed by self-reported questionnaires. Energy intake (EI) and energy expended in PA (PAEE) were calculated. The relations of SBs to body fatness were examined by multivariate linear models adjusted for the family average annual income, maternal overweight, EI and PAEE.
Results: Boys spent more time than girls on using computer or doing homework (all $p < 0.0002$). In girls, TV/DVD viewing, computer use and doing homework were positively related to %BF, FMI and FFMI (all $p < 0.04$). Moreover, girls who spent more time on SBs had 12.9%-23.3% higher FMI and 2.9% higher FFMI. Among boys, time of using computer was positively related to FFMI. However, no relation of TV/DVD viewing and doing homework to body fatness was observed in boys. Furthermore, the above observed associations were more pronounced in girls aged 7–10 years.
Conclusion: SBs are positively related to fat distribution among Chinese girls, independently of PA. These associations were stronger and consistently significant in the younger groups. Correnting author: Cheng G.

T3:PO.116

Variability in appetite and energy intake responses to exercise: A pooled analysis of acute laboratory-based studies

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Introduction: Exercise is promoted as an effective weight control strategy for all; however emerging data indicates that large variability exists regarding energy intake responses to exercise. This investigation pooled data from several laboratory studies to more fully explore the individual variability within appetite and energy intake responses to acute exercise.
Methods: Data from 16 of our group's laboratory studies were pooled to determine the between-subject variability in 1) hunger response during (n = 182) and after (n = 96) exercise; 2) ad libitum energy intake responses to acute exercise (n = 86). Data was derived from young, healthy, active males (age 22.3 ± 2.6 y; BMI 23.6 ± 2.2 kg/m^2). Exercise responses were determined by comparing exercise and control trial outcomes. Aerobic exercise bouts lasted 30–90 min (45–75% VO2 peak) with trials days endduring for 4–10 h. Hunger (AUC) responses were assessed during trials using Visual Analogue Scales and post-exercise energy intake was examined at ad libitum meals.
Results: Hunger was suppressed during exercise (-32%, $P < 0.001$) with no differences apparent afterwards. Large variability in response to exercise was evident however, during (-99 to +391%) and after exercise (-87% to +360%). No difference was observed in energy intake at the first meal (Control 1377 ± 474; Exercise 1411 ± 453 kcal); or for the summation of meals after exercise (Control 2951 ± 1085; Exercise 2999 ± 1083 kcal). Large variation in response was apparent at the first (-1196 to +1043 kcal) and subsequent meals (-1568 to +908 kcal) post-exercise.
Conclusion: Large variability exists in the individual appetite and energy intake response to acute exercise. Recognition of this variation is critical for personalised weight management strategies.

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T3:PO.117

Associations between nutritional knowledge, physical activity, cardiorespiratory fitness and obesity indicators in adolescents

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Introduction: Overweight and obesity have a multifactorial genesis, suggesting that's the result from the combination of several factors such as genetic, behavioral, environmental disturbances, lifestyles, physical activity and eating habits. The purpose of this study was to analyze the relations between nutrition knowledge (NK), physical activity (PA), cardiorespiratory fitness (CRF) and obesity indicators in adolescents in the city of Bragança.
Methods: The sample comprised 132 adolescents (57 girls and 75 boys), aged 12–18 years old. PA was measured using an accelerometer (GT3x; Actigraph), CRF was assessed by maximal multistage 20m shuttle run, NK was assessed by General Nutrition Knowledge Questionnaire, for Adolescents (GNKQA), portuguese version. The obesity indicators measured were body mass index (kg/m^2), waist and hip circumference (cm). Body fat percentage (%BF), total, and trunk, were measured by bioimpedance analysis with an electronic scale Tanita BC545.
Results: Through multiple linear regression, using the Enter method, and assuming %BF as the dependent variable and sex, age, NK, CRF and PA levels as independent variables, explained up to 52.9% ($P < 0.001$) of the variance in the dependent variable, and only the variables gender, CRF and sedentary PA showed significant relations with %BF. In the stepwise method, we founded that only CRF explains 40.9% ($P < 0.001$) of the variance in %BF. In the second model (final), with the inclusion of sex, the model went to explain 49.1% ($P < 0.001$) of the variance in the dependent variable.
Conclusions: Of the variables analyzed, CRF and sex are the most determinant variables to explain the variance in the %BF, despite the sedentary physical activity also have shown a significant relationship with the dependent variable.

T3:PO.118

Web-based intervention to promote weight loss maintenance using an activity monitor: Study design and 3-month interim report of a randomised controlled trial

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Introduction: Our previous study suggested that increased physical activity may be crucial for successful weight loss maintenance. The purpose of this study is to test the effectiveness of a web-based intervention designed to increase physical activity in promoting weight loss maintenance.
Methods: We are currently conducting a two-phase 27-month randomised controlled trial. Participants were recruited through newspaper advertisements. Eligibility criteria included age (40–64 years), body mass index (25–40 kg/m^2), and metabolic syndrome components (at least one). In phase 1, a 3-month group-based weight loss programme was provided to participants. We randomly assigned (1:1) participants who lost at least 5% weight in phase 1 to the control or intervention groups. Participants in the intervention group regularly report their body weight and physical activity through a web-based system compatible with a weight scale and activity monitor. Study staff provides personalized feedback based on weight and activity for 24 months. The primary outcome is 27-month body weight change.
Results: We recruited participants in 2 cities in Ibaraki Prefecture. In Mito, we enrolled 55 eligible participants in September 2014. In phase 1,49 participants decreased 5% of the baseline weight and were assigned to the control (n=25) and intervention (n=24) groups. In Chikusei, we enrolled 64 eligible participants in November 2014; their 3-month measurements will be carried out in February 2015.
Conclusion: We will continue web-based intervention for 24 months and test the hypothesis in February 2017.

Reference:
Nakata Y et al.: Obesity Facts 7;2014:376–87.

T3:PO.119

Physical activity improves functional exercise capacity for children and adolescents with obesity

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Introduction: Physical activities and education about healthy eating habits are essential for children with obesity. Six Minute Walk Test (6MWT) is a valuable and practical tool to measure functional exercise capacity in children with obesity.
Methods: Data about anthropometric parameters (weight, height, body-mass index (BMI), waist circumference), 6MWT, eating habits and physical activities was collected and analyzed by a multidisciplinary team in Children's Clinical University Hospital (Riga, Latvia) between August and November 2014.
Results: 31 children participated in study, 14 of them girls and 17 boys. Mean age (years ± SD) for girls was 13.4 ± 2.2, for boys 13.1 ± 2.7 (p = 0.689). Mean BMI (kg/m$_{,}$ ± SD) for girls was 30.0 ± 5.4, for boys 32.0 ± 5.0 (p = 0.298). No statistically significant difference was found between genders in performing the 6MWT, distance for girls was 582.5 ± 45.4 m, for boys 571.3 ± 75.2 m (p = 0.628). Statistically significant difference was found in between walked distance in children with physical activity out of school (629.0 ± 57.0m) and children without physical activity out of school (556.0 ± 57.3 m) (p = 0.005). 41.2% of children without physical activitiy out of school reported regular physical activity (running, swimming, bicycle and playing sports games) and 100% of children with physical activity out of school reported regular physical activity (p = 0.001).
Conclusions: All professionals and parents should ephasise the role of physical activity to children and adolescents with obesity.

T3:PO.120

Physical activity patterns in seven european countries measured by accelerometer: The food4me study

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Purpose: To describe physical activity (PA) patterns of the volunteers of the Food4Me Proof-of-Principle study; a 6-month pan European web-based randomized controlled trial on personalized nutrition, using objective accelerometry data.
Methods: Out of 1607 volunteers recruited, 1287 (539 men and 748 women) provided at least 3 weekdays and 2 weekend days of valid accelerometer data at baseline (tri-axial accelerometer: TracmorD, Philips).
Results: Following adjustment for country and season, men were slightly but significantly more active than women (mean physical activity level (PAL) ± standard deviation: 1.75 ± 0.19 vs. 1.72 ± 0.17, $p < 0.05$). Higher waist circumference was associated with lower PAL, less time spent in Moderate to Vigorous PA (MVPA) and more sedentary time (all ps<0.001). PAL was not influenced by age, but, in women, MVPA decreased whereas light PA increased with age ($p < 0.05$). Greek women had lower PAL and MVPA compared to the other countries ($p < 0.05$). Adherence to the World Health Organization (WHO) recommendations to accumulate weekly 150 minutes of moderate PA or 75 minutes of vigorous PA or equivalent MVPA was 58% for men and 40% for women. This is higher than in other large cohorts, especially US cohorts. Adherence differed by country for women: 54% met the recommendations in Ireland but only 22% in Greece ($p < 0.05$), but not for men.
Conclusions: Using accelerometers is feasible in a web-based intervention study and we encourage it in large trials. Participants in the Food4Me study had relatively high levels of PA but the majority would benefit from more PA.

T3:PO.121

Heterogeneity in the energy cost of posture maintenance during standing: Does it reside in differential patterns of "weight-shifting"?

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Introduction: Due to the disease risks associated with sedentary behaviour, there is much interest in methods to increase low-intensity

physical activity. In this context, it is a widely-held belief that altering posture allocation can modify energy expenditure (EE) to impact upon body weight regulation and health. However, we have recently shown the existence of two distinct phenotypes pertaining to the energy cost of standing – with the majority of individuals having no sustained increase in EE during steady-state standing relative to sitting comfortably. Here we investigated whether or not these two distinct phenotypes could be related to the presence/absence of spontaneous "weight-shifting", ie., the displacement of body weight from one foot to the other in order to minimise discomfort or maintain postural balance.
Methods: Min-by-min EE was measured during 10 min of standing in 36 young adults (18 men, 18 women) by facemask indirect calorimetry. Participants were asked to stand "naturally" on a dual-balance system, with each foot on a separate balance placed a few cm apart. Weight-shifting was assessed min-by-min as the delta weight between the two balances.
Results: The vast majority of participants (83%) showed no sustained increase in EE during the standing period compared to sitting. However, there was no discernible relationship between the energetic cost of standing and the presence/absence of spontaneous weight-shifting.
Conclusion: Whilst this study reconfirms that the large majority of individuals maintain sitting and standing postures at the same energetic cost, the mechanisms underlying this heterogeneity do not appear to be related to the general pattern of weight-shifting.

T3:PO.122

Influence of obesity on decreased deceleration in the horizontal direction during ambulation –lifestyle changes in obesity and relationship with kinetic characteristics

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Purpose: Increase in body weight during childhood has an important influence on the management of obesity in adulthood. Although we previously reported a lack of deceleration in the horizontal direction during a small clockwise turn in obese children, the influence of participant characteristics and life stage remains uncertain. This study aimed to clarify the effect of lifestyle changes on the kinetic characteristics of this lack of horizontal deceleration.
Method: This study consisted of an experimental design. Participants were recruited using notices posted in the university and excluded if they had no previous specialized training for the lower leg muscles. Of the 10 men (median age, 21 years) that participated, 6 men were in the obese (O) group, and 4 men were in the non-obese (NO) group. Median (range) weight, height, and body mass index were 93.5 (88.5–100.4) kg, 171 (168–178) cm, and 31.8 (30.9–33.8) kg/m^2, respectively, in the O group and 67.5 kg, 170 (162–179) cm, and 22.7 (21.5–26.5) kg/m^2, respectively, in the NO group. The participants were asked to walk on an elliptical track with a minor axis of 50 cm and major axis of 100 cm for 30 seconds in a clockwise direction at their own chosen speed. A force plate (PS-2142, Shimadzu, Japan) was placed in the 9-o'clock position to record the force applied in the outward direction, and the power in the horizontal and vertical directions was measured.
Results: Increased frequency of carbohydrate beverage intake between 9 and 18 years old and decreased frequency of physical activity at 12 years old (B = -63.5, 95% CI = -78.6 to –48.6.) significantly influenced the movement in the horizontal direction in the obese participants.
Conclusion: The age at which movement and intake of carbohydrate-containing drinks decreased had a significant influence on the lack of deceleration in the horizontal direction of a circumferential movement in obese participants.

Acknowledgement: Thank you, Everyone who participated in this study.Part of this study I received a research grant of Gunma PAZ College.

T3:PO.123

A socio-ecologically framed, school-based physical activity intervention has beneficial effects on obesity outcomes in adolescents from low ses communities: The pa4e1 rct

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Objective: One quarter of adolescents are overweight or obese, with the prevalence higher among adolescents from low socio-economic status (SES). Physical Activity 4 Every1 (PA4E1) is a 24-month physical activity intervention implemented in secondary schools from lower SES communities that aimed to reduce the decline in physical activity experienced during adolescence. This study reports the 12-month mid-intervention effects of PA4E1 on the secondary outcomes of weight, waist circumference and body mass index (BMI).
Methods: A cluster randomized controlled trial was conducted in 10 secondary schools located in low SES communities in New South Wales, Australia (1237 students, mean age 12 years, 48% boys). The school-based intervention was guided by socio-ecological theory and included seven physical activity strategies and six implementation strategies. The secondary outcomes included weight, waist circumference and BMI. Data was analysed using linear mixed models adjusting for school clustering.
Results: A total of 959 (78%) students provided anthropometric data at baseline and 640 (52%) at mid-intervention. There was a significant group-by-time effect in favour of the intervention group for mean difference (95% CI) in body weight (-0.65kg [-1.26 to –0.05], p = 0.04), waist circumference (-1.15cm [-1.98 to –0.32], p≤0.01) and BMI (-0.28kg/m^2 [-0.49 to –0.07], p = 0.01). The intervention resulted in significant effects on male student's BMI (-0.33kg/m^2 [-0.63 to –0.02], p = 0.04) and female students' waist circumference (-1.85cm [-3.00 to –0.70], p≤0.01).
Conclusion: A socio-ecologically framed, multicomponent school-based physical activity intervention that increases adolescents' physical activity may assist in preventing overweight and obesity in low SES adolescents.

T3:PO.124

Inflammation is related to worse self-perceived fatigue in obese boys and girls

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Introduction: In obesity, adipocyte dysfunction contribute to elevated circulating levels of C-reactive protein (CRP), an important marker for inflammatory burden. Inflammation is a well-known contributor to fatigue sensations in several diseases; but its role in obesity-related fatigue remains unclear. This study examined the relationship between circulating hs-CRP and self-perceived fatigue in obese adolescents.
Methods: 237 obese adolescents (140 girls and 97 boys; 15 ± 2 years) were examined for heart rate, blood pressure, body composition (DXA) and self-perceived fatigue (Multidimensional Fatigue Inventory, MFI-20). Blood samples were collected and analyzed for hs-CRP, triglycerides (TG), cholesterol (CH), high density lipoproteins (HDL) and low density lipoproteins (LDL). Correlations were computed corrected for gender and age.
Results: Higher hs-CRP was significantly related to higher body weight, BMI, heart rate and sys BP (resp r=0.17; r=0.24, r=0.19 and r=0.16; all p < 0.02) .In addiction higher hs-CRP levels were related to worse

self-perceived fatigue (subscale total fatigue r=0.15, general fatigue r=0.16 and physical fatigue r=0.17; all $p < 0.03$) and fat parameters (segmental and total fat; all r>0.22; all $p < 0.001$). Despite the fact that hs-CRP was related to fat parameters no relations were found for hs-CRP and blood lipid levels.
Conclusion: Based on our results we conclude that higher hs-CRP is not only related to fat accumulation and cardiovascular risk factors, but also related to worse self-perceived fatigue in obese adolescents.

T3:PO.125

The impact of a 6 week exercise programme on cardiovascular fitness in obese individuals attending the Rotherham Institute for Obesity (RIO)

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Introduction: Obesity coupled with an association of cardiovascular disease has caused an increased risk of mortality worldwide. For this reason, the assessment of cardiovascular fitness may be useful to help assess CVD risk, and in order to provide appropriate and tailored advice for physical activity.
Methods: 46 participants (age=36.7 +/- 20.6 yrs; BMI=36.1 +/- 7.2 kg/m^2) who were attending the on-site gym at the Rotherham Institute for Obesity (RIO) completed the Ebelling Protocol, a single stage submaximal walking test used to calculate predicted maximal oxygen uptake (VO2 max), at baseline and at 6 weeks. The Ebelling Protocol was used as maximal testing is not recommended for obese populations, as it is not feasible for those who may be limited by pain or fatigue, and increases the risk of cardiac events. Data was analysed with parametric tests, descriptive statistics and paired t-tests (t) to compare mean values.
Results: Following 6 weeks attendance at the RIO gym, resting heart rate significantly decreased from 85.1bpm to 76.8bpm ($t=5.98$, $P < 0.001$) and VO2 max significantly increased from 34.2 ml/kg min to 36.7 ml/kg min ($t=-4.86$, $P < 0.001$) in comparison to baseline. Furthermore, there was a significant increase in self-selected speed ($t=-7.46$, $P < 0.001$) and overall decrease in rate of perceived exertion (RPE), which was significant for those who remained at the same speed ($n=17$, $t=2.13$, $P = 0.4$).
Conclusion: Results support the inclusion of exercise in a weight management programme, facilitating significant improvements on cardiovascular fitness. The reduced RPE suggests that individuals may be able to work harder and that the exercise is more manageable.

T3:PO.126

Effect of submaximal exercise on muscle carnosine: The role of carnosine supplementation

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Introduction: Carnosine (β-alanyl-L-histidine) is a dipeptide abundant in skeletal muscle, with the ability to quench reactive carbonyl species, reduce metabolic and exercise-related stress and to improve muscle performance.
Methods: The effect of submaximal 1 hour run on carnosine levels in muscle was studied, before and after 2 months of carnosine supplementation (2g/day), in 7 male recreational runners/cyclists (age 34.0 ± 1.4y, BMI 22.2 ± 0.48 kg.m-2, VO2max 46.8 ± 1.9 ml.kg-1.min-1) applying 1H-MRS on 7T MR system (Magnetom, Siemens). Muscle carnosine measurement was performed before one hour lasting run (11.4 ± 0.4km) and repeated twice immediately after the run. Measurements of maximal aerobic capacity (VO2max, bicycle ergometry), muscle strength (leg-press dynamometer) & habitual physical activity (accelerometer) were also performed before and after the supplementation.
Results: Carnosine supplementation was associated with 17% ($p < 0.05$) increase in muscle strength, while VO2max & muscle carnosine content did not change. Supplemented individuals favored glycolytic energy sources during the maximal load as evidenced by higher respiratory quotient. Interestingly, muscle carnosine was negatively associated with ambulatory activity (steps /h; $r=-0.65$, $p = 0.02$) and vigorous physical activity (>8MET, min/day; $r=-0.65$, $p = 0.02$). The magnitude of muscle carnosine change after the run was, however, positively associated with volume (steps /h; soleus m. $r=0.64$, $p = 0.03$) and dynamics of habitual physical activity ($r=0.7$, $p = 0.01$).
Conclusion: Carnosine supplementation increased muscle strength and glycolytic energy utilization during the maximal intensity exercise. The positive association of running-induced change in muscle carnosine with the volume and intensity of habitual ambulatory activity indicate increased carnosine turnover in muscle of physically active individuals.

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T3:PO.127

Moderate to vigorous physical activities during physical education lessons, according to gender and body mass index

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Introduction: Current recommendations for PA, in school-aged children and adolescents, advocate 60 minutes of daily Moderate to Vigorous intensity PA (MVPA). The school, through physical education lessons (PE), plays a major role in the promotion and practice of PA. This study seeks to analyse, comparatively, levels of PA and the relative contribution of 45 and 90 minutes PE lessons to achieve daily recommendations for MVPA, particularly by gender, age, and weight status.
Methods: Sample consisted of 266 students, aged 10–17 years, belonging to an educational establishment of Guimarães, Portugal. BMI and body fat percentage were collected. We used the ActiGraph´s accelerometer's wGT3X-BT during PE lessons, in a total of 23 classes. Standard cut-off points were used for accelerometers.
Results: The results suggest that the percentage of MVPA are approximately equal in 45 and 90 minutes classes (26.7 vs. 26.6 45 min classes contribute about 13.3% of 60 minutes a day recommended for MVPA and 90 min lessons with 33.3 ±10.7%; In classes of 45 and 90 minutes, boys accumulate more MVPA and less sedentary PA compared to the girls; In 45 min lessons, only light PA, are statistically higher than in girls, and with similar results when overweight students are compared with normal weight. Boys, in MVPA, with overweight showing statistically higher results than those with normal weight; In 90 min class, only in the vigorous activities, girls with normal weight have statistically higher results than those with overweight/obesity. Age, BMI and percentage of fat mass were inversely related to the time in moderate to vigorous physical activity during 45 and 90 min classes.
Conclusions: Only for classes of 90 minutes, positive correlations were found between the time in MVPA and the number of sports covered during the class.

T3:PO.128

Increasing physical activity in children for obesity prevention: An innovative methodology using accelerometers

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Introduction: To date, the methods used to measure physical activity (PA) in children and adolescents often lead to missing or non-precise data. This study provides encouraging results on children participation rate and measure of PA, using 3D accelerometers.
Methods: In the EPODE France community-based programme, 7 facilitators were recruited to provide bi-weekly PA sessions to children for 7 weeks, using a kit including 6 different activities. 215 children aged 8 to 11 were recruited, from which 124 composed the control group and 91 the action group. Each child received a 3D accelerometer wristband. Measurement of the children PA was made once a week for 14 weeks (during the PA sessions and for 7 weeks after the PA sessions) thanks to the accelerometers. In parallel, the children completed a questionnaire on their PA habits, screen time and sleeping habits.
Results: The children participation rate in the sessions and motivation is high. First measures of PA level indicate that using an accelerometer is an interesting and accurate way to collect data on physical activity in children. The formal agreement between the community stakeholders enabled the researchers to regularly collect data using the accelerometers and the questionnaires.
Conclusion: Expected results are a 10-minutes increase of the children daily physical activity, 7 weeks after the end of the physical activity sessions.

T3:PO.129

Knowledge and Beliefs Saudi Female School Teachers on Physical Activity Participation by Girls.

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Background: With the recent shift towards urbanization in Saudi Arabia, physical inactivity and sedentary lifestyle have become predominant, particularly among children and adolescent1. Concurrently, obesity levels have risen seven-fold between 1988 and 20052. Some level of knowledge of the anticipated reward is required to motivate the effort required to participate in regular physical activity18,33. Aim: This study explored possible barriers behind physical inactivity in female students by assessing female teachers' knowledge of physical activity.
Methods: A validated questionnaire was administered and focused group discussions were held with female teachers of Al-Abna'a Schools in Riyadh, Saudi Arabia.
Results: The study found that the majority of teachers believed that physical activity was important for children and that girls should have physical exercise classes in school. However, teachers' levels of knowledge on physical activity recommendations for children was low. Barriers for regular physical activity in children were reported lack of social and parental support, children's low interest in physical exercise, and lack of sports facilities suitable for young girls.
Conclusion: Saudi female schools have only female teachers. Therefore, a programme to improve physical activity particpation by girls will require a comprehensive physical activity education for these female teachers as a start.

Acknowledgement: The study was funded by the Saudi Government.

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T3:PO.130

Does objectively quantified physical activity level independently predict nafld and visceral obesity?

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Introduction: Epidemiologic studies have suggested a negative relationship between nonalcoholic fatty liver disease (NAFLD), visceral adipose tissue (VAT) and self reported physical activity levels, but this subjective measurement can be inaccurate and prone to reporter bias. We aimed to investigate whether objectively measured physical activity predicted NAFLD and VAT in overweight/obese adults.
Methods: Habitual physical activity levels were measured via accelerometery (SensewearTM) across four days (three weekdays and one weekend) during an 8-week period. Average daily time spent in sedentary behaviour (MET<1.6), light (MET 1.6<3), and moderate (MET 3<5.9) activity was quantified (BodyMedia software, v8.0). Liver fat was assessed via proton magnetic resonance spectroscopy and VAT volume via magnetic resonance imaging. Bivariate correlations and hierarchical multiple regression analyses were performed with reference to prediction of liver fat percentage and VAT.
Results: Preliminary data (n=72) showed a significant correlation between VAT and sedentary behaviour ($p = 0.008$) and moderate activity levels ($p = 0.006$) but not between liver fat and any level of activity ($p > 0.05$). Regression analysis revealed that age, gender and the addition of known risk factors for obesity related-NAFLD accounted for 49% and 26% of the variance in VAT and liver fat respectively ($p < 0.01$). Adding sedentary and moderate physical activity levels to the model only accounted for a further 1% of variance for VAT ($p = 0.24$) and reduced it by 3% for liver fat.
Conclusion: Objectively measured levels of habitual physical activity and sedentary behaviour did not improve the overall capacity of known obesity related risk factors to predict VAT or NAFLD in overweight/obese adults.

T3 – Sleep

T3:PO.131

Associations between sleep patterns and lifestyle behaviors in children: An international comparison

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Introduction: The objective was to examine the associations between sleep patterns and lifestyle behaviors in children from 12 countries representing a wide range of geographic and socio-cultural variability.

Methods: The sample of this multi-national cross-sectional study comprised 5,777 children aged 9–11 years from sites in Australia, Brazil, Canada, China, Columbia, Finland, India, Kenya, Portugal, South Africa, United Kingdom and United States. Sleep duration (h/day), sleep efficiency (%) and bedtime (h:min) were measured over 7 days using an accelerometer (validated 24-h waist-worn protocol). Outcome measures included moderate-to-vigorous physical activity (MVPA), total sedentary time (SED), self-reported screen time (ST), and healthy/unhealthy eating patterns (HEP/UEP).
Results: Overall, participants averaged 8.8 (SD 0.9) hours of sleep per day with 96.2 (SD 1.4) % sleep efficiency and a mean bedtime of 22:18. After adjustment for age, sex, highest parental education and BMI z-score, results showed that (i) sleep duration was negatively associated with MVPA, SED and UEP score, and positively associated with HEP score; (ii) sleep efficiency was negatively associated with MVPA and positively associated with SED; and (iii) bedtime was positively associated with ST and UEP score, and negatively associated with HEP score. Results also showed that some of the associations between sleep patterns and lifestyle behaviors were different between study sites.
Conclusion: Sleep characteristics are important correlates of lifestyle behaviors in children, especially sleep duration and bedtime. Differences between countries suggest that interventions aimed at improving sleep and lifestyle behaviors should be culturally adapted.

T3:PO.132

Is Obstructive Sleep Apnea Level Related with Anthropometric Measurements and Body Composition?

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Introduction: Obesity is associated with Type 2 diabetes, hypertension, cardiovascular diseases, obstructive sleep apnea syndrome (OSAS). In this study, it was aimed to examine body composition and some anthropometric measurements of individuals who have different OSAS classification.
Methods: This research was carried out on 105 patients (74 males, 31 females) , who got diagnosed with OSAS, aged 19–64 years, in Sleep Disorders Center of Gazi University Faculty of Medicine. The classification of OSAS was done according to Apnea Hypopnea Index (AHI). The measurements of body weight, height, waist and hip circumference, neck circumference were taken and body composition was analyzed.
Results: In this study, the ratio of individuals whose BMI ≥30 kg/m^2 was 60.0% of patients. The percentage of obesite was found to be 48.38%, 56.67% and 70.45% in patients with mild, moderate and severe OSAS, respectively. The mean body mass index (BMI) and neck circumference (cm) values with severe OSAS were found higher than moderate OSAS in male ($p < 0.05$). In women, the mean waist circumferences, BMI and body fat percentages were found higher in severe OSAS than mild OSAS ($p < 0.05$). AHI was correlated with fat mass (kg) in males (r=0.327) and BMI in females (r=0.505) more than the other anthropometric measurements. Oxygen saturation (SaO2) was found higher correlated with body fat percentage in males (r=0.472) and fat mass in females (r=0.717) than the other anthropometric measurements.
Conclusion: It was concluded that body composition parameters were related to OSAS. The percentage of obesity was found to be higher in individuals with OSAS. The correlation between body composition and some anthropometric measurements were seen differences according to gender and OSAS levels.

T3:PO.133

Heart rate variability non-linear dynamics in obese patients during wakefulness and sleep

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Introduction: Obesity is accompanied by altered cardiovascular (CV) dynamics, associated with increased mortality risk [1]. Given the CV system non-linear nature, by analyzing the HRV complexity it is possible to assess the functionality of the underlying regulation system, with higher complexity suggesting better adaptability [2]. The dynamics of HRV complexity were hereby investigated during wakefulness and sleep, a state characterized by important CV changes, in healthy and obese subjects.
Methods: Seven obese patients and seven controls underwent overnight polysomnography. For each subject the electrocardiogram (ECG) was acquired and the tachogram was extracted; the Detrended Fluctuation Analysis (DFA) and Sample Entropy (SE) indices were calculated on ten-minute tachogram portions selected during wakefulness and sleep.
Results: Results are shown in Fig. 1. Both during wakefulness and sleep, the indices are significantly higher (p-value < 0.05) in the controls than in the obese patients. Both indices are higher during sleep for both groups, significantly for the obese population.
Conclusions: Significantly reduced complexity was observed in the obese group during wakefulness and sleep, possibly attributable to a regulatory mechanism breakdown. The higher complexity observed in the obese group during sleep is indicative of a CV regulation change and should be further investigated. Our results suggest that obesity can be associated with impaired CV control. Further studies should quantify altered HRV complexity impact on CV mortality in obesity.

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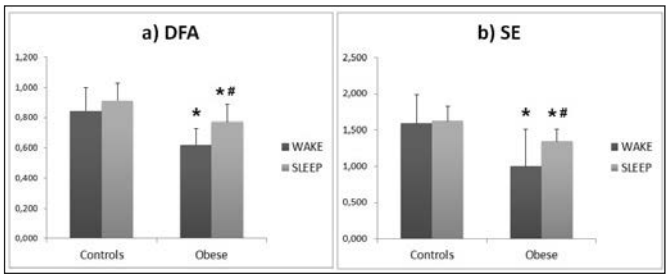

Fig. 1. a) DFA and b) SE mean values (± SD) during wakefulness and sleep, for the control and the obese groups. *
denotes significant difference ($p < 0,05$) when compared with control group; # denotes significant difference ($p < 0,05$)
when compared with wakefulness condition.

T3 – Sugar and artificial sweeteners

T3:PO.134

Rare sugar d-allulose prevents progression and development of diabetes in type 2 diabetes mellitus (t2dm) model otsuka long-evans tokushima fatty (oletf) rats

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Background: Prevalence of obesity has emerged as single most life-style-related health problem, mostly due to excess calorie leading to one of its complications, insulin resistance followed by concomitant increase in T2DM. To cope with increased demand of insulin pancreatic -cells become hypertrophic leading to failure followed by glucose intolerance. The situation demands age-adjusted balanced food intake.
Objectives: We introduce a zero-calorie sweet-taste monosaccharide, D-allulose, rare in nature and produced through enzymatic conversion in Kagawa University, Japan. D-allulose has been evaluated as a unique metabolic regulator of hyperglycemia and hyperlipidemia.
Methods: Treated OLETF rats fed 5% D-allulose where control OLETF and non-diabetic healthy control, LETO were fed water only. Body weight, food and drink intake were measured weekly, blood glucose and insulin monthly. Oral glucose tolerance test was performed. Liver, pancreas and other organs were preserved and stained.
Results: D-allulose controlled abdominal fat accumulation and thus prevented excess body weight increase. D-allulose improved insulin resistance through maintenance of fasting, random and OGTT blood sugar levels. It also significantly attenuated progressive β-islet fibrosis and preserved islets, evaluated by HE and Masson's staining and immunostaining of insulin, glucagon and α-smooth muscle actin. Serum levels of pro-inflammatory and anti-inflammatory adipokines were also controlled well by D-allulose. Among several mechanisms of the activity of D-allulose against both hyperglycemia and hyperlipidemia strong anti-inflammatory activities were prominent.
Conclusion: Rare sugar D-allulose might be a promising strategy for the prevention of obesity and, commencement and prevention of T2DM.

T3:PO.135

Acute metabolic and cardiovascular responses of healthy young adults to the ingestion of galactose - the forgotten sugar

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Background: Overconsumption of refined sugars has been implicated in the development of obesity and cardiovascular diseases, with fructose considered as a more damaging monosaccharide than glucose - in part attributed to its greater de-novo lipogenic and blood pressure elevating effects. Little is known, however, concerning the metabolic and cardiovascular effects of galactose – another monosaccharide (derived from lactose). We investigated here, at rest, the extent to which blood pressure (BP), energy expenditure (EE) and respiratory quotient (RQ) in response to galactose differ from those of glucose and fructose.
Methods: In a randomized cross-over design, 12 healthy young men and women of normal BMI attended 3 separate morning sessions during which continuous cardiovascular and indirect calorimetry monitoring were performed while sitting comfortably for at least 30 min before and 150 minutes after ingestion of 500 mL of water containing 60g of either glucose, fructose or galactose.
Results: Fructose ingestion elicited significant increases in both systolic and diastolic BP ($p < 0.001$) compared to little or no changes in BP after ingestion of glucose or galactose. EE increased to a similar extent after each of the three sugar drinks reaching similar peak values in about an hour, but its subsequent fall towards baseline values was faster with galactose and glucose than with fructose ($p < 0.05$). RQ increased with all three sugars, but to a much greater extent with galactose and fructose than with glucose ($p < 0.001$).
Conclusion: The kinetics of postprandial changes in BP and EE in response to galactose are similar to those for glucose, while galactose-induced increase in RQ (reflecting greater carbohydrate oxidation and/or de-novo lipogenesis) is closer to that for fructose.

T3:PO.136

Effect of sweetness intensity on ad libitum intake of milkshake, appetite, and subsequent snack intake

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Introduction: Overconsumption of sugar-sweetened beverages is linked to obesity. Previous studies on the effect of sweetness intensity on satiation have been conflicting. It may be that sweetness intensity and palatability were confounded in these studies. Higher sweetness may lead to faster satiation due to increased sensory exposure [1]. However, the high palatability of sweet food may trigger overeating [2]. Our primary objective is to investigate if sweetness intensity affects ad libitum intake of milkshake, while palatability is controlled. The second aim is to investigate if sweetness intensity in milkshake affects subsequent snack intake.
Methods: 26 females consumed ad libitum low, ideal, and high sweetness milkshakes (LSM, ISM and HSM) varying in the concentration of Canderel Granules sweeteners on 3 mornings. Sweetness intensities were selected individually by subject. LSM and HSM were similarly pleasant while ISM was the most pleasant. Subjects consumed ad libitum salty and sweet snacks following the milkshake. Hunger, desire for sweet and desire for salty food was rated before and after milkshake and snack intake.
Results: After consuming milkshakes, the desire for sweet food decreased ($p < 0.05$) whilst the desire for salty food was unchanged. Subjects consumed more salty snacks than sweet snacks ($p < 0.05$). There was no significant effect of sweetness intensity on intake of milkshake or appetite ratings.
Conclusion: Sweetness intensity did not affect ad libitum intake of milkshake, appetite or subsequent snack intake, despite of similar or different palatability.

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T3:PO.137

Sugar-sweetened beverages and obesity among children and adolescents: A review of systematic literature reviews

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Introduction: The prevalence of overweight and obesity among children and adolescents has increased worldwide and has reached alarming proportions. Currently, sugar-sweetened beverages (SSB) are the primary source of added sugar in the diet of children and adolescents. Contra-

dictive findings from studies and reviews have fuelled an endless debate on the role of SSBs in the development of childhood obesity. The primary aim of the present review of reviews was to assess how review-level and study-level methodological factors explain conflicting results across reviews and meta-analyses by providing an up-to-date synthesis of recent evidence regarding the association between SSB consumption and weight gain, overweight and obesity in a population of 6-month to 19–year-old children and adolescents. The secondary aim was to assess the quality of included reviews using the AMSTAR measurement tool.
Method: Systematic reviews and meta-analyses were included. The literature search was performed through the platforms Pubmed, Cinahl and Web of Knowledge.
Results: Thirteen reviews and meta-analyses were included. Nine reviews concluded that there was a direct association between SSBs and obesity in children and adolescents and four others did not. The quality of the included reviews was low to moderate and the two reviews with the highest quality scores showed discrepant results.
Conclusion: The majority of reviews concluded that there was a direct association between SSB consumption and weight gain, overweight and obesity in children and adolescents. However, recent evidence from well conducted meta-analyses shows discrepant results.

T6 – Environmental/ecological drivers

T6:PO.001

Fitness and food environments around junior high schools in taiwan and their association with body composition: Gender differences for recreational, reading, food and beverage exposures

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Introduction: In early adolescence personal behaviours, reproductive physiology and body composition (BC) change and the school environment may contribute. We investigated determinants of energy balance and nutritional status during child development by mapping.
Methods: The Nutritional and Health Survey in Taiwan (2010) for 1458 junior high school students was geo-mapped for 30 school environs. Facilities for physical activity (fitness centers, gymnasia and sports stadiums, activity centers and parks), sedentary activities (reading material rental shops (RMRS), internet cafes) and food and beverage outlets were calculated as weighted numbers within 1000 m of schools. Multiple linear regressions were used to predict BC variable z-scores.
Results: For boys, higher fitness center densities and, for girls, gymnasia and sports stadiums were associated with less abdominal fatness. For girls, body mass index, waist circumference (WC) and triceps skinfold thickness (TSF) were greater when RMRS density was higher as was TSF with internet café density. Where there were no food and beverage outlets, boys' WC and TSF were less with more parks, but girls were shorter and WC more adverse. With greater RMRS density and no FBOs, girls still had increased WC/Hip ratio, and less mid-arm muscle circumference. Boys' findings were more evident after considering puberty.
Conclusion: Physical activity facilities in school environments favour healthier adolescent body composition, but differently for boys and girls. Food and beverage outlet absence increases the likelihood of healthier BC for boys.

Acknowledgement: The present study was funded internally by the National Health Research Institutes in Taiwan. Prof Wen-Harn Pan is the coordinator of the Nutrition and Health Surveys in Taiwan (NAHSIT) on which the project was based.

T6:PO.002

Association between obesity in a social context and autism and other neurodevelopmental disorders

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Background: Several studies reported risk factors for autism and other neurodevelopmental disorders (AND) in children, such as maternal smoking, age and metabolic condition. However, other risk factors, particularly impacts of social determinants on AND remain unclear. We therefore examined the association between obesity at community level and AND in children.
Methods: We conducted a cross-sectional study in 2014, which recruited citizens aged 20 years or older of two towns in central Japan. A self-administered questionnaire was used to assess possible confounding factors such as age, body mass index (BMI), smoking habit and household income. A composite outcome of AND was used, which consists of their children's history of pervasive developmental and other three neurodevelopmental disorders. To adjust for demographic and possible confounding factors and to investigate the contextual effect of obesity at the community level, a mixed- effects logistic regression model was performed. Mean BMI in each dwelling area was entered into the model as a random effect.
Results: 5,272 female who had at least one child were included. Individuals with missing data or outliers of age and BMI were excluded. Finally, 5,095 female were analysed. Prevalence of AND was estimated as 1.4%. In the final model, maternal age was associated with AND. However, the other individual factors and mean BMI at the community level were not associated.
Conclusion: In the cohort, we did not find any association between obesity at the community level and AND in children. However, we would need to conduct further investigation into impact of social determinants on neurodevelopmental disorders like other diseases.

T6:PO.003

Urinary phthalate metabolites are associated with insulin resistance in obese subjects

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Introduction: Commonly used chemicals such as phthalates have come under scrutiny for their potential causative role in type 2 diabetes development1.
Methods: 123 obese subjects were recruited. Data were collected on physical activity level (PAL), medication use and smoking. Body mass index (BMI), 24-hour urine collection, a fasting blood sample and an OGTT were obtained. Several fasting and OGTT based estimates of insulin resistance and beta-cell function were calculated. Analysis of 10 major phthalate metabolites (PM) was performed2. The relationship between PM and estimates of insulin resistance and beta-cell function was assessed using regression analysis, the first adjusting for gender, the second adjusting for gender, age, PAL, smoking, medication use and BMI.
Results: Ten participants were diagnosed with type 2 diabetes, 50 individuals had abnormal glucose tolerance. Mean age was 41 and mean BMI was 38.7 kg/m$_{.}$. Both gender and multiple adjusted regression analyses indicated several PMs as significantly associated with the Belfiore Index. 1 PM was significantly associated with HOMA-IR in the multiple adjusted model. Several PMs were significantly associated with the Matsuda index, however only in the multiple adjusted model.

Conclusion: Phthalate levels are associated with markers of increased insulin resistance and decreased insulin sensitivity in an overweight and obese population.

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T6:PO.004

Environmental xenoestrogens contribute to inflammation and cardiometabolic risk during obesity in pre-menopausal women

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Introduction: Xenoestrogens (XEs) exposure have recently emerged as a risk factors for obesity and cardiovascular disease. In this regard, we investigate the levels of XEs in plasma and AT depots in a sample of pre- and postmenopausal obese women and their cardiometabolic impact in an obese state.
Methods: We evaluated XE levels in plasma and visceral (v) and subcutaneous (sc) adipose tissue (AT) samples of portuguese obese women undergoing bariatric surgery. Association with metabolic parameters and 10-year cardiovascular disease (CVD) risk was assessed, according to menopausal status (73 pre- and 48 postmenopausal). Levels of XEs were determined by gas chromatography. Anthropometric and biochemical data were collected prior to surgery.
Results: There was a different distribution of XEs among the three analyzed locations according to menopausal status. Furthermore, in pre-menopausal women, there was a positive correlation between XEs levels and metabolic and inflammatory parameters, namely HbA1c and the count of plasma monocytes with vAT XEs levels, and more importantly XE levels in plasma seem to predict CDV risk.
Conclusions: Our findings suggest that XEs exposure/accumulation/burden and not obesity per se may contribute to increase CVD risk and inflammation especially in premenopausal women, and thus these chemicals may have a potential role in the later development of cardiometabolic disease in obese women.

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T6 – The role of industry (inc reformulation)

T6:PO.005

Engendering positive partnerships with industry to address obesity: A framework for collaboration.

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As obesity continues to dominate public health discussions we are mired in an era of conflict and blame that does nothing to serve public health. If we are to solve the obesity epidemic worldwide, adversarial relationships with industry, particularly the food and beverage industry, must be set aside and we must identify ways to successfully engender collaboration. By doing so we will leverage resources from all possible constituencies who are interested in contributing to being part of the solution. If we are to address the obesity epidemic effectively we must engage in thoughtful scientific appraisal and develop sound evidence-based approaches to positively impact energy balance (i.e. improving the nutrition and physical activity environments) and for identifying safe and effective interventions to achieve this both at the population and individual level. Unfortunately, efforts to build effective industry-academic-public health partnerships in nutrition and obesity research are often met with emotional hyperbole and efforts to find common ground are met with interference and opposition. Increasingly both in the public and professional domains we have seen otherwise well-conducted research, involving fully transparent and appropriate funding, rejected out-of-hand based solely on the source of that funding, with no evidence whatsoever of misconduct. This must stop if we are to move forward. In this presentation, we will address how decades of experience and success in other sectors can inform our engagement with the food and beverage industry to allow meaningful scientific discovery to occur and effective public health strategies to be implemented and tested within a collaborative and transparent framework. Guidelines to promote ethical industry/academic partnerships that can expand our scientific knowledge and improve public health will be discussed and relevant research and policy papers discussed.

T6 – Stigma, bias and discrimination

T6:PO.006

Weight Stigma "gets under the skin" – evidence for an adapted psychological mediation framework – a systematic review

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Objective: Research consistently shows a negative view of individuals with obesity in the general public and in various other settings. Stigma and discrimination can be considered a chronic stressor as these factors have a profound impact on the psychological well-being of the affected individuals. This article proposes a framework that entails a mediation of the adverse effects of discrimination and stigmatization on mental well-being through elevated psychological risk factors that are not unique to weight but that could affect overweight and normal weight individuals alike.
Methods: A systematic research was conducted to assess the prevalence of psychological risk factors, such as self-esteem and coping, in individuals with obesity.
Results: 46 articles were assessed and included for detailed analysis. The number of studies on these topics is limited to certain dimensions of psychological processes. The best evaluated association of obesity and psy-

chosocial aspects is seen for self-esteem. Most studies establish a negative association of weight and self-esteem in children and adults. All studies with mediation analysis find a positive mediation through psychological risk factors on mental health outcomes.
Conclusions: This review shows that elevated psychological risk factors are existent in individuals with obesity and that they may be a mediator between weight discrimination and pathopsychological outcomes.

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T6:PO.007

The influence of weight-related teasing and non-normative eating behaviors on weight loss maintenance

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Introduction: Weight-related teasing (WRT) during childhood and adolescence is associated with non-normative eating behaviors of which a negative relationship with weight loss maintenance is well-documented. Due to the lack of longitudinal studies investigating the predictive value of WRT and non-normative eating behaviors, the present study aimed to prospectively examine the influence of WRT on weight loss maintenance as well as the role of non-normative eating behaviors as possible mediators of this relationship.
Methods: The sample consisted of N = 381 participants of the German Weight Control Registry who had lost at least 10% of their maximum weight and had maintained the reduced weight for at least one year. Participants' WRT during childhood and adolescence, their current eating behavior, and the change of their body mass index (BMI) across two years were assessed. Structural equation modeling was used to analyze the assumed mediational relationship.
Results: After controlling for age and sex, a greater effect of WRT during childhood and adolescence predicted more frequent restrained, external, and emotional eating. Emotional eating in turn predicted a smaller decrease or a greater increase of BMI and fully mediated the direct relationship between the effect of WRT and change of BMI. Fit-indices indicated good model-fit.
Conclusion: Weight loss maintenance is less favorable in individuals who had suffered from WRT during childhood and adolescence, especially when more frequent emotional eating is reported. Results underline the influence of WRT on non-normative eating behaviors, however, only emotional eating adds to the prediction of weight loss maintenance. Thus, results highlight the importance of interventions for the reduction of WRT and emotional eating.

T6:PO.008

Dieticians and stigma in the context of obesity- a systematic review

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Background: Recently, many studies examined negative prejudice of health care professionals towards people with obesity. Only a few studies focus on dieticians and nutritionists. The aim of this article is to provide a systematic review on the current state of quantitative research on weight-related stigma by dieticians and nutritionists.
Methods: A systematic literature review was conducted using Pubmed, Psycinfo, Web of Science and Cochrane Library. Only studies that investigated the attitude of dieticians towards people with obesity were included. Studies investigating other health care professionals, reviews or qualitative studies were excluded.
Results: Eight studies were found. Studies differ in terms of study characteristics (e.g. sample size), measuring instruments or scales (implicit vs. explicit) and the origin of the sample. Five studies clearly report prejudice by nutritionists towards people with obesity or overweight. Causes of obesity according to dieticians' beliefs were also investigated, indicating, that there is a defined preference for internal factors (such as lack of willpower or overeating) rather than genetic or biological causes.
Conclusions: Results of studies in dieticians are not as homogenous compared to other health care professional groups. The degree of negative attitudes towards people with obesity has been found to be slightly less pronounced. However, the current review outlines that this type of stigma is by all means relevant, especially when looking at dieticians' beliefs of what triggers overweight and obesity.

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T6:PO.009

Branding and social identity: Coca-cola does not make overweight children more popular

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Introduction: Children are exposed to substantial food and beverage marketing, which seeks to create brand loyalty from a young age. During development, children use brands to express individual and collective identity. Previous research has shown that even very young children have negative perceptions of overweight. The study aimed to test whether association with a popular brand would reduce this negativity.
Methods: 120 children (57 male) aged 4–9 years (mean 6.6y±1.2) from three UK primary schools were read a story book in which Tom, the main character, was drawn as either normal weight (NW) or obese (OB) and was either shown to be associated with 'Coca-Cola' or a non-branded 'fizzy drink'. Children rated Tom on several attributes/behaviours and indicated their perception of their own body shape.
Results: OB Tom was rated as less popular ($p = 0.004$) and less well behaved ($p = 0.002$) but not as having increased appetite or watching more TV. When associated with Coca-Cola, OB (but not NW) Tom was rated as less well behaved ($p = 0.020$). Popularity was not affected by the brand. ANCOVA (adjusting for age) found that OB Tom was also perceived as less likely to win a race. There was a non-significant trend ($p = 0.072$) to suggest that the presence of Coca-Cola increased NW (but not OB) Tom's likelihood of winning a race. Participant body shape did not affect ratings.
Conclusion: Young children recognise the physical limitations of obesity but not the likely contributory behaviours (energy intake/expenditure). Negative perceptions of overweight are prevalent even in this age group, and association with a popular brand does not improve this view. Brand association does influence peer perception, but weight stigma is too powerful to be overridden by short-term brand exposure.

T6:PO.010

An experimental study examining effects of health messages on explicit and implicit weight bias

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Introduction: A pervasive explicit and implicit weight bias (WB) has been observed in normal weight, overweight and obese individuals. Pub-

lic health campaigns targeting obesity-related themes have been discussed as a source of WB due to reinforcing stigmatizing notions. The present study examined whether health messages influence explicit and implicit WB.
Methods: In a randomized-controlled study, one hundred thirty-nine participants from the community were assigned to an experimental group (EG) or a control group (CG). Participants in the EG were presented with health related messages and participants in the CG were presented with neutral information. Measures of explicit and implicit WB were completed before and after manipulation.
Results: In the EG but not in the CG, paired samples t tests showed a medium effect increase of explicit WB and a medium effect decrease of implicit WB.
Conclusion: We provided first evidence that brief exposure to health related messages might have the potential to change WB. Dual-model approaches postulated two independent information processing systems, thus, health messages might have differentially affected measures of explicit and implicit WB. While emphasizing deliberative processes, health messages simultaneously activated automatically associative processes. Hence, obesity-related health messages might contribute to both health behavior and the pervasiveness of WB.

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T6:PO.011

Emotional and behavioural responses to perceived weight discrimination before and after substantial weight loss

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Introduction. This study examined experience of weight stigma and discrimination in 2573 people participating in the Slimming World programme who had attended for a mean (SD) of 16.6 (24.7) months, lost 20.1 (14.0) kg in weight and were trying to maintain their weight loss.
Methods: Subjects were questioned about (i) duration of attendance and weight change (ii) their experience of discrimination and stigma before and after losing weight, (iii) their emotional response to this experience, (iv) the impact it had on attempts to control their weight and (v) the impact it had on their ability to manage their weight.
Results: At their heaviest 40% of participants reported experiencing judgment, criticism or humiliation at least once per week. Incidents of perceived discrimination left recipients feeling ashamed (47%), depressed (41%) and useless (30%). In response to weight discrimination 65% turned to food for comfort while only 2% made long-term lifestyle changes. When asked, 63% of respondents reported gaining weight over time since they were first treated unkindly because of their size. Respondents said that since losing weight they were now more likely to be acknowledged by strangers with a smile (61%), eye contact (54%), a compliment (49%), a hello (43%) and a conversation (41%).
Conclusion: In people with significant weight to lose, perceived weight discrimination can cause emotional distress, which undermines weight control behaviours. Losing weight reduces experience of weight discrimination and we hypothesise that reducing stigma may actually facilitate weight management behaviours.

T6:PO.012

A human rights approach to childhood obesity

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Lessons from HIV/ AIDS can be applied to obesity **Introduction:** Childhood obesity is primarily considered an issue of public health or individual responsibility. It has been given limited consideration as a human rights concern. However, given human rights' application to the HIV/ AIDS, it is suggested that human rights norms should be explored in order to avoid stigmatisation and boost access to healthcare.
Methods: An examination of the United Nations' recommendations to states on a human rights approach to HIV/ AIDS is conducted. General principles that may have application to obesity treatment and prevention are distilled.
Results: Although HIV/AIDS and obesity are different, there are a number of general principles that could be given consideration in state responses to obesity. The recommendations include identifying and addressing discrimination, securing children's participation in decisions affecting them, ensuring access to age appropriate information, and access to healthcare that is adequate, accessible, acceptable and quality. Furthermore, states should adopt child centred national action plans, allocate appropriate resources and gather data disaggregated by gender, region and socio-economic considerations.
Conclusion: Although HIV/AIDS and obesity are different, the approach suggested warrants consideration. In light of the evidence of stigma and discrimination of persons with obesity, human rights principles should be given consideration in state interventions in childhood obesity. States should include these principles in action plans and outreach in order to avoid doing harm through their efforts to prevent obesity. Furthermore, states should contribute to the knowledge on childhood obesity by gathering disaggregated data in a rights compliant manner.

T6:PO.013

Obesity in childhood is associated with a much lower degree of education

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Introduction: Obesity in childhood may predispose to poor psychosocial health. Here we have investigated if the completion of secondary school (9 school years) and upper secondary school (+3y) is lower in children who have been treated for obesity than in matched controls.
Methods: 1061 Individuals from the Swedish childhood obesity treatment registry, BORIS (www.e-boris.se) were selected. Inclusion criteria: ≥20 years of age at follow-up. Exclusion criteria: Mental retardation. BMI SDS, median(IQR), was 3.36(1.11), age at last visit was 17.1(2.7). Mean(SD) time from last visit to follow-up was 6.3(3.0) years. 7780 individuals, matched for gender, age and living area, were randomly selected as controls. They were linked to the national education registry. Level of education at follow-up was divided into; 1 = not graduated from secondary school, 2 = graduated from secondary school, but not started upper secondary school, 3 = started but not graduated from upper secondary school, 4 = graduated from upper secondary school.
Results: The proportion of school completers was much lower among obese cases compared with matched controls (Table 1). No differences in ethnicity between cases and controls were observed ($p = 0.09$). Being non-Swedish, was associated with a lower degree of graduating from upper secondary school among the controls ($p < 0.001$), but not among the cases ($p = 0.09$). Being a women increased the chance of graduating upper secondary school among both cases ($p = 0.006$) and controls ($p < 0.0001$).
Conclusion: Obesity in childhood is associated with a severely lower educational level. The differences between the groups do not seem to depend upon gender, ethnicity or socioeconomic status based on living area.

Table 1. Completion of educational level.

Educational Level (see Methods)	Control n (%)	Case n (%)	p
1	26 (0.3)	14 (0.9)	0.06
2	926 (11.9)	390 (24.4)	<0.0001
3	931 (12.0)	300 (18.7)	<0.0001
4	5897 (75.8)	897 (56.0)	<0.0001
Total	7780	1601	

Tab. 1.

T6 – Inequalities/Cultural variation

T6:PO.014

Regional inequalities in overweight and obesity among first-time pregnant women in sweden, 1992–2010

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Introduction: Overweight and obesity are on the rise in Sweden but regional variations and time-trends are underexplored. Pre-pregnancy weight status has implications for pregnancy outcomes and can influence later health of the mother and offspring.
Methods: Using weight and height data on pregnant women from the Swedish Medical Birth Register (≥18 years, 8–12 weeks of gestation, first pregnancy only), age-standardized prevalence of pre-pregnancy overweight/obesity (BMI ≥ 25 kg/m^2) and obesity (BMI ≥ 30 kg/m^2) were estimated for each Swedish county for the years 1992, 2000 and 2010 (N=116,122). Maps were created using ArcMap v10.2.2 to display regional variations over time and logistic regression analyses used to assess if the observed trends were significant.
Results: The prevalence of overweight/obesity and obesity among pregnant women increased significantly between 1992 and 2010 in all Swedish counties. In 2010, Södermanland and Gotland exhibited the highest age-standardized overweight/obesity (40%) and obesity (15%), respectively. Västerbotten had the sharpest increase (75%) in overweight/obesity prevalence and obesity prevalence nearly tripled in Gotland between 1992 and 2010. Stockholm County had the lowest prevalence of overweight/obesity (26% in 2010) and obesity (7% in 2010) across years.
Conclusion: Regional inequalities in overweight and obesity prevalence are apparent in Sweden with Stockholm, the capital, displaying an advantage with the lowest prevalence. Further research should elucidate the reasons behind such disparities.

T6:PO.015

Extreme obesity and youth unemployment: Evaluation of a structured approach of care to facilitate access to bariatric surgery

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Introduction: Adolescent obesity entails a high risk of somatic and psychiatric comorbidities. Additionally, especially extreme obesity often impedes with social and vocational integration. For several reasons, socio-economically disadvantaged individuals have limited access to available obesity treatment options, including bariatric surgery. In our pilot study we aimed to capture the rate of unemployed adolescents with extreme obesity willing to participate in a structured program to potentially enable bariatric surgery.
Methods: Unemployed adolescents (14.0–24.9 years) with obesity (BMI ≥ 30 kg/m^2) were offered to participate at a group intervention on the premises of a local job center. We applied standardized questionnaires to assess health-related quality of life (DISABKIDS), depression (BDI-II), self-esteem (Rosenberg-Scale) and social anxiety (SASKO).
Results: Over the 18-months recruitment period of our pilot study, 80 eligible adolescents were identified by their case managers; of these 53 attended the initial appointment. 34 adolescents (mean BMI (SD) = 45.59 (6.29)) consented to participate. We found clinically relevant depressive symptoms in 33% and symptoms of social anxiety in 60% of the sample. Six participants were eligible for bariatric surgery and directed to a local competence network for an individual assessment of indication.
Conclusion: The preliminary results are promising with regard to the proportion of unemployed adolescents with extreme obesity who benefited from our treatment program. To evaluate the efficacy of such a program, longitudinal data concerning health and vocational perspective are required. Furthermore, the feasibility of this approach needs to be assessed in a larger model region encompassing more than one job center.

Acknowledgement: This study was supported by the German Federal Ministry of Education and Research and was integrated within the German Competence Network Obesity (Consortium „Youth with Extreme Obesity").

T6:PO.016

Health inequalities in energy balance-related behaviours among schoolchildren across in Europe: Baseline results of the "EPODE for the Promotion of Health Equity" (EPHE) project.

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Background: Tackling inequalities in overweight and obesity has become a top priority for the European research and policy agendas. It is well-known that such inequalities accumulate from early childhood onward, although they have not been studied extensively in children. This study is part of the EPHE project, the overall aim of which is to assess the impact and sustainability of the EPODE methodology to reduce health inequalities in childhood obesity. The current data are the results of an explorative analysis to identify inequalities in behaviours and determinants between groups with high and low socio-economic status.
Methods: 1266 children aged 6–8 years and their parents, from different socio-economic backgrounds, were recruited in 7 countries. To measure the energy balance-related behaviours of the children and their determinants, a questionnaire was addressed to the parents. The Mann-Whitney U test and Pearson's $\chi 2$ test were used to test differences between the socio-economic groups.
Results: Children of relatively low socio-economic status consumed fruits and vegetables less frequently, had higher intake of fruit juices and/or soft drinks and higher screen time than their peers of high socio-economic status. Parental rules and home availability were consistently different between the socio-economic groups in all communities. However a common pattern for all behaviours was not found and the variability across the countries was large.

Conclusions: This study shows socio-economic inequalities in children's behaviours and parental determinants. These baseline results have been used to tailor community-based intervention of the EPODE programmes. The impact is measured in a second evaluation and first results will be available by the time of the congress.

T6 – Consumer perspectives

T6:PO.017

Perceptions and participation in physical activity and pe in uk primary schools

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Introduction: The importance of children in engaging in physical activity and understanding its role in healthy weight healthy lives is well-established. This paper will compare genders and year groups for perspectives, knowledge and activity levels.
Methods: 81 pupils from 2 primary schools wore accelerometers for 5 days during the 6 hours of the school day, drew pictures of them being active, followed by interview and completed knowledge and perspective questions on health and physical activity.
Results: Findings indicate differences in, activity levels, choices, perceptions and understanding around healthy activity, PE and sport. Boys were significantly more active than girls and there were difference in activity between years. The groups described activity and physical education differently, for example year 5 boys were more likely to identify physical activity as sport and exercise, but were more likely to be correct in the recommended levels of activity required to stay healthy. Girls perceived themselves as active but not necessarily healthy whereas boys married the two.
Conclusion: There is a great deal more knowledge and insight needed with regards to the opportunities within school for health-inducing activity and education, if we are to have significant impact of the population's health related behaviours. This paper uses objective activity measures and pupil voice, and reports on the different outcomes n perception, understanding and action for different groups. This information may contribute to the on-going development of delivery of health-related messages.

T6 – Media

T6:PO.018

Television food advertising to children in malta: The extent and nature of exposure

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Introduction: To provide a comprehensive baseline analysis of the extent and nature of food and beverages (F&B) advertising to children on Maltese television.
Methods: Seven national free-to-air channels were recorded for seven consecutive days between 07:00–22:00 in March 2014. Recordings were screened for advertisements, which were coded according to predefined categories. F&B advertisements were coded as core (healthy)/non-core (unhealthy)/miscellaneous foods. Preliminary.
Results: Across all channels, F&B was the most heavily advertised product category (26.9%). The overall proportion of advertisements for core foods in the sample was 17.6%, compared to non-core (41.2%) and miscellaneous foods (41.2%). Within the sample, the three most frequently advertised F&B categories were for non fast-food restaurant/catering establishments (23.7%); fast food meals (17.8%); and supermarkets that advertised mostly non-core foods (7.3%). A significantly greater proportion of advertisements for F&B were broadcast during peak (as opposed to non-peak) children's viewing times. Commercial/political channels broadcast a higher rate of F&B advertising than public national channels. Furthermore, a significantly greater proportion of F&B advertisements were broadcast around drama programmes aimed at adults (but within peak children viewing hours), than around programmes aimed at children.
Conclusions: Children in Malta are exposed to more TV advertising for unhealthy than healthy food items throughout the day. There is a need to devise and implement regulation of HFSS foods around programmes that are popular with children and adults alike, rather than limiting restrictions to children's programmes only. Ongoing, systematic monitoring is essential for evaluation of regulations designed to reduce children's exposure to HFSS F&B advertising on television in Malta.

Acknowledgement: The authors would like to acknowledge the invaluable assistance of the recording team at the Malta Broadcasting Authority.

T7 – Lifecourse perspective

T7:PO.001

Predicting metabolic syndrome in mid-adulthood from body mass index and skinfold thickness values in childhood

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Introduction: Several studies demonstrated the association between childhood weight status and metabolic syndrome (MS) in adults. However, it is still unclear whether the observed associations reflect the tracking of body mass index (BMI) from childhood to adulthood or whether childhood adiposity has an independent effect on risk of MS. This study aimed to examine the effect of childhood BMI and skinfold thickness in prediction of MS in adults controlling for BMI gain from childhood to adulthood.
Methods: The study subjects were participants of the Kaunas Cardiovascular Risk Cohort study that started in 1977. A random sample of Kaunas schoolchildren born in 1964 was examined in the first survey. In 2012, a total of 507 subjects (63.9% of eligible sample) participated in the 35-year follow-up survey being 48–49 years old. In childhood, height, weight, subscapular and triceps skinfold thickness measurements were taken. The follow-up health examination involved measurements of BMI, waist circumference, blood pressure, glucose and lipids levels. Logistic regression models were fitted to assess the associations of childhood BMI and skinfold thicknesses as well as BMI gain with MS in middle age.
Results: BMI in childhood predicted development of central obesity (OR=1.2; 95% CI=1.1–1.3) and MS (OR=1.2; 95% CI=1.1–1.2) in adulthood. The sum of subscapular and triceps skinfold thicknesses in childhood was also associated with odds of MS (OR=1.3; 95% CI=1.1–1.6) in adulthood. The adjustment for BMI gain from childhood to adulthood did not diminish the effect of childhood anthropometric measurements for the prediction of MS.
Conclusion: Risk of MS may be affected by childhood BMI and skinfold thickness, irrespective of BMI gain from childhood to adulthood.

T7:PO.002

BMI and psychological well-being in primary school children

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Introduction: Few studies have explored psychological wellbeing and association of body mass index (BMI) in children as young as 6–9 years old. The purpose of this study was to describe the association of psychological well-being (dieting behaviours and body image perception) and BMI in primary school children from Year 2 (age 6–7 years) and Year 4 (age 8–9 years).
Methods: Baseline measurements are of 301 pupils (52% boys) from 8 primary schools in Northern England participating in the Phunky Foods feasibility study. Psychological well-being was measured using the Body Shape Perception Scale and the Measure of Dieting Behaviours (modified version of the Dutch Eating Behaviour Questionnaire). Fixed effects models were used to explore the association between BMI and psychological well-being, adjusting for gender and year group.
Results: Children categorised as overweight (85th to 95th percentile) or obese (>=95th percentile) using WHO BMI Growth Charts had higher body shape dissatisfaction scores than normal weight children ($p < 0.0001$) and girls had higher scores than boys ($p = 0.03$). Higher dietary restraint scores were observed in obese compared to normal weight children ($p < 0.0001$) and in Year 2 compared to Year 4 pupils ($p = 0.002$).
Conclusion: The results suggested that body shape dissatisfaction may begin in children, as young as 6–7 years old, and there is an association with increased BMI. Obesity prevention programmes need to ensure that psychological-wellbeing is not compromised and further research should be conducted on how interventions can help improve psychological well-being in this age group.

Acknowledgement: This project was funded by Purely Nutrition and Nestle Healthy Kids Network UK.

T7:PO.003

Correlations of BMI with handgrip strength, body composition, anthropometry, physical performance and inflammation markers in (pre)frail community-dwelling persons

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Introduction: In European countries, the prevalence of frailty and prefrailty is about 17% and 42%, respectively1. The aim of the study was to investigate the association between handgrip strength, body composition, anthropometry, physical performance and inflammation markers among the BMI of (pre)frail community-dwelling persons.
Methods: Frailty status (SHARE-FI2), handgrip strength (dynamometer), physical performance (SPPB3), anthropometry, body composition (BIA) and inflammation markers (leucocytes, CRP, IL-6) were assessed in (pre) frail community-dwelling (≥65 years) persons in Vienna, Austria. Fat free mass index (FFMI), fat mass index (FMI) and relative handgrip strength were height-normalised indices (kg/m^2). The statistical correlations were assessed using the Spearman's correlation coefficient.
Results: 85 (pre)frail persons [15% men; 83(8) years; BMI of 27.3(4.5) kg/m^2] were analysed. According to the WHO criteria 33% were normal weight, 43% overweight and 24% obese. There were significant correlations between BMI and age ($r=-0.41$; $p = 0.001$), relative handgrip strength ($r=-0.22$; $p = 0.005$), FFMI ($r=0.71$; $p = 0.001$), FMI ($r=0.86$; $p = 0.001$), abdominal girth ($r=0.70$; $p = 0.001$), mid arm circumference ($r=0.75$; $p = 0.001$), calf circumference ($r=0.45$; $p = 0.001$), leucocytes ($r=0.19$; $p = 0.001$), CRP ($r=0.39$; $p = 0.02$), and IL-6 ($r=0.23$; $p = 0.001$).
Conclusion: The BMI correlates significantly with age, handgrip strength, fat free mass and fat mass index, anthropometry and inflammation markers but not with physical performance.

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T7:PO.004

Waist circumference at 13 years and systolic blood pressure at 21 years of age: A direct or indirect effect? - A path analysis application.

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Objective: To study if the prospective association between waist circumference (WC) in adolescence and systolic blood pressure (SBP) in adulthood is direct or indirect through the tracking of these variables.
Methods: We analysed data from 1109 adolescents evaluated at 13, 17 and 21 years of age under the EPITeen cohort (Porto, Portugal). Sample z-scores were calculated for both WC (sexand age-specific) and SBP (sex-, age-, and height-specific). Path analysis was used to evaluate the relationships between WC and SBP, using the data collected at 13, 17 and 21 years of age. Models were stratified by sex and results are presented as correlations, r (p-value).
Results: The total effect of WC at 13y on SBP at 21y was r=0.148 (<0.001) for females and r=0.169 (<0.001) for males. Path analysis showed that this association was mainly mediated by the tracking of WC across age; the path representing this tracking (WC13 to WC17 to WC21 to SBP21) presented a correlation of 0.159 in females and 0.184 in males, while the path representing the SBP tracking (WC13 to SBP13 to SBP17 to SBP21) was much weaker (r=0.085 for females and r=0.067 for males). Non-significant correlations were found for the longitudinal associations (WC13 to SBP17 and WC17 to SBP21). We also tested the direct association between WC at 13y and SBP at 21 years, but it was not statistically significant and did not improve the goodness-of-fit of the path model.
Conclusion: Our results from a path analysis shows that the positive association found between WC in adolescence and SBP in early adulthood is mainly explained by the tracking of WC during this period, suggesting that a causal relationship might happen earlier than 13y.

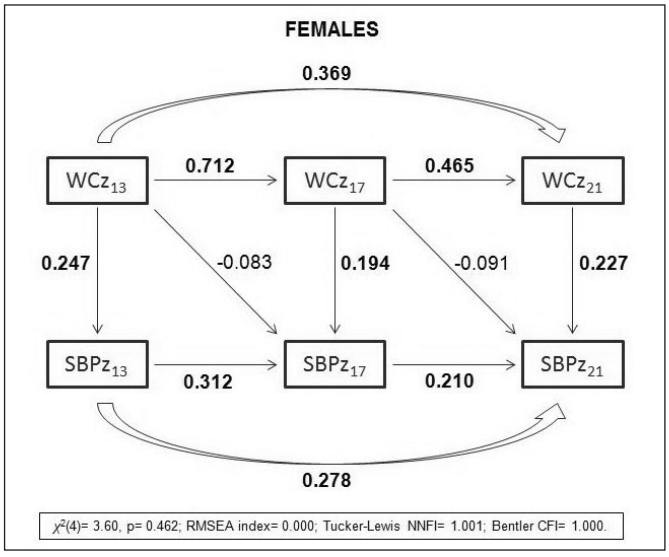

Fig. 1. Temporal relationship between waist circumference z-score (WCz) and systolic blood pressure z-score (SBPz), among females. Statistically significant ($p < 0.05$) correlations are printed in bold. RMSEA: root-mean-square error of approximation; NNFI: non-normed fit index; CFI: comparative fit index.

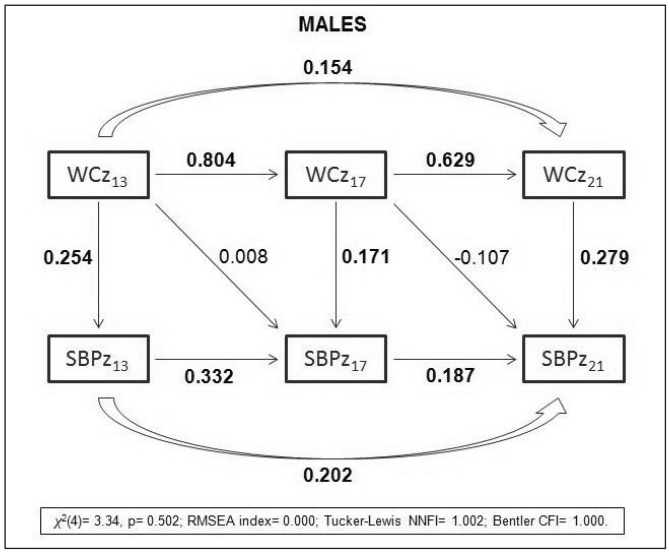

Fig. 2. Temporal relationship between waist circumference z-score (WCz) and systolic blood pressure z-score (SBPz), among males. Statistically significant ($p < 0.05$) correlations are printed in bold.RMSEA: root-mean-square error of approximation; NNFI: non-normed fit index; CFI: comparative fit index.

T7 – Population trends (European comparison)

T7:PO.005

Rapid increase of obesity prevalence in young adults among Koreans

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Background: It is well-known that obesity increases socio-economic loss of regional communities as well as individual health problem. Globally, prevalence of obesity has been increasing and the obesity was expanding more rapidly in developing countries than developed countries. In the present study, we investigated the trend and prevalence of obesity in Korea, one of the developing countries in Asia, through Korean National Health and Nutritional Examination Survey(KNHANES).
Methods: We performed cross-sectional analysis using KNHANES data from 1998 to 2012 over five time periods. Total 54,008 persons(men;23,357 and women;30,651) whose demographic data such as BMI(Body mass index)or estimated weight and height were participated into study. The study population was classified into three groups according to age;(20~39,40~59, and 60~79yr).All subjects also divided into five groups by BMI and obesity is defined as BMI ≥30.0kg/m^2
Results: The prevalence of obesity increased from 2.38% to 4.50% between the first(1998) and fifth(2010–2012) survey.Compared to survey in 1998, the odds ratio(OR) of obesity in 2010–2012 was 2.37 in men and 1.67 in women.At all intervals among surveys, prevalence of obesityrevealed increasing and accelerating trend in men. Considering age groups, the OR of obesity increased in young(2.59) and middle age(1.53)adults, while there was no significant increase of OR in older adults at all interval. Especially, increasing rate of obesity risk was greatest in young adult men(OR3.05).
Conclusion: In Korea, the prevalence of obesity is increasing and the speed of increase is more rapid and age of onset is earlier in men than in women at the same age group.The risk of obesity more rapidly increases in young adult group (20~39yr)than that in other age groups.

T7:PO.006

Prevalence of overweight and obesity at children and adolescents – data from electronic databases GPCY

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Introducing: Czech Republic through nationwide anthropological surveys (CAV), which were organized in every ten years from 1951 to 2001, had world-unique tradition in the collection and evaluation of anthropometric data paediatric population. However, in 2011 this tradition was interrupted.The aim: Evaluate anthropometric data from electronic databases practitioners for children and young (GPCY). To evaluate changes in the prevalence of overweight and obesity in the child population in 2011 Group: Of the 8 randomly registered offices of primary care paediatricians were selected data from children who meet the conditions for regular preventive medical examination for fixed age (the age ± 2 months). Was evaluated data from 9507 children (girls: 4808 boys: 4699) aged 3–17 (19) years. In each age group (3,5,7,9,11,13,15,17 years) were 632–708 children, only in the highest (19 years), only 174.
Methods: The obtained values of anthropometric parameters (height, weight) were processed by assessing software evaluated physical growth of a child under the CAV 1991 "RustCZ 2.3".
Conclusion: In offices GPCY is currently registered by age group 24% of children with overweight, 14% with obesity and 4% with severely obesity. Obese and overweight children form the second largest group of chronic disease, immediately after group of children with allergic diseases. Maximum for girls (23.8%) overweight were at age 11, (13.5%) obesity at age 13. For boys maximum (25.9%) overweight were at age 13 and (15.9%) obesity at age 11. The ration of obesity on overweight prevailed 57%. Seriousness of obesity significantly increased. Till third of obese children had a morbid degree of obesity with maximum incidence of 4.4% in adolescence.

T7:PO.007

Should children with overweight or obesity be excluded from height references?

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Background and objectives: Growth reference charts are usually based on measurements of children free from conditions affecting growth. However, samples collected during the past decades often contain a large proportion of overweight or obese children. Because obesity increases linear growth, this brings up the question to what extent the percentiles curves for length/height and the limits of "normal" growth are affected by the presence of these overweight and obese children in the sample.
Methods: Data from two cross-sectional samples of 2–18 years old children were analyzed: 12252 Belgian children, measured in 2002–4, and 6159 Norwegian children, measured in 2003–6. The LMS method was used to estimate height-for-age curves with and without children considered overweight or obese according to the International Obesity Task Force (IOTF) thresholds.
Results: The prevalence of overweight (including obesity) and obesity was 13.0% and 2.8% in the Belgian and 13.8% and 2.3% in the Norwegian sample. Children were taller when overweight (+0.49 and 0.43 standard devi-

ations, SD, in the Belgian and Norwegian sample respectively) or obese (+ 0.73 and 0.72 SD in the Belgian and Norwegian sample). No differences in effect size were observed between the youngest and oldest age groups. Excluding overweight and obese children had only a minor impact on the growth curves with largest difference in mean height SDS –0.09 in the Belgian and –0.12 in the Norwegian sample with a corresponding increase of up to 0.5% and 1.2% in number of children above +2 SD.
Conclusion: Current Belgian and Norwegian growth references for length/height were found largely unaffected by the current proportion of overweight and obese children.

T7:PO.008

Weight status and blood pressure (bp) in pre-school children

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Introduction: The relationship between BP and excess body weight has consistently been recognized in adolescents and adults, but the evidence of this association at early ages is scarce and controversial. The aim of this study was to examine the association of weight status and BP among children aged 4 to 6 years.
Methods: Cross-sectional study including all the children aged 4–6 years from 21 primary schools of Castilla-La Mancha region, Spain (n: 1588). Weight and height were measured twice by standard procedures. Body Mass Index (BMI) was categorized as thinness, normal weight, overweight and obesity according to gender-and-age specific cut-offs defined by Cole (Cole et al, 2000). After 5 min resting interval, with the right arm semi-flexed at heart level position, BP was measured twice using a calibrated semiautomatic OmronW M5-I device and appropriate cuff sizes according to arm circumference, with a 5 min interval between measurements, in a quite and relaxing conditions. ANCOVA models were estimated using BP as dependent variables, weight status categories as fixed factor and age and sex as covariates.
Results: Thinness and normal weight children has lower BP levels than their peers with excess of weight (figures 1 and 2)
Conclusions: Excess of weight is associated to higher BP levels even at early ages.

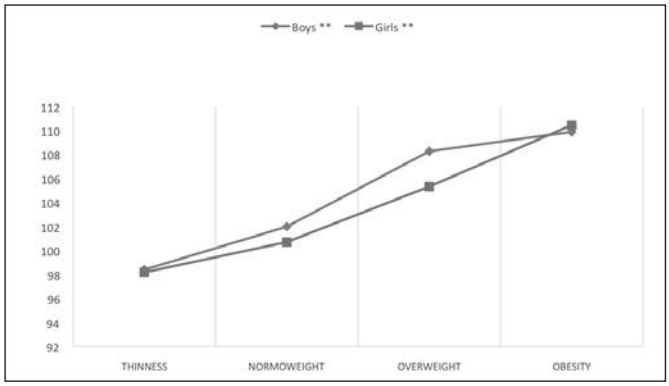

Fig. 1. Mean of systolic blood pressure of weight status categories controlling for age, by sex. **p≤0.001

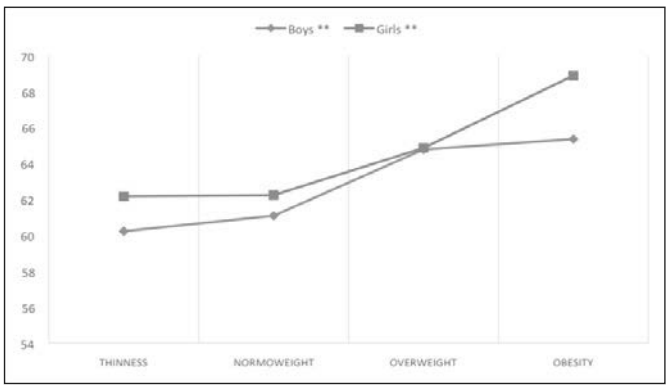

Fig. 2. Mean of diastolic blood pressure of weight status categories controlling for age, by sex. **p≤0.001

T7:PO.009

Thinness and excess of weigth prevalence by parental socioeconomic status (ses) in spanish preschool children

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Introduction: The latest reported obesity prevalence in Spanish children was higher than 35%. The aims of this study were to estimate the prevalence of thinness, overweight and obesity in the 2008–2009-birth cohort, and to examine the association between parental SES with weight and height status in this cohort.
Methods: Cross-sectional study including all the children aged 4–6 years from 21 primary schools of Castilla-La Mancha region, Spain (n:1398). Weight and height were measured twice by standard procedures. Children weight status was estimated according to the cut-offs proposed by the IOTF child growth standards criteria. Highest father-mother SES index was obtained by using the self-reported occupation and education levels.
Results: Showed in Fig. 1.
Conclusions: i)obesity prevalence in Spanish children born after the financial crisis is drastically decreasing; ii)the prevalence of excess of weight is not more frequent in lower SES categories; iii)parental SES is positively associated to stature.

	Parental SES					
	Lower	Lower-middle	Middle	Upper-middle	Upper	p
	n=49	n=382	n=627	n=279	n=61	
Weight (kg)	20.1 (4.9)	21.4 (5.1)	21.3 (4.7)	21.2 (4.2)	23.0 (4.6)	0.02
BMI (kg/m^2)	15.6 (2.7)	16.0 (2.7)	15.8 (2.4)	15.7 (2.2)	16.4 (2.1)	0.1
Height-for-age z-score	-0.1 (1.5)	0.2 (1.5)	0.2 (1.4)	0.1 (1.3)	0.5 (1.2)	<0.001
BMI categories, % (95% CI)						
Underweight	36.7 (22.2-51.2)	19.6 (15.5-23.7)	21.0 (17.8-24.3)	19.7 (14.9-24.6)	11.5 (2.6-20.3)	
Normal weight	46.9 (31.9-61.9)	58.1 (53.0-63.2)	59.0 (55.1-62.9)	62.4 (56.5-68.2)	62.3 (49.3-75.3)	
Overweight	6.1 (1.3-16.9)	13.1 (9.6-16.6)	11.3 (8.8-13.9)	11.8 (7.8-15.8)	18.0 (7.6-28.5)	
Obesity	10.2 (3.4-22.2)	9.2 (6.1-12.2)	8.6 (6.3-10.9)	6.1 (3.1-9.1)	8.2 (2.7-18.1)	

Fig. 1. Weight status prevalence and differences in body composition variables (ANOVA models controlled by SES in 2008–2009 birth cohort)

T7:PO.010

Fitness and fatness in spanish pre-schoolers.

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Introduction: At early ages the evidence of the relationship between physical fitness (PF) and body fatness indicators is limited. Aerobic capacity has been the only PF parameter studied, forgetting others parameters such as strength may be also related with cardiometabolic health. The aim of this study is to analyse the association between adiposity parameters with strength and aerobic capacity estimators in pre-school children.
Methods: Cross-sectional study including all the children aged 4–6 years from 21 primary schools of Castilla-La Mancha region, Spain (n: 1555). Adiposity parameters included: weight, height, waist circumference (WC) and triceps skinfold thickness (SFT) measured twice using standard procedures; body fat percentage (BF%) was estimated by bioelectrical impedance analysis; body mass index (BMI) was calculated as weight (kg)/height (m)2. PF parameters included: cardiorespiratory fitness (CRF) measured by 20-m shuttle run test, lower limbs muscular strength by standing long jump test corrected by allometric parameter of 0.67 (Jaric et al., 2005), and velocity by 4×10m shuttle run test. Partial correlation coefficient controlling for age between adiposity and PF parameters for each sex was estimated.
Results: Showed in Fig. 1.
Conclusions: Adiposity parameters are associated to PF even at early ages. Strength is the PF parameter more closely related to adiposity in pre-schoolers.

Boys

Girls	Velocity	CRF	Strength	BF%	SFT	WC	BMI
Velocity		-,409	-,305	,256	,208	,188	,181
CRF	-,368		,343	-,296	-,302	-,253	-,263
Strength	-,224	,258		-,709	-,686	-,715	-,700
BF%	,153	-,279	-,724		,871	,889	,925
SFT	,147	-,263	-,667	,845		,824	,859
WC	,150	-,258	-,732	,902	,780		,937
BMI	,123	-,257	-,703	,944	,829	,928	

Fig. 1. Partial correlation coefficients between adiposity and PF parameters controlling for age. All coefficients were significant at p≤0.001

T7:PO.011

Surveillance of Overweight including Obesity in Children Under 5: Opportunities and Challenges for the European Region

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Introduction: Current estimates report over 40 million children under 5 were overweight or obese globally (deOnis et al., 2010). Childhood overweight has become an increasingly important contributor to adult obesity, diabetes, and noncommunicable diseases (O'Malley et al., 2010) and at the opening of the 2014 World Health Assembly Dr. Chan announced a new initiative on childhood obesity (WHO press release. 'Director-general announces new initiative, 2014). The European Region needs to be more aware of the current state of the nutritional status of children under 5 in order to begin to make headway in this emerging area.
Methods: A review of publicly available data collected from 2000 on which reported prevalence of nutritional status in children under 5 in any WHO European Region Member States was done. The authors compiled estimates to form a cohesive perspective on the state of young childhood nutritional status in the Region.
Results: 28 of the 53 Member States had data available on the nutritional status of children under 5, particularly over-nutrition. This data differed in age ranges evaluated, cutoffs used (IOTF, WHO or country-specific), national representation and the method evaluated (self-report versus direct measurement). The prevalence of overweight (including obesity) in children under five ranges from 1% to 27.5% in Member States.
Conclusion: While it is generally recognized that nutritional surveillance data are crucial for the development of targeted action and the monitoring progress and success in counteracting obesity, regular assessments of the magnitude of overweight and obesity, particularly in children are not common in the 53 WHO European Member States (Wijnhoven et al., 2013). Evidence suggests that early intervention before five years of age is necessary if the trajectory to overweight in children is to be arrested (Black et al., 2013) and action needs to be taken to have consistent surveillance on this specific population.

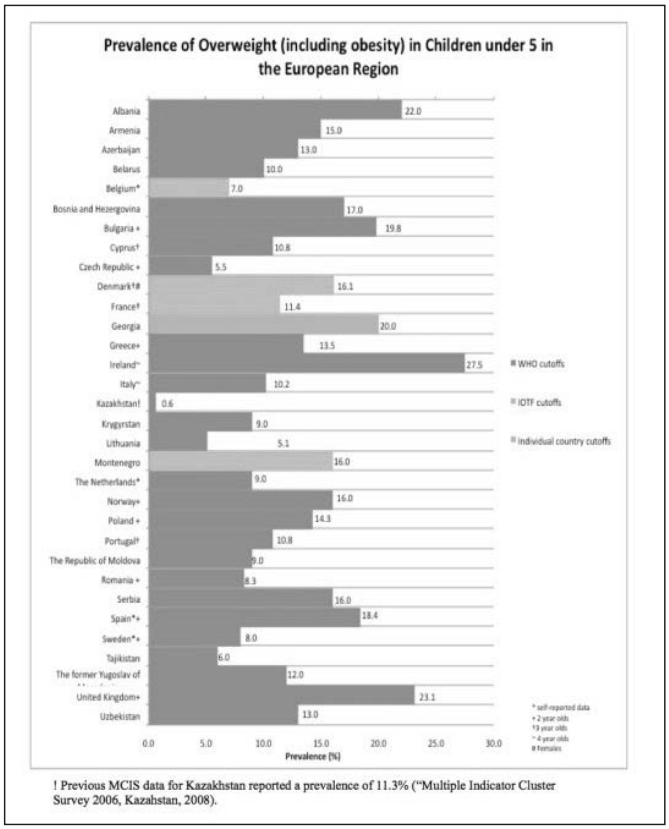

Fig. 1. Prevalence of overweight (including obesity) in children under 5 in the European Region

T7 – Health promotion policies

T7:PO.012

Overcoming obesity - wellbeing from healthy nutrition and physical activity. National obesity programme in finland

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In 2012, the National Institute for Health and Welfare (THL) launched national programme Overcoming obesity–wellbeing from healthy nutrition and physical activity. Obesity is a serious problem in Finland. The mean body mass index has increased in men since the 1970s and in women since the 1980s. Although this trend has leveled off over the past ten years, the prevalence of obesity is still at too high level. In 2012, 66% of working aged men and 46% of women were overweight or obese (BMI ≥ 25). Every fifth adult was obese (BMI ≥ 30). The aim of the programme is to achieve a downward trend in obesity prevalence in order to improve health and wellbeing and to maintain the population's functional and work ability. The health care sector plays an important role, but there are other stakeholders (e.g. policy makers, schools, community planning, non-governmental organizations, industry, media) at local, regional and national level which have an important role in preventing obesity of citizens. The aim of the programme is to challenge different stakeholders to work towards common goal. The actions will focus on healthy diet and physically active lifestyle. There are five main priorities: take into account health in all policies, advance fiscal incentives, improve the prevention and care of obesity in the health care, publish positive and not misleading health messages in the media and invest in obesity research. THL has developed checklists of the targets for different stakeholders. The purpose of lists is to assess how the targets of the national programme are achieved at local, regional or national level. THL promotes the implementation of measures through information guidance and collaboration with stakeholders and monitors outcomes through health monitoring and research.

T7 – Community based interventions

T7:PO.013

What is the impact of a community pharmacy-led weight management service for adults in a deprived urban area in UK? A mixed methods service evaluation

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Introduction: WHO acknowledges that community pharmacies may be an important component of the public health agenda to tackle obesity. The aim of this study was to evaluate a 12-week community pharmacy-led weight management service in a deprived urban area of Stockton-on-Tees, UK.
Methods: The service was delivered by pharmacists and pharmacy technicians over a 12 week period, targeting overweight adults. Quantitative data included participants' weight, height, waist circumference, and wellbeing scores. One-to-one, face-to-face interviews were conducted post-intervention with three pharmacists, two technicians and 11 service users (7 completers and 4 dropouts).
Results: 8 pharmacies and 58 participants were recruited, of which 11 completed the 12-week programme. On average, a reduction in weight, waist circumference and BMI, and an improvement in wellbeing scores, were found. The pharmacy was deemed to be a convenient and easily accessible setting by service users who praised the one-to-one personalised delivery approach. The service appeared to be equally effective when delivered by pharmacy technicians and pharmacists, which could prove useful in future delivery and practice in terms of freeing up pharmacists' time and making best use of resources. The service had knock-on effects of improved dietary habits for family and friends. Non-completers were complimentary of the service and the delivery, and continued to make lifestyle changes and lost weight.
Conclusion: The feasibility and impact of the service appears promising, and a useful option to the range of weight management services commissioned by local health authorities and councils. Further evaluation to assess whether the service has the potential to be offered effectively as a brief intervention is planned.

T7:PO.014

Community pharmacy interventions for public health priorities: A systematic review of community pharmacy-delivered weight, smoking and alcohol management interventions

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Background and Aim: Worldwide, community pharmacies may be an important component of the public health agenda to tackle obesity. WHO acknowledges that community pharmacies and their staff are easily accessible and, as such, could play a key role in public health initiatives. This systematic review aims to assess the effectiveness of interventions based in community pharmacies with a focus on weight management, smoking cessation and alcohol misuse.
Methods/design: We searched 10 databases for international studies that evaluated interventions based in community pharmacies that targeted weight management, smoking cessation and/or alcohol misuse. We included RCTs, non-RCTs, controlled before-after studies, interrupted time series and repeated measures studies.
Results: At the time of writing (December 2014), 29 studies are included in the review, including 13 on weight management. The final report will be delivered to the funders in March 2015. We intend to present the results of the review as they relate to weight management, alongside the dissemination strategy for the review, at ECO 2015. Discussion: The review will summarise the evidence base on the effectiveness of community pharmacy interventions in relation to weight management, smoking cessation and alcohol misuse. It will also explore if, and how, socio-economic status, gender, ethnicity and age moderate the effect of the interventions and will describe how the interventions have been organised, implemented and delivered, since context is an important factor governing the success of public health interventions.The protocol for this systematic review is registered with PROSPERO (registration no. CRD42013005943) and published (Todd et al. Systematic Reviews 2014, 3:93).

T7:PO.015

Questionnaire on life style for 8–10-year-old children: Concordance between parents and child responses

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Introduction: Vivons en Forme (VIF) is a program aiming at supporting municipalities to implement actions in line with French Nutrition Recommandations. To evaluate actions directed towards children, we built a questionnaire on child life style for 8–10-year-old- children and their parents. The aim of this study is to compare the concordance between the responses given by parents and children. Material and methodsThe study

was conducted in four schools located in 3 diffrent cities, one school was located in deprived area. The questionnaire was given to 99 children and their parents. Children filled the questionnaire at school, and parents at home. Only 87 parents responded. Statistical analyses were made on 87 parent-child pairs. Concordance was analysed by concordance percentage (C) and calculation of Kappa coefficient (K).
Results: Parent/child concordance is excellent for i) TV in child bed room C 83%, K0,63 (52%of children declare having TV in bed room), ii) computer in bedroom c 85%, K0,66 (29% of children having computer), iii) extracurricular physical activity C 89%, K O,73 (72% of children having physical activity; responses are discrepant for i) snacking while watching TV C 59%, K0,10 (yes : 42% children, 22% parents), ii) candy daily consumption C 25%, K0,11 (yes: 39% children, 17% parents), iii) chips daily consumption C 36%, K 0,15 (yes: 21% children, 3% parents).
Conclusion: 1 More than half of children have a screen in their bed room, and this should be considered in public health promotion campaigns. 2 Discrepancies between parents and children relate to unhealthy behaviours that are underestimated by parents and may be ignored.Related actions targeting parents should be reinforced.

T7:PO.016

PREVIEW: Preventionof diabetes through lifestyle intervention and population studies in Europe andaround the world. Over 2,000 volunteers randomized to the 3-y RCT.

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Introduction: PREVIEW is a 6-y EU project (2013–2018) under the FP7, KBBE programme. It involves 15 partners from Europe, Australia, Canada, and New Zealand. The primary goal is to identify the most efficient lifestyle pattern for the prevention of type-2 diabetes in a population of pre-diabetic overweight and obese individuals.
Methods: The project comprises 2 main lines of evidence: a 3-y multicentre, 2*2 factorial, clinical, randomized intervention trial (RCT) with up to 2,500 participants as well as large population studies in about 170,000 individuals across all age groups. The impact of a high-protein, low-glycemic index diet vs a high-carbohydrate, medium-glycemic index diet in combination with moderate or high intensity physical activity on the incidence of type-2 diabetes and related end-points are investigated. Interactions with habitual stress, sleeping pattern, behavioral, environmental, cultural, and socioeconomic variables are also studied. The RCT starts with an 8-week weight loss phase on a low-calorie diet, LCD (Cambridge Weight Plan) followed by randomization to a 146-weeks weight maintenance phase in the 4 intervention arms.
Results: Between Jun 2013 and Dec 2014, about 13,900 adults have been pre-screened; 4,740 screened and more than 2,050 adults enrolled by the 8 intervention centres. About 50 children/adolescents have also been included. The average age of the adults is 52 y, ~ 2/3 being female. During the 8-week LCD, a total of 1,327 have now achieved more than 8% weight loss (average 10.7% of initial body weight of 99.7 kg), allowing them to continue into the weight maintenance phase.
Conclusion: The PREVIEW project is running well with > 2,000 volunteers included in the RCT. PREVIEW will continue recruiting till end of Feb 2015.

Acknowledgement: The PREVIEW project receives funding from: EU 7th Framework Programme (FP7/2007-2013), grant agreement no. 312057. National Health and Medical Research Council - EU Collaborative Grant, AUS. The NZ Health Research Council (14/191) and UoA Faculty Research Development Fund. The Cambridge Weight Plan has kindly donated all products for the 8-weeks Low-Calorie Diet.

T7:PO.017

Bulgarian experience in the prevention of childhood obesity. "School for health" – for children, parents and teachers

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[1]Bulgarian Association for the Study of Obesity and Related DiseasesThe problem of childhood obesity in Bulgaria is of significant medical and social importance.

Recent studies show increase in obesity and overweight rates by 5–15% (depending on the age group). As part of the EPHE project (EPODE for the Promotion of Health Equity) Bulgarian association for the study of obesity and related diseases (BASORD) organized "School for Health – for children, parents and teachers" under patronage of the Minister of education and science. 270 children (age 7–9 year), parents and teachers from ten different schools in Sofia participated in the "School for health". At one of the most famous Bulgarian seaside resorts - Albena families and teachers spent one week together. For this period all the participants were educated in the principles of healthy and balanced lifestyle with an emphasis on diet and physical activity. Anthropometric parameters (body weight, body mass index, waist and hip circumferences) as well as body composition (fat mass and fat free mass) were measured in all participants. Children, parents and teachers had special meals for breakfast, lunch and dinner based on the national recommendations for healthy nutrition. Each day the program began with gymnastics on the beach and was followed by swimming in the sea and the pool and walks.The experience that all participants gained had very positive impact on their lifestyle. Two years after their participation in the project "School for health" they continue to apply the new methodic of nutrition and have increased their physical activity.

Acknowledgement: Funded and supported by EPHE project (EPODE for the Promotion of Health Equity)

T7:PO.018

Community-based pilot to tackle childhood obesity in a London Borough: A whole-system approach

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Introduction: Tackling childhood obesity is a pressing public health priority requiring multilevel and multi-stakeholder action. The aim of this intervention is to enable all members of the community to take part in effective and sustainable actions to promote healthy lifestyles and ultimately prevent childhood obesity.
Methods: This presentation describes the methodology of the intervention. The programme will be piloted in a London Borough between 2015 and 2018 focusing on children aged 4–16 years in the environment where they live, learn and play. Activities will be implemented at 3 levels: local government, community and children and their family. Activities will be built on existing public and private community-based initiatives, preventative and management services and environmental strategies. The programme has a dedicated local programme manager to mobilise local stakeholders and networks and implement actions. In every 6 months, a themed social marketing campaign will be developed based on evidence

and national recommendations focusing on a specific nutrition or physical activity issue (6 themes during the 3-year pilot). All activities at all levels will focus on the specific themes. A local steering group will be formed with a wide representation of local stakeholders including private and public partners. Methodology also includes continuous workforce training, wide dissemination of information resources, working with other local government departments and local agencies to improve the environment and community development including a grant scheme to support local initiatives. Expected results include increased awareness, improved skills and social norms, behaviour change regarding the specific lifestyle themes, and ultimately reduction in childhood obesity.

Acknowledgement: To the Royal Borough of Kensington and Chelsea for funding and supporting the design and implementation of this pilot.

T7:PO.019

NoHoW: Evidence-based ICT tools for weight loss maintenance

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Introduction: Obesity is a key economic and healthcare challenge for Europe. Effective interventions for weight loss are widely available, but few comprehensive solutions exist to help with weight loss maintenance (WLM) and most people re-gain lost weight. Research suggests promising evidence-based behaviour change techniques for WLM are self-monitoring, goal setting, action control, building self-efficacy and intrinsic motivation and that stress management and emotion regulation skills are key enablers of relapse prevention. Information and communication technology (ICT) has potential to provide accessible, scalable channels for people to engage with these evidence-based behaviour change techniques.
Methods: The NoHoW project (No. 633309) is a 3-centre randomized controlled trial designed to evaluate the most effective ICT tools for WLM using up-to-date behavioural science research. ICT delivery will be facilitated via a suite of tools including networked-wireless tracking technologies, weighing scales and activity sensors, apps, multi media resources and internet-based support. Participants will be given feedback based on personalised prediction models of what is most effective for them.
Expected results and impact: The RCT and linked studies of European consumer needs and behaviour will test whether ICT-based delivery of evidence-based behaviour change techniques is effective for WLM. Project results will feed into new developments for implementation by Slimming World (a large European commercial weight-loss provider), providing WLM benefits to >700,000 overweight and obese individuals. Large-scale implementation of online WLM tools will provide complementary, enhanced support to services that promote health education and weight management.

T7:PO.020

Are Intervention-Design Characteristics More Predictive than Baseline Participant Characteristics on Participant Attendance to a Paediatric, Community Weight Management Programme?

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Background: Approximately 50% of participants complete a paediatric weight management programme, yet the predictors of attendance and dropout are inconsistent. This study investigates subject and intervention-design characteristics associated with attendance at a group based, family weight management programme. SETTING AND SUBJECTS: Secondary data analysis of 2948 subjects (Age 10.4 ± 2.8 years, BMI 26.0 ± 5.7kg/m^2, Standardised BMI (BMI SDS) 2.48 ± 0.87, White 70.3%) from 244 MoreLife (UK) programmes. Subjects attend weekly for 10–12 weeks, sessions last 2–3 hours. Sessions include lifestyle guidance and physical activity.
Method: Subject characteristics (demographics, psychological (body satisfaction & self-esteem) and sedentary behaviour) were gathered at first contact and BMI SDS was noted weekly. Intervention-design characteristics were recorded (year, length (weeks), group size, age segregation and day of session). Attendance was calculated as total number of sessions attended (%). Multivariate linear regression examined predictors of attendance and multiple imputation countered missing data.
Results: Average attendance was 59.4%±29.3%. Baseline subject characteristics were 'poor' predictors of attendance. Intervention year, group size and day of session significantly predicted attendance (Tables 1 & 2). Yet, the most predictive marker of attendance was a change in BMI SDS during the programme (B = -0.38, 95% CI = -0.43 - –0.33).
Conclusion: A reduction in BMI was seen to predict greater attendance. However, baseline subject characteristics were weakly associated with attendance, refuting past findings. Dominant intervention characteristics (large groups, weekend sessions and recent delivery) predicted lower attendance. Future programmes may be better informed.

Acknowledgement: The author would like to thank MoreLife (UK) for providing the data for the study and the assistance given by the staff in aiding the author to understand the measures used. Additional thanks extend to the British Heart Foundation for funding the PhD study.

	B value	*SE B*	95% Confidence Interval	
			Lower	*Upper*
Constant	.726	.052	.624	.828
Length of Intervention	-.021	.012	-.045	.002
Year of Intervention	-.030***	.005	-.039	-.020
Intervention Group Size	-.041***	.011	-.063	-.019
Intervention Age Groups	-.004	.011	-.025	.017
Day of Intervention	-.052***	.012	-.077	-.028
Gender	.000	.011	-.021	.021
Age (Years)	.004*	.002	.000	.008
IMD Score	-.001**	.000	-.002	.000
White Ethnicity	-.008	.014	-.036	.021
Pre-Existing Medical Condition	-.009	.020	-.049	.030
BMI SDS	-.014*	.006	-.026	-.001
Self-Esteem	.003	.005	-.007	.014
Sedentary Behaviour	-.005	.004	-.013	.003
Body Satisfaction	.000	.000	-.001	.001
Change in BMI SDS	-.377***	.025	-.427	-.328

Note: $\Delta R^2 = 0.092$. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Fig. 1. Predictors of Attendance - Imputed Data

	B value	SE B	95% Confidence Interval	
			Lower	Upper
Constant	.721	.078	.569	.873
Length of Intervention	-.049*	.021	-.090	-.007
Year of Intervention	-.021*	.008	-.037	-.005
Intervention Group Size	-.049*	.020	-.089	-.009
Intervention Age Groups	-.032	.021	-.074	.010
Day of Intervention	-.055*	.024	-.102	-.008
Gender	.003	.018	-.032	.038
Age (Years)	.004	.003	-.002	.011
IMD Score	-.001	.001	-.002	.001
White Ethnicity	.018	.019	-.019	.055
Pre-Existing Medical Condition	-.024	.037	-.096	.048
BMI SDS	-.029**	.010	-.050	-.009
Self-Esteem	.009	.008	-.006	.024
Sedentary Behaviour	.001	.005	-.009	.010
Body Satisfaction	.001	.000	.000	.002
Change in BMI SDS	-.350***	.039	-.427	-.273

Note: $\Delta R^2 = 0.095$. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Fig. 2. Predictors of Attendance - Complete Case Data - Purpose of Sensitivity Analysis

T7:PO.021

Scaling-up community-based programmes (CBPs) for childhood obesity prevention: First results following the methodology appraisal of 13 CBPs

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Background: Childhood obesity and overweight is major public health concern in Europe. Programmes and initiatives across the region use various approaches to prevent this issue, encountering challenges in the implementation field. The current study aims to appraise the methodology of 13 community-based programmes and initiatives (CBPs) for strengthening and up-scaling their process, based on the pillars of EPODE methodology.
Methods: This is a descriptive research to identify strengths and weakness of the participant programmes. We conducted semi-structured interviews with the principal programme coordinators, assessing their approach to political commitment, public-private partnerships, social marketing, communication and scientific evaluation and dissemination. Two researchers appraised the information in reference to the EPODE pillars, using a scoring scale from 0 to 2.
Results: Formal political commitment existed in the majority of the programmes. 46% of the programmes had structural public-private partnerships and no interference with the methods/contents of programmes. The social marketing approach was lacking target group analysis and focus on environmental change in most of the programmes. The communication and dissemination methods were lacking for the majority of the programmes. 70% of the programmes conducted an evaluation, but usually that did not include all the important aspects of the programme. Results will be presented in more details during the congress.
Conclusions: The context and methods of implementation varied between the CBPs. We identified various aspects to be improved; tailored feedbacks, trainings and workshops are led. The next step is the progress appraisal of each CBP included in the project.

T7:PO.022

Characteristics of a successful program to decrease BMI and LNED intake in school children

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Healthy eating habits are essential to reduce children´s risk of health problems. The prevalence of obesity continues to increase and is growing concern in Portugal and Europe (Wijnhoven et al., 2014). This study aims to describe the characteristics of a successful program to decrease BMI and LNED intake among school children. 464 children (239 female, 6 to 12 years) from seven schools participated in this randomized trial. In Portugal children from elementary schools have only one teacher who teaches a range of subjects. The intervention program was based on health promotion model (Pender, 1996) and the social cognitive theory (Bandura, 1986) and aimed to promote healthier active lifestyles by encouraging children to be more active and make better food selection. The training sessions were approved by the Minister of Education with 72 hours of duration. The program was implemented over two terms: teachers' training delivered by researchers and intervention delivered to children by trained teachers. Intervened teachers had 12 sessions of 3 hours each with the researchers, according to the topics of nutrition and healthy eating for children and family (sessions 1–4); importance of water (session5); strategies to increase fruit and vegetable intake (session 6–8); strategies to improve physical activity and reduce screen time (sessions 9–10) and healthy cooking activities. After each session, teachers were encouraged to develop activities in the class according to the learned topics. This intervention program decreased the consumption of Low-nutrition, energy dense (LNED) foods and the Body Mass Index (BMI) z-score among the intervened children and offers promise to yield best practices in the prevention of overweight and obesity.

Acknowledgement: Our grateful Acknowledgement goes to all the children and their parents for the participation in this study, school administrators and school staff for the opportunity of the implementation of the study.No conflic

Reference:
Wijnhoven T; van Raaij J; , Sjöberg A; et al.: (2014). WHO European Childhood Obesity Surveillance Initiative: School nutrition environment and body mass index in primary schools. Int J Environ Res Public Health. 30;11(11):11261–11285.

T7 – Success and failure of interventions

T7:PO.023

A systematic review of the effectiveness of interventions targeting specific out-of-home food outlets (Foodscape study)

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Introduction: Food served by out-of-home food outlets (OHFOs) is typically energy dense. Therefore, OHFOs are an appropriate target for interventions to tackle obesity. This review focused only on OHFOs open to the general public (e.g. not workplaces).
Methods: Nine databases were searched (1993 to 2013) for relevant studies of any design that included a measure of change (pre to post) for a

relevant outcome (e.g. consumer or retail level data for dietary fat intake or sales figures of certain items).
Results: 23 studies were included; 13 repeat cross-sectional, 5 cohort, 2 controlled before and after, and 3 controlled clinical trials. 23 studies of six types of interventions/policies were included: nutrient labelling (12), trans-fat legislation (1), multicomponent multilevel health promotion (6), personalised receipts (1), price promotion (1) and telemarketing (2). Nutrient labelling only reduces calories purchased in specific fast food chains and for those who use labels. Multicomponent multilevel interventions increased healthy food purchases in certain restaurants, but not others. No data on cost implications were identified. Nutrient labelling does not appear to increase inequalities by having differential effects by age, gender, ethnicity, or socioeconomic status.
Conclusion: Calorie labelling legislation does not appear to be associated with a significant decrease in the amount of calories purchased across all fast-food chain restaurants. Further robust research is required, particularly in young people and in European populations.The protocol for this systematic review has been registered with PROSPERO (registration no. CRD42013006931) and published (Hillier-Brown et al. Systematic Reviews 2014, 3:17).

T7:PO.024

Effects of differences in frequency of guidance and intervention period on weight loss

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Introduction: There is no evidence on the relationship between weight loss and frequency of guidance and intervention period. The aim of study was to examine the effects of differences in frequency of guidance and intervention period on weight loss.
Methods: Sixty-four obese or overweight Japanese women with increased waist circumference, hypertension, dyslipidemia, or hyperglycemia participated in the dietary intervention with different frequency of guidance and intervention periods: 1.5-month, bi-weekly guidance (1.5m^{2}w, n = 7, 54.4 ± 6.6 years); 3-month, weekly guidance (3m1w, n = 32, 54.8 ± 6.4 years); 3-month, bi-weekly guidance (3m^{2}w, n = 25, 56.5 ± 5.0 years); 6-month, weekly guidance (6m1w, n =7, 47.6 ± 14.3 years). All four groups engaged in equal guidance contents (received same information in 24 hours guidance in total) and were instructed to reduce their dietary energy intakes to 1,200 kcal per day.
Results: Weight decreased significantly during the intervention in all groups (1.5m^{2}w: −5.1 ± 2.9 kg, 3m1w: −4.9 ± 2.6 kg, 3m^{2}w: −5.8 ± 3.0 kg, 6m1w: −5.8 ± 2.5 kg, P < 0.05), while group × time interaction was not significant (P > 0.05). However, weight loss per guidance (efficiency) in 3m1w and 6m1w were significantly higher than the other two groups (-0.2 ± 0.1 kg/guidance, −0.4 ± 0.2 kg/guidance, −0.2 ± 0.1 kg/guidance, −0.5 ± 0.2 kg/guidance, respectively), weight loss per week in 1.5m^{2}w was significantly higher than the other three groups (-0.8 ± 0.5 kg/week; −0.4 ± 0.2 kg/week; −0.5 ± 0.2 kg/week; −0.2 ± 0.1 kg/week).
Conclusion: Since there were little to no effect on the amount of weight loss and decrease in the efficiency, it is not necessary to increase the frequency of guidance over weekly or to extend intervention periods over 1.5 months blindly.

T7:PO.025

Effects of smart diet weight-loss program on weight loss and adherence based on surveys of common preferences

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Introduction: To examine the effects of our weight-loss program (SMART diet) on weight loss and adherence based on surveys of common preferences for the program.
Methods: Among 118 women with obesity or having at least 1 risk factor for metabolic syndrome (i.e., waist circumference, hypertension, dyslipidemia, hyperglycemia) who were encouraged to lose weight, group 1 (49.8 ± 12.4 years, n = 12) participated in our 12-wk weight-loss intervention using the SMART diet program based on surveys of common (individual) preferences (preference group: diet and exercise regimen with one-on-one guidance sessions 1d/wk, 60 min/session for 12wk) while group 2 (57.9 ± 5.8 years, n = 15) participated in our weight-loss intervention using non-preferences (non-preference group: diet regimen with group-guidance sessions 2d/wk, 60 min/session for 12wk).
Results: Weight decreased significantly during the intervention (preference group: 64.6 ± 12.2 to 58.9 ± 10.9 kg; P < 0.05, non-preference group: 69.1 ± 7.5 to 63.2 ± 7.8 kg; P < 0.05), but the program × time interaction was not statistically significant. However, a significant difference existed in the dropout rates (0% vs 53.3%; P < 0.05, respectively). Weight-loss per guidance session was higher in the preference group than the non-preference group (-0.5 ± 0.2 kg vs −0.2 ± 0.1 kg; P < 0.05).
Conclusion: The SMART diet program based on individual preferences contributes to low dropout rate, significant weight loss, and good adherence with less time and less guidance session requirement.

T7:PO.026

The effectiveness of long term physical activity without diet interventions on weight loss and blood pressure in adults with class i obesity

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The aim of the study was to access the effectiveness of long term physical activity intervention on weight loss and body composition and blood pressure. 37 obese men participated in the experiment (42 ± 5.0 years of age, BMI = 32.69 ± 5.61 kg/m^2). The six month long exercise program consisted of moderate-intensity cardiovascular exercise involving both the upper and the lower limbs for at least 60 to 70% of the subject's maximal heart rate. The subjects exercised 3 times a week (45 minutes each), two times a week at the gymnasium under close supervision of an exercise physiologist and one time a week a Nordic walking session. Before and after the intervention we performed basic anthropometric measurements (body weight, body height, waist and hip circumference, and waist to hip ratio (WHR). An bioimpedance method (using a Jawon Medical X-Scan-Plus II) was used to estimate body composition parameters: mean body fat (MBF), subcutaneous fat mass (SFM), visceral fat mass (VFM), lean body mass (LBM), skeletal muscle mass (SMM) and the percentage of these components during the study. Resting blood pressure was measured 3 times in a seated position using a mercury sphygmomanometer. After the exercise program the decrease in total body mass and BMI (p = 0.05), mean body fat, both in [kg] and [%] (p = 0.02; p = 0.04), visceral and subcutaneous mass fat (p = 0.02) as well as WHR (p = 0.05) was observed. There were no statistically significant changes in blood pressure, but slow

decrease tendency have been observed. Our results reporting that the addition of systematic physical activity at 60 to 70% of the subject's maximal heart rate, even without diet modification modestly but significantly induces weight loss and body composition positive changes and is important to maintain weight loss.

Acknowledgement: The research was supported by the National Science Centre grant No. N N404 312940

T7:PO.027

Group studio cycling is an effective intervention to improve cardio-metabolic health in overweight sedentary individuals

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Introduction: High intensity interval training (HIIT) improves health markers in groups at risk of cardiovascular and metabolic disease. The majority of evidence comes from laboratory studies with fixed intensity intervals and one to one supervision. Studio cycling, incorporating both aerobic and high intensity exercise, offers a platform for the implementation of HIIT within the wider community. The aim of the present investigation was to test the efficacy of group based studio cycling at improving markers of cardio-metabolic health in overweight individuals.
Methods: Eight, overweight, sedentary (86.1 ± 10.6 kg; 27.1 ± 4.7 ml.kg. min-1; <1.5 hr.wk-1) but otherwise healthy volunteers completed 8 weeks of supervised studio cycling lasting 50 minutes 3 times per week. Heart rate was monitored as a guide to exercise intensity achieved. Participants underwent evaluation for blood pressure, maximal oxygen uptake (V O_ (2 max)), body composition, and blood lipid profile before and after the intervention.
Results: Adherence to training was >95%. V O_(2 max) improved by 11.8% ($p < 0.0001$) and MAP reduced by 6.5% ($p < 0.05$). Fat free mass index increased by 4.4% ($p < 0.05$) and waist:hip by 1.2% ($p < 0.05$). Cholesterol was reduced by 13% ($p < 0.05$).
Discussion: These data show that group exercise is effective at improving cardio-metabolic health in overweight individuals and improves markers of disease risk with comparable benefits as reported in may laboratory HIIT studies. Studio cycling improves fat free mass and as such may help improve function of daily tasks due to an increase in lean mass. Coupled with a high adherence rate, studio cycling offers an effective intervention to improve cardiovascular health in physically inactive cohorts that can be implemented on a community wide scale.

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T7:PO.028

Behavioural, affective and contextual factors are important mediators in successful and healthy weight loss maintenance

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Introduction: Weight regain poses an unsolved challenge in obesity prevention. Thus, identification of factors securing successful long term weight maintenance is essential. Aim: To evaluate physiological and psychosocial mediators of successful weight loss maintenance in good and poor weight maintainers. Metabolic risk factors were assessed to identify health benefits.
Methods: 43 obese individuals obtained a 12% body weight loss through an 8 week long low-calorie diet. After weight loss, participants were followed for 52 weeks. Body weight, waist circumference, blood pressure, fasting plasma glucose and lipid levels were measured after weight loss and after 1 year. Qualitative interviews were conducted at the end of the trial and psychosocial factors characterizing good and poor maintainers were identified.
Results: Based on body weight changes during the 52 weeks, 3 groups were identified: group A (mean weight loss < 3.0%, n=9), group B (mean weight change from 3.0% weight loss to 3.0% weight gain, n=13) and group C (mean weight gain >3.0%, n=21). At week 52, group A and B had lower waist circumference, fasting plasma glucose and triglycerides compared to group C ($p < 0.05$). Specific behavioral, affective and contextual factors were identified in the three groups. Good maintainers reported regular exercise and a high degree of instrumentalization in their eating behavior, and described their everyday life as stable, structured and with strong social support as opposed to poor maintainers who reported a lack of stability and a high degree of psycho-social stress.
Conclusion: Sustained weight loss is associated with beneficial health outcomes, and behavioral, affective and contextual factors are important psycho-social mediators in successful weight loss maintenance.

T7:PO.029

Adding Context: Process evaluation of a childhood obesity prevention trial (the WAVES study)

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Introduction: Process evaluation can help contextualise trial outcomes. It can also assess an intervention's acceptability. A comprehensive process evaluation was implemented for the WAVES study, an evaluation of a childhood obesity prevention intervention for 6–7 year-olds delivered in UK primary schools (n=26). The intervention included additional daily school-time physical activity (PA), three cooking workshops (CW) for children and parents, a 6-week healthy lifestyle programme at a football club (Villa Vitality (VV)) and two information sheets signposting to local activities.
Methods: Data were collected using logbooks, observations, questionnaires, focus groups and interviews. Quantitative data were summarised as appropriate. Qualitative data were analysed using the framework approach. Based on the data collected for each intervention component schools were allocated an implementation score (low-high).
Results: Scores showed variation between schools in terms of implementation. Most schools implemented PA least well, and VV the best. This was contextualised by teacher reports of timetable constraints making PA delivery challenging. Parent attendance at CWs was another challenge. Teachers thought that VV offered a 'wow-factor' which was particularly appealing to children. The impact of the signposting sheets was questioned by teachers, and parents struggled to recall them.
Conclusion: The process evaluation results will provide context to the trial outcomes. Additional daily PA was challenging for teachers to implement. The importance of PA for health supports its continued inclusion in interventions, but strategies to support implementation are essential for adherence.

Acknowledgement: With thanks to the WAVES study research team, the trial investigators and collaborators, and the schools participating in the study.

T7:PO.030

Venturing down the rabbit hole of translational research: The peachtm child weight management program

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Child obesity is a dire public health issue. Trials show promising results, however few are translated to practice. This paper describes the process of translating an effective child weight management program (PEACHTM) from an RCT intervention to a community health program and public health initiative. PEACHTM is an Australian evidence-based, family-focussed child weight management intervention for 5–9y olds (NHMRC-funded RCT from 2004–08, ACTR 00001104). The trial showed a 10% reduction in relative adiposity at 6m, maintained for 18m with no further contact. Findings were disseminated via academic, professional and lay channels. Relationships were developed with government departments, clinicians and managers. Funding for translation was secured from state government and a car manufacturer. This iteration,"PEACHTM in the Community", involved development of a facilitator training program, revision of program content, relaxation of eligibility criteria and development of an evaluation framework based on the REAIM model. From 2009 to 2011,8 training workshops were delivered to 54 participants, of which 11 delivered 8 programs to 62 families. Reach, adoption and implementation were limited and key lessons were: a) build trust between researchers, service deliverers and management, b) understand and implement strategies to respond to the political environment in which community health programs are funded and delivered, c) need for adaptation of programs to enhance adoption, and d) importance of data collection support. These insights inform the current iteration of PEACHTM as a public health initiative in the state of Queensland (PEACHTM QLD), where it will be delivered to 1400 children over 3y.

T7:PO.031

Impact of participation in the peachtm child weight management intervention on parenting and family lifestyle behaviours: Pilot results of peachtm queensland

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Australian clinical practice guidelines for management of childhood overweight and obesity 2013 recommend family-focussed lifestyle interventions involving frequent contact with a health professional as effective. PEACHTM is an evidence-based group program supporting parents to improve the lifestyles of their overweight children 5–11 years via parenting skills training focussing on family eating and activity behaviours. Funded by the Queensland Government the program will be delivered to 1400 families in Queensland Australia in four phases over three years. This study presents pilot data of the impact on parenting and family lifestyle behaviours. A total of 53 families (59 children) were enrolled at 6 sites. Baseline and follow up data (at 6 month program end) were obtained from 22 families (24 children). Child dietary intake was assessed using the Child Dietary Questionnaire (CDQ), activity and sedentary behaviour using the CLASS questionnaire and impact on other family members via purpose developed questions. Descriptive pre-post comparisons are reported. There were improvements in all five sub-scales of the CDQ (eg fruit & vegetable score pre vs post median 10.9 vs13.1) and a reduction of 40 minutes/day in screen based activity. Parents reported increased confidence in setting limits regarding their child's eating and activity behaviours and improvements in their ability to manage their child's behaviour. All parents reported an improvement in eating habits (21/21) and 20/21 in activity patterns of the whole family. Most parents (20/22) felt the health and wellbeing of their whole family improved post-program. These early results suggest the merits and wider impact of taking a parent-led family-focussed approach to child weight management, as not only the target child benefits.

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T7:PO.032

Android obesity and inflammatory markers under the action of an interdisciplinary therapy program.

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Introduction: Obesity is one of the major public health problem actually. It has a multifactorial etiology and it's characterized by excessive accumulation of adipose tissue (AT). It's known that AT, especially that with android distribution, has an secreting-endocrine function, releasing any adipokines, which are responsible for developing metabolic disorders. They are responsable to modify vital functions of the body, such as the heart and imune function.
Objective: Check the effect of Long-Term Interdisciplinary Therapy (IT) in Android Obesity (AO) and in pro- and anti-inflammatory markers in obese adults.
Methods: There were 23 volunteers with a mean age of 41.34 ± 5.82 years old and mean body mass index of 33.97 ± 2.81 kg/cm¸. They underwent 32 weeks of IT, composed of six weekly interventions, three of physical exercise, one of physiotherapy, nutrition and psychology. The evaluations were performed on two occasions: before and after 32 weeks of IT. The distribution of AT was verified by Dual-energy X-ray absorptiometry (DEXA). The plasma levels of inflammatory markers were determined after collecting blood of volunteers, by ELISA immunoassay for IL-6, adiponectin and TNF-α. In statistical analysis were used the Student-t test and Wilkoxon, according to the normality of the samples. The level of considered significance was 5%.
Results: After IT the AO showed a significant reduction of 3.93% ±3.26 ($p < 0.001$). Proinflammatory markers was had a significant reduction in IL-6 (-1.79mg/dL, $p = 0.001$) and TNF-α (-1.43mg/dL, $p = 0.006$). The adiponectin showed an increasing trend, although it wasn't significant.
Conclusion: The TI against obesity promoted reduction of AO and decreased plasma levels of pro-inflammatory markers IL-6 and TNF-α.

T7:PO.033

Engagement with on-line programmes to prevent weight gain in young adults

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Introduction: Understanding how young adults engage with and use online resources for obesity prevention may provide valuable information to modify programme design and maximise impact.
Methods: Two 19-week online programmes shown to help to prevent weight gain were delivered by random allocation to university students; P1) a 'rational-model' (on weight-control), P2) a 'stealth-model' (global

food issues). 2051 participants, mean age 20.0 SD 3.6 years, BMI 22.4 SD 4.7 kg/m^2 who viewed the resources at least once, were included in this analysis, relating participant characteristics, residence-type and body-satisfaction to frequency and timing of log-ins and topic popularity.
Results: P1 attracted 1196 and P2 527 participants, more female (57.8%): 45% of all participants were satisfied with their weight but 75% would welcome advice on weight control. Mean log-in frequency by 19-week programme for P1 was 8.9 (SD 12.3) and 4.9 (SD 6.9) P2. Log-in frequency did not differ by university faculty, residence-type or gender. For P1, interest in weight management advice and baseline BMI were related to log-in frequency. Obese participants logged in on more occasions per programme; 12 vs. <8 for others with BMI <30 kg/m^2 (p = 0.012). Most frequent viewings for both programmes were in the first 2 weeks and programme usage decreased over time. The timings of log-in occasions (day/night, weekend/weekdays) were not associated with weight change.
Conclusion: On-line programmes designed to prevent weight gain are attractive to a range of young adults. Declining usage over time is the single biggest obstacle, so a series of shorter programmes might be more effective than a single long one.

T7:PO.034

Adolescents´ experiences with obesity. A qualitative study.

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Introduction: The Norwegian Healthy Future project aims to develop knowledge of how evidence-based interventions could be implemented by use of a Comprehensive Participatory Planning and Evaluation (CPPE) process. Obese adolescents are especially at risk for being obese adults, therefore important to reach to tailor interventions built on adolescents´ needs. In-depth understanding of adolescents´ perspectives can reveal potential footholds for interventions, and might strengthen the patient-clinician partnership in identifying patients´ strengths and motivating for weight loss. The aim of this study is to explore adolescents´ experiences of being obese.
Methods: A qualitative approach with action oriented research in a Norwegian context of primary health care was chosen. Individual repeated in-depth interviews were carried out and data analyzed by qualitative content analysis. Themes occurred from the data by stepwise developed codes, subcategories and categories.
Results: Across the 12 interviews of adolescents´ perspectives on everyday life with overweight five categories were identified: 1. Adolescents' suggested causes for obesity; 2.To speak about overweight; 3. Challenges in changing behavior; 4. Social relationships; 5.To ask for help. Three themes emerged: 1. Obesity as a multi-faced and "difficult-to-solve" condition; 2 Overweight as a shameful and vulnerable subject; 3. Obesity as a source for bullying and fragile social relationships.
Conclusion: Adolescents experienced everyday life with obesity differently, according to their experiences from being bullied, given social support, and their feelings of control and possibilities to reduce obesity.

T7:PO.035

Outcome of public obesity clinics in malaysia: Retrospective data of 417 subjects

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Introduction: Data are scarce concerning weight loss outcome of obese subjects following clinic program (Vasconcelos et al., 2004, Compe et al., 2003). The objective was to evaluate outcome and predictors of weight loss in outpatient obesity clinics.
Methods: Studied clinics provided endocrinologist and dietician consultations, physical activity with physiotherapists, support group meetings, meal replacement and anti-obesant therapy. Records of patients were scrutinized at first and 6th month entry. Outcome measures: Anthropometry measurements; biochemistry and co-morbidity profiles. Statistical tests: paired t tests, correlation, regression analysis, and ANOVA.
Results: Total of 417 patients (63.1% female, 77.2% Malay, 62.8% married) with mean age of 42.7 years (SD±12.43); and mean BMI of 47.1 (SD±9.47) kg/m^2. 63.8% had weight loss but only 17.3% had at least 5% weight loss. Mean weight loss is 2.15 (P < 0.001) with an average of 1.64%; BMI decreased by 0.89 (P < 0.001), pulse rate by 2.06 (P < 0.04), and waist circumference by 2.12 (P < 0.001). BMI changed was negatively correlated with HDL (r = -0.57, p < 0.01). Total cholesterol and LDL decreased by 0.16 (P < 0.03) and 0.15 (P < 0.02); Alkaline Phosphate and Alanine Transaminase decreased by 3.99 (P < 0.006) and 4.72 (P < 0.018). Weight reduction was significantly correlated with frequency of support group attended.
Conclusion: The obesity clinic resulted in an effective weight loss, which related to the attendance of support group sessions.

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Table 1: Demographic characteristics of the study subjects at baseline

Demographic characteristics	Baseline
All subjects, *n* (%)	417(100%)
Mean age in years (±Standard Deviation SD)	42.7±12.43
Location, *n* (%)	
Clinic 1	274 (71.2%)
Clinic 2	111 (28.8%)
Gender, *n* (%)	
Male	154 (36.9%)
Female	263 (63.1%)
Ethnic Group, *n* (%)	
Malay	322 (77.2%)
Chinese	32 (7.7%)
Indian	59 (14.1%)
Others	4 (1.0%)
Age groups (years), *n* (%)	
< 20	13 (3.1%)
20-29.9	44 (10.6%)
30-39.9	127 (30.5%)
40-49.9	90 (21.6
50-59.9	111 (26.6
>= 60	32 (7.7%)
Marital Status, *n* (%) †	
Single	87 (24.0%)
Married	262 (72.4%)
Divorcee	13 (3.6%)

†Number do not equal to n=417 due to missing data

Fig. 1. Demography characteristics

Table 2: Anthropometry and clinical profile of the study subjects

Demographic characteristics	Baseline (mean±SD)	6 months follow-up (mean±SD)	Mean difference	*p* value
Weight (kg)	121.25±26.91	119.10±14.0096	2.15	<0.001
Height (m)	1.5596±0.0840	-	-	-
Body Mass Index (kg/m²)	47.19±9.47	46.29±9.19	0.89	<0.001
Waist Circumference (cm)	121.59±15.15	119.47±15.21	2.12	<0.001
Neck Circumference (cm)	41.70±4.83	41.13±4.26	0.57	0.18
Diabetes status				
Fasting glucose (mmol/L)	6.39±2.37	6.32±2.65	0.07	0.695
HbA1c (%)	7.96±1.89	7.61±2.09	0.34	0.07
Dyslipidaemia				
Total Cholesterol (mmol/L)	5.01±1.08	4.86±0.98	0.16	0.03
High Density Lipoprotein (mmol/L)	1.19±0.29	1.26±0.51	-0.07	0.06
Low Density Lipoprotein (mmol/L)	3.10±0.93	2.95±0.88	0.15	0.02
Triglyceride (mmol/L)	1.60±1.14	1.55±0.79	0.05	0.48
Blood pressure				
Systolic blood pressure (mmHg)	138.15±18.37	136.57±18.19	1.57	0.17
Diastolic blood pressure (mmHg)	86.55±13.20	85.37±12.14	1.18	0.16
Pulse rate (beats/min)	84.63±13.23	82.56±12.29	2.06	0.04
Renal Function				
Creatinine (mmol/L)	71.86±24.8	72.37±26.97	-0.51	0.68
Liver Function				
Alkaline Phosphate (mmol/L)	80.08±24.96	76.09±22.99	3.99	0.006
Alanine Transaminase (mmol/L)	39.81±27.63	35.08±24.34	4.72	0.018
Aspartate Transaminase (mmol/L)	32.22±18.48	30.57±18.83	1.65	0.35
Urine Albumin	478.60±157.16	417.00±67.93	61.6	0.21

Fig. 2. Changes of Clinical Profile

T7:PO.036

Preliminary results of a dietary intervention among primary-school children

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Introduction: Prevention of obesity in schools has been planned by developing and then by evaluating the effectiveness of a Web-based Dietary Intervention. The research project „Evaluation of a Web-based Dietary Intervention among primary school children" is being carried out in a randomly selected sample of Elementary Schools in central/eastern Crete.
Objective: The aim is to evaluate the effectiveness of the dietary intervention by measuring body composition and dietary behavior of children prior to and after the intervention.
Methods: The nutritional intervention (material presented in another abstract) has been applied in a number of primary schools in ages 8–11. We followed two interventional approaches. The first is the 'traditional' intervention, which requires the presence of a dietitian for the lectures. The second is web-based, where the students attend digital presentations on nutrition and play respective interactive games, assisted by their teachers. For body composition measurements the methods BIS, NIR, triceps and circumferences were employed, while for dietary behavior a long questionnaire was distributed. For the statistical analysis the SPSS program was used.
Results: A statistically significant decrease was found (independent samples t-test) in %BF ($P < 0.0001$), as well as in triceps ($P = 0.002$) of children participated in the intervention courses (N=382) compared to the control group (N=86). There was no difference between the two intervention methods or between boys and girls. In parallel, a statistically significant improvement of dietary behavior was recorded.
Conclusions: The dietary intervention applied to 8–11 years old children was found to be effective in terms of decreasing the %BF levels and in improving the dietary behavior.

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T7 – Obesity and disease in populations

T7:PO.037

Trends in obesity and low birth weight among macedonian women in the period 2004–2013trends in obesity and low birth weight among macedonian women in the period 2004–2013

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In our study we have analyzed 23000 births in the 10-years period 2004–2013, reported and recorded in the national statistics by National Institute of Public Health. In the analyzed period, the average infant mortality rate (IMR) was 10.44/1000 live births [95% CI, 9.25 – 11.63]. Analyzed by 5-years intervals, IMR for 2004–2008 was 11.5 [95% CI, 10.18 – 12.82], while in the period 2009–2014 the rate was 9.38 [95% CI, 7.81 – 10.96], with remarkable continuous decrease. However, there are regional differences, with highest average IMR registered in Skopje and Polog region (11.12/1000 live births), while the rate is lowest in North-East region (8.18/1000). Another social determinant associated with IMR is mother's education, with IMR of 15.9/1000 in mothers without education, compared to 4.7/1000 in mothers with university education. Smoking, alcohol consumption and adolescent pregnancy are identified as main behavioral risk factors for infant mortality, while main biological and social factors are perinatal depression, bacterial infections, domestic violence and mother's body weight. Smoking, substance abuse, maternal infections and obesity have been identified as conditions that are compromising fetal development and result in pre-term delivery, low birth weight, respiratory problems and chronic conditions that can lead to death of the newborn. Holistic approach in defining strategies and implementation of public health interventions is key to risk mitigation and provision of environment in favor of minimizing risks. There is also implicit need to stimulate quantitative and qualitative research aimed at identification of specific characteristics of infant mortality in Republic of Macedonia and development of appropriate programs to address them, based on research data.

Acknowledgement: The study has been funded by University "Sts. Cyril and Methodius" – SkopjeThe study has been funded by University "Sts. Cyril and Methodius" – Skopje

T7:PO.038

The role of obesity in hypertension - Epidemiological long-term trends in the Austrian population

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Introduction: There is a lack of empirical evidence for the development of hypertension prevalence and its related factors. Therefore the aim of this study is to analyze the prevalence and long-term-trend of hypertension in Austria and identify subpopulations that are affected the most (stratification by obesity, sex, age, educational level).
Methods: This representative population-based study is based on self-reported data of adults (mean age: 47.7 ± 17.5; n = 178,818) that were taken from five national health surveys between 1973 and 2007. An adjustment of self-reported BMI was performed based on a preliminary validation study. Obesity was defined as a BMI ≥ 30 kg/m¸. Absolute changes (AC) and aetiologic fractions (AF) were calculated from logistic regressions to measure trends. To quantify the extent of social inequality, a relative index of inequality (RII) was computed.
Results: During the study period the age-standardized hypertension prevalence increased from 1.0% to 18.8%, with a considerable rise from 1991 onwards. There was a positive trend in all subpopulations, with the highest AC among obese women (+50.2%) and obese subjects ≥ 75 years

(+54.4%), whereas the highest risk was observed among the youngest obese adults (AF: 99.4%). The RII for hypertension was significantly higher for women than men.
Conclusion: Obesity and older age are significant factors for increased morbidity of hypertension. The most undesirable trends occurred in obese women and obese subjects ≥ 75 years. These risk groups should be given special attention when planning hypertension prevention programs. However, the high increase in the prevalence of hypertension is due to different aspects, e.g. a demographic change and a change in the definition of hypertension.

T7:PO.039

Obesity-related breast cancer risk is higher in women with asian than white ancestry

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Introduction: Breast cancer incidence remains lower in Asian than Western countries, while rates in Asian migrants have risen. Although obesity increases postmenopausal breast cancer risk and mortality across populations, the relation appears to differ by ethnicity. This review examines the association of obesity with breast cancer in women of Asian and white ancestry and proposes potential mechanisms of action.
Methods: Using data from the Multiethnic Cohort (MEC) as well as published reports from women with Asian ancestry, risk estimates were compared by ethnicity.
Results: A higher risk for Japanese than white women with a body mass index (BMI) >30 kg/m^2 was found in the MEC (HR=1.59; 95%CI: 1.24–2.05 vs. HR=1.38; 95%CI: 1.24–1.53) when compared to normal weight participants (1). The risk associated with a high waist to hip ratio (WHR) was also stronger for breast cancer incidence (2) and mortality (3) among Asian American than white women. This disparity may be due to a higher proportion of visceral than subcutaneous adipose tissue resulting in varying levels of adipokines and inflammatory markers (4).
Conclusion: Anthropometric measures from imaging are needed to understand the relation between obesity, biomarkers, and breast cancer across ethnic groups.

Acknowledgement: Research relating to this abstract was funded by grants R37CA54281 and UM1CA164973 from the US National Cancer Institute.

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T7:PO.040

Association between semicarbazide sensitive amine oxidase/soluble Vascular adhesion protein-1, insulin resistance and central obesity in adolescent males

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Introduction: In the adult type 2 diabetics the activity of semicarbazide sensitive amine oxidase (SSAO), analogous to vascular adhesion protein-1 (VAP-1), is increased; resulting in the production of H2O2 and (among others) methylglyoxal (MGO). Enhanced oxidative stress as well as MGO might induce insulin resistance (IR). In diabetics, elevated SSAO/VAP-1 levels are linked to cardiovascular complications. We asked whether alteration in SSAO/sVAP-1 system occurs already in early stages of IR, with regard to presence/absence of central obesity (CO).
Methods: In a cross-sectional study SSAO activity (determined radiometrically) and sVAP-1 levels (commercial ELISA) were determined in 4 groups of male Caucasian non-diabetic adolescents aged 17-to-21-years: 1/ lean insulin sensitive (LIS, n=33), 2/ lean IR (LIR, n=32), 3/ CO insulin sensitive (OIS, n=32), and 4/ CO-IR (OIR, n=31). CO was classified as waist-to-height ratio >0.5, IR as QUICKI<0.319.
Results: No significant between-group differences either in the activity of plasma SSAO (LIS=61 ± 18, LIR=60 ± 22, OIS=61 ± 16, OIR=60 ± 14 pmol/mg/h), or the levels of sVAP-1 were revealed. Enzyme activity of SSAO correlated significantly with concentrations of circulating sVAP-1 (R2=0.33; $p < 0.001$).
Conclusion: In non-diabetic adolescent males presence of cardiovascular risk factors such as CO, IR or their concurrent manifestation is not asssociated with altered activity of SSAO or circulating sVAP-1 levels. Whether SSAO/sVAP-1 alterations become manifested in presence of risk facors in older subjects prior to manifestation of diabetes remains to be elucidated. Satisfactory correlation between determination of plasma SSAO activity and sVAP-1 concentration suggest that the methods could substitute for each other.

T7:PO.041

Eddy – a project to prevent obesity and to reduce cadiovaskular risk factors in 11–13 years old adolescents

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Introduction: Diseases of the cardiovascular system are responsible for about 43% of all deaths in Austria and correlate strongly with obesity and its consequences. According to the HELENA data approximately 23% of the adolescents in Vienna are obese. So it is necessary to find concepts to prevent obesity.
Methods: The EDDY project is an interventional cohort study with duration of two years. The cohort is scaled in an intervention group and a control group consisting of 147 students from Viennese secondary and high schools. The intervention group will receive a comprehensive, age-appropriate nutrition training, physiological training and an exercise intervention each semester. Before and after intervention and at two follow-ups, subjects are physically measured and blood samples are taken. In addition, knowledge of nutritional issues, eating habits and psychological parameters are measured with adequate questionnaires.
Results: Preliminary outcomes show an improvement of nutrition knowledge, a significant reduction in the consumption of junk food, sweets and salty snacks as well as cardiovascular risk factors and an improvement of physical performance compared to control schools.
Conclusion: Previous data from the running project indicate that the intervention is able to improve nutrition habits and possibly the physical performance. It should be pointed out, that the inclusion of parents and teachers are so far not satisfying realized, however this will be very essential for a long-term effect.

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T7:PO.042

Is There an Association Between Weight and Dental Caries in School Aged Children: Effect of Being Overweight or Low Weight

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Introduction: Body weight status and dental caries has been associated in children by several studies in recent years. This study was aimed to evaluate the relationship between antropometric measurement and body composition with dental caries of children.
Methods: This study was conducted 12 ages 96 girls and 92 boys totally 188 children. Anthropometric measurements of children were taken and body fat percentage (%) was measured by bioelectric impedance analyzer. Body mass index (BMI) was evaluated according to age and gender with the reference of WHO 2007 for 5–19 years. Oral health clinical examinations of children were checked by a dentist. Mean DMFT and dmft index are used to evaluate dental caries status of children.
Results: The children were divided into three groups as underweight (9.6%), normal weight (44.7%), and overweight (45.7%). It was found that 48.3% of children had one tooth decay at least and mean DMFT was 1.1 ± 1.41. There was a negative correlation between body weight, waist circumference, BMI, body fat and dmfs with dmft index and number of temporary teeth caries ($p < 0.05$). Underweight children had higher DMFT and dmft index value and number of decay in primary teeth , than obese children but the difference was not found significant ($p > 0.05$). The number of temporary decay and filling teeth were lower in obese children. Children who have higher body fat percentage had better values of oral health indicators but the difference between the groups was not found significant ($p > 0.05$).
Conclusion: Development of dental caries is associated with underweight as obesity in children. Maintaining of ideal body weight and prevention of underweight and obesity with providing adequate and balance nutrition are important for prevention of dental caries in children.

T7:PO.043

Association of serum 25-hydroxyvitamin d and parathyroid hormone with hypertension in middle-aged and older korean adults

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Background: Previous studies have suggested that serum 25-hydroxyvitamin D [25(OH)D] and parathyroid hormone (PTH) levels are associated with hypertension. However, the associations have yet to be studied in Koreans. This study explored the relationship among serum 25(OH)D, PTH concentrations and the risk of hypertension in middle-aged and older Korean adults using the most recent nationally representative survey data.
Methods: A population-based, cross-sectional study was conducted with data collected from 5,260 Korean adults (aged ≥ 50 years) who participated in the 2010 and 2011 Korean National Health and Nutrition Examination Surveys. Hypertension was defined as a systolic blood pressure ≥ 140 mmHg, diastolic blood pressure ≥ 90 mm Hg, or current use of antihypertensive medication.
Results: The prevalence of hypertension significantly increased according to the quartiles of serum PTH levels ($P < 0.0001$), but not of serum 25(OH)D levels. In multivariable logistic analysis, the adjusted odds ratios (ORs) for hypertension were significantly higher among subjects in the highest quartile than among subjects in the lowest quartile of serum PTH level, after adjusting for potential confounders [OR = 1.28, 95% confidence interval (CI) = 1.04–1.59, P for trend = 0.0007]. The adjusted ORs for hypertension tended to decrease across the quartiles of serum 25(OH)D level, but the associations were not significant.
Conclusion: Serum 25(OH)D was not associated with the risk of hypertension, whereas serum PTH was positively associated with the risk of hypertension, suggesting that serum PTH may be an independent risk factor for hypertension in middle-aged and older Korean adults.

Acknowledgement: This research was supported by the Basic Science Research Program of the National Research Foundation of Korea (NRF) founded by the Ministry of Education, Science and Technology (NRF2012R1A1A1012317).

T7:PO.044

Economic and public health burden of obesity in hungary

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Background: "Obesity pandemic" reached Hungary, resulting visible high prevalence in the population. Previous evaluation in Hungary was completed in 1988, while obesity related health care expenditures were never estimated.
Aim (1)to collect updated prevalence data (2): estimating the economic burden of overweight/obesity for health budget.
Method (1)Anthropometric, educational and morbidity data of persons above 18y were registered in community and primary care settings, representatively in all regions of Hungary. (2)National Health Insurance Fund expenses related to inpatient (hospital), outpatient services and sick-leave finances related to obesity, diabetes and hypertension were analyzed. The incidence of obesity was calculated as 80% among diabetics and as 60% among patients with hypertension.
Results: (1)Data (BMI, waist circumference, educational level) of 40,331 individuals (16,544 men, 23,787 women) were analyzed. Overall prevalence for overweight was 40.4% among men, 31.3% among women, while for obesity 32.0% and 31.5%, respectively. Abdominal obesity was 37.1% in males, 60.9% in females. Data are presented by age-decades as well. The highest odds ratio for overweight was at middle the lowest for obesity at the highest educational level. The highest proportion of obese people lived in villages and in Budapest. Registered metabolic morbidities were strongly correlated with BMIs and both were inversely related to the level of urbanization. (2)According to the estimation 15–18% of total health expenditures and at least 1% of the GDP were spent.
Discussion There was a shift in the population toward being overweight and moreover obese, mainly in younger generation. Obesity is an important contributor of the increased health care expenditures.

Acknowledgement: Since 25y, it is the first population based survey in Hungary and the first about the national health care expenses. Shortening the abstract needed some compromises in the English grammar

T7:PO.045

Beyond BMI: Projecting the future burden of obesity in england using different measures of adiposity

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Introduction: Body mass index (BMI) is a frequently used measure to assess the weight of an individual adjusted for their height. At a population level BMI is a useful tool for monitoring and surveillance, but it can underestimate the risk of disease. Waist circumference (WC) appears to be a better predictor of disease risk, however comparatively fewer data exist. In this study, projections in England to 2050 for BMI and WC were compared.
Methods: Cross-sectional datasets from the Health Survey for England (HSE) for 2006–2011 were used to analyse both BMI and WC. For BMI, 3 categories were used, defined by WHO cut-offs: underweight and healthy weight (<25 kg/m^2), pre-obese (25–29.99 kg/m^2) and obese (≥30 kg/m^2).

For WC, 3 categories were used as suggested by the WHO [1]. For men: <94 cm, 94–101.99 cm and ≥102 cm and for women: <80 cm, 80–87.99 cm and ≥88 cm. Pearson correlation coefficients of BMI and WC were calculated in R. Projections to 2050 were generated for BMI and WC in males and females by fitting multivariate categorical regression models to the datasets.

Results: In $^{2}01^{1}$, the correlation coefficient was $0.^{84}$. BMI and WC were predicted to increase over time for males with a greater increase predicted for WC. Preliminary results showing that ~44% will be obese but ~66% will have a WC ≥102 cm by 2050.

Conclusion: Our prediction model shows that current predictions of the future burden of obesity related diseases [2] are likely to be underestimates and that predictions may be improved with the inclusion of WC. Understanding how distributions of obesity will change in the future is important for policy resource planning.

References:

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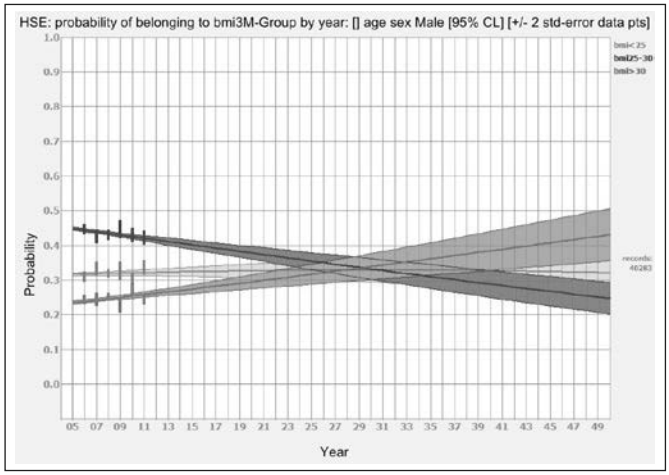

Fig. 1. Projected BMI prevalence to the year 2050 using HSE data from 2006–2011 for 18–100 year old males.

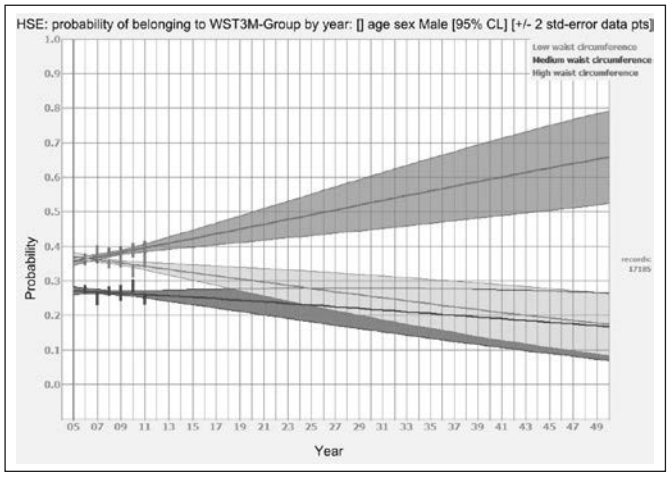

Fig. 2. Projected WC prevalence to the year 2050 using HSE data from 2006–2011 for 18–100 year old males.

T7:PO.046

Adenovirus-36 infection and its relation to dietary intake and response to in-patient weight management in obese girls

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Introduction: Human adenovirus 36 (Adv36) enhances an accumulation of fat mass. The response to weight management program (WMP) as well as an evaluation of dietary intake with respect to the presence of Adv36 antibodies has not been broadly investigated.

Methods: Subjects: 184 Czech obese girls, age 13.0–17.9 years, BMI > 97th percentile for sex and age. WMP: a 4-week in-patient supervised program included decreased dietary intake individually modified according to age and BMI with ensured recommended daily consumption of all essential nutrients and appropriate macronutrient balance, aerobic physical exercise and cognitive behavioral therapy. Adv36 antibodies: competitive enzyme-linked immunosorbent assay. Dietary intake: pre-treatment evaluation of 3-day dietary records by PC program NutriMaster. Anthropometric measurements, clinical examination and fasting laboratory assessment performed before and after WMP.

Results: In the pre-treatment period no difference in energy and nutrient intake between Adv36 infected and uninfected girls was revealed. After the intervention Adv36 positive girls presented with significantly greater decrease of z-score of waist circumference ($p = 0.024$), waist-to-hip ratio ($p = 0.007$) and weight-to-height ratio ($p = 0.019$) compared to Adv36 negative girls. On contrary the sum of four skinfolds decreased significantly more in Adv36 negative than in Adv36 positive individuals ($p = 0.013$). None of the further studied metabolic and hormonal parameters showed any significant relevance to Adv36 status in response to in-patient WMP.

Conclusion: In infected obese girls WMP led to a greater decrease of abdominal fat but to a preservation of subcutaneous fat.

Acknowledgement: Research related to this abstract was funded by these grants: IGA MZCR NT/13792-4, MH CZ-DRO (Institute of Endocrinology - EÚ, 00023761), CZ0123 from Norway through the Norwegian Financial Mechanisms.

T7:PO.047

Impact of body mass index (BMI) on clinical in-stent restenosis (isr), de-novo stenosis (dns) and repeat revascularization (rr) rate in patients undergoing percutaneous coronary intervention (pci)

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Background: Previous studies have described an "obesity paradox" with prognosis and various treatments of cardiovascular disease, including PCI. Until now exist contradictory data for the impact of BMI on clinical ISR, DNS and RR rate in patient undergoing PCI. We sought to investigate the impact of BMI on clinical ISR, DNS and RR rate in patients following first-time elective PCI.

Methods: Were included 735 patients from September 2011 to November 2013 in Department of Cardiology and followed for one year. Patients were categorized according to BMI groups. BMI 18.5 - 24.9 kg/m^2 as normal, 25 - 29.9 kg/m^2 overweight and > 30 kg/m^2 obese group. Primary endpoints were defined as the rate of clinical ISR, DNS and RR (PCI/CABG) in survivors.

Results: During follow-up survived 726 patients. Baseline clinical parameters were more severe in overweight and obese individuals. Obese compared to normal weight individuals had a higher length of stents per person (36.7 ± 22.02 vs 31.7 ± 17.5 $p = 0.016$) and a larger diame-

ter of stents used (3.14 ± 0.4 vs 2.98 ± 0.33 p = 0.0001). Overweight and obese had a reduced rate of ISR respectively (6% vs 18.4% p = 0.0001); (8.6% vs18.4% p = 0.015). Overweight had a reduced rate of DNS (6.3% vs 12% p = 0.022) There is no significant difference between obese and normal weight individuals on DNS rate (7.8% vs 12% p = 0.26). The RR rate for was lower in overweight and obese respectively (8.1% vs 22.5% p = 0.0001); (12.4% vs 22.5% p = 0.012)

Conclusions: The patients with higher BMI undergoing percutaneous coronary intervention paradoxally have less ISR and less RR. The larger diameter of vessel treated with larger diameter stents in obese individuals may explain the lower incidence of ISR and indirectly the lower need for RR in these patients.

T7:PO.048

Overweight and obesity among children in Norway by family country background

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Introduction: In the last decades the population of Norway, like other Western populations, has been characterised by an increased proportion of immigrants. Studies have shown that overweight/obesity is more prevalent in some immigrant groups than in the host population. We aimed at examining whether ethnicity was associated with general overweight/obesity and abdominal obesity among children and whether there were gender differences.

Methods: Height, weight and waist circumference were measured in nationally representative samples of 6652 8-year-olds in the 2010 and 2012 Norwegian Child Growth study. Measurements of general overweight (incl. obesity), using IOTF cut-offs, and abdominal obesity (waist-to-height ratio ≥ 0.5) were included. Ethnicity was determined on the basis of parents' country of birth; Norwegian, Western and Non-Western. Adjusted prevalence ratios (PR) were calculated by log-binomial regression. Socio-economic position was not adjusted for due to obvious educational differences in these groups.

Results: Children with Non-Western background had 27% higher prevalence of general overweight (incl. obesity) and 50% higher prevalence of abdominal obesity compared to children with Norwegian background (p-values for differences <0.01). Interaction term gender and country background was non-significant for all anthropometric measurements (p > 0.30) and gender stratified analyses were not performed.

Conclusion: In this nationally representative study, children with Non-Western background had significantly higher prevalence of general overweight (including obesity) and abdominal obesity compared to children with Norwegian background. The gender difference in overweight/obesity remained unchanged across country background.

T7:PO.049

Higher BMI z-score, frequent meals and a propensity to consume sugar are associated with cariogenic microorganisms in children

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Introduction: The microorganisms mutans streptococci (MS) and lactobacilli (LB) ferment carbohydrates from the diet and contribute to caries by lowering the pH in dental plaque. In adults, high counts of MS and LB in saliva have been associated with overweight, but in children evidence is limited. The objective of the present study was to investigate the association between salivary counts of MS and LB and children's weight status, while considering associated covariates.

Methods: Cross-sectional analysis of 271 children in Sweden, from the IDEFICS study. Saliva and anthropometric measures were obtained. MS and LB counts were dichotomized into low and medium-high counts (cut-off values related to caries-risk). Number of meals, propensity to consume sugar and sleep duration were assessed by a parental questionnaire and a 24-hour dietary recall. Logistic regression with forward selection of variables was used to predict medium-high versus low counts of MS and LB.

Results: Medium-high counts of MS, but not LB, were positively associated with higher BMI z-score (OR 1.6; 95% CI 1.1–2.3). Furthermore, associations were found between medium-high counts of MS and larger number of meals (OR 1.5; 95% CI 1.1–2.2), higher sugar propensity (OR 1.1; 95% CI 1.0–1.3), longer sleep duration (OR 0.5; 95% CI 0.3–1.0) and female sex (OR 2.4; 95% CI 1.1–5.4).

Conclusion: Higher BMI z-score was independently associated with medium-high counts of MS. Limiting intake frequency of sugar-rich foods and beverages, and promoting adequate amount of sleep could provide multiple benefits in public health interventions aimed at reducing caries and overweight.

Acknowledgement: We gratefully acknowledge Ann-Britt Lundberg at the Department of Cariology at the Institute of Odontology in Gothenburg for analyzing the saliva samples.

T7:PO.050

The prevalence of obesity in hospitalised patients and ethnicity related variance in access to healthcare may adversely influence management of obesity.

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Introduction: In England 67% of men and 57% of women are overweight or obese. We set out to identify the prevalence of obesity in patients admitted acutely unwell, and assess for sleep apnoea. At present there is no data exploring the lack in access to healthcare by ethnic minorities in the UK.

Methods: We assayed all medical patients admitted to The Royal London Hospital over 4 weeks (n=441).Weight, height and body mass index (BMI) calculated. Epworth Sleepiness Scale score calculated, and primary/secondary care consultations in relation to obesity over a year recorded. BMI by ethnicity and Epworth score were analysed by one-way analysis of variance (ANOVA).

Results: 50.1% of patients were classified as overweight or obese and 26.3% of patients had their weight recorded in the bedside clinical notes. No significant difference (p > 0.05) in BMI across ethnic groups. The average BMI of women was significantly greater (27.03 vs 25.18, p < 0.05).

Worryingly 53.8% of the 40.0–49.9 BMI group; and 66.7% of the ≥50.0 BMI group were aware of their stage of obesity. 25.6% of overweight and obese Caucasians sought out healthcare advice vs 22.8% of ethnic minority patients. The mean Epworth score was; 5.77 for the 30.0–39.9 BMI group and 10.62 for the 40–49.9 BMI group.

Conclusion: The BMI of women was greater and obesity prevalence in hospitalised patients is low, contrary to other (HSE 2012) reports. There was no difference in BMI across ethnic groups, but fewer ethnic minority patients sought healthcare advice than Caucasian counterparts due to the cultural differences Iqbal G et al (2012).A clear correlation between BMI and the Epworth Sleepiness Scale. Only a quarter of patients had weight recorded on admission, reflects our approach to managing obesity in secondary care.

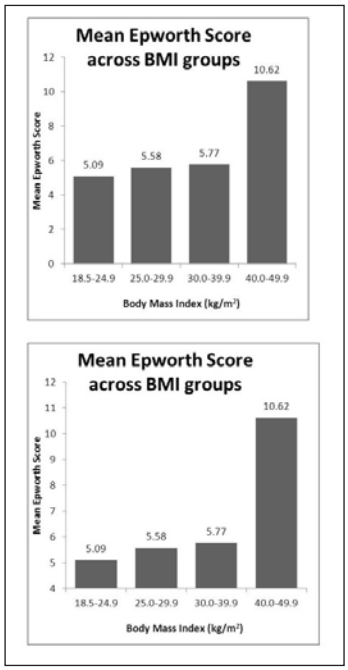

Fig. 1. Bar graphs to show Epworth sleepiness score across BMI ranges

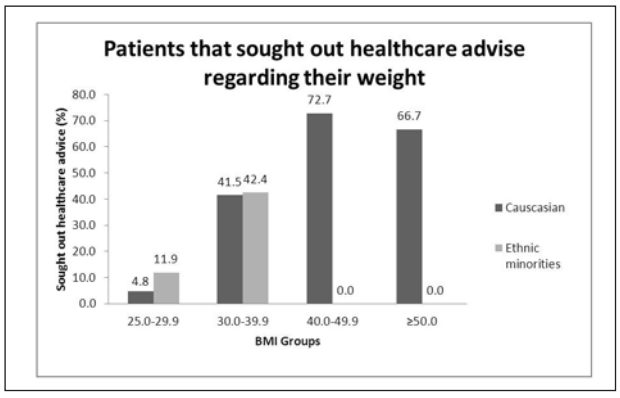

Fig. 2. Bar graphs to compare health care access acros ethnicity variance

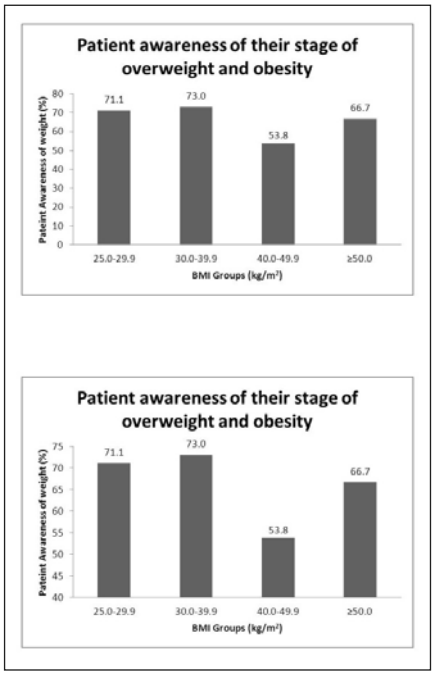

Fig. 3. Bar graphs to illustrate lack of awareness of obesity stage by severe obese patients

T7:PO.051

Mediterranean Diet and telomere length: The predimed-navarra study

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Introduction: A healthy lifestyle has been associated with longer telomeres, but whether a Mediterranean dietary pattern affect telomere length (TL) has not been fully elucidated yet. The aim of this study was to assess the cross-sectional relationship between TL and the adherence to a Mediterranean diet (MeDiet) in high cardiovascular risk subjects.

Methods: A total of 521 participants (55–80 years, 55% women) were randomly selected from the PREDIMED-NAVARRA trial. Leukocyte TL was measured by RT-PCR and age-adjusted z-scores for TL were calculated. A validated 14-item questionnaire was used to appraise adherence of participants to the MeDiet.

Results: A significant interaction for TL was found between the adherence to MeDiet and sex, since as the adherence to MeDiet increased, TL was predicted to increase only in women (P for interaction=0.049). Female subjects with a high adherence to a MeDiet (≥9.3 points) had longer telomeres than those with a lower adherence (<9.3 points) in multiple-adjusted models (PANCOVA=0.009). Interestingly, differences in TL between quintiles groups of adherence to MeDiet among women were tested, where the higher the compliance to a Mediterranean dietary pattern, the longer the telomeres in adjusted models (P trend=0.015). Moreover, a higher adherence to MeDiet (Q5) was associated with a 34% lower risk of having shorter telomeres (z-score≤ –1).

Conclusion: A greater adherence to a Mediterranean dietary pattern was associated with longer telomeres in high cardiovascular risk women in the frame of the PREDIMED trial.

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T7:PO.052

Non-overweight ‚apples' have higher cardiometabolic risk factors than overweight ‚pears': Waist-to-height ratio is a better screening tool than BMI for plasma cholesterol and glycated haemoglobin

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Introduction: We have previously shown that using BMI as a sole proxy for obesity and ignoring measures of central obesity such as waist to height ratio (WHtR) would misclassify around 10% of the whole UK population, and more than 25% of those of normal weight, as "not at risk"(1).
Objective: To explore the implications of this 'misclassification' in screening for the cardiometabolic risk factors, total cholesterol (TC) and glycated haemoglobin (HbA1c) using data from the Health Survey for England 2009 (HSE).
Results: In HSE adults aged 16y and over (n=2917), 41% of men and 29% of women classified as 'normal' by BMI, have WHtR exceeding 0.5. Overall, 12% of the total population would be missed by BMI screening (non-overweight 'apples'). When the HSE population was classified into four groups (2×2) using standard boundary values of BMI (<>25kg/m^2) and WHtR (<>0.5), mean TC was, as expected, lowest in the group with low/normal BMI and low WHtR (mean 5.1mmol/L) and highest among those with high BMI and high WHtR (mean 5.7mmol/L). Of greater interest, the group with 'low/normal BMI but high WHtR (non-overweight 'apples') had significantly higher mean TC than the group with high BMI but low WHtR (overweight 'pears') (5.73mmol/L SE 0.08 vs. 4.98mmol/L; SE 0.11; P < 0.0001). Similarly, HbA1c levels were higher among non-overweight 'apples' than among overweight 'pears' (5.62% SE 0.03 vs. 5.33% SE 0.04; P < 0.0001). These differences were also significant in both sexes.
Conclusions: This study not only supports our previous findings on the superiority of WHtR over BMI as a primary screening method for morbidity and mortality risk, but also demonstrates the potentially severe implications of misclassification by BMI alone in screening for cardiometabolic risk factors.

Reference:

1. Ashwell M, Gibson S. A proposal for a primary screening tool: ‚Keep your waist circumference to less than half your height'. BMC Med. 2014;12:207.

T7:PO.053

Overweight and obesity among polish pupils with visual impairment aged 7–18 years atteding special schools

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Introduction: Obesity among people with vision impairment may secondarily aggravate their disability. The study shows results the problem of excess weight in Polish children with vision impairment, attending special schools for the blind and visually impaired.
Methods: 89 subjects (50 boys and 39 girls) with vision impairment without coexisting disabilities took part in the study. The study was conducted in three Polish special schools for children with vision impairment. Anthropometric measurements and sociodemographic questionnaire were carried out. Excessive body weight among subjects was evaluated with the use of centile nets of the BMI according to the Polish recommendation.
Results: In the study sample, almost 18% of all children were overweight and 12% were obese. Even though girls were more overweight than boys (girls –33,3% and boys – 28%), gender gap was not the factor most significant in relation to overweight (chi2=0,000; p = 0,995) and obesity (z=0,587; p = 0,444). Obesity was not observed among rural inhabitants, however they were overweight two times more often than urban inhabitants. The family situation had no significant impact on the frequency of obesity and overweight among boys (chi2=1,435; p > 0,05) as well as among girls (chi2=5,405; p > 0,05).
Conclusion: The frequency of excessive body weight is 10% higher among children with vision impairment than in the general Polish population of children without disability at the same age. Sociodemographic variables had no significant impact on the frequency of overweight and obesity.

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T7:PO.054

Association between body mass index and waist circumference in 7 years old schoolchildren in bulgaria

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Introduction: Obesity of children is an important health problem in Bulgaria. The aim is to study and evaluate association of the overweight (OW) and obesity with WCs and waist-to-height ratio (WHtR) in children 7-year-old.
Methods: In 2013, a cross-sectional survey on 3353 schoolchildren aged 7 years, was conducted in the frame of the WHO European Childhood Obesity Surveillance Initiative (COSI). Weigh, height and WC of the children were measured. OW and obesity were assessed by BMI, using WHO Growth Reference 2007. Prevalence of OW and obesity among children with WC>90P and WHtR were examined. The results from the study in 2013 were compared with those obtained in the COSI survey carried out in 2008 on children in the same age.
Results: The prevalence of OW among children was 15.1%, obesity-12.9%. The rate of children >90P for WC was 9.5%. The prevalence of OW and obesity among children with WC>90P was 97.8%. as 2.2% with WC>90P were with normal BMI. Of the children with obesity 62.4% had WC>90P. Of the children with OW 8.3% had WC>90P, as it was determined a significant difference in the prevalence of high WC among boys and girls (5.2% vs.11.4%). WHtR values for the children with normal BMI was 0.43; with OW was 0.47 and those with obesity 0.53. The comparison of the obtained results in 2013 with those from the COSI survey in 2008 showed close high rates of OW, obesity as well as the same associations with WC/WHtR. The results confirm the possibility to use WHtR as appropriate criterion for OW/obesity assessment.
Conclusions: Overweight and obesity among 7-year-old children in Bulgaria are still of serious public health concern. Screening for abdominal obesity is important and has to be done even for children with BMI in the normal range, using either WC and/or WHtR.

T7:PO.055

Pai-1/adiponectin and conicity index is a moderate correlation between central obesity and inflammation in obesity women.

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Introduction: Visceral adiposity is the key promoter of chronic subclinical inflammation characterized by obesity condition. Inflammation cytokines that are secreted by adipocyte like the plasminogen activator inhibitor-1 (PAI-1) are involved in the cardiovascular pathogenesis events. Unlike the unsaturated fatty acids, the saturated fatty acids are associated with cardiovascular diseases and increase PAI-1. This study goal is to analyze the hypothesis of convergence between inflammation marker (PAI-1), food consumption, anthropometric and body composition indicators.
Methods: Forty-two volunteers, 31 women, aged 23–60 years with BMI 26–48 kg/m^2 were selected. For nutritional assessment it was used the body mass index (BMI), conicity index and three days of food consumption alternated. Blood samples were collected after 12h overnight fasting to analyze PAI-1, adiponectin and leptin concentrations. Individuals were grouped using adjusted terciles of the PAI-1 levels.
Results: The first tercil of the PAI-1 level was between 18.05–10,35 ng/mL, the second tercil between 10.30–8.11ng/mL and the third tercil between 7.9–3.52 ng/mL. The ingested fat quality was lower than the recommended, saturated and unsaturated fatty acids showed similar consumption: about 10%. The third tertile showed significant ($p < 0.05$) reduction in calories intake and circulating PAI-1. There was a moderate positive correlation between PAI-1/adiponectin ratio and conicity index (r=0.54).
Conclusion: These results suggest that measures of central obesity, inflammation (PAI/Adiponectin), conicity index and lower caloric intake can be used for another method to strengthen clinical subjective data.

T7:PO.056

The prevalence of abdominal obesity is as remarkable for underweight and normal adolescent girls as overweight and obese

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Objective: The study was carried out in order to determine the prevalence of the overall and abdominal obesity by using together body mass index (BMI) for age z-score, measurements of waist circumference and waist-to-height ratio in healthy Turkish adolescent girls.
Methods: A cross-sectional study was conducted on a total of 1112 adolescent girls aged 12 to 18 years old. Subjects were classified into four categories of BMI for age z-score (WHO, 2007 for 5–19 years old): underweight, normal, overweight and obese in accordance with the cut-off points (≤-2SDs to 1SD, –1SD to 1SD, 1SD to 2SD and ≥2SDs z-scores, respectively). Abdominal obesity was defined according to WC≥ 90th percentile for Turkish adolescent population references and WHtR ≥ 0.5.
Results: The prevalence of underweight 17.4%, normal weight 68.5%, overweight 12.1% and obese 2.0% were found. A total of 16.9% subjects were found abdominal obese based on WC≥90th percentile and 10.4% based on WHtR ≥0.5. Abdominal obesity was higher based on WC than based on WHtR. When evaluated four groups in terms of abdominal obesity status, prevalence was found 6.4% and 2.6% in underweight, 14.6% and 5.8% in normal, 60.0% and 37.3% in overweight and 88.8 and 77.3% in obese group according to WC and WHtR respectively. There were statistically significant difference between four groups both WC and WHtR ($p < 0.05$). Both WC and WHtR was positively correlated with age r:0.332, r:0.156, $p < 0.05$ respectively. There were significant positive correlations between BMI values and WC measurements, WHtR in all ages.
Conclusion: The prevalence of abdominal obesity has been found at high levels for overweight and obese adolescents. It should be emphasized that abdominal obesity is a condition that should be considered for underweight and normal adolescents. In accordance with these results, abdominal obesity should be regularly assessed for non-obese adolescents to prevent cardiovascular risks, metabolic syndrome and other related disease.

T7:PO.057

Distribution of dynamic plantar pressure of obese boys aged 8–14 years in China

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Introduction: Knowledge concerning the gait characteristics and foot structure of obese children has been conducted, which has been applied into clinical. The aim of this study was to compare dynamic plantar pressure between obese and non-obese boys at each age.
Methods: Totally 182 boys (8–14 years) were recruited from China, excluding pathology. Participants were tested by Footscan® Plate system. Each participant was required to walk with bare foot for three times in a custom speed to collect data of plantar pressure. According to the data of Working Group on Obesity in China, all subjects were classified into two groups at each age, group1 (thin and normal), group 2 (overweight and obese). Ten anatomical masks were defined by Footscan 7 Gait 2nd Generation (V7. 97). SPSS 17.0 was used to analyze intergroup difference.
Results: The values of peak pressure and maximum force, excluding toes 2–5, are greater in group 2, significant differences are mainly found in meta 2–5, midfoot and heel areas at each age. The values of load rate of two groups are greatest in heel, significant differences focus on meta 2-4 area. Pressure-time integral and impulse are greater in group 2, the significant differences of former focus on meta 2-4 area, and the later on meta 2-5, midfoot and heel areas.
Conclusion: Hlavacek[1] found that the higher load contribute to a decrease in the generation of toe reflex function, which leads to the smaller peak pressure and maximum force in obese children. The significant differences of load rate and pressure-time integral in Meta 2-4 area in obese group at each age further confirm the overload in forefoot, therefore, urgent attention must be given to the protection of forefoot.

Reference:

1. Hlavacek P, Kostelnı´kova L. Comparison of plantar pressures distribution between obese and non-obese children [J]. Clinical Biomechanics, 2008;23:662–720.

T7:PO.058

Distribution of dynamic plantar pressure of obese girls aged 7–13 years in China

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Introduction: Obesity directly impacts on development of lower limbs, gait characteristics and foot structure. The aim of this study was to compare dynamic plantar pressure between obese and non-obese girls at each age.
Methods: Totally 197 girls (7–13 years) without pathology were recruited from China. Data of plantar pressures of ten anatomical masks was collected by Footscan® Plate System. Each participant was required to walk with bare foot for three times in a custom speed. According to the data of Working Group on Obesity in China, all subjects were classified into two groups at each age, group1 (thin and normal), group 2 (overweight and obese). Intergroup differences were analyzed by SPSS 17.0.

Results: Results show that values of peak pressure and maximum force are greater in group 2, and significant differences are found in meta 2-5, midfoot and heel areas at each age. The values of load rate are greater in group 2, but no significant difference exists. The impulse of two groups are greater in toe1, meta 2-5 and heel areas, and significant differences are found in meta 2-5, midfoot and heel areas at almost each age.
Conclusion: Significant differences in peak pressure and maximum force are obvious, particularly in midfoot, which reveals that obesity can contribute to a lower arch. The values of load rate are both greatest in heel area. Andrew et al.[1] found that the faster the load rate of change, the higher risk of leg injury. Therefore, the protection of heel of children is imperative. The great impulse on big toe of most children provides a potential capacity to valgus.

References:
1. Andrew F-M, et al. Foot orthoses in the prevention of injury in initial military training: a randomized controlled trail [J]. The American J of Sports Med 2011,39(1):30–37.

T7:PO.059

Projection of changes in the prevalence of obesity from 2012 to 2050 in lithuania

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Introduction: Lithuania participates in the EConDA project which is funded by the EU Commission and aims to develop models to test the differential effect of chronic disease interventions in population sub-groups. One aim is to project trends in obesity forward to 2050 by different education level groups.
Methods: The data were obtained from six biennial cross-sectional nationally representative postal surveys from 2000 to 2012. In total, 5602 men and 7712 women aged 20–64 participated in these surveys. Self-reported body weight and height were used to calculate body mass index. Trends in overweight and obesity were projected using multivariate non-linear regression models by age, sex and education level.
Results: Between 2000 and 2012, the prevalence of obesity increased among less educated men from 11.8% to 19.7% and among high educated men from 10.7 to 15.8%. It remained almost stable among low and high educated women being 22.0% and 16.9% in 2012 respectively. The most remarkable increase in the prevalence of obesity was found in the oldest age group (55–64 years) of men (from 14.9% to 32.3%) and of women (from 32.9% to 41.7%). By 2050, preliminary results show the prevalence of obesity among men was projected to increase across all age groups, with the exception of 20–29 year olds, irrespective of education. In high educated women, a slightly downward trend in the prevalence of obesity was projected. The proportion of obesity in less educated women was projected to increase across all age groups, with the exception of women older than 34 years old.
Conclusion: There are educational differences in the distribution of obesity predicted to 2050 in Lithuania.

T7:PO.060

Application of the uk foresight obesity model in malta: Health and economic consequences of projected obesity trends

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Introduction: There is increasing worldwide concern about the health and economic burden of obesity. The aim of this research is to project disease burden and direct healthcare costs for a number of obesity-related conditions in Malta using the model developed by the UK Health Forum for the Foresight: Tackling Obesities project.
Methods: Self-reported Body Mass Index (BMI) data was obtained from nationally representative surveys (including four Health Behaviour in School-aged Children surveys and two European Health Interview Surveys for children's and adults' BMI respectively). Routine data sources were used to derive incidence, prevalence, mortality and survival for twelve obesity-related disease conditions as inputs for the model. A two-stage modelling process is used to predict future BMI rates, disease prevalence and related costs in a variety of scenarios. Stage 1 employs a non-linear multivariate regression model to project BMI trends; stage 2 employs a microsimulation approach to produce longitudinal disease/cost projections, and test the impact of reductions in BMI or the effect of public health interventions upon future incidence of these disease. Related direct or indirect healthcare costs of each disease are calculated on a cost-per-case basis.
Preliminary results: Initial projections based on child BMI prevalence data show a small decrease in the percentage of overweight and obese boys aged between 11 and 15 years by 2030, even as the percentage of overweight and obese 11–15 year old girls increases significantly within the same time period. Obesity-related disease costs and the impact of a number of interventions such as the introduction of a sugar sweetened beverage tax are being modelled.
Conclusion: These findings may have significant implications for policy, effectively highlighting the need for effective strategies to prevent this avoidable health and economic burden.

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T7:PO.061

Dxa-derived body fat indices of properly controlled hypertensive patients are lower than those of non-properly controlled patients in korean women

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Introduction: The proper blood pressure (BP) control is important in hypertensive patients for preventing stroke and cardiovascular diseases. Obesity, defined by BMI, is not only a risk factor of hypertension but also a related factor to BP control. However, it is uncertain whether body fat itself is related to BP control.
Methods: Data of the Fourth and Fifth Korea National Health and Nutrition Examination Survey (KNHANES IV-V) were applied in this study. Of these, 2955 hypertensive subjects, who were 19 years and older with DXA data and took antihypertensive drugs more than 20 days a month, were included.
Results: The proportion of the proper BP control (systolic BP under 140 mmHg and diastolic BP under 90 mmHg) was 59.1%. In male, the serum level of total cholesterol ($P < 0.001$), HDL cholesterol ($P = 0.031$) and triglyceride ($P < 0.001$) were lower in properly BP controlled group than in non-properly controlled group. However, there were no significant differences in DXA-derived body fat indices between the two groups. In female, the serum level of total cholesterol ($P < 0.001$) and triglyceride ($P = 0.009$) were lower in properly BP controlled group than in non-properly controlled group. BMI ($P = 0.047$), total body fat amount and percentage ($P = 0.023$, $P = 0.008$), limb fat amount and percentage ($P = 0.008$, $P = 0.003$) were lower, and appendicular skeletal muscle/body weight ratio was higher ($P = 0.010$) in properly controlled group.
Conclusion: In Korean hypertensive women, DXA-derived body fat indices were better in properly controlled patients than in non-properly controlled group. However, there were no differences of DXA indices between the two groups in Korean male hypertensive patients.

T7:PO.062

Clinical potential of 8-electrode BIA for sarcopenic obesity diagnosis and monitoring

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Introduction: Sarcopenic obesity, a pathological state with excess fat and depleted skeletal muscle mass (SM), is increasingly being recognized as a phenotype associated with adverse clinical outcomes. How does 8-electrode multi-segment bioimpedance analysis (BIA) compare to dual-energy x-ray absorptiometry (DXA) as the reference for estimating SM?
Methods: Appendicular lean soft tissue (ALST; arm, leg, and total) was measured by DXA and predicted by two BIA systems, MC-780 and MC-980 (Tanita Corp, Tokyo, Japan) in 74 healthy men and women age >18 yrs varying in BMI. The MC-780 and 980 results were almost identical and findings are therefore presented only for the MC-780.
Results: Total body fat mass measured by DXA and was highly correlated with BIA estimates (R2, 0.94, $p < 0.001$). Arm, leg, and total ALST for DXA and BIA (kg, X± SD) are shown for males (M), females (F), and combined M+F (T) in the table. There were no significant differences (D) observed in the regional and total ALST measures across any of the groups and group Ds were all <1 kg. DXA and BIA total ALST correlations ranged from 0.92–0.94 (all, $p < 0.001$). ARM D LEG D TOTAL D DXA M 8.4 ± 1.7 20.9 ± 3.8 ± F 4.5 ± 1.0 14.2 ± 2.6 ± T 6.4 ± 2.4 17.5 ± 4.7 23.9 ± 7.0 MC-780 M 7.8 ± 1.4 –0.6 ± 0.7 22.2 ± 3.4 1.2 ± 1.4 ± ± F 4.4 ± 0.7 –0.1 ± 0.6 14.5 ± 1.7 0.3 ± 1.2 ± ± T 6.1 ± 2.0 –0.3 ± 0.7 18.2 ± 4.7 0.8 ± 1.3 24.3 ± 6.7 ± R2 0.93 0.92 0.94
Conclusion: 8-electrode multi-segment BIA has the potential for diagnosing and monitoring sarcopenic obesity in the clinical setting.

T7:PO.063

Association of serum mir-155 and mir-146a with male subfertility and obesity

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Introduction: Micro RNAs (miRNAs) are small non-coding RNAs that regulate mRNA expression and stability. miRNAs are also present in the serum and have been identified as potential biomarkers for several disorders including inflammatory diseases. Among the different miRNAs, miR-155 and miR-146a are central regulators of inflammation and their intracellular levels are elevated in activated macrophages. Male subfertility has been associated with obesity-related Low Grade Systemic Inflammation (LGSI), as well as with androgen deficiency. Aim of this study was to determine potential association of miR-155 and miR-146a with LGSI, hypogonadism and fertility in human serum.
Methods: For this purpose, 60 subjects were randomly selected from an ongoing study on subfertile men (hypogonadal; n=20, eugonadal; n=20 and control group n=19). Circulating miRNAs, reproductive hormone levels and inflammatory cytokines were measured in the serum.
Results: Serum levels of miR-155 were associated with levels of miR-146a, but only miR-146a was associated with inflammatory markers. MiR-155 was associated with subfertility (for subfertile group 2.23 U, 95%CI 1.7 –2.7 U vs. 1.17, 95% CI 0.98–1.4 U in controls; $p = 0.001$). ROC analysis indicated that miR-155 with a cutoff value of 1.77 had 60% sensitivity and 95% specificity for identifying subfertility and positive and negative predictive values of 96% and 56% respectively. When used in combination with FSH, specificity and sensitivity were 82% and 84% respectively while positive and negative predictive values were 91% and 70% respectively. No association was observed with any of these miRNAs and BMI, cholesterol, HDL or LDL.
Conclusion: These results suggest that circulating miRNAs may be used as biomarkers of subfertility.

T7:PO.064

Association between physical activity and body composition among bariatric surgical candidates

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Objective: This study investigates the relationship between moderate-to-vigorous physical activity (MVPA) intensity and body composition parameters among women undergoing bariatric surgery.
Methods: Cross sectional analysis was conducted in 22 women (mean ± SEM: age 29.1 ± 1.0 years; height 159.1 ± 1.0 cm; body mass 113.2 ± 1.9 kg; IMC 44.6 ± 0.5 kg/m^2) candidates to bariatric surgical. Physical activities were measured objectively for seven consecutive days using a tri-axial accelerometer (ActiGraph, wGT3X-BT monitor). Additionally, body composition was estimate by multi-frequency bioimpedance analysis (Biospace, InBody 230). Pearson correlation analyses was used to test associations between total weekly (min) MVPA and body composition parameters.
Results: total weekly MVPA values ranged 100–711 min amongst bariatric patients with mean value of 275.5 ± 33.7 min. There was not observed a significant correlation ($p > 0.05$) between MVPA with body mass ($r = 0.33$), fat mass ($r = 0.18$) and body fat percentage ($r = -0.23$). On other hand, there was a moderate correlation of MVPA with fat-free mass ($r = 0.46$; $p = 0.03$) and skeletal muscle mass ($r = 0.45$; $p = 0.03$).
Conclusion: MVPA was positively related with fat-free mass and skeletal muscle mass in women seeking for bariatric surgery. Our findings indicate that the level MVPA should be encouraged among bariatric patients.

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T7:PO.065

The association of CRP with physical fitness, anthropometry and metabolic syndrome z-score in youth may differ by gender

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Introduction: C-reactive protein (CRP) is a predictor of cardiovascular events in adults but in adolescents the effect is lesser known. The aim of the study was to evaluate the correlation of CRP with anthropometric measurements in adolescents. Secondly, to investigate the association of CRP with markers of glucose metabolism and metabolic syndrome score (MetS z-score) and weather physical fitness had impact on this association.
Methods: A cross sectional study of 16 year old Icelandic adolescents (113 boys and 110 girls). Parameters measured were; body composition and body fat percentage (skinfolds; %BF), blood pressure, CRP, glucose, insulin, triglycerides, HDL and physical fitness (PF) with bicycle (VO2m-

ax). The MetS z-score was calculated from; waist circumference (WC), mean-arterial pressure (MAP), triglycerides, HDL (inverted) and HOMA-IR.
Results: The correlation of CRP with anthropometrical measurements was strongest, although moderate, with %BF and then WC. Multiple regression revealed the association of CRP with HOMA-IR and MetS z-score to be mediated through body fat. Adjusting further for physical fitness caused negligible variation on this association. Participants with good to superior PF had more favourable HOMA-IR and MetS z-score than those with very poor to fair PF but CRP was only lower among the fitter boys. When split up in to thirds according to participants' %BF all metabolic variables, except glucose, were more unfavourable among the 3rd %BF-group compared to the leaner groups. However, none of the metabolic biomarkers among the fit girls in the 3rd %BF-group were more favourable than among the girls with poorer fitness.
Conclusion: The association of CRP with HOMA-IR and MetS z-score appear to the greatest extent to be mediated through body fat in healthy adolescents and independent of physical fitness. High percentage of body fat among adolescent girls can hinder the beneficial effects of physical fitness on their metabolic status.

T7:PO.066

Prevalence of overweight and obesity among newly diagnosed patients with type 2 diabetes mellitus in durres albania

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Aim: Obesity and type 2 diabetes mellitus (DM) strongly affect general health of population worldwide. Obesity is considered to be a strong risk factor for developing type 2 DM. the aim of this study is to evaluate the prevalence of overweight and obesity in newly diagnosed patients with type 2 DM.
Methods: Begining in january 2013 until december 2014, 8000 patients with type 2 DM were consulted in our department. 1000 of them were diagnosed for the first time with type 2 DM. All these were enrolled in this study. we documented: weight, height, BMI, eating and exercice habits, personal and family history.
Results: 100 of them (10%) had normal body weight, of which 70 were females and 30 were males. 250 patients (25%) were overweight, of which 100 were females (40%) and 150 were males (60%). 650 patients (65%) were obese, of which 430 were females (66%) and 220 were males (34%). Overweight and obese patients didn't have any kind of restrain regarding food intake. they admitted having less or no physical activity.
Conclusion: 90% of newly diagnosed patients with type 2 DM were obese or overweight. this figure makes us realize about the impact that obesity and diabetes have on a patient's life, on society health budget and on what we should do to manage life with obesity and diabetes more easily, to prevent complications and to promote healthier eating and living.

T7:PO.067

The association between periodontal disease and overweight and obesity: A systematic review

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Introduction: Periodontitis and obesity are among the most common chronic disorders affecting the world's adult populations, and recent reviews, primarily based on cross-sectional studies have suggested a potential link between obesity and periodontitis, thus eliminating the possibility to assess temporal relationships and increasing the risk of reverse causality. This review assessed the evidence from longitudinal and experimental studies.
Methods: Intervention and longitudinal studies with overweight or obesity as exposure and periodontitis as outcome were searched through Pubmed/Medline and Web of Knowledge by two researchers.
Results: Eight longitudinal and five intervention studies were included. Two longitudinal studies found a direct association between overweight at baseline and risk of developing periodontitis, and further three studies found a direct association between obesity and development of periodontitis. The 3 remaining studies did not find significant associations. Two intervention studies on the influence of obesity on periodontal treatment effects found that the response to non-surgical periodontal treatment was better among lean than obese patients, while three studies did not report treatment differences between obese and lean.
Conclusion: This systematic review suggests that overweight, obesity, weight gain and increased waist circumference may be risk factors for development or worsening of periodontal disease.

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T7:PO.068

Association between uric acid and albumin/creatinine ratio in pre-metabolic syndrome

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Objective: Association between serum uric acid (UA) and urine albumin/creatinine ratio (ACR) has been observed in individuals with metabolic syndrome (MetS). We evaluated the cross-sectional association between UA and ACR in pre-metabolic individuals.
Methods: In a study of a representative Czech population (n=2895) aged 25–64 years, urinary albumin and creatinine excretion were determined in an early morning spot urine sample. Components of MetS were defined using the joint statement of IDF, NHBLI, AHA, WHF, IAS, and IASO. Individuals presenting with 1 or 2 components were supposed pre-metabolic. Hypertension was defined as systolic blood pressure ≥140 mmHg, or diastolic blood pressure (DBP) ≥ 90 mmHg, or current use of blood pressure lowering drugs. Individuals with diabetes treated with glucose lowering medication and/or current use of inhibitors of xanthine oxidase were excluded.
Results: There were 665 (25%) individuals without any component of MetS, and 1248 (46.8%) individuals with 1 or 2 components of MetS. In univariate linear regression, there was a significant correlation between UA and ln-ACR in pre-metabolic men (n=639; β 0.091; p = 0.022) and women (n=609; β 0.122; p = 0.003). In multivariate analysis of pre-metabolic individuals, UA was independently associated with ln-ACR (β 0.057; p = 0.005), age (β –0.265; p < 0.001), gender (β –0.502; p < 0.001), waist-to-height ratio (β 0.241; p < 0.001), ln-triglycerides (β 0.070; p = 0.001), estimated glomerular filtration rate (β –0.434; p < 0.001), amount of grams of alcohol per week (β 0.098; p < 0.001), and diuretics (β 0.056; p = 0.006). We observed independent interaction of ln-ACR with hypertension (p = 0.002) and DBP (0.025) in relation to UA. In individuals without any component of MetS, there was no association between UA and ln-ACR.
Conclusion: We report an independent association between UA and ln-ACR in pre-metabolic individuals. This association appears to be largely modified by hypertension, specifically by DBP.

T7:PO.069

Measuring physical activity level, and sedentary behaviours among studentsat the university of medicine, albania

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Introduction: Lack of physical is a major risk factor for overweight and obesity, leading the way to many other health conditions.Medical students are supposed to be best informed on this topic.
Objective: Evaluation of actual physical activity using pedometers, and sedentary behaviors among students at the University of Medicine in Tirana.
Methods:301 students (74% females) were interviewed using a structured questionnaire regarding their physical activity level and beliefs, and sedentary behaviors.Randomly chosen students (130) were afterwards instructed to use a pedometer to count the number of daily steps, without any suggestion as for the number of necessary steps for not being sedentary.
Results:BMI average was 21.2 kg /m^2 (s.d 2.49) in females, and 24.5 kg/m^2 /s.d.3.33) in males.Among females 6.8% were overweight and 0.5% were obese.Among males 37.2% were overweight, and 6.4% were obese. Abdominal perimeter was 72.8cm(s.d.6.6) and 88.4 cm (s.d.11) in males. Average number of steps per day in all students were 8712 (s.d. 5107), in females was 8.218 (s.d 4902) and 10.206 (s.d 5408) in males.73% of the students declared that they were not engaged in any kind of physical activity.
Conclusions: We didn't encountered a high level of obesity in this population, however a sedentary lifestyle was noted with only a small proportion of students approaching the level of non-sedentary lifestyle (>10.000 steps/day), therefore exposing them to weght gain problems in the next future.

T7:PO.070

Evaluation of body adiposity index as a predictor of cardiovascular risk in adults from bogotá, colombia

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Objective: We evaluated the predictive ability of the recently developed body adiposity index (BAI) on risk factors associated with early-onset cardiovascular disease
Materials and methods: A cross-sectional study in 527 volunteers from the education and automotive sector in Bogotá, Colombia. BAI was calculated using the Bergman et al. equation ([hip circumference in cm)/[height in m^2]1,5−18]). Clinical and laboratory data were collected: body mass index, central obesity, visceral fat, cholesterol, HDL-C, LDL-C, triglycerides and glucose. Atherosclerosis-index (AI): Cholesterol/HDL-C, LDL-C/HDL-C, triglycerides/HDL-C and lipid-metabolic index (LMI) ratios were calculated. Prevalence rates and means, according to tertiles (T), and multivariate analysis between the BAI, clinical and AI outcomes were estimated.
Results: Obesity prevalence was 33.9% (BAI > 27.5%). Subjects with lower BAI (T-1) had lower cholesterol, triglycerides/HDL-C, cholesterol/HDL-C levels and better LMI; P < .001. The multivariate model showed in T-3 subjects an OR 3.33 (95% CI 2.16 to 5.13) for central obesity and an OR 3.39 (95% CI 2.34 to 4.90) for increased visceral fat. As regards lipid and carbohydrate metabolism, BAI was able to predict the risk OR 7.95 (95% CI 4.88 to 12.94), OR 1.60 (95% CI 1.03 to 2.41), OR 1.69 (95% CI 1.06 to 2.70) and OR 9.27 (95% CI 2.01 to 21.80), shows a significant association between cholesterol, triglycerides, LDL-C and glucose, respectively, P < 0.001.
Conclusion: A high prevalence of obesity by BAI was observed, and statistically positive associations with cardiovascular risk factors were shown.

T7:PO.071

Abdominal obesity as a risk factor for occurrence of metabolic syndrome in people with sedentary lifestyles

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Introduction: The modern world faces the obesity as a serious crisis that has an epidemic character, in the health care system. Pouliot and his associates identified obesity as a probable cause for occurrence of metabolic syndrome. Goals: To determine the percentage of risk factors that define the metabolic syndrome and to determine their correlation, with a special turn on abdominal obesity as an important risk factor. **Materials and methods:** In this cross-sectional study 156 subjects participated, of which 101 women and 55 men. To determine the metabolic syndrome, we have used the criteria of the National Cholesterol Education Program's Adult Treatment Panel III. Abdominal obesity was determined by a method of measurement of the waist size in centimeters. The data was statistically processed with SPSS 8.0.
Results and discussion: There is a difference between the average waist sizes of the groups, the first group, without metabolic syndrome with an average of 52.05+6.93, and the other groups with metabolic syndrome, the second group with 75.76+13.80, the third group with 84.93+12.78, and the fourth group with 97.40+8.32.
Conclusion: In the group without metabolic syndrome, there was increased waist size in 17.7% of the subjects, whereas in the group with metabolic syndrome, with five risk factors, increased waist size was found in 20% of the subjects.The ANOVA test carried out between the referent group and the other groups with metabolic syndrome, and also just between the groups with metabaolic syndrome, has shown statistically significant difference in the waist size. Key words: abdominal obesity, sedentary lifestyle, metabolic syndrome.

Acknowledgement: Simonovska Valentina , MD , MSci , Assistant of Professor , Institute of Social Medicine , Medical Faculty , University of Ss Cyril and Methodius , Skopje ; Spasovski Mome MD, PhD , Professor , Institute of Social Medicine , Medical Faculty , University of Ss Cyril and Methodius , Skopje ;

T7:PO.072

Peculiarity of eating behavior pattern of women living in rural families of the republic of tatarstan

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Introduction: The evidence of cause-effect relation of obesity to severe metabolic disturbances and cardiovascular diseases defines the importance of this problem for modern health care and allows speaking of obesity as of serious threat for public health.
Methods: Selective investigation included the study of 536 women living in the rural area of the Republic of Tatarstan in 2013. The lifestyle characteristics was based on the questionnaire survey and direct interviewing of women living in rural families. 49.0% of women suffering from obesity were revealed in studied population. The eating behavior pattern in female population of the rural area was formed due to overeating high-fat, high- calorie foods. The number of meals per day is 6–7 in 61,6%, where the major proportion belongs to fats and carbohydrates, regular eating of vegetables and fruit was observed only in 21,3%, vegetable oil- in 32,3%, meat – in 49,0%, fish- in 6,8%. The obtained data are indicative of the fact that despite the excessive intake of high-calorie foods 88,1% of women in general are satisfied with their nutrition. The number of hot meals significantly decreased (p<0,05) in dynamics for the ten-year period, but the number of persons following the dietary regime increased. Considerable decrease (p<0,001) of regular intake of vegetables and fruit, vegetable oil, meat and fish in case practically constant satisfaction with nutrition

is a source of particular concern. Therewith the incidence of circulatory diseases increased from 380,6 to 518,5 cases per 1000 of corresponding population.
Conclusion: To prevent circulatory diseases a healthy eating behavior pattern of women living in rural areas is to be formed.The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University

T7 – Primary/secondary prevention

T7:PO.073

Nuts consumption in relation to overweight, and abdominal and general obesity

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Introduction: Nuts are one of the components of a healthy Mediterranean diet which are often restricted in weight management programs due to their high fat content. In this study, the relationship between nuts consumption and overweight, abdominal obesity and general obesity was assessed.
Methods: In this cross-sectional study, 550 female adolescents aged 15–18 years were selected from Isfahan Province using a multistage cluster random sampling. Anthropometric measures were recorded and dietary intakes were evaluated using a validated semi-quantitative food frequency questionnaire. nuts are considered in the current analysis were pistachio, almond, peanut, walnut and seeds. Abdominal obesity was defined as the 75th percentile of waist circumference for Iranian children and adolescents. Overweight and obesity were defined on the basis of International Obesity Tasks Force (TOTF) cut-points. Models are adjusted for age, total energy intake, percentage of energy from fat, and physical activity.
Results: The prevalence of abdominal obesity and overweight/obesity was 48.9 and 25.7%, respectively. After adjusting for potential confounders, subjects in the top quartile of the nut consumption were less likely to have overweight and obesity [OR: 0.25; 95% CI: 0.11–0.54] and abdominal obesity (OR: 0.43; 95% CI, 0.22–0.84), compared to those in the lowest quartile.
Conclusion: Consumption of nuts was negatively associated with lower risk of abdominal obesity, over weight and obesity. The results of this study suggested that replacing nuts into diets might help in controlling the weight. Research relating to this abstract was funded by National Nutrition and Food Technology Research Institute

T7:PO.074

Family and lifestyle factors mediate the association between socio-economic status and fat mass in children and adolescents

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Background: The socio-economic status (SES) is a major determinant of childhood overweight. The explanation of this association is unclear. Therefore, we examined mediators of the association between SES and fat mass (FM) in children to develop selective preventive measures against childhood overweight.
Methods: Data of 5,352 children aged 5–16 years of the Kiel Obesity Prevention Study were used to conduct mediation analyses between SES and FM. FM was assessed by bioelectrical impedance analyses. SES was derived from the highest educational level attained by either parent (low: 18.1%; middle: 32.5%, high: 49.4%). Single parenthood, common meals, maternal smoking habits and weight status, media consumption and physical activity of the children were considered as mediators. Mediation analyses were based on sex-adjusted linear regression models. Significance of indirect effects was tested by the use of the delta method (Sobel z test).
Results: Prevalence of overweight was 15.6%. The correlation between SES and FM increased with age (-0.068, –0.142 and –0.167 for 5–7-, 9–11- and 13–16-year olds, respectively ($p < 0.001$ for all)). In 5–7-year olds, media consumption (66.9%) and maternal BMI (54.3%) completely mediated the association between SES and FM. In 9–11-year olds, media consumption (28.1%), maternal BMI (23.9), maternal smoking habits (13.1%) and physical activity (9.1%) also completely mediated the association. In 13–16-year olds, approximately 55% of the association was mediated through maternal BMI (27.0%), maternal smoking habits (12.1%), common meals (7.5%) and media consumption (6.3%).
Conclusion: The association between SES and FM could be explained by 55–100%. The mediators varied by age. Thus, age-specific preventive measures have to be specified.

T7:PO.075

The effect of a school-based active video gameintervention on children's aerobic fitness, physical activity level, andexercise-related psychological variables: A preliminary RCT trial

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Objectives: To determine the effectiveness of the prescribed AVG intervention in the physiological, behavioral and psychological perspectives.
Methods: 40 children aged 9–10 were recruited at a local primary school in Hong Kong and were assigned randomly into control and intervention group. Children in the intervention group participated in two 60 minutes XBOX 360 gaming session per week for 12 weeks. The intervention was held in a large function room that allowed all children played at the same time and XBOX Sport Season One & Two that provided 12 different games of sports with light-to-moderate intensity were at children's free choice. Baseline and post-tests were conducted in both groups, measuring BMI, aerobic fitness, PA level (using accelerometer), exercise-related self-efficacy, and enjoyment. ANCOVA was employed to determine the post-intervention outcomes while controlling for the baseline data, with significant level set at 0.05.
Results: Data analysis revealed three major results: 1) children in the intervention group significantly outperformed those in the control group at post-test in aerobic fitness and average daily total physical activity ($p < 0.01$ and $p < 0.05$, respectively); 2) children in the intervention group marginally outperformed those in the control group in average daily moderate-to-vigorous physical activity ($p = 0.08$); 3) no significant differences were observed between intervention and control group at post-test in BMI, exercise-related self-efficacy, and enjoyment in physical activity ($p > 0.05$).
Conclusion: The prescribed AVG intervention provided an effective alternative in promoting children's aerobic fitness and physical activity in school setting.

T7:PO.076

A dyadic focus on obesity preventive health behaviors: Opportunities for novel research

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Introduction: To provide an overview of the FLASHE study, a forthcoming public-use resource that evaluates multilevel influences on obesity preventive health behaviors (diet, physical activity, sedentary behavior, sleep, etc) among parent-teen dyads.

Methods: FLASHE is a U.S.-based sample drawn from a Consumer Opinion Panel. Cross-sectional data were collected between April-October, 2014 using a web-based platform. FLASHE focuses on multilevel correlates of obesity among parent-teen dyads (12–17 years old) with an oversampling of Non-Hispanic Blacks. Objective physical activity was measured in a subsample of teens. Constructs include psychosocial factors (e.g. self-efficacy, motivation, emotional regulation), interpersonal factors (e.g. parenting style and parenting practices), and characteristics of the home and neighborhood environments among others (e.g. food insecurity, housing, employment).
Results: The FLASHE study enrolled 1944 dyads, of which 1251 were randomized to receive only the FLASHE surveys and 693 to receive the FLASHE surveys plus a physical activity monitor to be worn by teens for 7 days. Of the 1251,86% of dyads completed all surveys. Of the 693, over 90% returned the physical activity monitor and 80% completed all surveys and returned their monitor.
Conclusion: FLASHE is a unique, public-use resource to evaluate research questions focused on parents, teens, and parent-teen dyads across levels of influence on obesity preventive health behaviors. Work is ongoing to expand this useful resource by adding a geospatial component and linking it with extant data resources (e.g. policy databases) providing rich research opportunities for the EASO audience.

T7:PO.077

Mind-body practice is inversely associated with body weight status in a general population from the NutriNet-Santé Study

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Introduction: In industrialized countries characterized by a high prevalence of obesity and chronic stress, mind-body practices such as yoga or meditation may facilitate body weight control. However, virtually no data are available to ascertain whether practicing mind-body techniques is associated with weight status. We aimed to examine the relationship between the practice of mind-body techniques and weight status in a large sample of the adult general population.
Methods: A total of 14,400 men and 49,228 women aged ≥18 y participating in the NutriNet-Santé study were included in this cross-sectional analysis. We collected data on mind-body practices as well as self-reported weight and height. The association between the practice of mind-body techniques and weight status was assessed using multiple linear and logistic regression models adjusted for socio-demographic, lifestyle and dietary factors.
Results: Regular users of mind-body techniques were less likely to be overweight (OR (95%CI): 0.74 (0.69 to 0.79) adjusted for socio-demographic and lifestyle factors) or obese (OR (95%CI): 0.56 (0.50 to 0.62)) than never-users. In addition, regular users had a lower BMI than never users (slope (95% CI): –0.88 (-0.99 to –0.76)).
Conclusion: Our data provide novel information about an inverse relationship between mind-body practice and weight status. If causal links were demonstrated in further studies, such practice could be fostered in obesity prevention and treatment.

T7:PO.078

Intuitive eating is inversely associated with body weight status in a general population from the NutriNet-Santé Study

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Introduction: Intuitive eating is an adaptive dietary behavior that emphasizes eating in response to physiological hunger and satiety cues, together with low preoccupation toward food. It has been proposed as an alternative to weight loss programs that would promote a healthier food-mind-body connection. We therefore aimed at studying the relationship between intuitive eating and weight status in a large sample of adult general population.
Methods: A total of 11,774 men and 40,389 women aged ≥18 y participating in the NutriNet-Santé cohort were included in this cross-sectional analysis. Intuitive eating levels were collected using the validated French version of the Intuitive Eating Scale-2. The association between intuitive eating, its subscales (categorized into quartiles) and overweight/obesity was assessed using multivariate logistic regression models.
Results: A higher IES score was strongly associated with lower overweight/obesity in both men and women. The strongest associations were observed in women [quartile 4 vs. 1 for overweight (excluding obesity) (OR (95% CI): 0.19 (0.17, 0.20)) and obesity (OR: 0.09 (0.08, 0.10))]. Associations in men were as follow [quartile 4 vs. 1 for overweight (excluding obesity) (OR: 0.43 (0.38,0.48)) and obesity (OR: 0.14 (0.11,0.18))]. All IES subscales were inversely associated with weight status: in particular Eating for Physical Rather than Emotional Reasons, followed by Reliance on Hunger and Satiety Cues and Unconditional Permission to Eat.
Conclusion: Greater intuitive eating is associated with a lower prevalence of overweight and obesity which supports the importance of eating in response to hunger and satiety signals. These data bear out the relevance to promote such behavior for obesity prevention and treatment.

T7:PO.079

Sense of coherence, health perceptions and attitudes towards obesity treatment of general practitioners in poland

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Introduction: Physicians' attitude towards health may influence the use of prophylaxis in patients and their motivation to constructive health behaviors. The aim of this study was to evaluate the sense of coherence, health perception and attitude towards obesity treatment in primary care.
Methods: We examined 250 GPs. The mean age was 53.55 ± 0.57 yrs, mean BMI 25.53 ± 4.16 kg/m^2. We used: SOC-29, LZK and own questionnaire exploring the relationship to the obesity treatment.
Results: 60% of doctors have an average score of SOC. Subscale state has the highest score in LZK (74%).The most important criteria in LZK are: accept yourself(38%), feel happy (37%). 55.6% of respondents never or sometimes measure body weight of their patients, 88% recommend obese patients weight reduction. There is a positive relationship between SOC and LZK in category of process ($p < 0.01$) and purpose ($p < 0.05$). Doctors with longer professional experience more often explain to obese patientsthe possible consequences of obesity ($p < 0.05$). Doctors of the larger cities less often: do measurements of body weight of patients ($p < 0.001$),

ask obese patients about the cause of the obesity ($p < 0.05$), explain them the possible causes ($p < 0.01$), ask them about the difficulties in reducing excess body weight ($p < 0.05$). Doctors with a higher BMI, frequently ask obese patients about the difficulties with body weight reduction ($p < 0.05$). Doctors with low and average score of SOC less frequently measure the weight in their patients than doctors with high score SOC ($p < 0.05$).
Conclusion: GPs in Poland have a sense of coherence and perceive health the most commonly in category of status. High sense of coherence has impact on the diagnosis of overweight patients.

T7:PO.080

A comparison of a high low intensity exercise programme for sedentary middle managers

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Introduction: The importance of an active lifestyle and the value of exercise in achieving and maintaining a healthy body composition are well established. Psychological as well as physical gains are very important in order to promote programme adherence. The aim of this investigation was to study the effects of two exercise types: High Intensity Interval Training (HIIT) and Low Intense Steady State (LISS) exercise, upon psychological well-being of sedentary individuals working in stressful middle management positions.
Methods: Two periods of exercise were completed utilising a cross-over design with the HIIT and LISS training; 10 participants trained over a period of 8 days using an upright cycle. HIIT training consisted of 20–30 minutes intervals of 20 seconds high intensity followed by 60 seconds rest. LISS training consisted of 30 minutes steady state cycling at 60–75% max heart rate. Psychological well-being and mood state were measured through interview and questionnaire.
Results: A series of repeated measures ANOVA's indicated that all participants recorded lower levels of tension, calmness and happiness when exercising as opposed to being sedentary however, the improvements were greater with LISS. Where LISS resulted in improved mood state scores throughout, HITT resulted in increased depression, confusion and fatigue as well as a reduction in vigour. Interviews indicated a lack of confidence over being able to maintain a HITT exercise programme.
Conclusion: Although HIIT training may result in physiological improvements and has the advantage of fitting into busy lives, it appears that it may not result in the same sense of psychological well-being and may in fact lead to negative mood states, and consequently unlikely to promote exercise adherence.

T7:PO.081

Preventive and educative project „with children against obesity"

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Introduction: Childhood obesity has become an everyday reality. Mass media has become a common part of the educational process for children. It significantly influences people´s lifestyle particularly children's. The first specific environment interfering with the daily life of individuals, families and children is television but the web environment also influences them. Through the web environment, they gain information that shapes knowledge, social norms and perceptions of social life.
Methods: Obesity is a serious chronic disease leading to significant changes in life quality and decreasing a life expectancy. The websites html://sdetmprotiobezite.cz offer basic information about child obesity in the Czech Republic. Their aim is a promotion of concerted efforts to influence the child´s family in key preventive environments in childhood obesity.
Results: The preventive project is an open space for anyone who is interested or has questions about the issues of child obesity. The website with professional advice addresses five basic groups: families with children, health professionals, nutritional consultants, schools and the media, which should enable an orientation in the prevention of lifestyle diseases and obesity on the web environment.
Conclusion: The project is an original and innovative prevention website, which offers a comprehensive view of the prevention and treatment of overweight and obese children. The project offers original products that can be used in the everyday clinical practice for specific individuals who risk developing obesity, and those who have a family background of obesity.

Acknowledgement: Research relating to this abstract was funded by Ministry of Health Czech Republic, Health Promotion Project 2013 and Medical Access Solutions s.r.o.

T7:PO.082

What works in china? A literature review on effectiveness of current intervention for combating obesity among chinese school-aged children.

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Introduction: Since 1978, when the Deng Xiaoping's reforms including "Opening up to the World" policy initiated, China has witnessed dramatic economic growth. Undergoing nutrition transition, the burden of nutritional problems has been changing from under-nutrition to over-nutrition. The prevalence of overweight/obesity among Chinese children aged 7–18 has increased dramatically, with 19.0% and 10.9% for boys and girls respectively in 2010.
Aim: This review is to explore the effectiveness of interventions for prevention and treatment of overweight/obesity among Chinese schoolchildren.
Methods: I identified primary studies published from 1980s until 2013. Details of data sources, key terms, inclusion and exclusion criteria and the whole searching process were summarized in figure1. Data on author, study location, study design, age group, sample size, interventions, duration of study, length of follow-up, and findings were extracted for comparison.
Results: 33 studies were finally identified fulfilling the inclusion criteria. 28 were conducted in school settings with 3 in community surroundings and another 2 in the family setting. The studies consisted of one or more components as health/nutrition education, diet adjustment, physical activity, behavior modification and parental involvement. The measurements of study outcome included anthropometric measures, changes in overweight/obesity rate and changes in levels of obesity-related biomedical markers. Although the methodologies used in studies varied, 23 out of 33 (69.7%) were defined as effective according to statistically significant results in outcomes.
Conclusion: Heterogeneity in many aspects of study methodologies limited the meta-analysis of effectiveness of current interventions. Comprehensive school-based interventions seem promising for preventing and treating overweight among Chinese schoolchildren. Insufficient evidence is available to support the effectiveness of community- or family-based interventions.

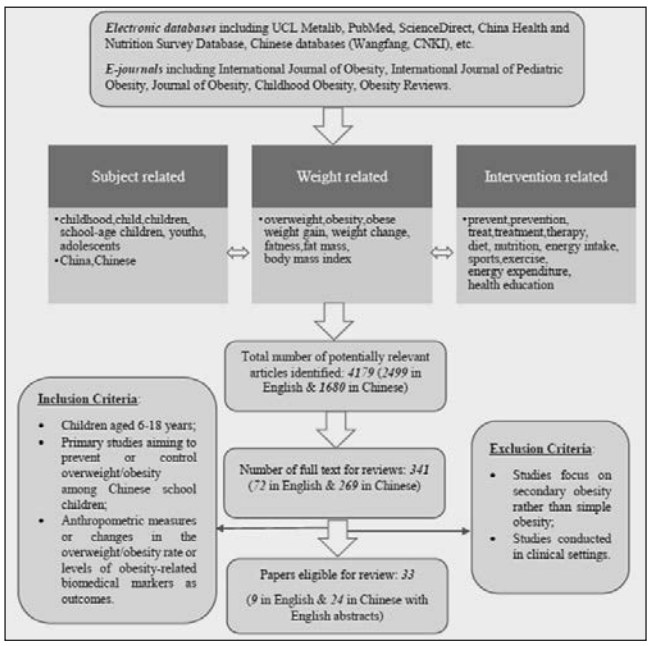

Fig. 1. Flow chart of literature searching

T7:PO.083

Muscle strength fitness are related to a high lipid–metabolic cardiovascular risk

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Objective: We studied the association of lipid–metabolic cardiovascular risk index with muscle strength fitness (MSF).
Methods: Healthy young (mean age 21.2 ± 4.7 years) men (n=6,095). MSF was measured two times with a TKK analogue dynamometer (handgrip). To account for differences in body size, peak grip strength was divided by body mass and handgrip (kg)/kg was used in further analysis. Subjects were further divided into six subgroups according to BMI (normal vs. overweight/obesity) and MF (tertiles: unfit, average, fit). Fasting blood was obtained to measure a lipid profile and glucose levels. A lipid–metabolic cardiovascular risk index (LMCRI) was derived from the levels of triglycerides, low-density lipoprotein cholesterol (LDL-c), high-density lipoprotein cholesterol (HDL-c), and glucose levels.
Results: The groups with the lowest MSF had 67% higher a lipid–metabolic cardiovascular risk index than the groups with the highest MSF ($P < 0.0001$). In overweight/obese participants, the LMCRI (66%/84%) was higher compared with subjects with normal weight ($P < 0.005$, in all). In BMI and MSF subgroups, LMCRI was higher in the overweight/unfit subgroup (0.008 ± 1.104) when compared with the normal-weight/unfit subgroup (-0.362 ± 0.722; $P < 0.0001$) and overweight/fit and normal-weight/fit subjects (-0.422 ± 0.675 vs. 0.064 ± 0.877; $P < 0.0001$). Figure 1.
Conclusions: Overweight and obesity are associated with serum conventional lipids and lipid–metabolic cardiovascular risk index. However, low muscular fitness levels should be avoided for primary cardiovascular disease prevention.

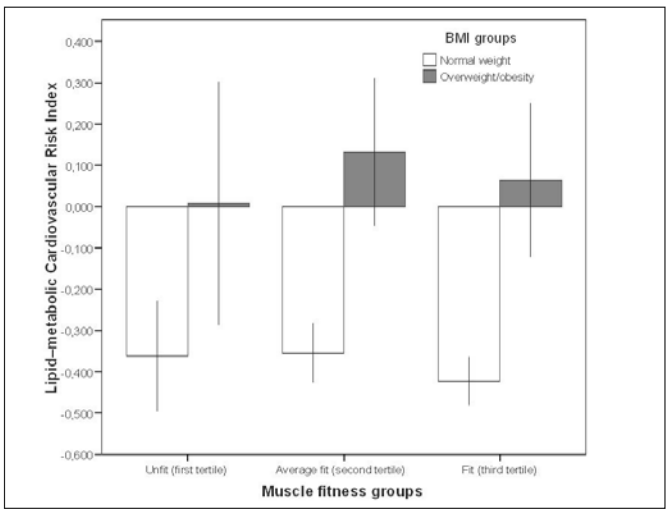

Fig. 1. A lipid–metabolic cardiovascular risk according MSF and BMI groups

T7:PO.084

Impact of body size and composition on energy cost of self-paced "walking for exercise"

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Introduction: Walking is the primary mode of exercise for adults of all ages, and a common health promotion strategy. Previous research suggests that external work of walking is not affected by obesity over speeds of 1.8 – 6.3 kph (0.5–1.7 m/s). This study examined if body size impacts self-selected exercise pace and walking economy.
Methods: 197 adults (M=80, F=117; 21 – 64 yrs; 48 – 133 kg; 18 – 43 kg/m^2) were recruited via stratification in 2 sex (male, female), 4 age (20–34.9, 35–44.9, 45–54.9, 55–65 yrs), and 3 BMI (normal weight (NW): 18–24.9 kg/m^2; overweight (OW): 25–29.9 kg/m^2; obese (OB): 30–45 kg/m^2) groups. The self-paced 'walking for exercise' (SPWE) speed was measured twice over 2 km on a 400m track. Energy cost of walking was determined at four speeds (SPWE-1.2 kph (–0.33 m/s), SPWE-0.6 kph (–0.1667 m/s), SPWE, SPWE+0.6kph) via indirect calorimetry. Walking economy (energy cost per unit walking speed) was determined for each participant from the energy – walking speed regression analysis, with a smaller slope evidence of greater walking economy. Body composition was determined via the 4-C model.
Results: There was no main effect of age ($P = 0.73$), but there were main effects for gender (M>F; $P < 0.001$) and BMI (NW>OW>OB; $P < 0.001$) on SPWE speed. Energy cost of walking differed with gender (M>F) and BMI (OB>OW>NW). Accounting for body weight and walking speed, walking economy did not differ between males and females, but remained different for BMI; NW (373 W/kph) > OW (422 W/kph) > OB (486 W/kph). Accounting for body composition rather than weight, walking economy did not differ between NW and OW, but a ~10% difference remained between OB and the other groups (NW<OB and OW<OB; $P < 0.01$).
Conclusion: Obesity impacts self-selected exercise walking speed and walking economy at speeds spanning below and above this speed. Consequently, despite obese adults choosing slower walking speeds for exercise, there is a great relative energy cost of walking for exercise.

Acknowledgement: Research relating to this abstract was funded by the National Health and Medical Research Council of Australia.

T7 – Policy

T7:PO.085

Building bridges between kindergartens and schools and primary health care services to reduse social inequalities

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Introduction: There are health inequalities between those with high education and income and those without. It is considered that these inequalities might be reduced by giving our children the same opportunities. In schools and kindergartens all children can be reached, including those who need extra follow-up and motivation. The Ministry of Education and Research and the Ministry of Health and Care Services in Norway have created a National Centre for Food, Health and Physical Activity to be a national resource centre for interdisciplinary work promoting the importance of good health in all children and young people. The Centre's aim is to promote and communicate the relationship between health and children's learning and education with an emphasis on healthy meals, good food experiences, and physical activity, and further pass on knowledge about adaptive measures for children and young persons with chronic illnesses and disabilities, within the framework of an inclusive society by experiencing belonging and mastering.
Methods: The Centre's target groups are primary audience in kindergarten, schools, child health centres, school health services; authorities, owners, managers and staff, and universities and colleges of further education of relevant educational programmes.
Results: The Centre undertakes targeted communications, counselling and guidance based on results from research, R&D work, and is developing examples of good practice and support materials that are predominantly presented Net-based.
Conclusion: The Centre is assigned tasks associated with national initiatives in health and education related to quality development and skills development, linked to the primary objectives within the two sectors from a political long-term perspective.

T7:PO.086

Family intervention targeting obese children: Treatment cost differences of two standardized programs

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Introduction: Incremental lifetime medical costs of an obese child are estimated to be 16 100 Euro (Finkelstein et al, 2014). This estimate reflects the potential cost saving of an intervention succeeding to prevent an obese child from persistent obesity. In Norway a family intervention has been performed (Trial Registry: www.clinicaltrials.gov; NCT01110096). We report treatment costs in the light of potential cost savings.
Methods: In a two-year randomized controlled trial a program (A) consisting of a two-week family treatment camp and four subsequent weekend camps was compared with (B) a four day out-patient lifestyle education program. The target group was children 7–12 years with a BMI ≥ iso-BMI 30 and at least one parent with BMI ≥ 30. Both alternatives include two days of hospital follow-up. Treatment cost per participating individual was calculated by multiplying the number of treatment days by average daily cost. Treatment cost per child was the sum of family member costs. Descriptive statistics and nonparametric methods will be used.
Results: Results based on a total of 76 children/families will be presented: Treatment costs according to three time periods 0–3 months, 4 to 12 months and 13 – 24 months. Cost variation within the two groups might be due to family size and families partly absent from the standard number of treatment days.
Conclusion: We presume a substantial cost difference between the two programs because of different number of treatment days. When comparing treatment cost to the estimated incremental life-time cost we must take intervention success rate and long term effects into consideration. Preliminary results indicate clinically meaningful effects of family based treatment.

Acknowledgement: Research relating to this abstract was funded by Norwegian Ministry of Health and Care Services, Norwegian Foundation for Health and Rehabilitation, GjendisigeStiftelsen.

Reference:
1. Finkelstein EA et al.: (2014) Pediatrics Vol.133; 5:854–862.

T7 – New analytical approaches in epidemiology

T7:PO.087

Waist circumference vs. waist-to-height ratio in estimation of central obesity in Slovak adults

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Background: Central obesity (CO) is a major risk factor for cardiovascular and metabolic disorders. Waist circumference (WC) and the waist-to-height ratio (index of central obesity, ICO) are the most widely used methods; however, if compared a certain level of discrepancy in the classification occurs.
Aim: We studied the degree of discrepancy between the WC and the ICO methods in classification of CO in the population of adults in Slovakia.
Methods: In secondary analysis of data from 3 cross-sectional studies in 18–63 year-olds, 2137 males and 2531 females, CO was classified as WC >93 cm and 80 cm, respectively; and ICO>0.50. Matching or discrepancy of the results was analyzed according to SD of height, or decades of age.
Results: According to WC 718 (34%) male and 859 (34%) females presented CO, employing ICO 987 (46%) males and 711 (28%) females were CO. In males height averaged 179 ± 7 cm; in –3 SD and –2 SD subgroups CO was underrated by WC in comparison with ICO in 35%, in the subgroup –1 SD and average height by 10% and 19%, respectively; while in tall subjects (height +2 SD and +3 SD) WC overrated CO in 5% and 12% of probands, respectively. Females' height averaged 166 ± 6 cm; WC underrated CO in short females (-3 SD and –2 SD) by 16% and 5%, respectively; and overrated CO in all other subgroups starting from –1 SD of height by 4%, 10%, 15% and 26%. WC and ICO correlated significantly with age in both genders; however, discrepancy between WC and ICO classification did not differ significantly in age group-decades in either gender.
Conclusion: In Slovak adults WC method to classify CO underrates CO in shorter subjects, in males shorter than 180 cm and in females <160 cm, while it overrates CO in tall subjects (in males from 187 cm and in females from 167 cm of height).

T7 – Optimising monitoring and technology with technology

T7:PO.088

Reliability and precision of a segmental multi-frequency BIA scale for the assessment of body composition in the elderly

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Introduction: Segmental bioimpedance analysis (sBIA) is a common tool to estimate body composition (body fat mass (FM), fat-free mass (FFM) and skeletal muscle mass (SMM)). sBIA is less expensive than dual X-ray absorptiometry (DXA) and has the advantage of portability. In the elderly the superiority of sBIA in estimating FM compared to anthropometry, is in a formative stage and reliability is not established. Therefore, our aim was to determine if a multi-frequency sBIA is more accurate measure of FM than BMI, waist circumference and waist-to-height ratio (WtHR). The second aim was to determine the accuracy of sBIA compared to DXA.
Methods: Weight, height and waist circumference were measured in 92 healthy subjects (53 women) aged 80–81 years from the H70 Gerontological and Geriatric study in Gothenburg. WtHR was calculated dividing waist (cm) by height (cm). Total and segmental FM, FFM and SMM were estimated by DXA and MC-180MA TANITA sBIA scale. The estimations from these techniques were compared by Bland-Altman plots and by linear regression of DXA values vs. the predicted values from sBIA, BMI, waist circumference and WtHR.
Results: sBIA- and DXA-based estimates were highly correlated. The associations between total and trunk FM by sBIA and DXA were not greater than those between BMI and DXA. sBIA underestimated FM, particularly trunk FM and FFM. SMM was greatly overestimated by sBIA, although highly correlated with DXA lean soft tissue. Good levels of agreement between the two techniques were found in men, whereas very low agreement rates were found in women (Figure 1). The presence of metal prosthesis did not influence the results.
Conclusions: sBIA is not an accurate measure of body composition in the elderly; moreover it was not superior to BMI in predicting FM.

Acknowledgement: We thank the Department of Psychiatry and Neurochemistry, Unit of Psychiatric Epidemiology, Mölndal, Sweden for their contribution to the H70 study.

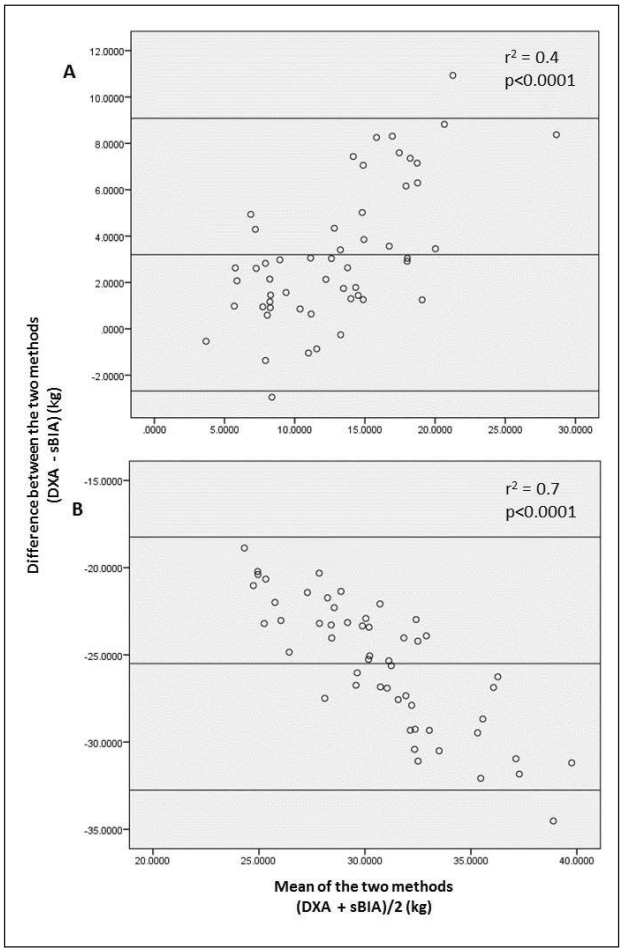

Fig. 1. Bland-Altman plots depicting means vs differences of DXA and sBIA estimates for FM (panel A) and SMM (panel B) in women. Horizontal lines are drawn at the position of the mean difference and at mean value 2SD.

T7:PO.089

Resting oxygen consumption and predective equations for resting metabolic rate among bariatric surgical candidates

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Metabolic equivalent (MET) is based in a universal value of resting oxygen consumption (VO2) of 3.5 mL/kg/min. Recent studies suggested the correction of 1 MET by equation of Harris-Benedict to provide more accurate values. On the other hand, controversies also exist between predictive equations to estimate resting metabolic rate (RMR), especially in severely obese individuals. This study measured resting VO2 and RMR by indirect calorimetry (IC) and compared the accuracy predictive equations to estimate RMR and 1 MET standard value among women undergoing bariatric surgery. Cross sectional analysis was conducted in 44 severely obese women candidates to bariatric surgical. RMR was measured by using indirect calorimeter CCM express (MedGraphics). The predictive equations used for estimate RMR were: Female Brazilian Population (FBP), Mifflin-St Jeor (MSJ), Henry & Rees (HR), Harris-Benedict (HB), FAO/WHO/UNU and Schofield (S). The RMR value measure by

IC was 1759 ± 36 kcal/day. In kcal/day, the MJS (1817 ± 22; mean difference [MD]: –58.3) and FBP (1826 ± 21; MD: –66.5) equations estimated the closest values ($p > 0.05$). Whereas HR (1886 ± 19; MD: –126.7), HB (1887 ± 18; MD: –127.4), FAO/WHO/UNU (1987 ± 35; MD: –227.9) and S (1954 ± 36; MD: –194.4) equations overestimates significantly ($p < 0.01$) RMR. Resting VO2 values ranged 1.47–2.92 mL/kg/min among obese women with mean value of 2.22 ± 0.00 mL/kg/min. The measured resting VO2 values were 36.4 ± 1.2% less than 1 MET standard value (3.5 mL/kg/min). **Conclusion:** In Brazilian severely obese women, MJS and FBP were the more precise equations to provide estimation of RMR. Additionally, the standard 1 MET value overestimate the measured resting VO2 and cannot be applicable to bariatric patients.

Acknowledgement: Support Foundation of São Paulo State (FAPESP) and National Council for Scientific and Technological Development (CNPq)

Friday, 8 May, 2015

T2 – De novo lipogenesis

T2:PO.001

Resveratrol mediated changes in rat adipose tissue microRNAs expression related to fatty acid synthase

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Introduction: The involvement of epigenetics as an anti-obesity molecule has not been addressed so far. The aim of the present study was to assess changes produced by resveratrol in microRNA (miRNA) related to de novo lipogenesis, specifically to fatty acid synthase (fasn), in adipose tissue from rats fed an obesogenic diet supplemented with resveratrol.
Methods: Sixteen male Wistar rats were divided into two groups, a control group and a group treated with resveratrol (30 mg/kg bw/d), both fed a diet high in sucrose and fat, for 6 weeks. MiRNAs involved in de novo lipogenesis were selected by checking the miRWalk Database and by revising the literature. Mir-539-5p, mir-1224 and fasn gene expressions were assessed by qRT-PCR. Protein expression of Sp1 transcription factor (SP1) and sterol regulatory element-binding protein 1 (SREBP1) were measured by western blot. Statistical analysis was carried out by using Student's t test.
Results: Resveratrol treatment reduced adipose tissue size. In rats treated with this polyphenol, protein expression of SP1 and SREBP1, two transcriptional factors acting synergistically in the regulation of fasn expression, were significantly decreased ($P < 0.05$). In good accordance, gene expression of fasn was also reduced ($P < 0.05$). The expression of mir-539-5p and mir-1224, two miRNAs involved in the regulation of Sp1, were up-regulated by resveratrol ($P < 0.05$).
Conclusion: The inhibition of de novo lipogenesis induced by resveratrol in adipose via fatty acid synthase can be mediated, at least in part, by the up-regulation of miR-539-5p and miR-1224. This shows the involvement of epigenetic mechanisms in the anti-obesity effect of this polyphenol.

T2 – Mitochondrial functions

T2:PO.002

Cd36 does not directly participate in mitochondrial fatty acid transport and oxidation.

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Introduction: CD36/FAT permease of plasma membrane is the key transmembrane transport protein for long chain fatty acids (FA). In the last years, conflicting results have been published regarding the localization of CD36 in mitochondria and its direct role in mitochondrial FA transport and oxidation.
Methods: We used the spontaneously hypertensive rat (SHR) that harbors mutant CD36 and transgenic SHR expressing wild type Cd36 (SHR-Cd36) and compered parameters of lipid metabolism in brown adipose tissue (BAT).
Results: CD36 protein in BAT was high, comparable to heart and present mostly in a glycosylated form. Of all tissues the Cd36 transcript was the highest in BAT (2.9 x higher than heart). Most of the CD36 signal was in microsomal fraction and only traces in mitochondria, most likely due to contamination. We also compared palmitate transport and oxidation in BAT and in primary cultures of brown adipocytes from SHR and SHR-Cd36 to test whether palmitate transport and oxidation is affected by mutant CD36. The import of palmitate into BAT was reduced in the SHR when compared to SHR-Cd36 rats (24.1 ± 0.8 vs. 29.0 ± 1.6 nmol palm/mg prot/2h, $P < 0.05$), confirming that FA transport across plasma membrane mediated by mutant CD36 is less effective. In contrast, there was no significant difference in palmitate oxidation in BAT from SHR and SHR-Cd36 rats (2.1 ± 0.1 vs. 2.1 ± 0.1 nmol palm/mg prot/2h), suggesting that CD36 is not important for FA transport into mitochondria.
Conclusion: Our results demonstrate important role of CD36 in transport of long chain FA across plasma membrane but not into mitochondria. We were not able to detect a significant amount of CD36 in isolated mitochondria and CD36 does not seem to directly participate in mitochondrial FA transport and oxidation.

Acknowledgement: Research relating to this abstract was funded by ERC CZ LL1204 and Grant Agency of the Czech Republic (14-36804G).

T2:PO.003

All-trans retinoic acid induces oxidative phosphorylation and mitochondria biogenesis in adipocytes

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A positive effect of all-trans retinoic acid (ATRA) on white adipose tissue (WAT) oxidative and thermogenic capacity has been described and linked to an in vivo fat loosening effect of ATRA in mice. However, little is known about the effects of ATRA on mitochondria in white fat. Our objective has been to characterize the effect of ATRA on mitochondria biogenesis and oxidative phosphorylation (OXPHOS) capacity in mature white adipo-

cytes. Transcriptome analysis, oxygraphy, analysis of mitochondrial DNA (mtDNA) and flow cytometry-based analysis of mitochondria density was performed in mature 3T3-L1 adipocytes after 24 h incubation with ATRA (2 μM) or vehicle. Selected genes linked to mitochondria biogenesis and function and mitochondria immunostaining were analysed in WAT tissues of ATRA-treated as compared to vehicle-treated mice. ATRA up-regulated the expression of a large set of genes linked to mtDNA replication and transcription, mitochondrial biogenesis and OXPHOS in adipocytes, as indicated by transcriptome analysis. Oxygen consumption rate, mtDNA content and staining of mitochondria were increased in the ATRA-treated adipocytes. Similar results were obtained in WAT depots of ATRA-treated mice. We conclude that ATRA impacts mitochondria in adipocytes, leading to increased OXPHOS capacity and mitochondrial content in these cells.

Acknowledgement: This work was supported by the Aix-Marseille Université, INRA and EU FP7 project DIABAT (HEALTH-F2-2011-278373). CIBER de Fisiopatología de la Obesidad y Nutrición is an initiative of the ISCIII (Spanish Government).

T2 – Remodeling, fibrosis and inflammation

T2:PO.004

Independent Association Between Circulating Galectin-3 Concentrations and Aortic Stiffness and Wave Reflection in a Community Sample.

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The pro-fibrotic inflammatory substance galectin-3 is associated with body mass index (BMI) and predicts outcomes in the general population. Whether galectin-3 is associated with arterial stiffness and aortic function is unknown. We aimed to determine whether circulating galectin-3 concentrations are associated with aortic pulse wave velocity (PWV) or wave reflection in a community sample with a high prevalence of obesity. Plasma galectin-3 and C-reactive protein (CRP) concentrations, as well as carotid-femoral PWV and the aortic reflected wave index (RI) (applanation tonometry and SphygmoCor software) were determined in 966 randomly selected participants of black African ancestry from the South West Township (SOWETO) of Johannesburg, 42% of whom were obese. 661 participants had 24-hour ambulatory blood pressure (BP) monitoring (SpaceLabs, model 90207). On bivariate analysis, galectin-3 concentrations were strongly correlated with BMI ($p < 0.0001$). Galectin-3 concentrations were independently associated with neither office nor 24-hour systolic (SBP) ($p = 0.88–0.92$), or diastolic ($p = 0.25–0.65$) BP. In contrast, with adjustments for confounders including office or BP, galectin-3 was independently associated with aortic PWV (partial $r=0.15$, $p < 0.0001$) and RI (partial $r=0.10$, $p < 0.005$). The BP-independent relations between galectin-3 concentrations and aortic hemodynamics persisted with further adjustments for CRP (PWV: partial $r=0.14$, $p < 0.0001$, RI: partial $r=0.10$, $p = 0.002$). Despite a lack of independent association with brachial BP, the pro-fibrotic inflammatory substance galectin-3 may contribute toward adverse outcomes through an impact on aortic stiffness and the magnitude of aortic reflected waves, effects that cannot be attributed to general inflammatory changes.

T2:PO.005

Impact of aging on immune cell distribution in brown and white adiposetissue depots

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Introduction: Age-related changes of adipose tissue mass and function are associated with an elevated risk to develop metabolic diseases like obesity and insulin resistance. Obesity is accompanied by a chronic low-grade inflammation with increased adipose tissue infiltration of immune cells. The correlation of inflammation and insulin resistance during obesity is well established. However, little is known about the impact of aging on immune cell distribution and activation in different depots and types of fat. The concept of 'Inflamm-aging' proposes that increased cytokine levels produced by immune cells could negatively affect metabolic function.
Methods: Assessment of immune cell gene expression patterns and flow cytometric analysis of immune cell distribution was conducted in interscapular brown adipose tissue (iBAT), epididymal and subcutaneous white adipose tissue of mice aged 8 weeks, 15 months, and 25 months.
Results: The distribution of immune cell subsets differs between individual fat depots and during aging, and is in some aspects distinct from the effects observed during obesity. For instance, no increase in total number of macrophages per depot was found during aging, whereas aging, like obesity, is accompanied by a shift from alternatively activated M2 towards classically activated M1 macrophages. This is also confirmed by increased expression of pro-inflammatory cytokines in freshly isolated macrophages. In summary, iBAT contains fewer immune cells and is more resistant to age-induced pro-inflammatory processes.
Conclusion: These findings show distinct sensitivities of different adipose depots to the age-related pro-inflammatory shift and suggest that functional changes in aged immune cells may contribute to metabolic dysfunction.

T2:PO.006

Age-related changes of extracellular matrix composition affect the metabolic homeostasis of adipose tissue

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Introduction: The composition of the extracellular matrix (ECM) is an important part of the cellular microenvironment that affects the mechanisms involved in stem cell homeostasis and tissue regeneration. In brown and white adipose tissue, similar to many other organs, a population of fibroblast-like progenitors is considered to be the major source of ECM while also giving rise to adipocytes. It is hypothesized that senescence leads to a pathological ECM-reorganization that in turn contributes to an impaired regenerative profile of brown and white adipocyte formation and maturation.
Methods: ECM components were assessed in brown and white adipose tissue depots from young (6–8 weeks) and old (12–15 months) mice using mRNA and protein expression analysis. Furthermore, in vitro assays were developed to determine the effects of alterations in the surrounding matrix on brown and white adipogenesis.
Results: qPCR analysis of white and brown adipose tissue revealed a significant reduction in the expression of highly abundant ECM components, such as collagens and integrins. In our in vitro tests, the ability to undergo brown adipogenic differentiation strongly depended on the maturation status of the ECM-producing cells: while immature progenitor cells produced matrix that supported brown adipogenesis, ECM produced by differentiating progenitors or mature adipocytes inhibited expression of brown adipocyte marker proteins such as UCP1. Of note, the ability to retain regulatory growth factors also differed between matrices from different sources.

Conclusion: These findings taken together suggest that changes in ECM composition with age might promote the development of metabolic dysfunction by affecting the adipogenic potential of tissue-resident progenitor cells.

T2:PO.007

Differential expression of glucocorticoid target genes in cell types of white adipose tissue from corticosteroid binding globulin deficient mice (cbg-/-) submitted to a hyperlipidic diet

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Introduction: Glucocorticoids are implicated in the body weight regulation. Scientific evidences suggest that CBG may have an active role modulating glucocorticoid action. Ours aims were to investigate whether white adipose tissue (WAT) from cbg-/- mice showed an altered proportion of cell types compared with cbg+/+ mice and to characterize the expression of glucocorticoid target genes in each cellular fraction.
Methods: Male mice (C57BL/6) cbg+/+ and cbg-/-, were submitted during twelve weeks to a control (C) or a hyperlipidic diet (HL). The epididymal WAT was digested with collagenase and adipocytes and stromal vascular fraction (SVF) obtained. Total, M1 and M2 macrophages were quantified by FACS. Gene expression was determined by RT-PCR.
Results: The abundance of cells from SVF and total macrophages tended to be lower in cbg-/- mice than in cbg+/+ with a C diet. Both parameters increased similarly in both genotypes when HL diet was consumed. The ratio M1/M2 was higher in cbg-/- than in cbg+/+ mice fed a C diet. HL diet increased the ratio M1/M2 in cbg+/+ but decreased it in cbg-/- mice. About half of 11βHSD1 expression in epididymal WAT occurred in SVF in cbg-/- mice, whereas in cbg+/+ more than 80% of this expression was found in adipocytes. Total WAT 11βHSD1 expression was decreased by HL diet in both genotypes, but in cbg-/- mice were at expense of expression in SVF. DUSP expression prevailed in SVF but was much lower in cbg-/- than cbg+/+ mice fed a C diet. HL diet decreased DUSP expression in cbg+/+ but increased it in cbg-/- mice.
Conclusion: The lack of CBG alters the expression of genes regulated by glucocorticoids in different cell types from WAT. The cells in stromal vascular fraction seem specially affected.

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T2:PO.008

Gelatinase a (mmp-2) promotes adipogenesis

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Introduction: The gelatinase subgroup of the matrix metalloproteinase (MMP) family (gelatinase A and B, or MMP-2 and –9) is known to play a pivotal role in adipose tissue biology. They are secreted by adipocytes and their activity is modulated during adipose tissue development. In the present study, we have evaluated the role of both gelatinases in adipogenesis.
Methods: Gene shRNA-mediated knockdown (Kd), or overexpression was performed in murine 3T3-F442A preadipocytes to evaluate the effect on differentiation into mature adipocytes. For de novo adipogenesis, nude athymic BALB/c mice were subcutaneously injected with genetically modified 3T3-F442A cells, and kept on a high fat diet for 4 weeks.
Results: Stable Mmp2 Kd was confirmed by i) 90% decreased mRNA expression ii) 4-fold reduced antigen levels and iii) 60% reduced gelatinolytic activity. Loss of MMP-2 significantly decreased preadipocyte differentiation, as demonstrated by Oil Red O staining (reduction by 65%) and mRNA expression of the adipogenic markers aP2, PPARγ and adiponectin. In contrast, overexpression of MMP-2 resulted in enhanced differentiation. Upon selective Mmp9 Kd, no differences in adipogenesis were observed as compared to control cells. De novo fat pads derived from 3T3-F442A cells with/without Mmp2 Kd, did not significantly differ in mass or adipocyte size and density. Expression of adipogenic markers was, however, significantly decreased with Mmp2 Kd. Similar experiments were performed in wild-type and MMP-2 knockout mice (C57Bl/6N). Absence of de novo fat pads suggests successful clearance by the host immune system. Additional experiments to prevent rejection are ongoing.
Conclusion: Our data indicate that MMP-2 is a key player in early preadipocyte differentiation.

Acknowledgement: Skillful technical assistance by A. De Wolf, I. Vorsters and C. Vranckx is gratefully acknowledged.

T2:PO.009

Immunological targeting of neoepitopes of osteopontin exposed after thrombin and matrix metalloproteinase-cleavage reduces osteopontin-induced cell adhesion

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Introduction: Osteopontin has been shown to be involved in immune cell migration, adhesion, and promoting inflammatory cytokine production. Its central region consists of a canonical RGD integrin binding sequence and a contiguous, cryptic integrin-binding site that is unmasked by thrombin or matrix metalloproteinase cleavage and is bound by α5β1, α4β1 and α9β1 integrins expressed, e.g., by leukocytes and other inflammatory cells. We targeted this region with monoclonal antibodies or sera induced by peptide immunization of mice to prevent cellular adhesion in vitro.
Methods: Recombinant human OPN in full length or truncated forms was immobilized on the surface of V-well microtiter plates to induce adhesion of fluorescence-labeled HEK 293 cells as a model system for OPN-induced immune cell adhesion.
Results: Induction of HEK 293 adhesion was markedly stronger by the truncated OPN forms as compared to full-length OPN. Using post-immune sera or monoclonal antibodies, we could specifically block the adhesion to OPN fragments corresponding to the thrombin and matrix-metalloprotease-cleaved form.
Conclusion: Cell adhesion to OPN strongly depends on protease cleavage and can be immunologically targeted. These results are a step forward to an immunotherapeutic approach to target obesity-induced adipose tissue inflammation and insulin resistance.

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T2:PO.010

Potential mediatory role of macrophages in air pollution-related adipocyte dysfunction: Differential effect of two diesel exhaust particles samples

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Introduction: Exposure to fine particulate matter (PM) air pollution negatively affects human health, but a possible connection with obesity-associated morbidity remains uncertain. Beyond the lungs, PM-derived

compounds may activate resident or circulating immune cells that could then engage in an immune-metabolic interaction with adipocytes. Here we assessed whether macrophages exposed to water extracts of two standard diesel exhaust particles (DEP) samples could induce a conditioned medium (CM) that would affect adipocyte function

Methods: RAW264.7 macrophages were treated with water extracts of 2 standard DEPs with high/low organic compounds content (SRM-1650/2975). CM was collected, and used to expose cultured adipocytes for 6h.

Results: Adipocytes exposed to CM of untreated macrophages exhibited a decreased insulin-stimulated p-Akt/T-Akt and p-Gsk/T-Gsk, and elevated basal lipolysis, compared to control adipocytes. When CM was prepared from macrophages pre-treated with SRM-2975, but not SRM-1650, a further decline in insulin responsiveness was observed. Lipolysis was not further altered. In search of potential macrophage-derived mediators, we considered altered secretion of TNFα, IL-10, IL-6 and additional cytokines using specific ELISAs and a multiplex assay. So far, differential secretion of these factors has not been consistently evident, suggesting alternative cytokines or non-cytokine mediators.

Conclusion: Results indicate: i. a potential mediatory role for macrophages in the induction of PM-related adipocyte insulin resistance; ii. different samples from one type of environmental source may induce different endocrine outcomes. The specific PM components, as well as the macrophage-derived mediators for PM-related adipocyte dysfunction have yet to be identified.

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T2:PO.011

Gene expression levels of wnt5a and sfrp5 in visceral adipose tissue of obese subjects are related to inflammation

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Introduction: Wingless-type MMTV integration site family (WNT)-5A is a secreted glycoprotein involved in the regulation of the inflammatory response and secreted frizzled-related protein (SFRP)-5 has emerged as an anti-inflammatory adipokine binding and sequestering WNT5A. **Objective:** The aim was to evaluate the involvement of WNT5A and SFRP5 in obesity and obesity-associated type 2 diabetes (T2D) as well as to explore their role in visceral adipose tissue (VAT) inflammation.

Methods: Ninety subjects were included in the study. Visceral adipose tissue (VAT) gene expression levels as well as circulating concentrations of WNT5A and SFRP5 were analysed. The effect of tumour necrosis factor (TNF)-a and lipopolysaccharide (LPS) on the expression levels of WNT5A and SFRP5 in cultures of human differentiated adipocytes was also explored. We also investigated whether WNT5A itself can activate an inflammatory response in human differentiated adipocytes.

Results: Circulating concentrations of WNT5A were significantly increased ($P < 0.01$) in normoglycaemic (NG) and T2D obese patients compared to lean subjects. In this regard, increased ($P < 0.01$) expression levels of WNT5A together with decreased ($P < 0.05$) mRNA levels of SFRP5 in NG and T2D obese patients were found in VAT. WNT5A expression was significantly enhanced ($P < 0.01$) by TNF-a and LPS, while no effects were found in SFRP5 gene expression levels. Furthermore, WNT5A treatment significantly enhanced ($P < 0.05$) the mRNA levels of IL6, IL1B, MMP2, MMP9 and SPP1 in adipocytes.

Conclusions: Activation of non-canonical Wnt signalling through the upregulation of WNT5A and downregulation of SFRP5 may promote a proinflammatory state in visceral adipose tissue contributing to the development of obesity-associated comorbidities.

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T2:PO.012

Increased gene expression of s6k1 in human visceral adipose tissue in obesity is related to inflammation and insulin resistance

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Introduction: The ribosomal protein S6 kinase 1 (S6K1), a component of the insulin signalling pathway, has been proposed as a key molecular factor in insulin resistance development under conditions of nutrient overload. The aim was to evaluate the involvement of S6K1 in obesity as well as to explore their association with visceral adipose tissue (VAT) inflammation.

Methods: Forty females were included in the study (9 lean and 31 obese). Real-time PCR analyses were performed to quantify gene expression levels of S6K1 as well as representative players involved in signalling pathways related to S6K1 and inflammation in VAT. We also explored the effect of the stimulation with insulin in human visceral adipocytes.

Results: Increased expression levels of S6K1 in obese patients in VAT were observed ($P < 0.05$). Moreover, a positive association ($P < 0.05$) of S6K1 expression with different markers of insulin resistance was observed. S6K1 mRNA levels in human visceral adipocytes were significantly increased ($P < 0.01$) after insulin stimulation. Finally, S6K1 gene expression levels were positively correlated with VAT gene expression levels of the inflammatory markers CCL2, CD68, MMP2, MMP9, VEGFA and CHI3L1 as well as with mRNA levels of MTOR and MAPK8 (JNK).

Conclusion: These data show that S6K1 is upregulated in human VAT in obesity, suggesting its role in the dysfunctional adipose tissue via a close association with insulin resistance and inflammation development

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T2:PO.013

Adipose tissue stiffness evaluated by non-invasive elastometry (adiposcan) associates with structural and molecular actors of extracellular matrix

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Introduction: Extracellular matrix remodeling is a hallmark of adipose tissue (AT) pathologic alterations in obesity. It relates to metabolic abnormalities and associates with AT stiffness, for which we have recently developed a non-invasive method- the Adiposcan (Echosens, Paris)- based on vibration-controlled transient elastography (VCTE). Our aim was to

identify how the VCTE (VS) relates to metabolic characteristics and components of AT ECM structure and functions in morbid obesity.
Methods: 119 obese subjects (age 39.4 ± 10.8yr, BMI 46.2 ± 6.5kg/m^2, female 68.1%) candidates for bariatric surgery (BS) were recruited and their phenotypes were determined according to several bioclinical characteristics. AT stiffness (VS) was measured by Adiposcan in the periumbilical region before BS. We obtained per-operative subcutaneous AT samples for fibrosis quantification by histochemistry (picrosirius red). Using PCR-ARRAY, we examined the expression of genes related to AT ECM structure and function in a subset of non-diabetic women.
Results: We confirmed that AT stiffness (VS) is positively associated with pericellular fibrosis (rho=0.28, p = 0.02) and with blood fasting glucose, HbA1c, liver transaminases and triglycerides whereas negatively with fat mass% (DXA). We here show that VS is positively associated with expression of genes encoding profibrotic proteins (SPP1, THBS1, TGFB1), matrix fibers (COL6A1, COL6A2), basement membranes (COL4A2, LAMC1, LAMB3), adhesion molecules (SELE, ICAM, CD44) and metallopeptidase inhibitors (TIMP1). VS is also positively associated with integrins involved in mechanotransduction (ITGB2, ITGA5, ITGA8) and transcription factors controlling fibrosis and inflammatory genes (NFkB1, CEBPB).
Conclusion: Physical measure of AT stiffness is associated with molecular actors of ECM structure and function and need to be confirmed at the protein levels. This study illustrates the interest of developing non-invasive tools to phenotype the adipose tissue.

T2:PO.014

Mef-derived adipocytes from e2f1-ko mice exhibit decreased basal autopahgy and ask1 signaling and improved metabolic and endocrine function, with resistance to stress

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Introduction: There is growing interest in metabolic roles of cell cycle regulators, and in transcription-level regulation of autophagy and ASK1-MAP kinase, which are activated in human adipose tissue in obesity. E2F1, a cell-cycle –related transcription factor, is up-regulated in omental fat in human obesity, correlating with expression of ASK1 and autophagy genes. We hypothesized that E2F1 regulates these pathways and contributes to adipocyte dysfunction.
Methods: We utilized mouse embryonal fibroblasts (MEF) of E2F1-KO mice, differentiated into adipocytes (morphology, oil red O staining, and expression of markers of adipocyte differentiation) comparably to WT-MEFs.
Results: E2F1-KO adipocytes had markedly lower expression of ASK1 and autophagic flux activity. Insulin sensitivity and responsiveness, assessed by insulin-stimulated phosphorylation of Akt, GSK3 and p70S6 kinase, were higher in E2F1-KO MEF-adipocytes than WT cells, but overall similarly affected by pre-exposure to inflammatory cytokines, resulting in insulin resistance. Basal lipolysis was nearly 3-fold lower in the KO vs WT adipocytes, but like WT exhibited a 3-fold increase in glycerol and FFA release in response to cytokines. Leptin secretion in KO adipocytes was decreased 25%, and adiponectin increased 2.5-fold compared to WT. Importantly, in the absence of E2F1 cytokines failed to decrease secretion of both adipokines as in WT.
Conclusion: E2F1 transcriptionally regulates autophagy gene expression and activity, and ASK1 signaling. In its absence, adipocytes exhibit improved endocrine/metabolic function, and resistance to adipokine alternations induced by inflammation. Results support metabolic regulatory functions of cell-cycle proteins which contribute to adipose dysfunction in obesity.

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T2:PO.015

High-intensity resistance exercise assuage the deleterious effects ofobesity on mmp-2 and oxidative stress in left ventricle of rats

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Objective: to evaluate the effects of eight-week resistance training (RT) on body mass (BM), activity of Metaloproteinase-2 (MMP-2), antioxidant enzymes, lipid peroxidation, Citrate synthase (CS) and total lipid content in the left ventricle (LV) of obese rats.
Methods: Sixty Wistar rats was distributed into six experimental groups (n=10/each): fed with standard diet: Control (CT), Sedentary (SED) and trained (RT) groups, and fed with high-fat diet (CT-Ob), Sedentary (SED-Ob) and trained groups (RT-Ob). RT protocol was conducted with 4–9 climbs of a vertical ladder with weights attached to their tails. Sessions were carried out every 72 hours.
Results: The three weeks obesity-induction period induced higher BM, LV mass, activity of MMP-2, lipid peroxidation and lower CS activity compared to CT ($p < 0.05$). After eleven weeks of high-fat diet, the SED-Ob presented a higher BM compared to SED. The consumption of high-fat diet (SED-Ob) was able to promote lower Total Super Oxide Dismutase (Total-SOD) and Mitochondrial Super Oxide Dismutase (Mn-SOD) and higher Glutathione (GSH) activity. The BM was lower to the RT-Ob compared to SED-Ob, even though higher compared to RT-Ob ($p < 0.005$). In the RT-Ob of MMP-2 activity was higher ($p < 0.03$) compared to RT, but lower ($p < 0.04$) compared to SED-Ob. The RT protocol promoted greater CS activity ($p < 0.03$), Total-SOD ($p < 0.001$) and Mn-SOD ($p < 0.03$) and lower activity of GSH ($p < 0.01$) in RT-Ob. There was no alterations on TBARs level in the LV of the RT-Ob. However, we observed increased lipid content ($p < 0.04$).
Conclusion: RT, in obese rats, could be a no pharmacological tool able to positively modulate the activity of MMP-2 and some antioxidant enzymes. These effects are important for the maintenance of heart health, relieving the deleterious effects on obesity-related on LV.

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T2:PO.016

CD56bright nk cells are enriched in adipose tissue and may contribute to local obesity-induced inflammation

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Introduction: An important underlying cause of obesity-induced IR is chronic systemic inflammation derived from progressive inflammation in visceral adipose tissue (VAT). In this study we characterized the mononu-

clear immune cells in peripheral blood (PB), visceral and subcutaneous adipose tissue (SAT) of humans.
Materials and methods: Human samples were obtained during laparoscopic surgery of patients undergoing elective cholecystectomy. Exclusion criteria: age>65 yrs, active infection, current treatment with antiinflammatory or immunosupresive drugs, malignant disease, acute or chronic kidney and liver disease, heart failure (NYHA III or IV), thyroid disease, use of weight loss drugs, alcohol abuse. All patients signed an informed consent before tissues were isolated. Statistics. Student's t test, Mann-Whithey and ANOVA tests, with Bonferroni's posttest Correction for multiple comparisons, were used. $P < 0.05$ was considered statistically significant.
Results: We find that T cells are a dominant immune cell subset in both VAT and SAT. Compared to PB, adipose tissue (AT) contains relatively more CD8T cells. Markedly, we found that AT contains more NK cells than PB. In particular CD56Bright cells, which produce high levels of IFNγ, were 2–4 fold increased in AT compared to PB. When NK cell numbers were correlated to BMI, we observed a clear positive correlation in AT, but not in PB, even though our sample size was too small to reach statistical significance. In addition, we observed that VAT, but not SAT expresses activating ligands for the NK cell receptor NKp46. NKp46 ligand expression was also positively correlated with BMI.
Conclusion: Our study identifies NK cells as an important immune cell subset in AT. The positive correlation of NK cells and activating NK cell ligands in AT with BMI might indicate that this pro-inflammatory immune cell subset may play an important role in the development of VAT-inflammation and contribute to the development of IR.

T2:PO.017

Oral administration of trans10? Cis12 conjugated linoleic acid (cla) in mice induces a reversible inflammatory and fibrotic signature in adipose tissue.

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Oral administration of trans10, cis12 conjugated linoleic acid (CLA) provokes an accumulation of macrophages in the adipose tissue (Poirier et la, Diabetes 2006). Here, we used this model to assess the components of this immune response in adipose tissue and to test whether the compound affect gut immunity, permeability and microflora composition. Immune cell abundance and phenotype were assessed by gene expression analysis, immunohistochemistry and flow cytometry in adipose tissue, jejunum and colon of mice receiving daily gavage of CLA for 7 days. Collagen deposition and fibrosis-related genes were assessed in adipose tissue. Microbiota composition was determined by 16S rRNA analysis. Macrophages and to a lesser extent T-lymphocytes accumulated in adipose tissue with CLA treatment. Phenotypic analysis revealed the prevalence of M2 anti-inflammatory macrophages. This was accompanied by marked collagens deposition. Immune cell infiltration and extracellular matrix accumulation were fully reversible after 7 days with no gavage. In contrast to adipose tissue, both jejunum and colon displayed no alteration in the expression of macrophage and T-lymphocyte markers. However, a decreased expression of genes encoding tight junction proteins (claudin and occludin) and a significant switch in microbial community were observed. In conclusion, we show that adipose tissue response to acute oral CLA administration is more adaptive that pathological, as suggested by the reversibility of both CLA-induced cellular and structural alterations. These observations enlighten an unexpected resilience of adipose tissue in response to a nutritional stressor. Part of the effects of CLA could be mediated by CLA-induced increased intestinal permeability and microbiote alteration.

Acknowledgement: GLN and FRM

T2:PO.018

Inflammatory macrophage infiltration in human obese adipose tissue increases tryptophan degradation toward kynurenine pathway

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Introduction: Indoleamine2,3dioxygenase1 (IDO1) catalyzes the degradation of tryptophan to kyn (Kyn) which in turn is metabolized via the kynurenine pathway (KP), to yield bioactive metabolites (collectively, kynurenines (KPm)). Tryptophan catabolism is induced by inflammation, suggesting that it could likewise be triggered in obesity. The aim of our study was to determine whether serum KPm levels and KP enzyme expression in the human adipose tissue are altered in obesity.
Methods: We assessed serum KPm levels in 836 individuals from a prospective cohort of French Europeans, and in 100 morbidly obese women who underwent bariatric surgery. Gene expression of KP enzymes was analyzed in visceral and subcutaneous adipose tissue from obese women, in human primary adipocytes and in monocyte-derived pro-inflammatory M1 and anti-inflammatory M2 macrophages.
Results: Increased levels of Kyn were associated with BMI ($P = 4.7\times10–19$) in the prospective cohort. Moreover, Kyn, kynurenic acid and quinolinic acid levels were positively associated with BMI ($P < 0.05$) in obese women. The gene expression of several KP enzymes (IDO1, KYNU, KMO and CCBL2) was increased in visceral adipose tissue of obese women as compared to lean controls ($P < 0.05$). In vitro stimulation by pro-inflammatory cytokines of primary adipocytes induced the expression of these enzymes in these cells ($P < 0.05$) except KMO that was never expressed in these cells. In addition, IDO1, KYNU, KMO and CCBL2 expressions were higher in M1 than in M2 macrophages ($P < 0.05$).
Conclusion: Obesity is associated with increased serum KPm levels and higher expression of KP enzymes in adipose tissue from obese women that may result from pro-inflammatory macrophages and from adipocytes in response to inflammatory cytokines.

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T2:PO.019

Chronic resistance training decrease inflammation in intra-abdominal adipose tissue of ovariectomized rats

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Introduction: Chronic Inflammation is an obesity hallmark and body mass reduction decreased it. However, ovariectomized (OVX) mice showed visceral adipose tissue (VAT) inflammation and reduced insulin sensitivity even without increased adiposity. So we aimed to test if resistance training (RT) was able to decrease chronic Inflammation in VAT of ovx rats.
Methods: Sprague-Dawley rats were divided into (n=6): sham-sedentary (S-SED), ovariectomized (OVX)-SED, S-resistance trained (RT), OVX-RT, S-acute-RT (A) and OVX-acute RT groups. Surgery was performed at 10 weeks of age. After three weeks, TR groups started a 10-week climbing program in a ladder with progressive overload. S-A and OVX-A performedγ one bout session. Mesenteric AT was used for RNAm analysis
Results: OVX-SED rats had higher body mass than SHAM SED rats and chronic RT partially abrogate it. VAT of OVX-SED rats displayed evidence of immune infiltration and inflammation because had increased expression of macrophage chemoattractants (Osteopontin, Rantes and MCP-1), macrophage infiltration (F4/80 and CD11b), inflammatory cytokines (IL-1β, IL-6 and TNF-α) and Th1 cytokine IFN-γ. M2 macrophage arginase-1 was increased but IL-10 decreased. Acute RT increased all these genes but also increased IL-10 in non-ovx rats and increased only osteopontin, CD11b and IL-1β in ovx rats. Chronic-RT reversed these changes caused by ovarian hormone loss or by the acute-RT in non-ovx animals.
Conclusion: Inflammation in VAT induced by ovarian hormone loss is restored by chronic-RT even reducing body mass only partially. Non regular exercise may also induce immune infiltration and inflammation in non-ovariectomized rats.

T2 – Oxygen tension

T2:PO.020

Chronic adipose tissue hypoxia and dysfunction in subjects with obstructive sleep apnoea

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Background: Many subjects with morbid obesity suffer from obstructive sleep apnoea (OSA). Obesity and OSA are independently associated with increased cardiovascular disease (CVD) risk. Adipose tissue (AT) dysfunction of obesity contributes to CVD risk, yet it is unclear if AT is affected by the reduction in arterial oxygenation in OSA or hypoventilation.
Methods: In 16 obese men with OSA and 15 BMI matched men without OSA (controls), the delivery of oxygen to AT was measured in:- 1) arterial blood by finger pulse oximetry (SaO2) 2) blood in abdominal AT microcirculation by reflectance spectroscopy (SATO2) along with AT blood flow (ATBF) 3) abdominal AT itself with Clarke-type electrode (pATO2). Abdominal AT biopsies were analysed for gene expression.
Results: SaO2 was lower in awake OSA subjects compared to controls (95.3 ± 1.3% (mean±SD) vs 97.5 ± 1.4%, t-test, $p < 0.009$, n=10) yet within the abdominal AT neither SATO2 (62.5 ± 18.9 vs 72.5 ± 7.3%, ns, n=12) nor pATO2 (49.2 ± 7.5 vs 49.4 ± 13.9mmHg, ns, n=8) were significantly different. Interestingly ATBF was higher in OSA subjects (109.6 ± 23.25 vs 78.9 ± 24.9au, $p < 0.005$, n=12). In controls higher ATBF was associated with increased pATO2 (Spearman's $\rho=0.75$, $p = 0.02$, n=9) but not in OSA. Biopsy mRNA expression was significantly higher in OSA for HIF-1alpha (48%, $p = 0.04$), MCP-1 (54%, $p = 0.02$) and TGFbeta (49%, $p = 0.01$).
Conclusions: Respiratory hypoxia reduces mean SaO2 in awake OSA subjects compared to controls but does not further increase AT hypoxia associated with obesity. Changes in gene expression in OSA suggest chronic hypoxic tissue dysfunction, perhaps as a result of intermittent hypoxia. Increased ATBF with OSA may represent an adaptive compensatory mechanism to limit the confounding effect of respiratory hypoxia on AT hypoxia.

Acknowledgement: Funding: Royal Devon and Exeter NHS Foundation Trust and NIHR Exeter Clinical Research Facility

T2 – Ectopic fat

T2:PO.021

Appendicular and central fat storage is negatively related to self-perceived fatigue and muscle performance in obese boys and girls.

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Introduction: Maximal strength is an important factor to perform daily activities, especially in obese persons whose muscles must carry heavier loads, which can induce higher levels of fatigue. Excess weight consists mainly of fat mass but also lean mass which can influence the muscle performance positively in non-weight bearing activities. Studies correlating grip strength with segmental and total body composition (using DXA) in obese children are scarce. This study explores the relation between self-perceived fatigue, body composition and muscle performance in obese adolescents
Methods: 140 girls and 97 boys (15 ± 2 years) were examined for body composition (BC) (DXA), muscle performance (grip strength (GS), fatigue resistance and grip work) and self-perceived fatigue (Multidimensional Fatigue Inventory, MFI-20).
Results: Girls showed no difference in absolute muscle performance compared to boys, but when corrected for lean arm mass girls performed significantly better than boys. No significant difference was found between the sexes for absolute fat mass, but girls showed significantly higher fat percentage and lower lean mass than boys. GS showed good correlations with lean mass (expressed in absolute and relative values) in as well for appendicular segments as for total BC, and a negative correlation was found for fat% in both sexes. Worse self-perceived fatigue was related to higher fat mass and lower lean mass. No relations were found between grip performance and self-perceived fatigue.
Conclusion: Based on our results we conclude that self-perceived fatigue and handgrip performance are significantly related to segmental and total body composition. Further studies are necessary to evaluate whether self-perceived fatigue can be improved by weight loss interventions.

T2:PO.022

Danish childhood obesity chronic care treatment reduces 1h-mrs measured ectopic fat content in liver and muscle

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Introduction: Ectopic fat deposition in non-adipose tissue (including liver and muscle) is an important predictor of cardiovascular disease. Hepatic and muscular steatosis are both common in obese children, which underlines the need for an effective treatment of these conditions, especially in childhood obesity.
Methods: Forty-one overweight children and youths, enrolled in The Children's Obesity Clinic Treatment protocol, Holbćk, Denmark, were assessed by anthropometry, fasting blood samples (glucose, insulin, HbA1c, and lipids), and liver and muscle fat content (MFC) by magnetic resonance spectroscopy, at enrolment and after intervention.
Results: The baseline median body mass index (BMI) standard deviation score (SDS) was 2.80 (range: 1.49–3.85) with a median age of 14 years (10–20). During 12 months of intervention, the 41 children and youths (22 girls) decreased their BMI SDS by 0.22 (95% CI: [0.08; 0.43], p = 0.002) accompanied by reductions in liver and muscle fat percentages of 1.0% (95% CI: [0.1; 3.5], p = 0.02) and 2.3% (95% CI: [0.4; 3.9], p = 0.02), respectively. The prevalence of hepatic steatosis decreased from 29% to 22% and the prevalence of muscular steatosis decreased from 76% to 46%. Linear regression showed that changes in liver fat associated with changes in HbA1c (p = 0.04), changes in MFC (p = 0.04), and baseline levels of liver fat (p < 0.0001), while changes in MFC associated with baseline levels of MFC (p < 0.0001) and changes in visceral adipose tissue volume (p = 0.04), independent of age, sex, duration of treatment, baseline degree of obesity and pubertal developmental stage.
Conclusion: Reductions in magnetic resonance spectroscopy measured liver and muscle fat are possible in childhood obesity treatment and suggest a decrease in cardiovascular disease risk.

T2:PO.023

Heart fat infiltration in subjects with and without coronary artery disease

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Background and Aims: Fat may accumulate around the heart in epicardial adipose tissue or inside the heart as lipid droplets (LD). The aims were to compare the myocardial steatosis between subjects with and without coronary artery disease (CAD), and to identify in which cells LD are contained.
Methods and Results: We studied male subjects undergoing cardiac surgery either for coronary bypass grafting (CAD, n= 23) or for valve replacement (non-CAD, n=18). Body mass index, waist circumference, glucose, insulin, HOMA index, leptin, adiponectin and Hs-CRP were evaluated. Biopsies were collected from right atrial myocardium during appendix incannulation. Immunohistochemistry for perilipin (PLIN) 1 and 2 was used to characterize LD and their localization respectively in adipocytes or myocardial cells. Both PLIN1 and PLIN2 resulted to be significantly higher in subjects with CAD than in those without (respectively: 0.35 ± 0.04 OD vs 0.28 ± 0.05 OD; p < 0.004; 0.27 ± 0.05 OD vs 0.22 ± 0.05 OD; p < 0.004). PLIN 1 was significantly associated with leptin and Hs-CRP and negatively with adiponectin, whilst PLIN 2 with BMI, waist circumference, leptin and negatively with adiponectin. After taking into account absence/presence of hypertension and CAD/nonCAD, adiponectin was inversely associated with PLIN 1 (R2 0.523), while both waist circumference and adiponectin were positively associated with PLIN 2 (R2 0.399).
Conclusion: Myocardial steatosis is significantly greater in subjects with CAD than in those without, depending on both metabolically active adipocytes interspersed among cardiomyocytes, and higher fat deposition inside cardiomyocytes; serum adiponectin and waist are independent predictors of myocardial steatosis

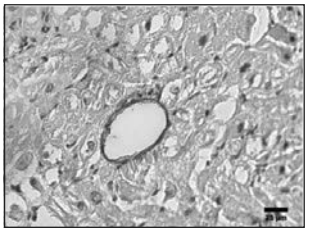

Fig. 1. Representative images of immunohistochemical staining showing the expression of PLIN1 in the atrium of patients without coronary artery disease (NON CAD)(200x magnification. Scale bar = 25μm).

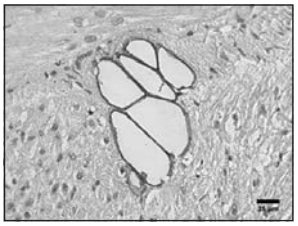

Fig. 2. Representative images of immunohistochemical staining showing the greater expression of PLIN1 and a greater number of adipocytes between cardiomyocytes in the atrium of patients with coronary artery disease patients (CAD) (200x magnification. Scale bar = 25μm).

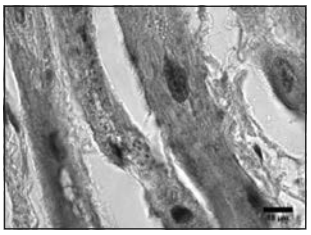

Fig. 3. Representative images of immunohistochemical staining showing the expression of PLIN2 in the atrium of patients without coronary artery disease (NON CAD) (400x magnification. Scale bar = 10μm).

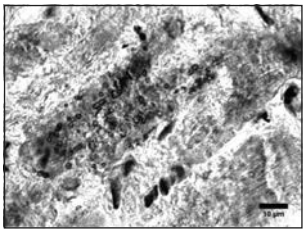

Fig. 4. Representative images of immunohistochemical staining showing the expression of PLIN2 in the atrium of patients with coronary artery disease (CAD) (400x magnification. Scale bar = 10μm).

T2 – Lipotoxicity

T2:PO.024

Sex-dependent differences in rat hepatic mitochondrial biogenesis and fat metabolism in response to rosiglitazone treatment

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Introduction: High caloric intake is linked to hepatic steatosis in which mitochondrial dysfunction seems to play a key role, impairing fat homeostasis. Rosiglitazone (Rsg), a PPARγ agonist that ameliorates insulin sensitivity and mitochondrial function, may play a role in mitochondrial biogenesis, a process that includes both proliferation and differentiation. The aim of this study was to define sex-related differences in mitochondrial biogenesis and fat homeostasis in response to Rsg treatment.
Methods: Eight-week-old male and female Wistar rats were fed a high-fat diet (HFD, 23% fat) for 16 weeks. Half of the animals were supplemented with Rsg (100mg/kg) during the last two weeks of HFD feeding. Markers of mitochondrial biogenesis and fat metabolism were analysed.
Results: Rsg treatment induced an increase in PGC1α expression leading to an increase in mitochondrial proliferation (mtDNA) in both sexes. Male rats maintained mitochondrial differentiation (COX IV, TFAM, UCP2) while females decreased it. In parallel, hepatic triglycerides diminished more strongly in males, in accordance with the stimulation of fatty acid oxidation (PPARα) and inhibition of de novo lipogenesis (SREBP-1c) in this sex.
Conclusions: In a fatty liver context, Rsg treatment improves mitochondrial function through an increase in mitochondrial proliferation and maintenance of mitochondrial differentiation in male rats leading to an improvement of hepatic fat homeostasis. The lower degree of steatosis reached by HFD females may explain the minor hepatic changes observed in response to Rsg treatment in both mitochondrial differentiation and fat metabolism.

T2:PO.025

Sexual dimorphism in cardiac adiponectin signalling in rats on high fat diet induced obesity: Role of sex hormones

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Introduction: Adiponectin is an adipokine that increases cardiac insulin sensitivity thus exerting an important effect on myocardial function which is lost during the development of diabetic cardiomyopathy. Rosiglitazone (Rsg) is an antidiabetic drug that increases systemic insulin sensitivity through the enhancement of adiponectin synthesis. Previous results from our research group show that 17beta-estradiol (E2) activates adiponectin signalling in both skeletal muscle and L6 myotubes. The aim of this work was to study the role of sex hormones on adiponectin and insulin cardiac signalling pathways, as well as the effect of Rsg, in a lipotoxic environment.
Methods: Male and female rats were fed a control or high fat diet (HFD) for 16 weeks. Half of the HFD rats were treated with Rsg during the last 2 weeks. Animals were sacrificed and cardiac muscles were harvested. Concurrently, H9c2 cardiomyotubes were treated with palmitate (PA), E2, testosterone (T), and adiponectin. Key proteins of adiponectin and insulin signalling pathways were determined by Western blot.
Results: HFD male rats had a lower p-AMPK to t-AMPK ratio value than females. Rsg induced an increase of both p-AMPK to t-AMPK and Akt to t-Akt ratios that were more pronounced in females. Moreover, T reduced the p-AMPK to t-AMPK ratio in adiponectin treated H9c2 cells.
Conclusion: In male rats, HFD had a higher deleterious effect on cardiac adiponectin pathway activation, the response of which to Rsg was lower compared to that of females. Consequently, insulin sensitivity was improved in response to Rsg only in female rats. Our in vitro results suggest that T could be involved in the sex dimorphism observed in vivo with Rsg treatment.

T2:PO.026

Effect of the Exposition of Persistent Organic Pollutants on in vitro model of adipocytes in relation to a higher risk of diabetes mellitus type II

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Introduction: In humans, organochlorine persistent organic pollutants (POPs) are associated in epidemiological studies with a higher risk of diabetes mellitus type II. However, the specific mechanism of POPs action is not yet known. These lipophilic pollutants are stored primarily in adipose tissue. To examine the effect of POPs on adipocyte metabolism, we prepared an in vitro model of adipocytes from human mesenchymal stem cells derived from adipose tissue (hMSC). To study the effect of POPs, it was necessary to characterize the process of differentiation of adipocytes at first. The ongoing process of differentiation was described by quantitative assessment of the expression of selected genes using RT real-time PCR with LNA probes. These genes are involved in the processes of implementing the undifferentiated phenotype of adipocytes - OCT4, NANOG and SOX2, or direction of differentiation in adipocytes - PPARγ, PPARGC1B and PLIN2.
Methods: We prepared a model of adipocytes from human mesenchymal stem cells derived from adipose tissue (hMSC). The differentiation of adipocytes was performed in the presence and without of dichlorodiphenyldichloroethylene (DDE). During 28 days from the point when differentiation was initiated, the samples were taken every 3 days. The pattern of expression will be presented. Process of differentiation was analysed by quantitative assessment of expression of the following genes: OCT4, NANOG, SOX2, PPARγ, PPARGC1B and PLIN2. We also analyzed a panel of control genes (GAPDH, beta-actin, GUSB, HPRT, TBP, YWHAZ) and found GUSB, HPRT and YWHAZ to be most relevant.
Results: During differentiation of adipocytes in the presence of DDE, we observed silencing of the expression of markers of differentiation (PLIN2, PPARγ and PPARGC1B).
Conclusion:
Results: of the assessment of expression of selected genes indicate that DDE could inhibit adipocyte differentiation. Impact on metabolic pathways is now being investigated.

Acknowledgement: This work was supported by grant of the Ministry of Health of the Czech republic, IGA MZ NT 14330-3/2013.

T2 – Lipid Metabolism

T2:PO.027

Characterization of hypodermic adipose tissue in obese mice

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Introduction: In obesity, hypodermic adipose tissue grows at the expense of surrounding tissues. The aim of the present study was to characterize the hypodermic adipose cells compared to other adipose tissues in a mouse diet-induced obesity model.
Methods: C57Bl6 male mice were randomly assigned to a control or a high-calorie diet for 4 or 12 weeks (HCD4 or HCD12). We studied the changes in mice adipose tissue weights and in adipose cell size distribution in hypodermic (hWAT), subcutaneous (scWAT), retroperitoneal (rWAT), and epididymal (eWAT) using multisizer IV (Beckman Coulter). The lipolytic response was investigated measuring the glycerol produced. We also examined in vitro insulin sensitivity of hWAT compared to the other adipose tissues.
Results: In HCD4 and HCD12, the body weight of obese mice was increased compared to non-obese ($p < 0.001$). hWAT lipolytic response was lower than the other tissues responses in HCD4 mice, but was higher than eWAT and scWAT responses in HCD12 mice. The bimodal distribution of adipose cell sizes of hWAT was not observed in HCD4 mice compared to the other tissues whereas it was observed in HCD12 mice. In HCD4 mice, adipocyte cell size rose only in eWAT and rWAT while in HCD12 mice, adipocyte cell size increased in all adipose tissues.
Conclusion: This study suggests that adipose tissue from hypodermis layer behaves the same than other tissues in HCD12 mice but not in HCD4 mice.

T2:PO.028

Saturated fatty acids in human visceral adipose tissue are associated with increased 11- β-hydroxysteroid-dehydrogenase type 1 expression

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Background: Visceral fat accumulation is associated with metabolic disease. It is therefore relevant to study factors that regulate adipose tissue distribution. Recently overeating saturated fatty acids promoted greater visceral fat storage than unsaturated fatty acids (Rosqvist et al. Diabetes 2014;63:2356–2368). Visceral adiposity is observed in states of hypercortisolism, and the enzyme 11-β-hydroxysteroid-dehydrogenase type 1 (11β-hsd1) is a major regulator of cortisol activity by converting inactive cortisone to cortisol in adipose tissue. We hypothesized that tissue fatty acid composition regulates body fat distribution through local effects on the expression of 11β-hsd1 and its corresponding gene (HSD11B1) resulting in altered cortisol activity.
Findings: Visceral- and subcutaneous adipose tissue biopsies were collected during Roux-en-Y gastric bypass surgery from 50 obese patients (45 women, BMI; 40 ± 4 kg/m^2). The fatty acid composition of each biopsy was measured and correlated to the mRNA levels of HSD11B1. 11β-hsd1 protein levels were determined in a subgroup (n=12) by western blot analysis. Our main finding was that tissue saturated fatty acids were associated with increased 11β-hsd1 gene- and protein-expression in visceral but not subcutaneous adipose tissue.
Conclusions: The present study proposes a link between HSD11B1 and saturated fatty acids in visceral, but not subcutaneous adipose tissue. Nutritional regulation of visceral fat mass through HSD11B1 is of interest for the modulation of metabolic risk and warrants further investigation.

Acknowledgement: We would like to thank Siv Tengblad for analysing fatty acids at the laboratory at Uppsala University, and Elisabeth Dungner and co-workers at the Lipid laboratory at Karolinska University Hospital for excellent technical support. We would also like to thank Jakob Hedberg and Eduardo Sima and the surgical team at Uppsala university hospital for assistance with biopsy collection.

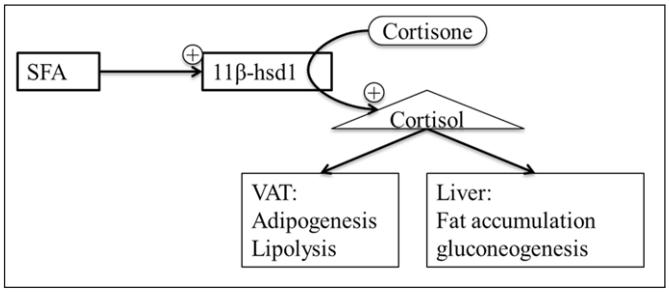

Fig. 1. This schematic picture presents a hypothetical link between SFAs and disease-risk-phenotypes through HSD11B1 expression.

T2:PO.029

Acetylation of malate dehydrogenase 1 promotes adipogenic differentiation via activating its enzymatic activity

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Acetylation is one of the most crucial posttranslational modifi cations that affect protein function. Protein lysine acetylation is catalyzed by acetyltransferases, and acetyl-CoA functions as the source of the acetyl group. Additionally, acetyl-CoA plays critical roles in maintaining the balance between carbohydrate metabolism and fatty acid synthesis. Here, we sought to determine whether lysine acetylation is an important process for adipocyte differentiation. Based on an analysis of the acetylome during adipogenesis, various proteins displaying signifi cant quantitative changes were identifi ed by LC-MS/MS. Of these identified proteins, we focused on malate dehydrogenase 1 (MDH1). The acetylation level of MDH1 was increased up to 6-fold at the late stage of adipogenesis. Moreover, overexpression of MDH1 in 3T3-L1 preadipocytes induced a signifi cant increase in the number of cells undergoing adipogenesis. The introduction of mutations to putative lysine acetylation sites showed a signifi cant loss of the ability of cells to undergo adipogenic differentiation. Furthermore, the acetylation of MDH1 dramatically enhanced its enzymatic activity and subsequently increased the intracellular levels of NADPH. These results clearly suggest that adipogenic differentiation may be regulated by the acetylation of MDH1 and that the acetylation of MDH1 is one of the cross-talk mechanisms between adipogenesis and the intracellular energy level.

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T2:PO.030

Deuterium labeling and 2H-NMR technique to assess triglyceride re-esterification rate in epididymal white adipose tissue of mice

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Introduction: Futile cycling of triglycerides (TG) and non-esterified fatty acids in white adipose tissue (WAT) may represent an important energy-consuming process and could contribute to metabolic flexibility and lipid homeostasis. In current experiment, we tested if different re-esterification rate in WAT may reflect different propensity to obesity between obesity-resistant A/J and obesity-prone C57BL/6J (B6) mice.
Methods: A/J and B6 male mice were held and dissected at thermoneutral temperature (control animals), or exposed to cold for 2 or 7 days. 2 or 4 days prior to dissection, all mice were injected with a bolus of 2H2O; also 5% of their drinking water was replaced by 2H2O for the rest of the experiment in order to obtain stable 5% 2H2O concentration in body water. Glycerol of TG produced after 2H2O injection was enriched by 2H. Therefore, 2H content in TG isolated from epididymal WAT, measured by 2H-NMR, reflected rate of fatty acid re-esterification.
Results: 2H-enrichment of glycerol moiety of TG was slightly increased after first 2 days in cold. However, only prolonged cold exposure resulted in a strong (up to 4-fold) rise in TG production, while re-esterification rate was significantly higher in A/J mice. However this inter-strain difference became apparent only in the mice injected with 2H2O 2 days but not 4 days before the dissection.
Conclusion: Here we present a newly established technique for assessment of the re-esterification rate in WAT in vivo. This rate can be increased several-fold in response to prolonged cold exposure. In comparison to B6 animals, futile cycling in A/J mice is more flexible, which could be possibly linked to the lean phenotype of these mice (see Flachs et al at this meeting).

T2:PO.031

Lipidomic and proteomic profiling reveals possible biomarkers of brown adipose tissue aging

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Background: Ageing is a risk factor for the development of metabolic diseases such as insulin resistance and obesity. Recent studies suggest that these pathologies could be exacerbated by an age-related decline of brown fat mass and activity. Until now, little is known about the molecular regulation of brown adipocyte formation and metabolism during ageing. It has been proposed that age-related changes in circulating and locally produced endocrine signals could negatively affect regeneration and function of brown adipose tissue thus leading to impaired metabolic health.
Methods: A correlative mass spectrometric approach was chosen to analyze age-related lipidomic and proteomic changes in murine interscapular brown adipose tissue to identify potential biomarkers of reduced brown adipocyte function. The effects of candidate biomarkers on brown adipocytes were subsequently characterized on the molecular level.
Results: Lipids were classified into different lipid sub-classes. The amounts of prenols and sphingoid base lipids were significantly enhanced with age and individual metabolites, such shingosine-1-phospate and ceramides, displayed distinct regulatory effects on brown adipogenesis. The proteomic study in turn revealed age-related changes of lipid metabolism, specifically PPAR-signaling and fatty acid metabolism, as among the most significantly affected pathways in aged brown adipose tissue.
Conclusions: These findings taken together suggest that the decline of brown adipose tissue mass and function could at least in part be due to changes of lipid composition and metabolism during ageing.

T2:PO.032

Doses of quercetin in the range of serum concentrations exert depilidating effects in 3t3-l1 pre-adipocytes

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Introduction: Quercetin (Q) intake in the diet is higher than that of other polyphenols and a wide range of biological effects, such as prevention of oxidation, inflammation and cancer, have been attributed to this molecule. Nevertheless, data concerning its delipidating effect, are scarce. The purpose of the present study was to determine whether doses of Q in the range of serum concentrations (around 2 μM) exert any effect on triacylglycerol (TG) accumulation in maturing pre-adipocytes and mature adipocytes. The influence on the expression of adipogenic markers and on the activity of enzyme involved in TG metabolism were assessed.
Methods: 3T3-L1 pre-adipocytes were treated with low doses (0.1–10 μM) of Q at different phases (early and late stages of adipogenesis and the whole adipogenic process). TG content was measured by spectrophotometry. Peroxisome proliferator-activated receptor γ2 (PPARγ2) and sterol regulatory element-binding factor 1 (SREBP1) protein expression were assessed by Western-Blot at whole adipogenenic process for 1 and 10 μM doses.
Results: During whole adipogenesis, Q reduced TG content at all tested doses. At the early state of adipogenesis, doses of 1, 2 and 5 μM reduced TG content, but during the late state only doses of 5 and 10 μM were effective in decreasing TG content. 1 μM of Q reduced SREBP1c mature protein levels. 10 μM of Q reduced PPARγ2 and SREBP1c expression.
Conclusion: Quercetin, in the range of serum concentrations, is able to inhibit adipogenesis, but depending on the dose the mechanisms of action seems to be different.

T2:PO.033

Obesity correlates to an increased transforming growth factor β (TGF-β) signaling in human visceral and subcutaneous adipose tissue

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Introduction: TGF-β is a pleiotropic cytokine with major roles in adipose tissue regulating adipogenesis and inflammation. It signals through phosphorylation of receptor-activated Smads, but also crosstalk with many others signaling pathways, including ERK1/2 and AKT. Increased plasma levels of TGF-β associates to human adiposity but data regarding TGF-β signaling in human adipose tissue is lacking. In this context, we aim to characterize the TGF-β expression and signaling in adipose tissue from normoponderal and overweight/obese patients.
Methods: Adipose tissue samples from subcutaneous and visceral depots were collected from subjects with BMI ranging from 20 to 50 kg/m^2 un-

dergoing gastric bypass surgery or laparoscopic cholecystectomy, aging from 18 to 80 years-old. TGF-β mRNA expression was analyzed by real-time PCR and activation of Smads, AKT and ERK1/2 was evaluated by Western blotting.

Results: In normoponderal and overweigh individuals, lower levels of TGF-β mRNA were found in subcutaneous adipose tissue when compared to visceral pads, a feature that is blunted in the obese state. Nevertheless, in both subcutaneous and visceral adipose tissue, TGF-β mRNA levels were positively correlated with body mass index (BMI). Concordantly, activation of Smad2, Smad3 and Akt was also associated to an increased fat mass. In addition, an increased in ERK1/2 phosphorylation was observed in overweight but not in obese patients.

Conclusion: In human adipose tissue, TGF-β signaling increases with adiposity, most probably through phosphorylation of Smad2, Smad3 and also AKT pathway. ERK1/2 signaling should be important during weight gain, but in obesity, ERK1/2 activation decreases to basal levels suggesting signaling desensitization, a common feature among resistant phenotypes.

T2:PO.034

Expression of Free Fatty Acid Receptors (FFAR) in subcutaneous and abdominal adipocytes in an obesity rat model with hypercaloric diet

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Introduction: Free fatty acids receptors (FFAR), whose function in the cell surface plays a significant role in the regulation of cell function, are involved in many physiopathological processes, such as metabolic disorders like obesity1,2. The aim of this protocol was to analyze the expression of FFARs (41, 43 and GPR120) in abdominal and subcutaneous dysfunctional adipose tissues.

Methods: Obesity was induced in male Wistar rats, with hypercaloric diet (30% sucrose in drinking water) and standard chow ad libitum during 20 weeks. Dissection of visceral fat (abdominal and subcutaneous) was performed for analyze the relative expression by RT-PCR.

Results: The expression of FFAR 43 and 41 was lower in fat tissues in obese rats, in contrast to normocaloric diet group. The expression of GPR120 in the high sucrose diet, shown no statistical difference versus the control group.

Conclusion: The current expression of FFAR 43 and 41 yields significative statistical difference among the groups, showing a reduction in the total presence of RNAm in abdominal and subcutaneous in dysfunctional adipose tissues. The GPR120 did not show diferences in the relative expression when the obesity is present. Further comparative methods are in process to clarify if the obesity changes the functional receptors in these two tissues for new pharmacological approaches.

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T2:PO.035

Garcinia mangostana extract attenuates the mebabolic disorders of high-fat-fed mice through activation of ampk pathway

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Obesity is associated with increasing risks of life-threatening pathologies such as diabetes, hypertension, and heart disease, while weight loss has been reported to ameliorate these associated conditions. Due to the previous reports regarding anti-adipogenic activity of mangosteen extracts in in vitro experiments, we investigated the effects of long-term supplementation with mangosteen extract (50 and 200 mg/kg/day p.o. for 80 days) in mice with established obesity (3-month high-fat diet). Untreated obese mice showed a weight gain of 30.1% compared with mice fed a normal diet. Therefore, the objective of this study was to investigate the effects of mangosteen extract on the metabolic disorder states in high-fat-diet (HF)-fed mice and the underlying mechanisms related to adipogenesis. Mangosteen extract supplementation produced a marked and sustained decrease in body weight compared to the HF group. The levels of serum GOT, GPT, glucose, triglyceride, total cholesterol, low-density lipoprotein cholesterol, and free fatty acid were markedly elevated in HF mice, whereas in the 200 mg/kg of mangosteen extract-treated group, these levels were significantly reduced (GOT –28.2%, GPT –21.2% , glucose –25.7%, total cholesterol –24.8%, free fatty acid –23.0% vs. HF group). Although mangosteen extract did not modify high-density lipoprotein cholesterol, it significantly reduced low-density lipoprotein cholesterol (LDL, –63.8%) and, notably, increased the HDL/LDL ratio (9.4 vs. 3.7 in HF group). Also 200 mg/kg of mangosteen extract treatment activated the hepatic AMP-activated protein kinase (AMPK) and Sirtuin 1 and supressed PPARγ expression in in vivo system. Thus, our results suggest that mangosteen extract exerts anti-obesity effects by regulating energy metabolism and hepatic lipid homeostasis in HF-induced obese mice.

Acknowledgement: This study was supported by a grant from the GRRC program of Gyeonggi province [GRRC DONGGUK2014–B03, Development of functional food to alleviating metabolic syndromes and circulatory disorders]

T2:PO.036

Association of plasma lipids fatty acid composition with metabolic profile of czech adolescents

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Background: Obesity in childhood increases the risk of obesity in adulthood, and is predictive for the development of metabolic disorders. The fatty acid composition is associated with obesity and obesity-associated disorders. We investigated relationship between serum fatty acids composition, adiposity, lipids profile, parameters of glucose metabolism and leptin. Design: The study subjects were 380 adolescents aged 15.0 – 17.9 years. The study's variables included anthropometric measurements, serum lipids and hormonal parameters. Individual FA were determined in plasma by gas-liquid chromatography and desaturase activities were estimated from product/precursor ratios.

Results: Percentage of body fat was significantly positively correlated with palmitoleic acid (16:1n-7, PA) content, SCD activity and omega-3 fatty acids content. PA content positively correlated with serum total, HDL and LDL cholesterol and triglycerides levels, C peptide and HOMA-R. SCD activity and PA level had a positive significant correlation with leptin.

Conclusion: Plasma PA content has a significant positive relation with adiposity in obese adolescents. Higher levels of PA may be due activation of SCD. PA content and SCD activity are associated with insulin resistance and dyslipidemia.

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T2 – Adipokines

T2:PO.037

Monocyte chemotactic protein-1 is associated with intermuscular adipose tissue area independently of the visceral fat area

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Introduction: Ectopic fat is lipid accumulated in tissues that typically do not store large amount of fat, such as liver, vessel and skeletal muscle and is a major risk factor for metabolic disorders. Adipokines such as leptin and monocyte chemotactic protein 1 (MCP-1) are secreted from adipose tissue and have roles in lipid and glucose metabolism. It has been shown that visceral fat significantly contributes to the development of cardiovascular diseases and insulin resistance. Emerging evidence suggests that intermuscular fat is also a risk factor for insulin resistance, but the underlying mechanism still remains unclear. In this study, we investigated whether the levels of leptin, adponectin and MCP-1 are related to intermuscular fat area in obese Korean women.
Methods: A cross-sectional study was performed on 77 obese subjects. Visceral fat area and intermuscular fat area were measured by multi-slice computed tomography scan. Correlation between the levels of adipokines and the fat areas was assessed using Pearson correlation and covariate-adjusted multivariable regression.
Results: Leptin levels were positively correlated with the body fat percentage ($r = 0.480$, $P < 0.001$) and abdominal subcutaneous fat area ($r = 0.452$, $P < 0.001$). MCP-1 levels were positively correlated with the intermuscular fat area ($r = 0.483$, $P < 0.01$). After adjustment for age, height, and other body composition metrics, serum levels of leptin were still related to subcutaneous fat area ($\beta = 0.376$, $P = 0.001$). The serum levels of MCP-1 were associated with intermuscular fat area ($\beta = 0.447$, $P = 0.001$) after adjustment for visceral fat area.
Conclusion: Intermuscular adipose tissue area was associated with the levels of MCP-1, suggesting its role in the development of insulin resistance.

Acknowledgement: We are grateful to the participants in this study.

T2:PO.038

Adipokines and the risk of metabolic disorders at the different types of obesity in women

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Introduction: The purpose of this study was to research the adiponectin and leptin contribution to the development of metabolic disorders in women with android and gynoid types of fat distribution.
Methods: The study included 101 women aged 40 to 65 years. The anthropometric examination was conducted, value of the waist-to-hip circumference ratio (WHR) less than 0.85 in women with pre-obese and obese referred to the group with gynoid type of fat distribution (GTFD), while values of WHR 0.85 and above - to the group with android type (ATFD). Serum concentrations of triglycerides, HDL cholesterol, glucose, insulin, leptin and adiponectin were determined. Insulin resistance HOMA-IR and visceral obesity VAI indexes were calculated.
Results: At the similar degree of accumulation of excess adipose tissue in women with GTFD severity of hormonal-metabolic disorders was lower than that in women with ATFD whose index of HOMA-IR also indicated the presence of insulin resistance. VAI index value was not significantly higher in women with GTFD compared to normal body weight (NBW) women, but it was 2.4 times higher in women with ATFD. The concentration of leptin was higher in women with GTFD and ATFD compared with women with NBW, which is characterized for obesity, but the concentration of adiponectin was significantly lower in ATFD and has not differed at GTFD compared with women with NBW.
Conclusion: For women with ATFD characterized by high VAI, hypoadiponectinaemia, insulin resistance and metabolic disorders, defining high risk of cardiovascular diseases and type 2 diabetes. In women with GTFD obesity is associated with normal adiponectin levels and low VAI, and its hormonal and metabolic features can be characterized as «metabolic healthy» obesity.

T2:PO.039

General and central obesity measurement associations with markers of chronic low-grade inflammation and type 2 diabetes

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Introduction: Inflammation has been suggested a possible mechanism linking adiposity with type 2 diabetes. Central obesity indicated by waist circumference (WC) measurement is thought to be a greater risk factor for chronic low-grade inflammation compared to general obesity characterised by body mass index (BMI). However, evidence for this association is still equivocal. In this study we compare biomarker relationships with BMI and WC measures and type 2 diabetes. We examine a range of pro-inflammatory cytokines, acute-phase response proteins, coagulation factors, white blood cell counts and a combination of these markers to determine which measurement is more strongly associated with diabetes-related inflammation.
Methods: This was a cross-sectional study involving a random sample of 2,002 men and women aged 50–69 years. Correlation and logistic regression analyses were used to explore general and central obesity measurement relationships with non-optimal biomarker levels, biomarker combinations and type 2 diabetes.
Results: When compared with BMI, WC was more strongly related to a majority of inflammatory markers, adverse biomarker clustering and type 2 diabetes. In multivariable analysis, only WC remained significantly associated with type 2 diabetes (OR: 2.96, 95% CI: 1.93–4.55) after adjusting for BMI (OR: 0.73, 95% CI: 0.49–1.10) four or more markers (OR: 4.67, 95% CI: 2.64–8.27) and other potential confounders.
Conclusion: These data suggest that central obesity is a greater risk factor for type 2 diabetes and associated chronic inflammation than BMI. However, our results also demonstrate that the relationship between obesity and diabetes-related inflammation cannot be completely accounted for by surrogate adiposity measures.

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T2:PO.040

Autocrine effects of transgenic resistin reduce palmitate and glucose oxidation in brown adipose tissue

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Introduction: Resistin has been identified as an adipokine that links obesity to insulin resistance in mice. In our previous studies in spontaneously

hypertensive rats (SHR) expressing a nonsecreted form of mouse resistin (Retn) transgene specifically in adipose tissue (SHR-Retn), we observed an increased lipolysis and serum free fatty acids, ectopic fat accumulation in muscles and insulin resistance. Recently, brown adipose tissue (BAT) has been suggested to play an important role in the pathogenesis of metabolic disturbances by its ability to dissipate energy excess.
Methods: In the current study, we analyzed autocrine effects of transgenic resistin on BAT glucose and lipid metabolism and mitochondrial function in the SHR-Retn versus SHR controls.
Results: We observed that BAT isolated from SHR-Retn transgenic rats when compared to SHR controls showed a lower relative weight (0.71 ± 0.05 vs. 0.91 ± 0.08 g/100 g body weight, $P < 0.05$), significantly reduced both basal and insulin stimulated incorporation of palmitate into BAT lipids (658 ± 50 vs. 856 ± 45 and 864 ± 47 vs. 1086 ± 35 nmol/g/2h, PL0.01, respectively), and decreased palmitate oxidation (37.6 ± 4.5 vs. 57 ± 4.1 nmol/g/2h, $P = 0.007$) and glucose oxidation (277 ± 34 vs. 458 ± 38 nmol/g/2h, $P = 0.001$). In addition, in vivo microPET imaging revealed reduced 18F-FDG uptake in BAT induced by exposure to cold in SHR-Retn transgenic versus control SHR controls (232 ± 19 vs. 334 ± 22 kBq/cc*ccm, $P < 0.05$). In addition, we observed reduced expression of Ucp1 and Cidea genes in SHR-Retn versus SHR rats which suggests lower differentiation status of BAT in transgenic rats.
Conclusion: These results provide compelling evidence that autocrine effects of resisitin in BAT might play an important role in the pathogenesis of insulin resistance in the rat.

T2:PO.041

Comparing effects of exercise- and diet-induced weight loss on chemerin, adiponectin, insulin resistance and inflammation in obese men

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Background: The adipokines chemerin and adiponectin are reciprocally related in the pathogenesis of insulin resistance and inflammation in obesity. Weight loss increases adiponectin and reduces chemerin, but effects of caloric restriction and physical activity are difficult to separate in combined lifestyle modification. We compared effects of diet- or exercise-induced weight loss on chemerin, adiponectin, insulin resistance and inflammation in obese men.
Methods: Eighty abdominally obese Asian men (BMI ≥ 30 kg/m^2, waist circumference WC ≥ 90 cm, mean age 42.6 years) were randomized to reduce daily intake by ~500 kilocalories (n = 40), or perform moderate-intensity aerobic and resistance exercise (200–300 minutes/week) (n = 40) to increase energy expenditure by a similar amount for 24 weeks.
Results: The diet and exercise groups had similar decreases in energy deficit (-456 ± 338 vs. –455 ± 315 kilocalories/day), weight (-3.6 ± 3.4 vs. –3.3 ± 4.6 kg) and WC (-3.4 ± 4.4 vs. –3.6 ± 3.2 cm). The exercise group demonstrated significantly greater reductions in fat mass (-3.9 ± 3.5 vs. –2.7 ± 5.3 kg), serum chemerin (-9.7 ± 11.1 vs. –4.3 ± 12.4 ng/ml) and high-sensitivity C-reactive protein (-2.11 ± 3.13 vs. –1.49 ± 3.08 mg/L), and insulin resistance as measured by homeostasis model assessment (-2.45 ± 1.88 vs. –1.38 ± 3.77). Adiponectin increased only in the exercise group.
Conclusions: Exercise-induced weight loss was more effective in reducing serum chemerin, insulin resistance and systemic inflammation, whereas increased adiponectin concentration could be related to exercise itself or greater fat loss.

Acknowledgement: We thank all the men who participated in the study.

T2:PO.042

Spirulina maxima reduces blood pressure, oxidative stress and improves parameters associated with insulin resistance in obese hypertensive patients.

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Spirulina maxima (SM) consumption is known to be associated with enhanced cardiovascular and metabolic health. The purpose of this study is to examine the hypothesis that supplementation with SM alters insulin resistance and associated cardiovascular risk factors in obese, hypertensive patients. In a double-blind, placebo-controlled trial, 50 obese, hypertensive subjects were randomized to receive a daily supplement of 4 capsules that contained each either 0.5 g of SM extract or a matching placebo, for 3 months. At baseline and after 3 month of treatment, the anthropometric parameters, blood pressure, plasma lipid levels, glucose levels, total antioxidant status (TAS) levels, interleukin 6 (Il 6) levels, and insulin levels are assessed. Insulin sensitivity was evaluated by the euglycemic hyperinsulinemic clamp technique. After 3 months of supplementation, both systolic and diastolic blood pressure had significantly decreased in the SM group as compared with the placebo group ($p < 0.044$). Considerable ($p < 0.002$) reduction in low-density lipoprotein cholesterol level was observed in the SM group when compared with the placebo group. Supplementation also contributed to significant ($p < 0.031$) increases in the TAS level and ($p < 0.043$) insulin sensitivity ratio. In conclusion, daily supplementation with 2 g of SM favorably influences blood pressure, insulin sensitivity, oxidative stress, and lipid level in patients with obesity-related hypertension.

T2:PO.043

Sleep duration affects theserum adiponectin level of obese women undergoing weight loss intervention

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Background: Adiponectin, secreted from adipose tissue, is an adipokine that is involved in various cellular processes such as energy metabolism and inflammation. Although the serum adiponectin level is inversely correlated to BMI and closely associated with obesity and related diseases, neither the impact of weight loss on the adiponectin level nor the factors that influence the levels of adiponectin during weight loss intervention are known.
Objective: We assessed the changes in the serum adiponectin level of obese women during seven months of weight loss intervention. In addition, in order to determine factors that affect the serum adiponectin level, various clinical variables were evaluated, including objective sleep parameters.
Methods: Ninety overweight and obese women aged 25 to 65 years completed a seven-month weight loss intervention. Serum levels of adiponectin, body fat rate, depression, anxiety, and objective sleep parameters assessed by actigraphy were measured at baseline and at the end of the intervention.
Results: The mean values of weight loss and reduction of body fat rate were 10.3 ± 4.8 kg and 4.8 ± 3.2%, respectively. The serum adiponectin level was significantly increased after weight loss intervention ($P < 0.001$). In a multiple regression analysis, the change of the adiponectin level was

positively associated with the magnitude of body fat loss (β = -0.306, P = 0.0015) and increase of sleep minutes (β = 0.205, P = 0.0319).
Conclusion: An increase in objective sleep duration was related to a significantly increased serum adiponectin level, independent of the change of body fat rate during the weight loss intervention. Improvement of sleep duration may be important as a component of weight loss interventions for obese people.

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T2:PO.044

Relationship between serum osteoprotegrin concentration (sopg) and inflammatory process in group of patients with metabolic syndrome (ms).

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MS increase risk of atherosclerosis (A)and frequency of cardiovascular diseases. Taking into account the fact that, underlying cause of a A is an inflammatory process, the correlation between high sensitivity CRP and serum osteoprotegrin (sOPG) concentration seems to be very interesting. Aim of the study was to evaluate sOPG concentration. The relationship between sOPG, anthropometric parameters, insulin resistance and chronic inflammatory process were analyzed.
Material: 70 patients with MS vs control group – 20 healthy volunteers.
Methods: Anthropometric parameters such as BMI, WHR were determined. At the same time the percentage of body fat (% FAT)was assessed using electrical bioimpedancy method. Insulin resistance was estimated applying HOMA index. Serum insulin concentration was determined by ELISA method.
Results: Patients with MS were characterized by high values of anthropometric parameters (BMI, WHR), higher concentration of insulin, hsCRP, HOMA index and sOPG. We have observed the significant correlation between sOPG and body weight, WHR, hsCRP, insulin and HOMA index.
Conclusions: 1) Concentration of sOPG and insulin resistance were significantly higher in group of patients with MS. 2) The insulin resistance plays significant role in development of an A. Close correlation between sOPG and HOMA index may suggest that sOPG could be involved in process of development of A. 3) Inflammatory process plays a role in development of A. The significant correlation between hsCRP and sOPG can also confirm the role of OPG in this process.

T2:PO.045

Macrophage migration inhibitory factor (mif) and adipokines in severe obese women with normal and impaired glucose tolerance

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Macrophage migration inhibitory factor (MIF) is implicated in the pathogenesis of several inflammation related diseases, including obesity and type 2 diabetes (T2D). MIF is elevated in obesity. Hyperglycemia could increase plasma visfatin in patients with T2DM. This increase gets more prominent as the glucose intolerance worsens. The aim of the study was to determine level of MIF and adipokines (plasma visfatin, adiponectin and leptin) in obese women with normal and impaired glucose tolerance. Ten obese women (age: 35.46 ± 2.21yrs; BMI 34.11 ± 0.75 kg/m^2) with normal glucose tolerance (NGT) and 10 age and BMI matched obese women (age: 35.80 ± 2.54 yrs; BMI 36.98 ± 1.66 kg/m^2) with normal fasting and impaired glucose tolerance (OGTT-75 gr of glucose) (IGT) were included in the study. Fasting MIF (ELISA, ng/l), plasma visfatin (EIA Phoenix, ng/ml), adiponectin (Linco RIA, ng/ml), leptin (Linco RIA, ng/ml) and insulin (RIA Inep, mU/l), were measured. Insulin sensitivity (M index: mg/kgBW/min) was determined using euglycemic 2hr clamp. There was no difference in fasting visfatin between NGT and IGT (72.66 ± 4.11 vs. 69.80 ± 5.55, $p > 0.05$), fasting leptin (33.53 ± 2.98vs.30.70 ± 3.88, $p > 0.05$) fasting adiponectin (8.84 ± 1.61vs.9.65 ± 4.59, $p > 0.05$) and plasma MIF (2456.75 ± 428.91 vs. 2344.80 ± 481.80, $p > 0.05$). Insulin sensitivity was reduced in obese women with IGT (6.55 ± 0.51vs.2.74 ± 0.38, $p < 0.05$). There were no significant correlations among investigated parameters neither with insulin sensitivity index. No significant differences among investigated adipocytokines were found in women with IGT in comparison with women with NGT. In conclusion, our data suggest that impairment in insulin sensitivity precede change in adipocytokines and MIF during development of type 2 diabetes in obesity.

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T2:PO.046

Circulating betatrophin concentrations and adipose tissue expression in type 2 diabetes and obesity

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Context: Recently, the hormone betatrophin has been proposed to promote pancreatic β-cell proliferation in mice. Even though the results of studies in humans are controversy and the mode of action is still unclear, an association of betatrophin to obesity, lipid metabolism, and glucose tolerance is beyond dispute.
Objective: Thus, we tested the hypothesis that betatrophin serum concentrations and Betatrophin adipose tissue expression are related to parameters of obesity and metabolic abnormalities.
Design and Methods: Betatrophin serum concentrations and mRNA expression in paired omental and subcutaneous adipose tissue samples were studied in 2 cross-sectional studies of 882 individuals. Additionally we investigated a subgroup of 115 volunteers who underwent bariatric surgery.
Results: Higher betatrophin serum and mRNA expression levels were measured in individuals with T2D. We found relationships between betatrophin serum concentrations and age, gender, body fat, FPG, HbA1c, TG, ALAT, ASAT, and gGT. Despite the relationships to FPG and HbA1c remained all correlations significant after adjusting for BMI, gender and age. The Betatrophin mRNA expression was correlated to BMI, body fat, FPG, HbA1c, FFA, ALAT, ASAT, leptin, adiponectin, but not to FPI and lipid metabolism in sc AT, and to BMI, HbA1c, ALAT, ASAT in omental AT. After adjustment for age, gender and BMI only the correlation to FPG kept significant. Weight loss caused no significant reduction in circulating serum betatrophin but in Betatrophin mRNA expression.
Conclusions: Our data support the hypothesis that betatrophin may play a role in linking obesity to type 2 diabetes. The associations between circulating betatrophin and metabolic disorders are partly related to Betatrophin expression in adipose tissue.

T2:PO.047

Plasma retinol binding protein type 4 (RBP4) and TNF system activity in relation to nutritional status women with and without polycystic ovary syndrome (PCOS)

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Introduction: The aim of the study was to assess the associations between TNF system activity and plasma RBP4 levels depending on nutritional status and PCOS occurrence.
Methods: A cross-sectional study involving 86 PCOS (47 obese) and 69 Non-PCOS women (38 obese). Anthropometric parameters and body composition were measured. In the fasting state of serum concentrations of glucose, insulin, androgens, FSH, LH, SHBG and plasma TNF-α, sTNFs and RBP4 levels were assessed.
Results: There were no differences in plasma TNF-α, sTNFR1 and RBP-4 between PCOS and Non-PCOS group. Plasma sTNFR2 levels were significantly higher in PCOS than Non-PCOS group. Regardless of higher TNF-α levels in both obese than in normal weight groups, no differences between corresponding PCOS and Non-PCOS subgroups were found. Plasma sTNFR1 levels were higher in obese than normal weight PCOS subgroups and no differences were shown between obese and normal weight Non-PCOS subgroups. In addition sTNFR1 levels were higher in obese PCOS than Non-PCOS subgroups, with no difference between normal weight subgroups. In turn, plasma sTNFR2 levels were similar in normal weight and obese PCOS and higher in normal than obese Non-PCOS, as well as in normal weight and obese PCOS than obese Non-PCOS subgroups. Plasma RBP4 levels were higher in normal weight than obese PCOS, and lower in normal weight Non-PCOS than in both obese subgroups. In addition RBP4 levels were higher in normal weight PCOS than Non-PCOS and lower in obese PCOS than Non-PCOS. The negative correlation between plasma RBP4 and TNFR2 levels in all study group and Non-PCOS group was shown.
Conclusions: It seems that changes in plasma sTNFR2 and RBP4, but not TNF-α and sTNF1 are associated per se with the occurrence of PCOS. Although nutritional status is a factor modifying the direction of these changes. Circulating RBP4 levels seems to be modified by the concentration of circulating sTNFR2 regardless of the PCOS occurrence.

Acknowledgement: Research relating to this abstract was funded by Medical University of Silesia

T2:PO.048

Plasma insulin like factors and its binding protein levels and nutritional status women with polycystic ovary syndrome (PCOS)

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Introduction: Nutritional status modulates secretion of plasma insulin like factors 1 and 2 and its binding proteins. However, the impact of nutritional status on levels on INSL3 in PCOS women is hardly known. The aim of the study was to analyze relationships between plasma IGF1, IGF2, INSL3, IGFBP1 and IGFBP3 and nutritional status as well as insulin resistance in PCOS women.
Methods: A cross-sectional study involving 85 PCOS (48 obese) and 72 Non-PCOS women (41 obese). Anthropometric parameters and body composition were measured. In the fasting state of serum concentrations of glucose, androgens, FSH, LH, SHBG, insulin and IGF1, IGF2, INSL3, IGFBP1 and IGFBP3 were assessed.
Results: Plasma IGF1 levels were significantly lower in obese than normal weight in both PCOS and Non-PCOS subgroup, but without intergroup (PCOS vs. Non-PCOS) difference. While, plasma IGF2 levels were significantly higher in PCOS than Non-PCOS group, and corresponding subgroups, and in obese than in normal weight Non-PCOS women. Higher plasma INSL3 levels were also shown in PCOS than Non-PCOS group. However, plasma INSL3 levels were higher in obese than in normal weight PCOS women and lower in obese than normal weight Non-PCOS women. Plasma IGFBP1 and IGFBP3 levels were comparable in study groups. However, plasma IGFBP1 levels in both PCOS subgroups were significantly lower than in normal weight Non-PCOS subgroup, and similar as in obese Non-PCOS subgroup. Additionally, in obese PCOS subgroup plasma IGFBP3 levels were higher than in normal weight PCOS subgroup, but lower than in obese Non-PCOS subgroup.
Conclusions: The activity of IGFs and IGFBPs system is affected by nutritional status. It seems that its impact in PCOS is modify by exacerbated insulin resistance.

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T2:PO.049

The relationship between circulating visfatin/nicotinamide phosphoribosyltransferase, obesity, inflammation and lipids profile in elderly population, determined by structural equation modeling

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Introduction: The available literature data suggest that circulating visfatin/Nicotinamide Phosphoribosyltransferase (NAMPT) levels variability in humans is related to obesity, insulin resistance, inflammation and lipids' profile. The aim of the study was to assess the relationship between circulating visfatin/NAMPT, obesity, insulin resistance, inflammation and lipids' profile in a large population-based elderly cohort, applying structural equation modeling.
Methods: The analysis included 2983 elderly participants of the PolSenior study with assessed total blood count, and fasting concentrations of lipids, glucose, insulin, CRP, interleukin-6, and visfatin/NAMPT (by ELISA), and calculated HOMA-IR.
Results: The circulating visfatin/NAMPT levels were higher in obese than normal weight subjects, in those with hs-CRP above 3 mg/L, and with low serum HDL cholesterol and in insulin resistant subjects. Based on results of the exploratory factor analysis a baseline model of mutual relationship between four latent and measured variables was created and a final model, was developed by maintaining only two significant paths. The important variables for the 'Inflammation' latent variable proved to be hs-CRP and

IL-6 serum levels. In case of the 'Nutritional status' construct important variables were BMI, waist circumference, and to a less extent insulin resistance.. Additionally, the residual correlation between those two constructs was also statistically significant.
Conclusion: The structural equation modeling provided support for the existence of a link between visfatin/NAMPT level, nutritional status and inflammation. This indicates that, fat depot, especially the visceral one, is the important source of circulating visfatin/NAMPT in elderly population.

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T2:PO.050

Omentin levels are significantly decreased in patients with morbid obesity (mo) and increase after gastric bypass surgery

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Introduction: Patients with MO have a high risk for cardiovascular (CV) morbidity, mortality and diabetes. The only effective method to reduce weight and the associated risks is bariatric surgery. Omentin, a novel adipokine, – preferentially produced by visceral adipose tissue - was found to be associated with insulin resistance and obesity. Thus it was of interest to evaluate Omentin levels in patients with MO before and after weight loss induced by gastric bypass.
Methods: We included 81 patients with MO (69 women, BMI 47 ± 7 kg/m¸) and 39 healthy controls (BMI 26 ± 3 kg/m¸). All patients were investigated before and one year after gastric bypass surgery. Apart from weight and CV risk-markers, an oral glucose tolerance test (oGTT) was performed and insulin resistance (IR) was calculated by using HOMA. Omentin levels were determined in serum samples by an ELISA.
Results: Omentin levels were significantly decreased in MO vs healthy controls: 461 ± 153 vs 619 ± 196 ng/ml; $p < 0.001$. After weight loss induced by bariatric surgery Omentin levels significantly increased (461 ± 153 vs 515 ± 177 ng/ml; $p = 0.003$). Delta Omentin levels (pre minus post) were significantly associated with fasting plasma glucose ($p = 0.032$), one hour ($p = 0.002$) and two hours ($p = 0.007$) plasma glucose levels in the OGTT.
Conclusion: This is the first study demonstrating (a) decreased Omentin levels in patients with MO compared to healthy controls and (b) a significant increase of Omentin levels after dramatic weight loss induced by gastric bypass. Since Omentin was shown to be associated with insulin sensitivity and glucose metabolism, the observed significant increase in Omentin after dramatic weight loss might help to understand the beneficial effects of gastric bypass surgery.

T2:PO.051

Angiogenin increases after bariatric surgery (bs) in patients with morbid obesity (mo)

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Introduction: Angiogenesis is a complex process regulated by stimulatory and inhibitory factors. Angiogenin – a 14,124-Da soluble protein - is an important angiogenic growth factor, that has a great influence on the process of creation of new vessels. Angiogenin induces nitric oxide synthesis in endothelial cells. Since patients with MO have an increased risk for cardiovascular (CV) disease, we were interested in angiogenin levels in patients with MO compared to healthy lean controls (CO), as well as before and after BS.
Methods: We included 80 patients (mean age: 39 ±11 years; mean BMI: 45.8 ± 6.9 kg/m¸) with MO in comparison with 40 CO (mean age: 47 ±8 years; mean BMI: 25.3 ± 5.7 kg/m¸). All patients were investigated before and 2 years after BS. Apart from weight and CV risk-markers, a glucose tolerance test (75g), renal and inflammation parameters were assessed. Angiogenin levels were assessed by an ELISA.
Results: Two years after bariatric surgery Angiogenin levels increased significantly: 548 ± 163ng/ml vs 612 ± 164 ng/ml; $p < 0.001$. Patients with MO had significant lower Angiogenin levels than CO: 548 ± 163ng/ml vs 624 ± 123 ng/ml; $p = 0.042$. In the correlation analysis ΔAngiogenin levels were associated with ΔTriglycerides ($R= 0.361$; $p = 0.009$) and Δ2hour postprandial Insulin ($R= 0.404$; $p = 0.024$) In a multivariate model Δ2hour postprandial Insulin (Beta= 0.4070; $p = 0.021$) remained as a single predictor for ΔAngiogenin.
Conclusion: Patients with MO have significant lower Angiogenin levels compared with CO, but Angiogenin levels increase significantly after BS. Since Angiogenin can induce angiogenesis and helps formatting new blood vessels, our results might help to understand the beneficial effects of bariatric surgery regarding CV morbidity and mortality. diabetes and lipid profile than women. In limited surgery capacity, one might consider to prefer men to women for bariatric procedures.

T2:PO.052

Children's psychosocial stress and emotional eating: A role for leptin?

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Introduction: An important public health threat is that stress has been associated with a higher energy intake due to emotional or reward-based eating. One hypothesis is the effect of stress-induced cortisol changes on leptin, an anorexigenic adipokine that decreases reward-related behaviors.
Methods: In 254 Belgian children (5–12y), serum leptin levels were examined on their association with stress and emotional eating. Stress was measured by the Strengths and Difficulties Questionnaire (emotional, conduct and peer problems) in 2010 and 2012 and by salivary cortisol (4/day) in 2010. Emotional eating was measured with the DEBQ. Longitudinal linear mixed models were adjusted for age, sex, body fat and pubertal stage and leptin was tested as mediator or moderator in the stress - emotional eating relation.
Results: Stress data, more specific emotional problems, were longitudinally related to higher leptin levels but only in girls (beta=0.11). Also a higher daily cortisol output was associated with higher leptin levels in girls (beta=0.14). Leptin levels were cross-sectionally but not longitudinally associated with more emotional eating (beta=0.24). Leptin was no mediator but a moderator in the relation between stress and emotional eating.
Discussion: Both self-reported and objectively measured stress increased girl's leptin levels. Moreover, we have confirmed the moderating effect of leptin: only in the presence of high leptin, stress increased emotional eating. These results are in agreement with the hypothesis that stress leads to increased leptin levels but that the body might become resistant to leptin and as a consequence the reward-lowering effect of leptin might be lost in stressed people. Consequently, stress is often causing emotional eating, also in children.

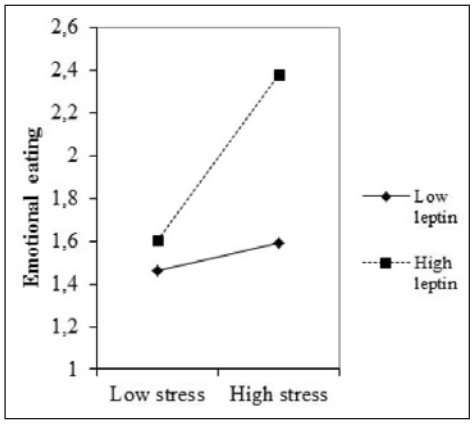

Fig. 1. Leptin as moderator in the relation between stress and emotional eating.

T2 – Recruitment of adipocytes

T2:PO.053

Adipose tissue inflammation and function in non-obese type 2 diabetics

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Introduction: White adipose tissue (WAT) resident cell populations and adipocyte morphology are affected by obesity. Proinflammatory macrophages have been associated with increased WAT inflammation observed in obesity. Altered adipogenesis has been suggested to affect adipose morphology. We aimed to characterize WAT-resident cell populations in non-obese type 2 diabetics and matched healthy controls.
Methods: The stromal vascular fraction of WAT biopsies was isolated from a metabolically well-characterized cohort consisting of non-obese healthy (n=13) and type 2 diabetic patients (n=14). Fluorescence-activated cell sorting (FACS) with a 13-color antibody panel was used to determine frequencies of adipose progenitor cells, endothelial cells, CD4+ and CD8+ T cells, Tregs, B cells, tissue resident M1 and M2 macrophages in SAT. Fractions of CD45-/CD31-/CD34+ progenitor cells, CD45+/CD14+/CD206+/CD11c+ M1-WAT macrophages, CD45+/CD14+/CD206+/CD11c M2 WAT macrophages, and CD45+/CD14+/CD3+/CD4+ T-cell fraction was sorted for RNA extraction. Gene expression analysis of adipogenesis markers was performed by qPCR in progenitor cell fraction.
Results: Lean type 2 diabetic patients exhibit enlarged adipocyte size, 587 pl ± 117 pl $p < 0.01$** compared to healthy controls 451 pl ± 109 pl $p < 0.01$** . No difference in cell fraction frequencies between healthy controls and type 2 diabetic patients were observed. The M1-M2 macrophage ratio in SAT correlates positively to adipocyte size ($\rho=0.445$, $p = 0.026$*) and to TNFα secretion ($\rho = 0.495$, $p = 0.009$**). Gene expression analysis on the impairment of adipogenesis is currently under evaluation.
Conclusion: Adipocyte size is the primary culprit potentially underlying diabetes and complications caused by WAT inflammation. The M1-M2 macrophage ratio correlated with adipocyte size and TNFα secretion, suggesting that M1-macrophages might be involved in generating a proinflammatory phenotype in non-obese human WAT.

T2 – White, beige and brown Adipocytes

T2:PO.054

Selection of aptamers for mature white adipocytes by cell selex using flow cytometry

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Adipose tissue, mainly composed of adipocytes, plays an important role in metabolism by regulating energy homeostasis. Obesity is primarily caused by an abundance of adipose tissue. Therefore, specific targeting of adipose tissue is critical during the treatment of obesity, and plays a major role in overcoming it. However, the knowledge of cell-surface markers specific to adipocytes is limited. We applied the CELL SELEX (Systematic Evolution of Ligands by EXponential enrichment) method using flow cytometry to isolate molecular probes for specific recognition of adipocytes. The aptamer library, a mixture of FITC-tagged single-stranded random DNAs, is used as a source for acquiring molecular probes. With the increasing number of selection cycles, there was a steady increase in the fluorescence intensity toward mature adipocytes. Through 12 rounds of SELEX, enriched aptamers showing specific recognition toward mature 3T3-L1 adipocyte cells were isolated. Among these, two aptamers (MA-33 and 91) were able to selectively bind to mature adipocytes with an equilibrium dissociation constant (Kd) in the nanomolar range. These aptamers did not bind to preadipocytes or other cell lines (such as HeLa, HEK-293, or C2C12 cells). Additionally, it was confirmed that MA-33 and 91 can distinguish between mature primary white and primary brown adipocytes. These selected aptamers have the potential to be applied as markers for detecting mature white adipocytes and monitoring adipogenesis, and could emerge as an important tool in the treatment of obesity.

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T2:PO.055

Secoisolariciresinol diglucoside inhibits adipogenesis in 3T3-L1 adipocytes

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Introduction: Obesity is a metabolic disorder characterized by chronic inflammation and dyslipidemia and is a strong predictor for the development of hypertension, diabetes mellitus, and cardiovascular disease. Secoisolariciresinol diglucoside (SDG) is a Lignan which belongs to the phytoestrogen family. This component exists abundantly in flaxseeds, therefore can be isolated from flaxseeds commonly. Flaxseeds are used for treating type 2 diabetes, fatty liver, hyperlipidemia, and obesity in Traditional Korean Medicine. However, anti-obesity effect of SDG has not been reported to date. Thus, the aim of this study was to examine anti-obesity functions of SDG by assessing differentiation of adipocyte, adipogenesis-related gene expressions and protein expressions.
Methods: The cellular lipid content in 3T3L-1 adipocytes was assessed by Oil Red O staining. Expressions of peroxisome proliferators activated receptor-γ (PPAR-γ) and CCAAT/enhancer-binding protein (C/EBP) were determined by real-time RT-PCR. Protein expressions of AMP-activated protein kinase α (AMPKα), liver kinase B1 (LKB1) were performed by western blotting.

Results: SDG suppressed the differentiation of 3T3-L1 adipocytes by down-regulating cellular induction of PPAR-γ, and up-regulating the AMPKα. Furthermore, SDG successfully activated phosphorylations of AMPKα/LKB1. These results demonstrate that SDG has a potent anti-obesity effect in 3T3-L1 cells due to the inhibition of adipogenesis.
Conclusion: Our results demonstrate that SDG inhibits adipogenesis in 3T3-L1 adipocytes. SDG may be beneficial in the treatment of obesity and can be used as a safe natural promoter of health.

T2:PO.056

Saikosaponin A, an active component of Bupleuri Radix, regulates brown adipocyte differentiation via activation of SIRT1-AMPKα axis

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Introduction: Saikosaponin A (SSA) is a major triterpenoid saponin isolated from Bupleuri Radix, a widely used Chinese traditional medicine to treat various inflammation-related diseases. Brown adipocytes play an important role in regulating energy balance, and there is a good correlation between obesity and the amount of brown adipose tissue. In spite of several studies confirming the various effects of SSA including anti-inflammatory and anti-cancer, its effect on brown adipocytes has not been reported to date. Therefore, this study examined the regulatory action of SSA in brown adipogenic differentiation using primary brown preadipocytes.
Methods: Expressions of uncoupling protein 1 (UCP-1) and peroxisome proliferator-activated receptor gamma coactivator 1-alpha (PGC-1α) were determined by real-time RT-PCR. Western blot was used to assess the protein levels of silent mating type information regulation 2 homolog 1 (SIRT1), AMPKα and p-AMPKα.
Results: Our results clearly showed that expressions of brown adipocyte-related genes, such as UCP-1 and PGC-1α were dramatically up-regulated by treatment with SSA. In addition, SSA increased the expression of SIRT1, suggesting its effect on the SIRT1 - AMPKa axis, which plays a key role in metabolism. As expected SSA successfully activated the phosphorylation of AMPKα. Our study shows that SSA is capable of increasing differentiation of brown adipocytes via activation of p-AMPK, suggesting its potential therapeutic application in the treatment or prevention of obesity.
Conclusion: Our results show that SSA induces brown adipocyte differentiation via activation of SIRT1-AMPKα axis. Therefore, SSA may be beneficial in the treatment of obesity and can be used as a safe natural promoter of health.

T2:PO.057

Effects of all-trans retinoic acid (ATRA) on white adipose tissue (WAT) in a model of obesity-related type 2 diabetes (T2D)

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Obesity-related T2D is characterized by WAT dysfunction including adipocyte hypertrophy, low grade inflammation and few beige adipocytes in WAT. We investigated the effect of ATRA on inflammation and remodeling of WAT in 3 month old db/db mice (10/group) treated with vehicle (corn oil) or ATRA 0.6 mg/day, 5 days/wk for 12 wks by voluntary oral feeding. We monitored a subset of mice for further 8 wks after tx cessation. ATRA caused a significant reduction in white adipocyte size which was maintained in the post tx phase (washout) (8229 ± 165 μm² CTRL vs 5775 ± 285 μm² ATRA vs 5405 ± 571 μm² post tx, $p < .0001$). ATRA increased UCP1 gene and protein expression in visceral WAT (1.4 ± 0.47 CTRL vs 13.42 ± 5.0 ATRA), which was not retained post tx. Obesity is characterized by adipose tissue macrophage infiltration, which is the source of inflammatory cytokines associated with insulin resistance (IR). WAT was examined for the presence of macrophages using the protein marker F4/80. ATRA resulted in a significant decrease in the frequency of F4/80+ crown-like structures (CLS), which was sustained post tx (1.02 ± 0.24 CLS/um² CTRL vs 0.15 ± 0.55 ATRA vs 0.32 ± 0.23 post tx, $p < .05$). The expression of inflammation-related genes (MCP-1, PAI-1, and TNF α) were not reduced immediately after tx, however, they were significantly suppressed in the post tx phase. We have shown that long-term ATRA tx promotes the remodeling of WAT and induces UCP1-positive beige adipose in WAT. Further, ATRA attenuates inflammation by reducing macrophage infiltration and suppressing the expression of the inflammation-related genes. This suggests that ATRA may be useful for obesity-related T2D by inducing the beige phenotype to promote weight loss, while simultaneously reducing inflammation to improve WAT function and IR.

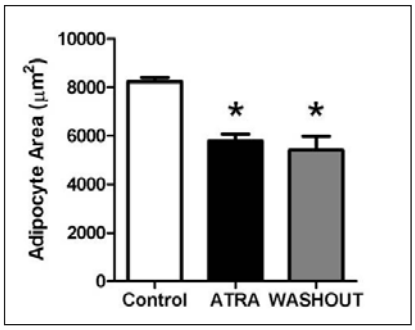

Fig. 1. Mean adipocyte area.

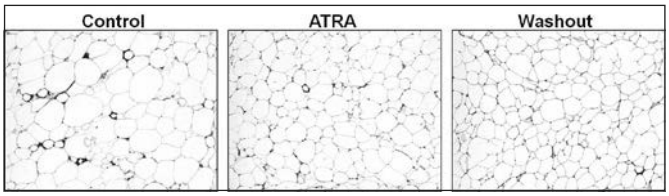

Fig. 2. Immunohistochemistry of F4/80 (brown staining) in WAT.

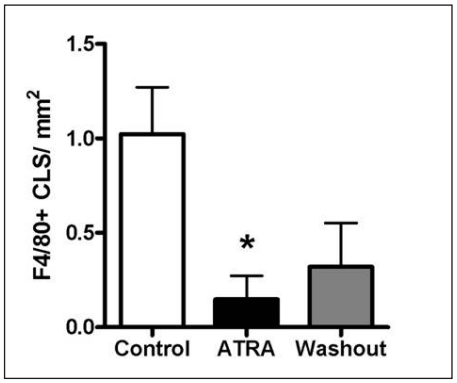

Fig. 3. Frequency of crown-like structures (CLS) positive for the macrophage marker F4/80, expressed as the number of CLS per mm².

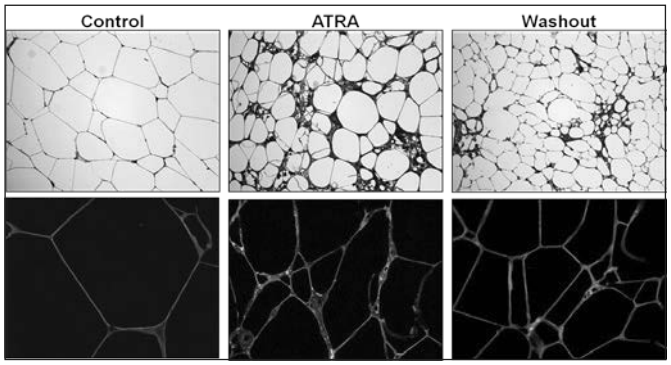

Fig. 4. Immunohistochemistry of the beige adipose marker UCP1 (brown staining) in WAT (top) Fluorescent immunohistochemistry for the mitochondrial marker HSP60 (green), lipid droplet membrane marker perilipin-A (red), or nuclear stain DAPI (blue) in WAT (bottom).

T2:PO.058

Tamoxifen: How it influences adipocyte biology in vivo

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Tamoxifen is a selective oestrogen receptor modulator (SERM): it can activate the oestrogen receptor (ER) in some tissues acting as an oestrogen agonist, while inhibits it in others, behaving as an antagonist. This drug is commonly used in two important fields: in chemotherapy as endocrine treatment of choice for metastatic ER-positive tumours in women and in genetic engineering as a widespread activation system of inducible Cre-mediated recombination technology. However, effects of Tamoxifen treatment on adipose tissue are not well characterized in literature. Therefore, this study had the aim to investigate how Tamoxifen influences adipocyte biology in vivo. To analyse the role of the drug on adipose tissue biology in vivo, inbred male mice (C57Bl/6NTac) were treated with Tamoxifen and analysed in terms of adipocyte biology, energy homeostasis, insulin sensitivity and lipid profile. In this study we obtained that Tamoxifen treatment leads to: (I) different body composition (II) increased insulin sensitivity (III) higher Triglyceride level in serum (IV) browning effects in subcutaneous adipose tissue and (V) an increased Ki67 mRNA expression. In conclusion, Tamoxifen has significant effects on adipose tissue biology, body composition and glucose metabolism, which need to be considered when using Tamoxifen as a tool to generate inducible knockout mouse models. Our data further suggest that Tamoxifen treated control mice should always be characterized in addition to the transgenic models to avoid misinterpretation of data related to Tamoxifen effects.

T2:PO.059

Adipose tissue site-related differences in lactate procduction from glucose by isolated rat adipocytes

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Male Wistar rats kept under standard conditions were killed under anaesthesia and samples of subcutaneous inguinal (SC), mesenteric (ME), epididymal (EP) and retroperitoneal (RP) adipose tissue were dissected. Adipocytes were isolated with collagenase; adipocyte number, integrity and cell size were calculated using direct microscopic observation and Image J. The cells were incubated at 37şC and 5% CO2 in DMEN media, supplemented with 3% serum albumin, 3% FBS and varying concentrations of glucose (0,5.5,11,22 and 30 mM). EP and RP cells were larger than in ME. SC cell size was more variable. After 48 h incubation, cell viability was well maintained in nornoxia. Data for glucose consumption, and release to the medium of lactate, were expressed as pmol/cell and day. Maximal glucose uptake was observed at values >11 mM, and was highest in EP, followed by ME, RP and SC (a 7x difference between sites). Lactate production was maximal in EP, RP and MS and minimal in SC. The proportion of glucose converted to lactate was highest in RP, followed by ME and PG, and low in SC. The results show a considerable difference in the use of glucose, with RP, EP and ME taking up more glucose than SC, but delivering a large proportion of it as lactate as has been found in vivo and in cultured cells. The possible importance of this active glucose wasting is thus, specifically related to adipose tissue site.

Acknowledgement: Grants: PN Biomedicina SAF2012-34895, and PN Ciencia y Tecnología de los Alimentos AGL-2011-23635 from the Government of Spain

T2:PO.060

Potential involvement of mirnas in adipogenesis modifications induced by resveratrol metabolites

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Introduction: trans-resveratrol (3,4,5-trihydroxystilbene, RSV), a promising polyphenol in obesity, present in plant origin foods, undergoes rapid metabolism resulting in several metabolites. In a previous study we described how certain resveratrol metabolites modify the expression of genes related to the adipogenesis. The aim of the present work was to determine whether miRNAs are implicated in the observed anti-adipogenic effect of resveratrol metabolites in 3T3-L1 murine pre-adipocytes
Methods: 3T3-L1 maturing pre-adipocytes were treated from day 0 to day 8 of differentiation with 25 μM of resveratrol metabolites: trans-resveratrol-3'-O-glucuronide (3G), trans-resveratrol-4'-O-glucuronide (4G) and trans-resveratrol-3-O-sulfate (3S). Expression of miRNAs involved in adipogenesis as well as their target genes and other key regulator genes of this process were measured by Real Time RT-PCR.
Results: 3G only increased the expression of miR-155. CEBPβ mRNA levels were reduced and, surprinsingly, those of SREBF1c were increased. No changes were observed in the expression of CEBPα, PPARγ and LPL genes. 4G also increased miR-155 expression, as well as that of miR-27b. Even though 4G did not change the expression of miR-145, its target genes were reduced (IGF1 and KLF5). This metabolite also reduced CEBPβ and CREB mRNA levels. 3S increased miR-145 expression, without changing those of miR-155 and miR-27b. IGF1, CREB, CEBPβ, KLF5, SREBF1c, PPARγ, CEBPα, and LPL gene expression was also reduced after treatment with this metabolite.
Conclusion: Whereas 3S inhibits the whole metabolic process by acting on miR-145 and miR-27b, 3G and 4G inhibit partially the adipogenesis, at least in part, by increasing miR-155.

T2:PO.061

Epa triggers the „brite" phenotypic shift even at a late stage of adipocyte differentiation

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Introduction: We have recently shown that BMP4 promotes browning of primary human adipocytes. Besides pharmacological and hormonal regulation, dietary long-chain polyunsaturated fatty acids (PUFAs) may also

trigger this process. Alongside this question, it is still under discussion if the browning effect is rather caused by transdifferentiation or direct conversion of differentiated adipocytes.
Methods: Human preadipocytes were isolated from subcutaneous adipose tissue, differentiated for 8 days, and treated from day 8 to 12 with 20 µM of the n-3 PUFAs eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), the n-6 PUFA arachidonic acid (ARA) or BMP4. Adipogenic state and gene expression markers were analysed via RT-PCR, Western Blot and Oil Red O Staining.
Results: Assessing general adipogenesis, PPARγ mRNA expression and HSL protein abundance did not show any notable change in response to PUFAs or BMP4. Oil Red O Staining was significantly elevated through overall PUFA treatment, but not after BMP4 treatment. As expected, adiponectin was upregulated via the n-3 PUFAs EPA and DHA. BMP4, which is known to promote browning in the early stage of adipogenesis, was not able to enhance expression of the brite/brown marker UCP1 and the mitochondrial marker CPT1B, when applied in the late stage of adipogenesis. Most importantly, exclusively EPA lead to an increase in mRNA levels of UCP1 and CPT1B. In contrast to EPA, the n-6 PUFA ARA elevated mRNA expression of the white adipocyte marker TCF21.
Conclusion: EPA treatment of differentiated adipocytes leads to a "brite" phenotypic shift, indicated by enhanced UCP1 and CPT1B mRNA levels. This browning effect at a late stage of adipogenesis cannot be triggered by BMP4, suggesting a major relevance for dietary n-3 PUFAs.

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T2:PO.062

Evaluation of reference genes for gene expression studies in human brown adipose tissue

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Introduction: Human brown adipose tissue (BAT) has during the last five year been subjected to an increasing research interest, due to its putative function as a target for future obesity treatments. The most commonly used method for molecular studies of human BAT is the quantitative polymerase chain reaction (qPCR). This method requires normalization to a reference gene (genes with uniform expression under different experimental conditions, e.g. similar expression levels between human BAT and WAT), but so far no evaluation of reference genes for human BAT has been performed.
Methods: Two different microarray datasets with samples containing human BAT were used to search for genes with low variability in expression levels. Seven genes (FAM96B, GNB1, GNB2, HUWE1, PSMB2, RING1 and TPT1) identified by microarray analysis, and eight commonly used reference genes (18S, B2M, GAPDH, LRP10, PPIA, RPLP0, UBC, and YWHAZ) were selected and further analyzed by quantitative PCR in both BAT containing perirenal adipose tissue and subcutaneous adipose tissue. Results were analyzed using two different algorithms (Normfinder and geNorm).
Results: Most of the commonly used reference genes displayed acceptably low variability (geNorm M-values <0.5) in the samples analyzed, but the novel reference genes identified by microarray displayed an even lower variability (M-values <0.25).
Conclusion: Our data suggests that PSMB2, GNB2 and GNB1 are suitable novel reference genes for qPCR analysis of human BAT and we recommend that they are included in future gene expression studies of human BAT. The use of reference genes with low variability will increase the fidelity in qPCR results from human BAT.

T2:PO.063

In the rat, adipose tissue lactate levels correlate with lactate dehydrogenase gene expression and activity

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Female and male adult Wistar rats were fed standard chow or a simplified cafeteria diet for one month. Then, the rats were killed and the white adipose tissue (WAT) in four sites: perigonadal, retroperitoneal, mesenteric and subcutaneous (inguinal) were sampled and frozen, measuring also the full size of each WAT site. Gene expression analysis of lactate dehydrogenase, and key lipogenic and glucose metabolism enzymes were analysed. The levels of lactate in tissue and plasma lactate as well as the WAT activity of lactate dehydrogenase were measured. Lactate gradients (differences in molal concentration) between WAT and plasma were estimated. The influence of sex and diet (and indirectly WAT mass) on lactate levels and their relationships with lactate dehydrogenase activity and gene expressions were measured. There was a high production of lactate by WAT, practically irrespective of site, diet or sex. Tissue lactate levels (and molal gradients) were a direct correlate of lactate dehydrogenase activity in the tissue. Lactate dehydrogenase activity was directly correlated with the expression of the genes Ldha and Ldhb for this enzyme when all sites, and sex/diet groups were taken in consideration. The ability of WAT to produce lactate was not directly dependent of WAT metabolic state. The data suggest that there were no post-translational modifications of lactate dehydrogenases (both heart and muscle types, which distribution is similar in this rat tissue) elicited by sex or diet, with no site differences either. These data agree with a role for WAT lactate dehydrogenase as an 3C outlet for excess glucose

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T2:PO.064

Effects of Hyperthyroidism on Amount and Activity of Brown Adipose Tissue in Humans.

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Background: The large majority of knowledge on BAT is derived from studies in rodents and very little is known about the amount and effect on the metabolism in humans. In rodents thyroid hormones are known to increase amount and activity in BAT but two recently published studies in humans reach contradictory conclusions. AIM: To investigate the effects of thyroid hormones on the amount and activity of BAT in humans
Methods: 10 patients with thyreotoxicosis (T3 > 3 nmol/L and suppressed TSH) will be investigated at diagnosis and after 3–6 months of euthyroidism induced by antithyroid treatment. The patients will all be over the age of 50 due to the radiation given by the scans (requested by the local Ethical Committee). All will be scanned for active BAT by the integrated FDG PET-CT before and after treatment.BAT is activated by means of crushed ice placed under the feet in individualized intervals during the scan procedure. Indirect calorimetry is done to determine the basal metabolic rate and subcutaneous fat biopsy to examine the effect on subcutaneous white fat and the possible "browning" effect.
Preliminary results: Five patients have been recruited and the initial scans performed. The mean age of the five patients was 58.9 ± 8.7 years and the meanT3 level was 3.6 ± 0.8 nmol/l. Only one of the five had active BAT initially. Three of these five patients have been investigated after they have obtained the euthyroid state.

Conclusions: Results from rodent studies cannot be directly transferred to humans. BAT is scarce and the amount varies greatly between human individuals. In the present study the presence of BAT seems minor even though these patients initially had elevated levels of thyroid hormones. These findings may be due to the age of these patients since it is shown that there is an inverse association between age and the presence of BAT in humans. We plan to have the complete study including adipose tissue examination ready within the next months.

Acknowledgement: I would like to thank the Novo Nordisk Foundation for financial support.

T2:PO.065

Adipose tissue natriuretic peptide receptor dysregulation in obesity and type 2 diabetes

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Introduction: Natriuretic peptides (NP), atrial and B-type NP stimulate lipolysis and energy expenditure in adipocytes via NP receptor-A (NPRA). Both peptides bind also to NP receptor-C (NPRC) promoting NP clearance. Thus, NP receptor ratios determine the strength of NP signaling.
Methods: We measured expression of the NP receptors in human adipose tissue in: i) a cross-sectional study of 50 subjects with wide range of BMI and glucose tolerance; and ii) a randomized study of 19 subjects with type 2 diabetes (T2DM) treated for 12 weeks with pioglitazone or placebo.
Results: The NPRA/NPRC mRNA ratio in adipose tissue of obese was lower compared to lean subjects ($p \leq 0.001$). Independently of BMI, NPRA/NPRC was reversed in T2DM comparing to subjects with normal and impaired glucose metabolism ($p \leq 0.01$) and strongly correlated with insulin sensitivity ($r=0.5824$, $p \leq 0.001$). Similarly, at the protein level we observed a significant reduction of NPRA and increase of NPRC in the obese and T2DM subjects relative to the lean. Expression of PGC1-α, a target of NP signaling, was also lower in obese vs. lean ($p \leq 0.0001$) and strongly correlated with insulin sensitivity. In a 12-week trial with pioglitazone, improvements in insulin sensitivity correlated with increases in adipose tissue NPRA/NPRC ratio, PGC-1α and UCP1 expression ($p \leq 0.01$).
Conclusions: These data indicate that dysregulated expression of NP receptors in adipose tissue is associated with obesity and T2DM, while improving insulin sensitivity resulted in a net higher NPRA/NPRC ratio, the mechanisms underpinning their reciprocal regulation remains to be understood.

T2:PO.066

All-trans retinoic acid promotes browning of white adipose tissue in adult mice

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The role of brown adipose tissue in the regulation of energy balance and maintenance of body weight is well known in rodents. Recently, interest in this tissue has re-emerged due to the realization of active brown-like adipose tissue in adult humans and inducible brown-like adipocytes in white adipose tissue depots in response to appropriate stimuli („browning process"). A positive effect of all-trans retinoic acid (ATRA) on white adipose tissue (WAT) oxidative and thermogenic capacity has been described and linked to an in vivo fat loosening effect of ATRA in mice. However, little is known about the effects of ATRA on induction of brown-like adipocytes (beige/BRITE) in white adipose tissues. In this study, changes in the expression of Slc27a1, CD137, TMEM26, HOXC9 and TBX1 genes recently described as beige/BRITE-related genes (Wu el al. Cell 2012 and Waldén et al., AJP 2012) were analyzed in WAT depots of adult NMRI male mice acutely injected with ATRA or vehicle, together with biometric and blood parameters. The treatment triggered an up-regulation of the mRNA levels of CD137 in all adipose depots of ATRA-treated mice and an up-regulation of Slc27a1, HOXC9 and TBX1 in some adipose depots (mainly visceral) of ATRA-treated mice in accordance with the previously published results showing that ATRA favors the acquisition of brown adipose tissue-like properties in WAT (Ribot et al. Obesity Res. 2001 and Mercader et al. Endocrinology 2006). The results indicate that ATRA favors the acquisition of beige/BRITE markers in WAT. Understanding the mechanisms and effectors involved in the remodeling of WAT can contribute to new avenues of prevention and treatment of obesity and type 2 diabetes.

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T2:PO.067

Effects of fgf21 gene invalidation on brown and white adipose tissue pathophysiology

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Introduction: Experimental increases in the endocrine factor FGF21 protect against diabetes and obesity in rodents. However, obese patients and rodent models of obesity show a paradoxical increase in blood FGF21. We undertook a "loss-of-function" approach to get insight in the role of FGF21 on adiposity.
Methods: Male FGF21-KO and wild-type mice were sacrificed. Interscapular BAT, inguinal and epididymal WAT were collected. Metabolites, hormones and cytokines were determined by spectrophotometry, ELISA or Multiplex. Gene expression was determined by qRT-PCR. Cell morphology was assessed by optical microscopy. Cell precursors from fat depots were differentiated to adipocytes in culture, and 14C-glucose oxidation was determined.
Results: FGF21-KO mice did not show major changes in adipose depots size; glycemia and insulinemia were increased, and adiponectin levels were reduced. The expression of marker genes of carbohydrate and lipid metabolism, adipogenesis and "browning" was essentially unaltered in adipose depots. Increased expression of inflammation and macrophage infiltration markers (e.g. Nos2, TNFa, Arg1) was found in BAT from FGF21-KO mice; opposite changes were found in inguinal WAT. Morphological differentiation "in vitro" of brown and white adipocytes lacking FGF21 was unaltered, whereas the expression of marker genes of "browning" (e.g. UCP1, Sirt3, Bmp8b, UCP3) was reduced. Glucose oxidation in FGF21-KO brown and white adipocytes was significantly reduced.
Conclusions: In vivo, the lack of FGF21 causes minor effects in adipose tissues, with the exception of altered local inflammation status. However, the impaired glucose oxidation due to the lack of FGF21 found in adipocytes support the notion of an autocrine role of adipose tissue FGF21 on glucose homeostasis.

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T2 – Angiogenesis

T2:PO.068

Effect of 17β-estradiol on 3T3-L1 adipocytes differentiation and on VEGFA expression

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Introduction: Adipogenesis and angiogenesis are two closely related processes. In this context, the VEGFA plays an important role, since changes on its expression and on the expression of its signaling machinery components regulate the angiogenesis and may affect the development of obesity and insulin resistance. Estradiol (E2) is considered a protector against obesity and a regulator of the VEGFA gene. Thus, our hypothesis is that VEGFA may be involved in E2-mediated adipogenesis/insulin sensitivity.
Methods: 3T3-L1 mouse preadipocytes were treated with 17β-estradiol during the differentiation. We analyzed the mRNA expression of some adipogenesis markers including Pparg, Cebpa and Slc2a4 and GLUT4 protein. In addition, the expression of VEGFA mRNA and protein was analyzed during the differentiation process, and in full differentiated cells treated with 17β-estradiol.
Results: Levels of Pparg, Cebpa and Slc2a4/GLUT4 are progressively increased during the conversion from 3T3-L1 preadipocytes to adipocytes. In addition, on day 8 of differentiation, cells exposed to E2 presented a significantly increase in GLUT4 protein, Slc2a4 mRNA, and Cebpa mRNA as compared to control cells, while Pparg and Vegfa did not change. However, when differentiated cells were treated for 24 hours with E2, Vegfa mRNA and VEGFA protein expression were increased as compared to control.
Conclusion: Results suggeste that estradiol promotes adipogenesis enhancing expression of adipogenesis markers, such as Cebpa and Slc2a4/GLUT4. Moreover, the increasing VEGFA production induced by E2 in mature adipocytes can improve angiogenesis, protecting the adipose tissue from obesity-induced hypoxia, and consequently, from inflammation, which leads to insulin resistance in this tissue.

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T2 – Systemic consequences of adipose tissue metabolism

T2:PO.069

Diagnosis of visceral obesity by using imaging methods

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Introduction: evaluate the significance of radiological methods of diagnosis of visceral obesity in patients with obesity and metabolic syndrome (MS).
Methods:examined 78 obese patients with MS, mean age 45,9 ± 15,5 years, including 38 men and 40 women. Comparison group: 20 obese patients with varying degrees (8 males, 12 females, mean age of 48,2 ± 9,3 years) without having criterion MS. The control group included 25 people (10 males and 15 females, mean age 46,3 ± 4,1 years) with no obesity. Diagnosis of MS accounted indicators anthropometric data, lipid and carbohydrate metabolism, blood pressure and insulin resistance . Methods used computer (CT) and magnetic resonance imaging (MRI), ultrasonography (USG) visceral obesity (VO).
Results: Radiation exposure during CT, significant time spent in the performance of MRI in conjunction with the economic burden justify the appropriateness of including in the scheme of studies of patients with obesity ultrasound to determine VO as an indicator of MS. Standard ultrasound technique identified during a highly informative, comparable (r = 0,66 at p = 0,0005) with tomographic methods (CT, MRI). Her performance (visceral adipose tissue - VAT, visceral adipose tissue /subcutaneous adipose tissue- VAT / SAT) highly correlated with indicators of disorders of carbohydrate (glucose, insulin, insulin resistance index) and lipid metabolism (LDL, VLDL). Threshold VAT above which diagnosed in, according to the standard ultrasound in patients with MS was 109.11 mm.
Conclusions: Ultrasonography can be used for screening of patients with obesity, including -in children, adolescents and pregnant women in order to diagnose visceral obesity as a risk factor for MS.

T2:PO.070

Klk7 plays a role in body weight regulation, insulin sensitivity and glucose metabolism

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Background: Previous studies showed that beneficial effects on glucose metabolism of vaspin are at least in part mediated through inhibition of the protease Kallikrein 7 (Klk7). Based on these findings, we investigated the physiological relevance of the Klk7-vaspin system in mice with a targeted whole-body disruption of Klk7 in vivo.
Methods: We generated a whole-body Klk7 knockout mouse (Klk7-/-) and systematically characterized the consequences of Klk7 deficiency on body weight, fat mass, serum concentrations of leptin, basal metabolism, food intake and parameters of glucose and lipid metabolism.
Results: Klk7 deficiency causes significant changes in body fat content, basal metabolism, spontaneous activity, food intake as well as leptin serum concentrations. At an age of 30 weeks, Klk7-/- mice have significantly lower body fat (7.2 ± 2.9%) than the controls (9.9 ± 2.7%) ($p < 0.05$). Moreover, Klk7-/- mice have significantly lower serum leptin concentration (25.9 ± 6.2ng/ml) in relation to the controls (42.3 ± 2.5ng/ml) ($p < 0.05$). In female Klk7-/- mice, food intake (4.3 ± 0.5g/day) was significantly lower compared to the controls (4.7 ± 0.3g/day, $p < 0.05$). Although glucose tolerance was indistinguishable between Klk7-/- and control mice of both genders, male Klk7-/- mice display a significant improved insulin sensitivity compared with littermate controls at an age of 24 weeks ($p < 0.05$). Both genders of Klk7-/- mice showed a different basal energy expenditure at day and night phase compared with controls.
Conclusion: Our data indicate that Klk7 plays a previously unrecognized role in body weight regulation, food intake, insulin sensitivity as well as basal- and glucose metabolism. The mechanisms, how Klk7 disruption affects these traits need to be explored in further studies.

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T2:PO.071

Gip as a new biomarker of metabolic complications in obese patients

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Introduction: The altered GIP secretion and action was recently linked to obesity-related metabolic disorders but the underlying mechanisms are not well understood. The objective of this study was to compare the pattern of GIP secretion and correlation with metabolic risk markers in obese subjects during fasting and postprandial state.
Methods: In obese and not obese patients fasting and postprandial plasma GIP, glucose, insulin, lipids, glutathione peroxidase, IL-6, sE-selectin, MCP-1, leptin, adiponectin, visfatin were measured in five different time points during oral lipid tolerance test and glucose tolerance test.
Results: A total of 114 obese patients and 37 control non-obese subjects, were randomized into the study. Fasting GIP levels differed between obese (32,22 pg/ml) and control (24,27 pg/ml) subjects ($p < 0,05$) and correlated with glucose, triglycerides, total- and LDL-cholesterol, as well as sE-selectin, MCP-1, visfatin and leptin/adiponectin ratio ($p < 0,05$). The levels of GIP at 120 min after high fat meal were significantly higher than those measured at 120 min after glucose ingestion both in obese (365,93 pg/ml vs 156,4 pg/ml, $p < 0,05$) as well as control subjects (381,09 pg/ml vs 154,94 pg/ml, $p < 0,05$). Enhanced postprandial GIP response to fat or glucose challenge (AUC) was positively correlated with glucose AUC, TG AUC, FFA AUC and negatively with glutathione peroxidase activity ($p < 0,05$). In patients with the highest fasting GIP concentrations (3rd tertile), increased sE-selectin ($p < 0,05$) and MCP-1 blood levels (p,0,05) were observed.
Conclusions: We suggest, that GIP is a putative early biomarker of metabolic consequences of obesity and associated proinflammatory state.

T2:PO.072

The risk for weight regain after weight loss is related to weight loss-induced cellular stress in the adipose tissue

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Introduction: Weight loss results in increased lipolysis in adipocytes, which lose their fat and shrink (You et al. 2006). However, after returning to a stable energy balance, adipocytes rapidly prepare for re-storing fat. This metabolic adaptation appears related to an increased stress response (Bouwman et al. 2009; Wang et al. 2009). This suggests that cellular stress accumulated in adipocytes during a negative energy balance is a driving force for weight regain. Our aim was to determine expression levels of stress proteins during weight regulation after a dietary intervention and a follow-up period.
Methods: Twenty-five healthy subjects started with a very low energy diet for 8 weeks with a 10-month follow-up period. Participants were categorized in groups depending on weight loss during the diet period and on weight maintenance or regain during follow-up. Before, after the diet and after 10 month follow up, abdominal subcutaneous adipose tissue biopsies were obtained. Levels of stress proteins in biopsies were determined by Western blotting.
Results: Weight regainers showed increased level of β-actin, calnexin, HSP60 and HSP70 expression during the weight loss period. BiP, HSP27, SOD1 and SOD2 did not change significantly during this period. Correlation analysis showed that changes of β-actin, HSP70 and HSP27 are linked via changes in HSP60. Significantly increased levels of β-actin and HSP60 were also seen after 4 days glucose restriction of mature adipocytes.
Conclusion: Subjects regaining weight after dieting have increased levels of cellular stress and structural support proteins in their adipose tissue, most likely residing in the adipocytes. We conclude that accumulating cellular stress in adipose tissue during weight loss is a risk factor for weight regain.

Acknowledgement: We thank Dr. Ping Wang for helpful discussions and advice.

T2:PO.073

Effect of secretome from obese and lean rat adipose tissue on the proliferative capacity and the cancer-related gene expression of a normal mammary epithelial cell line

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Introduction: Obesity is associated with higher risk for breast cancer. This work evaluates the effect of secretome obtained from obese or lean rat adipose tissue on the proliferative capacity of a normal human mammary cell line, MCF10A, as well as the expression of some genes related to pro-carcinogenic events.
Methods: Three week-old female Sprague-Dawley rats were fed a high fat diet (DIO: 60% Kcal/g fat, n=12) or standard diet (LEAN: 5.5% Kcal/g fat, n=11) for 10 weeks. Retroperitoneal (RPAT) and subcutaneous (SAT) adipose tissues were extracted and cultured for secretome collection. MCF10A cell line was exposed for 24 hours to a 1% of secretomes from each group and proliferation was measured. Furthermore, genes associated with cell proliferation (ALDH3A1), antioxidant protection (SIRT1) and tumor suppresion (PTEN, TGFB) were quantified by qRT-PCR.
Results: RPAT secretome from obese rats induced a significant increase in cell proliferation (2.12 ± 0.13 a.u) with respect to lean animals (1.17 ± 0.05 a.u; p-value<0.001). No statistically significant differences were observed after treatment with SAT secretome from lean (0.89 ± 0.03 a.u) or obese rats (0.85 ± 0.02 a.u). Interestingly, gene expression fold change of PTEN (0.91 ± 0.07), TGFB (0.81 ± 0.07) and SIRT1 (0.66 ± 0.04) was significantly downregulated while ALDH3A1 (1.95 ± 0.18) was upregulated ($p < 0.05$) after MCF10A treatment with obese compared to lean RPAT secretome. No statistical differences were found between lean or obese SAT secretome treatment.
Conclusions: These results point out to a possible involvement of factors produced by obese visceral adipose tissue in changes related to early steps of tumor promotion. Further studies are needed to identify those obesity-related carcinogenic factors.

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T2:PO.074

Characterization of the role of alms1 in the adipose tissue in mice and humans

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Introduction: Alström Syndrome (AS) belongs to the class of ciliopathies and is a rare recessive disease characterized by obesity and Type 2 diabetes (T2DM), and fibrosis with multiple organ involvement. The disease causing gene is ALMS1, which is ubiquitously expressed with multiple splice variants. The protein ALMS1 localizes to the centrosomes, basal bodies and endosomes suggesting a role in ciliary function and intracel-

lular transport, but its link with the metabolic complications is still poorly understood.

Methods: We characterized the adipose tissue (AT) of a mouse model of AS (Alms1GT/GT) at 6 weeks of age, using gene and protein expression analysis. We also examined the expression of ALMS1 in the AT other mouse models of obesity as well as in obese patients with or without T2DM and comparing their levels with those obtained in normal weight subjects.

Results and Conclusions: Young Alms1GT/GT displayed a systemic glucose intolerance and altered localization of GLUT4 both in the basal state and after insulin stimulation, which causes an aberrant insulin signaling, downstream or independently of AKT. These events appear before the increase of body weight and circulating insulin levels. AT expansion appears to be secondary to the increase in de novo lipogenesis stimulated by the high insulin levels. These findings propose a direct role of ALMS1 in the glucose homeostasis through the GLUT4 trafficking pathway. ALMS1 expression in human and mouse models of obesity showed quantitative differences between obese and control subjects. Furthermore, the reduction of ALMS1 in obese patients suggests its implication in the pathophysiology of the AT, independent from AS.

Reference:

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T2:PO.075

Betulinic acid, a TGR5 agonist, prevents adipogenesis in 3T3-L1 adipocytes through suppression of STAT3 phosphorylation

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Aim of this study was to evaluate the anti-adipogenic effect of betulinic acid (BA), a plant-derived triterpenoid, and its action mechanism in relation to STAT3. BA treatment during 3T3-L1 differentiation significantly suppressed adipogenesis as demonstrated by Oil Red O staining. STAT3 is a key transcription factor, recently known to be involved in the adipogenic process. At the initial stage of 3T3-L1 differentiation, phosphorylation of STAT3 was significantly increased. Pre-incubation with BA inhibited differentiation-induced activation of STAT3 and reduced adipogenic (PPARγ, C/EBPα and GLUT4), and lipogenic (SREBP1, FAS, SCD1 and adiponectin) mRNA levels, showing that anti-adipogenic effect of BA is mediated by inhibition of STAT3 activation. BA is known agonist for a Gs-protein coupled bile acid receptor, commonly known as TGR5. Involvement of TGR5 in energy homeostasis and metabolic diseases is becoming evident, and TGR5 activation is known to negatively regulate STAT3 signaling in the liver of TGR5-deficient mice [1]. Interestingly, the intracellular level of cyclic-AMP was elevated after 1 h treatment of BA and the inhibitory effect of BA on adipocyte differentiation was reversed by pre-treatment of SQ22536, an adenylyl cyclase inhibitor, inferring that BA might exert anti-adipogenic effect most likely through TGR5 activation. This study suggests that BA suppresses adipocyte differentiation via inhibition of STAT3 phosphorylation and induction of cyclic-AMP level. These results direct future studies into identification of specific signaling role of TGR5 in adipogenesis.

Reference:

1. Chen, W.D., et al.: Deficiency of G-protein-coupled bile acid receptor Gpbar1 (TGR5) enhances chemically-induced liver carcinogenesis. Hepatology. 2013.57:656–666.

T2:PO.076

Obesity-induced chronic inflammation in C57Bl6J mice, a novel risk factor in the progression of renal AA amyloidosis?

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Background: Compelling evidence links obesity induced systemic inflammation to the development of
chronic kidney disease (CKD). This systemic inflammation may result from exacerbated adipose inflammation. Besides the known detrimental effects of typical pro-inflammatory factors secreted by the adipose tissue (TNF-α, MCP-1 and IL-6) on the kidney, we hypothesize the enhanced obesity-induced secretion of serum amyloid A (SAA), an acute inflammatory protein, to play a key role in aggravating obesity-induced CKD.

Methods: Groups of male C57Bl/6J mice (n = 99 in total) were fed a low (10% lard) or high (45% lard) fat diet for a maximum of 52 weeks. Mice were sacrificed after 24, 40 and 52 weeks. Whole blood samples, kidneys and adipose tissues were collected. The development of adipose and renal tissue inflammation was assessed on gene expression and protein level. Adipocytokine levels were measured in plasma samples.

Results: A distinct inflammatory phenotype was observed in the adipose tissue of HFD mice prior to renal inflammation, which was associated with an early systemic elevation of TNF-α, leptin and SAA (1A-C). With aging, sclerotic lesions appeared in the kidney, the extent of which was severely aggravated by HFD feeding. Lesions exhibited typical amyloid characteristics (2A) and pathological severity positively correlated with bodyweight (2B). Interestingly, more SAA protein was detected in lesions of HFD mice.

Conclusion: Our data suggest a causal link between obesity induced chronic inflammation and AA amyloidosis in C57Bl/6J mice. Though future studies are necessary to prove this causal link and to determine its relevance for the human situation, obesity may hence be considered a risk factor for the development and progression of renal AA amyloidosis in the course of CKD.

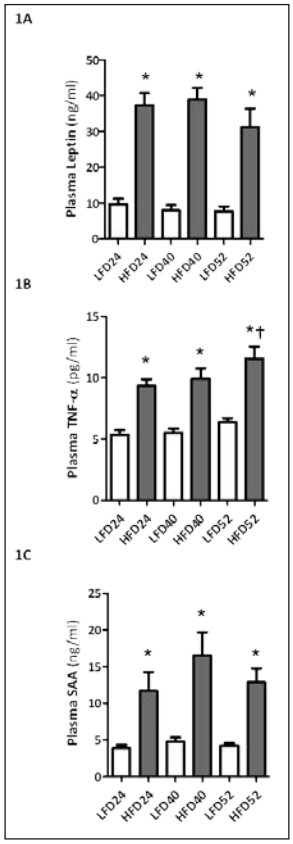

Fig. 1. Systemic plasma levels of (A) Leptin, (B) TNF-a and (C) Serum Amyloid A (SAA) in low fat (LFD) and high fat (HFD) mice after 24, 40 and 52 weeks.

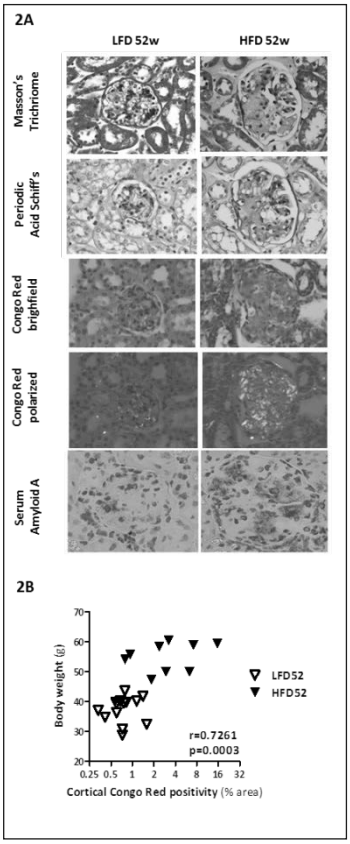

Fig. 2. Representative pictures of kidney glomerular pathology after 52w of low-fat (LFD52) is aggravated by high-fat (HFD52) feeding. (A) From top to bottom stained for Masson's Trichrome, Periodic Acid Schiff's, Congo Red (brightfield), Congo Red (polarized) and Serum Amyloid A protein. (B) Congo Red positive area positively correlates with body weight.

T2:PO.077

Insulin resistance is exaggerated in early-onset obesity and accompanied by down-regulation of miRNAs that mediate inflammation and fibrosis.

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Background: Early and rapid onset of obesity, consequent to abdominal adipose tissue expansion is associated with inflammation and insulin resistance (IR). microRNA (miRNA) may be biomarkers and mediators of both.
Aims: Cardiometabolic risk factors, before and after weight loss, was investigated in early- and adult-onset obesity. Expression of miRNA mediators was also determined.
Method: Non-diabetic subjects before and after surgical weight loss were recruited. Anthropometric measures recorded and fasting blood samples used for determination of lipids, glucose, insulin and adipokines. Expression of miRNA was assessed using an inflammatory array.
Results: Despite both cohorts being morbidly obese, the early-onset group was younger, more IR, hyperleptinaemic, had higher levels of IL-6 and MCP-1 and lower adiponectin. On dichotomization into metabolically healthy (MHO) and pathological (PO), the prevalence of MHO in the early-onset was 20% as opposed 27% in adult-onset. However, in the adult-onset the PO had high leptin, while analogous group of the early-onset had low leptin levels, compared to the MHO. Surgical weight loss improved metabolic profiles of PO of both cohorts, while MHO remained unchanged. miRNA expression in the PO compared to the MHO before weight loss showed significant down regulation of those associated with inflammation (mir-19b, mir-9), IR (mir-142, mir-144, mir-122), fibrosis (mir-29) and adipogenesis (mir-15, mir-130a, mir-374a). Weight loss lead to upregulation of miRNA expression (mir-302a, b, c, mir-9).
Conclusion: In early onset-obesity IR and inflammation are exaggerated. Also lower levels of leptin in this group may suggest greater SNS activation directly inhibiting adipose leptin. Some, but not all, of the metabolic and inflammatory lesions that accompany obesity and IR are ameliorated by weight loss, along with up-regulation of miRNAs mediating IR and inflammation, but not fibrosis.

T2:PO.078

A-mangostin regultes the hepatic steatosis and body fat mass in obese mice with high-fat diets

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Obesity is a major risk factor to develop the metabolic disorders related to hyperglycemia, insulin resistance, hyperlipidemia, hepatic steatosis and cardiovascular diseases, while weight loss has been reported to ameliorate these associated conditions. Due to the previous reports regarding anti-adipogenic activity of α-mangostin, a major active xanthone from mangosteen, Garcinia manostana L., in vitro experiments, we investigated the effects of long-term supplementation with α-mangostin (10 and 50mg/kg/day p.o. for 7 weeks) in mice with established obesity (3month high-fat diet). Therefore, the objective of this study was to investigate the effects of α-mangostin on the metabolic disorder states in high-fat-diet (HF)-fed mice and the underlying mechanisms related to adipogenesis. α-Mangostin supplementation produced a marked decrease in body weight and the levels of serum GOT, GPT, glucose, triglyceride, total cholesterol, low-density lipoprotein cholesterol, and free fatty acid were significantly reduced compared to those in mice with HF diets. Also α-mangostin decrease the fat volume and size and ameliorated the hepatic steatosis in mice with α-mangostin supplementation plus HF. Moreover, α-mangostin activated the AMPK, sirT 1 and suppressed PPARγ levels in liver. Thus, our results suggest that α-mangostin exerts anti-obesity effects in HF-induced obese mice.

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T2:PO.079

Association of serum 25-hydroxy vitamin-d levels with cardiometabolic variables in pre-pubertal children with obesity

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Introduction: The relationship between obesity and vitamin-D status has already been proven and it seems that obese population is at risk of vitamin-D deficiency. The aim of this preliminary study was to estimate the vitamin-D concentration and its association with cardiometabolic indices in pre-pubertal children with different degree of total/abdominal obesity.
Methods: Thirty three children (mean age 8.0 ± 1.3 years, 57.6% males) were recruited. Anthropometric and blood pressure (BP) measures, fasting serum 25-hydroxyvitamin-D (25OHD), glucose, insulin, homeostatic model of assessment (HOMA-IR) and lipids were investigated. Vitamin-D levels < 50 nmol/L were considered as a severe insufficiency and those between 50–75 nmol\L - as a mild insufficiency. 25OHD levels were measured by a validated HPLC/UV method. Obesity status was estimated using the IOTF reference for BMI and the Bulgarian childhood reference for waist circumference.
Results: Severe 25OHD insufficiency was observed in 48.5% of all participants, while 30.3% of them had suboptimal Vitamin-D concentrations. The median 25OHD level was 48.3 (41.6–60.9) nmol/L, without gender differences. Obese children had lower 25OHD concentrations compared to their non-obese counterparts [48.2 (32.9–59.9) vs. 62.6 (50.2–76.0)], $p > 0.05$). Serum 25OHD levels correlated negatively with insulin levels ($r=-0.592$, $p = 0.012$), HOMA-IR ($r=-0.521$, $p = 0.032$) and body weight ($r=-0.526$, $p = 0.03$). No significant association was found with lipids and BP measurements. Applying the backward regression model, the age of our participants was found as the main predictor of their Vitamin-D status.
Conclusion: Abnormal Vitamin-D status is highly prevalent among obese pre-pubertal children, associated with increased insulin resistance.

T2:PO.080

Sarcopenic obesity, metabolic syndrome and inflammation in adult Caucasian Italian subjects

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Introduction: Recently metabolic aspects linked to sarcopenic obesity (SO) were investigated. Extant studies involved especially older people from Asian or White-mixed American cohorts. The aims of our study were to explore the prevalence of SO in Italian pregeriatric subjects and to investigate the relationship among SO, metabolic syndrome (MS) and inflammation.
Methods: Subjects were recruited from 2011 to 2014. Inclusion criteria were age>18 and <65 years, BMI>30 kg/m^2. Body weight, height, waist circumference (WC) were measured. Fat mass (FM) and fat-free mass (FFM) were assessed by DXA. Appendicular skeletal muscle mass (ASMM) was calculated. Sarcopenia was defined as ASMM/h2 or ASMM/weight <2SD than the sex-specific mean of a young population. The cutoffs were ASMM/h2<6.54 kg/m^2 for men and 4.82 kg/m^2 for women, and ASMM/weight<0.2827 for men and 0.2347 for women. ISI-Matsuda was calculated. MS was diagnosed (NCEP-ATP III).
Results: 727 subjects (age:44.9 ± 13.54, BMI:37.22 ± 5.08 kg/m^2)were enrolled. The prevalence of SO was 1.0% or 34.8% in men and 0.6% or 50.1% in women, basing on ASMM/h2 ratio or ASMM/weight. SO subjects based on ASMM/h2 were scarce, only data relying on ASMM/weight were considered. SO subjects were older, with higher BMI, WC, FM, and lower FFM and ASMM than non- SO individuals. Hs-CRP levels were higher and ISI-Matsuda was lower in SO subjects. The presence of MS was higher in SO subjects than non-SO subjects (47.6% vs 34.3%). ASM/weight decreased when increasing the components of MS ($p < 0.05$ for all values).
Conclusion: SO is associated with MS and inflammation in adult Caucasian subjects. Metabolic profile evaluation should be recommended in SO.

T2:PO.081

Ageing of human adipose tissue and related systemic alterations

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Introduction: Obesity has a complex and poorly understood relationship with the ageing process. Adipose tissue is a main pathogenic actor in obesity and associated metabolic dysregulation. Our aim was to characterize adipose tissue alterations associated intrinsically with ageing by comparing healthy elderly with healthy young individuals, and their association with systemic parameters related to adipose tissue metabolic and endocrine functions.
Methods: 28 healthy elderly individuals (>70 year-old; BMI 27.4+0.6) and 10 young (<40; BMI 24.3+0.3) healthy adults were studied. Biopsies from abdominal subcutaneous adipose tissue (SAT) were obtained. Transcript gene expression and telomere length were determined using qRT-PCR and qPCR, respectively. Circulating metabolites, adipokines and cytokines were measured by spectrofotometry, ELISA or Multiplex.
Results: Lipid profile was unaltered in aged individuals whereas glucose homeostasis (HOMA) was moderately worsened. Telomere length was reduced in SAT from elderly individuals. Leptin and pro-inflammatory gene expression (TNFα, IL-8) was increased in fat from elderly individuals whereas no changes were found for adiponectin, PPARγ and C/EBPα. Circulating levels of leptin, pro-inflammatory cytokines and FGF21 were increased in elderly individuals. Leptin serum levels correlate with leptin gene expression in fat, BMI, IL-6 and MCP-1 levels. FGF21 levels correlated with glucose homeostasis markers and TNFα.
Conclusions: Healthy ageing is associated with altered gene expression in adipose tissue. Accordingly, circulating leptin and proinflammatory cytokine levels are increased due to ageing, as well as serum FGF21. Human adipose tissue appears as a relevant target of the physiological decay associated with the ageing process.

Acknowledgement: Acknowledgments: Supported by ISCIII (PI11/00376, PI11/02512, PI14/00063, PI14/00700), MINECO (SAF2011-23636), Spain, and EU FP7 BETABAT (HEALTH-F2-277713).

T2:PO.082

Associations of 7-oxygenated derivatives of dhea with anthropometric measures and their changes in response to a short-term weight management in overweight/obese adolescents.

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Introduction: Anti-obesity potential has been described for dehydroepiandrosterone (DHEA) and its 7-oxygenated derivatives. The aim was to

reveal whether plasma concentrations of 7α-OH-DHEA, 7β-OH-DHEA and 7-oxo-DHEA are associated with adiposity measures and their changes in response to a short-term weight management in adolescents.
Methods: 248 adolescents: 108 boys - age (x ± SD): 15.0 ± 1.5 years, body mass index (BMI): boys 32.9 ± 4.6 kg/m^2; 140 girls - age: 15.4 ± 1.5 years, BMI: 31.5 ± 4.1 kg/m^2. Body composition: bioimpedance Tanita BC-418 MA. Steroids: liquid chromatography-tandem mass spectrometry. Weight management (WM): 4-week supervised in-patient WM programme (energy restricted diet, daily aerobic exercise and cognitive behavioural therapy).
Results: Both 7α-OH-DHEA and 7β-OH-DHEA were positively associated with BMI, BMI SDS, WC and WC SDS ($p < 0.01$). In addition 7α-OH-DHEA was also significantly positively related to % fat and % trunk fat ($p < 0.001$). Only in girls baseline 7β-OH-DHEA levels were positively related to all anthropometric indexes ($p < 0.038$). Baseline concentration of 7α-OH-DHEA was inversely related to decreases of BMI, % fat and % trunk fat ($p < 0.003$) in response to WM. On the other hand, baseline concentrations 7β-OH-DHEA and 7-oxo-DHEA were not associated with decline in adiposity measures.
Conclusions: Plasma concentrations of 7α-OH-DHEA were positively related to baseline adiposity measures and inversely to their changes in response to WM in adolescents. In contrast, baseline concentrations of 7β-OH-DHEA and 7-oxo-DHEA were not associated with decline in adiposity measures. Our results do not support favourable effects of the pre-treatment levels of 7-oxygenated derivatives of DHEA on adiposity reduction in response to a short-term WM.

Acknowledgement: Funding: Research relating to this abstract was funded by IGA MZCR NT/13792-4, NT/13542-3 and MH CZ - DRO (Institute of Endocrinology - EU, 00023761).

T4 – Addiction/Addiction after Bariatric Surgery

T4:PO.001

Continuous Glucose Monitoring for Evaluation of Glycemic Excursions and Hypoglycemia after Roux-en-Y Gastric Bypass

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Introduction: Hypoglycemia is well-known after Roux-en-Y gastric bypass (RYGB) and may be difficult to diagnose since symptoms are non-specific and difficult to distinguish from dumping syndrome. Continuous glucose monitoring (CGM) has been proposed as a diagnostic tool in this evaluation. Thus, we aim to assess the CGM technology in evaluating the glycemic excursions among RYGB-patients.
Methods: Twelve subjects with symptomatic hypoglycemia and 12 subjects asymptomatic after RYGB were recruited. Subjects were subjected to CGM (measuring interstitial fluid glucose (IFG) every 5 min) for 6 days. Moreover a 5-hours mixed meal tolerance test (MMTT) was performed measuring plasma glucose (PG).Another day the patients followed a low-carbohydrate diet (LCD). The other days the patients followed their ordinary diet (OD).
Results: Fig 1 shows the relationship between mean IFG and mean PG during the MMTT. Bland-Altman plot (fig 2) of the relationship between minimum IFG and minimum PG indicates that CGM overestimates minimum IFG by a fixed bias of 1.0 mM; CI (0.7; 1.4). Mean IFG (from 06 AM to midnight) was comparable during the day of LCD and an OD-day ((5.4 ± 0.1 vs. 5.6 ± 0.1) mM; $p = 0.06$) whereas the standard deviation (SD) of mean IFG was significantly lower during LCD compared to OD ((0.6 ± 0.1 vs 1.1 ± 0.1) mM; $p < 0.001$). The mean amplitude of glycemic excursions (MAGE) was significantly reduced during LCD compared to OD ($p < 0.001$).
Conclusion: Although CGM overestimates minimum IFG this study indicates that CGM may be a useful tool especially in the evaluation of treatment effect on glycemic variation in RYGB-operated subjects, as illustrated for LCD. LCD reduces the glucose variability compared to OD expressed both as a reduction in SD and MAGE, even at the same mean IFG.

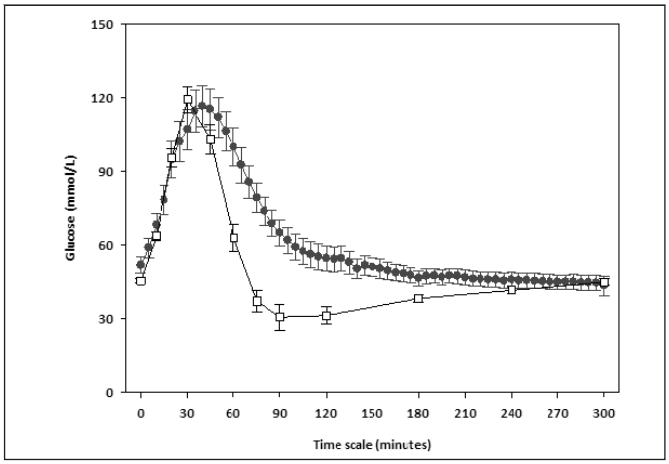

Fig. 1. Mean interstitial fluid glucose ± standard error of mean interstitial glucose (–●–) and mean plasma glucose ± standard error of mean plasma glucose (–□–) measurements during a 5-hours mixed meal tolerance test.

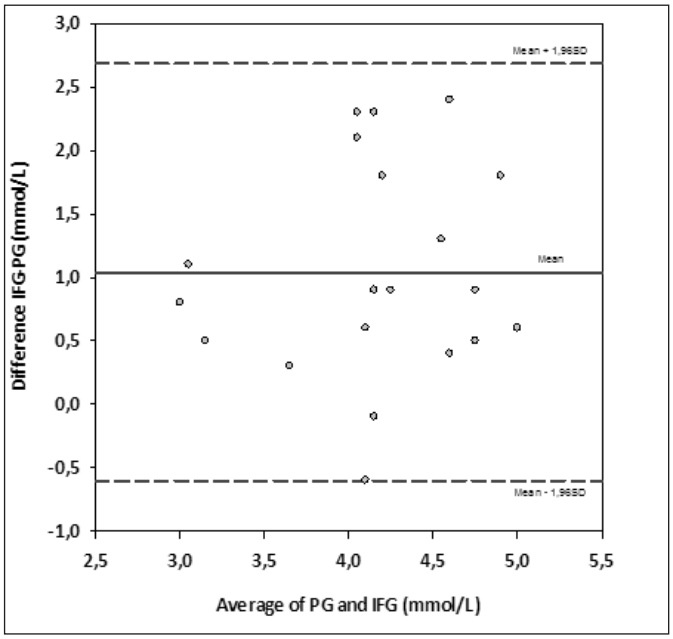

Fig. 2. Comparison between minimum plasma glucose (PG) and interstitial fluid glucose (IFG) during 5-hours mixed meal tolerance test. Bland Altman plot showing average minimum glucose ((PG+IFG)/2) against minimum glucose difference (IFG-PG).

T4:PO.002

Pre-diabetes and its influence on bariatric surgery outcomes: A prospective study in a hospital population

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Introduction: Several studies have established the influence of type 2 diabetes on bariatric surgery outcomes.As pre-diabetes is the early stage of glucose abnormalities, it seems relevant to understand if pre-diabetes has already impact on bariatric surgery outcomes.
Objectives: To evaluate the implications of pre-diabetes on bariatric surgery outcomes.
Methods: Observational, prospective study of obese patients evaluated between January/2010-December/2013.Anthropometric and metabolic parameters were analyzed.Glucose metabolism abnormalities defined according to ADA.
Results: Of 983 patients, 252 were excluded for prior diagnosis of diabetes, 68 for insufficient data and 1 for age <18 years.Of the 662 patients included, 581(87.8%) were female, with a median age of 42Y(IQR, 34-51) and body mass index of 43.5 kg/m^2(IQR, 40.6-47.1);55 were diabetic and 328 pre-diabetic, with no differences in basal BMI.Pre-diabetics had higher levels of total cholesterol, LDL cholesterol, triglycerides, systolic blood pressure and HOMA-IR, compared to euglycaemic($p < 0.05$). Comparing to euglycemic at 12 months post-surgery:pre-diabetics had a more significant reduction in fasting glucose, HbA1c and HOMA-β; had less significant reduction in total cholesterol, LDL and diastolic blood pressure($p < 0.05$); and had lower % of excess BMI lost(%EBMIL) (66.0%vs.75.2; $p < 0.001$).No differences were found regarding %EBMIL, comparing diabetics and pre-diabetics.
Conclusion: In our population pre-diabetes is a determinant of bariatric surgery outcomes.Regarding %EBMIL, these results demonstrate that the statistically significant difference was related to the transition of the euglycemic state to pre-diabetes and not from pre-diabetes to diabetes.These data support the need of an early intervention in obese patients, before settling down glucose metabolism abnormalities.

T4:PO.003

The role of Helicobacter pylori infection on insulin resistance, beta-cell function and metabolic syndrome in an obese population

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Introduction: Recent studies have demonstrated an association between Helicobacter pylori (Hp) infection, insulin resistance (IR), beta cell dysfunction, and metabolic syndrome (MS), due to activation of pro-inflammatory cytokines and deregulation of immune response. However, this association is inconsistent and controversial.
Objective: To evaluate the association between Hp infection and IR, beta cell function and MS.
Methods: Cross-sectional study of 983 obese patients evaluated between January/2010-December/2013. Anthropometric and metabolic parameters were analyzed.IR was defined by HOMA-IR; beta-cell function by HOMA-β; MS by IDF criteria.Test for Hp was carried out by endoscopic biopsy.
Results: Of 983 patients, 252 were excluded for prior diagnosis of diabetes, 13 for insufficient data and 1 for age<18 years.Of the 717 patients included, 629(87.7%) were female, had a median age of 41 years (interquartile range [IQR], 35–51) and BMI of 43.5kg/m^2 (IQR, 40.6–47.1). Body fat index of 47.0% (IQR, 46.4–47.5), insulin 16.9U/mL (IQR, 11.1–25.0), HOMA-IR 3.7 (IQR, 2.3–5.6) and HOMA-β 242.3 (IQR 144.4–402.3). Median C-reactive protein was 6.3 mg/L (IQR, 2.6–12.0). The SM was present in 57% (95% CI, 53.1 to 60.9) and 15.3% (95% CI, 12.7–17.9) were smokers. The Hp was positive in 60.1% (95% CI, 55.8–64.4).Comparing positive vs negative Hp infected patients there was no statistically significant differences in respect to gender, age, BMI, body fat index, smoking, HOMA-IR, HOMA-β or MS.
Conclusion: In our population, Hp infection was not associated with increased risk of IR, beta cell dysfunction or MS. Thus, it seems premature to advocate other specific intervention attitudes regarding Helicobacter pilory in obese patients that could have impact or decrease their cardiovascular risk.

T4:PO.004

Increased bioavailability of alcohol following sleeve gastrectomy – preliminary results 3 months after surgery

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Introduction: There is growing concern that bariatric surgery increases risk of alcoholism postoperatively. As several surgical procedures exist, insight into how different operative techniques influence bioavailability relatively can be valuable information when deciding for appropriate treatment. We set up a trial to compare the effect of sleeve gastrectomy versus gastric bypass on 1 year bioavailability of ethanol. This is 3 months preliminary data from the 5 first sleeve gastrectomy patients.
Methods: Participants, all with BMI>40 kg/m^2, met fasting and had a standardized breakfast one hour prior to alcohol administration. Ethanol dosage was calculated on basis of preoperative total body water (TBW) estimated by bioelectrical impedance (InBody 720). Dosage was 0.4 g/kg TBW for women and 0.5 g/kg TBW for men. Test sequence (intravenous or peroral) was randomized with a washout period of minimum 48 hours. For peroral testing, participants consumed in 5 minutes vodka 40% diluted with orange juice to a concentration of 20%. For the intravenous test, ethanol 40% was diluted with glucose 5% to a concentration of 5 g/100 ml, and administered as infusion over 30 minutes in vena brachialis. Blood alcohol content (BAC) was analysed with Roche Modular P with lower detection limit of 2.2 mmol/L, and area under curve (AUC) was calculated with WinNonlin software.
Results: 3 months postoperatively uptake of alcohol was more rapid, reached higher concentrations and were detectable longer. Relative bioavailability (AUClast) was considerably higher than prior to surgery.
Conclusion: Sleeve gastrectomy seems to increase bioavailability of ethanol which in turn may enhance its toxicological effects.

Acknowledgement: We are grateful to the Clinical Research Facility at St. Olavs University Hospital for their assistance in the trial.

T4:PO.005

Relationship between body mass index and food addiction: How do these measures relate?

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Introduction: Few studies have investigated the nature of the relationship between body mass index (BMI) and food addiction (FA), measured by the Yale Food Addiction Scale (YFAS; Gearhardt et al., 2009). While most of them reported a positive linear relationship between these variables, one study using aggregated data suggested a non-linear relationship (Meule, 2012). The aim of the present study was to pursue the exploration of the relationship between BMI and FA in an attempt to shed more light on the nature of this relationship among a clinical sample.
Methods: Individuals seeking help for eating or weight difficulties in clinics affiliated with Laval University were recruited. They were weighted and measured, and completed the YFAS (N=70, mean BMI=41.84kg/m^2). Linear and logistic regression analyses were conducted to determine whether being in a certain weight category significantly predicted the number of FA criteria endorsed and the probability to obtain a FA diagnosis.
Results: As shown in figure 1, analyses revealed that when compared to the obesity class III category (reference group; BMI > 40 kg/m^2), the overweight ($p = 0.044$) and the obesity class I ($p = 0.019$) categories could significantly better predict the number of FA criteria endorsed. This model explained 13% of the variance. The same pattern was found for the relationship between BMI and FA diagnosis (odds ratio 11.67 (overweight) and 15.56 (obesity class I)) and this model explained 28% of the variance.
Conclusion: Findings from this study help clarify the way BMI and FA relate and highlight the complexity of this relationship, as FA symptomatology appears to behave differently across weight categories. Further studies are needed to better understand this relationship and its clinical implications.

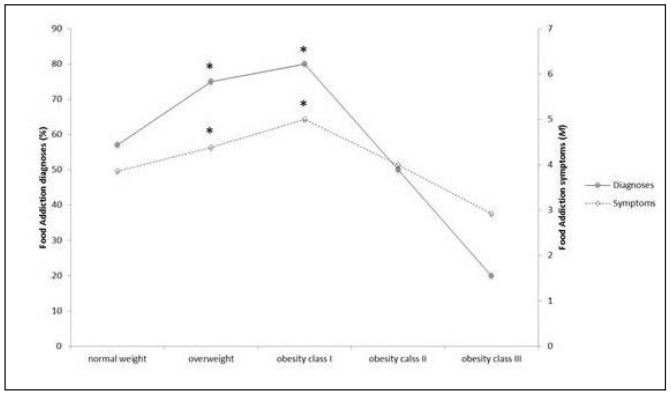

Fig. 1. Prevalence of food addiction diagnoses, in percentage (%), as well as mean number of food addiction criteria endorsed in relation to established weight categories. *$p < 0.05$

T4:PO.006

Brain Activity in Obese Individuals with an Addictive Tendency to Food

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Introduction: Obesity is a major healthcare problem facing today's society. Why certain individuals within an obesogenic society are more susceptible to becoming obese remains unclear, however differences in genetics, physiology and psychology may partly explain variation in risk. In addition some individuals may be susceptible to highly palatable food, showing addictive-like eating behaviours. However, controversy exists as to whether a proportion of people with obesity have an addictive disorder relating to food intake. Recently the Yale Food Addiction Scale (YFAS) was developed as a validated method for identifying individuals who have addictive tendencies towards food. The aim of this study was to compare brain activity in food addicted (high YFAS score) and non-addicted obese individuals (low YFAS score) and compare this activity to lean individuals and individuals with alcohol addiction.
Methods: Resting state brain EEG activity was compared in 38 obese (BMI >30kg/m^2), 20 normal weight (BMI 18–25kg/m2) and 13 alcoholic individuals were recruited. The obese individuals were divided into low (n = 18) and high (n = 20) YFAS groups based on median split of YFAS scores.
Results: Obese individuals increased activity was identified in the precuneus and posterior cingulate cortex (PCC), major hubs in the default mode complex which is involved in self-referential and bodily information processing. A conjunction analysis between food addicted and non-addicted individuals revealed anti-correlated activity in the rostral anterior cingulate (rACC) and dorso-medial prefrontal (dmPFC) corticies. Increased hunger in the food addicted group correlated to increasing activity in the rACC in a similar area correlated to craving for alcohol in individuals with alcoholism.
Conclusion: Obese individuals with a tendency to food addiction have neurobiological differences when compared to those without food addiction and show similar changes to people with alcoholism.

T4 – Brain imaging and phenotyping

T4:PO.007

High-fat feeding affects cognitive performance and brain glucose metabolism in adult mice

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Introduction: Epidemiological evidence and experimental studies support the association between obesity and cognitive decline. Alterations of brain glucose metabolism and insulin sensitivity have been advocated as potential causal factors. Our aim was to assess the effect of a 6-month high-fat diet (HFD) on cognitive performance and brain metabolic activity in adult mice.
Methods: Explorative and cognitive behaviour of lean (n=19), HFD-induced obese (n=20) and Alzheimer's Disease (AD) mice supplied (n=20) or not (n=20) with HFD was monitored up to 8 months of age. Then, brain glucose uptake in fasting conditions and during acute intranasal insulin stimulation was determined by 18F-Fluoro-2-deoxy-D-glucose positron emission tomography (18F-FDG PET) in subgroups of animals.

Results: A progressive decline in exploratory and cognitive performance was detected at 8 months of age from ND to HFD, to AD and to HFD-fed AD mice (r=-0,4, p < 0,05), with a pronounced worsening in explorative behaviour in the latter group (p < 0,05 vs baseline). The encephalization quotient was reduced in proportion to the diet-induced weight gain (r=-0,8, p < 0,001). In fasting conditions, 18F-FDG PET revealed a considerably higher brain glucose uptake in cognitive and homeostatic regions in HFD-fed mice regardless of AD (p≤0,05 vs respective controls). A positive effect of intranasal insulin administration on brain glucose metabolism was observed, especially in the AD group.
Conclusion: A 6-month HFD exposure significantly alters cognitive performance and brain glucose metabolism in adult mice. The acute intranasal administration of insulin has a positive effect on brain glucose metabolism in AD.

T4 – Eating Disorders

T4:PO.008

Association between adult attention deficit/hyper activity disorder, binge eating and obesity in the population of Belarus.

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Introduction: Attention deficit/hyperactivity disorder (ADHD) is a neurobehavioral disorder that affects near 3,2–4.0% of the adult population of Belarus. Studies have revealed high rates of ADHD (26–61%) in patients seeking weight loss treatment suggesting an association between ADHD and obesity. The objective of the present study was to test the association between ADHD and overweight and obesity in the population of Belarus
Methods: Participants were 2560 residents (58.6% female) aged 18–45 years. A retrospective assessment of childhood ADHD and a self-report assessment of adult ADHD were administered. Diagnosis was defined by three categories: never met diagnostic criteria, met full childhood criteria with no current symptoms, and met full childhood criteria with current symptoms.
Results: The prevalence of overweight and obesity was 34,8 and 28.4%, respectively, among adults with ADHD, and 29.6 and 20.6%, respectively, among persons with no history of ADHD. Adult ADHD was associated with greater likelihood of overweight, (odds ratio (OR) = 1.64; 95% confidence interval (CI) = 1.05, 2.37) and obesity (OR = 1.82; 95% CI = 1.14, 2.65).
Conclusion: Results were similar when adjusting for demographic characteristics and depression. Mediation analyses suggest that binge eating disorder (BED), but not depression, partially mediates the associations between ADHD and both overweight and obesity.
Results: suggest that adult ADHD is associated with overweight and obesity and BED.

T4:PO.009

Increasing risk of eating disorders in patients with childhood obesity

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Introduction: Obesity from early age is considered a strong predictor of the premature development of cardiovascular diseases and other comorbid conditions [1–3]. This retrospective case-control study aims at exploring if childhood obesity may be involved in the development of eating disorders (EDs).
Methods: A group of patients with diagnosis of EDs (n=99) were compared with a control group (n=423). Personal data, socioeconomic status, lifestyle, weight history, dieting, body mass index at pubertal development, family history of obesity as well as for eating disorder have been considered. Logistic regression has been used to assess the influence of childhood obesity in the development of EDs.
Results: Obese children had almost two times (p = 0,018) the risk to develop EDs, compared with normal and underweight ones. In particular, obese children had a three times (p = 0,018) and 2,6 times (p = 0,031) higher risk to develop respectively binge eating disorder (BED) and bulimia nervosa (BN). Moreover, the female component of our sample as well as the subjects with motherly positive anamnesis for EDs (MPAEDs), had respectively a five times (p < 0,001) and four times (p = 0,037) higher risk to develop EDs than males and subjects with motherly negative anamnesis for EDs (MNAEDs).
Conclusion: Our results indicate a high and increasing prevalence of EDs patients with early history of childhood obesity and suggest the necessity to develop more sensibility and awareness by clinicians who treat overweight and obese children.

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T4:PO.010

Psychopathology of nes obese patients

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Introduction: Night Eating Syndrome (NES) is an Eating Disorder characterized by evening hyperphagia (consuming ≥25% of total daily food intake after dinner), morning anorexia, and depressed mood that worsens in the evening. It is still unclear which are the psychopathological features of NES and the importance of the sleep disorder in its etiopathogenesis. This study evaluates mental dimension features in NES obese patients and psychiatric comorbidities.
Materials and methods: 980 obese patients (M age: 35; M BMI: 44.4; f/m:653/327) were enrolled in this study, 96/980 had NES diagnosis (M age: 38; M BMI: 43; f/m:55/41). The diagnostic evaluation includes: psychiatric interview, semi-structured interview for eating behavior and psychodiagnosis to evaluate the mental dimensions: impulsiveness: Binge Eating Scale(BES), Barratt Impulsiveness Scale(BIS-11), depression: Beck Depression Inventory(BDI-II), body image: Body Uneasiness Test(BUT), anxiety: State Trait Anxiety Inventory(STAI-Y 2).
Results: In this sample, morning anorexia is not present. It turns out to have an associated daytime eating behavior: binge24%; nibbling 40%; gorging and snacker 36%. BIS = 67.8 and BES = 19.5; STAI-Y = 47.7; BDI-II = 19.4; BUT: GSI = 2.55; PST = 16.1; PSDI = 0.6; Tot = 84. Prevalent comorbities are: depression (21%), an anxiety disorder (12.5%), psychosis (2%).
Conclusions: The psychopathological analysis of obese patients with NES requires a psychiatric treatment: psychopharmacological and/or psychotherapeutic before any care in fulfilling obesity healing.

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T4:PO.011

Attitudes and Behaviors Related to Eating and Body Shape in Young Adults Born Preterm

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Background: Preterm birth has been listed as a potential risk factor for later attitudinal and behavioral problems related to eating disorders (ED). We examined the association between preterm birth and symptoms related to EDs in young adult women and men.
Methods: We studied young adults from two birth cohorts: ESTER (Northern Finland 1985–1989) and Arvo Ylppö Longitudinal Study (Uusimaa, Finland, 1985–1986). Of them, 175 were born early preterm (EPT, <34 wk GA), 349 late preterm (LPT, between 34–37 wk GA) and 635 were term-born controls (N=1159). Mean age was 24.1 (SD 1.4) years. The subjects completed 3 subscales of the Eating Disorder Inventory (EDI)-2 (total of 22 items), including Drive for Thinness (DT), Body Dissatisfaction (BD) and Bulimia (B). Group differences were examined by linear regression.
Results: Mean total EDI score was higher in women than in men (74.2, SD 18.9 vs 55.0, SD 14.5, $p < .001$). Women born EPT scored 5.9 points (95% CI −10.6 to −1.3, $p < .05$) lower in EDI total scores than controls. This difference was observed in all three EDI subscales, DT, BD and B. The differences persisted after adjustments for cohort, age, parental education, maternal smoking and pre-pregnancy BMI and height, body fat percentage, smoking, depression and timing of puberty of the subject. We did not observe differences between women born LPT and controls or any differences among men.
Conclusions: Women born EPT have significantly healthier attitudes and behaviors related to eating and body shape than controls born at term.

T4 – Psychological support and Patient Support

T4:PO.012

Psychosocial characteristics of bariatric candidates with respect to approval, delay and denial at psychological assessment prior to surgery

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Introduction: Pre-operative psychological assessment of bariatric candidates plays important role in treatment success. It may result in approval, delay or denial of bariatric procedure.
Methods: The study compares outcomes of psychological evaluation according to their profiles. Data from 395 bariatric candidates who underwent semi-structured interview and questionnaires of BDI-II, TFEQ, OWLQOL & WRSM, were statistically analyzed. Patients were allocated into groups according to results of psychological evaluation.
Results: There were 80.51% of women (318) in the cohort. Average age 44,11 (±11,28) years, BMI 42,57 (±6,83) kg/m^2, weight 122,5 (±24,94) kg. Group A: 276 (69,99%) pts in whom no psychological objections to the planned bariatric intervention were present. Group B: 119 (30,13%) pts were delayed and repeatedly psychologically evaluated. Group B was subdivided into Group B1 (70) pts who later met the requirements and underwent bariatric procedure and Group B2 (49) pts, who did not comply and were contraindicated. Significantly more women, older subjects > 50 years, and BMI < 39 kg/m^2 were present in Group A. Higher score of restriction TFEQ (10,4) was found in Group A vs. Group B1 (8,7) and Group B2 (8,3). In comparison with Group A, Group B2 presented more unmarried men with higher average BMI (44,9 vs. 41,8 kg/m^2) and more patients with BMI > 50kg/m^2. Scores of restriction in TFEQ were lower for Group B2 than for Group A (average 8,3 vs.10,4), higher in disinhibition (average 9,5 vs.7,9), showed worse QoL (# of symptoms in WRSM 11,6 vs.9,5).
Conclusion: Statistically significant difference in questionnaires scorings as well as in gender and BMI was found between the Group A and sub-Group B2.

T4:PO.013

The impact of shame, self-criticism and social rank on eating psychopathology in overweight and obese members of a commercial weight management programme.

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Background: Research has highlighted the important role social rank, shame and self-criticism play in vulnerability to and maintenance of eating disorders. However, it is not clear if these factors are also important for weight control capability in populations who are overweight or obese.This study examined associations between self-criticism, social comparison, external shame, negative affect (emotions) and eating psychopathology in overweight/obese participants attending a weight management programme focused on behaviour change.
Methods: 2236 participants completed an online survey with measures of self-criticism, social comparison, external shame and negative affect, adapted to address these aspects in relation to eating behaviour, body weight and shape.
Results: Correlational analyses showed that external shame, self-criticism and social comparison were associated with negative affect and eating psychopathology. Path analysis showed that when the effect of depressive symptoms was controlled for the impact of external shame, hated self and reassured self on disinhibition and susceptibility to hunger was fully mediated by their effect on weight-related negative affect. In turn, inadequate self and negative social comparison predicted higher disinhibition and susceptibility to hunger directly and partially through weight-related negative affect.
Conclusions: Shame, self-criticism, and perceptions of low social rank significantly predict eating-related difficulties in members of the general population participating in popular weight-loss programmes. Targeting shame, self-criticism, and perceptions of low social rank are important areas of focus for interventions in members of the general population experiencing eating and weight-related difficulties.

T4:PO.014

The impact of self-criticism and self-reasurance on weight related positive and negative affect and well-being in participants of a commercial weight management programme.

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Introduction: Weight stigma can potentially undermine weight management by increasing self-criticism. We recently examined the links between external shame, self-criticism, social comparison, negative affect and eating behaviours in 2,236 participants attending a community based weight management program focused on behaviour change. Shame and self-criticism influenced measures of eating behaviour (disinhibition and perceived hunger)- an effect fully mediated through weight-related negative affect. In the present study we examined the impact of self-criticism on wellbeing.
Method: 2,175 participants completed an online survey using measures of self-criticism, self-reassurance negative and positive affect and well-being (which were adapted to specifically address eating behaviour, weight and body shape perceptions).
Results: Correlation analyses showed that self-criticism was associated with negative affect and wellbeing. Path analysis suggested that self-criticism significantly decreased well-being, both directly and indirectly, mediated by increased levels of negative affect about one's weight, and by decreased levels of positive affect about one's weight. The ability to self-reassure had a higher predictive effect on increased well-being by predicting less negative affect and by predicting increased levels of positive affect regarding one's weight. All effects were significant at $p < 0.001$.
Conclusions: Factors that increase self-criticism impact on well-being in participants engaged in attempts to manage their weight, both directly and through their impact on weight related affect. Developing self-reassuring competencies in weight management programmes enhances weight related affect and well-being.

T4:PO.015

No difference in weight loss achieved following a vlcd in conjunction with telephone-based group support compared with a vlcd in conjunction with face-to-face support

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The number of effective weight loss programmes which are readily accessible for our increasingly obese population is a growing problem. LighterLife, a commercial weight-loss provider, offers weight loss and maintenance programmes which utilise a tripartite approach consisting of formula based foods for weight loss in conjunction with behavioural-change therapy underpinned by group support to aid clients with longer-term weight maintenance. LL2U is a pilot weight loss programme in which the group support is accessed via telephone rather than face-to-face (F2F). We evaluated the efficacy of LL2U by comparing data for obese clients (n=17) who had completed 8 weeks of VLCD whilst receiving group support on LL2U with data from an equal sized group of age and BMI matched individuals who had completed 8 weeks of VLCD on LighterLife Total (F2F support). Within-group comparisons were performed using paired t-tests and differences in mean weight over time between the groups assessed using a repeated measures analysis of variance (RM-ANOVA) (OpenStat, version 2013 http://www.statpages.org/miller/openstat) After 8 weeks there was a significant weight reduction for both groups when compared with baseline (mean ± SEM) (LL2U: 98.3 ± 4.0 kg vs. 86.5 ± 3.45 kg, $p < 0.001$ and Total: 95.3 ± 3.5 kg vs. 83.6 ±3.1 kg, $p < 0.001$). RM-ANOVA showed that the total weight change observed for the LL2U group did not differ significantly from that observed in the Total group (-11.8 ± 3.6 kg versus –11.7 ± 3.2 kg, $p > 0.05$) throughout the period of observation. These data provide evidence that a VLCD alongside LL2U based group support is effective in supporting initial weight loss in obese clients. Whilst successful weight maintenance is complex and multi-factorial, behavioural change therapy via telephone may provide the support required. However, the impact of this on longer term weight maintenance still needs to be established.

T4:PO.016

Prevalence of depression and associated factors in greek obese patients

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Introduction: Prevalence of depression in obese population is significantly high, resulting in deterioration of overall quality of life. Most of the time depression and obesity co-exist, affecting many aspects of life, such as sexual life and quality of sleep.
Methods: In the first COM in Greece a total sample of 48 obese outpatients (mean age 47.8 ± 14.1 years and mean BMI 41.6± 8.1 kg/m^2) undergone a psychiatric evaluation of depression status (HDRS), sexual dysfunction (ASEX) and quality of sleep and daytime sleepiness as part of the standard baseline assessment.
Results: All the outpatients have suffered from some degree of depression (mild 16.7%, moderate 43.8%, severe 14.6%, very severe 25%). Majority of study population were women (79.2%) and morbidly obese (43.8%). According to Epworth Sleepiness Scale 87.5% of the outpatients had developed either moderate or serious sleep disorder, while 33.3% had sexual dysfunction. The severity of depression demonstrates a significant positive correlation to sexual dysfunction ($p < 0.05$) as well as to quality of sleep ($p < 0.01$). There was a significant relation between depression and financial status of individuals ($p < 0.05$). BMI and weight, on the other hand, was not statistically associated to depression degree.
Conclusion: Although overweight and obesity are positively associated with depression and depressive symptoms there is data that report either no relationship or an inverse relationship between the two. Nevertheless, this study indicates that prevalence of depression and related disorders are very common among obese people who seek treatment, a fact that highlights the essential role of a psychiatrist as a member of the specialized team for the treatment of obesity.

T4:PO.017

Self-esteem and its relation to self-recognition of one's own body in relation to nutritional status of women diagnosed with polycystic ovary syndrome

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Introduction: Symptoms of depression and the lack of self-acceptance is more common among women with polycystic ovary syndrome (PCOS) than in the general population of women. One of factors influencing these

disturbances is nutritional status. Therefore, the aim of the study was to assess self-esteem and its relation to self-recognition of one's own body of women with PCOS in relation to nutritional status.
Methods: Two-hundred-thirty-four women diagnosed with PCOS were enrolled. Body mass and height were measured and BMI was calculated. Nutritional status was assessed on the basis WHO criteria. Self-esteem was assessed on the basis of polish adaptation M. Rosenberg scale and self-recognition of own's body by Franzoi and Shields scale.
Results: Normal body mass was diagnosed in 66.2% study women, overweight in 19.7% and obesity in 14.1%. There were no differences in age of the study group (24.7 ± 5.5, 24.9 ± 4.6 and 25.5 ± 4.6 yrs) and satisfaction with their sexual attractiveness (47.3 ± 7.7; 47.1 ± 7.6 i 46.1 ± 10.6 points). While, the degree of satisfaction with weight control and with physical condition (29.3 ± 9.1 vs. 25.4 ± 7.2 vs. 23.8 ± 9.8 points and 32.1 ± 5.9 vs. 28.9 ± 6.5 vs. 28.0 ± 8.0 points, respectively). Low level of self-esteem was more frequent in obese women 18.1%. In addition, any obese women had high level of self-esteem.
Conclusions: Overweight and obesity are the factors decreased satisfaction with weight control and physical condition but not with sexual attractiveness. While, low self-esteem in women diagnosed with PCOS is increased by obesity, only.

T4:PO.018

The role of emotional regulation in childhood obesity: Implications for prevention and treatment

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Background: Stress and negative emotions represent an important public health threat e.g. by increasing the risk to develop obesity. Since the process to cope with negative emotions (= emotion regulation (ER)) already develops during childhood, we present a novel conceptual framework model on the role of ER in prevention and treatment of childhood obesity.
Methods: An electronic database search (MEDLINE, Web of Knowledge and Scopus) was conducted on observational and interventional/experimental literature concerning the ER-obesity link and its underlying concepts. We also present an overview of ER intervention techniques.
Results: Our model states that childhood ER is a fundamental link between stress and obesity. Stress along with ineffective ER causes abnormal cortisol patterns, emotional eating, a sedentary lifestyle and sleep problems. In the development of obesity and ER, also parents play a role. In contrast, effective ER skills decrease obesity-related unhealthy behaviour and enhance protective factors, which boost mental and physical health. In children, some observational studies were found but very few intervention studies, mainly pilot or still on-going studies.
Conclusions: Encouraging effective ER could be a new approach in the fight against and the treatment of childhood obesity. Future ER interventions are needed to confirm this model in children.

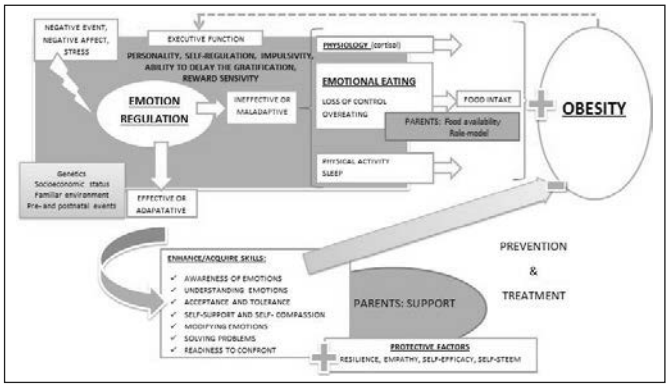

Fig. 1. Conceptual framework model on the role of ER in the prevention and treatment of childhood obesity

T4:PO.019

Retrospective analysis of subjective wellbeing and weight loss in patients receiving talking therapies at the Rotherham Institute for Obesity (RIO)

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Rotherham Institute for Obesity (RIO)

Introduction: RIO is a specialist weight management service with a comprehensive multidisciplinary team approach that includes talking therapies. The therapies involved are solution focussed and include Motivational Interviewing (MI), Cognitive Behavioural Therapy (CBT), Neurolinguistic Programming (NLP), Emotional Freedom Techniques, life coaching and hypnotherapy. Patients are referred by other members of the RIO MDT if patients are suspected of emotional eating, are identified as having binge eating or comfort eating, or are suspected of having underlying psychological barriers to weight loss.
Methods: Retrospective analysis of qualitative and quantitative data for all partcipants aged 19–80 years, between April 2010 to March 2013, who attended the RIO weight management programme (n=4587). Subjective wellbeing (SWB) scores were measured by means of the WHO-5 wellbeing index at the initial assessment and at 6 months.
Results: From the 2091 patients that completed the 6 month RIO programme, 627 patients (30%) were seen by a talking therapist (TT). patients who saw a TT demonstrated improved SWB scores by 25% ($p < 0.001$, $r=0.3$) compared to 21% ($p < 0.001$, $r=0.2$) who had not seen a TT. Patients who were referred had a higher BMI (average 44.4 kg/m^2) compared to those who had not (41.02 kg/m^2). Weight loss was similar for both groups; 5.8kg in those who received TT compared to 5.7kg in those who did not.
Conclusion: SWB improvements were enhanced for patients who saw a talking therapist, however overall weight loss results were similar for both groups. Patients referred for talking therapy were usually those having siginificant difficulty in losing weight, yet relatively a considerable amount of weight was seen in this cohort.

T4:PO.020

Does A Health Information Technology developed by Children and their Parents improve Obesity Therapie?

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Existing interventions prove limited effectiveness and sustainability. IT-enhanced interventions have the potential for higher accessibility and cost-effectiveness.They aim not only modifying the patient's behavior but also to positively in influence their family system.

Methods: In cooperation with therapists, extremely obese children, their parents, and differnt researcher, a mobile health information system (HIS) with special data security was developed, consisting of a tablet PC with cooking and shopping support, relaxation tools, the ability to measure speed of eating and emotional parameters and physical activity accelerometer. Three groups of each six extremely obese children (BMI > 99.5, median BMI z-score 3.0, age 13.2 ± 2.3 years) were assigned. Therapy in either an (1) individual or (2) group setting with HIS, or (3) individual care without HIS. All groups were evaluated for above metioned items in a specialized centre before and after 12 months of therapy. Questions of interest: 1. Does a HIS developed by children and their parents improve adherence to therapy and thus improve health outcomes in families with low time resources? 2. Can HIS help the family to change its activity, nutrition, mood and communication habits.
Results: 25% of extremely obese children with HIS and 60% without HIS decreased their BMI-SDS. HIS children did not reduce their obesity better than the control group without HIS, if parents did not support their children at home. Those children with parental support did use HIS for activity, mood and nutrition monitoring regularly.
Conclusion: In extremely obese children, home support with HIS is only effective, when children are guided by their parents while using the HIS. To select appropriate families for HIS home support, a careful examination of the family system in context with their motivation and their psychosocial problems is unalterable by questionnaires and interviews.

Acknowledgement: ą Children's Hospital of Eastern Switzerland, St. Gallen, * SNF Grant #CR 10/1 135552 ¸ University of St. Gallen, Switzerland ł ETH Zurich, Switzerland [4] Eurobesitas Centre (COMS) Vevey, Switzerland [5]University of Fribourg, Switzerland [6] Saarland University, Germany

T4 – Quality of life

T4:PO.021

Not weight status but parental education and perception of weight and health are related to health related quality of life in children and adolescents.

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Introduction: Previous research suggests that weight status is negatively associated with health related quality of life (HRQoL) in children and adolescents. However, little is known on other factors influencing HRQoL. Therefore, the aim of this study is to describe the association between weight status, children's characteristics and HRQoL.
Methods: Baseline data from a prospective cohort studying 715 children (2–18 years) in 73 general practices in the Netherlands were used. Height and weight were measured during regular consultation and children and parents filled-out questionnaires about HRQoL (Pediatric Quality of Life Inventory), demographics, parents' perception of the child's weight, parents' perception of the child's health status and number of GP consultations over the last twelve months. Data were analysed using a multiple linear regression model with HRQoL as dependent variable.
Results: Global HRQoL scores were significantly lower in overweight and obese children (78.2(14.1), n=116) compared to underweight (84.9(10.1), n=109) or normal weight (83.6(10.7), n=372) children ($p < 0.001$). Multiple linear regression analysis showed that not weight status but lower parental education, perceived overweight and perception of lower health were significantly associated with decreased global and physical HRQoL ($p < 0.01$). Higher weight status, child considered as overweight and poor perceived health were associated with impaired psychosocial HRQoL ($p < 0.05$).
Conclusion: Physical HRQoL is associated with parental education and perception of weight and health while psychosocial HRQoL is associated with weight status but also with health and weight perception.

T4.PO.022

Liraglutide 3.0 Mg reduces body weight and improves hrqol in overweight or obese adults without diabetes: Scale obesity and prediabetes randomized, double-blind, placebo-controlled, 56-week trial

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Obesity is a chronic disease associated with physical and mental health problems and reduced health-related quality of life (HRQoL), which can be improved by weight loss (WL). The effects of liraglutide 3.0 mg, as adjunct to diet & exercise, on body weight (primary endpoint) and HRQoL in overweight/obese adults were investigated. Individuals (BMI ≥27 kg/m¸ with ≥1 comorbidity or ≥30 kg/m¸) were advised on a 500 kcal/day deficit diet & exercise program, and randomized 2:1 to once-daily sc liraglutide 3.0 mg (n=2487) or placebo (n=1244). Baseline characteristics: age 45.1 years, 78.5% female, weight 106.2 kg, BMI 38.3 kg/m¸, 61.2% with prediabetes. The Impact of Weight on Quality of Life-Lite (IWQoL), Short-Form (36) Health Survey (SF-36) and Treatment Related Impact measure-Weight (TRIM-W) questionnaires were used to assess health-related outcomes (score ranges 0-100). Data were observed means±SD and estimated treatment differences (ED), with LOCF. Clinicaltrials.gov ID: NCT01272219. At week 56, individuals on liraglutide 3.0 mg had more WL (8.0 ± 6.7%) vs placebo (2.6 ± 5.7%; ED −5.4% [95%CI −5.8;-5.0]; $p < 0.0001$). WL was accompanied by improvements in the total IWQoL score with liraglutide (10.6 ± 13.3) vs placebo (7.6 ± 12.8; ED 3.1 [2.2;4.0], $p < 0.0001$), mostly driven by improved physical function. The TRIM-W total score (ED 2.1 [1.3;3.0], $p < 0.0001$), SF-36 summary physical/mental health scores (ED 1.7 [1.2;2.2], $p < 0.0001$; 0.9 [0.3;1.5], $p = 0.003$), and all domain scores of IWQoL and SF-36 improved with liraglutide vs placebo. In conclusion, weight loss with liraglutide 3.0 mg, as adjunct to diet & exercise, was accompanied by weight-related improvements in HRQoL, including physical function and mental health. Greater weight loss led to greater improvements in HRQoL scores.

Acknowledgement: Supported by Novo Nordisk

T4:PO.023

Quality of life and negative emotionality in overweight and obese non-clinical sample

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Introduction: The present study investigates the correlates of health-related quality of life (HRQoL) in the adult overweight and obese population and the association between body mass index, depression, anxiety, and potential mediating effects of physical health functioning.
Methods: The research was conducted on a sample of overweight and obese adults who visited their primary care physician. A total of 143 women and 130 men were enrolled in the study, 43% of the subjects were overweight, and 57% of the subjects were obese. The subjects ranged in age between 21 and 60 years. Depression and anxiety were assessed using the

Hospital Anxiety and Depression Scale (HADS), physical health functioning was evaluated using the Medical Outcome Study Short-Form 36 (SF-36), and BMI was calculated as weight divided by height squared.
Results: The regression analysis results indicated that the components of physical HRQoL (physical functioning and role limitation due to physical problems) mediate the relationship between body mass index and depression only in women. The higher level of body mass decreased the quality of life, and different aspect of impaired physical health became a potential risk factor for the development of depressive symptoms. Men do not relate their weight to poorer quality of life (e.g., general health or life roles).
Conclusion: The results from the present study show that a different pattern of functioning exists between men and women. It is important to identify the factors that can effectively motivate and stimulate obese people to change their lifestyle and to consider the differences in psychological functioning between women and men.

T4:PO.024

Weight loss with liraglutide 3.0 Mg is associated with improved health-related quality of life (hrqol) and treatment satisfaction in overweight or obese adults with type 2 diabetes (t2d)

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Background: Obesity is a chronic disease associated with T2D and low HRQoL, which can be improved by a 5–10% weight loss. We studied the impact of weight loss with liraglutide 3.0 mg, as an adjunct to diet and exercise, compared with placebo and liraglutide 1.8 mg on HRQoL in overweight/obese adults with T2D.
Methods: 846 participants (means: age 55 years; males 50%; BMI 37 (27–68) kg/m¸; HbA1c 7.9%; diabetes duration 7.3 (0.2–36) years; 11% on diet + exercise, 57% on metformin monotherapy, 31% on combination OADs) were randomized (2:1:1) to 56 weeks of once-daily s.c. liraglutide 3.0 mg (n=423), 1.8 mg (n=211) or placebo (n=212) treatment + guided diet (500 kcal/day deficit) and exercise. The Impact of Weight on Quality of Life (IWQoL) Lite and Diabetes Treatment Satisfaction Questionnaire (DTSQ) were used to assess health-related outcomes. Clinicaltrials.gov ID: NCT01272232.
Results: At week 56, weight loss (mean±SD) was 5.9 ± 5.5%, 4.6 ± 5.5% and 2.0 ± 4.3% with liraglutide 3.0 mg, 1.8 mg, and placebo, respectively. The mean total score of the IWQoL-Lite improved with 3.0 mg (11.7 ± 14.7), but not 1.8 mg (9.1 ± 14.1), vs. placebo (7.6 ± 12.6; estimated difference (ED) and 95%CI: 2.7 [0.6 4.9]; p = 0.014); this was driven by an improved physical function score (15.4 ± 17.1 with 3.0 mg vs. 9.5 ± 16.6 with placebo; ED: 4.9 [2.1 7.7]; p = 0.0006). Liraglutide 3.0 mg, but not 1.8 mg, also improved the DTSQ vs. placebo (ED: 1.4 [0.4 2.5]; p < 0.01).
Conclusion: In overweight/obese individuals with T2D, liraglutide 3.0 mg, as adjunct to diet and exercise, was superior to placebo and 1.8 mg on weight loss (p < 0.0001 and p = 0.0024, respectively), and also significantly improved HRQoL and diabetes treatment satisfaction.

Acknowledgement: Supported by Novo Nordisk

T4:PO.025

'Blodomloppet' - a way to increase self-confidence connected to physical aktivity

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Introduction: Physical activity has an important role to play regards to affecting different risk factors, among others insulin sensitivity and improved physical wellbeing (1–2). It is also well known that children and young people who are physically active as children tend to retain these good habits into adulthood (2). Many young people who suffer from obesity have negative experiences of physical activity and are often excluded early from physical activities. This in turn leads to exclusion and increases the stigma both physically and socially (3). We decided to start training for a non-competitive race and chose ‚Blodomloppet', a 5km circuit non-professional running competition.
Method: Reduced starting fees enabled the group to take part free of charge. Four young people entered in 2012 and five in 2013. One physiotherapist ran the race with the group and one was placed alongside the track to offer support and as a rallying point. This also gave us an opportunity to discuss nutrition and training in connection with the experiences from ‚Blodomloppet'.
Result: All participants completed the race. They expressed the importance and strength of the group (community) which gave all the participants the confidence to run the race. After the race the participants felt an increased confidence in their own bodies through physical activity. The memory of their achievement was later seen in the group training and as a consequence we could raise our expectations of them. Estimations of the group BMI before and after the race resulted in a reduction of 0.9 units of BMI. Research suggests that a reduction of 0.5 units of BMI means a significant health gains with respect to risk factors (1).
Conclusion: To put the foundation for a healthier lifestyle where physical activity remains a certainty, can perhaps become the result when a homogenous group is put together to give the conditions they did not have with them from the outset.

Fig. 1. Adolecents that participated in „Blodomloppet"

T4:PO.026

Deterioration of quality of life perception depending on different obesity levels

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Introduction: In recent years, the assessment of quality of life of obese people has been extensively studied. Although anthropometric characteristics are strong indicators of health status, obese population demonstrates also impairment of quality of life. The aim of our study was to assess the

relationship between the quality of life self-perception and the obesity degree, using the Moorehead – Ardelt QOL II (MAII) questionnaire, among subcategories of obesity in the first COM in Greece.
Methods: A total of 23 outpatients (mean age 44.6 ± 12.2 years and mean BMI 39 ± 5.2 kg/m^2) were recruited in order to assess the MA II. Basic anthropometric and sociodemographic characteristics were recorded.
Results: The majority of the outpatients were women (82.6%) and declared a moderate financial status (73.9%). Half of the outpatients (47.8%) were university educated. The 34.8% had a regular weekly physical activity, while 39% were smokers and had metabolic syndrome, according to IDF classification criteria. Obesity was sub-grouped into three categories according to WHO criteria, class I (17.4%), class II (47.8%) and class III (34.8%). MA II total score had a negative correlation with body weight (-0.456, $p < 0.05$) and BMI (-0.548, $p < 0.01$) and it was significantly different among obesity subgroups ($p < 0.05$), demonstrating a gradual decrease by each higher obesity category.
Conclusion: This study demonstrates that perceived quality of life deteriorates as the obesity degree rises, insinuating that even a small weight reduction may play a crucial role not only in health status improvement but also into quality of life, underlying the need of holistic treatment of obesity.

T4:PO.027

Family-based behavioural treatment for childhood obesity decreases BMI and improves health relatetd quality of life

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Introduction: Over the past decades childhood obesity rates have tripled. Effective treatment for obese children is extremely important because of the negative impact it can have on both the physical and psychological well-being of the child, as well as health-related quality of life (HRQL). The objective of this study was to examine potential benefits of family-based behavioral treatment for obese children on BMI standard deviation scores (BMI-SDS), psychological well-being and health related quality of life HRQL.
Method: Treatment was provided to 43 obese children, aged 7–12 years and a participating parent. The treatment consisted of 18 group and individual sessions delivered three times a week over six weeks. Measurements included height and weight, BMI-SDS was calculated, and psychological well-being and quality of life were assessed with questionnaires (The Strength and Difficulties Questionnaire and Pediatric Quality of Life). Assessments were conducted at baseline, after the 6 weeks of treatment and during booster sessions at 3, 6 and 12 months post-treatment.
Results: Among the 31 children that finished the 6 weeks program, the BMI-SDS decreased significantly during treatment (mean BMI-SDS = 3.49 (SD = 0.7) at baseline and 3.08 (SD = 0.6) after the 6 weeks of treatment ($p < .0001$). Among the 16 children that met up at the 1-year booster session the BMI-SDS decreased significantly (mean BMI-SDS = 3.36 (SD = 0.6) at baseline and 2.80 (SD = 0.4) after 1-year ($p < .0001$). There were no significant differences in psychological well-being during treatment ($p > .05$), nor at 1-year follow-up ($p > .05$). HRQL improved during treatment ($p < .01$) but was not maintained at 1-year follow-up ($p > .05$).
Conclusion: The family-based behavioural treatment provided to obese children in Iceland produced promising results regarding long term decrease in BMI-SDS and in short term health-related quality of life.

T4:PO.028

Skeletal Muscle Quality: Concordant Findings from Two Practical Non-Invasive Approaches

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Background: Phase angle (θ), derived from bioelectrical impedance analysis (BIA) resistance and reactance, decreases with adult age and is associated with changes in nutritional status, skeletal muscle (SM) function, and insulin resistance. Another measure of SM quality is the light fraction (LF) measured with ultrasound (US) followed by image processing; echogenic light SM is produced with fat and fibrous tissue infiltration of normally dark SM. While BIA systems automatically measure θ, technical training is needed for operation of the US system and subsequent image analysis.
Methods: The aim of this study was to examine the associations between these two age-related measures of SM quality: θ at 50 KHz using an 8-electrode multifrequency BIA system (MC980, Tanita Corp., Tokyo, Japan); US (GE LOGIC). Subjects were 165 males and females, ages 5–80 yrs, with US measures of biceps, triceps, calf, and thigh muscles; and θ measures of each arm and leg.
Results: Significant correlations ($p < 0.05$) were present for key associations, including: bicep LF and arm θ; triceps LF and arm θ; thigh LF and leg θ; age and biceps and thigh LF, and leg θ. Our findings thus show concordant relations between the two different measures of SM quality, θ and LF.
Conclusions: Measurement of θ may be a simple, practical, and clinically-useful measure of age-related changes in SM quality that can be studied in the context of sarcopenia and related metabolic disorders.

T4:PO.029

Psychosocial quality-of-life, lifestyle and adiposity: A longitudinal study in preschoolers

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Objective: In obesity prevention, insight about the role of psychosocial aspects early in life is pivotal. Several reviews reported contradictory results regarding the associations between children's psychosocial and adiposity and they noted the lack of longitudinal studies focusing on explaining or moderating lifestyle factors. Therefore, our aim was to test whether low psychosocial Quality-Of-Life (QOL) in preschoolers is associated with lifestyle and adiposity changes over one schoolyear and whether lifestyle moderates the latter.
Methods: Longitudinal data from 291 preschoolers (initially 3.9–6.3y) was collected in the Swiss Ballabeina study: psychosocial QOL (emotional, social and school QOL by PEDsQL), adiposity (BMI, waist, fat%), diet (food frequency), screen time and activity-level (accelerometers).
Results: Low psychosocial QOL was related to unfavorable changes in diet (less fruit β=0.21 and more fat intake β=-0.28) and lower physical activity (β=0.21). Some longitudinal QOL-adiposity relations appeared only after moderation by lifestyle (beta-range: 0.13–0.67). Low psychosocial QOL was associated with adiposity increases in children with an unhealthy diet intake (i.e. low fruit, high fat intake or high soft drink intake frequency) or a high sedentary time. By contrast, low psychosocial QOL was associated with longitudinal decreases in adiposity in preschoolers with a high fruit intake frequency or with a healthier activity level.

Conclusions: The current study results emphasize the need for testing moderation in the QOL-adiposity relation. An unhealthy diet can be a vulnerability factor and high physical activity a protective factor in QOL-induced adiposity. Consequently, QOL and lifestyle should be targeted concurrently in multi-factorial obesity prevention.

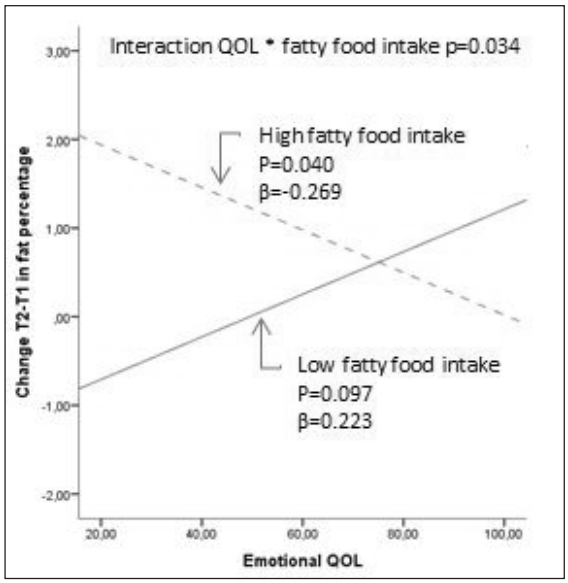

Fig. 1. Fatty food intake as moderator in the longitudinal effect of QOL on adipozity

T4:PO.030

Retrospective analysis of subjective wellbeing index scores, with effect of weight change and demographics in patients attending the Rotherham Institute for Obesity

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Introduction: There is a bi-directional association between obesity and mental wellbeing (Gatineau and Dent, 2011). Demographics such as age, Body mass Index (BMI), gender, deprivation and employment are also involved in the relationship. This study aimed to identify if the subjective wellbeing (SWB) of participants is affected by attending the Rotherham Institute for Obesity (RIO), and to investigate whether weight loss or gain affects the result, and identify other variables or demographics that may affect the initial SWB.
Methods: Retrospective analysis of qualitative and quantitative data for all participants aged 19–80 years who completed the full 6 month RIO weight loss programme between Jan 2010 to Dec 2012 was made (n=1895). The data included age, gender, weight, BMI, postcode, employment status and WHO-5 index scores.
Results: All participants achieved the WHO-5 criteria of 10% increase in scores at 6 months ($p < 0.017$ Bonferroni adjusted score). Demographics did affect initial SWB scores, but overall SWB improved in most categories apart from participants who were classed as carers ($p = 0.01$) or permanently sick ($p = 0.04$) or students ($p = 0.93$). The participants that lost or maintained weight achieved the WHO-5 criteria of 10% increase in scores achieving significant change ($p = 0.001$) whereas the patients who gained > 4.9kg of weight achieved less than 10% ($p = 0.19$)
Conclusion: SWB does improve after completing a 6 month weight management programme and is affected by demographics initially, and weight changes on completion

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T4 – Anxiety and depression

T4:PO.031

Depressive symptoms and associations with low vitamin d levels and adherence to mediterranean diet in morbidly obese patients

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Introduction: In obese persons vitamin D deficiency (VDD) is present and obesity is associated with depression1. We evaluated parameters of vitamin D, severity of depression and adherence to Mediterranean diet in morbidly obese patients.
Methods: In this randomized controlled trial (NCT02092376) patients with VDD were included. The Beck Depression Inventory (BDI-V)2 was used to estimate depression in morbidly obese patients with 35 points as threshold. Additionally, 25-hydroxy-vitamin D (25-OHD), 1,25-dihydroxy-vitamin D (1,25-DiOHD) and Mediterranean Adherence Score (MEDAS)3 were assessed. The threshold of 25-OHD and 1,25-DiOHD is 75 nmol/l and 86.5 pg/ml.
Results: In patients [n=39; age 43 (14) years, mean (SD); 72% women; BMI of 43.7 (4.6) kg/m^2] with following means of 25-OHD: 41.3 (12.2) nmol/l, 1,25-DiOHD: 47.5 (16.7) pg/ml, BDI-V: 31 (16) points, and MEDAS: 5 (2) points. 35% suffered from clinically relevant depression by BDI-V. Patients with lower 1,25-DiOHD levels showed higher BDI-V points ($r=-0.43$; $p = 0.02$). Depressive patients had lower adherence to Mediterranean diet [4 (1) vs. 6 (2) points; $p = 0.001$] compared to non-depressive ones.
Conclusion: About one third suffered from depression with association to low levels of active form of vitamin D. Furthermore, non-depressive patients showed a higher adherence to Mediterranean diet compared those with depression. However, further research regarding causality of the association between VDD and depression is required.

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T4:PO.032

Depression and suicidal ideation among adults with metabolic syndrome: Data from the 2008–2010 Korea National Health and Nutrition Examination Survey

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AIM: Suicide and depression are one of the highest public health problems worldwide. Suicidal ideation represents an important phase in the suicidal process and often precedes suicidal attempts or completed suicide. Patients with chronic medical disease are more likely to report suicidal thoughts and depression. However the studies on relationship between these conditions and metabolic syndrome are rare. We aimed at investigating the prevalence of depression and suicidal ideation among adults with metabolic syndrome in Korea.
Methods: We analyzed data for 17924 persons (Men; 7516 persons & Women; 10408 persons) from 2008–2010 KNHANES who did not have cancer or hepatitis or liver cirrhosis. Each individual was assessed for the presence of metabolic syndrome according to the NECP-ATP criteria except for waist circumference, for which new criteria recently suggested

by Korean Society for Study of the Obesity was used. The presence of depression or suicidal ideation and were defined by a self-reported questionnaire asking if the participants had ever been diagnosed with depression by medical doctor or had any suicidal thoughts.
Results: The prevalence of depression (17% vs. 14%, $p < 0.001$) and suicidal ideation (20% vs. 17%, $p < 0.001$) was significantly higher in participants with metabolic syndrome. Mean scores for the EQ-5D decreased significantly with participants with depression (0.80 ± 0.22 vs. 0.91 ± 0.13, $p < 0.001$) and suicidal ideation (0.79 ± 0.22 vs. 0.92 ± 0.13, $p < 0.001$) in the group with metabolic syndrome.
Conclusions: This study shows that metabolic syndrome is associated with depression and suicidal ideation and this relationship was negatively associated with health related quality of life.

T4:PO.033

Poor mental health in severely obese patients unexplained by the presence of comorbidities

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The prevalence of obesity, especially severe obesity where body mass index (BMI) exceeds 40 kg/m^2 and where the physical risks are greatest, is increasing. However, little is known about the impact of severe obesity on psychological well-being and self-rated health (SRH). We aimed to investigate this relationship in patients attending an Irish weight management clinic. SRH was measured with a single-item inventory (excellent = 1, poor = 5). Well-being was measured with the validated World Health Organization-Five Well-being Index (WHO-5), in which scores <13 indicate poor well-being. Previous studies of the Irish population have reported mean SRH = 2.56 (males) and 2.53 (females) and mean well-being = 16.96. Number of medications was used as a proxy for comorbidity and multiple imputation was applied to minimise bias due to missing data in self-reported questionnaires. One hundred eighty-two (46.8%) completed questionnaires were returned. The sample was representative of the clinic population with a mean age of 47.1, mean baseline BMI of 51.9 kg/m^2 and 64.3% females. Mean SRH was 3.73 in males and 3.30 in females; mean well-being was 10.27 in males and 10.52 in females. In the final multivariable models, number of medications, depression and obstructive sleep apnoea, WHO-5 and current BMI were significant predictors of SRH, and secondary level education, social support and mindfulness scores were significant predictors of psychological well-being. The results show that mean self-rated health and psychological well-being scores in this population of severely obese patients are substantially worse than in the Irish population at large. The poor psychological well-being seen is not explained by the presence of comorbidities, but social support and mindfulness may be important targets for improving well-being. Improving psychological well-being in addition to weight loss and effective management of comorbidities may be important for improving SRH.

Acknowledgement: The authors gratefully acknowledge statistical support received from the Centre for Support and Training in Analysis and Research, University College Dublin. This study was funded by the Health Research Board of Ireland.

T4 – Disability/intellectual deficiency

T4:PO.034

Piloting a manualised weight management programme for overweight and obese persons with mild-moderate learning disabilities: Results of the shape up-ld study

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Introduction: Obesity prevalence is higher among adults with mild-moderate learning disabilities (LD) than in the general population. There is a need for services designed to meet the needs of this group. We piloted a manualised weight management programme for overweight and obese adults with LD (Shape Up-LD).
Method: A two-arm, individually randomised, controlled pilot trial in adults with LD (n=50) comparing Shape Up LD to Usual Care. Shape Up LD involves 12 weekly group sessions led by trained facilitators, including advice on healthy eating, physical activity and behaviour change techniques. Communication is aided through the use of pictorial handouts. Where applicable, carers of the participants attended sessions and received training on how to support participants. Anthropometric measures were taken at baseline, 3 and 6 months. Participants in the groups and group facilitators were also interviewed.
Results: At 3 months, Shape Up-LD participants were 0.34kg lighter than those who had received Usual Care (95% CI –2.38kg, 1.69kg). At 6 months this difference had increased to –0.55kg (95% CI –4.34kg, 3.24kg). Participants and carers were positive about the programme and gave examples of behaviour change, though some wanted more practical elements to be included. Facilitators liked the programme but were frustrated with carers who did not support participation in the group or behaviour change despite the training given.
Conclusion: Shape Up-LD may be beneficial for weight loss. Although the observed difference in this pilot was small, weight loss appeared to continue even after the groups had finished. There was enthusiasm for the groups among those involved, but more work may be needed to develop stronger interventions that better manage the role of carers.

Acknowledgement: This study was funded by the National Institute for Health Research (NIHR) under its Research for Patient Benefit (RfPB) Programme.

T4:PO.035

The effect of weight on cognitive function

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Introduction: There is some evidence that poor neurocognitive ability and conditions such as Alzheimer's disease may be associated with obesity. A few studies, predominantly in clinical settings, demonstrate poorer executive function in obese adults. Executive functions are high level cognitive mechanisms that manage everyday thinking and behaviour; however, measurement has been problematic and has lacked a theoretical foundation. Using Miyake et al's (2000) model of executive function this work (a) assessed the feasibility of employing a range of cognitive tests in a community setting and (b) the association between weight and cognitive function.

Methods: A mixed method sampling strategy was employed to collect cross-sectional data from a community sample (e.g. workplaces, community centres). Cognitive tests that reflected the main executive functions were designed and piloted. Four cognitive tests were used in the study. Height and weight were measured and self-reported depression (CES-D), demographic and clinical variables were obtained. Individuals were classified using the 5 traditional BMI groups.
Results: Three-hundred and fifteen individuals, aged 18 –65 years, were recruited to the study (mean age 38 years; 55% female; 61% employed). Underweight and obese/morbidly obese individuals demonstrated deficits on tests of memory and cognitive processing when compared with normal weight individuals, when controlling for age and depression.
Conclusion: Having a healthy BMI appears to provide a cognitive advantage. Further data collection and statistical modelling is required to control for other potentially key demographic and clinical confounding variables. Whether deficits on these cognitive tests translate into deficits in everyday tasks also warrants attention.

T4:PO.036

Do patients with mental health conditions or learning difficulties that attend the Rotherham Institute for Obesity lose weight?

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Introduction: The Rotherham Institute for Obesity (RIO) is a specialist centre for weight management with a multidisciplinary team approach, based in a primary care setting. The commissioned contract did not require that RIO saw any patient with severe mental health conditions, learning difficulties, or anyone else that might be deemed to struggle with engagement with the service or understanding of the information/support provided. However, the MDT agreed to see these patients and this study is the first analysis of whether these cohorts of patients respond to the specialist weight management services offered at RIO.
Methods: A retrospective analysis of adult data during the 12 months during 2013 was performed and patients identified with the specified conditions that might be classified as severe mental illness or learning difficulties. A further breakdown of these patients was also performed in order to see if there was any variation in success with specific conditions. Further analysis of weight loss was performed and other markers of success including bio-impedence and blood tests.
Results: 54 patients with severe mental health illnesses or learning difficulties attended RIO during the period analysed. Of these, 36 (66.7%) did not complete the full 6 month RIO weight management programme, which was higher than the normal average drop out rate for completion at RIO (approximately 50%). 18 patients did complete the full 6 month RIO programme and of these 15 (83%) were successful at losing weight.
Conclusion: Patients attending RIO who are classified as having severe mental health problems, and/or learning difficulties, can lose weight with the support of a specialised weight management service.

T5 – Pregnancy

T5:PO.001

Stability and change in BMI, self-esteem, eating and body satisfaction during and after pregnancy: A cross cultural comparison of israeli and uk women.

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Introduction: Maternal body mass index (BMI) is associated with negative body image and restrained eating which are experienced differently across cultures. The present study explored if levels of self-esteem, eating behaviours and body satisfaction change from early pregnancy to 24 months following birth. An additional aim was to identify if such measurements vary according to country and BMI.
Methods: 73 women from Israel and the UK participated in the study. Data were collected every six months and women completed questionnaires assessing self-esteem (RSEQ), body image (BIS/BIDQ) and eating behaviours (DEBQ). Women reported their weight and height and BMI were calculated. Regression modelling was used to account for changes and to assess the independent impact of BMI on outcomes.
Results: Self-esteem remained stable across follow-ups and did not differ according to country. As mothers' BMI increased they ate more according to emotional cues and were less satisfied with their body. Findings from this study note that BMI was the strongest predictor for self-esteem, eating behaviours and body satisfaction.
Conclusion: The period after pregnancy is a key time to investigate how well women adjust to motherhood. Future research should aim to continue and explore mothers' well- being, eating behaviours and body satisfaction in the immediate time postpartum, but also how well women adjust to such changes over time.

T5:PO.002

Patterns of prenatal growth and skinfold thickness at birth

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Introduction: Identify whether patterns of restricted or rapid fetal growth are related to skinfold thickness at birth.
Methods: Multilevel models were used for the modelling of fetal and postnatal growth from the Born in Bradford (BiB) cohort. Fitted values and Z-scores were produced at 20, 30, 40 prenatal weeks. Restricted and rapid growth were defined as a change in conditional Z-score in the fetal period of <-0.67 and >0.67, respectively. ANOVAs and linear regression (adjusted for weight at birth) were used to test for differences in subscapular and tricep skinfold thickness and the centripetal fat ratio at birth, by type of prenatal growth.
Results: Neonates who had experienced restricted fetal growth had significantly smaller subscapular and tricep skinfold thickness compared to those with normal or rapid fetal growth. Rapid fetal growth was also associated with significantly thicker skinfold thickness compared to normal fetal growth. After adjusting for weight at birth, these associations were attenuated and became non-significant. There were no significant differences in the centripetal fat ratio between any of the types of fetal growth, before or after adjustment for size at birth.
Conclusion: Periods of restricted or rapid fetal growth were associated with differences in skinfold thickness at birth. However, adjusting for size at birth resulted in differences being attenuated to the null, suggesting that independent effects of reduced or rapid fetal growth in a particular period of time were not apparent. Furthermore, a tendency to deposit fat centrally was not associated with any particular pattern of fetal growth.

T5:PO.003

Extreme obesity in pregnancy and the association with preterm and postdate birth: A national study of births in england, uk

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Introduction: Extreme obesity (BMI≥50kg/m^2) represents the smallest subgroup of maternal obesity (BMI≥30kg/m^2) with an incidence of 0.1%. However, it is increasing at a rapid rate and significantly associated with adverse perinatal outcomes(12). Preterm (<37 weeks) and postdate (≥42 weeks) births incur increased perinatal risk for mother and baby. There is an evidence-base for the association between maternal obesity and preterm or postdate birth, but a lack of research on the association with extreme obesity.
Methods: Secondary analysis of existing data on 531,219 singleton live births in 16 UK maternity units from 1990–2007 was undertaken. Logistic regression controlled for gestation at booking, ethnic group, parity, deprivation, maternal age and employment. Adjusted odds ratios (AORs) were produced for preterm and postdate births. Analysis of preterm subgroups included moderate (32–36 weeks) and very/extreme preterm birth (20–31 weeks; including births below the limit of viability <24 weeks).
Results: Following exclusions for missing data, 392,530 births remained. Compared to recommended BMI (18.5–24.9kg/m^2), extreme obesity was significantly associated with preterm (AOR 1.9 95%CI 1.5–2.6) and postdate birth (AOR 1.8 95%CI 1.3–2.5). Subgroup analyses identified the greatest association with very/extreme preterm birth (AOR 2.1 95%CI 1.1–3.7).
Conclusion: Maternal extreme obesity was significantly associated with an increased risk of preterm and postdate birth. The association was greatest between extreme obesity and very/extreme preterm birth. This preterm birth subgroup has the greatest risk for the baby, including gestational age at delivery below the limit of viability.

Acknowledgement: Research relating to this abstract was funded by a UK Medical Research Council 1+3 PhD studentship

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T5:PO.004

Relations between weight change before and during pregnancy: Data from the national elfe cohort

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Introduction: Several studies suggested a beneficial effect of weight loss before pregnancy in obese women in regard to pregnancy complications.
Methods: We studied the associations of weight change and dietary restriction in the year before conception with gestational weight gain, globally and by BMI category at conception, in 14077 mothers of the Elfe national French birth cohort. We excluded cases of pregestational diabetes or hypertension.
Results: Women who were obese at the beginning of pregnancy (9.1%) gained less weight during pregnancy than non-obese women (8.4 ± 7.3 vs 13.6 ± 4.9 kg, $p < 0.0001$). They also declared dieting in the year before pregnancy (29.4%) more often than non-obese women (12.2%, $p < 0.0001$). In multivariable analyses, women who lost more than 5 kg in the year before pregnancy were younger, had a higher BMI, were more often smokers and multiparous ($p < 0.0001$). Women who declared dieting in the year before pregnancy had higher BMI and economic and educational status, were more often born in France and employed ($p < 0.0001$). Regardless of maternal BMI right before pregnancy, women who lost more than 5 kg the year before pregnancy experienced higher gestational weight gain than the others (13.4 vs 11.9 kg for women with stable weight over the period, for example, global $p < 0.0001$), as did women who dieted before pregnancy (13.7 vs 11.8 kg, $p < 0.0001$). A similar pre-pregnancy weight loss had higher impact on gestational weight gain when associated with dietary restriction (interaction p: 0.003).
Conclusion: Almost 30% of obese women tried to lose weight in the year before pregnancy. Regardless of maternal nutritional status, pre-pregnancy weight loss, especially if voluntary, seems to induce a compensatory response resulting in higher gestational weight gain.

Acknowledgement: The Elfe cohort was funded by the French National Research Agency (ANR), program "Investments for the Future": reference ANR-11-EQPX-0038.

T5:PO.005

Implications of pregestational overweigth and obesity on the lipid and glucometabolic profile during pregnancy

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Lipid alterations during gestation are suggested to impact obesity and GDM associated adverse pregnancy outcomes. The objective is to assess longitudinal changes in serum lipids during pregnancy in women with different degrees of obesity under special consideration of the glucometabolic status. 208 pregnant women stratified by preconceptional BMI (normal weight with BMI<25: n=89 (42,8%), overweight with BMI 25–29.9: n=59 (28.4%), obese with BMI>30: n=60 (28.8%)) underwent an 75g-2h-OGTT ≤21st gestational week (visit 1). Final diagnosis was performed in GW 24–28 (IADPSG criteria: 129 NGT, 79 GDM). An additional blood drawn for the assessment of glucometabolic and lipid profile was performed in visit 1 and at further three visits until delivery. OGTT data were used to estimate insulin sensitivity. GDM prevalence was related to degree of obesity (normal weight: 25.8%, overweight: 40.7%, obese: 53.3%, $p = 0.003$). At baseline obese and overweight women showed already elevated levels of triglycerides (TG, $p < 0.001$) and usCRP ($p < 0.001$) and decreased HDL-C values ($p = 0.01$), whereas total cholesterol (TC) and LDL-C were comparable between the groups. In relation to visit 1 all lipid parameters showed a significant increase in the whole group. However, the increase in serum lipid concentrations was less pronounced in overweight and obese compared to normal weight subjects (LDL-C: $p = 0.006$, TC: $p = 0.002$, TG: $p = 0.002$). These differences were independent of baseline insulin resistance and GDM status. Regarding fetal outcome maternal obesity was associated with higher birth weight (percentiles of gestational age). Although lipids were not correlated to birth weight there was a significant association with preconceptional BMI and insulin resistance during pregnancy. Decrease of pregnancy induced hyperlipidemia in obese and overweight women is independently prevalent of glucose disorders. Further studies on the effect of maternal metabolism on fetal outcome is needed.

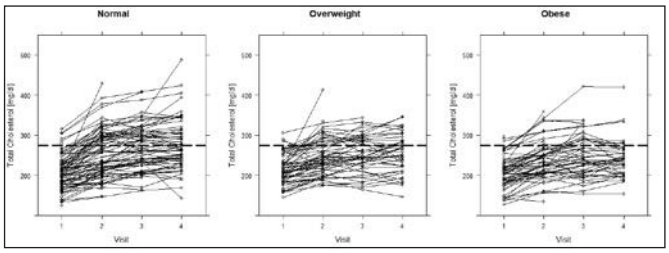

Fig. 1. Trajectories of total cholesterol during pregnancy in women categorized by preconceptional BMI: normal weight (BMI<25), overweight (BMI 25–29.9), obese (BMI>30)

T5:PO.006

Determination of relationship between prepregnancy maternal body mass index and gestational diabetes mellitus

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Introduction: Increasing of obesity among women of reproductive age may contribute to the occurrence of gestational diabetes mellitus (GDM). Aim of this study was to examine the relationship between maternal prepregnancy body mass index (BMI), weight gain during pregnancy and improving GDM in pregnant women.
Methods: Forty women with GDM and 40 healthy women as a control group were recruited from the Department of Obstetrics and Gynecology. Exclusion criteria were pre-GDM, polycystic ovary syndrome, kidney disease, thyroid disease, history of GDM, multiple pregnancy. GDM was diagnosed with two-step oral glucose tolerance test. BMI was calculated from weight and height and categorized according to the WHO classification.
Results: The average maternal age was 32.1 ± 4.9 years among cases and 28.7 ± 4.9 years among controls. Maternal weight gain was higher in the GDM group than in the control group (16.9 ± 4.33 kg versus 14.4 ± 4.61 kg, $p < 0.05$). Women with GDM had a high BMI (mean 26.4 ± 5.73 kg/m^2) than healthy women (22.6 ± 3.56 kg/m^2) and the difference between the two groups was statistically significant ($p < 0.05$). In the case group 22.5% of women were obese while in the control group 2.5% of women were obese ($p < 0.05$). Women's prepregnancy BMI was significantly positive correlated with the risk of GDM ($r=0.381$, $p = 0.000$).
Conclusion: Higher prepregnancy BMI is correlated positively with improving GDM. Gestational weight gain is a significant risk factor for GDM in the overweight or obese patients but not in patients who were underweight or had a normal BMI before pregnancy.

T5:PO.007

Maternal overweight and obesity are not associated with birth weight discordance in twin pregnancies

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Introduction: Maternal overweight/obesity (OW/OB) increases risk of complications to women and their unborn children. The incidence of twin pregnancy has increased due to delayed childbearing and greater use of reproductive technologies. Fetal outcomes are worse when differences between twins birthweight exceed 20%. Fetal nuchal translucency measurement (NT) via ultrasound at 11–14 weeks' is a robust screening method used to predict many pregnancy outcomes. It is unknown whether maternal OW/OB and discrepant NT values are associated with discordant birthweights in twins.
Methods: We retrospectively examined 652 twin pregnancies at the Ottawa Hospital between 2008–2012 who opted for first trimester prenatal screening. Multivariate logistic regression were performed and odds ratios (ORs) calculated.
Results: When categorized according to birthweight discordance < 20%, maternal age (32.8 ± 5 years), pregravid BMI (25.4 ± 6 kg/m^2), weight at ultrasound (71.8 ± 18 kg), and twin NT difference (0.3 ± 0.5 mm) were similar to those with birthweight discordance ≥ 20% (maternal age 33.0 ± 5 years, BMI 25.6 ± 6 kg/m^2, weight at ultrasound 72.5 ± 19 kg, twin NT difference 0.4 ± 0.7 mm). Adjusting for maternal age, pregravid BMI, gestational age at delivery, and maternal alpha-feto protein level, twin NT difference ≥20% vs. <20% (OR 1.22; 95% CI 0.67-2.20, $p = 0.52$) and pregravid BMI ≥ 25 kg/m^2 vs. 18.5-24.9 kg/m^2 (OR 0.82; 95% CI 0.46-1.45, $p = 0.65$) were not associated with twin birthweight discordance.
Conclusion: Prepregnancy OW/OB and NT discordance ≥20% do not increase a woman's chance of giving birth to twins with a ≥20% difference in birthweight.

Acknowledgement: ZM Ferraro was supported by a Canadian Institute of Health Research (CIHR) allied care provider postdoctoral fellowship from the Institute of Human Development, Child and Youth Health. R Page was supported by a summer studentship provided by the Division of Maternal-Fetal Medicine at The Ottawa Hospital General Campus.

T5:PO.008

Patterns of pre-pregnancy BMI and gestational weight gain in West Sumatra, Indonesia and their effects on pregnancy outcomes

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Introduction: Indonesia is currently experiencing a nutrition transition, where obesity is increasing while malnutrition has not yet been defeated. Energy deficiency, obesity and gestational weight gain (GWG) all impact on pregnancy outcomes, which are known to influence the future development of obesity and metabolic disorders.
Objective: The objectives were to determine the pattern of body mass index (BMI) and GWG in a sample of Indonesian pregnant women and to identify the associated pregnancy outcomes.
Methods: Between August and December 2010, 1013 women in Indonesia were enrolled into the study. Birth weight data was available for 579 women.
Results: Under-nutrition (BMI<18.5kg/m$_{\iota}$) in pregnancy in Indonesia was high at 19.6% and the proportion of women who were overweight (BMI≥25.0kg/m$_{\iota}$) or obese (BMI≥30.0kg/m$_{\iota}$) was 13.0% and 1.6% respectively. In pregnancy 50.6% of women gained too little weight according to the IOM guidelines. Weight gain in accordance with IOM guidance reduced the outcomes of small for gestational age (SGA) and large for gestational age (LGA). Macrosomia increased significantly with increasing pre-pregnancy BMI and weight gain above the IOM recommendations. Multivariate analysis showed GWG increased with increasing maternal education and in those living in urban rather than rural areas and GWG decreased with increasing pre-pregnancy weight. Birth weight was found in multivariate analysis to increase with increasing maternal age, height, pre-pregnancy weight and GWG and to be greater in women living in rural than urban areas.
Conclusions: To improve maternal and infant outcome there is a need to ensure adequate weight prior to pregnancy and for maternal education, especially in relation to appropriate weight gain in pregnancy.

Acknowledgement: Research relating to this abstract was partly funded by the Directorate General of Higher Education, Ministry of Education and Culture in Indonesia and the British Council.

T5:PO.009

Blood cell transcriptomic-based early biomarkers of adverse programming effects of gestational calorie restriction and their reversibility by leptin supplementation

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Introduction: Moderate maternal undernutrition during gestation in rats may program the offspring to develop later pathologies. Oral administration of physiological doses of leptin throughout lactation could revert

some of these alterations. Using these animal models, we aimed to identify early transcriptome-based biomarkers, indicators of both programmed susceptibility to later disorders and response to neonatal leptin treatment in peripheral blood mononuclear cells (PBMCs), an easily accessible surrogate tissue.
Methods: Male and female rats belonging to 3 groups were studied: the offspring of ad libitum fed dams (controls), the offspring of 20% calorie restricted dams during the first part of pregnancy (CR), and CR rats supplemented with physiological doses of leptin throughout lactation (CR-Leptin). Animals were sacrificed on postnatal day 25 and PBMCs were isolated. Whole genome microarray analysis was performed in PBMCs from male rats.
Results: 224 known genes were differentially expressed between control and CR animals ($p \leq 0.01$). Leptin treatment in CR males normalised the expression of 218 of these genes to control levels; 22 of them were fully reversed ($p \leq 0.01$). Of these 22 genes, q-PCR analyses in PBMCs from males and females revealed Crmp1, Gla, Gls, Lrp11, Paox, Tmsb4x and Ubash3b as particularly interesting, because increased expression levels found in CR pups were totally reverted by leptin treatment in both genders.
Conclusion: Leptin supplementation throughout lactation is able to revert most of the transcript-based potential early biomarkers identified in PBMCs associated to undernutrition during pregnancy. These markers may be useful for early identification and subsequent monitoring of individuals who are at risk of later diseases and would specifically benefit with the intake of appropriate amounts of leptin during lactation.

Acknowledgement: The research leading to these results was supported by the Spanish Government (grant AGL2012-33692), the European Union's Seventh Framework Programme FP72007-2013 under grant agreement n. 244995 (BIOCLAIMS Project), and the Instituto de Salud Carlos III, Centro de Investigación Biomédica en Red Fisiopatología de la Obesidad y Nutrición, CIBERobn.

T5 – Fetal programming/epigenetics

T5:PO.010

Association of excessive gestational weight gain, using the iom criteria, with adiposity of their offspring: Systematic review

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Introduction: Excessive gestational weight gain (GWG) during pregnancy is associated with an increase in adiposity indicators and metabolic disorders of the offspring. The objective of this review was to analyze the association of excessive GWG in prospective studies, using the Institute of Medicine (IOM) criteria, with the adiposity indicators and metabolic diseases of their offspring.
Methods: An electronic search was conducted in the MEDLINE/PubMed, EMBASE, and CINAHL databases from January 2004 to September 2014. Selection was restricted to prospective studies, using IOM criteria as definition of GWG. In total 1312 potential related studies were identified. After screening, 126 full papers were reviewed, and five papers met the inclusion criteria.
Results: The offspring age at assessing time ranged from 5 to 21 years. Only one study conducted in 21yo showed an association between excessive GWG with obesity and metabolic diseases of their offspring; one including 2 to 20yo, showed an association with child overweight; one at nine years of age show that greater GWG was associated with greater adiposity and adverse cardiovascular risk factors; one study of 5yo children showed an association of excessive GWG with an increase in child BMI Z-score among normal and overweight mothers, and one study of 5yo children showed an association between excessive GWG with overweight in non-overweight mothers.
Conclusions: All studies among normal weight mothers consistently showed an association of excessive GWG with adiposity indicators or other components of the metabolic syndrome early in life, during adolescence or adulthood. However, due to the age range of those studies it is warranted more long term studies that confirm this association among adult offspring.

T5:PO.011

Maternal intake of a cafeteria diet during lactation in rats leads to a thin-outside-fat-inside (tofi) phenotype in the offsping

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Introduction: We aimed to assess, in rats, the influence of maternal intake of a cafeteria diet during lactation on the lasting metabolic effects in their offspring.
Methods: Dams were fed with a standard chow (control) diet or a cafeteria diet throughout lactation. After weaning, the offspring were fed with control diet until the age of 15 weeks and body weight was followed. Circulating triglycerides (TG) and free fatty acids (NEFA) were measured under ad libitum feeding and 14h fasting conditions at weaning and at 13 weeks of age. At this latter age, an oral glucose tolerance test (OGTT) was also performed.
Results: Maternal cafeteria diet feeding during lactation resulted in a lower body weight of their offspring (both in males and females), which was already significant at the age of 6 days and was persistent when animals were growing (until the age of 8 weeks in males and 15 weeks in females). Notably, despite the lower body weight, the offspring of cafeteria diet fed dams showed greater fat accumulation than controls at both ages studied. They also displayed, at weaning, higher circulating TG levels, both under feeding and fasting conditions, and higher circulating levels of NEFA under feeding conditions. At 13 weeks, the hypertriglyceridemia was still present in males, and circulating NEFA levels remained higher in females. Moreover, offspring of cafeteria diet fed dams presented an altered glycemic response to an OGTT.
Conclusion: The intake of a cafeteria diet during lactation in rats produces permanent consequences in the metabolic health of their offspring, which are associated with greater fat accumulation, without higher body weight: the so-called thin-outside-fat-inside (TOFI) phenotype.

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T5:PO.012

Leptin intake in suckling rats restores altered t3 levels and markers of adipose tissue sympathetic drive and function caused by gestational calorie restriction

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Introduction: Maternal calorie restriction during gestation in rats has been associated with altered white adipose tissue (WAT) sympathetic innervation and function in offspring. Here, we aimed to investigate whether supplementation with oral leptin (a breastmilk component) throughout lactation may revert the aforementioned adverse programming effects.
Methods: Three groups of male and female rats were studied at postnatal day 25: the offspring of control dams, the offspring of 20% calorie-restricted dams during pregnancy (CR), and CR rats supplemented with

physiological doses of leptin throughout lactation (CR-Leptin). Tyrosine hydroxylase (TH) levels and its immunoreactive area, and mRNA expression levels of lipid metabolism-related genes and of deiodinase iodothyronine type II (Dio2) were determined in WAT. Triiodothyronine (T3) levels were determined in blood.
Results: In CR males, leptin treatment restored the decreased TH levels and its immunoreactive area in WAT, and partially normalized expression levels of genes related to lipolysis and fatty acid oxidation (adipose triglyceride lipase, hormone-sensitive lipase, carnitine palmitoyltransferase 1b, and peroxisome proliferator-activated receptor gamma coactivator 1-alpha). Leptin treatment also reverted the decreased T3 plasma levels and WAT lipoprotein lipase mRNA levels occurring in CR males and females, and the decreased Dio2 mRNA levels in CR females.
Conclusions: Leptin supplementation throughout lactation reverts the malprogrammed effects on WAT structure and function induced by undernutrition during pregnancy. These findings support the relevance of the intake of leptin during lactation, bearing clear characteristics of essential nutrient, and provide a strategy to treat and/or prevent the programmed trend to obesity acquired by inadequate fetal nutrition.

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T5:PO.013

Maternal obesity during pregnancy affects offspring telomere lenght at birth and in later life

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Introduction: We have shown that maternal obesity is associated with cardio-metabolic diseases in the adult offspring [1]. Overflow of nutrients and inflammatory molecules through the placenta during foetal development has been suggested as a causal mechanism. We aimed to investigate the association between maternal pregnancy body mass index and offspring early ageing by the assessment of their telomere length (TL) at birth and in adult life.
Methods: Leukocyte TL was measured in 80 newborn offspring (maternal BMI range 18.5–41.0 kg/m^2), and in a cohort of 1082 subjects aged 67–79 years (maternal BMI range 18.6–38.7 kg/m^2). All subjects underwent anthropometric, metabolic and inflammatory characterization. Information on general health and diseases were collected.
Results: Overweight/obese mothers with high pregnancy weight gain gave birth to offspring with shorter TL at birth compared with offspring born to mothers in whom only BMI ($p = 0.02$) or weight gain ($p = 0.03$) was high. Increased maternal inflammatory TNF-alpha ($p = 0.07$) and MCP-1 ($p = 0.03$) levels were detected in the group with shorter offspring TL. In the adult cohort, a negative correlation was observed between maternal pregnancy BMI and TL in the female offspring ($p = 0.04$). Moreover, in the adult population short TL was a marker of worse health conditions ($p < 0.05$), type 2 diabetes ($p = 0.04$), history of myocardial infarction ($p = 0.02$), angina pectoris ($p = 0.03$), and high waist circumference ($p = 0.004$) and weight ($p = 0.001$).
Conclusion: We conclude that high BMI and excessive weight gain during pregnancy are associated with an increased inflammatory state and shorter offspring TL at birth extending into late adulthood, when short TL relates to metabolic and cardiovascular disease.

Acknowledgement: Research relating to this abstract was funded by the EU-FP7-HEALTH DORIAN project (Grant Agreement #278603)

Reference:
1. Eriksson JG at al. Ann Med 2014, 46(6):434–438.

T5:PO.014

Obesity predisposition in rats caused by maternal dietary obesity is avoidable by normalizing the diet before mating

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Introduction: Maternal obesity during pregnancy and lactation predisposes offspring to obesity and other metabolic disorders in adulthood. Here we studied in rats whether the expected detrimental effects in the offspring associated to maternal dietary obesity may be reverted by the removal of the obesogenic diet before mating.
Methods: Female rats were fed a cafeteria diet (CD) from days 10 to 100 of life and then a standard diet (SD) (postcafeteria dams). A parallel control group of female rats fed with SD were included. One month after removal of CD, female from control and postcafeteria groups were mated with males. At weaning, offspring of control and postcafeteria dams were fed with SD until 4-months of age, and then with SD or western diet (WD) until 6-months of age.
Results: Rats fed on a CD had higher body weight and body fat content than controls. The removal of the CD produced a reduction in body weight and body fat content, although both parameters remained 8% and 13% higher, respectively, in postcafeteria dams than in controls at mating. During lactation, no differences were observed between both groups concerning body weight; however, postcafeteria dams showed higher body fat content and higher leptin levels in serum and milk than controls. Notably, from the 9th week of life onwards, offspring of postcafeteria dams displayed lower body weight than controls; they also showed a lesser increase in body weight and body fat content than offspring of control dams after 2-months exposure to a WD.
Conclusion: Removal of CD in obese rats before gestation, although without complete reversion of body weight excess, may prevent the detrimental effects in the offspring associated to maternal obesity. Moreover, it is suggested that the greater protection of the offspring of postcafeteria dams against fat accumulation in adulthood, particularly when exposed to an obesogenic diet, might be related to the intake of greater amounts of leptin during the suckling period.

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T5:PO.015

Maternal consumption of High Esterified Pectins during pregnancy and lactation and protection from obesity and related disorders in the offspring

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Prebiotics can modulate the composition of gut microbiota of progeny. We aimed to study the offspring effects of supplementation of rat dams with high esterified pectins (HEP), during the second half of pregnancy and throughout lactation, studying protection effects against obesity. Dams were fed with normal or 5% HEP supplemented diet from day 12 of pregnancy until the end of lactation. At day 25, weight and adiposity (by Echo MRI) of male and female progeny of control or pectin supplemented dams (offspring: C and P respectively) were measured; after sacrifice, tissue samples were collected. Blood levels of insulin, leptin, glucose, irisin and FGF21 were measured. Immunohistochemistry analysis of the brown adipocyte marker UCP1 was performed in inguinal white adipose tissue (iWAT). At 4 months, half of animals of each group were fed an obesogenic Western Diet (WD). Biometrical parameters were followed. At 6 months, general blood parameters were measured under fed and fasted conditions. At day 25, P animals showed increased insulin and decreased

irisin blood levels; FGF21 levels tended to decrease in P males and to increase in P females. We observed multilocular adipocytes and UCP1 positive cells in iWAT in P males and females. At 6 months, both P males and females showed lower body weight under chow diet, but only P females showed decreased fat mass under WD and tended to show lower cumulative calorie intake, and significantly lower fasting plasma triglycerides. Our results suggest a protective role of mother HEP supplementation during pregnancy and lactation against obesity related disorders, especially in female offspring, and a possible WAT browning effect in both sexes. Also, this model may be suitable for the validation of early biomarkers of metabolic robustness.

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T5:PO.016

Structural changes on bone a in male rat offspring depending on maternal diet

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Introduction: Obesity as an epidemic problem induces many diseases including the metabolic syndrome. It causes low-grade systemic inflammation, which can also affect bone architecture. Proinflammatory cytokines are key mediators in osteoclast differentiation and bone resorption through the RANKL/RANK/OPG pathway. In our study we compared bone microstructure and TNF-α bone expression in animal subjects in dependence to diet exposed to in utero, during and after lactation.
Methods: Ten female Sprague Dawley rats, nine weeks old, were randomly divided in two groups and fed either a control diet or food rich in saturated fatty acids during five weeks, and then mated with genetically similar male subjects. After birth and lactation male offspring rats from both groups were randomly divided in four groups depending on the diet they were fed until twenty-two weeks of age. Body weight throughout the experiment was measured and body mass index was calculated, total cholesterol, triglyceride level, IL-6 and TNF-α in serum were measured. Bone microstructure was analyzed in fifth lumbar vertebra (n=24) using digital photographic images. TNF-α expression was measured in bone samples using immunohistochemistry.
Results: The offspring of healthy female rats fed with high content of saturated fatty acid food had the highest serum concentrations of the IL-6 (157.39 ± 48.38 pg/ml) and TNF-α (63.49 ± 3.43 pg/ml) and also the highest intensity of the TNF-α immunohistochemical staining in the bone marrow. The same group had the lowest values of trabecular bone volume and trabecular number, but the highest values of trabecular separation.
Conclusion: Such result suggests that saturated fatty acid food stimulates TNF-α expression in the bone marrow, which contributes to deterioration of the bone mass and bone structure in rat's offspring.

T5:PO.017

Changes in nutrition type between generations influence on bone structural changes in female offspring

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Introduction: It is believed that changes in feeding protocol between generations have influence on the balance of the whole organism. Epidemiological studies suggest that skeletal growth is programmed during intrauterine and early postnatal life. The aim of the study was to determinate impact of maternal dietary fat excess and nutrition of female offspring on the bone structural changes.
Methods: Ten female Sprague Dawley rats were randomly divided in two groups. One group was fed with high content of saturated fatty acid food (HFD) and the other one with standard laboratory chow (CD). Offspring from both groups were randomly divided in two subgroups after coupling and lactation period, subsequently there were four groups of offspring (n=6 each) with different feeding protocol: a) CD-CD – control diet mothers and offspring, b) CD-HFD – control diet mothers and high fat diet offspring, c) HFD-CD – high fat diet mothers and control diet offspring and d) HFD-HFD – high fat diet mothers and offspring. At the age of 18 weeks in female offspring bone microstructure was analyzed in fifth lumbar vertebra using digital photographic images.
Results: The control diet female offspring of high fat fed mothers showed the highest values of trabecular thickness and trabecular number, while the CD-HFD offspring group had the highest values of trabecular separation and cortical thickness.
Conclusion: Maternal nutritional status affects the future bone development of female offspring.

T5 – Early feeding practices and nutrition

T5:PO.018

Infant eating behaviours- impact of age, maternal BMI and country

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Introduction: Rapid weight gain in infancy is positively associated with the development of later obesity. The present study aimed to address maternal perception of babies eating behaviours. Specific objectives were if mothers' perceptions of their babies eating vary according to babies' age, country and BMI. As mother's well-being and satisfaction with body affect their own eating behaviours, this study explored if such associations affect mothers' perceptions of babies' eating.
Methods: 73 women and babies from Israel and the UK participated in a two years follow-up study. Data were collected every six months. Women filled out questionnaires assessing eating/ feeding behaviours, maternal wellbeing and satisfaction with body. Regression modelling was used to account for change and to assess the independent impact of BMI on outcomes.
Results: Healthy-weight mothers were more aware of their infant's satiety cues whereas overweight and obese mothers were more likely to feed according to a schedule. UK mothers were more concerned for their babies hunger than Israeli counterparts. Mothers with high levels of self-esteem were more aware of their infants' satiety cues. Mothers who were dissatis-

fied with their body were more concerned for their baby being overweight or overeating.
Conclusion: Strong associations were identified between maternal psychological characteristics (including eating behaviours) and babies' eating behaviours.

T5:PO.019

Prevalence of overweight and obesity and growth patterns in czech breastfed children

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Introduction: Breastfeeding is considered to be one of the fundamental factors in children's obesity prevention. Because growth references are important for children's weight and nutritional status assessment, understanding potential practical consequences when using available tools is critical. Material and methods: In the Czech Republic, longitudinal data from a total sample of more than 1700 breastfed children aged 0 - 18 months were collected to assess prevalence of overweight and obesity. To compare a growth pattern of Czech breastfed children with the current WHO growth standards (2006) as well as with the Czech references (1991,2001) the sample of 960 Czech breastfed children was subsequently selected using the same criteria as in the WHO MGRS study.
Results: The prevalence of overweight and obesity in the sample of Czech breastfed children was significantly lower compared to the reference population. This difference was statistically significant at the age of 6 months and the number of obese and overweight breastfed children further decreased with age. Thus only 0,7% children fed according to the WHO recommendation (i.e. exclusively breastfed for 6 months) were diagnosed as obese at 18 months. Czech breastfed infants were longer with a greater head circumference at all percentiles compared to WHO standards and were similar to national references. The percentile weight-for-age and weight-for-length values of Czech breastfed infants differed from both the WHO standards as well as the national references. The differences compared to the current Czech references were smaller than differences compared to the WHO standards.

T5:PO.020

Determinants of weight gain during the first two years of life - the gecko drenthe birth cohort

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Background: Rapid weight gain in infancy is known to be related to childhood obesity. It is not clear exactly which period in infancy is most important for the development of overweight. To explain weight gain in the first two years of life, the predictive values of individual factors were compared within four different domains: prenatal, nutrition, lifestyle and socioeconomic factors.
Methods: In a Dutch population-based birth cohort, length and weight were measured in 2475 infants at 1,6, 12 and 24 months. Determinants were retrieved from medical files and parental questionnaires. Factors were compared with linear regression to best explain differences in weight gain, defined as changes in Z-score of weight-for-age and weight-for-length over 1–6, 6–12 and 12–24 months.
Results: Birth weight (prenatal domain) and type of feeding (nutritional domain) were most importantly related to weight gain in the first six months, see Figures 1–4. From six months onwards, the ability to explain differences in weight gain decreased substantially (from R2total=38.7% to R2total<7%). Breastfeeding vs. formula feeding showed distinct growth patterns in the first six months, but not thereafter. We found two categories of predictors. First, those related to Z-score deviations, e.g. paternal BMI. Second, those that predict baseline risk for future overweight and have a permanent effect on Z-scores, e.g. maternal BMI.
Conclusion: The prenatal and nutrition domain were most important to predict weight gain, mainly in the first six months of life. After these first six months other yet undetermined factors start to play a role.

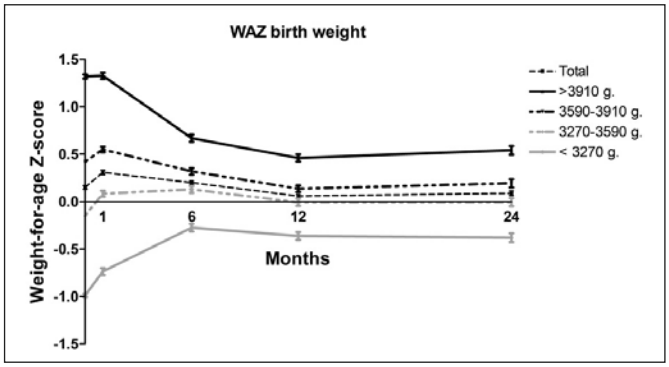

Fig. 1. Mean weight-for-age Z-scores for birth weight over time.

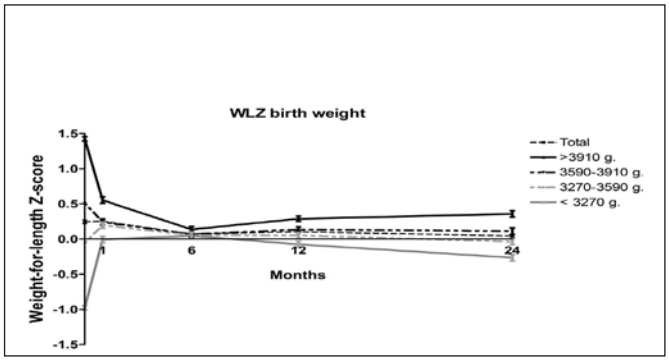

Fig. 2. Mean weight-for-length Z-scores for birth weight over time.

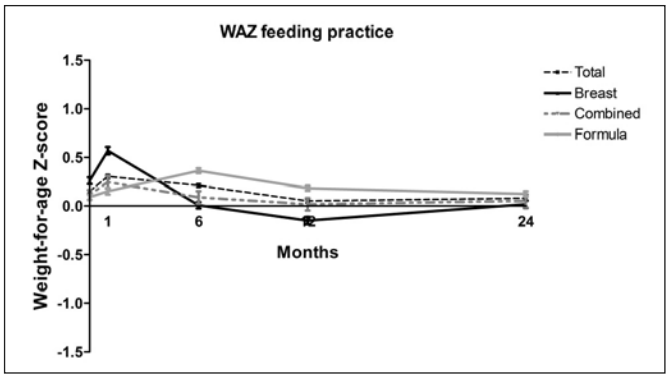

Fig. 3. Mean weight-for-age Z-scores for type of feeding over time.

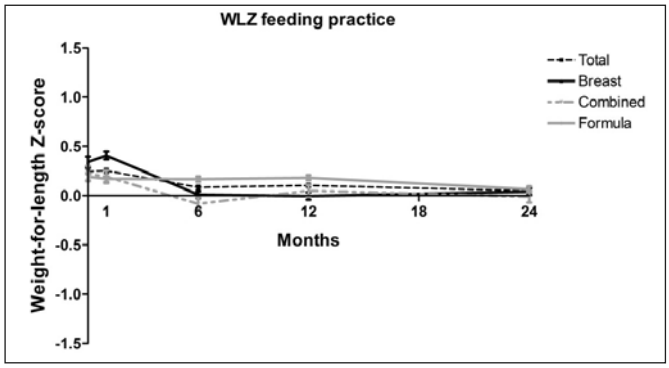

Fig. 4. Mean weight-for-length Z-scores for type of feeding over time.

T5:PO.021

Associations between pickiness, conflicts around mealtime and weight development among children age 2–6 years; results from the „healthy start" study

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Introduction: Problematic eating behaviours, such as rejecting certain food items, are sources of concerns for parents. Especially pickiness which may lead to malnutrition and if prolonged influence the child's growth. The objective of the present study was to examine if conflicts around mealtime were associated with pickiness, and furthermore, if pickiness or conflicts around mealtime were associated with weight development over 1″ year.
Methods: Information was obtained from the randomized intervention study "Healthy Start" and included 509 children from 2–6 years. Logistic regression was used to examine the association between pickiness and conflicts adjusted for potential confounders. Among the control children (n=198), linear regression was used to examine if pickiness or family conflicts at baseline were associated with BMI at baseline and after 1″ year follow-up.
Results: Analyses showed a strong association between pickiness and conflicts (OR:3.15, $p < 0.001$) also after adjustment for possible confounders (OR:3.55, $p < 0.01$). There were no significant differences in mean BMI between picky and not picky children, at baseline ($p = 0.64$) or after 1″ year follow-up ($p = 0.48$). A direct association was seen between conflicts at mealtime and BMI at baseline, after adjusting for parental BMI ($p < 0.01$). No association were seen after follow-up ($p = 0.18$).
Conclusion: Our results suggest that conflicts around mealtime and pickiness are highly related. Moreover, conflicted meals seemed to be related to lower BMI, whereas neither pickiness nor conflicted meals seemed related to development in BMI over 1″ year follow-up period.

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T5 – Healthy development

T5:PO.022

BMI in 1″ year old children in relation to parental BMI: A cross-sectional study

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Background: Overweight and obesity is accelerating throughout the world; a threat to population health and longevity. Healthy BMI and lifestyle need to be established early in life. In this study we aimed to determine BMI of 1″-year-olds in relation to parental BMI.
Methods: Parents' of 697 1″-year-olds completed a questionnaire on parental and child health. For this study data on parental weight and height and socio-demographics were used, as well as child weight and height measured at an ordinary visit in child health care. We used thresholds for children's BMI recommended for surveillance by the Royal College of Paediatrics and Child Health (RCPCH) in 2012, based on the WHO Child Growth standards derived from an international sample.
Results: Among 1″-year-olds BMI was above the 85th percentile for 33%, and above the 95th percentile for 14%. Thus, these Swedish children of today had a considerably higher BMI than children in the reference population already at this early age. The probability of a child having a BMI above the 95th percentile was significantly increased if either the mother or father was overweight. Furthermore, we found a positive synergy effect between the mother and father being overweight and the child having a BMI above the 85th percentile. Overall, our findings seem largely valid for the whole country, except for country of origin, and can therefore probably be generalised outside the study area with less immigrants.
Conclusion: Overweight is common already at 1″ year of age in this population. The risk increases if one parent is overweight, and even more if both parents are overweight. Health promotion activities early in life need to be strengthened.

Acknowledgement: Thanks to all personnel involved in the data collection, parents and children participating and the Salut team. Financial support for participation in this conference was gratefully acknowledged from the Research Unit of the Department of Medicine-Geriatrics at Skelleftel Hospital. The study was undertaken within the FAS Centre for Global Health Research at the Medical Faculty of Umeĺ University.

T5:PO.023

Strain-specific difference in maturation of amp-activated protein kinase in murine skeletal muscle during early postnatal development

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Introduction: AMP-activated protein kinase (AMPK) is engaged in control of energy metabolism. Little is known about changes in AMPK subunits expression and AMPK activity in skeletal muscle during the early postnatal development, between birth and weaning. The aims of the study were to characterize the activity of AMPKα1 and AMPKα2 isoforms and gene expression of these subunits in skeletal muscle while comparing obesity-prone C57BL/6 (B/6) and obesity-resistant A/J mice.
Methods: Male (M) and female (F) pups of the B/6 and A/J mice were born and maintained at 30°C. Gastrocnemius muscle was collected by freeze-clamping and AMPK activity was determined using AMARA peptide substrate. Gene expression was assessed by real-time quantitative RT-PCR.

Results: The activity of AMPKα1 at 10 days (D) was significantly higher in comparison with the AMPKα2 activity in all tested groups. Between 10D and 28D, the AMPKα1 activity decreased in mice of both strains except for A/J F. In A/J mice at 28D, activity of AMPKα2 was higher than that of AMPKα1. Total activity of AMPK (α1+α2) in B/6 mice decreased significantly between 10D and 28D but it stayed constant in A/J mice. Expression of AMPKα1 gene was constant in both A/J and B/6 mice between 10D and 28D. Expression of AMPKα2 gene increased between 5D and 28D in both strains.
Conclusion: During early postnatal development strain-specific changes in AMPK activity in murine skeletal muscle were observed. While in the obesity-resistant A/J mice the activity stayed constant, it declined in the obesity-prone B/6 mice. Changes in AMPK activity in skeletal muscle during early postnatal development may affect propensity to obesity in adulthood, depending on the genetic background of the mice.

T5:PO.024

Plasma acylcarnitines levels as an early complex biomarker of propensity to high fat diet-induced obesity

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Introduction: Induction of obesity by high-fat diet (HFD) in mice is associated with development of impaired glucose tolerance and dyslipidemia, i.e. characteristic features of metabolic syndrome in humans. Various inbred strains of mice vary in their propensity to HFD-induced obesity. Moreover, individual mice differ substantially in their responses to the obesogenic environment, resulting in large variations in their body weight gain, glycemic control, and plasma lipid profiles in spite of identical genetic background. Well characterized C57BL/6J (B6) mice represent a suitable model for studying the mechanisms underlying propensity to obesity and insulin resistance.
Methods: We have explored a possibility to use complex changes in plasma metabolome, namely in the acylcarnitine levels, as a biomarker of propensity to dietary obesity and associated disorders. B6 mice (n=200) were fed since 3 months of age either HFD or standard Chow, and plasma samples and physiological data were collected at 2, 4, 12, 22, 24 weeks of age. Spearman pairwise correlations between plasma metabolite levels and various physiologic parameters were performed with respect to age, gender and feeding status.
Results: It was found that C6 and C18:1 plasma acylcarnitine levels at 4 weeks of age positively correlated with body weight at 24 weeks of age independently of gender. The links between circulating acylcarnitines at young age and glucose homeostasis in the adult animals are being further analyzed.
Conclusion: Our results document that plasma acylcarnitines levels could serve as biomarkers of propensity to obesity and possibly as a complex biomarker of obesity-associated metabolic disorders.

T5:PO.025

Longitudinal study of intracellular water and growth in children aged 8–11 years

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Introduction: Accurate determination of body hydration is of great importance considering its contribution in health issues1.Likewise, high adiposity associated with childhood obesity, may increase the risk of adult diseases2.These constitute reasons why evaluation of body measurements are necessary during all stages of growth.
Objective: The aim was to assess the variations in growth and body composition in 8–11 year-old children.
Methods: In the context of an interventional project (presented in another abstract) body composition assessment (percent body fat %BF, percent intracellular water %ICW using BIS) and anthropometric measurements (weight, height, SKF) were performed in a sample of 589 school children before and after the intervention, lasted from February to June 2014.
Results: The increase of height over time differed with gender and age and was higher in female than male (0.060 versus 0.052 m/y with statistically significant difference P = 0.001), especially within 9–11 years. Also, girls had significantly higher %BF and %ICW than boys both at baseline and at the end of the intervention. %ICW was negatively correlated with %BF as expected. Initial %ICW was also negatively correlated with the change of %ICW (between the two measurements). The difference of %BF between the two measurements was negatively linked to the respective difference of %ICF.
Conclusions: This study indicated the close relationship between %ICW and %BF, both of which are markers of growth. Based on these markers, School-aged girls were found closer in the adolescent age phase, compared to boys. References 1. Ellis KJ, Shypailo RJ, Wong WW. Am J Clin Nutr, 1999;70:847–53. 2. Day RS, Fulton JE, Dai S, Mihalopoulos NL, Barradas DT. Am J Prev Med 2009;37(1S):S25-S33.

Acknowledgement: The current project is implemented through the Operational Program „Education and Lifelong Learning" action Archimedes III and is co-financed by the European Union (European Social Fund) and Greek national funds (National Strategic Reference Framework 2007 - 2013). We thank the teachers of participating schools, as well as Dr. Rousakis and Mr. Klinakis for their valuable help.

T5 – Education/Schools

T5:PO.026

Web-based interactive material for dietary intervention among primary-school children

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Introduction: Primary prevention of obesity in elementary schools can be applied by developing and introducing modern computer/information applications. The Project „Evaluation of a Web-based Dietary Intervention among primary school children", also aims to develop digital-interactive material for dietary interventions. **Objective:** The aim was to establish and validate a public digital-interactive site for dietary intervention in elementary schools, focusing in fruit and vegetable consumption.
Methods: An HTML and CSS based website, providing presentations and games concerning nutrition, through PowerPoint, VISUAL BASIC programming and Flash, was designed and utilized for nutritional intervention in a number of primary schools.
Results: In the web-based approach developed, the students attend multimedia presentations on nutrition and play respective interactive games, assisted by their teachers. The designed website is divided in two main sections; the first provides guidance for parents and teachers, while the second includes the digital presentations and interactive games, combining thus information and practice. To become children-friendly, the multimedia design utilizes vitamin super-heroes, animations, voices, funny sounds, and short tales with options for the children to choose correctly or not; still, showing the health consequence of each choice.

Conclusions: The developed educational material concerning dietary intervention in children is of public domain and may be used freely in Greek schools to prevent obesity.

Acknowledgement: We would like to thank the teachers and the directors of schools whose children participated to the survey. The current project is implemented through the Operational Program „Education and Lifelong Learning" action Archimedes III and is co-financed by the European Union (European Social Fund) and Greek national funds (National Strategic Reference Framework 2007–2013).

T5 – Childhood and adolescence

T5:PO.027

Development of the Child Three Factor Eating Questionnaire

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Introduction: The revised TFEQ 21 item questionnaire (TFEQr21: Cappelleri et al, 2009) is a more psychometrically robust version of the original TFEQ. The TFEQr21 measures Cognitive Restraint (CR), Uncontrolled Eating (UE) and Emotional Eating (EE).
Method: 182 children (89 males, 93 females, aged 8–14 years, BMI 15.82 – 32.36kg/m^2) were recruited from schools and the MoreLife weight loss camp in West Yorkshire, to assess the feasibility of using the TFEQr21 in children. Questionnaires assessing the TFEQr21 and self-esteem were completed and height and weight were measured. A subsample took part in structured interviews to determine understanding of the TFEQr21. The results from the feasibility study informed the development of the child version of the TFEQr21 (CTFEQ). Recruitment is still underway for validation of the CTFEQ.
Results: Preliminary data suggest children below 11years do not have adequate understanding of the TFRQr21. For children 11years and above, body weight was significantly and positively related to UE, females scored sig. higher on EE and a lower self-esteem was associated with higher CR and EE scores, particularly in females. A number of items were identified as problematic, through both item analysis and the interviews. These items were subsequently simplified in the development of the CTFEQ to aid comprehension whilst maintaining original meaning.
Conclusion: The TFEQr21 is not accurately comprehended in children. A child version of the questionnaire has thus been developed and is undergoing validation. The results from the feasibility study suggest that the factors of the TFEQ functions similarly in children compared to adults. This will be particularly important for assessing eating behaviour traits across childhood to adulthood.

T5:PO.028

Epicardial fat thickness: Threshold values and lifestyle correlation in male adolescents

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Background: Obese adolescents with high proportion of visceral fat are at higher risk of developing the metabolic syndrome.
Objectives: The study aims to investigate if echocardiographic epicardial fat thickness (EF) could be predictive of visceral obesity (VO) early in life and to provide EF threshold values specific for male adolescents. Further aim was to investigate the association between EF, lifestyle and metabolic disease familiarity.
Methods: Anthropometric data were collected from 102 normal weight and overweight, healthy male adolescents (mean age: 14.91 ± 1.98 years); bioelectrical impedance analysis and transthoracic echocardiogram were performed in the same sample. Each participant fulfilled a validated self-administered lifestyle questionnaire.
Results: We found higher EF values in sedentary adolescents ($P < 0.05$), in those who never eat fruit and vegetables ($P < 0.05$), and in those with overweight mothers ($P < 0.05$). The strongest independent predictor of EF was waist circumference ($P < 0.0001$). Using the waist to height ratio as a marker of VO, logistic regression analysis revealed that 1 mm EF gain is responsible for seven times higher VO risk ($P < 0.0001$). Receiver Operating Characteristic (ROC) analysis showed that the optimal cut-off for EF thickness associated to youth VO is 3.2 mm.
Conclusion: Ultrasonography EF measurement might be a second-level assessment tool, useful to detect early cardiometabolic damage stage.

T5:PO.029

Weight-loss treatment in children and adolescents: Systematic review and evaluation of the effect of conservative treatment on weight status

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Introduction: In Europe, prevalence rates for childhood obesity have plateaued at a high level. Due to the elevated risk of long-lasting somatic and psychiatric comorbidities, effective interventions are in frequent demand. Weight loss treatment has been shown to be effective, yet the overall outcome concerning weight status has not been sufficiently highlighted. The objectives of this review were a literature update and the deduction of clinical implications.
Methods: A systematic literature research was performed for studies published between May 2008 (terminating date of a 2009 Cochrane review) and December 2013 in Medline via PubMed. Studies were assessed on the basis of defined inclusion criteria and relevant criteria for methodological quality.
Results: 48 randomized controlled trials with a total of 5025 participants were identified. With regard to eligible studies fulfilling predefined methodological quality criteria, weight losses between 0.05 and 0.42 BMI z-score within 24 months after starting treatment were reported. 41 studies included data on dropout rates before the end of the intervention. These were 10% or higher in 27 studies (66%) and 25% or higher in 9 studies (22%).
Conclusion: Based on consistent evidence, treatment seeking families should be informed about the limited effect of conservative obesity treatment on weight status. The investigation of predictors for treatment success and the evaluation of additional treatments focusing on coping with obesity warrant future research. References: Mühlig Y, Wabitsch M, Moss A, Hebebrand J. Weight loss in children and adolescents – a systematic review and evaluation of conservative, non-pharmacological obesity treatment programs. Dtsch Artzebl Int 2014; 111:818–24.

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T5:PO.030

Experience of major life events during childhood and development of obesity in adulthood: A co-twin control study.

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Background: The etiology of adult obesity is still poorly understood, even if often simply attributed to too much food and too little exercise. A few studies have suggested that adverse psychological factors may predispose the development of adult obesity among normal weight children Aims The aim of this study was to examine if separation from parents, parental loss and living in a "children's home" during childhood could be associated with development of adult obesity Key
Methods: A total of 146 complete adult twin pairs discordant for BMI (one had a normal BMI and the co-twin a BMI > 30 kg/m¸) were identified from the Danish Twin Registry. The twins gave an interview and a physical examination in 2006. The Childhood Family Relationship Questionnaire (CFRQ) was used to assess life events
Results: Before age 17, 20.8% of the participants had been separated from mother, 26.1% had been separated from father for a period on average 4.5 years during childhood. Furthermore 9.3% of the children had experienced living in children's home and 6.8% had lost their father. There was a tendency that staying in a children´s home and separation from father was related to discordance for BMI in adulthood, whereas separation from mother and paternal death was related to less discordance. However, none of these differences were significant.
Conclusion: The present study did not demonstrate independent effects of major life events during childhood and development of obesity in adulthood

T5:PO.031

Assessment of vitamin d status in obese and nonobese turkish adolescents: Its relation to insulin resistance and nutritional status

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Introduction: There is increasing epidemiological evidence linking sub-optimal vitamin D status with overweight and obesity. Although increasing BMI and adiposity have also been negatively associated with the change in vitamin D status following supplementation, results have been equivocal.
Methods: The research was carried out with 39 obese (BKI>95.th percentile) and 30 nonobese adolescents (n=69), aged between 12 and 17 years. The questionnaire was developed including the demographic status, nutritional status and dietary habits, physical activities of adolescents, anthropometric measurements were taken and body composition was measured by bioelectric impedance analysis. In the third stage, biochemical analysis were measured.
Results: There was no statistical differences between obese serum 25(OH) D (16.2 ± 6.2 ng/ml) and nonobese (18.1 ± 5.9 ng/ml) serum 25(OH)D ($p > 0.05$). We sought to evaluate the prevalence of low levels of 25(OH) D by examining hypovitaminosis D (<30 ng/L), vitamin D sufficiency (>or =30 ng/L) in obesity. Serum 25(OH) D level was inversely correlated with antropometric mesurements in obese and nonobese adolescents ($p > 0.05$). While there was no significant difference between serum 25(OH)D levels and HOMA-IR; there was a positive correlation between serum calcium and HOMA-IR ($r=0.276$ $p < 0.05$) independent of body adiposity. There was a positive correlation between serum 25(OH)D levels and amount of daily dietary calcium ($r=0.371$) and phosphorus intake ($r=0.438$) ($p < 0.05$).
Conclusion: Low vitamin D status is prevalent among adolescents. The results suggest that the importance of vitamin D fortification and increased dietary calcium in the Turkish diet to meet RDA requirements and avoid onset of vitamin D deficiency-related diseases in Turkish adolescents.

T5:PO.032

Evaluation of childhood obesity assessments in secondary care paediatric clinic reference: Obesity services for children and adolescents (osca) network group uk guidelines

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Aim of Study: to evaluate clinical assessment of obesity in a secondary care paediatric set up against current OSCA Guidelines for childhood obesity assessments in UK.
Method: 72 children (1–16 yrs) were primarily assessed for obesity; data entered on to a pro forma based upon OSCA guidelines, for analysis.
Results: 33 patients (46%) were classified as morbidly obese, 24(33%) severely obese, 15(21%) obese. Evaluation showed 46% of children and young persons with obesity had not been assessed well and adequately. Clinical examination (in 85%) and investigations (in 76%) were adequate in majority of patients, but adequate history assessment was lacking in 90% of patients. This would lead to non-identification of causation and co-morbidities, and further leading to possible lack of adequate timely interventions. The most common co-morbidity newly identified was Vitamin D deficiency (40%). Significant co-morbidities like PCOS (36% of adolescent girls), Type 2 Diabetes, Impaired glucose tolerance, hypertension, dyslipidaemia and psychological distress/bullying were also newly identified through the assessments. Children with neurodevelopmental/behavioural/learning difficulties were at higher risk to develop obesity. The clinical assessment for obesity related sleep disorders was grossly inadequate, and did not use recommended Paediatric Sleep Questionnaires.
Conclusion: We suggest use of a Obesity Assessment Pro-forma in clinics to improve assessments in secondary care. The Study suggests pragmatic approach to check Vitamin D level in all, and sex hormone profile in pubertal girls (to exclude PCOS) with obesity. The evaluation highlights lack of customised physical activity programmes; some children will benefit from psychology support while dealing with their weight management.

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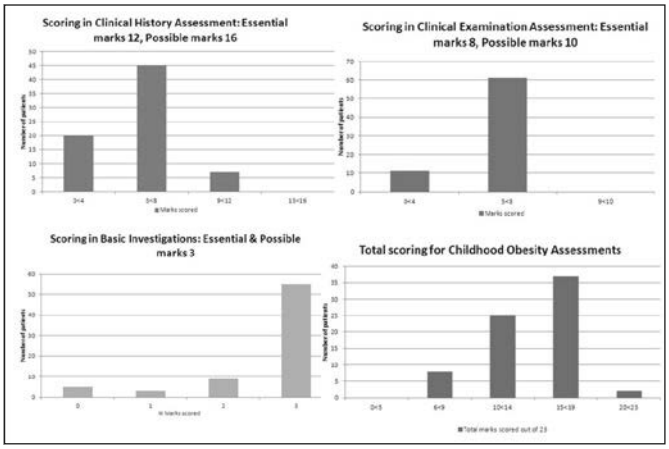

Fig. 1. Evaluation of childhood obesity assessments

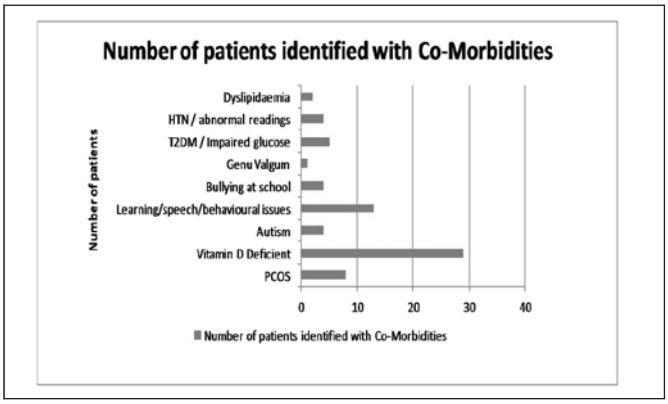

Fig. 2. Childhood obesity Co-morbidities

T5:PO.033

Children's BMI is strongly effected by family income at birth – but parental education is of major importance for the growing social gap up to 8 years of age

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Background: The development of BMI in early childhood is dependent on socioeconomic factors. Our aim was to explore the impact of parental education level and family income for development of BMI from birth to 8 years age.
Methods: 3018 children born in 1998–2006 from the IDEFICS study and register controls were included. Weight and height measurements from birth up to 8 years of age were obtained from the Child Health Services. Parental education and family disposable income, obtained from Statistics Sweden and the Medical Birth Register, were defined as high/low. Obesity was defined by WHO references. Confounders were sex and age of the child, parental origin, maternal smoking and maternal BMI.
Results: At birth, the children's mean BMI (SD) was lower in families of low vs. high income (13,74 (1,35) vs. 13,94 (1,36), $p < 0.0001$). Results remained significant after adjusting for confounders. No differences in birth BMI were detected between children of low and high-educated parents (13,87 (1,37) vs. 13,83 (1,35), $p = 0.48$). From 6 months onwards, children of low-educated parents showed higher mean BMI than children of high-educated. At 8 years, mean BMI in the low/high educated groups were 17.12 (2.44) and 16.38 (1.94), $p < 0.0001$. Results remained significant after adjusting for confounders. Prevalence of obesity in the low and high-educated groups were 11% and 4,1%, $p < 0,0001$. The difference in BMI at 8 years seen in the low/high income group disappeared after adjusting for confounders (17.5 vs. 17.6, $p = 0,63$).
Conclusion: Impact of family socioeconomic factors on children's BMI differs by income and education. The effect of parental education becomes more evident by age up to 8 years of age. Interventions for healthy weight development must start very early in life.

T5:PO.034

Preschool children, dxa fat parameters and obesity risk factors.

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Introduction: Preschool age is perceived as a strategic preventive target regarding long-standing obesity. This study aims to evaluate the association between preschool obesity, fat distribution and future risk factors.
Methods: A total of 25 healthy children, aged 5.52 ± 0.61 (4.2–7 years, 36% boys) were investigated in 2014. Standard anthropometry (body weight, height and waist circumference (WC)) was performed, blood pressure (BP) was measured. A history and child's behavior patterns questionnaire was filled by caregivers. Fat mass was estimated by DXA. Overweight and obesity were defined according to the IOTF references (Cole et al., 2000). The presence of hypertension was defined according to NHBPEP (2004) as a measure above 95th percentile for age, sex and height.
Results: One third of the participants (32%) were overweight or obese, and 76% of all had family history of obesity. Two of the children (8.3%) had elevated systolic BP (SBP). The total fat tissue (%) measured by DXA scan correlated with BMI, WC ($p < 0.001$) and with SBP ($p = 0.004$, with elevated SBP - $p = 0.009$). Both android and ginoid fat distribution correlated positively with elevated SBP, although the stronger correlation was with android fat distribution ($p = 0.006$). The only child (a boy) with elevated both systolic and diastolic BP was born small for gestational age and had android fat distribution. There was a significant negative correlation between systolic and diastolic BP and reported sports training ($p = 0.019$, $p = 0.003$ resp.).
Conclusion: The current findings suggest early development of obesity related risk factors in preschool healthy children who have android fat distribution and positive family history of obesity. Sports training has favorable effect on BP even at this young age.

T5:PO.035

Prevalence of obesity in students of elementary schools. Impact of socioeconomic factors . Data from the hellenic national action plan for the assessment, prevention and treatment of childhood obesity

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Introduction: The aim of the study is to assess the prevalence of overweight/obesity of elementary school students and evaluate correlations with socioeconomic parameters.
Materials and methods: This is a cross-sectional study conducted from10/2012- 12/2013. A pre-selected, representative elementary school cohort (N=18.648, age range 5.9–12.3 years)was derived, using stratification and PPS methodology. Parents responded to questionnaire and students were measured with high sensitivity methods (Ht 0.1cm, Wt 0.1kg, BMI calculated). IOTF cut offs were used to classify the children. Socio-economic status index was calculated (SES index range 0–13) on years of parental education, rented vs owned residence, m^2/person, number of vehicles. Logistic regression was applied using STATA 11.0.
Results:A 9.4% of students were overweight and 25.0% were obese, for a total of 34.4% being overweight or obese.Rural area students were sig-

nificantly more obese (11.3± 6.6 vs 8.4 ± 3.6 city areas, p < .005). Mother's higher education has protective effect (OR= 0.97, 95% CI: 0.96–0.99), as well as father's education (OR=0,98). There was statistical significant difference in SES index between obese and normal weight students. Children of mothers working longer hours are at higher risk of being overweight/obese (OR=1,03,95%CI: 1.01–1.06), and the same applies for fathers. Furthermore there was a positive correlation with overweight/obese status and grandmother's responsibility of children's nutrition.There was no significant difference by sex (p = 0.63) or age (p = 0.52).
Conclusions: The prevalence of overweight/obesity in Greek students of elementary schools is high. Parental education has a protective effect, however longer parental working time is correlated with obesity and overweight.

T5:PO.036

Subclinical hypothyroidism in danish overweight and lean children and youths

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Introduction: The aim of the study was to investigate the prevalence of subclinical hypothyroidism (SH) and examine possible associations between thyroid hormones and anthropometric measures in Danish overweight and lean children and youths.
Methods: In this cross-sectional study, 1948 overweight children and youths (873 boys), aged 2–24 years, and 1339 lean controls (517 boys), aged 6–22 years, were included from the Registry of the Danish Childhood Obesity Biobank. All participants were characterized by anthropometrics and serum thyroid-stimulating hormone (TSH), triiodothyronine (T3), free T3, and free thyroxine (T4). SH was defined as TSH in the range 4.5–10.0 mIU/L, which is above the normal range, and free T4 and free T3 within the normal range (free T4: 13.0–21.0 pmol/L, free T3: 3.9–7.7 pmol/L).
Results: The prevalence of SH among overweight participants was 10.9% (213 of 1948) vs. 6.9% (93 of 1339) in the lean group (OR: 1.6, 95% CI: [1.3;2.1], p = 0.0001). The overweight group had higher BMI SDS (median 2.77 (range 1.28–6.65) vs. 0.07 (-3.16–1.28)), higher concentrations of serum TSH (median 2.60 (range 0.02–62.36) vs. 2.30 (0.50–30.0), p < 0.0001), and free T3 (median 5.8 (range 3.6–8.9) vs. 5.6 (2.6–9.8), p < 0.0001). Linear regression analysis demonstrated a positive association between serum TSH concentrations and BMI SDS (p < 0.0001) and waist/height-ratio (p < 0.0001) across both groups, independent of age, sex, and pubertal development stage.
Conclusion: The prevalence of subclinical hypothyroidism is more frequent in Danish overweight children and youths compared to lean. Furthermore, serum concentrations of TSH and free T3 are positively associated with BMI SDS indicating a relationship between obesity and dysregulated thyroid homeostasis.

T5:PO.037

Predictive validity of the core index in predicting obesity. Data from the hellenic national action plan for the assessment – prevention and treatment of childhood obesity

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Introduction: As the prevalence of childhood obesity increases, a tool for risk prediction of childhood overweight/obesity is of utmost importance. The aim of this study, is to validate the CORE (Childhood Obesity Risk Evaluation)index, introduced by the Healthy Growth Study, as a predictor of obesity development in late childhood.
Materials and methods: This is a cross-sectional study conducted from10/2012- 12/2013. A pre-selected, representative elementary school cohort (N=18.648, age range 5.9–12.3 yrs) was evaluated. It was derived by using stratification and PPS methodology. Students with fully completed questionnaires were eligible for this analysis (N=5.946, 2822 boys, mean age 11.1 ±2.2 yrs). Information requested included: Mother's pre-pregnancy weight status, maternal smoking during pregnancy, maternal educational level and infant weight gain in the first 6 months of life and the children's gender for the development of theCORE Index.
Results: A 27.4% of them (28.6% boys and 26.2% girls) were overweight and 9.1% (9.6% boys and 8.8% girls) were obese, for a total of 36.5% (38.1% boys and 35% girls) of the students being overweight or obese. The CORE index was 3.06 ±1.9 (boys 3.49 ±1.84, girls 2.65 ±1.91), range: 0.0–11.0. The likelihood of developing obesity by unit increase of the CORE index is 1.3 (O.R 1.3, 95%, CI 1.18–1.33). The optimal cut off point of CORE index for obesity risk reduction is 3.5, with 58.6% sensitivity and 63.6%specificity.
Conclusions: CORE index is a simple and inexpensive tool that can be used by paediatricians and practitioners enabling valid parent counselling regarding their child's risk of developing obesity. Ref. Manios et al. Childhood Obesity Risk evaluation based on perinatal factors and family sociodemographic characteristics: CORE Index , Eur.J of Peds, 2013

T5 – Screening and early interventions

T5:PO.038

Prevalence Obesity among Saudi College Students

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Abstract: Aim. (i) To estimate the prevalence of the metabolic abnormalities among Saudi college students in Riyadh, Saudi Arabia, and (ii) to investigate the association between different indicators of body composition and these abnormalities.
Methods: A total of 501 college students participated in a cross-sectional study. Anthropometric assessments, BP measurements, and biochemical assessment were done. Metabolic abnormalities were identified.
Results: Applying BMI, 21.9% and 20.6% of students were classified as overweight and obese, respectively. Central obesity was prevalent in 26.9% and 42.2% of students based on WC and WHtR, respectively. Other metabolic abnormalities were hypertension (23.6%) and abnormal FPG level (22.6%). Three or more abnormalities were prevalent in 7.8% of students and increased significantly to 26.4%, 20%, and 17.6 in obese subjects based

on BMI, WC, and WHtR, respectively. With the exception of abnormal FPG, prevalence of individual metabolic abnormalities as well as the number of these abnormalities significantly increased with increasing BMI, WC, and WHtR (P < 0.001 each).
Conclusion: Our findings provide evidence for the presence of MS in Saudi college students. Central adiposity contributes to the high incidence of individual MS components. College health programs that promote healthful lifestyle and avoidance of adult weight gain are recommended.

Acknowledgement: To King Abdullah International Medical Reseach Center

T5:PO.039

Preventive project „with infants against obesity" – skojenciprotiobezite.cz

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Introduction: Serious consequences are to be awaited since the pandemic of childhood obesity in 21st century. Prevention and treatment of childhood obesity by physician for children have significant potential if it is started early. The prevalence of overweight is in 6.9% of infants in 6 months in Czech Republic, which represents the absolute number of about 7000 infants per year.
Methods: The preventive program „With Infants Against Obesity"is designed for physicians for children in the context of preventive examinations. The website html://skojenciprotiobezite.cz presents the tool for effective communication and collaboration between pediatricians, nurses and parents. The main objective of the project is to enable parents and physicians understand the problems of overweight and obesity prevention in key preventable period, in infancy.
Results: The website html://skojenciprotiobezite.cz is a free accessible website to the general information. For health care professionals there is an established registered access to expert information of Guideline for Prevention of Overweight and Obesity in Infancy. For parents of infants this is a practical approach to preventive and curative measures of childhood overweight.
Conclusion: The preventive project "With Infants Obesity" is an original and innovative prevention website, which offers a comprehensive view of the prevention of overweight and obese children. The project offers useful guidance that can be used in the everyday clinical practice for infants with risks of developing obesity, including their family background.

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T5 – Child protection and welfare

T5:PO.040

The prevalence and the risk factors of obesity among elementary school children in adiyaman, turkey

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Background: Childhood obesity is an important problem in the twenty-first century. Pediatric nurses have a key role in the prevention, diagnosis and management of childhood obesity. **Objectives:** The aim of this study is to determine the prevalence and the risk factors of obesity among elementary school children.
Methods: This is a descriptive and cross-sectional study. The research population includes 36,082 elementary school children in Adiyaman, Turkey. The research sample includes 3,028 children from seven schools selected according to stratified random sampling. Research participation was voluntary. The data was obtained from a demographic form and a 25 question-survey which was sent to the families. Children's height and weight were measured by the researchers. To analyze the data, SPSS and Excel were used. The values for frequency, mean, standard deviation, chi–square, one way anova, and logistic regression were calculated.
Results: The children were all between 5 and 15 years old. Of them, 51.2% were male, 13.4% were overweight (between 85 and 95 percentile) according to the Body Mass Index (BMI), and 8.7% were obese (above 95 percentile). Risk factors for childhood overweight and obesity include being male, having average or high socioeconomic status (SES), traveling to school by car or bus, parents with higher levels of education and parents who are overweight.
Conclusion: Childhood obesity is an important problem which needs to be resolved. To create a plan of care for obese children, nurses need to consider the risk factors defined in this study.
Keywords: Childhood obesity, overweight, risk factors, nurse.

T8 – Comorbidities (inc diabetes, hypertension, lipids, sleep apnea, sexual dysfunction)

T8:PO.001

Assessment of nutritional status in patients with non-alcoholic fatty liver disease

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Aims: Obesity is associated with nonalcoholic fatty liver disease (NAFLD) and adversely affects the progression of liver diseases. Currently, there is no consensus on the parameters that have the highest value in assessing the nutritional status in patients with non-alcoholic steatohepatitis (NASH). The aim of this study was to assess the nutritional status of patients with NAFLD through five methods. Material and methods: A total of 124 patients with NAFLD – 60 men (48.3%) and 64 women (51.6%), with an average age 58.3 ± 9.1 years, were included into the study. The data were collected with a structured questionnaire that was divided into two parts: the first part included Mini-Nutritional Assessment (MNA), subjective global assessment questions (SGA) and instant nutritional assessment (INA), and the second part included information about diet and eating problems (we used a modified food-frequency questionnaire). We also calculated Nutritional Risk Index (INR).
Results: Malnutrition was found in 4 (3.22%) patients by MNA and SGA, in 6 (6.45%) by INA, and in 20 (20.1%) by INR. The INR detected malnutrition at a significantly higher rate compared with the other four methods. All patients had body mass index (BMI) over 19 kg/mp. Risk factors for malnutrition (assessed by the combined score) were the following: low HDL-cholesterol (HDL-cholesterol below 40 mg/dl in men, and less than 50 mg/dl in women) (OR=5.82, CI95% 1.6 to 10.04, p = 0,001), hypertriglyceridemia (TG over 150 mg/dl) (OR=2.1, CI95% 1.01 to 4.91, p = 0.045), the AST/ALT ratio >1 (OR=3.17,95%CI 1.05 to 9.6, p = 0.011), Forns index >6.9 (OR=3.28, CI95% 1,08–9,91, p = 0,019).

Conclusions: The prevalence of combined obesity and malnutrition in patients with NAFLD is higher than estimated.

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T8:PO.002

Diabetes Remission Clinical Trial (DiRECT): Protocol for cluster randomised controlled trial

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Introduction: Type 2 diabetes mellitus (T2DM) can be reversed by an energy restricted diet and around 15kg weight loss. This non-surgical approach can be provided at relative low cost in Primary Care, where obesity and T2DM can be routinely managed, using a structured weight management programme. This 5 year study will establish the frequency with which it is possible to produce remission of T2DM at 12 months and sustain this over 2 years.
Methods: Cluster-randomised design with GP practices the unit of randomisation: 280 patients from c.30 practices in Scotland and Tyneside will be allocated either to continue usual guideline-based care or to add Counterweight Plus, which includes 12–20 weeks total diet replacement (TDR), food reintroduction and long-term weight loss maintenance. Main inclusion criteria: men and women aged 20–65 years, all ethnicities, T2DM 0–6 years duration, body mass index >27kg/m^2, <45kg/m^2. Tyneside subjects will undergo MR studies of pancreatic and hepatic fat, and metabolic studies of insulin secretion to determine mechanisms underlying T2DM reversal. All participants will be followed up at 1 and 2 years.
Results: Co-primary endpoints: weight reduction 15kg or more and reversal of diabetes (HbA1c <48mmol/mol) at one year.
Conclusion: This study will establish if a structured weight management programme, delivered in Primary Care by practice nurses or dietitians, is a viable treatment to achieve T2DM remission and guide future management. Results will be available from 2018. Trial Registration ISRCTN03267836

T8:PO.003

Treatment with continuous positive airway pressure (CPAP) decreases plasma Heme Oxygenase 1 (HO1) levels in morbidly obese patients (MO) with severe obstructive sleep apnea (OSA)

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Introduction: HO1 is a new adipokine with a protective role against the cellular stress and hypoxia (1). MO presents with high circulating levels and high adipose tissue expression of HO1 (2). Its role with the coexistance of OSA and the treatment with CPAP have not yet been studied. 1.Abraham N et al. Heme Oxygenase: a target gene for antidiabetic and obesity. Current Pharmaceutical Design,2008;14:412–21. 2. Lehr S et al. Identification and Validation of novel adipokines released from primary human adipocytes. Molecular & Cellular Proteomics 2012; Jan;11(1):M111.010504.
Methods: we studied 57 MO with sever OSA, 40 women and 17 men (age 46.2 ± 10.0 years, BMI 46.8 ± 7.06 kg/m^2, AHI (Apnea hipoapnea index) 64.1 ± 27.6 events/hour). Thirty were treated with CPAP, 24% were smokers, 67% had hypertension and 38% type 2 diabetes. Levels of HO1 were measured by ELISA (Elisa Kit bioNova científica, s.l.Madrid). Epworth sleepiness scale (ESS) score, AHI and percentatge of total sleep time with oxygen saturation < 90% were determined by overnight conventional polisomnography (CE-Series Compumedics, Victoria, Australia). Waist circumference, % body fat by bioelectrical impedance (TANITA) and HOMA insulinresistance index were also measured. For statistical analisis SPSS-PC-plus version 19 was used.
Results: patients treated with CPAP had lower plasmatic levels of HO1 compared with patients without treatment (5.89 ± 1.29 vs 8.84 ± 6.70pg/mL, p = 0.029). The only variables that were different between both groups were the presence of DM2 (52% vs 26%, p = 0.038) and the ESS score (13.5 ± 5.74 vs 9.70 ± 3.64, p = 0.007) in the treated vs untreated groups.
Conclusion: CPAP treatment reduces HO1 plasmatic levels in MO with sever OSA.

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T8:PO.004

Sleep architecture, body composition and metabolic profile after one month of weight loss intervention in obese people with Obstructive sleep apnea

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Introduction: Weight loss has been extensively recommended for obese people with obstructive sleep apnea. This work aims to compare sleep architecture, body composition and metabolic profile of obese individuals with obstructive sleep apnea (OSA) after one month of weight loss intervention.
Methods: 23 obese men, 41.6 ± 7.9 years old were submitted to one month of caloric restriction. Energy deficit was 30% of total energy expenditure. Before and after intervention the following evaluations were made: laboratory polysomnography, body composition by plethysmography and blood collection for lipd profile, glycemia and hormones insulin and IGF-1 determination.
Results: One month intervention resulted in improvements in all anthropometric and body composition parameters as body mass (103.8 ± 12.5 to 99.8 ± 12.7kg, p = 0.000), BMI (35.4 ± 4.2 to 33.8 ± 4.2 kg/m^2, p = 0.000), % of fat mass (38.1 ± 5.6 to 36.8 ± 6.4%, p = 0.012), % of fat free mass (61.5 ± 5.9 to 63.3 ± 5.8%, p = 0.000) and waist circumference (112.3 ± 9.4 to 107.3 ± 8,7 cm, p = 0.000). Glycaemia (108.4 ± 7.7 to 101.1 ± 5.1 mg/dL, p = 0.000), Total Cholesterol (187.2 ± 29.0 to 166.6 ± 22.3 mg/dL, p = 0.001), LDL Cholesterol (112.5 ± 25.9 to 102.4 ± 18.4 mg/dL, p = 0.022), Insulin (36.0 ± 16.1 to 27.4 ± 10.8 uIU/mL, p = 0.000) and HOMA-IR (5.32 ± 2.58 to 3.17 ± 1.27, p = 0.002) were improved. No differences were found in HDL-cholesterol. In relation to sleep architecture were improved: Apnea-Hypopnea Index (AHI, 46.4 ± 25.6 to 40.2 ± 27.2 events/h, p = 0.028), hypopneas events per night (111.7 ± 57.1 to 76.2 ± 65.4 events, p = 0.027), oxyhemoglobin saturation (93.6 ± 1.5 to 94.8 ± 1.6%, p = 0.009) and desaturation index during NREM sleep (45.8 ± 24.9 to 34.2 ± 25.6, p = 0.001).
Conclusion: One month of weight loss intervention is sufficient to cause a significant reduction on body weight, improvements in body composition and lipid and insulin resistance profile, AHI and oxyhemoglobin saturation.

T8:PO.005

The prevalence of co-morbidities in obese individuals embarking on a very low calorie diet (vlcd) weight loss programme at lighterlife

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LighterLife is a commercial weight loss provider offering a range of programmes for overweight and obese individuals. Those with conditions which are contra-indicated for a VLCD are refused entry onto this programme and those with certain co-morbidities must see their general practitioner for monitoring. There are strict rules within the UK on the marketing of products which facilitate weight control. Administered by the Advertising Standards Authority (ASA), the Committee for Advertising Practice (CAP) states that 'Obesity is frequently associated with a medical condition and a treatment for it must not be advertised to the public unless it is to be used under suitably qualified supervision'. The prevalence of co-morbidities which require medical monitoring in obese individuals embarking on the LighterLife Total VLCD weight loss programme has not previously been investigated. Cross-sectional analysis of client baseline medical data was performed to assess the prevalence of co-morbidities in all obese individuals who applied to embark on the LighterLife VLCD programme in 2014. Data from 14,855 individuals with a mean age of 44.6 (±11.7) years and mean BMI of 36.9 (±6.0) were analysed. 970 individuals (7%) presented with contra-indications for a VLCD and were declined onto the programme. 1084 individuals (7.3%) without contra-indications presented with co-morbidities and were required to undergo medical supervision. 86% of all obese individuals who sought to join the LighterLife VLCD programme in 2014 presented with no obesity related co-morbidities and did not require medical supervision. These data provide insight into the prevalence of co-morbidities in obese individuals prior to joining a weight loss programme which is significantly lower than that suggested by CAP. To ensure that the rules regarding the advertising of weight loss products and programmes to obese individuals are evidence-based, these data should be taken into consideration.

T8:PO.006

Effect of a dietary weight loss intervention on the lipid profile of obese individuals with signs of non-alcoholic fatty liver disease: Beyond standard lipids.

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Introduction: Cardiovascular disease (CVD) is an important cause of morbidity and mortality in non-alcoholic fatty liver disease (NAFLD). Dyslipidaemia is one of the suggested mechanisms linking CVD and NAFLD. We assessed an extensive lipid profile in obese patients with NAFLD signs and looked at dietary impact.
Methods: Obese patients had a metabolic and liver assessment. If NAFLD was suspected, liver biopsy was proposed. After 6 months of diet, patients were re-evaluated, including an extensive lipid profile with apolipoproteins, LDL and HDL subspecies.
Results: We selected 73 patients that completed a 6-month weight loss program, with baseline BMI 35.1kg/m¸ (Q1-Q3:32.4–39.8) and age 48 ± 12y. In 69 patients at least one standard lipid parameter was disturbed at baseline. Biopsy proven liver steatosis was associated with smaller LDL ($p = 0.056$) and HDL particle size ($p = 0.040$). This was also reflected by the inverse associations between liver scores for NAFLD/NASH and LDL and HDL particle size. Serum GGT ($p < 0.001$), Fatty Liver Index ($p < 0.001$), calculated liver percentage ($p < 0.001$) and NAFLD liver fat score ($p = 0.001$) were higher in patients with a hypertriglyceridemic waist. Patients achieved a weight loss of 9.1 ± 5.6% and most parameters of lipid metabolism improved. Changes in some lipids (TG, HDL, HDL2b, HDL3a, HDL3b, HDL mean particle size, ApoB, ApoE, RLP) were related to change in visceral adipose tissue.
Conclusion: We confirm the proatherogenic lipid profile in NAFLD, with high total cholesterol, high LDL and smaller LDL peak particle size. This lipid profile is associated with markers of steatosis and fibrotic NASH, suggesting that dyslipidaemia may play a role in the link between NAFLD and CVD. We observed that weight loss improves most parameters of lipid metabolism.

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T8:PO.007

Diagnosis of diabetes mellitus in a population of obese patients: Ogtt or a1c/fasting plasma glucose

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Introduction: Obesity is associated with an increased risk of type 2 Diabetes Mellitus (DM). Oral glucose tolerance test (OGTT), fasting plasma glucose (FPG) and A1c test can be use to diagnose the condition. As the OGTT is more expensive and time consuming than alternative tests is questionable to perform the test in all obese patients. **Objective:** To compare OGTT with A1c and FPG in the diagnosis of DM in obese patients.
Methods: Cross-sectional study of a population of 717 morbidly obese adults evaluated in a Multidisciplinary Assessment of Surgical Treatment of Morbid Obesity between January/2010-December/2013. Demographic, anthropometric and metabolic parameters were evaluated. Diabetes was defined according to ADA criteria.
Results: In a cohort of 717 patients, 629 (87.7%) were female, with a median age of 41 years (IQR 35–51) and a median BMI of 43.5kg/m^2 (IQR 40.6–47.1). Of 707 patients who performed FPG, 18 (2.5%) met DM criteria; of 657 patients who underwent OGTT, 37 (5.6%) fulfilled DM criteria; of 673 who performed A1c, 25 patients (3.7%) had DM by this criterion. 629 patients performed the three diagnostic tests. Of those, 18 patients (2.9%) did not meet criteria for DM by A1c or FPG, but they were diagnosed by OGTT. The FPG and A1c diagnosed DM in 12 patients (1.9%) with a normal OGTT. The FPG and A1c test showed a specificity of 98% and a sensitivity of 48.6% for the identification of patients with DM compared with OGTT.
Conclusion: OGTT diagnosed diabetes in patients with normal FPG and A1C. FPG or A1c showed a low diagnostic sensitivity, which highlights the importance of performing OGTT in obese patients, in order to reduce the number of undiagnosed cases of diabetes.

T8:PO.008

Improved cartilage quality indicated by dgemric after more than 12% weight loss with a 16 week formula diet programme in elderly obese with knee osteoarthritis: A cohort study

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Purpose: To assess if weight loss can improve the quality of hyaline cartilage in patients with Knee osteoarthritis (KOA). Cartilage quality was assessed by delayed Gadolinium Enhanced MRI of Cartilage (dGEMRIC) in 1.5 tesla (T) MRI scanner.
Method and materials: 19 patients (BMI>30) with symptomatic KOA from a 16-week formula diet (Cambridge Weight Plan ®, Northants., UK) weight loss intervention study were included from the CAROT trial (NCT00655941). Included patients had K/L (Kellgren/Lawrence) grade 1–2 in the lateral tibiofemoral compartment. Inversion recovery dGEMRIC with four inversion times was performed using intra articular contrast at baseline and after 16 weeks. Weight-bearing posterior femoral cartilage was region of interest (ROl). Differences in weight loss and dGEMRIC T1-values were compared between the groups.
Results: 9 patients with K/L 1 and 10 patients with K/L 2 were included. No group differences at baseline: dGEMRIC T1-values: 467 ms for K/L 1, and 518 ms for K/L 2 ($p = 0.11$); at 16 weeks: weight loss: 12.3% of BMI for K/L 1 and 14.3% of BMI for K/L 2 ($p = 0.37$). Average dGEMRIC T1-value increased with approximately 28 ms (CI: –29; 86) in K/L-group 1, and decreased 61 ms (CI: –116;-7) in K/L-group 2 ($p = 0.03$). Taking baseline dGEMRIC into account, the changes showed the same trend, although less pronounced ($p = 0.10$). Reproducibility was similar to previous publications: ICCs of 0.96 for intra-reader and 0.92 for inter-reader variability.
Conclusion: Our results indicate that improvement of cartilage quality after more than 12% weight loss may be possible in early stage but not in later stage KOA. The results may indicate a point of no return for improvement of cartilage quality.

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T8:PO.009

Decrease of microalbuminuria (mi) by weight loss induced by bariatric surgery (bs) in patients with morbid obesity (mo)

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Introduction: Since MI is an important risk factor for both kidney and cardiovascular disease, we investigated albumin excretion rate (AER) and kidney function (eGFR) in a large cohort of patients with MO before and after BS.
Methods: 1280 patients with MO (BMI: 45.4 ± 6.3km/m^2, mean±SEM, age 40 ± 12y) were included in a cross-sectional study and 288 were analysed 2 years after BS. Apart from anthropometric data, a 75g oGTT, renal parameters and lipids were assessed. HOMA-IR and eGFR (CKD-Epi formula) were calculated, AER was quantified by collecting 24h urine on 3 consecutive days. Hyperfiltration was defined as eGFR> 90ml/min/1.73m^2.
Results: 246 of 1280 (19.2%) patients had MI (16.1%) or macroalbuminuria (MA;3.1%) and 623 (48.7%; mean eGFR 105.4 ± 15.0ml/min/1.73m^2) had hyperfiltration. Patients with diabetes (n=274), had more often (χ=34.712; $p < 0.001$) an increased AER (30.9% vs 14.6%) compared to patients without (n=733). Patients with MI were more obese ($p < 0.001$), older ($p = 0.002$), had a higher systolic ($p < 0.001$) and diastolic blood pressure ($p = 0.001$), fasting blood glucose ($p = 0.001$) and 1h postprandial (pp) blood glucose levels ($p = 0.001$), HbA1c ($p < 0.001$), fasting ($p < 0.001$), 1h pp ($p = 0.001$), 2h pp insulin levels ($p = 0.010$) and HOMA-IR ($p < 0.001$), triglycerides ($p < 0.001$) and HDL cholesterol levels ($p < 0.001$) compared to normoalbuminuria. After BS (mean weight loss 41 ± 12kg), AER decreased from 12.2 (6.8–23.1) to 8.9 (5.3–14.8)mg/24h ($p < 0.001$) in the whole and from 59.9 (39.6–104.1) to 12.1 (8.2–28.4) mg/24h ($p < 0.001$) in the MI group and only 9.7% (n=28) had still MI or MA.
Conclusion: Increased AER and hyperfiltration are present in a substantial portion of patients with MO. Weight loss induces a dramatic decrease of AER by about 50%, which parallels reduction of risk factors.

T8:PO.010

Associations between non-alcoholic fatty liver disease, anthropometry and diabetes in morbidly obese patients

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is very prevalent and obesity is a significant risk factor. Diagnosis of non-alcoholic steatohepatitis (NASH) requires liver biopsy. We estimated the prevalence of NASH and fibrosis in morbidly obese patients.
Methods: In this randomized controlled trial (NCT02092376) liver biopsy was performed at the time of bariatric surgery and Bedossa's SAF (Steatosis, Activity, Fibrosis) score was used for categorizing liver lesions1. Additionally, total body fat content by dual-energy-absorptiometry and serum liver enzymes were examined.
Results: 35 patients [71% women, age 43(13) years, mean(SD)] with a BMI of 44.1(4.7) kg/m^2, waist circumference (WC) of 128.2(11.0) cm, and total body fat of 42.8(7.0)%, were analyzed. The following risk factors were present: diabetes 26%, hyperlipidemia 23%, and hypertension 43%. Moreover, 80% had some degree of steatosis (S≥1), 77% had NASH (A≥2), 31% demonstrated significant liver fibrosis (F2-F3), and 6% had cirrhosis (F4). Total body fat and diabetes were significantly associated with fibrosis ($r=-0.543$, $p = 0.001$ and $r=0.584$, $p = 0.001$). WC was related to degrees of steatosis ($r=0.363$, $p = 0.01$). Furthermore, patients with NASH compared to those without had significantly higher alanine transaminase (ALAT) levels [40.6(21.4) vs. 21.3(6.8) U/l, $p = 0.001$].
Conclusion: In this study, NASH and significant liver fibrosis are present in a high percentage of morbidly obese patients. Fibrosis and steatosis seem to be associated with total body fat, diabetes and WC. Furthermore, patients suffering from NASH demonstrated higher levels of ALAT.

Reference:
1. Bedossa P, et al.: Hepatology 2012. 56(5):1751–1759.

T8:PO.011

Bariatric surgery as hypouricemiant therapy in a population of obese

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Introduction: Hyperuricemia is considered by some authors as a risk factor for cardiovascular disease and several studies demonstrated association between hyperuricemia and increased cardiovascular mortality. Bariatric surgery (BS) in addition to the reduction in weight can lead to improvement in obesity comorbidities including hyperuricemia.
Objective: Evaluation of the prevalence of hyperuricemia in a population of obese patients underwent BS before and 12 months after the procedure.
Methods: Retrospective study of patients who underwent BS between January 2010 and June 2013. We included only patients with uric acid assay at 0 and 12 months after surgery. We compared the uric acid (UA) and the prevalence of hyperuricemia before and after the procedure. Hyperuricemia is defined by uric acid value greater than 6,8mg/dL.
Results: 791 patients were included, with mean age of 42.7 ± 10.8 years and BMI 44.4 ± 5.6 kg/m^2. We observed decreased of uricemia in the total sample (before 5.9 vs 12m 4.6mg/dL, p <0.001), in females (before 5.8 mg/dL vs 12m 4.3 mg/dL, p <0.001) and in males (before 6,6mg/dL vs. 12m 6.5/mg/dL, p <0.001). For hyperuricemia there was a reduction in the prevalence (total sample – before 12,9% vs 12m 4.2%; Female gender - before 8.2% vs 12m 1.8%; Male - before 44.7% vs 12m 20,4%, p <0.001 for all).
Discussion: The UA values and the prevalence of hyperuricemia were higher in males, which is in agreement with other studies. The BS was shown to be useful in reducing the UA values and decreased prevalence of hyperuricemia. These results demonstrate the effectiveness of BS as hypouricemiant therapy. In obese patients with gout treated with hipouricemiant drugs, the BS can be an opportunity for suspension of these drugs.

T8:PO.012

The diagnostic dilemma for type 2 diabetes in patients with morbid obesity

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Background: The incidence of type 2 diabetes (T2DM) amongst patients undergoing bariatric surgery ranges from 15–23%. In 2010 HbA1c was recommended for use as a diagnostic test for diabetes by the ADA. This is the first study comparing the different diagnostic criteria (DC) for diabetes in a large cohort of patients with MO
Methods: In total 926 patients with MO (mean age 40 ± 12 years) were included, of whom 14.2% (n=145) had a known T2DM and were therefore excluded. All patients with unknown T2DM (n=781) underwent an oral glucose tolerance test (OGTT; 75g glucose) and were included. The thresholds of DC for diabetes were HbA1≥6.5%, fasting plasma glucose (FPG) ≥126mg/dl and 2 hour post-challenge glucose ≥200mg/dl. Insulin levels were assessed in the fasting state as well as post OGTT and HOMA-Insulin resistance (IR) was calculated. In addition, cardiovascular risk factors were evaluated in all patients.
Results: The prevalence of undiagnosed T2DM was 6.9% (n=54) using the HbA1c criteria, 7.1% (n=55) using the 2-hour OGGT criteria ≥200mg/dl, but only 3.6% (n=28) using the FPG criteria. Remarkably, only 2.4% (n=19) of the patients fulfilled all 3 criteria. Prevalence of the metabolic syndrome using the ATP III criteria was similar in patients diagnosed for diabetes by HbA1c (83%), FPG (79%) or 2 hour post-challenge glucose (87%). HOMA-IR was 8 (5;13) in the group defined by HbA1c, 9 (8;14) in the 2 hour post-challenge glucose and 10 (7;18) in the group defined by FPG.
Conclusion: The present study indicates a significantly higher prevalence of diabetes when HbA1c or 2 hour glucose are used as DC in comparison with FPG indicating that the previously used FPG criteria underestimate the existence of diabetes in patients with morbid obesity.

T8:PO.013

Anthropometric Approach to Insulin Resistance: Neck Circumference Measurement

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Insulin resistance is associated with visceral fat content. Neck circumference is an index for upper body subcutaneous adipose tissue distribution. In addition, neck circumference has been evaluated in relation to insulin resistance. The aim of the present study was to determine the relationship between neck circumference and insulin resistance. A total of 104 women in normal weight (BMI: 18.5–24.9 kg/m^2, n:51), and obese (BMI: ≥30 kg/m^2, n:53) aged 20–49 years, were included in the study. In this study, biochemical parameters (glucose, insulin, HbA1C) were performed after 8–10 hours fasting. Homeostasis model assessment of insulin resistance (HOMA-IR) was calculated as fasting glucose level (μU/mL)×fasting insulin level (mg/dL) /405. Neck circumference (at the level of the thyroid cartilage) were measured and cut off value was accepted 35 cm for women. Mean BMI of normal weight and obese women were 23.18 ± 3.4 kg/m^2, 35.2 ± 4.2 kg/m^2, respectively. It was determined that all of the obese women's neck circumference were above the 35 cm. Mean neck circumference of obese and normal weight women were 37.2 ± 1.9 cm and 31.0 ± 1.6 cm, respectively. Mean HOMA value of obese and normal weight women were 2.7 ± 1.3, 1.2 ± 0.57. Obese women's HOMA value was above the normal range (<2.5). A significant relationship was found between HOMA, HbA1C, BMI, glucose and insulin levels and neck circumference ($p < 0.05$). It was determined that neck circumference strongly correlated with BMI, glucose, insulin, HOMA ($p = 0.000$). At the end of this study, it was concluded that neck circumference is associated with BMI and insulin resistance. Neck circumference measurement could be used in clinical screening of obese patients. Moreover, determination of beneficial effects of neck circumference may be valuable for studies in future.

T8:PO.014

Incidence and remission of type 2 diabetes in relation to weight loss, weight stability and degree of obesity: The swedish obese subjects (sos) study.

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Aim: To analyse the incidence and remission rates for type 2 diabetes (T2D) among obese individuals in relation to initial BMI and magnitude of weight reduction in the Swedish Obese Subjects (SOS) study.

Methods: 3485 obese individuals receiving bariatric surgery or conventional treatment were included in this report. Individuals were grouped into four BMI categories according to baseline BMI (<35; 35–40; 40–45; or ≥45 kg/m^2) and five weight change categories depending on the resulting BMI at 2 years (weight increase (≥1 BMI unit increase), weight stable (less than 1 BMI unit change), minor weight reduction (–1 to –9 BMI units), medium weight reduction (–0 to –14 BMI units), and major weight reduction (more than –15 BMI units). The incidence and remission of T2D at 2 years was assessed.
Results: Among weight stable individuals, T2D incidence rates were 5.5, 7.4, 8.3 and 5.2%, in the four baseline BMI categories, respectively. Among those with an initial BMI of 35–40, 40–45 and ≥45 attaining a minor reduction of weight, the corresponding rates were 1.3, 1.2 and 3.4%, respectively. In the medium/major weight reduction groups, T2D incidence was ≤0.5%. Among weight stable individuals with T2D at baseline, the T2D remission rates were 15.3–26.9%, and for individuals attaining a minor weight reduction, remission rates were 48.1–70%. In the medium/major weight reduction groups, the remission rates were 77–97%. There were no differences in the 2-year incidence and remission rates between the different baseline BMI groups obtaining the same degree of weight reduction.
Conclusion: Our results suggest that, in obese subjects, the favourable effect of weight reduction on T2D incidence and remission is independent of the initial degree of obesity.

Acknowledgement: We thank the staff members at 480 primary health care centers and 25 surgical departments in Sweden that participated in the study.

T8:PO.015

Weight loss success in obese knee osteoarthritic patients is independent of pressure-pain sensitivity at enrolment: A prospective cohort study

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Purpose: Weight loss is a recommended treatment for adipose patients with knee osteoarthritis (KOA). It is unknown if sensitization of the nociceptive system prevents improvement in pain induced by weight loss. The aim of the study was to investigate if baseline pressure-pain sensitivity of the lower leg influences weight loss success of a diet intervention in obese KOA patients.
Methods: 168 out of 192 participants from a prospective cohort were included (ClinicalTrials.gov identifier: NCT00655941). A computerized tourniquet cuff pressure algometer was used to determinate pressure pain sensitivity. Pressure-pain threshold (PPT), pressure-pain tolerance threshold (PTT) and tolerance threshold pain score (TTPvas) was measured before a 16-week diet intervention. We dichotomised the changes in pain and body weight into treatment response (y/n) knee pain improvement >30%, and weight loss success (y/n) defined as a weight loss >10%. We assessed the associations between baseline pain sensitivity variables and the binary variables predicting response/success.
Results: 30% achieved an improvement in knee pain above 30% (mean change: 9.6 [SD 14.5]/mm). Baseline pressure pain sensitivity could not predict improvements in knee pain above 30% (PPT: OR=1.03 [95% CI 0.99to1.08]/kPa; PTT: OR=1.01 [95% CI 0.98to1.04]/kPa; TTPvas: OR=1.06 [95% CI 0.85to1.32]/mm). 74% achieved a weight loss above 10% (mean change: –12.6 [SD 6.1]/kg). Baseline pressure pain sensitivity could not predict weight loss success either (PPT: OR=1.01 [95% CI 0.97to1.06]; PTT: OR=1.01 [95% CI 0.98to1.04]; TTPvas: OR=1.03 [95% CI 0.84to1.27]).
Conclusions: Pressure pain sensitivity at baseline does neither have a prognostic value for predicting the clinical outcome nor the weight loss success of a diet intervention in obese KOA patients. These results suggest that all obese patients with KOA will benefit from weight loss intervention treatment independently of any sensitization of their nociceptive system.

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T8:PO.016

Determinants of evolution of glomerular filtration rate one year after bariatric surgery

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Introduction: Many studies have shown that hyperfiltration induced by obesity decreases after bariatric surgery, but some studies also shown an increase of glomerular filtration rate (GFR). Furthermore, the factors that influence GFR after bariatric surgery have been poorly studied.
Methods: We studied the evolution of GFR in 323 candidates for bariatric surgery (age 43 ± 11 yr, M/F 49/274, BMI 46 ± 7 kg/m^2), by measuring creatinine clearance (assessment of plasma and 24h-urinary creatinine) before and one year after surgery. The links between creatinine clearance and clinical and biological parameters were also studied.
Results: Excess weight loss was 61 ± 24%. Body surface decreased from 2.26 ± 0.23 to 1.98 ± 0.21 m^2 ($p < 0.001$). Plasma creatinine decreased from 72 ± 16 to 69 ± 36 µmol/l ($p < 0.001$) and 24h-urinary creatinine from 13.4 ± 4.8 to 11.5 ± 4.5 mmol/24h ($p < 0.001$). Mean GFR decreased from 133 ± 37 to 122 ± 49 ml/min ($P < 0.001$) in parallel to body surface. GFR decreased in subjects with preoperative GFR>120 ml/min ($P < 0.001$), but was stable in those with 90<GFR<120 ml/min and increased in those with GFR<90 ml/min ($p < 0.01$). In multivariate analysis, GFR did not correlate with blood pressure or metabolic parameters, but correlated positively with body surface ($P < 0.001$) and protein intake ($P < 0.01$) and negatively with age ($P < 0.001$) and persistence of antihypertensive drugs ($P < 0.001$) after surgery.
Conclusion: GFR decreased after bariatric surgery in subjects with hyperfiltration, but increased in subjects with renal failure. The main determinants of creatinine clearance after surgery were body surface, age, protein intake and antihypertensive treatment.

T8 – Metabolic outcomes (diabetes, lipids, hypertension)

T8:PO.017

Effect of metformin on cardiometabolic risk factors in patients with abdominal obesity and non-alcoholic fatty liver disease (NAFLD)

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Introduction: NAFLD is the chronic disease associated with obesity, insulin resistance and cardiometabolic diseases. Aim: to study the efficacy of metformin and its impact on cardiometabolic risk factors in patients with abdominal obesity with NAFLD according to liver biopsy.
Methods: 77 patients aged 30–50 were divided into a control group of non-pharmacological treatment (n=37) and primary (n=40) with metformin 2 g per day for 1 year.
Results: The group with metformin: the median weight loss in the study and control groups was 6.3 and 3.0 kg (p = 0,002), BMI - 2.3 and 1.2

(p = 0,002), and waist circumference - 6.0 and 4.0 cm (p = 0,003), respectively (p < 0,005). In the main group clinically significant weight loss (≥5%) reached 72.5%, in the control group - 37.8%. In the study group there was a significant reduction in fasting plasma glucose of 9.7% and up to 120 minutes OGTT by 16.2%, 20.8% insulin, HOMA-IR by 32.1%, total cholesterol by 9.7% LDL-cholesterol by 13.2%, triglycerides by 25% and a significant increase in HDL-cholesterol by 18.2% (p < 0.0001). The control group indicated a less pronounced decrease in these indicators, except for a statistically significant reduction of insulin (p > 0,05) and the changes in HDL-cholesterol (p = 0,07). The study group showed a significant increase in adiponectin by 46.9% (p < 0.001) reduction in CRP by 48.6% (p < 0.001) and PAI-1 activity by 12.1% (p = 0,0005), markers of endothelial dysfunction: endothelin-1 by 20%, E-selectin on 3,6%, ICAM-1 by 6.5%, VCAM-1 by 8.1% (p < 0.0001); there were no significant changes of these indicators in the control group.

Conclusion: A therapy with metformin in patients with abdominal obesity contributes to a significant reduction in body weight and correction associated with NAFLD cardiometabolic disorders.

T8:PO.018

Particularities of the association of obesity with chronic kidney disease in the patients with type 1 diabetes mellitus

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Introduction: The objective of study was the assessment of obesity and insulinresistance (IR) in patients with type 1 Diabetes Mellitus (DM) with and without chronic kidney disease (CKD).

Methods: We analised a random sample of 140 patients with type 1 DM, 40% women and 60% men, to whom were recorded: age, gender, duration of DM, IR parameters ((waist circumference (WC), body mass index (BMI), waist-hip ratio (WHR), glicated hemoglobin (HbA1c), estimated glucose disposal rate (eGDR), the daily insulin requirement, C peptide, hypertensive status, dyslipidaemia)), smoking status, creatinine, estimated Glomerular Filtration Rate (eGFR)(MDRD-4). CKD was defined as eGFR < 60 ml/min/1.73 m^2 or urinary albumin to creatinine ratio ≥ 30 mg/g.

Results: The prevalence of CKD was 58.57% (42.85% of women and 69.04% of men); of patients with CKD, 29.26% were women and 70.73% men. Average age, duration of DM, WHR, abdominal obesity, the presence of neuropathy was comparable at the two groups. Patients with CKD have presented overweight or obesity 40.24% vs. 32.75%, lower eGDR (5.86 ± 2.24 vs. 7.16 ± 2.24 mg x kg ą x min ą), higher HbA1c (8.90 ± 1.72% vs 8.33 ± 1.65%), lower daily insulin necessary, lower C peptide than patients without CKD. Between patients with CKD, 67% have presented HTA, dyslipidaemia 70.73%, 63.41% smoking status, diabetic retinopathy 83% comparatively with 39.65%, 53.44%, 36.20%, 63.8% of those without CKD.

Conclusions: Overweight or obesity, eGDR, HTA, dyslipidaemia, poor glycemic control, C peptide, the daily insulin requirement, smoking status, retinopathy were significantly associated with BCR (P < 0.005). IR parameters are associated with CKD.

T8:PO.019

The Potential Role of Iron and Copper in Pediatric Obesity and Nonalcoholic Fatty Liver Disease

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Introduction and summary: Obesity is a rapidly growing health problem and is paralleled by a multitude of comorbidities, including nonalcoholic fatty liver disease (NAFLD). NAFLD has become the most common chronic liver disease both in adults and children. The current understanding of NAFLD is still fragmentary. While simple steatosis is characterized by the interplay between excessive free fatty acid accumulation and hepatic insulin resistance, the progression to NASH has been related to oxidative stress and a proinflammatory state with dysbalanced adipokine, cytokine levels and endotoxin-mediated immune response. In addition, oxidative stress has been suggested to play a central role for the sequelae leading to NASH. Trace elements are critical in regulatory, immunologic and in antioxidant functions resulting in protection against inflammation and peroxidation and consequently against the known comorbidities of obesity. Disruptions of the metal detoxification processes located in the liver are plausibly related to NAFLD development via oxidative stress. Perturbations of iron and copper homeostasis have been shown to contribute to the pathogenesis of NAFLD.

Methods and results: This review presents current data from pediatric studies. In addition, data from adult studies are summarized where clinical relevance may be extrapolated to pediatric obesity and NAFLD.

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T8:PO.020

Exploring the feasibility of investigating the impact of diet-induced weight loss on biomarkers for colorectal cancer (crc): Preliminary results from the intercept study

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Introduction: Epidemiological data demonstrate that obesity is associated with raised risk of some cancers, but there is less evidence that weight loss reduces risk. Bariatric surgery is associated with reduced risk of cancer in some studies, but there are no comparable data for dietary/behavioural programmes. The notorious difficulty of weight-loss maintenance makes it difficult to examine effects on long-term cancer outcomes. Cancer-related biomarkers could provide a valuable intermediate end-point

Methods: This single-arm study examined the feasibility of investigating the effects of diet-induced weight loss on molecular biomarkers of CRC risk in serum and colon tissue. Twenty obese, but otherwise healthy, adults (21–57yrs) followed an 8-week complete meal replacement weight loss programme. Before and after treatment, blood was drawn for serum biomarkers and endoscopic examinations were used to obtain colon biopsies. Anthropometric measures were taken by a nurse.

Results: Participants achieved successful weight loss (9–18%), adhered to study procedures and reported high satisfaction with the study. Mean levels of IGF-1 were similar pre- and post-intervention (IGF-1 mean Δ=0.87 nmol/L), whereas insulin and CRP levels were reduced (insulin mean Δ=-3.97 mIU/L, CRP mean Δ=4.37 mg/L). Linear change score models supported associations between changes in weight and change in both insulin (β=0.37, p < .001) and CRP (β=0.10, p = 0.003).

Conclusion: This approach to studying the effects of weight loss on CRC risk is feasible. Even in this small sample, weight loss was associated with

improvements in two serum biomarkers for CRC risk. Analysis of tissue biopsies is underway and will provide insight into the effect of weight loss on molecular markers in target tissues for CRC.

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T8:PO.021

Association between obstructive sleep apnea screening and adverse pregnancy outcomes among obese gravidas

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Background: Obstructive sleep apnea (OSA) in pregnancy may be associated with preeclampsia (PEC), cesarean delivery (CD) and gestational diabetes mellitus (GDM). We implemented the STOPBANG Questionnaire (SB), a common screening tool for OSA, in a subspecialty obstetrics clinic established to mitigate gestational weight gain in low-income, urban obese gravidas. Subjects met biweekly with a maternal-fetal medicine specialist, a nutritionist and a social worker to enact lifestyle changes for enhanced health.
Objective: To evaluate the association between the SB findings and adverse maternal outcomes among an obese, pregnant cohort.
Methods: Of the 297 women prospectively enrolled in the cohort, 157 had both delivery and SB data and thus were included in the current analysis. BMI was measured at the time of SB screening. The associations between SB findings and adverse maternal outcomes were analyzed using multiple logistic regression to control for potential confounders, including age, parity, hypertension, and BMI.
Results: BMI ranged from 30 to 71 kg/m^2 (M=41, SD=7.5), age from 15 to 42 years (M=26.7, SD=5.6) and 93% were African American. 46% of women screened positive for OSA using SB. A + SB screen was associated with an increased risk of GDM (OR=2.71, CI=1.02–7.21) but was not associated with CD or PEC in this cohort.
Conclusions: Among obese gravidas, a + SB screen was a significant predictor of GDM, suggesting an independent association between sleep-disordered breathing and glucose metabolism. This association suggests that early glucose screening is indicated in the obese gravida with a + OSA screen. Further study is needed to determine if preconception OSA evaluation and treatment, in addition to standard weight loss management, can mitigate GDM and its consequences.

	Women w/ + SB (n=72)	Women w/ - SB (n=85)	OR (95% CI)
Gestational Diabetes Mellitus	17 (68%)	8 (32%)	2.71 (1.02 to 7.21)
Preeclampsia	14 (61%)	9 (39%)	1.79 (0.64 to 5.04)
Cesarean Delivery	35 (49%)	36 (51%)	1.17 (0.59 to 2.33)

Fig. 1. OSA Screening and Maternal Health Outcomes

T8:PO.022

Additional analyses of the weight-lowering efficacy of liraglutide 3.0 Mg in overweight and obese adults: The scale obesity and prediabetes randomised trial

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This trial investigated the safety and efficacy of liraglutide 3.0 mg for weight management as adjunct to a 500 kcal/day deficit diet and exercise program (NCT01272219). Adults with BMI ≥27 kg/m¸ and ≥1 comorbidity or with BMI ≥30 kg/m¸ were randomised 2:1 to once-daily liraglutide 3.0 mg (n=2487) or placebo (PBO) (n=1244). Data are observed means for the full analysis set with LOCF at week 56, unless stated otherwise. Statistical analyses are estimated treatment differences (ETD; ANCOVA, continuous variables) or odds ratios (OR; logistic regression, categorical). Baseline BMI subgroups were ≤29.9, 30–34.9, 35–39.9 and ≥40 kg/m¸. Baseline characteristics were age 45y, 79% female, body weight (BW) 106 kg, BMI 38 kg/m¸ and 61% with prediabetes. A total of 92% of patients on liraglutide lost BW vs 65% on PBO (figure). Completers on liraglutide (n=1789,72%) lost 9.2% (9.7 kg) of BW vs 3.5% (3.8 kg) on PBO (n=801,64%; ETD –5.7%, p < 0.0001). In total, 73% of completers on liraglutide lost ≥5% BW vs 35% on PBO (OR 5.0, p < 0.0001). BW loss of >10% occurred in 41% vs 14% (OR 4.0, p < 0.0001) of liraglutide-treated vs PBO-treated patients. Overall, BW loss with liraglutide was similar in those with and without prediabetes at screening (–8.0% vs –7.9%, respectively, p = 0.59) and across baseline BMI subgroups (%, p = 0.054; kg, p = 0.54). Non-completion was mainly due to GI AEs and lack of efficacy for liraglutide and PBO groups respectively. In conclusion, liraglutide 3.0 mg, as adjunct to diet and exercise, induced significant BW loss compared to placebo; 92% of subjects treated with liraglutide lost weight. For liraglutide-treated patients completing the study, mean BW loss was 9.2% vs 3.5% on PBO. BW loss with liraglutide was independent of baseline prediabetes status and BMI.

Acknowledgement: Supported by Novo Nordisk

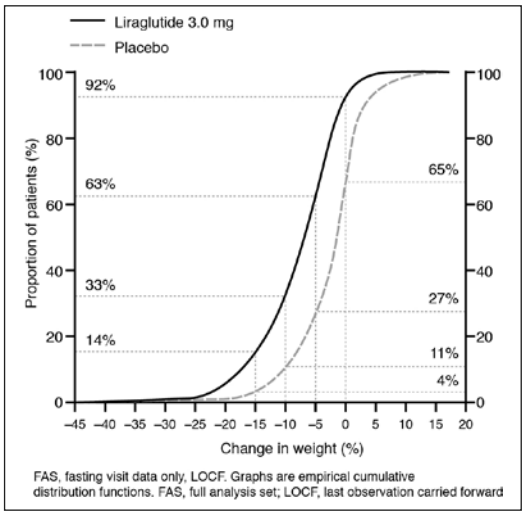

Fig. 1. Distribution of weight loss over 56 weeks in the SCALE Obesity and Prediabetes trial.

T8:PO.023

The influence of obesity and diabetes on the effectiveness of statin therapy in patients with increased cardiovascular risk.

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Background: Statins are used to reduce cardiovascular risk in patients with cardiovascular diseases. However, the effectiveness of therapy in many cases remains unsatisfactory. The aim of this study was to evaluate the efficacy of statin therapy in patients with elevated cardiovascular risk and the factors affecting the efficacy of treatment. Patients and methods: This study was conducted on the basis of questionnaires obtained from 8998 adult patients diagnosed with cardiovascular diseases, by cardiologists based on the patient history and physical examination of the patient and the available documentation during routine cardiological outpatient consultations.
Results: 39.4% of respondents were obese according to WHO criteria and 62.3% according to the IDF criteria of visceral obesity. 24.3% of patients had been diagnosed with type 2 diabetes. The most commonly utilized statin was atorvastatin (44.6%), followed by simvastatin (30.6%) and rosuvastatin (25.4%). Treatment was not considered fully effective in 2999 (91.8%) of patients (treated with a statin for at least 3 months) with reported recent complete lipid profile on statin therapy. LDL-cholesterol target, adjusted for cardiovascular risk, was obtained by 8.2% of study patients, most frequently on rosuvastatin therapy (18.4% of treated). Patients with very high risk of cardiovascular disease were least likely to attain target LDL cholesterol - 3.4%. The effectiveness of treatment decreased along with nutritional status (13.8% with normal weight, 9.8% of overweight and 5.2% obese) and was lower in patients with type 2 diabetes (5.4% vs. 9.4% without diabetes, p <0.001).
Conclusions: The effectiveness of treatment of hypercholesterolemia with statins is low, not adjusting for cardiovascular risk. Obesity, and type 2 diabetes are among factors limiting the efficacy of statins treatment.

T8:PO.024

Can weight loss outcomes be improved by teaching weight maintenance skills before a weight loss intervention?

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Introduction: Previous research has shown that teaching weight maintenance skills prior to a weight loss intervention leads to better long-term weight maintenance outcomes. Within the context of a randomised, controlled trial looking at the effects of a high versus low egg diet on circulating lipid profiles, we sought to determine whether implementation of a weight maintenance program before a weight loss program would lead to better weight outcomes.
Methods: 140 overweight or obese participants with pre-diabetes or type 2 diabetes were randomised. Participants attended the clinic monthly for the first six months. For the first three months, participants were instructed to maintain their weight whilst making healthier food choices. For the ensuing three months (3–6 months), they were prescribed a daily energy restriction of 500 kcal per day and instructed on the specific types and quantities of foods to consume. No intervention took place during the follow-up (6–12 months).
Results: Baseline BMI of participants (mean±standard deviation (SD)) was 34.6 ± 6.2 kg/m^2 and body weight was 95.7 ± 19.1 kg. Only a small 1.8 ± 2.5 kg weight loss was evident during the weight loss intervention (3–6 months). However, weight loss continued after the end of the intervention, from 6–12 months, to 3.1 ± 5.8 kg. When assessing the change in weight from the initial contact with participants (month 0), the total weight loss over the 12 month study was 3.8 ± 5.8 kilograms (~4% of initial body weight). There were no significant differences in weight change between the two groups.
Conclusion: Weight loss continued from end of intervention to end of follow-up. These findings provide indirect support for the concept of teaching participants how to maintain a consistent body weight prior to weight loss interventions as typically weight regains after the end of an intervention. A longer-term follow-up > 12 months is needed in future studies.

Reference:
Kiernan M et al.: J Consult Clin Psych 2013;81:336–346.

T8:PO.025

Preterm delivery is related to pre-pregnancy obesity in mothers with gestational diabetes

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Aim: To assess the association between preterm delivery, pre-pregnancy body mass index (pre-BMI), overweight and obesity in mothers with gestacional diabetes (GDM).
Method: Observational retrospective study including all women with GDM and singleton pregnancies followed in our Unit (N=3,151). Women with pregestational diabetes were excluded. Associations between preterm delivery and pre-BMI, overweight, obesity, age, GDM severity defined by fasting glucose and area under the 100g-oral glucose tolerance test (OGTT) at GDM diagnosis; fasting insulinemia previous to GDM treatment, gestational age at GDM diagnosis, insulin treatment, excess gestational weight gain, urogenital infection, hydramnios and pregnancy-induced hypertensive disorder were studied. Student's t, Mann-Whitney U and two-sided X2 tests were used in univariate analyses. Preterm delivery associated factors (P < 0.005) were introduced in a multiple logistic regression model.
Results: Preterm delivery was reported in 126 (4.0%) of GDM mothers. It was associated with pre-BMI (24.7 ± 4.6 vs. 26,0 ± 5,4 kg/m^2 in preterm deliveries, P = 0,014), pre-pregnancy obesity (3.1 vs. 5.4%, P = 0.036), maternal age (mean±SD: 33 ± 4 vs. 34 ± 5, P < 0.001), fasting glucose (90 ± 14 vs. 94 ± 17 mg/dl, P = 0.032) area under the 100g-OGTT (513 ± 52 vs. 522 ± 63 mg/dl·min-1, P = 0.048), fasting insulinemia (median (IQ range): 10 (7–13) vs. 13 (9–17) µUI/ml, P = 0.009), lower gestational age at GDM diagnosis (27 ± 5 vs. 25 ± 6, P = 0.006) and pregnancy-induced hypertensive disorder (6.2% vs. 11.2%, P = 0.027). Pregnancy-induced hypertensive disorder was the main risk factor of preterm delivery in multivariate analysis (AOR 95%CI) (1.90 1.07–1.37). This risk magnitude was increased in mothers (N=336) being obese pre-pregnancy (4.38 1.24–15.49).
Conclusion: In GDM mothers, preterm delivery is related to being obese pre-pregnancy. GDM mothers with pregnancy-induce hypertensive disorders are at the highest risk of preterm delivery if they were obese pre-pregnancy.

T8:PO.026

Efficacy and safety of liraglutide 3.0 Mg and 1.8 Mg in weight loss responders vs non-responders in overweight/obese adults with type 2 diabetes (t2d): A subgroup analysis of the scale diabetes trial

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SCALE Diabetes (NCT01272232) evaluates the efficacy and safety of liraglutide for weight management in overweight/obese adults with T2D. This subgroup analysis compares outcomes in responders (weight loss [WL] ≥5%) vs non-responders (WL<5%) at 56 wk. Adults (50% male, mean age 55 yr, BMI 37 kg/m^2, HbA1c 7.9% and T2D duration 7.3 yr) were randomised 2:1:1 to liraglutide 3.0 mg (n=423), 1.8 mg (n=211) or placebo (PBO) (n=212) as adjuncts to diet and exercise. Change from baseline are LS means (efficacy) or observed means (safety) with LOCF. More individuals on liraglutide 3.0 mg (49.9%) and 1.8 mg (35.6%) were responders compared with PBO (13.8%), p < 0.0001. Mean WL for liraglutide 3.0 mg, 1.8 mg and placebo responders and non-responders is shown in Table. Consistent with greater WL, responders on liraglutide 3.0 mg and 1.8 mg had improved efficacy outcomes vs non-responders (Table). In responders and non-responders AEs were reported by 96 vs 92% and 96 vs 90% for liraglutide 3.0 mg and 1.8 mg respectively, and 94 vs 85% for PBO. SAE frequency was similar in responders and non-responders. Most AEs were GI and were more common in responders vs non-responders with liraglutide 3.0 mg (76 vs 55%) but not different for liraglutide 1.8 mg (58 vs 57%) and PBO (41 vs 39%). Rates (events/pt/yr) of documented symptomatic hypoglycemia (PG≤56 mg/dL) were similar in responders vs non-responders across all groups: liraglutide 3.0 mg (0.9 vs 0.8), liraglutide 1.8 mg (0.8 vs 1.1); placebo (0.1 vs 0.3). Mean change in pulse across groups is shown in Table. In conclusion, more individuals achieved ≥5% WL with liraglutide 3.0 mg and 1.8 mg. Non-responders on liraglutide still had significant improvements in HbA1c, indicating a WL-independent effect. AE incidence was similar across subgroups.

Acknowledgement: Supported by Novo Nordisk

	SCALE Diabetes: change in efficacy endpoints from baseline at 56 weeks					
	Liraglutide 3.0 mg		Liraglutide 1.8 mg		Placebo	
Efficacy endpoints	Responders (n=205)	Non-responders (n=206)	Responders (n=72)	Non-responders (n=130)	Responders (n=29)	Non-responders (n=181)
Weight loss, %	-10.3	-1.6	-10.4	-1.3	-9.7	-0.7
Weight loss, kg	-10.8	-1.7	-10.8	-1.5	-10.7	-0.8
Waist circumference, cm	-9.6	-2.5	-8.9	-2.7	-8.9	-1.7
Body mass index, kg/m^2	-3.9	-0.6	-3.8	-0.5	-3.7	-0.3
HbA_{1c}, %	-1.6	-1.0	-1.5	-1.0	-1.1	-0.2
Systolic blood pressure, mmHg	-5.0	-0.5	-6.2	-1.9	-5.3	0.5
Diastolic blood pressure, mmHg	-1.6	-0.1	-2.3	-0.3	-2.8	-0.2
IWQoL-Lite, total score	14.6	8.6	11.3	8.0	10.8	7.1
Pulse rate, bpm (SD)	1.4 (9.5)	2.8 (10.0)	2.3 (10.6)	2.2 (9.7)	-4.0 (9.6)	-1.0 (9.2)

Responders, subjects who achieved ≥5% weight loss; Non-responders, subjects who achieved <5% weight loss or who experienced weight gain. Efficacy endpoints are least squared means estimates, LOCF. Safety endpoints are observed means (SD), LOCF for pulse.

Fig. 1. Efficacy and safety endpoints for responders and responders on liraglutide 3.0 mg, liraglutide 1.8 mg and placebo in the SCALE Diabetes trial.

T8:PO.027

Significant increase of low magnesium (mg) serum levels in diabetic patients after weight loss induced by bariatric surgery (bs)

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Background: Low Mg levels are associated with insulin resistance, type 2 diabetes (DM), but also vascular calcification and subsequently cardiovascular events. The aim of this study was to assess Mg levels in patients with morbid obesity (MO) before and after BS.
Methods: 302 patients with MO (82.1% women, mean BMI 46.2 ± 6.7kg/m^2) were investigated in a longitudinal study before and 2 years after BS and compared to 92 non-obese healthy controls (CO; mean BMI 25.6 ± 4.5kg/m^2). Serum Mg levels and cardiovascular risk factors were assessed. All patients underwent a 2-hour 75g OGTTwhich revealed: 60 patients with DM, 53 with impaired fasting glucose (IGT) and 189 with normal glucose tolerance (NGT).
Results: Patients with MO had significantly lower levels of Mg than CO (0.84 ± 0.07mmol/lvs 0.92 ± 0.06mmol/l; p < 0.001). After BS an increase of Mg was noted (0.85 ± 0.08mmol/l, p = 0.014), but did not reach the levels of CO (0.92 ± 0.06mmol/l; p < 0.001). Before BS we found a stepwise decrease of Mg levels from NGT over IGT to DM (0.80 ± 0.09 vs0.84 ± 0.07vs0.85 ± 0.07, p < 0.001). The difference in Mg between DM/IGT (p = 0.009) and DM/NGT (p < 0.001) were significant. Post surgery Mg values were not different between the subgroups. Concordantly we obtained a difference between changes of Mg levels pre- to post-op between the three subgroups; overall: p < 0.001; DM (increase 7%):p < 0.001; IGT (increase 1%):p = 0.858, NGT (increase 1%):p = 0.657. Multivariate regression demonstrated fasting blood glucose as the strongest predictor of Mg levels (Beta=-0.222, p < 0.001).
Conclusion: Patients with morbid obesity have significantly lower serum Mg levels before as well as after weight loss due to BS compared to CO. The increase in the whole group is mainly due to the 7% increase of Mg levels in the group of patients with DM.

T8:PO.028

Diabetes remission is higher in men compared to women after bariatric surgery

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Introduction: The majority of patients undergoing bariatric surgery (BS) are women. Women and men have a different risk for gaining cardiovascular (CV) disease. It is still not clear if morbidly obese men have the same risk profile as women. Therefore we investigated gender differences regarding diabetes and weight loss in patients before and after BS.
Methods: We included 438 patients with MO (mean age 40 ± 12years, 347 (84%) females, 66 males) before and 2 years after BS. In patients without diabetes a 75g oGTT was performed. Diabetes Mellitus was defined by ADA criteria. Apart from demographic and CV risk factors renal, inflammation parameters and Insulin levels were assessed. HOMA-Insulin resistance (IR) was calculated.
Results: Women and men did neither differ in age (40 ± 12vs41 ± 12, p = 0.679), nor in BMI (46.5 ± 7.1vs46.0 ± 6.7kg/m^2; p = 0.603). But men had a slightly higher but not significant excess BMI loss compared to women (73.7 ± 23.2 vs 66.4 ± 29.8%; p = 0.064). Before BS men had significantly more often type 2 diabetes (37.7vs15.8%) and equal frequency

of patients with prediabetes (19.7vs19.5%); Chi-Square 16.941; p < 0.001. After surgery, only 1.6% of the male and 2.6% of the female patients were still suffering diabetes and 6.3% vs 6.7% were suffering prediabetes; Chi Square 0.079; p = 0.961. Men had a greater decrease in HOMA-IR (p = 0.013), LDL-cholesterol (p = 0.030), triglycerides (p < 0.001) and HbA1c (p = 0.002) and an increase in HDL-cholesterol (p = 0.002) than women.
Conclusion: Our data indicate that, even though there are no differences in excess BMI loss men benefit more from BS regarding

T8:PO.029

The relationship between type ii diabetes risks and sociodemographic characteristics

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Aim: The aim of this study was to determine the relationship between socio demeographic characters and Type II diabetes(DM) risk in adults.
Methods: This study was performed in 4400 individuals between 18–65 years of age.The subjects were chosen by using basic random sampling method.All subjects were administered a questionnaire including questions about sociodemographic characteristics.Type II Diabetes Risk Assessment Questionnare was used to evaluate type diabetes risk and scores were grouped as "very high (over 20 points), high (15–12 points), middle (12–14 points), slight (7–11 points), low (lower than 7 points)".Frequencies, mean values, chi-square were used; p < 0.05 was considered significant.
Results: Of 4400 participants 50.3% (n=2212) were female and 49.7% (n=2188) were male with the mean ages of 41,18 ± 14.73 and 37.38 ± 14.24 respectively. There were 2353 (53.5%) subjects in 18–39 years age group and 2047 (46.5%) subjects in 40 and over age group. A total of 67.7% were married,29.6% were house wives,%17.7were students.%26.0 of the participants were active smokers and 13.0% had hypertension.Women had more 10 years diabetes risk than men (p = 0.042) and their risk scores were significantly higher than men (p = 0.037). Similarly being married was significantly high risk for DM (p = 0.000). BMI was a significant risk factor (p = 0.000); as a person had higher body weight the was nearly 15 fold more for type II DM.We found 10 years DM risk scores more in active smokers group (p = 0.000).The risk scores were higher (10.3% in very high risk group) in retired people as we expect, because of the age(p = 0.000).Education level was an important risk factor for 10 years DM risk (p = 0.000).As a person had a higher education level the risk score was lower.
Conclusion: In this study it was determined that type II DM risk was incresed realeted with gender, marrital status, age, BMI, smoking, occupation and having a chronical disease.

T8:PO.030

Combined intervention with pioglitazone and n-3 fatty acids in metformin-treated diabetic patients

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Aims/Hypothesis: Marine n-3 fatty acids eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids help in primary prevention of cardiovascular disease, but their impact on glucose homeostasis in type 2 diabetic (T2D) patients remains unclear. We aimed to evaluate the effect of a combination intervention using EPA+DHA and a suboptimal doses of insulin-sensitizing drug pioglitazone in obese patients with T2D already treated with metformin.
Methods: In a double-blind, placebo-controlled trial, 69 patients, 38–70 years of age (66% men) were randomly assigned to 24-week-intervention using: (i) corn oil (5 g/day; Placebo), (ii) pioglitazone (15 mg/day; Pio), (iii) EPA+DHA (2.75 g/day; Omega3), or (iv) pioglitazone and EPA+DHA (Pio+Omega3). The primary endpoints were the changes from baseline in insulin sensitivity and in triacylglycerol clearance assessed using hyperinsulinemic-isoglycemic clamp and a meal test. Secondary endpoints included changes in fasting glycemia and HbA1c, glucose and NEFA clearance and inflammatory markers.
Results: Omega3 and Pio+Omega3 increased EPA+DHA content in plasma phospholipids. Pio and Pio+Omega3 increased body weight and adiponectin levels. Both fasting glycemia and HbA1c were increased by Omega3, but unchanged by Pio+Omega3. Insulin sensitivity was improved by Pio + Omega-3
Conclusions: Besides preventing a modest negative effects of Omega-3 on glycemic control, the combination of pioglitazone and EPA+DHA can be used to increase insulin sensitivity and postprandial lipid clearance in T2D patients on stable metformin therapy.

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T8:PO.031

The evalutaion of metabolic syndrome status at menopause

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Metabolic syndrome (MetS) is characterized by hypertension, dyslipidemia [low levels of high-density lipoprotein cholesterol (HDL-C)and elevated triglycerides (TG) levels], obesity, insulin resistance and elevated blood glucose levels. It is a risk factor for cardiovascular diseases (CVD) and type 2 diabetes mellitus . Studies have shown that about 50% of postmenopausal women are obese .The increase in body fat (BF) in postmenopausal women, especially the increase in abdominal adipose tissue, will result in the increasing risk of dyslipidemia, insulin resistance and CVD. Among women, the development of CVD shows an increase after 45–54 years of age (menopause age), appearing 10 years later than men. Besides, menopause is an important risk factor for metabolic syndrome. A number of observations suggest that oestrogen deficiency after menopause is a risk

factor for CVD: the age- adjusted risk of CVD in women with premature menopause is higher than it is in pre-menopausal women. Oestrogens also increase plasma lipids and triglycerides profile in postmenopausal females. It is interesting to note that the first four risk modifiable factors are components of the MetS. To conclude, the hypoestrogenaemia of menopause would play a direct and indirect role inthe biochemical and mechanic changes that contribute to the development of hypertension. The effects of menopause on serum lipids may modulate CVD risk. In conclusion, postmenopausal status seems to play an important role in the prevalence of the metabolic syndrome.

T8:PO.032

The impact of subclinical hypothyroidism in microvascular damage in patients with metabolic syndrome

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Background: High risk of coronary heart disease, heart failure and cardiovascular mortality is observed in metabolic syndrome (MS). Subclinical hypothyroidism (SH) is also associated with an increased risk of cardiovascular diseases. The aim of the study was to assess the impact of SH in microvascular damage in patients with MS and arterial hypertension (AH).
Methods: 87 patients were divided into 3 groups: 25 (28.7%) patients with AH, 37 (42.6%) patients with AH and MS, 25 (28.7%) patients with AH, MS and SH. 22 practically healthy people were included in the control group (CG). Microvascular function was determined in all the patients by laser Doppler flowmetry.
Results: Statistically significant reduction of the standard deviation of microcirculation (SD M) was observed in all groups in comparison with healthy controls. In the AH+MS+SH group a significantly increased heart rate induced fluctuations (AmaxCF/3SD M) (values more 30%), respiratory rate fluctuations (AmaxHF/3SD M) (values more 30%) and intravascular resistance (AmaxCF/M) (values more 10 perfusion units (PU)) were found as compared to healthy individuals, patients with AH and patients with AH and MS. In the AH+MS+SH group the index of the effectiveness of the microcirculation (IEM) was decreased in comparison with healthy controls and AH+MS patients (1,23 [0,99; 1,65] vs 1,75 [1,23; 2,24] *и* 1,67 [1,31; 2,00] PU respectively ($p < 0,05$)).
Conclusions: Results of microvascular function examination were similar in MS+AH and MS+AH+SH groups. Microvascular dysfunction in MS+AH+SH patients was stronger and was particularly characterized by suppression of active regulation mechanisms and severe venous and capillary congestion.

T8 – Long term outcomes

T8:PO.033

Effectiveness of a multidisciplinary weight loss programme to maintain a weight loss greater than 10% from the initial weight, after two years follow up. PROKAL Study: Results at 24 months

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Introduction: The PronoKal Method® is a multidisciplinary weight loss method combining diet, physical activity and coaching, which not only achieves quick and safe weight loss, but also re-educates the patient in healthy lifestyle habits that help to maintain long term results.
Objective: To assess the effectiveness of the PronoKal Method® with progressive dietary guidelines vs a standard low calorie diet, in weight reduction and long-term maintenance. METHODS: A randomised, open, controlled clinical trial on weight loss with a multidisciplinary weight loss programme with progressive dietary guidelines that include a ketogenic VLCD diet based on protein preparations followed by a low calorie diet with the progressive reintroduction of natural foods and a low calorie maintenance diet (VLKD group) compared with a standard low-calorie diet. The percentage of patients achieving a weight loss greater than 5% and 10% at one year and at two years was subject to study.
Results: The percentage of patients with a weight loss greater than 5% and 10% was statistically higher throughout the study in the VLKD group compared to low-calorie group. At 12 months, almost 90% of the VLKD patients group maintained a weight loss greater than 10%, while at two years 43% of patients still maintained a loss of between 5% and 10%, and 58% of patients with a loss greater than 10% of the initial weight, compared to only 21.7% of patients in the low-calorie group ($p < 0.05$).
Conclusions: The results of this study demonstrate that the multidisciplinary weight loss programme is effective not only for weight loss but for long-term maintenance. This achievement meant that at two years almost 60% of patients maintained a loss of more than 10% compared to their initial weight.

T8:PO.034

The long-term effectiveness of a multidisciplinary approach to weight loss compared with a low calorie diet. PROKAL Study: Results at 24 months.

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Introduction: The PronoKal Method® is a multidisciplinary slimming which start with a ketogenic VLCD diet based on protein preparations followed by a low calorie diet with the progressive reintroduction of foods, food re-education and a low calorie maintenance diet; physical activity and emotional support (coaching).

Objective: To evaluate the effectiveness of the multidisciplinary slimming method in the short, medium and long term (2 years) for weight loss compared with a standard low calorie diet in obese patients. METHODS: A randomized (1:1), open, controlled clinical trial to assess the effectiveness of the Método PronoKal® (VLCK diet group) vs a standard low calorie diet (LC diet group) accompanied by physical activity and emotional support, in the weight reduction of obese patients. The follow-up lasted 2 years. The results between the groups was compared at 2 to 6 months,12 months and 24 months.
Results: Differences were found between both groups in weight reduction, which was significantly higher in the VLCK diet throughout the study (2 months: –13.6 vs 4.8 kg; 6 months: –22.0 kg vs –6. 8 kg; 12 months:-19.9 vs –7.0 kg and 24 months –12.53 kg vs –5.2 kg; all $p < 0.001$). This weight loss translated into a statistically higher decrease in BMI and waist circumference (WC) in the VLCK group at one year (BMI: –7.0 vs –2.6 kg/m^2 and WC: –18.4 vs –7.0 cm; both $p < 0.001$), and also at two years (BMI: –4.3 kg/m^2 vs –1.9 kg/m^2; and WC: –11.5 cm vs –4.1 cm; both $p < 0.01$). The decrease in BMI allowed the VLCK group of patients to remain outside the obese range (<30 kg/m^2) for 18 months, whereas the low-calorie patients remained > 30 kg/m^2 despite the weight loss.
Conclusions: The PronoKal Method® has not only proved to be more effective than a standard low calorie diet in the short, medium and long term, but, unlike the low-calorie diet, it has been able to maintain the patients free from obesity during a period of 18 months.

T8:PO.035

Obese hypogonadal men with cardiovascular diseases (CVD) lose weight and benefit from long-term treatment with testosterone undecanoate injections (TU): Observational data from a registry study

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Introduction: Hypogonadism is associated with cardiometabolic. There is little information on long-term effects of testosterone therapy (TRT) in men with CVD. Material and
Methods: Prospective, cumulative, observational registry study from a single urologist's office. 347 hypogonadal men received TU for up to 87 months. A subgroup of 68 men with a previous diagnosis of coronary artery disease (CAD; n=40) and/or a history of myocardial infarction (MI; n=40) and/or stroke (n=6) were analyzed. These patients are considered high-risk patients.
Results: Mean age: 60.76 ± 4.94 years, mean observation time 72 months. 64/68 men were obese. 68 men were followed for 3 years, 59 4 years, 54 5 years, 44 6, and 28 7 years. Declining numbers reflect the nature of the registry but not drop-out rates. Weight (kg) decreased from 115.07 ± 13.71 to 90.79 ± 8.92. Waist circumference (cm) decreased from 112.07 ± 7.97 to 99.14 ± 6.53. BMI decreased from 37.27 ± 4.45 to 29.58 ± 3 ($p < 0.0001$ for all). Mean weight loss was 18.75 ± 0.71%. Fasting glucose decreased from 108.74 ± 17.08 to 96.14 ± 2.01 mg/dl, HbA1c from 7.81 ± 1.16 to 5.86 ± 0.49% ($p < 0.0001$ for both). Total cholesterol decreased from 304.66 ± 34.09 to 187.75 ± 7.6, LDL from 184.28 ± 37.51 to 120.64 ± 29.29, triglycerides from 308.38 ± 56.3 to 187.04 ± 7.65 mg/dl. HDL increased from 63.79 ± 17.79 to 67.14 ± 16.71 ($p < 0.0001$ for all). Systolic (from 167.82 ± 11.01 to 142.39 ± 9.54) and diastolic (from 102.28 ± 8.23 to 80.07 ± 7.13 mmHg) BP decreased ($p < 0.0001$ for both). C-reactive protein (CRP) decreased from 3.97 ± 4.73 to 0.32 ± 0.44 mg/dl. No major cardiovascular events occurred.
Conclusion: TRT in hypogonadal men with CVD was well tolerated and resulted in significant and sustained improvements of cardiometabolic risk factors.

T8:PO.036

Effects of long-term treatment with testosterone undecanoate injections (TU) on excessive obesity in hypogonadal men – experience from observational registry studies

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Introduction: Obesity can cause hypogonadism, and hypogonadism promotes further accumulation of fat mass in a vicious cycle. In excessively obese men (BMI ≥40 kg/m^2), a 75% prevalence of hypogonadism was found. Material and
Methods: Cumulative, prospective, observational registry studies of 609 men from two cohorts with total testosterone levels ≤12.1 nmol/L receiving TU for up to 11 years. A subgroup of 39 men with excessive obesity (BMI minimum: 40.1; maximum: 46.5 kg/m^2) received uninterrupted treatment for up to 114 months. Minimum treatment duration: 42 months, maximum: 114 months.
Results: Average weight decreased from 128.7 kg to 101.5 kg, average weight loss 27.2 kg. The magnitude of weight loss depended on treatment duration: the longer the treatment, the greater the weight loss. Minimum weight loss was 18 kg in a subject who had received 42 months of treatment, maximum weight loss of 39 kg was observed in a man who had been treated for 87 months. No subject gained weight, and weight loss was progressive over time. Average waist circumference decreased from 118.0 cm to 104.9 cm by 13.1 cm. The smallest reduction of 6 cm was seen in a man who had been treated for 57 months, the greatest reduction of 25 cm was observed in a man who had been treated for 114 months.
Conclusions: Treating hypogonadism by TU in hypogonadal men with excessive obesity resulted in sustained improvements in weight and waist circumference in all subjects. The magnitude depended on treatment duration.

T8:PO.037

Effects of continuous treatment up to 11 years with testosterone undecanoate injections (TU) in 115 hypogonadal men on anthropometric parameters: Real-life data from an observational registry study

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Introduction: The longest-term follow-up on testosterone replacement therapy (TRT) in the literature is 6 years. In this registry study, we assessed effects of TRT beyond this period. Material and
Methods: Single-center, cumulative, prospective, registry study of 262 hypogonadal men receiving TU for up to 11 years. In 147 men, TRT had been temporarily discontinued. In 115 men reported here, TRT was continued for up to 11 years. 4 patients dropped out, 2 due to relocation, 2 were lost to follow-up. Measures were taken at every other visit. Results at the end of 10 years follow-up are reported.
Results: Mean age was 59.05 ± 9.36 years (min.: 19; max.: 80). Total T increased from 7.84 ± 2.34 nmol/L to trough levels (measured prior to the following injection) between 17 and 20 nmol/L, free T from 150.31 ± 65.24 to 400–500 pmol/L, and SHBG decreased from 40.12 ± 20.73 to 33.11 ± 22.14 nmol/L ($p < 0.0001$). Mean waist circumference decreased from 106.47 ± 8.72 to 92.33 ± 5.32 cm. The decrease was statistically significant vs baseline ($p < 0.0001$) and significant vs previous year for the first 7 years. The reduction of waist circumference was 11.98 ± 5.03%. Mean weight decreased from 97.3 ± 12.88 to 84.65 ± 7.04 kg. Mean BMI decreased from 30.81 ± 4.33 to 27.06 ± 2.49 kg/m^2. Decreases were statis-

tically significant vs baseline ($p < 0.0001$) and significant vs previous year for the first 8 years. Weight reduction was progressive and accumulated to 18.51 ± 6.46% after 10 years. No major adverse cardiovascular event (MACE) occurred during the entire observation time.
Conclusions: Long-term TRT improved anthropometric parameters in hypogonadal men in a meaningful and sustained fashion.

T8:PO.038

Temporary withdrawal of testosterone treatment (TRT) with testosterone undecanoate injections (TU) in morbidly obese hypogonadal men – a series of case reports

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Introduction: Little is known about the optimal duration of TRT in elderly hypogonadal men. We assessed anthropometric parameters and glycaemic control in 9 morbidly obese, hypogonadal men with or without withdrawal of long-term treatment with TU. Material and
Methods: From a registry study of 262 hypogonadal men, 9 men with obesity grade III were analysed. All men received TU for approximately 6 years. In 6 men, TU was withdrawn for approximately 2 years before treatment was resumed. 3 men received continuous treatment for up to 10 years.
Results: Patient age at baseline: 54–69 years. 2 men had type 1 diabetes mellitus (T1DM), 5 men type 2 diabetes mellitus (T2DM). Patients with T1DM or T2DM received treatment by their individual general practitioners / internists. Weight decreased in all patients while on TU by 13 to 37 kg, waist circumference 6 to 25 cm. During interruption of T therapy, all patients gained weight and waist circumference which started dropping again after resuming T treatment. In diabetics, HbA1c decreased by at least 1.1% to a maximum of 3%. After discontinuation of TU, HbA1c increased by a minimum of 1.1% and improved again after resuming TRT. At end of observation, all diabetic patients had HbA1c <7%, 5 out of 7 had an HbA1c ≤6.5%.
Conclusions: In morbidly obese hypogonadal men, benefits of TRT on anthropometric parameters are partly reversed after discontinuation but recovered after resuming therapy. In diabetic men, TRT improves glycaemic control but effects seem to be largely lost when treatment is interrupted.

T8:PO.039

Effects of interrupting and resuming long-term testosterone replacement therapy (TRT) on anthropometric parameters in hypogonadal elderly men. How long should hypogonadal subjects be treated?

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Introduction: This study investigated effects of long-term TRT, its withdrawal and resumption on anthropometric parameters in hypogonadal men. Material and
Methods: Prospective, cumulative, registry study in 262 hypogonadal patients (mean age 59 years) receiving testosterone undecanoate injections (TU) 1000 mg in 12-week intervals for up to 11 years. After TRT for a median duration of 5 years, 147 men interrupted TRT for 2 years, mainly due to cost reimbursement issues, and resumed TRT thereafter (Group I; I). 115 men were treated continuously (Group C; C). Three periods of equal duration were defined: pre-interruption (on TRT), during interruption (off TRT) and post-interruption (on TRT after resumption of TRT). For comparison, the same periods were analysed for those patients who continued TRT throughout. Anthropometric parameters were measured at every other visit.
Results: I: T was 16.54 pre, dropped to 7.48 and increased to 18.5 nmol/L post-interruption. C: T was stable at 19.61,19.76 and 19.65 nmol/L. I: Waist circumference (WC) was 100.16 pre, increased to 105.44 during and decreased to 102.29 cm post-interruption. C: WC declined from 98.4 to 97.2 and 95.7 cm. I: Weight was 92.1 pre, increased to 97.1 during and decreased to 94.4 kg post-interruption. C: Weight declined from 87.7 to 86.2 and 84.4 kg. In Group I, 6 patients had major adverse cardiovascular events (MACE) while off TRT. There were no MACEs in Group C or in Group I while patients were on TRT.
Conclusions: Interruption of TRT resulted in worsening of symptoms. Hypogonadism may require lifelong TRT.

T8:PO.040

Allostatic load in patients with type ii diabetes

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Objective: Optimal glycemic control is necessary to prevent and extend the complications of diabetes. If the regulation couldn't be maintained, homeostasis is interrupted in consequence of altered metabolic processes. Chronic dysregulation of physiological systems may lead allostatic load (AL). The aim of the present study was to investigate the association of AL biomarkers in patients with diabetes that who gained control with blood glucose regulation or not.
Methods: Total 103 patients with diabetes enrolled from the outpatient clinic of Endocrinology and Metabolism of Ondokuz Mayıs University. Patients divided into two groups which are unregulated and regulated diabetes, according to HbA1c levels higher and lower than 6.5%. Twelve biomarkers were used; fasting blood glucose, blood pressure, body mass index (BMI), waist/hip circumference, total cholesterol, HDL cholesterol, HbA1c (%), body fat percentage, serum C-reactive protein (CRP), albumin, cortisol , DHEA-S levels to asses AL. Values within higher than the referances were scored as 1 while those falling below the referances scored as 0. AL indices ranged from 0 to 12.
Results: The study was carried out on 30 male (29.1%) and 73 female (70.9). The mean ages of the patients were found 46.46 ± 5.973 years. Mean AL score among the sample having unregulated and regulated blood glucose was 5.1 ± 1.18 and 4.32 ± 1.64, respectively. The difference between groups was statistically significant ($p < 0.05$). Biomarkers that contribute to allostatic load score were evaluated, mean CRP levels were 4.6 ± 2.06 mg/dL, fasting blood glucose were 113.5 ± 23.45 mg/dL in the sample that having regulated blood glucose and mean CRP levels were 7.39 ± 8.71 mg/dL, fasting blood glucose were 165.04 ± 52.99 mg/dL in the sample that having unregulated blood glucose. Dietary carbohydrate percentage of energy was higher (42.1 ± 6.48%) in the unregulated group than the regulated group (42.1 ± 6.48%) but not statistically significant. The difference between total energy, fat and sodium amount of dietary intakes were different between groups ($p < 0.05$). Diabetes duration represents statistically significant correlation with AL (r: 0.201) and HbA1c (r: 0.489).
Conclusion: Poor glycemic control have negative effects on AL biomarkers and allostatic adaptation is impaired in uncontrolled diabetes.

T8:PO.041

A systematic review and meta-analysis on the effects of exercise training versus hypocaloric diet: Distinct effects on body weight and visceral adipose tissue

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Introduction: Exercise training ("training") and hypocaloric diet ("diet") are frequently prescribed for weight loss in obesity. Whilst changes in body weight are commonly used to evaluate lifestyle interventions, visceral adiposity (VAT) is a stronger predictor for morbidity and mortality than body weight. Currently, it is not known whether training or diet has superior effects on VAT. The aim of this study is to compare the impact of training versus diet on VAT in overweight/obese humans.
Methods: Pubmed, Cochrane, Web of Science and Embase were systematically searched for eligible studies that evaluated the effects of training or diet (duration >4 weeks) on radiographic quantified VAT in overweight/obese humans.
Results: 117 Studies (n=4,815) were included. Training and diet caused VAT loss (standard mean difference (SMD): –0.47; 95%CI –0.56/-0.39 and SMD –0.63; 95%CI-0.71/-0.55, respectively, (both P < 0.0001). When comparing diet versus training, diet caused a larger weight loss (SMD 0.308; 95%CI 0.02/0.596; P = 0.04). In contrast, a trend was observed towards a larger VAT decrease in training (SMD –0.59; 95%CI –1.248/0.071; P = 0.08). Changes in weight and VAT showed a strong correlation after diet ($R_{ˌ}$=0.737, P < 0.001), and a modest correlation after training ($R_{ˌ}$=0.451, P < 0.001). In the absence of weight loss (Y-axis intercept), training is related to 6.1% decrease in VAT, whilst diet showed virtually no change (1.1%).
Conclusion: Both training and diet reduce VAT. Despite a larger effect of diet on weight loss, training tends to have superior effects in reducing VAT. Finally, weight loss does not necessarily reflect changes in VAT and, therefore, examining weight loss may lead to spurious conclusions when evaluating benefits of lifestyle-interventions.

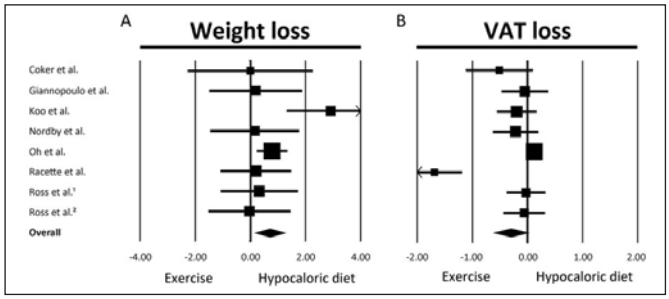

Fig. 1. Forest plot of the effect size (SMD) of (A) exercise training versus hypocaloric diet on weight loss and (B) exercise training versus hypocaloric on VAT loss in 8 RCT's (n=400) that directly compared interventions. The SMD and 95%CI for individual studies and the pooled estimate (assessed with the use of Random Effects Model) are depicted.

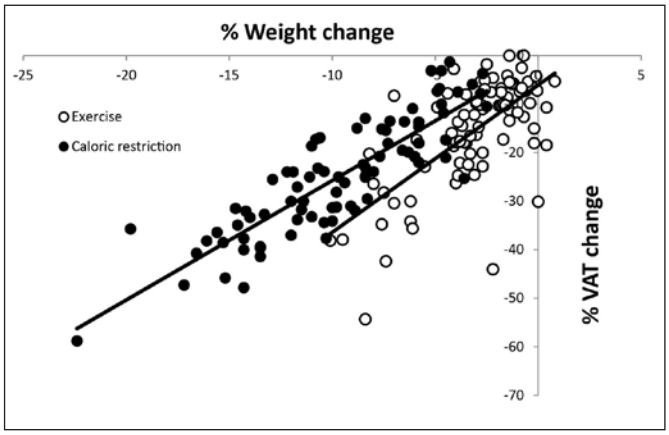

Fig. 2. Correlation between %VAT change and %weight change for exercise studies ($R_{ˌ}$=0.4531, P < 0.001; trendline: y = –3.03x – 6.1), and caloric restriction studies ($R_{ˌ}$=0.737, P < 0.001; trendline: y = -2.46x - 1.1).

T8:PO.042

Bariatric surgery – does age matter?

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Introduction: Bariatric surgery is considered as more effective treatment of morbid obesity than conservative medical treatment. However, there is contradictory evidence regarding the influence of age on bariatric surgery outcome [length of hospital stay (LOS), long-term weight loss] and long-term adherence to postoperative care.
Methods: Pre- and postoperative [2 (Y2) and 5 years (Y5)] evaluation of 96 adult female morbidly obese patients [mean age 43.9(15.3) years] who underwent Y-Roux gastric bypass. Patients were split into two groups [Young 20–36y, Old 50–72y] and matched for Body Mass Index [mean BMI kg/$m_{ˌ}$ Y 46.2(4.8) vs. O 46.6(5.3)].
Results: LOS of O was significantly longer compared to Y [mean (standard deviation), Y 7.1(3.2), O 10.3(10.0), p = 0.023]. After 2 years 60% of Y, 81% of O (p = 0.019) and after 5 years 42% of Y and 63% of O (p = 0.03) were available for postoperative follow-up. Mean BMI loss (kg/$m_{ˌ}$) was 16.7(4.8) in Y vs. 15.0(5.4) in O after Y2. After Y5 Y had reduced BMI by –15.9(5.0)kg/$m_{ˌ}$ vs. O –14.6(5.9)kg/$m_{ˌ}$. In Y5 67% had a higher BMI [mean +2.6(1.9)kg/$m_{ˌ}$] than three years before, with no difference between groups. Linear regression revealed a significant association between age and LOS (p = 0.007), as well between Y5 BMI loss, age (p = 0.04) and baseline BMI (p = 0.001).
Conclusion: Patients at higher age, compared to younger ones, might experience a longer LOS and less pronounced BMI reduction. This and less extensive adherence of younger patients to postoperative care should be considered when information about the surgical intervention and postoperative care is given and bariatric surgery is planned. Reasons for limited adherence to follow-up need further evaluation.

T8:PO.043

Behavioral predictors of weight regain after bariatric surgery

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Introduction: A significant percentage of patients undergoing bariatric surgery procedures (CB), the weight regain occurs after the first years, it is believed that behavioral influences play a modulatory role in this prob-

lem. AIM: We propose to identify the factors regarding lifestyle, which can reduce the effectiveness of the CB past three or four years after Gastric Bypass (BYG) or Tubular gastrectomy (GT).
Methods: The study was performed in 68 patients (71% female and 29% male) operated in 2008–2009 of CB (48% GT and 52% BYG) in the Obesity Unit of the La Paz University Hospital, Madrid, Spain. By questionnaire "ad hoc" were recorded attendance monitoring visits and physical activity and self-perception about the results. Has been results established telephone contact with each patient to confirm data history.
Results: Mean age of 41.4 ± 9.3 years. We observed that patients with BYG lost more weight 74% versus 46.2% with GT, using as an indicator the % excess BMI lost. When evaluating the % weight loss (PP): 66% of BYG loses a ≥30% and ≤30% % PP 64% GT. 56%, patients with BMI between 40 and 50 lost> 30% body weight while in cases of extreme obesity (BMI> 50), only 44% lost> 30%. With a trend to significance (0.067). Regarding physical activity, 53% stated „active" and of them, 70% lost > 30% PP. 26.5% did not do any physical activity. Regarding self-perception on the results, 86% reported feeling well and great correlated with weight loss.
Conclusion: The importance of nutritional monitoring is a mechanism to ensure the success of bariatric surgery. Adherence to a program of physical activity is a predictive factor in maintenance weight loss.

T8 – Bariatric and metabolic surgery

T8:PO.044

Bpd as a re-do bariatric and metabolic operation

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Introduction: Biliopancreatic diversion (BPD) is considered as one of the most powerful primary operation in WL and metabolic outcomes. Multifactorial background of obesity and multi-level obesity „defending" mechanisms may potentially contribute to unsatisfactory treatment results, neccessitating re-do surgery. Malabsorptive re-do operations following failed restrictive procedures may lead to the best outcomes.
Methods: Between January 2003 and December 2012, 2781 different bariatric and metabolic procedures were performed by our team. In total, 251 (9.02%) patients required reoperation due to procedure (weight loss/metabolic outcome) failure. In 81 (32.3%) BPD was chosen for re-do. In this re-do group, 38 (46.9%) patients were T2DM. Prospectively, basic demographic data were collected, as well as pre re-operation, 1,3, 6, 12 and 24 mths post-op %EWL, %EBMIL and T2DM changes (glycaemia, IRI, Hb1A, HOMA IR, fasting insulin secretion) were monitored.
Results: As a re-do procedure, BPD resulted in statistically significant ($p < 0.001$) changes: mean %EWL (55.5± 8,4), %EBMIL (76,0 ± 6.8). In diabetics glycemia decreased (7.9 ± 2.4mmol/l to 5.4 ±1.1mmol/l $p < 0.001$), Hb1A decreased (7.3 ± 1.7% to 4.3 ± 0.9%), HOMA-IR decreased (9.9 ± 2.7 to 3.1 ± 1.5) $p < 0.001$). Six months after re-do BPD 20 patients (52.6%) were without any anti-DM medication, in one year remission and/or improvement was observed in 34 (89.5%) T2DM patients.
Conclusions: As a re-do procedure, BPD is safe and effective procedure in terms of %EWL and T2DM improvement/resolution.

T8:PO.045

Novel transoral endoscopic technique to reduce stomach volume induces changes in gastrointestinal transcriptome

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Introduction: Bariatric surgery is a very effective intervention strategy in obesity. Recently, a novel minimally invasive technique, the Articulating Circular Endoscopic stapler has been developed, which reduces gastric volume. This procedure results in a 34.9%(IQR 17.8–46.6) median percentage of excess weight loss in the first year [1]. Here, we present the first study investigating changes in gene expression and underlying molecular pathways in stomach and duodenum tissue from humans subjected to Articulating Circular Endoscopic stapler.
Methods: Ten obese patients underwent a transoral endoscopic procedure in which several gastric plications were created to reduce the volume of the stomach. Prior to the procedure and after one year, mucosal biopsies were taken from the fundus, antrum and duodenum. Gene expression was measured using microarray analysis. Transcriptome data were correlated to changes in gut hormone levels and weight loss.
Results: Transcriptome analysis revealed that expression of somatostatin was reduced in both the fundus and duodenum after the stomach reduction procedure, which was in line with the obtained results on plasma hormone levels (ghrelin, GLP-1 and PYY). Gene sets related to inflammation were downregulated in the fundus. In the duodenum the procedure resulted in an upregulation of gene sets related to lipid metabolism.
Conclusion: This transcriptome analysis is one of the first studies using biopsies from humans subjected to a gastric volume reduction and provides key insights into underlying mechanisms of this novel minimally invasive bariatric surgical technique.

Reference:

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T8:PO.046

The quality of follow-up is essential for success after laparoscopic adjustable gastric banding in adolescent

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This study is based on a prospective follow-up of 49 severely obese adolescent (75% girls) operated in a single French institution since 2008. Surgery was proposed only after at least one-year lifestyle intervention in a multidisciplinary program managed by a pediatric team. Post-operative management included several multidisciplinary visits. The mean age at surgery was 16.2 ± 0.9 years. Mean body mass index was 42.5 ± 5.9 kg/m$_{\text{،}}$, corresponding to a mean weight of 118.8 ± 22.3 kg. At 12 and 24 months after surgery, mean weight was 98.7 ± 21 kg and 93.6 ± 19.3 kg respectively ($p < 0.001$); corresponding to mean BMI 34.7 ± 6.2 and 32.3 ± 6.7 ($p < 0.001$) and a percentage of excess weight loss (EWL) of 41.8 ± 21.4% and 59.1 ± 24.9% ($p < 0.001$). The mean number of visits per patient was 9 in the first year (range 4–24) and 7 in the second year (range 3–16). During the follow up, 6 (12%) gastric bands were removed: 5 for slippage and 1 for band intolerance. Two ports repositioning were

realized but none device infection was observed. There was one death, 46 months after surgery from uncontrolled aorta hemorrhage during the procedure for gastric band removing. In multivariate analysis, including the sex, age at surgery and the mean number of consultations/year, only this last criterion was found significant on weight loss. Two years after surgery, significant differences were found between patients who had 6 or less consultations/year and those with 12 consultations/year for final weight ($p = 0.004$) or EWL ($p = 0.005$). These results show that more than 50% EWL can be obtained two years after gastric banding in adolescents. But they plead for the primordial role of compliance and thus for the importance of multidisciplinary medical support.

T8:PO.047

Bariatric surgery reduces the long-term incidence of diabetes-associated vascular disease in initially non-diabetic obese patients

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Background: Bariatric surgery reduces the risk for diabetes in obese patients, and prevents micro- and macrovascular complications in obese patients with diabetes. We analysed the effects of bariatric surgery on micro- and macrovascular events in obese patients without diabetes at baseline.
Methods: The Swedish Obese Subjects (SOS) study is a prospective matched intervention study conducted at 25 surgical departments and 480 primary healthcare centers in Sweden. The current analyses included 3429 obese patients who did not have diabetes at baseline. Of them, 1658 patients underwent bariatric surgery and 1771 obese matched controls given usual care. Microvascular (eyes, kidneys and peripheral nerves) and macrovascular (legs, heart and brain) events requiring hospital or specialist outpatient treatment or that were associated with death during follow-up were traced by searching the Swedish Cause of Death Register and the Swedish National Patient Register. Median follow up time was 18 years.
Results: Bariatric surgery reduced the incidence of the combined endpoint of micro- and macrovascular events, whichever came first, in patients without diabetes at baseline (566 and 411 events in the control and surgery groups, respectively; HR=0.73; 95%CI: 0.64–0.82; $P < 0.001$). When analyzed separately, both microvascular (HR=0.48; 95%CI:0.38–0.60; $P < 0.001$) and macrovascular (HR=0.80; 95%CI:0.70–0.92; $P < 0.002$) were reduced in the surgery group. The reduction of the incidence of micro- and macrovascular events was more pronounced in patients with prediabetes at baseline compared to those with normal glucose status (interaction P-value=0.005).
Conclusion: Bariatric surgery reduced the long-term risk of diabetes-associated vascular disease in obese patients without diabetes at study start.

T8:PO.048

Insulin sensitivity and secretion after different bariatric operations

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Laparoscopic gastric plication (P) is an emerging bariatric procedure.We aimed to compare the effects of laparoscopic gastric banding (LAGB) and biliopancreatic diversion (BPD) on insulin resistance and secretion with the effects of P. A total of 52 T2DM women (age: 30–66 years) were recruited into three study groups: (i) 20 in P; (ii) 16 BPD; and (iii) 16 LAGB. Euglycaemic clamps (glucose disposal per kg of fat free mass, Mk per FFM) and mixed meal tolerance tests were performed before (exam 1), at 1 month post-op (exam 2) and at 6-months post-op (exam 3). Beta cell function was evaluated using the mathematical model. Mk per FFM was higher in P than in LAGB or BPD ($p < 0.05$) in exam 1 and was significantly higher in all groups in exam 2 than in exam 1 and in exam 3 vs. exam 1 ($p < 0.001$). Basal insulin secretion was higher in both BPD and LAGB than in P in exam 1. It decreased significantly in LAGB in exam 2 vs 1 ($p < 0.01$) and exam 3 vs 1 ($p < 0.001$), whereas in BPD the decrease was significant in exam 2 vs 1 ($p < 0.01$) and in exam 3 vs 2 ($p < 0.05$) and vs 1 ($p < 0.001$); and in P, it decreased only between exam 1 and 3 ($p < 0.05$). Total insulin secretion decreased significantly only in BPD, in exam 2 vs exam 1 and in exam 3 vs exam 1 ($p < 0.001$). Glucose sensitivity was similar in all groups before operations. It increased in LAGB in exam 2 vs 1 ($p < 0.05$) and in exam 3 vs 1 ($p < 0.05$) and in P, it increased in exam 2 vs 1 ($p < 0.05$). In conclusion, we have found similar improvement in insulin sensitivity after all types of operations. Only BPD led to the decrease in demand on beta cells (decreased integrated insulin secretion during meal test), on the contrary it didn´t improve glucose sensitivity, which was however improved after both P and LAGB.

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T8:PO.049

Pre-operative liquid low-calorie diet reduces liver fat and liver volume in morbidly obese patients undergoing roux-en-y gastric bypass

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Introduction: Roux-en-Y gastric bypass (RYGB) is considered the gold-standard treatment to provide sustained weight loss in morbidly obese individuals. A pre-operative diet is advised to reduce liver size and decrease risks of complications. There is no consensus on the optimal type and duration of this diet. Previous studies have shown that low-calorie diets (LCD) may be of benefit to reduce liver fat and volume (1,2,3,4)
Aim: To compare the effect of 3 pre-operative diets on liver fat and volume in morbid obese patients awaiting RYGB
Methods: Morbidly obese volunteers (n=30, BMI:40–55kg/m^2) on the waiting list for RYGB were randomly assigned to a liquid formula 810kcal/day LCD (Cambridge Weight Plan®, Northants, UK) for 2 weeks (2W LCD), for 6 weeks (6W LCD), or to a 800–1000kcal/day conventional food diet (CONTROL) for 2 weeks. Liver fat and volume were measured by 1H MRS and MRI respectively using a 1.5T Phillips MR scanner
Results: 23 participants completed the diet (table 1). Liver fat reduced from 8.59% (4.81–15.4%) to 4.42% (2.11–9.28%) and liver volume from 2.23L (1.99–2.50L) to 1.89L (1.66–2.15L). Liver fat and volume (log) significantly correlated at baseline ($r= 0.58$, $p = 0.003$) and overall ($r=0.64$, $p < 0.0001$). Reductions in liver fat ($-38.3 \pm 6.9\%$) and liver volume ($-15.0 \pm 1.9\%$) were significantly correlated ($r=0.66$, $p = 0.0007$). Liver fat and liver volume significantly reduced in both LCD groups compared with the control with no significant difference between the 2W and 6W groups (table 2, figure A and B)
Conclusion: The LCD induced significant liver fat and volume reduction by 2 weeks compared with the conventional food diet with no significant further reduction by 6 weeks

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1. Fris, 2004 (2) Lewis, 2006 (3) Colles, 2006 (4) Edholm, 2011.

	2W LCD	6W LCD	CONTROL
Sex (F:M)	8:1	6:2	4:2
Age (years)	40 (30-53)	47 +/- 4	41 +/- 5
Weight (kg)	124.4 +/- 3.4	121.5 +/- 7.2	126.4 +/- 7.2
BMI (kg/m 2)	45.7 +/- 1.0	45.2 +/- 1.2	45.3 +/- 1.8

Fig. 1. Baseline characteristics of participants

	2W LCD	6W LCD	CONTROL
Liver fat reduction (%)	-40.0 +/- 7.1	-65.1 +/- 8.2	0.1 +/- 8.3
Liver volume reduction (%)	-17.0 +/- 1.5	-21.1 +/- 2.3	-3.7 +/- 2.5

Fig. 2. Reduction in liver fat and liver volume following the diet

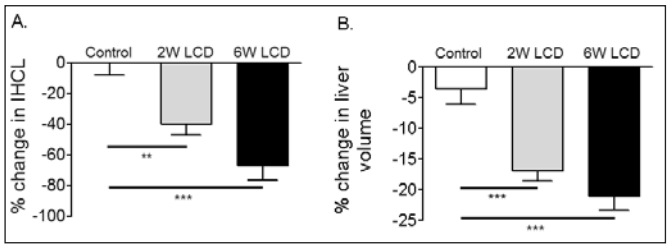

Fig. 3. Changes in liver fat (A) and liver volume (B) following the diet

T8:PO.050

Improvement of plasma Heme Oxygenase 1 (HO1) levels in morbidly obese patients (MO) with severe osbstructive sleep apnea (OSA) after bariatric surgery

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Introduction: HO1 is a new adipokine with a protective role against the cellular stress and hypoxia (1). MO presents with high circulating levels and high adipose tissue expression of HO1 (2). The effect of bariatric surgery on HO1 has not yet been studied. 1.Abraham N et al. Heme Oxygenase: a target gene for antidiabetic and obesity. Current Pharmaceutical Design,2008;14:412–421. 2. Lehr S et al. Identification and Validation of novel adipokines released from primary human adipocytes. Molecular & Cellular Proteomics 2012; Jan;11(1):M111.010504.
Methods: we studied 57 MO with sever OSA, 40 women and 17 men (age 46.2 ± 10.0 years, BMI 46.8 ± 7.06 kg/m^2, AHI (Apnea hipoapnea index) 64.1 ± 27.6 events/hour) before and after bariatric surgery. Thirty were treated with CPAP, 24% were smokers, 67% had hypertension and 38% type 2 diabetes. Levels of HO1 were measured by ELISA (Elisa Kit bioNova científica, s.l.Madrid). All patients underwent overnight conventional polisomnography (CE-Series Compumedics, Victoria, Australia). Waist circumference, % body fat by bioelectrical impedance (TANITA) and HOMA insulinresistance index were also measured. Sleeve gastrectomy or Roux-en-Y gastric bypass was performed according to the local protocol. For statistical analisis SPSS-PC-plus version 19 was used.
Results: taking all the patients as a group, plasma HO1 levels decreased after bariatric surgery (7.43 ± 5.13 vs 6.95 ± 4.27 pg/mL, p = 0,022), however, this effect was only observed in those patients who had not been treated with CPAP (8.84 ± 6.72 vs 8.00 ± 5.69pg/mL, p = 0,021).
Conclusion: Bariatric surgery improves HO1 levels in MO with severe OSA without treatment with CPAP.

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T8:PO.051

Long-term albuminuria remission after bariatric surgery in swedish obese subjects (sos)

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Introduction: Obesity is associated with increased risk of chronic kidney disease (CKD). Albuminuria is a predictor of progressive CKD. Bariatric surgery reduces body weight in obese subjects, but the effects on CKD is unclear. We have previously shown that bariatric surgery is associated with reduced incidence of albuminuria compared with conventional obesity treatment.
Methods: The SOS (Swedish Obese Subjects) study is a prospective, controlled intervention study including 2010 participants who underwent bariatric surgery and 2037 controls receiving conventional obesity treatment. 24-h urine collections were performed at baseline, and after 2, 10 and 15-years. Urinary albumin excretion (UAE) was calculated based on 24-h urine collection (urine albumin concentration (mg/l) × urine volume (l))/urine collection time (min)) and expressed as mg per 24 h. For the current analysis, 699 SOS study participants with microalbuminuria (defined as UAE between 30–300 mg/24 h) at baseline were included. Remission of albuminuria (defined as UAE < 30 mg/24 h) over 15 years was the main outcome measure.
Results: Microalbuminuria remission during follow-up (2, 10 and 15-years) was observed for more than 65% of the study participants undergoing bariatric surgery. The odds-ratios for remission after surgery were 5.8, 1.9 and 3.8 after 2, 10 and 15-years follow-up, respectively when compared to conventionally treated patients (all P≤0.001).
Conclusion: Participants with microalbuminuria who underwent bariatric surgery had increased likelihood of remission compared with participants receiving conventional obesity treatment.

T8:PO.052

Obese subjects with Type 2 Diabetes undergoing Sleeve Gastrectomy: Impact on Cardiac Function

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Introduction: Diabetic cardiomyopathy is an increasingly prevalent health issue, with no specific management options. Patients with type 2 diabetes are often obese, and management of obese subjects with diabetes is always challenging. In this study, we examined the impact of bariatric surgery (sleeve gastrectomy) on diabetic cardiomyopathy for obese patients with type 2 diabetes.
Methods: Eight obese patients with poorly controlled type 2 diabetes undergoing sleeve gastrectomy had left ventricular (LV) systolic and diastolic function assessed by advanced echocardiographic techniques: global longitudinal strain (GLS), LV ejection fraction (both for LV systolic function) and septal e' (for LV diastolic function), before and 9-months after surgery.
Results: Following sleeve gastrectomy, the subjects had a mean weight loss of 28.0 ± 16kg with the body mass index decreasing from 44 ± 9kg/m^2 to 35 ± 6kg/m^2 (p < 0.001). Glycaemic control improved, with HbA1c decreasing from 9.2 ± 2.0% at baseline to 6.7 ± 1.3% at follow-up (p = 0.002) (figure 1). There was a significant improvement in LV systolic function: GLS improved from –13.2 ± 3.7% to –19.7 ± 2.2% (p < 0.001), and LV ejection fraction increased from 60 ± 5% to 70 ± 4% (p < 0.001). Im-

provement in GLS was associated with the amount of weight lost (ρ=0.81, p = 0.015). LV septal e' velocities increased from 6 ± 1 to 8 ± 2 cm/s (p = 0.015), indicating better LV diastolic function.
Conclusion: Sleeve gastrectomy in obese patients with type 2 diabetes is effective not only in reducing weight and improving glycaemic control, but also results in significant improvement in both systolic and diastolic LV function. This may have implications for obese subjects with diabetic cardiomyopathy.

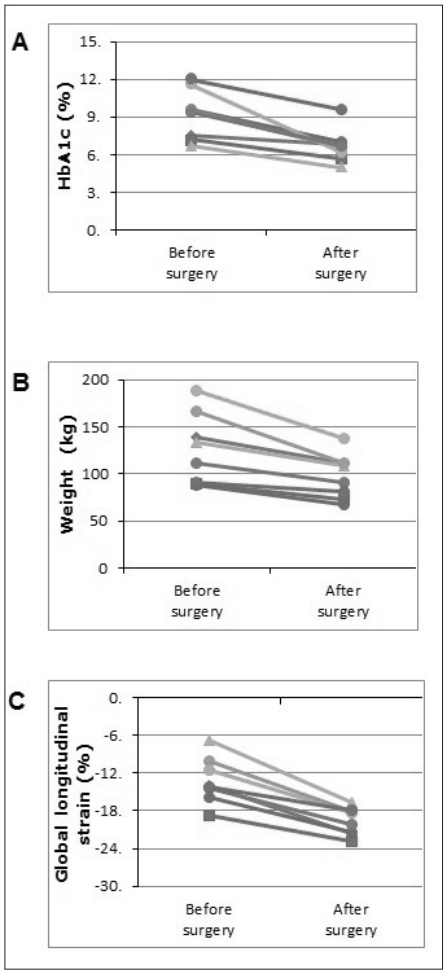

Fig. 1. Graphs showing improvements with regards to glycated haemoglobin (HbA1c) (Panel A), weight (Panel B) and global longitudinal strain (Panel C) before and after surgery for our cohort of patients

T8:PO.053

Bone mineral density after gastric bypass surgery

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Introduction: Reduced bone mineral density (BMD) is a recognised complication of Roux-en-Y gastric bypass (RYGB) surgery. Calcium malabsorption, secondary to vitamin D deficiency, is partially responsible and calcium/vitamin D supplementation is recommended to reduce risk of osteoporosis. However, some studies documented declines in BMD in the absence of significant changes in circulating vitamin D or PTH.
Methods: We audited BMD at 1–5 years in 66 patients (40 women and 26 men; mean age 46.5 ± 9.3 years), who underwent RYGB and who were on calcium/vitamin D supplementation. We compared serum calcium, PTH, vitamin D and % Excess Body Weight (EBW) loss between those with low and normal BMD.
Results: 25 of the 66 patients (37.9%) showed low BMD (19 osteopenia and 6 osteoporosis) either at lumbar spine or hips. Mean serum calcium and PTH concentrations were not significantly different between those with low BMD and those with normal BMD (p = 0.43 and p = 0.15, respectively). Mean %EBW loss was significantly higher in patients with low BMD (75.1 ± 14.0%) compared to those with normal BMD (61.8 ± 17.5%) [p = 0.0006].
Conclusion: Our audit showed that over a third of patients who underwent RYGB developed osteopenia or osteoporosis despite being on calcium/vitamin D supplementation, suggesting that other mechanisms, such as rate of weight loss or protein intake may be important factors in contributing to low BMD following RYGB. The greater weight loss in our patients with low BMD is in keeping with studies which found an association between weight loss and bone loss. Also, diets containing 1.0–1.5 g/kg protein are recommended for optimum bone health indicating that the common practice of prescribing 60–80 g of protein after bariatric surgery is inadequate and may contribute to bone loss.

T8:PO.054

The adjustable gastric banding does not reduce monocytes count 1 year after bariatric surgery

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Introduction: Monocytes (Mn) associate with atherosclerosis. Monocytosis is common in obesity. We studied the Mn count 1 year after bariatric surgery (BS) and the predictors of Mn variation. METHODS: We retrospectively studied morbidly obese patients submitted to BS: AGB (adjustable gastric banding), RYGB (Roux-en-Y gastric bypass) and SG (sleeve gastrectomy) between 2010 and 2012. Follow-up: 1 year. We excluded patients without complete white blood cells (WBC) count before or 1 year after BS. We compared WBC counts before and 1 year after BS. We evaluated the correlation between Mn and BMI, insulin resistance (HOMA2-IR), and HDL. A multivariable linear regression analysis was built to study predictors of Mn variation. RESULTS: We studied 796 patients (AGB 248, RYGB 466, SG 82). RYGB patients were younger; AGB patients had lower initial BMI and HOMA2-IR values and lost less weight. AGB patients had lower initial Mn count compared to RYGB and SG [0.46 (0.38–0.58); 0.53 (0.43–0.64) and 0.52 (0.43–0.68), respectively; p < 0.001]. In AGB patients, there was a significant increase in Mn count 1 year after BS [0.50 (0.40–0.66); p < 0.001], and a reduction in RYGB and SG [0.47 (0.38–0.58); p < 0.001 and 0.48 (0.40–0.62); p = 0.005, respectively]. At baseline, there was no correlation between Mn count and BMI (rho= –0.07; p = 0.20); a weak positive correlation between Mn count and HOMA2-IR (rho=0.16; p = 0.02); and a weak negative correlation between Mn count and HDL (rho=-0.13; p < 0.001). In a multivariable linear regression analysis, AGB surgery was an independent predictor of Mn count increase.
Conclusions: Except for AGB, BS can lead to a reduction in the Mn count 1 year after surgery. AGB associates with an increase in Mn count independent of age, sex, insulin resistance and HDL.

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T8:PO.055

Effect of three types of bariatric surgery on anthropometry and glucose metabolism: Two years follow-up – pilot study

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Introduction: Bariatric surgery is the most effective tool in the treatment of obesity and related comorbidities, such as Type 2 Diabetes Mellitus, dyslipidemia, hypertension, etc. We compared effect of laparoscopic gastric banding (LAGB), laparoscopic greater curvature plication (LGCP) and biliopancreatic diversion (BPD) in morbidly obese women with Type 2 Diabetes.
Methods: 41 obese diabetic women underwent bariatric surgery: 11 LAGB (age: 58.3 ± 6.19 yrs; BMI: 44.8 ± 7.16 kg/m^2), 16 LGCP (age: 51.8 ± 9.79 yrs; BMI: 41.6 ± 8.93 kg/m^2), 14 BPD (age: 50.4 ± 6.19 yrs; BMI: 47.8 ± 8.02 kg/m^2). All women underwent 3-hour mixed meal tolerance test before the treatment and after 2 years. Index of insulin resistance (HOMAR) and area under curves (AUC) were calculated. For statistical analyses, Mann-Whitney and ANOVA with repeated measurements were used (NCSS, 2004).
Results: LAGB (n=11): weight declined by 15 ± 9 (min: 2.6; max: 31.4) kg; body mass index (BMI) by 4.9 ± 2.89 kg/m¸; fat mass (FM; Tanita TBF-300) by 10.8 ± 7.2 kg LGCP (n=16): weight declined by 14 ± 20 (1.9; 65.2) kg; BMI by 5.1 ± 7.46 kg/m¸; FM by 5.7 ± 4.5 kg BPD (n=14): weight declined by 33 ± 16 (10.4; 65.8) kg; BMI by 11.4 ± 4.78 kg/m¸; FM by 26.2 ± 14.4 kg Significant decrease of fasting and stimulated parameters of glucose metabolism was found in the group of BPD (HOMAR: $p < 0.0001$; AUC Glucose:$p < 0.001$; AUC Insulin:$p < 0.0001$; AUC C-peptide:$p < 0.001$). After LAGB, only fasting parameters decreased (Glucose: $p < 0.02$; Insulin: $p < 0.03$; C-peptide: $p < 0.01$; HOMAR: $p < 0.04$).
Conclusion: Although the study is limited by the small number of patients, we found that BPD resulted in the best long-term glucose metabolism improvement. Determination of incretin levels will be subject of further analyses.

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T8:PO.056

Polyneuropathy after bariatric surgery - case report

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Introduction: The knowledge about bariatric surgery complications is increasing with the rising numbers of procedures performed. Neurological complications of nutritional deficiencies following bariatric surgery are rare with an incidence of 4.6% and may result in serious consequences. Case report: A 30-year-old woman (BMI 50.6kg/m^2) underwent gastric bypass in August/2011. Two months later she began persistent vomiting and required hospitalization. After discharge she complained about progressive muscle weakness in lower and upper limbs, with significant functional impairment. She noted sensory loss in all four limbs. Neurological examination revealed: distal tetraparesis predominantly in lower limbs, glove and sock hypoesthesia and abolished osteotendinous reflexes, with gait disability. She was admitted to the Neurology Department. Nerve conduction studies revealed severe axonal sensorimotor polyneuropathy and sural nerve biopsy showed absent myelinated fibers. Analytical study revealed: folic acid 1.9mg/dL (2.2–17.5) and vitamin D 9ng/mL (>30). CBC, iron kinetics, vitamin B12, vitamin E and copper were normal. A vitamin complex was started (thiamine, folic acid and vitamin D), with progressive recovery of deficits. Currently she has autonomous gait with mild motor deficit in dorsiflexion of the left foot. It was assumed a diagnosis of carencial sensorimotor polyneuropathy due to thiamine deficiency.
Conclusion: Vitamin deficits following bariatric surgery can present with severe polyneuropathy, not always fully reversible. Because body reserves of thiamine are low, its deficiency may develop in the first few months after surgery. The present case highlights the need for early recognition of signs and symptoms and the importance of immediate supplementation.

T8:PO.057

Effectiveness of prolonged low calorie liquid diet in pre-operative optimisation of super super obese patients undergoing bariatric surgery

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Introduction: Patients with super super obesity (SSO; BMI >60) undergoing bariatric surgery present major technical and physiological challenges. Techniques suggested to manage peri-operative risk include pre-op restricted-calorie diet and intra-gastric balloon. In our institution we prospectively instituted a policy of introducing a long duration, low calorie liquid diet prior to surgery. We compared this strategy with our results prior to its introduction.
Methods: A prospectively maintained database was interrogated to identify all SSO patients undergoing bariatric surgery between February 2007 and September 2013. Those having procedures prior to May 2011 did not have prolonged, specific pre-operative diet. From May 2011 however all patients were enrolled on a Cambridge Weight Plan® liquid diet – >six weeks 700–920kcal/day following an initial 1500kcal/d diet for > two weeks. We compared pre-operative weight loss, peri-operative complications and long term outcome in those receiving the liquid diet versus those not.
Results: 18 SSO patients used Cambridge diet and 22 did not. Mean pre-operative BMI and co-morbid status were similar. Mean excess body weight loss from pre-diet clinic assessment to operation was slightly higher in the Cambridge diet group (15.3% vs. 10.4%, $p = 0.18$). Operations performed were similar with all patients having their planned procedure. Peri-operative complications were significantly more common in the non-Cambridge diet group(6 patients versus 1, $p = 0.04$).
Conclusion: The Cambridge diet gives good pre-bariatric procedure weight loss in the super super obese population. This appears to contribute to better outcomes with regard to surgical complication rates as compared to patients having a non-standardised pre-operative diet. This may reflect more effective loss of intra-abdominal and hepatic adiposity, or an effect of improved metabolic and nutritional status, in patients undergoing prolonged, liquid low calorie diet.

Acknowledgement: Diet programmes were provided gratis by Cambridge Weight Plan®, Northants, UK.

T8:PO.058

Bariatric Surgery: Prior History in Parents does not mean future intentions for children

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Background: Custodial attitudes towards bariatric surgery in their children are under-researched; though as rates of bariatric surgery in obese adults in Western Australia increases alongside incidence of childhood obesity, we expect surgery to increasingly be considered a viable weight loss treatment.
Methods: We explored parental history and attitudes towards bariatric surgery through a questionnaire administered during a weight management clinic. Quantitative information was collected on surgery history, type, and professionals consulted regarding surgery, diet changes, physical activity, and satisfaction with surgery and outcomes; and if custodians would consider bariatric surgery for their child. Qualitative data was collected through an open-format comments section, and analysed for common themes.
Results: Families of 49 adolescents responded: 44 mothers, 4 fathers and 1 grandmother. Surgery had been performed upon 3 of the reporting custodians, 3 other immediate family members, and a further 11 family members and associates. 5 custodians were on the waiting list. Lap-banding was the most common of surgery performed, and satisfaction with the outcome and experience was high. Surgeons were the most common professional consulted prior to, and following, surgery. Lifestyle changes post-surgery focussed primarily on diet. Half of custodians surveyed would consider bariatric surgery for their child. This did not appear to be affected by history of surgery in the family. When comments were analysed, the main theme was that surgery would be a last resort, after diet and exercise attempts had been exhausted. Custodians reported being aware of risks and side-effects however their belief was that the risks of obesity were greater.
Conclusion: Custodial attitudes towards bariatric surgery in their child are complex and must be explored further. Preliminary findings show that custodians are making balanced decisions, with primary consideration for the welfare of their child.

Acknowledgement: The participants and the CLASP team.

T8:PO.059

A RCT of Intragastric balloons in obese adolescents: Preliminary data

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Background: Intragastric balloons (balloon) are an effective, less invasive weight loss method used in adults. Their use in adolescents has not been studied. The purpose of this RCT was to determine if the balloon has a role in obesity management in adolescents receiving lifestyle modification.
Methods: A total of 30 obese adolescents with co-morbidities were randomly allocated to 2 groups: A Control group undertook a 1 year lifestyle program; a 3 month intensive phase followed by a 9 month maintenance phase. The intervention group in addition to the lifestyle program was admitted for insertion and removal of the balloon under general anaesthetic; the balloon remained in situ for 6 months. Outcomes were measured at 6 and 18 months.
Results: Baseline demographics were similar in both groups. Control group: 16 pts, 5M:11F, age 14.0 ±1.2 years, weight 106.5 ±13.8kg, BMI zscore 2.49 ±0.18, waist circumference 116.9 ± 10.2 cm, body fat % 46.3 ± 6.3 (mean±SD). Intervention group: 14 pts, M7:7F, age13.58 ±1.26 years, weight 111.4 ± 22.5 kg, BMI zscore 2.58 ± 0.20, body fat % 43.5 ± 4.9 (mean±SD). At 6 months both the control and intervention groups had significant reductions in BMI zscore (-0.15 ±0.1 p = 0.0002 vs −0.10 ± 0.15 p = 0.018) and body fat % (-2.6 ± 3.7% p = 0.017 vs −3.1 ± 3.8% p = 0.021) respectively (mean±SD). The intervention group also showed a significant reduction in weight, waist circumference and fat mass. Changes observed at 6 months were not seen at 18 months. The groups did not differ in weight loss, BMI z-score or body fat % change. No adverse events occurred during insertion or removal of the balloon, one patient required early removal of the balloon 1 month post insertion for psychological intolerance.
Conclusion: Both lifestyle and balloon and lifestyle improve BMI z-score and reduce body fat % in obese adolescents in the short term, however these changes are not maintained in the long term. The balloon appears to be safe and well tolerated in obese adolescents.

Acknowledgement: The families who have given their time freely, and the CLASP clinical service at Princess Margaret Hospital.

T8:PO.060

Inflammatory status and iron homeostasis in women supplemented before and after obesity surgery

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Bariatric surgery may lead to specific nutritional deficiencies, such as iron deficiency, especially in women of childbearing age because of their higher iron requirement for appropriate erythropoiesis. On the other hand, surgery improves inflammation and iron homeostasis, which raises the question of whether supplementation is still required. The objective was to analyze the effect of Roux-en-Y gastric bypass (RYGB) and preoperative and postoperative vitamin and mineral supplementation on the inflammation status and iron homeostasis of premenopausal women. This interventional prospective study included 45 nonmenopausal women aged 20 to 45 years, with a body mass index (BMI) of 35 to 60 kg/m^2, who either took one recommended daily allowance (RDA) of vitamin and mineral supplements for 30 days before surgery and two RDAs for six months after surgery (Group 1; n=34); or who took 1 RDA for six months after surgery (Group 2; n=11). Assessment relied on the sample's anthropometric measurements and laboratory tests (iron metabolism and inflammation markers). The baseline transferrin saturation index (TSI) of 10 women indicated iron deficiency. Six months after surgery, the BMI, high-sensitivity C-reactive protein (hs-CRP), and insulin resistance of the two groups had decreased. The TSI of Group 1 increased and transferrin decreased, indicating better iron status due to preoperative and postoperative supplementation. Serum iron increased in Group 2. Six months after surgery, both groups had lower ferritin, and the prevalence of anemia was 9%. Hepcidin correlated with ferritin before and after surgery.
Conclusion: Inflammation had improved six months after RYGB. Vitamin and mineral supplementation before and after surgery improved the markers of iron status.

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T8:PO.061

Interest of using continuous glucose monitoring system (cgms) among pregnant women undergone a bariatric surgery at 24–28 gestation weeks

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Introduction: Among pregnant women, who had undergone bariatric surgery, it is difficult to evaluate glycemic status with usual care. Our objective was to describe glycemic profile at 24–28 gestation weeks by using a Continuous Glucose Monitoring System (CGMS), in this population.
Methods: 12 pregnant women (8 malabsorptive procedures, 4 restrictive procedures) were evaluated during 72 hours with a CGMS. Pre- and post-prandial glycemic profile was analyzed. As the same time, a 75g Oral Glucose Tolerance Test (OGTT) was performed for diagnosis of gestational diabetes (GDM) and its tolerance was evaluated by visual analogic scale.
Results: Maternal age was 30.3 ± 6 years and pre-pregnancy body mass index was 35.3 ± 8.8 kg/m¸. Mean period between surgery and pregnancy was 2.9 ± 2.5 years. Mean blood glucose level was 87.7 ± 15.8 mg/dl. 1 and 2 hours post-prandial blood glucose levels (PPG1h and PPG2h) were 114.3 ± 13.6 mg/dl and 91.3 ± 17.1 mg/dl respectively. Time to reach post-prandial peak of glucose level was 55.1 ± 17.1 min. Moreover, in our population, we observed higher glycemic variability with higher level of GPP1h and lower level of GPP2h, especially following gastric bypass, than in pregnant women without bariatric surgery (1). Four women had GDM (2 diagnosis according to abnormal glucose values in OGTT, 2 to abnormal values in CGMS). Moreover, one third of the OGTT was invalid following bypass gastric because of vomiting.
Conclusion: CGMS is useful to examine the particular glycemic profile among pregnant women who had undergone bariatric surgery, when it is difficult to diagnose a GDM with usual care, especially following gastric bypass. Also, the variability of glycemic profile can be explained by the consequences of surgery.

Reference:
1. Yogev et al.: Am J Obstet Gynecol. 2004.

T8:PO.062

Long-term prevalence of anaemia and related micronutrients deficiency after bariatric surgery

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Introduction: Iron, vitamin B12 (VitB12) and folic acid (FAc) deficiency can occur after bariatric surgery (BS) and may cause anaemia. Aim: To determine the prevalence of anaemia and micronutrients deficit (iron, VitB12 and FAc) before,12, 24 and 36 months (M) after gastric banding(GB), gastric bypass(RYGB) and sleeve gastrectomy(SG).
Methods: Retrospective longitudinal study of patients submitted to BS between 01/2010–06/2013. Patients without medical records of blood cell count (BCC), iron, VitB12, FAc, supplements or blood transfusion were excluded. Anaemia was defined according WHO criteria. Deficit of micronutrients: serum iron <60µg/dL, transferrin saturation <20% or ferritin <15ng/mL; VitB12 <200pg/mL; AcF <2.2ng/mL.
Results: Sample composed by 953 patients, mean age 42.6(10.8)years, 86% women. RYGB performed in 59.8% patients, BG in 28.5% and SG in 11.6%. Prevalence of anaemia before surgery 7.7% (N=953); 12M 13.1% (N=847); 24M 17.3% (N=439); 36M 18.7% (N=251). The majority of patients with anaemia had undergone RYGB (12M: RYGB 71.2% / BG 15.3% / SG 13.5% p = 0.002; 24M: RYGB 77.6% / GB 13.2% / SG 9.2% p = <0.001; 36M: RYGB 80.9% / GB 17.0% / SG 2.1% p = <0.001). Deficiency of any micronutrient was found more frequently in RYGB group (statistical significance regarding 24 and 36M iron deficiency and VitB12).There was no association between micronutrients deficiency and weight loss. We found more supplements prescription in RYGB group. Only 1 patient required blood transfusion at 12M and 36M, respectively.
Discussion: Our results are in agreement with previously published and highlight the importance of checking BCC/micronutrients levels after BS to avoid important complications such as anaemia.

T8:PO.063

Routine closure of mesenteric defects in laparoscopic roux-en-y gastric bypass results in no internal hernia developed in 180 consecutive cases

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Background: Internal hernia after LRYGB is a serious complication leading to rise in patient's morbidity and mortality. But the closure of the mesenteric defects remains a subject of controversy. The aim of this study is to evaluate the results of routine closure of mesenteric defects in retrocolic antegastric LRYGB.
Methods: Clinical data of patients underwent LRYGB in the First Affiliated Hospital of Jinan University between January 2012 and January 2014 were reviewed. All the patients had retrocolic and antegastric anastomosis as a standard procedure with linear stapling. The jejunojejunal anastomotic mesenteric defect and Peterson's defect were routinely closed by interrupted permanent suture. The patients were follow-up at 1, 3, 6, 12 months and annually thereafter.
Results: 180 LRYGB were performed. There were 121 males and 59 females with mean age of 33.6 years (range, 18–58), mean preoperative BMI 42.3 (range, 28.6–78.3), mean operating time 122 minutes (range, 104–139). All the patients had at least 12 months follow-up. Percentage of excess weight loss in 1, 3, 6, and 12 month after operation were 27.3 ± 8.3%, 54.2 ± 7.4%, 76.8 ± 8.7%, 79.6 ± 8.6%, respectively. No any patient (0%) developed internal hernia postoperatively. No any severe complications and death cases were observed.
Conclusions: Routine closure of mesenteric defects in LRYGB does not increase much operating time. No internal hernia was developed if the mesenteric defects are properly closed. Randomized control trial is needed to verify the long term outcomes.

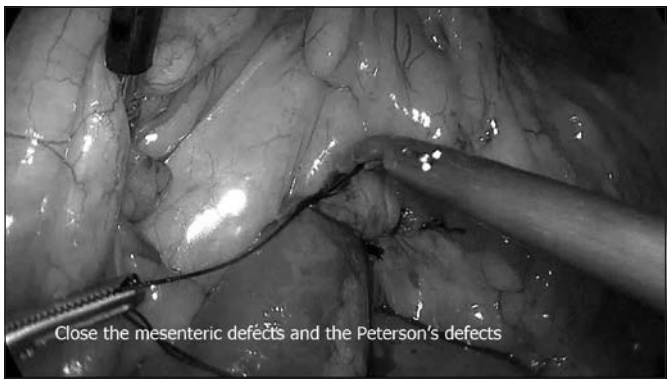

Fig. 1. Close the mesenteric defects and the Peterson's defect

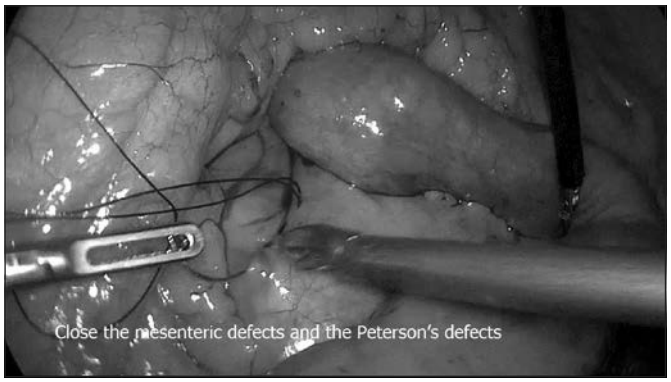

Fig. 2. Close the mesenteric defects and the Peterson's defect

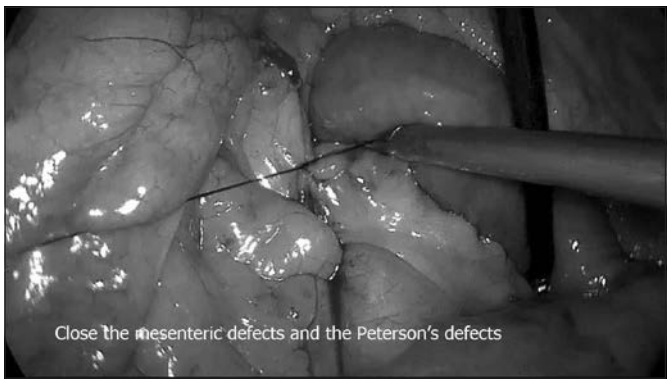

Fig. 3. Close the mesenteric defects and the Peterson's defect

T8:PO.064

Long lasting effect of gastric bypass on risk factors for atherosclerosis

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Obesity is associated with insulin resistance, affected glucose toleration, change in serum lipids, and mild systemic inflammation. Metabolic surgery improves proatherogenic metabolic parameters as well as weight reduction.

Methods: In Center for obesity, Clinical Center of Serbia, were operated 146 obese patients (90 females and 56 males). Average body mass index (BMI) was 43.4 ± 7.3kg/m^2, 34.2 ± 6.8 years of age. Serum glucose level was 5.56 ± 1.3mmol/l, total cholesterol 5.21 ± 1.3mmol/, HDL 1.15 ± 0.7mmol/l, LDL 3.03 ± 0.4mmol/l, triglycerids 2.11 ± 1.2mmol/l, C-reactive protein 13.3 ± 9.8mg/l. In all patients were performed gastric bypass. Before surgery patients were on dietary regiment with 500kcal calorie restriction per day during 4–6 months. Three weeks before surgery daily energy intake was 1000kcal.

Results: Two years after surgery BMI was lower 29,9% (13.2 ± 0.9kg/m^2,, $p = 0.01$) than before. Serum glucose was lower 9.7% (0.5mmol/l±0.3mmol/l, $p < 0.05$). Total cholesterol decreased 9.7% (0.74 ± 0.2mmol/l, $p < 0.05$), as well as LDL cholesterol which decreased 34.5 ± 0.6%($p < 0.05$). The level of triglycerids was less 54.6% (1.1 ± 5mmol/l, $p < 0.001$) than before operation. HDL cholesterol increased 21% (0.3 ± 0.2mmol/l, $p < 0.05$) after two years. Creactive protein was markedly decreased two years after surgery, 89% (11.3 ± 3.2mg/l, $p < 0.001$).

Conclusion: Metabolic surgery, especially gastric bypass in morbidly obese patients have long-lasting beneficially effect on lipid profile, blood glucose, and systemic inflammation and due to this action, lowering risk for atherosclerosis, diabetes type 2 and obesity related metabolic diseases.

T8:PO.065

Weight loss after 3 types of bariatric surgery - 3 years of follow-up

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Introduction: Different bariatric surgery (BS) techniques are currently available (restrictive, malabsorptive, mixed procedures). Aim: To compare the effect on weight, body mass index (BMI) and percentage of alterable weight loss (AWL) over 3 years after 3 BS techniques - gastric band (GB), gastric bypass (RYGB) and sleeve gastrectomy (SG).

Methods: Retrospective longitudinal study of patients who had undergone BS between 01/2010-06/2011. Variables analyzed at 12, 24 and 36 months: Weight (W), Weight Change (WC), BMI, BMI variation; %AWL (AWL = 100% x [(initial BMI - BMI time x) / (initial BMI - 13)].

Results: Sample composed by 215 patients, mean age 43.2(10.1)years, 91.6% women. 54.9% of patients placed BG (W 109.2 (15.6)kg; BMI 43.2 (5.7)kg/m^2); 42.8% underwent RYGB (W 121.3 (19.5)kg; BMI 46.2 (5.9) kg/m^2); 2.5% were submitted to SG (W126.6 (19.5)kg; BMI 46.9(5.7) kg/m^2). The greater reduction in weight was achieved with in RYGB group, but close to that obtained with the SG (RYGB 41.6/42.5/41.6 vs. BG 18.9/18.9/18.4 vs. SG 41.1/42.1/40.6 p = <0.001). RYGB also reduced more units of BMI, but all techniques were associated with a slight regain at 36 months (RYGB 30.44/30.06/30.42; BG 35.73/35.69/35.89; SG 31.90/31.57/32.18). The %AWL was significantly higher in patients who had undergone RYGB (RYGB 46.98/47.96/46.91 vs. BG 24.28/24.50/23.86 vs. SG 44.21/45.23/43.71).

Discussion: Our results confirm that RYGB is the surgical technique with greater effect on weight reduction. However, regardless of the technique chosen there was a slight regain in weight/BMI three years after surgery, secondary to other factors that influence weight loss sustainability.

T8:PO.066

Single stage precise laparoscopic roux-en-y gastric bypass in the treatment of asian super obese patients: Comparison between BMI ≥50 and <50

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Background: The aim of this study is to investigate the surgical techniques and clinical outcomes of precise laparoscopic Roux-en-Y gastric bypass (PLRYGB) in treatment of Asian super obesity with BMI≥50.
Methods: Clinical data was collected and analyzed in consecutive patients underwent PLRYGB in the First Affiliated Hospital of Jinan University between March 2011 and March 2014. 30 patients in super obesity group with BMI≥50, and 30 patients in ordinary obesity group with BMI<50 as a control. Patients were followed up for 12~36 months.
Results: No any conversion to open operations or deaths. Preoperative BMI were (ordinary obesity group vs super obesity group) 38.1 ± 5.3 kg/m^2 and 58.3 ± 4.7 kg/m^2, respectively($P < 0.05$). Compare with baseline, the BMI decreased gradually and reach the peak one year after the operation in both groups: 27.2 ± 3.3 kg/m^2 and 36.7 ± 4.8 kg/m^2, respectively ($P < 0.01$). %EWL and preoperative BMI were in a linear negative correlation ($P < 0.05$). %EWL in 12 and 24 months of the two groups were: 75.3 ± 14.0%, 63.6 ± 9.4%; 80.1 ± 12.3%, 71.4 ± 12.5%, respectively ($P < 0.05$). The %EWL in super obesity group was lower than that in the ordinary obesity group($P < 0.05$). Co-morbidities including fatty liver, hypertension, T2DM, hyperuricemia, sleep apnea and hyperlipidemia were cured or relieved after one year of operation. Mild postoperative complications were observed in the two groups, including 9 cases of hair loss and 3 cases of dumping syndrome. Occurrence of loose skin after surgery is higher in super obesity group(6 cases, 20%) than that in ordinary obesity group (2 cases, 6%), $P < 0.05$.
Conclusions: PLRYGB is safe and feasible as a single stage operation for Asian super obese patients. The %EWL in ordinary obesity group is higher than that in super obesity group after one year of operation. Preoperative weight loss may be favorable in overall weight loss outcomes. Occurrence of loose skin after surgery is higher in super obesity group.

T8:PO.067

Vitamin d deficiency and obesity: Retrospective evaluation of vitamin d variation in obese subjects undergoing bariatric surgery

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Introduction: There seems to be a causal relationship between vitamin D deficiency (vitD) and obesity, but the nature of this association remains controversial.
Objectives: Evaluate: (1)the prevalence of vitD deficiency in obese subject undergoing bariatric surgery before and 12 months after surgery; (2)variation of vitD over 12 months of follow-up; (3)correlation between the vitD and excess BMI (EIMCP).
Methods: We performed a retrospective study of 983 patients undergoing bariatric surgery between January/2010 and June/2013 on Centro Hospitalar de São João. Patients were divided into surgical technique - adjustable gastric banding (AGB), gastric bypass (GB), sleeve gastrectomy (SG). Baseline and 12 months post-surgery values of vitD were determined.
Results: Follow-up was completed in 245 patients, of which 13.1% were men and 86.9% were women, with a median age of 43.0 years (interquartile range(IQR) from 35.00 to 53.00), median weight 113,05kg (IQR 103.78–127.00), and median BMI 43,5940kg/m^2 (IQR 40.1463–46.6769). Median baseline vitD were 12,0ng/mL (IQR 8.0–17.0). A larger percentage of patients had prior vitD deficiency (80.8%) than at 12 months after surgery (42.9%), having found an average increase of vitD at 12 months of 9.19 ± 11,006ng/ml ($p < 0.001$). The variation of vitD was statistically significant in all groups ($p = 0.004$), with a median of 10,0ng/mL in the AGB (IQR 2.0–15.0), 7,0ng/mL in GB (IQR 0,0–15.0), and 13,0ng/mL in SG (IQR 6.5–20.0). The weight loss at 12 months was statistically significant ($p < 0.001$), with a median loss of –17,800kg for AGB [IQR –9.975-(-17,800)]; –38,000kg for GB [IQR –31.800-(-44.900)]; –28,150kg for SG [IQR –21.600-(-41.650)]. There was no correlation between the vitD and EIMCP.
Conclusions: VitD deficiency was confirmed in our study population. We verified a significant increase in vitD with weight loss and over the 12 months follow-up. However, there was no correlation between the vitD and EIMCP.

T8:PO.068

Acute weight loss following omega-loop-gastric bypass surgery impairs liver transaminases and cholestatic parameters in diabetic and non-diabetic patients

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Introduction: 50–75% of obese and diabetic patients exhibit non-alcoholic fatty liver disease, which is associated with elevated liver enzymes. We hypothesized that increased flux of toxic lipids mobilized from adipose tissue to the liver during acute weight loss might be a risk factor for liver impairment within the first months after bariatric surgery.
Methods: Within our cohort study we evaluated liver enzymes (AST, ALT), De Ritis Ratio (DRR) and cholestatic parameters (CP) (AP, bilirubin) pre-, 3, 6 and 12 months postoperative (T0-T12) in non- (N) and diabetic (D) patients with omega-loop gastric bypass.
Results: N [n=28; =82%; 41 ± 15(mean±SD) years] and D [n=22; =68%; 54 ± 10 years] obese patients showed a significant weight loss (WL) of 37.4 ± 6.6% in N vs. 33.7 ± 7.9% in D at T12, (N vs. D n.s.). Acute WL was greater for N [N 22.7 ± 5.6% vs. D 18.4 ± 3.9%, $p = 0.02$], and AST dropped significant in N [23(16–41)U/l, median(min-max) to 27(19–58) U/l, $p = 0.01$] at T3. At T0 D had significant higher DRR than N [1.2 ± 0.9 vs. 0.8 ± 0.2, $p = 0.01$]. This difference appears also at T3 [N 0.9 ± 0.2 vs. D 1.1 ± 0.5, $p = 0.01$], whereby it dropped in D and rose in N. In the whole cohort we found an increase in CP [AP: 87(55–115)U/l to 93(65–136)U/l, $p = 0.01$; N vs. D n.s.; bilirubin: 0.6(0.3–1.0)mg/dl to 0.8(0.5–1.5)mg/dl, $p = 0.00$; N vs. D n.s.]. At T12 all parameters returned to preoperative values, except for AST in N [T0 to T12, N:5(-11–30)U/l vs. D:1(-43–25)U/l, $p = 0.01$].
Conclusion: Acute weight loss results in rise of transaminases, DRR, and CP in N, probably due to increased free fatty acid flux, as they exhibited greater weight loss with a potential risk for acute liver decompensation for patients at elevated risk (eg higher fibrosis score) at T0.

T8:PO.069

The effect of omega-loop versus roux-en-y gastric bypass on weight loss liver and cholestatic parameters

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Introduction: There is evidence that Omega-Loop Gastric Bypass (OLGB) demonstrates promising results for weight loss (WL). However, it's impact on liver enzymes compared to Roux-en-Y Gastric Bypass (RYGB) has not yet been determined.
Methods: We evaluated liver enzymes (AST, ALT), cholestatic parameters (CP: GGT, AP, bilirubin) and NAFLD fibrosis score (NFS)1 pre-,3,6 and 12 months postoperative (T0-T12).
Results: Non-diabetics who underwent either RYGB [n=25; =92%; BMI:45.6 ± 4.1(mean±SD); age:44.3 ± 10.2] or OLGB [n=25; =88%; BMI:45.3 ± 5.3; age:43.5 ± 13.2] were analysed. OLGB showed a greater WL compared to RYGB [T3: RYGB 15.7 ± 4.3 vs. OLGB 23.3 ± 5.5%; p = 0.001; T6: 23.8 ± 6.0 vs. 33.5 ± 6.6%; p < 0.001; T12: 29.7 ± 9.2 vs. 37.0 ± 6.5%; p < 0.01]. ALT dropped in RYGB (T0-T12:p = 0.04), while rising in OLGB (p < 0.05) over the observation period [T0: 33 ± 21 vs. 32 ± 15U/l, n.s.; T12:25 ± 8 vs. 37 ± 16U/l; p < 0.01]. Compared to T0 RYGB vs. OLGB showed a significant higher AST at T6, this difference disappeared at T12 [T0: 28 ± 12 vs. 26 ± 9U/l; n.s.; T6: 25 ± 7 vs. 34 ± 16; p = 0.04]. GGT increased in RYGB from T0-T6 [T0: 43 ± 57U/l vs. T6: 19 ± 11U/l; p < 0.05], while it remained stable in OLGB [T0: 33 ± 15 vs. T6:33 ± 32U/l; n.s.]. NFS initially showed higher proportion of NAFLD in RYGB vs. OLGB [20 vs.12%] this proportion changed at T12 [13 vs. 24%]. In the whole cohort a maximal rise in CP was found at T3 in RYGB and OLGB [AP: (T0: 88 ± 24 vs. 84 ± 21U/l; n.s. T3: 107 ± 21 vs. 96 ± 21; n.s.); bilirubin: (T0: 0.5 ± 0.1 vs. 0.6 ± 0.2mg/dl; p = 0.02; T3: 0.7 ± 0.3 vs. 0.9 ± 0.3mg/dl; n.s.)]. Increased AP (T0-T12; p = 0.01) and bilirubin (T0-T12; p < 0.001) remained high until T12.
Conclusion: OLGB vs. RYGB results in greater WL but deterioration of liver parameters in the first year after surgery.

Reference:
1. Angulo P, Hui JM, Marchesini G et al.: Hepatology.2007;45(4):846–854.

T8:PO.070

Effect of two preoperative low-energy diets on liver fat content in bariatric patients: A randomized trial

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Introduction: It is known that a preoperative low-energy diet (LED) can effectively reduce liver fat content (LFC). In a prospective, randomized intervention study, we compared two LED products (high protein plus low carbohydrate vs. high carbohydrate) concerning their effects on LFC.
Methods: 69 patients scheduled for bariatric surgery were randomized to receive LED1 (75 g protein, 28 g fat, 80 g carbohydrates) or LED2 (58 g protein, 19 g fat, 111 g carbohydrates) and 200 g of vegetables daily for two weeks. Pre- and post-interventionally, LFC was measured by a dedicated analysis of MRI data (1.5 T, 2-point Dixon method). Patients with LFC>10% at baseline were included (n=46).
Results: Age and BMI were similar between groups (LED1: n=22; 13 f, mean age 46.6 years, mean BMI 48.4 kg/m¸; LED2: n=24; 15 f, 47.2 years, 47.9 kg/m¸). LFC decreased significantly from 28.9 ± 10.1% by 4.9% (LED1) and from 21.0 ± 8.8% by 4.4% (LED2). This decrease was 1.0 (-2.9; 5.0) percentage point higher in LED2 compared to LED1 (ANCOVA; p = 0.6). Relative changes were 19% in LED1 and 20% in LED2, respectively. Baseline values were strongly correlated to follow-up values (r=0.82 [0.70; 0.90]). There were, however, no associations between the relative changes in LFC and body weight (r=-0.02 [-0.31; 0.28]; p = 0.9) and liver volume (r=-0.04 [-0.3; 0.21]; p = 0.7).
Conclusion: Both diets resulted in a significant reduction in liver fat content by 20% previous to bariatric surgery, independent of changes in body weight or liver volume.

Acknowledgement: This work was supported by the Federal Ministry of Education and Research (BMBF), Germany, FKZ: 01EO1001.

T8:PO.071

Long term outcomes of three types of bariatric surgery on obesity and type 2 diabetes

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Objective: To compare weight loss and glucose control in individuals with type 2 diabetes after three types of bariatric surgery: gastric banding (GB), sleeve gastrectomy (SG), and Roux-en-Y gastric bypass (RYGB), with up to 5 years follow-up.
Methods: A retrospective study of all persons with diabetes who are members of the largest health maintenance organization in Israel, who underwent bariatric surgery during the years 2002–2011. HbA1c <6% at follow-up was defined as remission from diabetes. Types of surgery were compared using one-way analysis of variance (ANOVA) and chi-square test, as applicable. Multivariate logistic regression models were applied to study relationships between risk factors and remission.
Results: 2190 individuals were included, 64.8% women. The operations performed were: 1027 GB, 1023 SG and 140 RYGB. Mean BMI+SD at baseline, 1 year postoperative and 5 years postoperative were 43.5+6.18, 36.6+6.06, 36.2+6.45 for GB, 43.6+6.42, 34.3+6.23, 36.5+7.25 for SG and 42.8+5.85, 32.7+5.22, 34.1+4.87 for RYGB. Mean HbA1c+SD at baseline, 1 year postoperative and 5 years postoperative were 7.6+1.58, 6.5+1.22, 6.8+1.48 for GB, 7.7+1.63, 6.4+1.18, 6.7+1.57 for SG and 8.0+1.78, 6.3+0.98, 7.04+1.42 for RYGB. Altogether, at one year follow up, the proportion of patients who achieved remission was 37.4%, and at 5 years, 32.9%. In the multiple regression model, all operation types had the same remission rate at five years. Five-year remission was inversely associated with baseline HbA1c and with treatment with insulin at baseline, and positively associated with BMI.
Conclusions: For all three surgeries, mean BMI and HbA1c decreased considerably during the first year postoperative, and remained lower than the basal values until the end of follow up. Early improvements were greatest for RYGB, though the advantage over the other operations diminished with time.

T8:PO.072

Subclinical hypothyroidism in a population of obese patients

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Introduction: The incidence of subclinical hypothyroidism (SH) varies from 4 to 10% depending upon the gender, age and population studied. Increased levels of TSH are observed in obese patients and previous studies have demonstrated that with increasing TSH there is an increase in BMI.
Objective: SH prevalence and comparison of weight loss among patients with SH and euthyroid patients (ET) in a population of obese undergoing bariatric surgery.
Methods: Retrospective study of patients who underwent bariatric surgery between January 2010 and June 2013. We included patients with preoperative determination of TSH and FT4 and excluded patients with thyroid disease, patients on therapy (levothyroxine or antithyroid synthesis) and those without information on these two factors.
Results: 820 patients were analyzed, 86.7% (n = 711) were female, with mean age of 42.6 (10.7) years, baseline BMI 44.3 (5.6) kg/m^2. Of these, 760 were ET and 44 had SH. The prevalence of SH baseline was 5.4%. The mean baseline TSH was higher in SH (SH 5.24 (1.58) vs ET 1.88 (0.80) µUI/mL; p < 0,001); no difference in the levels of FT4 (SH 1.04 (0.15) vs ET 1.07(0.15) ng/dL; p = 0,176). No differences were found with statistical significance between the ET and SH in initial BMI (ET 44.3 (5.7) vs SH 45.2 (5.8)kg/m^2; p = 0.292), in weight loss (ET 32.3 (15.4) kg vs SH 32.6 (15.2) kg, p = 0,927) and BMI at 12 months (ET 31.9 (5.5) vs 32.7 SH (56) kg/m^2; p = 0,351).
Conclusion: The HS prevalence in this population was similar to that reported in previous studies. In this sample basal, TSH was not a determinant of the decrease in weight after surgery.

T8:PO.073

Nutritional factors affecting weight loss at three months after laparoscopic sleeve gastrectomy

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Background and aim: Laparoscopic sleeve gastrectomy (LSG) is a newer bariatric surgical procedure with promising results and fewer long-term complications. The factors influencing weight loss after LSG are not entirely understood. The aim of this study was to investigate how the preoperative nutritional status of the patients undergoing LSG influence weight loss at three months after surgery.
Material and methods: We included in this study all patients who underwent LSG during 2013–2014 in our center. We calculated body mass index (BMI) before surgery and % excess weight loss (% EWL) at 3 months after surgery. We assessed the following seric markers before, and 3 months after surgery: total proteins, albumin, iron, calcium, magnesium, potasium, vitamin D, PTH, folic acid, C reactive protein.
Results: We evaluated 30 patients (22 women). Average age was 41 ± 11.9 years, and average BMI before surgery was 44.1 ± 8.3 kg/m^2 (min. 34.5 kg/m^2, max. 63.8 kg/m^2). Before surgery, the most common nutritional deficiency was in vitamin D: average value was 14.9 ± 9.4 ng/dl (95%CI: 10.5–19.5 ng/dl), but 36.8% of patients had values of ≤10 ng/dl. % EWL a 3 months after surgery was 45.6 ± 12%. We saw that % EWL correlated positively with the following preoperative seric markers: seric albumin (R=0.868, p = 0.05), kaliemia (R=0.555, p = 0.049), magnesemia (R=0.615, p = 0.048) and vitamin D (R=0.45, p = 0.039) and negatively with age (R=-0.544, p = 0.044), preoperative weight (R=-0.657, p = 0.028), C reactive protein (R=-0.693, p = 0.042) and PTH (R=-0.841, p = 0.034).
Conclusions: Given that older age, greater weight and a poorer preoperative nutritional status hinter weight loss after LSG, we suggest that this procedure should be disscused with patients earlier, to increase its benefits.

T8:PO.074

Genetic polymorphisms and body weight loss in women: One year after roux-en-y gastric bypass surgery

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Introduction: The preva¬lence of obesity is constantly increasing under the influence of genetic, environmental, dietetics and metabolic factors. To treat morbid obesity and obesity co-morbidities, bariatric surgery has configured as the only treatment to achieve loss suitable weight and durable. The aim of this study was to investigate the association of body weight loss with different genetic polymorphisms in women underwent bariatric surgery, one year after the procedure.
Methods: Were included 351 women in the study. Analyzes for the identification of single nucleotide polymorphism (SNP) were performed before the bariatric surgery, using the TaqMan Genotyping Assay (Applied Biosystems®). The polymorphisms analyzed were: GHRL rs26802; GHSR rs572169, rs7799039 LEP, LEPR rs1137101, rs3813929 HTR2C; UCP2 rs659366; rs660339 UCP2, UCP3 rs1800849, rs7498665 SH2B1; TAS rs35874116, TAS rs9701796 and rs9939609. One year after Roux-en-Y gastric bypass surgery, the loss weight was associated with SNP.
Results: After one year of surgery, was observed a body weight loss about 43 (24–83) kg among women, with a percentage of excess weight lost (%EWL) equal 69 (37 – 119) %. Genotypes often less than 10% corresponded to genes GHSR, HTR2C, TAS and TAS. Of the 12 SNPs evaluated 2 show the effect on body weight loss. Volunteers who had TT genotype of GHSR gene had 3.5 times more possibility to be below the median of %EWL compared CC+CT genotype. Volunteers who presented T allele of the FTO gene had 2.2 times more possibility to be below the median of %EWL.
Conclusion: The polymorphisms related with ghrelin receptor (GHSR) and fat mass and obesity (FTO) were associated with body weight loss after one year of Roux-en-Y gastric bypass surgery in women.

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T8:PO.075

SADIS – new method in bariatric/metabolic surgery.

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[4]Surgical dept, University hospital, Trnava University, Trnava, Slovakia SADIS – new method in bariatric/metabolic surgery Holéczy, P., Bužga, M., Keher, I., Bolek, M., Figurová, E. Surgical department, Vitkovice hospital, Ostrava-Vítkovice, Czech republic Department of fysiology and patofysiology, Medical Faculty, Ostrava University, Ostrava, Czech republic Department of surgical disciplines, Medical Faculty, Ostrava University, Ostrava, Czech republic Surgical dept, University hospital, Trnava University, Trnava, Slovakia

Aim: Bariatric surgery has more than 60 years history. There were invented and introduced to surgical practise more than 50 types of operations. The ideal operations ist still seeking. V r. 2010 was first reported a new

alternative to biliopancreatic diversion – duodenal switch - SADIS (single anastomosis duodenoileal with sleeve gastrectomy.
Material and methods: After obtaining agreement from ethical committee we started to perform this operation in our two centers in the frame of prospective study. The indication for surgery was failed sleeve resection and weight regain. Four patiens were operated on from may to september 2014. Two of them were diabetics, two had hypertension, in one dyslipdaemia was under medical treatment.
Results: significant weight loss was recorded in all patients, antidiabetic treatment and antihypertensive drugs was removed and all patiens express satisfaction with the operation. Improvement in glycaemic control was observed, as well. No surgical complication was recorded.
Conclusion: It is impossible to create any firm conclusion from this pilot report. More patiens and longer follow up are necessary to confirm very optimistic report of Torres and co.

T8:PO.076

No evidence of impaired oral hormone substitution after gastric bypass surgery in patients with morbid hypothalamic obesity and hypopituitarism secondary to craniopharyngioma

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Background: Craniopharyngiomas (CP) are benign brain tumors presenting in childhood treated by tumor resection together with radiotherapy. In about half of the cured patients hypothalamic damage leading to eating disorders and obesity as well as to hypopituitarism, necessitating consequent hormone substitution therapy, is observed. Bariatric surgery is an efficient treatment strategy for morbid obesity. However, so far it is unknown, whether oral hormone substitution is hampered by impaired intestinal absorption, leading to severe hypopituitarism or adrenal insufficiency.
Methods: 4 CP-patients with hypopituitarism and morbid obesity treated by gastric bypass surgery were included in this retrospective analysis. Dosage of hormone substitution, hormonal blood concentrations, adverse effects of impaired drug absorption and anthropometric characteristics were investigated pre and 3 to 12 months post operatively.
Results: In all CP-patients (3w/1m; BMIbasal 49 ± 7kg/m^2) gastric bypass resulted in distinct weight loss (-35 ± 27kg). In follow-up examinations mean concentration of fT4 increased (fT4basal 0.9 ± 0.31ng/dl vs fT4FollowUp 1.28 ± 0.29ng/dl). No patient developed any signs of adrenal insufficiency postoperatively. Mean daily dosage of oral thyroid hormone substitution (levothyroxinebasal 156 ± 44µg/d vs levothyroxineFollowUp 150 ± 30µg/d) and hydrocortisone (hydrocortisonebasal 29 ± 12mg/d vs hydrocortisoneFollowUp 26 ± 2mg/d) was unchanged. Mean insulin-like-growth-factor-1 concentration decreased after weight loss (IGF-1basal 217 ± 93ng/ml vs IGF-1FollowUp 111 ± 36ng/ml), whereas daily growth-hormone substitution was slightly increased (somatotropinbasal 0.9 ± 0.5mg/d vs somatotropinFollowUp 1.0 ± 0.4mg/d).
Discussion: Our results in n=4 CP patients suffering from hypopituitarism indicate that oral hormone substitution is not impaired following gastric bypass operation, probably making it a safe and considerable treatment strategy in patients suffering from hypothalamic obesity.

T8:PO.077

The Discrepancy Between Patient Expectations and Achievable Body Weight Loss Ratios in Patients Undergoing Bariatric Surgery

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Background: We had the observation that patients scheduled for bariatric surgery had unrealistically high weight loss expectations, probably due to lack of delivery of proper information by healthcare providers. In this study, we have formally tabulated the expectations of patients from bariatric surgery and compared this information with the reported outcomes of the procedure.
Methods: Patient Expectations from Bariatric Surgery Questionnaire was applied to 42 patients followed at Metabolism Clinic of Cerrahpasa Medical Faculty and were referred to the bariatric surgery clinic. The questionnaire was applied within a week prior to the surgery. Weight loss expectations percentage for each patient was calculated by dividing the expectation stated by a patient to his/her absolute excess weight. Additionally, factors that motivate patients were questioned.
Results: 42 patients (8 male, 34 female, preoperative mean BMI: 48.82 ±8.99kg/m^2) attended to the survey. Laparoscopic sleeve gastrectomy was planned for 40 patients and en-Y gastric baypass was planned for 2 patients. Average weight loss expectation was 97 ±18% (range: 46–141%). There was no significant correlation between body weights or BMIs and weight loss expectations. We have also asked the main motivating factor that lead the patients to seek for bariatric surgery. Most of the patients believed that bariatric surgery would cure their related morbidities completely (diabetes, hypertension etc) by losing their excess weight, as well as having a better physical comfort.
Conclusion: A recent meta-analysis on the follow-up of patients after bariatric surgery has shown that patients lose their 61% of excess body weight by a bariatric surgery procedure. Our study indicated that our patients have developed unrealistic goals and expectations from bariatric surgery procedures. This discrepancy may be a reason for disappointments after the procedures and loss of motivation to follow their post-op Methabolism Clinic visits

T8 – Multidisciplinary treatment

T8:PO.078

Common misconceptions about dieting and nutrition by the obese patients of our diet program.

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We counsel patients who are obese and are suffering from Metabolic Syndrome. Our diet plan does not require the patient to count calories. It is mainly a low-sugar, low-starch, low-saturated fat and low-sodium diet. The patients are encouraged to eat until they are full and they are allowed to eat at any time of the day. The diet is high in lean protein, omega-3 and omega-6 fatty acids, and vegetables with high fiber content. Here is a list of statements from patients that are commonly heard in our clinic: I have to drink milk and eat cheese everyday because I have osteoporosis I cannot eat meat because I have high cholesterol I have to eat sugar because I heard that my brain needs sugar to function I have to eat some sugar and starch because I am a type 2 diabetic I have to eat my rice and bread everyday because it is in my culture I am eating fruits because fruit contain natural sugar I do not drink diet soda because I was told that I can gain weight even if it contains zero calories I do not eat after 7 PMI was told breakfast is the most important meal of the day I was told to eat more often to lose weightI am an emotional eater I have to eat my birthday cake on

my birthday I am on a fat free diet I gain all this weight because I cannot exercise All these misconceptions might hinder the patient's weight loss progression. This presentation will provide an opportunity to discuss the validity of these statements

T8:PO.079

Pharmacological studies on the effects of topiramate on appetite and metabolism

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Introduction: Topiramate is a well-known antiepileptic drug. Recent data show that low doses of Topiramate leads to weight reduction in humans. The objectives of our study were to investigate the influence of Topiramate on metabolism in obese rats, and to investigate its action on the free radicals in plasma. **Materials and methods:** Wistar female rats (n= 16) were randomly assigned to either control diet (chow food) or an experimental high-fat diet to develop an experimental model of obesity. The nutritional period lasted for one month. Then, rats were divided into two groups - control and experimental (obese treated with Topiramate - 50mg/kg p.o.) Topiramate was administered for another two months. Body weight was weekly measured. At the end of the study rats were anaestezised and decapitated. Blood samples, liver, adipose tissue, brain were taken for further measurements. The concentration of free radicals in the plasma was determined by the method of MTT - formazan.
Results: Topiramate significantly decreased the body weight of the obese group compared to the control group ($p < 0.001$). Secondly, Topiramate reduced the plasma levels of free radicals in the experimental group.
Conclusions: Our data suggest that Topiramate has a potent beneficial effect on body weight and metabolism in rats. Moreover, the drug decreases the plasma free radicals which may influence the mechanisms for development of obesity.

T8:PO.080

The national observational study results of effectiveness and safety of obesity medical treatment

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Introduction: Despite the newly emerging drugs safety in the treatment of obesity is the primary goal. In Russia performed observational study on the efficacy and safety of sibutramine for the treatment of obesity.
Methods: At the time of evaluation of results 12093 patients (10048 women and 2045 men) were included in the study, a 6-month course of treatment completed the 10503 patients, 920 patients completed 12 months. Inclusion criteria were the following: age 18–65 years, BMI ≥ 30 kg/m^2 or a BMI ≥ 27 kg/m^2 with type 2 diabetes and/or dyslipidemia. Exclusion criteria were: cardiovascular diseases, uncontrolled hypertension, mental illness, severe liver and chronic kidney disease. All patients received sibutramine 10 or 15 mg once daily.
Results: After the first 6 months and the subsequent 6-month of sibutramine treatment period (median/95% CI) weight loss was –14.25 kg (-14.4; –14.1) / –19.16 kg (-19.8; –18.5), BMI change –5.14 kg/m^2 (-5.2; –5.1) / –6.97 kg/m^2 (-7.2; –6.7), WC –10.5 cm (-10.7; –10.3) / –14.7 cm (-15.5; –13.9); HR 0.26 bpm (0.1; 0.4) / 0.19 bpm (-0.2; 0.6), SBP –1.36 mmHg (-1.5; –1.2) / –0.96 mmHg (-1.5; –0.4), DBP –1.15 mmHg (-1.3; –1.0) / –0.32 mmHg (-0.8; 0.2) ($p < 0.001$). According to the Well-Being Questionnaire (WBQ-12) after 12 months of treatment revealed change of positive well-being, negative well-being, energy and general well-being (mean ± SD): 3.7 (± 4.0), –3.8 (± 3.8), 3.8 (± 3.7), 11.4 (± 10.5) respectively ($p < 0.001$). During the observation period 1.6% of patients were reported adverse events, hypertension and tachycardia amounted for 0.1%. Severe side effects have not been identified.
Conclusion: Long-term therapy of obesity with sibutramine is effective and safe subject to the indications and contraindications for its prescription.

T8:PO.081

Risk of overweight and obesity in adult patients with the genetic disorder sickle cell disease: Are all types created equal?

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Introduction: Historically, patients with the genetic disorder Sickle Cell Disease (SCD) were considered at risk for underweight, malnutrition, and premature death. Thus, little attention was placed on dietary management, exercise, sleep hygiene or stress management as these patients were not considered at risk for overweight and obesity. Our recently published data however, suggests that patients with SCD live longer; with over half of our sample at risk for overweight and obesity1. The current study used baseline data collected via survey methodology, and evaluated the association of SCD subtype with obesity risk.
Methods: Data from N = 242 (46% female) adult (M = 33.37 ± 12.68 years) SCD clinic attendees taking part in an ongoing IRB-approved longitudinal study at a Southeastern United States medical center was examined. A 700-item psychosocial/medical survey was completed, height and weight were measured and BMI calculated (kg/m^2). Subjects were classified according to SCD subtype.
Results: Using ANCOVA with Bonferroni correction for multiple comparisons; we considered SCD type/BMI associations with covariates age, gender and education. We found that BMI was greater (i.e. in the overweight to obese range) among individuals possessing the SB+ and SC subtypes (ps<.001) compared to individuals with SS type whose BMI's were lower and more consistent with traditional conceptualizations of SCD.
Conclusion: Our study suggests that patients with SB+ and SC type SCD must increasingly be concerned with morbidities of lifestyle, like obesity. Interventions should be tailored to disease type. Reference 1. Pells JJ, Presnell, KE, Edwards, CL, Wood M, Harrison, MO, DeCastro, L, Johnson S, Feliu M, Canada S, Jonassaint JC, Barker C, Leach-Beale B, Mathis MJ, Applegate K, Holmes A, Byrd G, Robinson E. Moderate Chronic Pain, Weight and Dietary Intake in African-American Adult Patients with Sickle Cell Disease. Journal of the National Medical Association.2005;97(12): 1622-1629

T8:PO.082

Impact of multidisciplinary preparation to bariatric surgery on health behaviors

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Introduction: International guidelines emphasize the need for multidisciplinary preparation before bariatric surgery to improve safety and effectiveness, but its impact has been little studied. Our aim was to explore the impact of this preparation on dietary habits, physical activity, weight loss and quality of life before surgery.
Methods: We prospectively recorded in 78 candidates for bariatric surgery (age:43 ± 12 yr; M/F:15/63; weight:122 ± 17 kg; IMC:44 ± 5 kg/m^2), anthropometric parameters, food intake, physical activity (Beacke questionnaire) and quality of life (SF36) at the beginning and the end of the preoperative preparation (7 ± 2 months).

Results: Reported caloric intake decreased from 2143 ± 640 to 1906 ± 564 kcal/24h ($p < 0.001$) during the preparation and snacking from 68 to 13% of the subjects. Physical activity increased ($p < 0.05$) and quality of life improved ($p < 0.01$), but mean weight change was zero (±5 kg). The mean number of preoperative consultations proposed (with nutritionist, dietician, psychologist and sports coach) was 7 ± 2 and was as greater as patients gained weight during the preparation ($R = 0.2992$, $p < 0.01$). However, the number of consultations was positively correlated with the decrease of reported caloric intake ($R = 0.2885$, $p < 0.05$). Furthermore, weight loss before surgery was positively related to postsurgical weight loss (recorded at 6 ± 1 months in 59 subjects), whereas preoperative dietary changes were not.
Conclusion: Despite increase of dietary knowledge (reflected by improved diet report) during preoperative preparation, candidates for bariatric surgery have difficulty to actually change their eating behavior (reflected by weight change) before surgery. However, only weight change seems to impact the success of bariatric surgery.

T8:PO.083

Overweight and obesity in sickle cell disease: Primary disease management, psychosocial considerations, and health promotion.

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Background: Sickle Cell Disease (SCD) is a genetic disease that influences hemodynamics in such a way that red blood cells exhibit diminished capability to effectively transport oxygen and carbon dioxide to and from the lungs and the tissues of the body. The disease affects primarily non-white populations. It is the most common genetic blood disorder in the US and one of the most common worldwide. Medical and psychosocial consequences of SCD are often devastating. Medical comorbidities include small vessel occlusions in major organs, increased incidence of stroke; frequent, unpredictable, intense and debilitating pain and premature death. Psychosocial consequences include disturbed mood, body image and reduced quality of life. In recent years, advancements in hematological treatments have improved prognosis for some patients affected by SCD with improved life-expectancy as a result. Consequently, there has been an increase in chronic, lifestyle-related diseases that typically, disproportionately affect African American men and women such as hypertension, diabetes, and obesity. We will provide a comprehensive overview of the existing (albeit limited) research on the etiology, consequences and treatment of SCD and its comorbid medical and psychosocial correlates within a biopsychosocial framework paying particular attention to healthy lifestyles and lifestyle-related disease states. Our overarching theme will be centered on a framework for comprehensively and holistically treating the patient within a Behavioral Medicine paradigm to improve overall health and lifestyle-related factors; particularly as they relate to overweight, obesity and related comorbidities. Areas of research covered will include: 1) Sickle Cell Disease: History, prevalence, etiology, treatment; pain management (behavioral & pharmacological); psychosocial correlates: Psychopathology, social support, and body Image; and the role of nutrition, physical activity and weight management.

T8:PO.084

Two years obesity intervention program in children and adolescents: The importance of age at enrollment

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Aim: To evaluate pre-post changes following a two-year outpatient hospital based intervention program with monthly sessions for childhood obesity.
Methods: Data on body mass index (BMI) during intervention, two years prior start and two years after treatment termination, was collected from 34 children and adolescents with obesity (age range 5.5 – 15.1 years, 17 girls). Paired t-tests and multivariate linear regression models were used for analysis. Blood samples were taken at start an end of treatment.
Results: In children under 12 years of age (n=18), a significant reduction of BMI SDS was observed (-0.35, $p = 0.003$) with a non-significant increase in BMI SDS (0.23, $p = 0.061$) in children over 12 years (n=16). Two years after end of intervention, 55% of the children (n=29) showed stabilization or further reduction (>-0.25) in BMI SDS while increase of 0.25 BMI SDS or more occurred in 45%. Significant reduction was found in blood lipids.
Conclusion: The intervention was found beneficial in younger children, underlining the importance of early intervention. However, post-treatment increase in BMI SDS of more than 0.25 SDS in almost half of the treated children indicates a need for longer follow-up or treatment content that better enhance long term maintenance of positive lifestyle changes.

T8:PO.085

The effect of long-term interdisciplinary therapy on bone metabolism and adipokines in obese adults

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Introduction: Obesity has been associated with increased bone mineral density (BMD). However, it is suggested that pro-inflammatory adipokines from adipose tissue can increase resorption activity and decrease bone formation and that anti-inflammatory adipokines can increase bone mass. This study aimed to assess the effects of long-term Interdisciplinary Therapy (IT) on pro- and anti-inflammatory adipokines and bone metabolism in obese adults and to check the role of bone metabolism in adipokines of this population.
Methods: Nineteen adult obese women were submitted to a 32 week IT. The IT consisted of intervention with physical exercise, physiotherapy and nutritional and psychological support. The body composition, total BMD, total bone mineral content (BMC), TNF-α and IL-6 (pro-inflammatory adipokines) and adiponectin (anti-inflammatory adipokine) blood concentration were evaluated before and after the therapy. The paired Student t-test and Wilcoxon test were used to assess the data. Also, the correlation between delta variations (Δ) was performed by using the Pearson correlation coefficients.

Results: The IT promoted a significant reduction in body mass (-4,96kg), body mass index (BMI) (-1,87kg/m$_x$), fat mass (-3,45kg), percentage of fat mass (-1,60%), IL-6 (-1,54ng/ml), TNF-α (-1,41ng/ml) and a increase in total BMC (78,1g) all with $p < 0,05$. The total ΔBMC was correlated with the other Δ variables and a positive association was found with Free Fat Mass ($p = 0,003$) and a negative correlation was observed with Fat mass ($p = 0,009$) and IL-6 ($p = 0,022$).
Conclusion: IT promoted an improvement in body composition, total BMC and pro-inflammatory adipokines. Moreover, the increase of BMC was associated with a reduction in IL-6 blood concentration.

T8:PO.086

Changes in body mass index (BMI) standard deviation score (sds) during one-year outpatient obesity intervention program in children and adolescents

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Introduction: Efficient treatment-strategies are needed for overweight and obese children. The aim of the present study was to evaluate an obesity intervention program for severe childhood obesity in Bergen, Norway. One-year changes in BMI SDS were analyzed.
Methods: Ninety-three obese children and adolescents (35 boys) with a mean age of 11.8 years (range 5.5–17.9) and mean (SD) BMI SDS 3.07 (0.49) were included, completing one year of the intervention. The treatment was an interdisciplinary family-based lifestyle intervention for children with severe obesity, combining both a hospital outpatient clinic and the primary health care. The treatment targeted diet, physical activity and sedentary behaviour. The participants were scheduled to undergo physical examinations every six months by a paediatrician at hospital and monthly weighing sessions by a nurse in the primary health care. BMI was standardized using Norwegian growth charts.
Results: Mean (SD) BMI SDS was unchanged in the group as a whole, with a baseline value of 3.07 (0.49) and 3.07 (0.63) after one year of treatment ($p = 0.830$). A significant reduction in mean BMI SDS was however seen in boys (-0.13, $p = 0.001$) and for children below 12 years of age (-0.12, $p = 0.003$). For children entering the intervention at age 12 years and older, the mean BMI SDS was in contrast significantly increased (+0.09, $p = 0.023$). A multiple linear regression analysis showed that changes in BMI SDS were significantly dependent on both gender ($p < 0.001$) and age ($p < 0.001$).
Conclusion: Better response in the prepubertal age range underlines the importance of early interventions. Further studies are needed to find good treatment solutions for the adolescents.

T8:PO.087

Changes in food intake, energy expenditure and body composition after a long-term interdisciplinary therapy in obese adults

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Introduction: Obesity is a chronic disease, strongly associated with an energy imbalance. This imbalance is due to excessive intake of food coupled with physical inactivity. The prevention and treatment of obesity is a major challenge worldwide. Interdisciplinary weight loss therapy has emerged as an alternative to prevent and treat obesity by promoting a lifestyle modification.
Methods: The population considered on the study was comprised of 25 obese participants aged 41.5 ± 5.6 years. The participants were submitted to an interdisciplinary therapy involving diet, exercise and psychological support during the course of one year. The food intake was estimated by three-day dietary record. The dual-energy x-ray absorptiometry was performed to determine body fat and fat-free mass. The resting energy expenditure was measure through indirect calorimetry. All measures were performed at baseline and after the therapy.
Results: Changes in food intake were significantly observed after therapy. Energy intake was reduced 21.4%, carbohydrate intake was reduced 25.3%, fat intake was reduced 26.2%, and sodium intake was reduced 34%. The therapy was effective in reducing body weight (6.5%, $p < 0.001$), BMI (6.5%, $p < 0.001$), body fat (6.0%, $p < 0.001$), waist circumference (5.8%, $p < 0.001$), and hip circumference (4.6%, $p < 0.001$).
Conclusion: Long-term interdisciplinary therapy was effective to change food intake, body composition and to reduce weight loss. In this way, the interdisciplinary approach is a good strategy to prevent and treat obesity and its associated comorbidities.

T8:PO.088

Clinical Effectiveness of the Intensive Weight Management Programme

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Introduction: Evidence suggests that lifestyle modifications including diet and physical activity (PA) play a key role in the management and prevention of obesity. We aimed to assess the effectiveness of the Intensive Weight Management Programme (IWMP) in middle-aged obese adults.
Methods: IWMP is a prospective intervention conducted in the obesity clinic from 2009–2013. It consisted of 3 phases, each lasting 8 weeks: 1. weight loss, 2. weight stabilisation and 3. weight maintenance. In each phase, patients were required to adhere to a prescribed dietary regime and record food intake and PA. This „before and after analysis" is geared to assess the clinical effectiveness of the IWMP. Primary outcome was weight change between the baseline and the end of the programme. Secondary outcomes included changes in blood pressure (BP) and other cardio-metabolic variables. Changes in the outcomes were analysed by age, sex, smoking status, employment and occupation.

Results: Data were available for 141 patients. Mean (SD) weight change was –20.5 (9.8) kg. 86% of the patients lost the expected 5% of their baseline weight by the end of the intervention. Patients reporting non-sedentary occupations experienced significantly greater mean (SD) weight loss than their sedentary counterparts, 16.9 (7.9)% vs. 12.7 (6.4)%, p = 0.030. Changes in weight did not substantially vary by other socio-demographic factors studied. Median (IQR) change in systolic and diastolic BP was –5 (-16,10) mmHg and 0 (-10,6) mmHg, respectively. However, the differences in blood pressure changes by socio-demographic factors were not statistically appreciable.
Conclusion: IWMP was associated with substantial body weight reduction consistently across the strata of age, sex, smoking and employment and modest reduction in BP.

T8:PO.089

Interdisciplinary therapy effects on anthropometrics, VO2max and quality of life in obese adult women.

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Introduction: Obesity is cited as an aggravating factor of physical functioning, such as general health perception and vitality as well as psychological functioning and social well-being. It was associated with poor body image, depression, stigmatisation, discrimination, diminished social interactions, and lower socioeconomic status, affecting the quality of life.
Methods: 22 adult obese women were enrolled at presential therapy consisted of physical exercise sessions three times a week and nutritional, psychological and physiotherapy intervention once a week at the Federal University of São Paulo – Brazil.. Maximal oxygen uptake (Fitmate®), body composition (Lunar Prodigy DEXA) and quality of life (WHOQOL-brief) were recorded before and after 32 weeks of intervention.
Results: Showed in figure 1
Conclusion: These findings showed an important increase in all domains of Quality of Life promoted by interdisciplinary therapy. An improvement in VO2max and decreased in fat mass are a potential triggers that corroborate these improvements.

	Baseline	Final	ρ
Body Mass (kg)	93.2±12.1	87.4±12.0*	0.001
BMI	33.7±2.6	31.5±2.5*	0.001
Waist Circumference (m)	105.7±8.3	99.7±7.8*	0.001
Hip Circumference (m)	117.9±7.0	112.7±7.1*	0.001
Neck Circumference (m)	37.9±3.9	37.6±3.8	0.253
VO2máx (L/min)	2.0±0.4	2.3±0.4*	0.001
Total Tissue Mass (kg)	87.5±10.8	83.0±10.8*	0.001
Fat Tissue Mass (kg)	40.5±6.7	36.0±7.7*	0.001
Lean Tissue Mass (kg)	46.9±8.9	46.9±9.0	0.853
Quality of Life (QoL)	9.6±2.5	14.7±1.7*	0.001
Physical Domain (QoL)	12.8±2.0	14.4±3.8*	0.018
Psichology Domain (QoL)	11.8±2.9	14.2±2.1*	0,001
Social Relationship (QoL)	11.3±3.5	12.4±5.0*	0.042
Enviroment Domain (QoL)	12.3±2.6	13.7±2.4*	0.029

Fig. 1. Anthropometrics, VO2max and Quality of Life after Interdisciplinary Therapy

T8:PO.090

The influence of a 6 month intervention on self-perceived fatigue, body composition and handgrip performance in obese boys.

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Introduction: The main goals of obesity intervention programs are decreasing body weight, fat mass and increasing lean mass. It is generally accepted that fat mass decreases with weight loss, but results on lean mass are inconsistent. The relation between weight-loss induced changes in body composition and fatigue sensations in obese adolescents remain unexplored. This study examined the effect of a 6 months weight loss program on self-perceived fatigue, grip performance and body composition.
Methods: 81 obese boys (15 ± 2 years) were examined for body composition (DXA), maximal grip strength, fatigue resistance (the time during which grip strength decreased to 50% of its maximum value during sustained maximal contraction), grip work (calculated as fatigue resistance x 0.75 x maximal grip strength, corresponding to the area under the curve) and self-perceived fatigue (Multidimensional Fatigue Inventory, MFI-20). The boys were divided into 2 groups; a high weight loss group (HWL, >20% body weight) and a low weight loss group (LWL, <20% body weight).
Results: At baseline HWL and LWL showed similar weight, BMI and grip parameters. HWL improved significantly for all grip and self-perceived fatigue parameters whereas LWL improved only for fatigue resistance and grip parameters corrected for body weight. Both LWL and HWL lost significant fat mass, but the HWL also lost significant lean mass and significantly more fat mass compared to LWL.
Conclusion: After a 6 month multidimensional weight loss program, HWL showed significantly improvements in self-perceived fatigue and grip performance despite the fact that they also lost more lean mass.

T8:PO.091

Obesity and outcome in the icu

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Introduction: The prevalence of obesity in the critically ill seems to correlate with the rise in obesity in the general population Overweight patients seem to have a poorer outcome and a higher risk of complications such as increased ICU length of stay, and increased ventilation requirements during their Intensive Unit Care (ICU) stay.
Objectives: A prospective observational study was carried out to evaluate the relationship between Body Mass Index (BMI), ICU lenght of stay (ICU-LOS), duration of mechanical ventilation and mortality among these patients. Patients with Metabolic Syndrome were excluded from the study.
Methods: A prospective observational study in a 24 bed General ICU. All medical, surgical and trauma patients that were hospitalized in the ICU over a period of two years were included in the study. Based on their BMI values, the patients were divided into 3 groups. Group A: BMI between 18.5 and 24.9 (n=571); Group B: BMI between 25 and 39.9 (n=123); Group C: BMI >40 (n=54). Demographic data was obtained for all patients. APACHE and SOFA scores were calculated upon admission.
Results: 748 patients were included in the study. These patients had a SOFA score between 8 and 15. Significant differences were observed between groups A and C: in ICU length of stay ($p < 0.01$), duration of mechanical ventilation ($p < 0.01$) and ICU mortality ($p < 0.01$). Moreover, we found no statistically significant differences in terms of mortality between groups A and B (17.35% vs 18.87%).
Conclusions: In our study a BMI >40 was significantly associated with an increase in mortality in ICU patients

T8:PO.092

Positive preliminary evaluation of the results in a newly established childhood obesity clinic including children who drop out of follow-up

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Introduction: In 2011 a small multidiciplinary team was formed at Landspitali University hospital to treat obese children by improving their life style (the Health School, 6 specialities, less than 2 positions in total). It has reached 10% of all obese children in Iceland in 4 years. As in other obesity treatments, a high proportion of families do not return to scheduled visits. The aim of this study was to investigate the reasons for drop-out and estimate the effect of the treatment on body weight.
Methods: The children were treated individually or in groups, based on cognitive behavioural family treatment. All children seen at the Health School from 1.1.2011 to 15.3.2013 were included in this study. Parents were contacted by phone and invited to a visit, with the child. Weight, height and waist circumference were measured, and the parents asked to answer a survey with questions about motivation, achievement and lifestyle.
Results: 173 children were included. Last contact with the Health School was over a year ago in 66%,, median follow-up time was 27 months. In total 88% (n=153) were reached and measurements were obtained from 51% (n=89). Reduction in BMI Standard Deviation Score (BMI-SDS) was seen in 66% (n=59). The overall decrease in BMI-SDS was –0.24 (responders only –0.59). The questionnaire was answered by 76% (n=132). The most frequent reasons for drop-out were not knowing of the follow-up (31%) and lack of interest (23%).The majority (94%) was satisfied with the service offered and would recommend the Health School.
Conclusion: A small dedicated team can have a lasting effect on obese children and even a large portion of children who drop out of treatment lose weight in the long term. The main reasons for not continuing treatment are lack of motivation and time.

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T8:PO.093

Family-based behavioral treatment of obesity - the fabo-study

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Introduction: The purpose of the FABO study is to evaluate the effect of family-based behavioral weight loss treatment (FBBT) compared with the effect of today's standard treatment given to children and adolescents suffering from obesity at the Obesity Outpatient Clinic (OOC), Haukeland University Hospital. FBBT has been demonstrated to be the most effective treatment option for youth with obesity. Such treatment has not previously been incorporated into an obesity clinic in Norway.
Methods: The FABO study is a randomized controlled trial, in which families (N=120) will be recruited among children and adolescents between ages 8–16 years referred to the OCC by their general practitioner. Criteria for admission to the clinic are an (IOTF) isoBMI of ≥ 35, or isoBMI ≥ 30 with obesity related co-morbidity. Families are randomized to receive FABO treatment immediately or following standard treatment (wait-list control condition). The FABO treatment consists of 17 weekly manualized sessions with subsequent follow-up every three month for two years. Outcome variables include the following: Anthropometry: BMI, waist-circumference and body composition (measured with BIO-impedance and DXA scan). Physiological measures: blood samples, blood pressure. Activity level/inactivity and sleep pattern (measured with accelerometer). Psychological measures: Questionnaires (DEBQ, YEDE-Q, CBCL, CDI, SPPC) and food records (4-day diet record).
Results: Details of the FABO treatment and study will be presented along with the preliminary analysis.
Conclusion: This is the first systematic application of FBBT in the treatment of obesity among youth in Norway. The preliminary response to treatment is promising and indicates that FBBT is likely to become a part of a stepped-care treatment.

T8:PO.094

Influences of gastric bypass surgery on their own, partners' and children's weight and physical activity

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Roux-en-Y gastric bypass (RYGB) surgery results in great weight loss in most women, but less is known about the influences on their own, partners' and children's physical activity, and influences on children's and partners BMI. Research questions: (i) Are obese women, treated by RYGB gastric bypass, who lose a large amount of weight, more physically active 9 months after surgery? (ii) Are the children and partners of obese women treated by RYGB, with great weight loss after RYGB, more physically active 9 months after surgery? Are children and partners of obese women, with great weight loss after RYGB, affected in terms of BMI?
Methods: RYGB was conducted in 5 specialized clinics. Height, weight and physical activity (PA) were measured objectively 3 months before and 9 months after RYGB. PA was measured by tri-axial Actigraph GT3X+ accelerometers during 1 week. PA was categorized by time spent in moderate or vigorous PA (MVPA), low PA (LPA), and sedentary behavior (SB). Approximately 60 women, 35 spouses, and 75 children (7–14 years of age) were included in most analyses. Linear regression models for repeated measurements were used to evaluate changes in own, partners' and children's BMI and PA, between the two time points.
Results: The women lost on average 11.7 BMI units (33.2 kg) between the two data collection time points. Their partners lost on average 0.9 BMI units (2.5 kg) over the 9 months period. Among the children the prevalence of overweight and obesity went from 57.0% to 48.6%, reflecting a relative risk of 0.85 (95% CI 0.73; 1.00, p = 0.048). For obesity only, the prevalence went from 18.2% to 15.9%, giving a relative risk of 0.87 (95% CI 0.62; 1.24, p = 0.447). We found no significant differences in MVPA, MVPA, LPA or SB from 3 months before to nine months after surgery in women, despite substantial weight loss. 44% of partners and 39% of children decreased time spent on MVPA, and increased time spent in SB, between pre- and post-surgery.

T8:PO.095

Phentermine/topiramate/ephedrine with coffee shows to weight management in obesity for 4 weeks, especially those with high VAT and hyperglycemia

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Although caffeine/ephedrine (thermogenic) and Qsymia (anorectic) were approved, they are not available in Korea. It is crucial for anti-obesity medication that thermogenic as well as appetite suppression would be included. Therefore we investigated the effect of weight loss using by phentermine/topiramate/ephedrine over a cup of coffee in obesity. In addition which fatness markers; metabolic variables further would be assessed to relate with its outcome. 50 obese subjects (female: 76%, 29.79 kg/m^2) were investigated to study the clinical efficacy of phentermine7.5mg/topiramate50mg/ephedrine20mg with a sip of coffee for weight management for 4 weeks. All of them were examined their energy intake, and given behavioral counseling. Weight, height, body fat (bioelectric impedance (BIA)), and visceral adipose tissue (VAT) were measured at initial visit. Fasting plasma glucose (FPG), insulin, free fatty acid, lipid profiles were obtained. The regimens were taken once a day, and body fat was assessed through BIA at 4 week visit. Pearson coefficient, paired t-tests and ANOVA analysis were performed. FPG, visceral adipose tissue showed the significant association with medication after adjusted for age. Therefore the weight, body fat were compared according to 4 groups based on FPG, VAT. All subjects lost 6.83 kg**, 1.82% for 4 weeks respectively. While the weight loss showed best in high VAT/FPG group, fat loss did in low VAT/FPG group. (*: P < 0.05, **: P < 0.01) In conclusion, phentermine/topiramate/ephedrine with coffee demonstrates to promote the significant weight loss, especially tends to show weight loss in obese subjects with high VAT and hyperglycemia for 4 weeks. Well controlled clinical trial would be considered in the future.

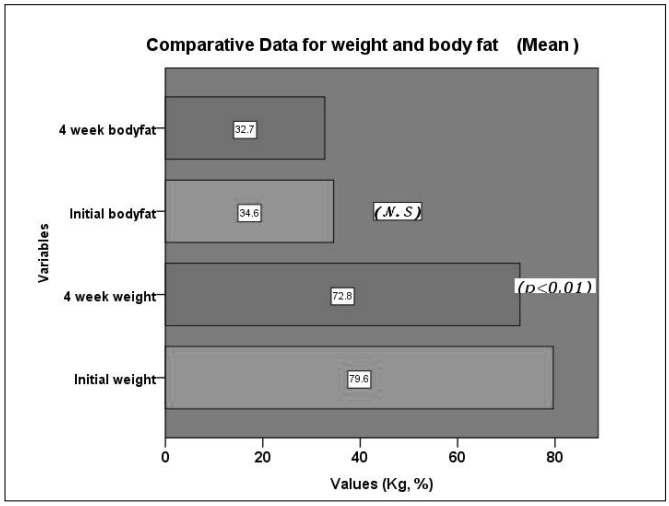

Fig. 1. Comparison of change of weight and body fat for 4 weeks

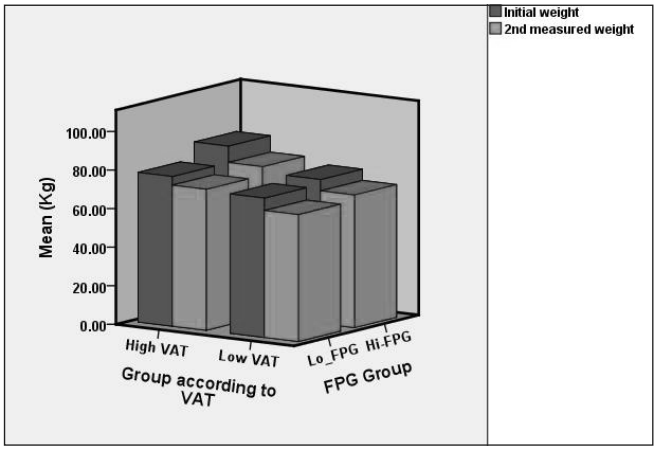

Fig. 2. The change of weight according to fasting plasma glucose and visceral adipose tissue

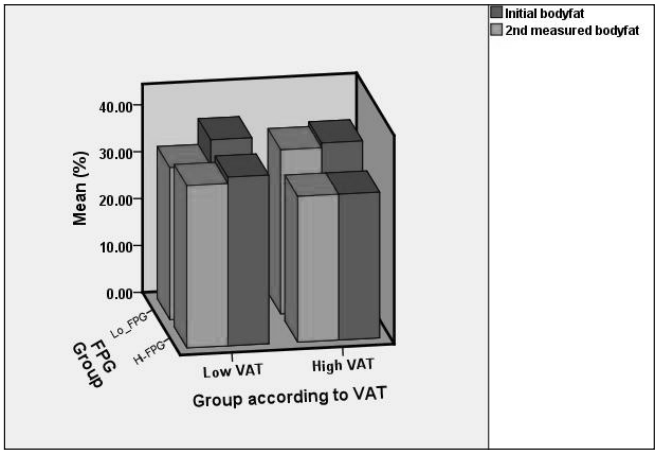

Fig. 3. The change of body fat according to fasting plasma glucose and visceral adipose tissue

T8:PO.096

Clinical efficacy of weight and body fat using by hutermin (phentermine)/topiramate/aperin to Korean overweight subjects for 4 weeks

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In order to explore the effect of weight loss by combined medication of Qsymia and Retigen, we investigated the effect of weight and body fat using by hutermin 15mg (phentermine; Huons, Korea), aperin (Huons, Korea; ephedrine 25 mg, caffeine 25 mg, acetaminophen 200 mg) and topiramate 50mg for 4 weeks. 46 subjects (female 87%, BMI 28.3 kg/m^2) were enrolled to study the clinical efficacy of weight loss using by hutermin/topiramate/aperin. Weight, height, and body fat (bioelectric impedance (BIA), DXA, CT) were measured at initial visit. In addition, body fat and weight were assessed through BIA at 4 week visit. Pearson coefficient, pair t-test were performed for statistics. The probability less than 0.05 was considered as significant at two sided. As visceral (VAT) and subcutaneous adipose tissues (SAT) were significantly related with medication use, weight and body fat were compared for 4 weeks according to 4 groups based on adipose tissue. 5.35 kg** (71.67 +/- 1.92 to 66.32 +/- 1.7), 2.69%* (33.47 +/- 1.07 to 33.47 +/- 1.07) were decreased in all of participants for 4 weeks (*: P < 0.05, **: P < 0.01) Among 4 groups, weight change in high VAT/SAT group was highest; in contrast the change of body fat in

low VAT/SAT group was, Noted were minor adverse events such as hot flushing, palpitation, and insomnia. In conclusion, hutermin/topiramate/aperin showed the significant reduction in weight and fat for overweight subjects for 4 weeks. Interestingly, body fat decreased most in lower SAT/VAT group. It implies that hutermin/topiramate/aperin may affect SAT as well as VAT. Further controlled cohort trial would be needed to explore the relationship between adipose tissue and the regimen in the future.

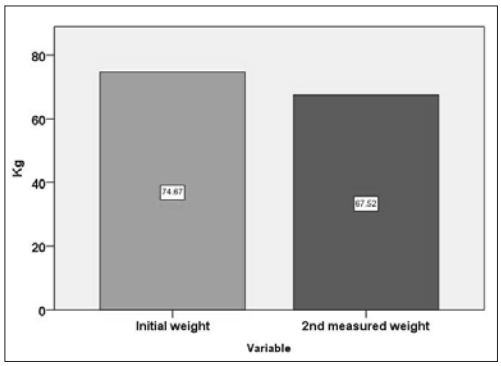

Fig. 1. Comparison of weight for 4 weeks

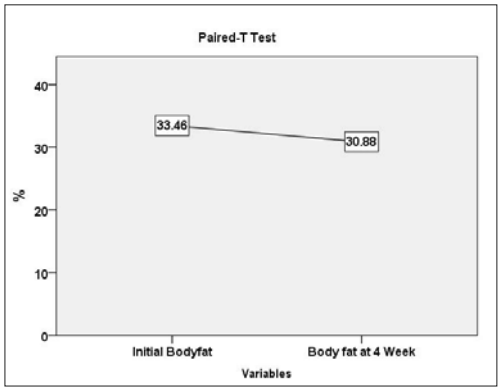

Fig. 2. Comparison of body fat for 4 weeks

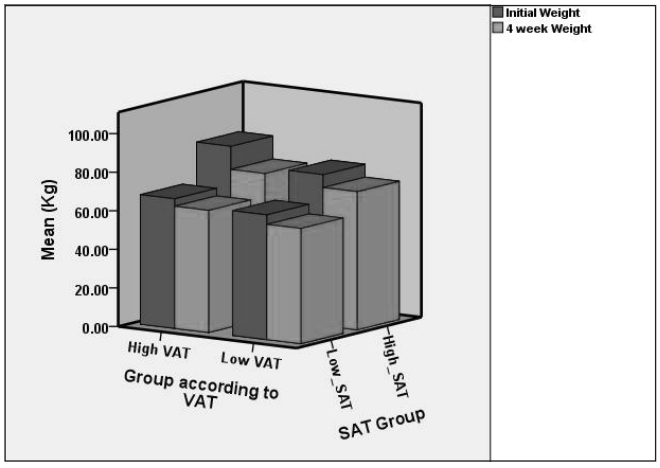

Fig. 3. Comparison of weight change for 4 weeks between groups based on adipose tissues

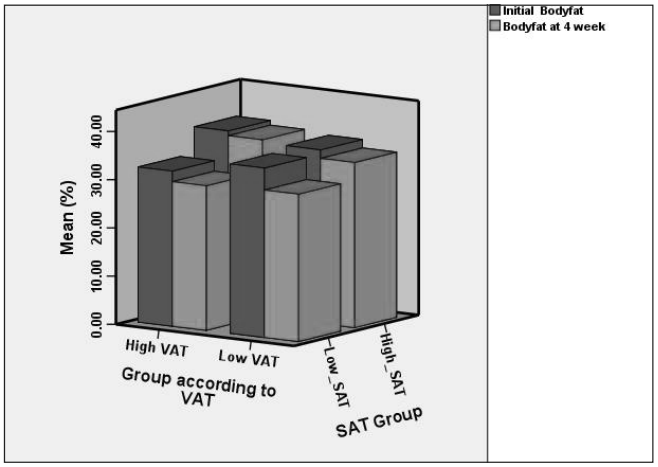

Fig. 4. Comparison of body fat change for 4 weeks between groups based on adipose tissues

T8:PO.097

Should the dosage of phentermine is adjusted for lower BMI patients?

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Introduction: Phentermine is recommended for subjects whose BMI are 30kg/m^2 or greater and 27kg/m^2 or greater having weight-related comorbidity. But in South Korea, the cutoff point of BMI for obesity is lower than that in Western countries, so in many cases, phentermine is being prescribed for the patients who have lower BMI than the recommendation. The aim of this study is to know whether to adjust the dosage of phentermine considering the lower BMI state.

Methods: The pateints who participated in the treatment were divided into the two groups, BMI 25kg/m^2 or greater(high BMI group: n=37) and less than 25kg/m^2(low BMI group: n=39). They all received phentermine-HCl 37.5mg per day with life style modification for 4weeks. They were checked BMI, body weight, body fat weight before and at the end of the treatment. And to check the adverse reactions, at every visit, twice a week, they were asked about the discomfort with the medication. Result: The mean of weight loss was 3.79 ± 1.72kg(5.0 ± 2.0% of initial weight) in hight BMI group and 3.36 ± 1.85kg(5.37 ± 2.9% of initial weight) in low BMI group. There were no significant differences in the change of body weight, BMI, body fat and the incidence of adverse reactions between both groups.

Conclusion: Phentermine was well tolerated and made the favorable results in weight control for lower BMI patients like for obese patients. It is considered that it doesn't need to adjust the dosage of the agent even for the lower BMI patients.

T8:PO.098

Early phase of metformin action in dietary-obese mice: Lack of involvement of amp-activated protein kinase and possible interaction with n-3 fatty acids

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Introduction: We have shown previously that n-3 fatty acids (omega-3) prevent both hepatic steatosis and insulin resistance in obese mice depending on AMPK. Metformin lowers glycaemia presumably via suppression of mitochondrial complex I activity leading to AMPK activation; however, AMPK-independent effects were also observed. We investigated whether pretreatment with omega-3 could enhance acute metformin action, and whether AMPK is involved.
Methods: Adult C57Bl/6 mice were fed a high-fat diet (HFD) for 6 weeks, and then either HFD or HFD with 15% lipids replaced by omega-3 (HFD-F) for 2 weeks. At the end, mice were given metformin (400 mg/kg) or saline and then underwent oral glucose tolerance test (OGTT) or were killed to collect liver samples. Similiar experiment with a lower dose of metformin (60 mg/kg) was performed with mice lacking α2 AMPK subunit (AMPKα2-KO).
Results: During OGTT, metformin, but not saline, lowered glycaemia as well as an area under the glycaemic curve (AUC). In saline-treated mice, AUC was lower in HFD-F fed group ($p < 0,05$). Omega-3 also tended to augment effect of metformin, but the difference was not statistically significant. We observed no change in AMPK activity in liver, and no difference between control and AMPKα2-KO mice in response to omega-3 or metformin during OGTT.
Conclusions: The absence of changes in AMPK activity in liver as well as no difference in response of AMPKα2-KO mice collectively suggest that AMPK is not essential for the acute hypoglycaemic effect of metformin. Moreover, there was a trend for an additive effect of omega-3 and metformin on glucose metabolism, which deserves further characterization.

T8:PO.099

Characteristics of anti-obesity medication prescribers prior to the approval of new pharmacotherapy in the US

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Introduction: A survey of obesity medicine specialists was conducted before the recent approval of several new anti-obesity medications (AOMs) in 2012 and 2014. A subset of physicians reported that they "frequently" prescribed phentermine (P) for weight loss. The aim of this analysis is to characterize the prescribing practices of these physicians, as they may be the most comfortable in prescribing new AOMs for their patients as they become available.
Methods: An Internet survey was sent to obesity medicine physicians inquiring about their practice and prescribing habits.
Results: 307 respondents reported frequently prescribing P to treat obesity. They treated 1235 ± 2212 patients per year per physician, compared to 339 ± 472 patients for doctors who rarely prescribe P (n=18). 40% of these doctors practice only obesity medicine. Less than 5% were in a surgical setting and over 75% were in private practice. 13% prescribe P for 12 weeks or less, while 53% prescribe P long term for chronic disease management. . Only 30% require patients to take drug holidays. 47% are located in the southern US. Liraglutide was prescribed by 9% of these physicians; bupropion: 35%; naltrexone: 5%; topiramate: 36%; orlistat: 14%; exenatide: 14%; metformin: 38%; diethylpropion: 51%: phendimetrazine: 50%; zonisamide: 4%. With regard to combination therapy, 32% were prescribing phentermine/topiramate; 44% prescribe phentermine + metformin and5% prescribed bupropion/naltrexone. The most common nutrition strategy was a low carbohydrate diet.
Conclusion: Physicians who frequently prescribe P treat a large number of patients for obesity. In 2012, these physicians had limited options in medications and prescribed some medications off-label to help in obesity treatment. Recommended next steps will be to assess changes in AOM prescribing that may occur with the recent US approval of many of the prescription strategies already described in this study.

T8 – Medico-Surgical approaches

T8:PO.100

The impact of roux-en-y gastric bypass on neuroendocrine regulation of energy balance and their possible implications on appetite/satiety

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Introduction: The body weight varies depending on the prevailing direction of environmental pressures, however; physiological factors could intervene in the control of body weight. The aim of the present study was assess the impact of Roux-en-Y gastric bypass (RYGB) on hormones and peptides involved in the control of energy balance and their possible implications on appetite/satiety.
Methods: The sample was composed of 41 extremely obese (39 women and two men) who underwent Roux-en-Y gastric bypass (RYGB). Anthropometric and biochemical markers were collected prior to surgery and 6 months post-RYGB.
Results: The BMI decreased from 44.62 ± 6.32 kg/ m^2 to 31.66 ± 5.66 kg/m^2 ($p < 0.001$) at the 6th month. Percentage of excess weight lost was 63.50 ± 24.99%. Levels of the glucose decreased significantly 6 months after gastric bypass ($p < 0.001$). Also, at the 6th month after the surgery, the PYY values were significantly higher than the baseline period ($p < 0.001$). The multiple linear regression analysis revealed that α-MSH levels and BMI were together dependents predictors of changes in PYY concentrations.
Conclusions: The RYGB surgery seems to be relate to neural mechanisms, which possibly by an adaptive response are involved in mediating post-surgery changes in PYY secretion. This finding could explain the good results of surgery in mediate the control of energy intake, modulates feeding behavior and contribute to improvements in glycemic and the appetite/satiety control.

Acknowledgement: FAPESP (2013/04136-4; 2013/19046-0; 002804928-41), CNPq (150177/2014-3; 300654/2013-8) and CAPES.

T8 – Ethics and guidelines

T8:PO.101

Bariatric surgery in adolsecents: Is there a consensus in treatment algorithms

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Introduction: Childhood obesity shows increasing prevalence becoming serious health, social and economic problem. There´s variation in obesity prevalence among different age and sex groups, and geographical regions. It is widely accepted that bariatric surgery is the most effective treatment for morbidly obese adults, reducing mortality, improving/resolving co-morbidities, decreasing health-care utilization and costs, however there´s a lack of robust data about the role of bariatric surgery and standardized approach in surgery for obesity in adolescents.
Methods: Review of the most frequently adopted algorithms for surgical treatment of obese adolescents was carried out and generally accepted common grounds as well as the most frequent differences are highlighted.
Results: The commonly accepted criteria for childhood bariatric treatment are: BMI > 40 (99.5th percentile for the respective age) and at least one co-morbidity; BMI > 50 with less serious comorbidities; Failure of nonsurgical treatments with at least 6–12 months of weight-reducing attempts in a specialized center; Patient shows skeletal and developmental maturity / attains 95% of adult height based on estimates from bone age. Is able to commit a comprehensive medical and psychological evaluation before and after surgery. Is willing to participate in a postoperative multidisciplinary treatment program;
Conclusion: More evidence and algorithm for bariatric surgery in adolescents is needed to evaluate outcomes, including influence on physical growth and QoL, international registry and definition of specialized childhood MDT centers is necessary.

T8 – Emerging treatments

T8:PO.102

Low-level laser therapy (lllt) associate with aerobic plus resistance training to improve inflammatory biomarkers in obese adults.

Campos R.S.[1], *Dâmaso A.R.*[1], *Masquio D.C.*[1], *Aquino Jr A.E.*[2], *Sene-Fiorese M.*[2], *Duarte F.O.*[3], *Tock L.*[4], *Parizotto N. A.*[3], *Bagnato V. S.*[2]

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[2]Optics Group from Institute of Physics of São Carlos (IFSC - USP) - São Carlos - SP- Brazil,
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Introduction: Recently investigations suggest the benefits of Low-Level Laser (light) therapy (LLLT) in noninvasive treatment of cellulite, improvement of body countering and control of lipid profile. However, the underlying key mechanism for such potential effects associated to aerobic plus resistance training to reduce body fat and inflammatory process, related do obesity in women still unclear.
Methods: For this study, it was involved 40 obese women with age of 20–40 years. Inclusion criteria were primary obesity, body mass index greater than 30 kg/m$_{¸}$ and less than 40 kg/m$_{¸}$. The voluntaries were allocated in two different groups: Phototherapy group and SHAM group. The interventions consisted on physical exercise training and application of phototherapy (830nm), immediately after the physical exercise, with special designed device. Pro/anti-inflammatory adipokines were measured.
Results: It was showed that LLLT associated to physical exercise is more effective than physical exercise alone to increase adiponectinemia the most potent anti-inflammatory adipokine. Also it was showed reduced values of neck circumference (cm), insulin concentration (μU/ml) and interleukin-6 (pg/ml) in LLLT group.
Conclusion: physical exercise training and Low-Level Laser (light) therapy promote improvement in inflammatory framework and body composition, suggest the phototherapy can be an important tool in the treatment of obesity, being this results applicable in the clinical practice.

Acknowledgement: FAPESP (2013/04136-4; 2013/19046-0; 002804928-41), CNPq (150177/2014-3; 300654/2013-8) and CAPES.

T8:PO.103

Energy cost of lower body vibration across varying frequencies in young men and women

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Introduction: There is increasing recognition about the importance of enhancing energy expenditure (EE) for weight control through increases in low-intensity physical activities compatible with daily life (2–4 METS; i.e. 2–4 times the resting EE). Whole-body vibration increases EE modestly and could present both a useful adjuvant for obesity management and a tool for metabolic phenotyping. However, it is not clear whether a "dose-response" relationship exists between vibration frequency and EE. The aim of this study was to investigate the relationship between lower body vibration (LBV) frequency and EE.
Methods: EE was measured by indirect calorimetry in 8 healthy young adults (4 men, 4 women), first at rest while sitting in a comfortable seat and then standing without vibration, and subsequently during 5 cycles of intermittent LBV (30s vibration and 30s rest per cycle) at 3 frequencies of 30, 40 and 50 Hz (validated by accelerometry) separated by 5 min rest while sitting; LBV was standardized with the subject standing with both knees slightly bent to the extent that body vibration occurred only below the waistline.
Results: LBV increased EE relative to resting levels (+55% vs sitting, $p < 0.001$; +37% vs standing, $p < 0.001$). However, no differences in EE were observed across vibration frequencies, including in a subgroup (n=4) which repeated the protocol on 3 separate days. Intra-individual coefficient of variation in EE during sitting, standing without vibration and during LBV was 2.2, 7.7, and 10%, respectively.
Conclusion: No relationship could be demonstrated between EE and LBV frequency in the range of 30–50Hz, raising the possibility that within this range, the impact of increased vibration on skeletal muscle tension is buffered by tendon elasticity.

T8:PO.104

Combination prolonged-release naltrexone/bupropion therapy resulted in clinically meaningful improvements in weight and quality of life (qol) - integrated analysis of four phase 3 trials

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[2]Quality of Life Consulting, Durham, NC USA

Introduction: Comprehensive treatment for obesity ideally will improve physical, psychological, and social aspects of health in addition to facilitating weight loss.
Methods: This integrated analysis of 4 Phase 3, 56-week trials of naltrexone/bupropion 32/360 mg prolonged-release (NB) vs placebo (PBO) investigated changes in weight and weight-related QOL using the Impact of

Weight on Quality of Life-Lite (IWQOL-Lite) scale at baseline and at 8, 16, 28, and 56 weeks of treatment. All patients (NB n=2043, PBO n=1319) had BMI ≥27 and ≤45 kg/m^2. Treatment group differences (LS mean±SE) in the modified ITT-LOCF population (≥1 post-baseline weight while on study drug) were evaluated by ANCOVA with treatment, study, and baseline values as covariates.

Results: Baseline characteristics were similar between treatment arms: 81% female, 79% Caucasian, mean age 46 years, mean BMI 36 kg/m^2, mean IWQOL-Lite total score of 71. Completion rate was 66% (NB) and 59% (PBO). NB was associated with significantly greater improvements in weight (Week 56: −7.0 ± 0.2% NB vs −2.3 ± 0.2% PBO; $p < 0.001$), IWQOL-Lite total score (Week 56: +11.9 ± 0.3 NB vs +8.2 ± 0.3 PBO; $p < 0.001$), and all IWQOL-Lite subscores (Physical function, Self-esteem, Sexual life, Public distress, Work; all $p < 0.05$ vs PBO). At Week 56, significantly more patients reduced body weight by ≥5% with NB (53% vs 21%; $p < 0.001$); greater improvement in IWQOL-Lite was observed in these patients. 36% of NB subjects (vs 12% PBO; $p < 0.0001$) achieved clinically meaningful improvement in both weight (≥5% weight loss) and IWQOL-Lite. The most common adverse events with NB, consistent with the individual components, were nausea (32%), constipation (19%), headache (18%), and vomiting (11%).

Conclusion: NB meaningfully improved both weight and psychosocial outcomes.

T8:PO.105

Prolonged-release naltrexone/bupropion improves glucose control in individuals with prediabetes

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Introduction: Combination therapy with prolonged-release naltrexone/bupropion 32 mg/360 mg (NB) reduces body weight in subjects with and without type 2 diabetes mellitus (T2DM), and improves glycemic control in subjects with T2DM. Given the well-established relationship between weight loss and prevention of T2DM, we examined the effects of NB in overweight/obese subjects without T2DM but with impaired fasting glucose (FG) in 3 Phase 3 clinical trials.

Methods: Subjects with impaired FG (≥5.56 mmol/L at screening and baseline) who completed 56 weeks of treatment in conjunction with lifestyle modification were assessed (NB n=176, placebo [PBO] n=108; 76% female, mean age 51 years, mean BMI 37 kg/m^2, mean weight 103 kg). Weight and FG were analyzed as LS means, insulin and HOMA-IR as geometric LS means; differences were evaluated by ANCOVA with treatment, study, and baseline values as covariates.

Results: At week 56, weight change was significantly greater with NB (-9%) vs PBO (-5%; $p < 0.001$ vs. NB). At baseline, FG was 6.17 mmol/L for NB and 6.08 mmol/L for PBO. At 56 weeks, FG was reduced by 0.59 mmol/L with NB vs 0.38 mmol/L with PBO ($p = 0.013$ vs NB). Fasting insulin was similar at baseline (NB: 15.5 µIU/mL; PBO: 15.3 µIU/mL) and was significantly reduced with NB (30%) vs PBO (13%) at week 56 ($p = 0.002$ vs NB). HOMA-IR was 4.2 (NB) and 4.1 (PBO) at baseline; greater improvement was observed with NB (-37%) vs PBO (-19%; $p = 0.001$ vs NB). Weight loss was correlated with reductions in FG (r=0.38), insulin (r=0.49), and HOMA-IR (r=0.50; all $p < 0.001$, no difference between NB and PBO).

Conclusion: Greater weight loss with NB was associated with significantly greater improvement in FG, insulin, and HOMA-IR vs PBO. Such weight loss may delay the progression to T2DM.

T8:PO.106

Antiobesity activities of aminoprocalcitonin in high-fat-diet–induced obese mice

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Background: Obesity is associated with insulin resistance and a state of abnormal inflammatory response. Recently aminoprocalcitonin (NPCT), a neuroendocrine peptide produced in the brain and peripheral tissues, has been shown to play an important neuroimmune role in inflammation. NPCT act as a catabolic mediator in neuroendocrine and metabolic mechanisms that regulate energy homeostasis. NPCT may be a candidate for participation in the cross-talk between inflammatory and metabolic signals.

Objective: This study investigated the effects of chronic subcutaneous infusion of NPCT on obesity and its associated factors in high-fat-diet-induced obese (HF) mice.

Methods: Male C57BL/6 mice were randomly assigned to one of four groups: low-fat-diet (LF)-vehicle, LF-NPCT, HF-vehicle and HF-NPCT. NPCT was administered via subcutaneous osmopumps. After 4 week of treatment, obesity-associated factors, including food/caloric intake, body weight, plasma concentrations of insulin, glucose (insulin-resistance), and circulating markers of inflammation were measured.

Results: A 4-week infusion of NPCT significantly decreased the food/caloric intake body weight and plasma levels of proinflammatory cytokines (TNF-α, IL-6, and/or IL-1β) in HF fed mice. The anti-inflammatory effects of NPCT were associated with improved glycemic status in the treated animals, evidenced by improved glucose tolerance.

Conclusions: These findings identify a potential novel application for NPCT as an anti-obesity and anti-inflammatory agent.

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T8:PO.107

Can lllt associated with a mixed training change the cardiovascular risk in obese women?

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Introduction: The use of phototherapy as a non-invasive treatment has been disseminated in recent years, mainly in controlling diseases, muscle performance and also in the aesthetic treatment. Recently, our research group demonstrates that the phototherapy when associated with exercise training was efficient to ameliorate the lipid profile in obese woman.

Objective: Investigate the effect of the LLLT associated with aerobic and resistance mixed training on cardiovascular risk in obese women. Methodology: Women aged 20–40 years (BMI ≥ 30 kg/m^2), was divided into 2 groups: Phototherapy (P) and Sham (S). They trained aerobic plus resistance exercises (in a concurrent mode), 1 hour, 3 time/week during 16 week. Phototherapy was applied after each exercise session for 16 minutes, infrared laser, wavelength 808nm, continuous output, and power 100mW,

energy delivery 50 Joules. The body composition was measured with bio-impedance InBody®.
Results: Described in table above.
Conclusion: LLLT when associated with concurrent (mixed) exercise potentiate the exercise effects decreasing neck and waist circumference, visceral fat and platelets, all of these factors included in the cardiovascular risk in obese woman. These results suggest the LLLT as new therapeutic tool to control the cardiovascular risk in obese people.

	SHAM			PHOTOTHERAPY		
	Basal	End	Δ (%)	Basal	End	Δ(%)
Body mass (Kg)	97,21±13	94,46±12,8 P=0,0000001*	-4,74±2,2	94,49±12,8	89,29±12,8 P=0,000001*	-5,55±2,05
Visceral fat (cm²)	160,89±21,4	154,40±22,2 P=0,00004*	-4,42±2,8	150,48±19,9	140,71±19,9 P=0,0000001*	-7,09±2 P=0,0209**
Platelets	292,78±52,9	287±50,1 P=0,01*	-1,89±1,7	270,0±22,2	249,8±23,8 P=0,05** P=0,00001*	-7,53±2,9 P=0,00008**

Table 1. Body mass, visceral fat and platelets.*initial versus end; ** Sham versus Phototherapy

	SHAM			PHOTOTHERAPY		
	Basal	End	Δ (%)	Basal	End	Δ (%)
Waist circumference (cm)	113,22±13,8	110,56±13,0 P=0,000006*	-2,31±1,1	107,69±10,0	103,81±9,1 P=0,00001*	-3,55±0,7 P=0,02**
Neck circumference (cm)	39,98±2,2	38,58±1,9 P=0,0361*	-1,04±1,9	38,09±2,3	36,27±1,9 P=0,00009*	-4,71±3,20 P=0,00031**

Table 2. Waist and neck circumference.*initial versus end; ** Sham versus Phototherapy

T8:PO.108

Early achievement of significant weight loss with prolonged-release naltrexone/bupropion is associated with additional weight loss at one year - an integrated analysis of four phase 3 trials

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Introduction: Naltrexone prolonged-release (PR) / bupropion PR (NB [32mg/360mg]) significantly reduced body weight vs placebo (PBO) in four Phase 3 trials of overweight/obese subjects (BMI ≥27 and ≤45 kg/m²) at Week 56: NB –7.0% (SE=0.2) body weight vs PBO –2.3% (SE=0.2; $p < 0.001$). As early response to treatment may be indicative of greater long-term weight loss, an integrated analysis of four Phase 3 NB trials (n=2043 NB, n=1319 PBO) was performed to evaluate the proportion of early responders (observed ≥5% weight loss at Week 16) and their long-term weight loss.
Methods: Treatment differences (LS mean) in the modified ITT-LOCF population (≥1 post-baseline weight on study drug) were evaluated by ANCOVA with treatment, study, and baseline values as covariates.
Results: Baseline characteristics were similar between treatment groups: 81% female, 79% Caucasian, mean age 46 years, and mean BMI 36 kg/m². The goal of ≥5% weight loss by Week 16 was achieved in 51% of NB subjects (similar across the overweight and 3 obesity classes [range: 44–54%]) and 19% of PBO subjects. Of the early NB responders, 87% completed 56 weeks of treatment. In the early NB responders (-9.2% LS mean weight change at Week 16), body weight at Week 56 was further reduced (-11.3% from baseline) and weight loss of ≥10% or ≥15% was achieved by 55% and 30% of subjects, respectively. The safety/tolerability profile of NB was consistent with its individual components. The most frequent AEs with NB in both the overall Phase 3 population and the early responder population were nausea, constipation, and headache.
Conclusions: The majority of subjects treated with NB achieved ≥5% weight loss by Week 16; these subjects exhibited additional weight loss at 1 year, and 87% continued treatment to study end.

T8:PO.109

An integrated analysis of weight loss with combination prolonged-release naltrexone/bupropion therapy by BMI classification

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Introduction: Naltrexone prolonged-release (PR) / bupropion PR (NB [32/360 mg]) significantly reduced body weight vs placebo (PBO) in the four Phase 3 trials of overweight/obese patients (BMI 27–45 kg/m²). This integrated analysis examined weight loss in these trials when stratified by baseline BMI (obesity class): Class-I (30.0–34.9 kg/m²), Class-II (35.0–39.9 kg/m²), Class-III (≥40 kg/m²).
Methods: Treatment group differences (LS mean±SE) in the modified ITT-LOCF population (≥1 post-baseline weight on study drug) were evaluated by ANCOVA with treatment, study, and baseline values as covariates.
Results: Baseline characteristics were similar between treatment arms (NB n=2043; PBO n=1319): 81% female; 79% Caucasian; mean age 46 years; mean BMI 36 kg/m²; obesity Class-I 37%, Class-II 36%, Class-III 25%. Completion rate was 66% (NB) and 59% (PBO). At Week 56, significantly greater weight loss was observed with NB (-7.0 ± 0.2%) vs PBO (-2.3 ± 0.2%; $p < 0.001$), and a more patients attained ≥5% weight loss with NB (odds ratio vs PBO: 4.1; $p < 0.001$). NB patients experienced favorable shifts in BMI class from baseline (NB vs PBO: improved = 45% vs 20%, no change = 53% vs 74%, worsened = 2% vs 6%; $p < 0.001$), and a non-obese BMI was achieved in 17% of Class-I NB subjects (vs 6% PBO) and 3% of Class-II NB subjects (vs 1% PBO). Weight loss with NB was similar across the 3 obesity classes (-4.0% to –5.0% PBO-corrected, all $p < 0.001$), as was achievement of ≥5% weight loss (odds ratio vs PBO: 3.5 to 4.3; all $p < 0.001$). The safety/tolerability profile of NB was consistent with its components; the most common AEs were nausea (32%), constipation (19%), headache (18%), and vomiting (11%).
Conclusion: The clinically significant weight loss associated with NB was consistent across a wide BMI range.

T8:PO.110

Vitamin d supplementation promotes weight loss and waist circumference reduction in overweight/obese adults with hypovitaminosis d

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Hypovitaminosis D is associated with adiposity and higher risk of developing obesity-related complications. Intervention studies with cholecalciferol provided inconsistent results. The objective was to evaluate whether restoration of optimal vitamin D status promotes weight loss and improves metabolic serum biomarkers. Four-hundred overweight or obese patients with vitamin D insufficiency were recruited from 2011 to 2013. Participants received a balanced moderately-low-calorie diet and were assigned to 3 groups: 1) no treatment; 2) cholecalciferol 25.000 UI / month; 3) cholecalciferol 100.000 UI / month. At baseline (T0) and after 6 months (T1) we determined: anthropometric measures, BMI, waist circumference, body composition, plasma 25-hydroxyvitamin (OH) D, fasting glucose, fasting insulin, and glycated hemoglobin. Differences were investigated using repeated measures ANOVA regardless of patient adherence to treatment (intention-to-treat analysis). Six-month supplementation with 25.000 and 100.000 UI increased serum 25(OH), but only 100.000 allowed achievement of optimal vitamin D status ($p < 0,001$) (Fig. 1). A significantly greater weight decrease was observed in the 25.000 and

100.000 UI groups (–3,8 kg and –5,4 kg) compared to untreated (-1.2 kg) (Fig. 2). Waist circumference reduction was more substantial in the vitamin D group (25.000: –4.00 cm; 100.000: –5.48 cm; untreated: –3.21 cm; $p < 0,05$) (Fig. 2). Adjustment for age, sex, and BMI did not affect statistical significance. Improved HbA1c was noted in patients supplemented with 100.000 UI, but this finding lost significance after adjustment for weight decrease. The present data indicate that vitamin D supplementation ameliorates anthropometric profiles and enhances the beneficial effects of hypocaloric diet.

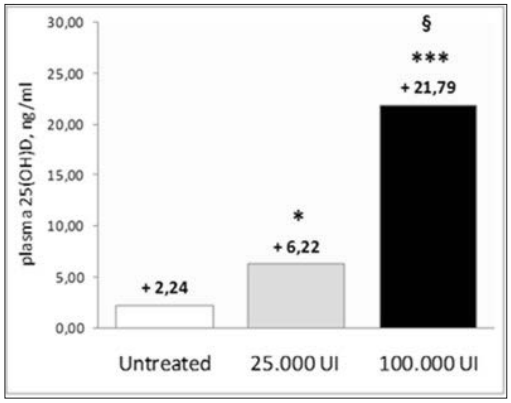

Fig. 1. Plasma 25(OH) concentration increase after 6-month cholecalciferol supplementation. RM Two- way ANOVA, Bonferroni post hoc test. * $p < 0.05$ vs untreated; *** $p < 0.001$ vs untreated; § $p < 0.05$ vs 25.000 UI

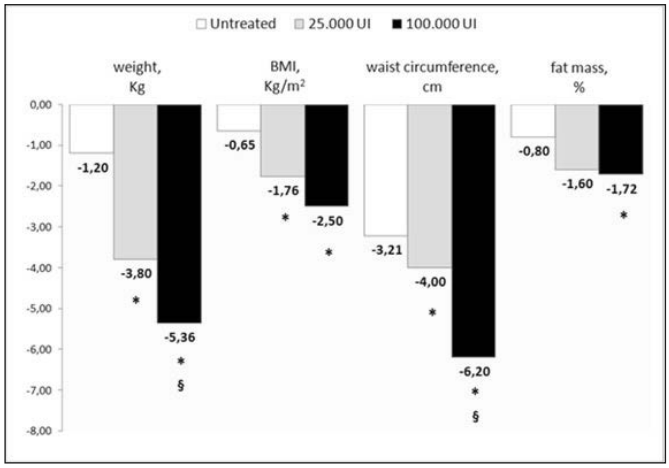

Fig. 2. Decrease in weight , BMI, waist circumference and fat mass after 6-month cholecalciferol supplementation. RM Two- way ANOVA, Bonferroni post hoc test. * $p < 0.05$ vs untreated; § $p < 0.05$ vs 25.000 UI

T8:PO.111

Randomized, double-blind, placebo–controlled, 4-week proof of concept trial of beloranib, a novel treatment for patients with prader-willi syndrome

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Patients with Prader-Willi syndrome (PWS) fail to regulate metabolism and hunger, resulting in preoccupation with food and extreme drive to eat that leads to severe obesity. Beloranib is a MetAP2 inhibitor that reduces hunger and restores balance to the production/utilization of fat; prior studies have shown ~11% body weight (BW) loss and ~50% reduction in hunger over 12 wks in exogenous obesity. This was a randomized, double blind, placebo-controlled study in 17 adults with PWS. Patients were randomized to receive blinded twice weekly SC doses of 1.2 mg (n=5), 1.8 mg (n=6) of beloranib, or placebo (n=6) for 4 weeks. All patients were offered 50% increase in daily calorie allowance throughout the trial. All 17 patients (11 females, age 33.5yr, BMI 31.4kg/m^2, BW 72.0kg) completed the trial. After 4 wks, patients on placebo had an average (±SEM) increase of 3.6% ± 2.4% total body fat vs. a reduction in total body fat of 0.9% ± 1.1% and 4.5% ± 2.0% in the 1.2 mg and 1.8 mg beloranib groups, respectively ($p < 0.05$ for both doses). Biomarkers associated with cardiovascular disease risk (lipids, hs-CRP) and adipose tissue function (adiponectin) were also improved in both beloranib groups. Food-related problem behaviors, as measured by Hyperphagia Questionnaire, improved by 1.8% (1.2mg), 52.4% (1.8mg), vs. worsening by 40.5% with PBO ($p = 0.025$ vs. 1.8 mg). Beloranib was well-tolerated with no severe/serious adverse events and no clinically significant changes in laboratory values or ECG/vital signs observed.. This study demonstrated proof-of-concept safety and effectiveness of beloranib on body composition, food related problem behaviors, and cardiovascular risk markers in PWS. Phase 3 trial assessing safety and efficacy of beloranib in patients with PWS has been initiated.

T8:PO.112

In a phase 2 study, beloranib, a novel methionine aminopeptidase 2 (metap2) inhibitor, appeared safe and showed significant body weight loss over 12 weeks in obese adults

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Beloranib is a MetAP2 inhibitor that reduces hunger and restores balance to the production and utilization of fat. Previous studies in obese women showed ~4% - 6% body weight (BW) loss with 1–4 mg beloranib administered twice weekly over 4 weeks. In the current Phase 2, randomized, double-blind, placebo-controlled study, 147 subjects were randomized to one of 3 beloranib dose groups; 0.6 mg (n=37), 1.2 mg (n=37) or 2.4 mg (n=35), or to placebo (n=38) given twice-weekly over 12 wks. Changes in BW, hunger, and cardiometabolic biomarkers were measured. Subjects were mostly white females with mean age 48.4 yr, BW 100.9 kg, and BMI 37.6 kg/m^2. Greater than 80% of the subjects completed the trial in the 0.6 mg, 1.2 mg and placebo groups, while ~43% of the 2.4 mg group completed treatment. The primary reason for early withdrawal was due to adverse event (AE), with the most common AEs leading to withdrawal being related to sleep disorders in the 2.4 mg group. There were no serious AEs deemed to be related to study drug and no clinically significant abnormal laboratory measures, vital signs, or ECG findings. AEs were generally mild, transient, and self-limiting. After 12 wks of treatment, subjects on 0.6 mg, 1.2 mg, or 2.4 mg lost an average (±SEM) of –5.5 ± 0.5, –6.9 ± 0.6, and –10.9 ± 1.1 kg vs. –0.4 ± 0.4 kg for placebo (all $p < 0.0001$ vs. placebo). Hunger, blood pressure, LDL-c, triglycerides, and hs-CRP decreased in the beloranib groups. Beloranib treatment for 12wks, representing the longest duration of drug exposure in humans, appeared safe and generally well-tolerated at doses less than 2.4 mg, and resulted in clinically meaningful BW loss, with improved hunger and cardiometabolic markers. Beloranib shows promise for further development in the treatment of severe obesity.

T8 – Diagnostics

T8:PO.113

Influence on helicobacter pylori eradication of laparoscopic gastric plication

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Introduction: Among the surgical procedures for the treatment of morbid obesity, laparoscopic gastric plication has known as a bariatric technic with little or no studies regarding operative findings and patient follow-up. Aim of this study is to evaluate the incidence of Helicobacter pylori (HP) infection on the preoperative and post operative outcomes of patients undergoing laparoscopic gastric plication.
Methods: A retrospective study was done on the gastric pathology specimens results of randomly selected asymptomatic 100 patients of 407 who underwent laparoscopic gastric plication from 2010 to 2013.All the specimens were analysed by the same pathologist and histological grading was based on the Sidney classification.
Results: 76 of the 100 patients are HP positive while 24 were negative. There is no significant difference between two groups in terms of age, BMI, sex and weight.Altough no differences were found at the preoperative and postoperative gastroscopies of these 100 patients according to the activity, atrophy, intestinal metaplasia and the positivity of HP, we observed difference at the aspect of inflammation ($p = 0.012$).
Conclusions: While HP were not be treated via laparoscopic gastric plication, we detected the positive influence on the inflammation of patients operated by laparoscopic gastric plication.

Acknowledgement: The authors declare that there is no Acknowledgement regarding the publication of this paper.

T8:PO.114

Spise: Single point insulin sensitivity estimator – a novel parameter to evaluate insulin sensitivity in obese adolescents

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Introduction: Insulin resistance is a key feature of obesity-associated metabolic comorbidities. Clinical assessment of insulin sensitivity (IS) currently uses indices calculated from plasma glucose and insulin values (fasting as well as during oral glucose tolerance test). These indices correlate insufficiently with the IS assessed by the glucose-clamp method. The goal of the current study is to contrive and validate a new and simple index for IS which does not necessitate the prevenient evaluation of insulin-levels.
Methods: This study was carried out by the Beta-JUDO consortium (Beta-Cell Function in Juvenile Diabetes and Obesity) and included 21 morbidly obese patients (age 14.5 ± 1.8 years, 29% female, WHO-ISO-BMI 41.6 ± 12.7 kg/m^2). They underwent both a standardized oral glucose tolerance test and an isoglycemic glucose-clamp from which IS indices were derived. The SPISE is calculated by mathematical modeling and includes BMI (kg/m^2), serum triglycerides (mg/dL) and serum-HDL-cholesterol (mg/dL). The detailed description of the SPISE is complex and at present in preparation for publication.
Results: Matsuda's ISI comp, HOMA-IR respectively QUICKI correlate with the M-value from glucose-clamps with r = 0.51, 0.52 and 0.51 (each with a p-value of <0.05) in this study population. In comparison, the SPISE shows an r-value of 0.59 (p-value <0.01) when correlated with the M-value.
Conclusion: As an innovative index the SPISE enables an improved estimation of peripheral insulin sensitivity derived from a single fasting sample without the need to determine insulin.

T8:PO.115

Comparison of correlation between prostate volume and obesity

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Introduction: Benign prostatic hyperplasia(BPH) is a common condition in males more than 40 years old, and the incidence of BPH has shown a tendency to increase with age. Obesity is state of excessive accumulation of fat in the body, and leads to changes in the body's metabolism and endocrine function, so progression of BPH occurs in obesity status according to many articles. The purpose of this study is to compare the efficacy of obesity indices which correlate with prostate volume.
Methods: The study was carried out in 285 males, who visited health promotion center in Jeju National University Hospital and underwent transrectal ultrasonography and abdominal fat computed tomography from April, 2010 to June, 2013. Anthropometric parameters were measured directly and blood samples were obtained in a fasting state more than 8 hours in the morning. Then, we analyzed the correlation between obesity indices and prostate volume.
Results: After adjusting by age, prostate volume was positively correlated with BMI($r=0.227$, $P < 0.001$), waist circumference(WC)($r=0.151$, $P = 0.011$), waist to height ratio(WHtR)($r=0.149$, $P = 0.012$), visceral fat area(VFA)($r=0.157$, $P = 0.008$). However prostate volume was not correlated with subcutaneous fat area(SFA) and visceral to subcutaneous ratio(VSR). WHtR had the largest area under the curve(AUC) for the identification of prostate volume more than 30ml(AUC=0.595, $P = 0.017$). Then the VFA and BMI were in order.
Conclusion: Prostate volume was positively correlated with BMI, WC, WHtR and VFA in the obesity indices and WHtR had the largest AUC and then, VFA and BMI were in order.

T8:PO.116

BMI, in itself, is not sufficient parameter for evaluation of nutritional state of professional soldiers in the armed forces of the czech republic

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Introduction: In the Armed Forces of the Czech Republic there has been introduced a system evaluating the health capability of active-duty service, regulation No 103/2005 Sb. One of the evaluation criteria is also the nutritional state assessed only by BMI values. Aim of our study was to determine real nutritional state of soldiers.
Methods: Nutritional state assessment was focus on body composition measured by bioimpedance analysis supplemented with waist circumference, skinfold thickness, mid-arm circumference and hand grip strength test.

Results: For now we enrolled 404 male soldiers and 50 female soldiers with mean age 32.0 ± 7.4 years and 28.6 ± 8.6 years, respectively. BMI was 25.8 ± 3.5 kg/m^2 vs. 23.5 ± 3.5 kg/m^2. Overweight was found in 51.2% vs. 20%, obesity in 10.2% vs. 6%. Percentage of body fat in range of overweight was found in 11.4% vs. 32%, and in range of obesity was found in 6.2% vs. 20%. Waist circumference ≥ 94 cm for men and ≥ 80 cm for women was found in 10.2% and 6% and waist circumference ≥ 102 cm for men and ≥ 88 cm for women was found in 5.7% and 6%.
Conclusion: First results of our work indicate that the BMI criterion, in itself, is not sufficient, especially for evaluating overweight and it is necessary to extend the current assessment algorithm with other parameters, that means waist circumference and percentage of total body fat. These parameters are able to complete the BMI values and better identify individuals with the risk of development of obesity and associated complications. Nowadays we prepare amendment of regulation about evaluating the health capability of active-duty service.

T8:PO.117

Phenotypic characterization further anthropometric measures in morbid obesity

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Introduction: Body composition, fat distribution, presence and extension of co-morbidities, weight history, functional status and degree of compulsivity are among others, phenotypic traits that allow us a more accurate assessment of health risk of obese people. AIM: Characterize and categorize obese patients according to their clinical and functional status.
Method: Data is collected from 81 patients with severe obesity. Weight, height, waist circumference, biochemical parameters and blood pressure are registered. Also recorded are hepatic, renal and osteoarticular diseases, sleep-apnoea syndrome and/or gastro-oesophageal reflux, if present. The degree of functional capacity is assessed and patients are categorized according criteria of hypertriglyceridemic waist (HW), Garvey's Cardiometabolic Disease Staging System (CMDS) and Edmonton Staging System (ESS).
Results: 67% women. Average age 47+10y, 18% below 30y. Average BMI of 47 kg/m^2, 26% of patients have a BMI >50 kg/m^2. Average waist circumference of 132+14cm, 22% of women and 10% of men have a high HW index. 55% of the patients have hypertension, 33% diabetes, 34% show sleep-apnoea syndrome and 25% gastro-oesophageal reflux. Most patients (62%) live sedentarily. Applying ESS, nine patients (11%) are in the highest risk range and 70% are in the high-risk range. Using CMDS 51% show high risk and 22% medium risk. No correlation was found between BMI and CMDS/ESS.
Conclusion: A diagnostic approach using clinical staging systems provides us with information on presence or extension of co-morbidities which can guide the decision making process. A proper characterization of obese people could help determining and establishing better criteria to prioritize therapeutics interventions in this group of patients.

T8:PO.118

COMPARISON OF TWO DIFFERENT BIA INSTRUMENTS

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Introduction: Bioelectrical impedance analysis is a simple and non-invasive method to assess the effectiveness of weight reduction interventions, to identify the patient's health risk and to formulate individual dietary and exercise recommendations. A standardized BIA measurement is needed to allow accurate monitoring of changes in the body composition. In this study two BIA instruments were compared to determine agreement.
Methods: 88 postoperative bariatric surgical patients, 69 women and 19 men, (BMI= 31.58 ± 6.6 kg/m^2, age = 42.3± 12.1years) underwent BIA measurement with the BIA Corpus RX 4000 (BIAC), lying in supine position1, and with the Seca mBCA 515®, standing barefoot, as recommended by the manufacturer. Body composition was calculated with Gray et al.2 prediction equation. Bland Altman method was used to determine agreement.
Results: Comparison of Seca® and BIAC resulted in an observed difference in resistance (+71.8 ± 25.2Ω, p = <0.001), reactance (-1.3 ± 4.0Ω, p = 0.002) and phase angle (-0.85 ± 0.3°, p = <0.001). Limits of agreement between Seca® and BIAC were 121.17Ω/ 22.3Ω for resistance, 6.6Ω/ –9.3Ω for reactance and –0.3°/-1.5° for phase angle. A significant (p < 0.001) difference remained after calculation of FFM (kg) (-3.1 ± 1.6 kg, p < 0.001), FM (kg) (3.1 ± 1.6 kg, p < 0.001) and FM% (3.5 ± 1.7%, p < 0.001), resulting in lower FFM and higher FM values determined with Seca®.
Conclusion: Changing BIA instruments while monitoring body composition over time needs consideration of potential differences in the measurement.

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T8:PO.119

Cardiometabolic risk factors and inflammation in adipose tissue are increased in obese subjects classified as metabolically healthy

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Introduction: It has been suggested that individuals with the condition known as metabolically healthy obesity (MHO) may not have the same increased risk for the development of metabolic abnormalities as their non-metabolically healthy counterparts. However, the validity of this concept has recently been challenged since it may not translate into lower morbidity and mortality. The aim of the present study was to compare the cardiometabolic/inflammatory profile and the prevalence of impaired glucose tolerance (IGT) and type 2 diabetes (T2D) in patients categorized as MHO or metabolically abnormal obesity (MAO).
Methods: We performed a cross-sectional analysis to compare the cardiometabolic/inflammatory profile of 222 MHO and 222 MAO patients (62% women) matched by age, including 255 lean subjects as reference (cohort 1). In a second cohort, we analysed the adipokine profile and the expression of genes involved in inflammation and extracellular matrix remodelling in visceral adipose tissue (VAT, n=82) and liver (n=55).
Results: The cardiometabolic and inflammatory profiles (C-reactive protein, fibrinogen, uric acid, leukocyte count and hepatic enzymes) were similarly increased in MHO and MAO in both cohorts. Moreover, above 30% of patients classified as MHO according to fasting plasma glucose exhibited IGT or T2D. The profile of classic (leptin, adiponectin, resistin) as

well as novel (SAA and MMP9) adipokines was almost identical in MHO and MAO groups in cohort 2. Expression of genes involved in inflammation and tissue remodelling in VAT and liver showed a similar alteration pattern in MHO and MAO individuals.
Conclusion: The present study provides evidence for the existence of a comparable adverse cardiometabolic profile in MHO and MAO patients.

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T8:PO.120

Relationship of serum tsh with body mass measures in healthy adults

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Introduction: The problem of obesity is multi-faceted and requires the understanding of different areas to effectively address and reverse the current trends.The present study aims to look at the association between thyroid-stimulating hormone and body mass measures.
Methods: 742subjects, healthy, self reported, euthyroid staff of Peoples University aged 18–60 years were screened and those with TSH between 0.3mU/L-10mU/L were taken for the purpose of analysis.TSH was estimated by 3rd generation chemiluminescence assay.Pearsons correlation coefficient was calculated.
Results: We derived significant positive correlation between TSH and BodyMassIndex($P < 0.0001$), TSH and Weight($p = 0.0016$), TSH and WaistCircumference($P = 0.0007$), TSH and HipCircumference($P = 0.0017$).
Conclusion: In our study we derived a significant positive correlation between TSH and BMI in euthyroid adults. The studies so far about the relationship of weight and thyroid functions have shown significant and positive correlation [1] as well as no correlation [2]. There is a need to look at serum TSH levels of an individual in light of his/her weight as obese/overweight people tend to have higher serum TSH.Further the inverse derivation of the available data can open new avenues for treatment of obesity presuming thyroid hormones have significant impact on adiposity.

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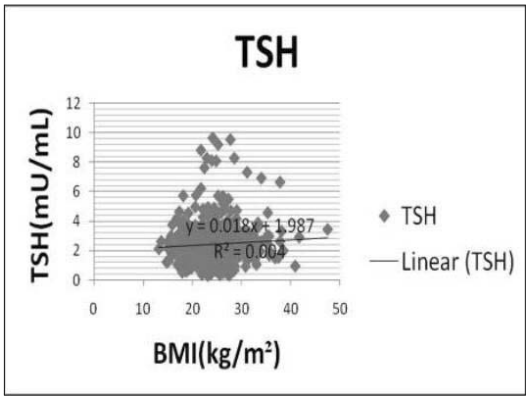

Fig. 1. Linear regression analysis for correlation of TSH with BMI.

Group	Mean	SD	N	r Value	P value
TSH	2.43	1.18	721	0.117	0.0016
Weight	63.66	14.51	721		
TSH	2.43	1.18	721	-0.073	0.0505
Height	162.64	10.82	721		
TSH	2.43	1.18	721	0.201	<0.0001
BMI	23.89	4.33	721		

Fig. 2. Correlation of TSH level with weight, Height and BMI.

Group	Mean	SD	N	r Value	P value
TSH	2.43	1.18	721	0.126	0.0007
WC	83.85	13.48	721		
TSH	2.43	1.18	721	0.116	0.0017
HC	98.33	10.12	721		
TSH	2.43	1.18	721	0.019	0.5953
W/H	1.00	4.10	721		

Fig. 3. Correlation of TSH level with WC, HC, W /H

T8:PO.121

The influence of glucose homeostasis on body weight loss

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Introduction: The primary objective of the present study was to evaluate the influence of the glucose homeostasis, evaluated by HOMA, on body weight loss promoted by a 6-month weight loss program, based on a multidisciplinary approach, with personalized interventions and lifestyle group sessions.
Methods: The sample comprised 94 adults (40,8 ± 10,1yr; 30.7 ± 5,5kg/m²). Body weight was assessed at baseline and at the end of the 6-months loss program with an electronic scale (SECA, Hamburg, Germany). The 6-month weight loss program was composed by lifestyle weight loss group

sessions and all the participants were follow by a multidisciplinary team comprised a physician, a nutritionist, a psychologist and an exercise physiologist. Glucose homeostasis was evaluated by HOMA Test (baseline insulin (μU/ml) x baseline glucose (mg/dl) / 405) at baseline. Multiple regression analysis was performed to assess the multivariate relationships between glucose homeostasis and body weight loss.
Results: At 6-month, participants lost, on average, 6.4kg ± 6.2kg ($p < .001$) of initial body weight (range: –6.7kg – 26,4 kg loss), with no differences between genders ($p > 0.05$). Glucose homeostasis was not associated with body weight loss ($p > 0.05$). No correlation was found between baseline glucose homeostasis and body weight loss at 6-month ($p > 0.05$).
Conclusions: This analysis suggested that glucose homeostasis does not influence body weight loss in adults that follow a 6-month weight loss commercial program, that included nutritional and physiologic sessions and physical activity recommendations.

T8 – Geriatric obesity, treatment

T8:PO.122

The implications of sarcopenia and sarcopenia obeisty on lung function in healthy eldery

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Introduction: Previous studies have demonstrated a positive association between obesity and decreased lung function. In this study, we evaluated the impact of sarcopenia and sarcopenic obesity on pulmonary impairment in healthy elderly.
Methods: This study included [2,85]0 subjects aged over [6]0 ([1],[198] men and [1,652] women) that participated in the Korean National Health and Nutrition Examination Survey (KNHANES) from 2008 to 2011. We excluded individuals who had chronic diseases such as chronic liver disease, chronic kidney disease. We also excluded individuals who had FEV1/FVC<0.7 and chronic obstructive lung disease, bronchial asthma, tuberculosis. Appendicular skeletal muscle mass (ASM) divided by weight (ASM/Wt, %) was estimated by dual X-ray absorptiometry (DXA). Sarcopenia was defined as 2 standard deviations below the gender specific mean for young healthy adults. Obesity was defined as waist circumference greater than 90cm in men and 85cm in women.
Results: According to the above definition, our cut off value for sarcopenia in men and women was 27.85% and 21.35%, respectively. The prevalence of sarcopenia in individuals aged over 60 was 10.0%. Significant positive correlations were found for ASM/Wt with forced vital capacity (FVC) (R2 0.428, P < 0.001) and forced expiratory volume in 1 second (FEV1) (R2 0.342, P < 0.001). Lung function in the sarcopenic obesity group appeared to be decreased compared to the normal group after adjusting for age, smoking status, alcohol consumption and exercise by multiple logistic regression.
Conclusions: In conclusion, sarcopenia and sarcopenic obesity were closely associated with decreased lung function in healthy Korean elderly.

T8 – Complications

T8:PO.123

Waist Circumference Correlates with Disease Severity in Acute Pancreatitis

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Background/aims: obesity is a well-known factor contributing to the etiology of acute pancreatitis (AP). In order to clarify its role in the pathogenesis and progression of the disease, several studies were conducted with different outcomes. Since the number of performed studies is limited, we decided to check the conclusions and present our own results.
Method: In this retrospective study, medical histories of 156 patients diagnosed with AP during the years 2008 and 2009 were analyzed. Of the 156 patients, 81 were men and 75 women, mean age 64,2 ± 14,5 years, average APACHE II score 8,58 ± 4,07. Body-mass index (BMI), waist circumference (WC), hip circumference and waist-hip ratio were retrieved and their correlation with local, systemic complications and death outcomes were compared using receiver operating characteristic (ROC) curves.
Results: among the researched parameters only WC correlated with local, systemic complications and death outcomes. According to ROC curves, the cut-off value of 96 cm had 94.6% sensitivity and 40,3% specificity value in predicting systemic complications ($p = 0,0018$). The cut-off value of 103 cm had 68% sensitivity and 59,4% specificity value in predicting local complications ($p = 0,0048$), while the cut-off value of 100 cm predicted mortality with 80% sensitivity and 42,5% specificity value ($p = 0,0031$). Among other parameters, only waist-hip ratio – local complications ROC curve reached statistical significance; for cut-off value of 0,96 sensitivity was 80% and specificity 42,5% ($p = 0,0101$).
Conclusion: although obesity is a definitive risk factor for AP, the exact measure which should be used to quantify the level of risk still eludes us. Statistical analysis has shown that in our case BMI was a poor parameter and WC had a better correlation in predicting complications, including death, in patients with AP. However, low specificity is the problem which will impede WC from gaining a more pronounced role in everyday practice.

T8 – Alternative treatments

T8:PO.124

Effects of Traditional Chinese acupuncture for treatment of obesity: A systematic review

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Background: Traditional Chinese acupuncture has become popular for obesity throughout the world but there is a lack of evidence of its efficacy and safety. The aim of this study is evaluate the safety and therapeutic benefits of traditional acupuncture treatment in management of obesity in randomized controlled trials (RCT)
Methods: The review was conducted according to Cochrane Handbook for Systematic Reviews 5.1.0 and searched in 22 electronic databases and hand search for all RCT quasi-RCT without language restrictions. Key words were acupuncture, obesity, overweight, randomized clinical trial and their synonyms. The risk of bias of included studies was assessed. The differences in effect size between traditional acupuncture and control: placebo, no treatment and dietary therapy/exercise groups were analysed.

Result: A total of 5,805 potential studies were identified following search strategy and 5,710 of them were excluded after screening titles and abstracts. Eight studies were included in this study. The total sample size is 965 with an average of 120 per trial. The participants aged from 13 to 60 years old. The duration of treatment varied from 30 days to three months. Only two trials involved follow-up period, half year and one year respectively. All included RCTs had unclear or high risk of bias in all domains. Meta-analyses showed that acupuncture was more effective for reducing body weight and BMI than placebo, no treatment and dietary therapy/exercise for short-term effects.
Conclusions: In conclusion, although acupuncture appeared to be beneficial for reducing body weight and BMI in patients with obesity, hoewver due to the high or unclear risk of bias and unexplained substantial heterogeneity, the results need to be interpreted with caution.

T8:PO.125

Evaluation of the efficacy and safety of Redusure (IQP-AK-102), a proprietary combination for weight reduction

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Introduction: IQP-AK-102 is a novel combination of three soluble fibres. Due to its unique physicochemical properties, satiety sensation in the upper gut is enhanced through gastric distension and delayed gastric emptying, which subsequently reduces food intake1,2.
Methods: 119 overweight and obese subjects participated in this randomized, double-blind, placebo-controlled trial. Subjects took either 2 capsules of IQP-AK-102 or placebo twice daily and were counseled to maintain a 20% calorie-deficit diet (energy contributions: 50% carbohydrates, 30% fat, and 20% protein) and moderate physical activity for 12 weeks.
Results: 111 subjects were included in the final analysis. Body weight and body fat mass were similar in both groups at baseline. After 12 weeks, subjects on IQP-AK-102 experienced a statistically significant greater reduction in mean body weight compared to placebo group (3.53 ± 2.28 kg versus 0.14 ± 1.84 kg, $p < 0.001$). IQP-AK-102 group had higher body fat mass decrease (2.51 ± 3.16 kg versus 0.05 ± 1.95 kg, $p < 0.001$). Statistically significant reduction in waist and hip circumference was also observed after 12 weeks. No serious product-related adverse events were reported.
Conclusion: The results indicate that IQP-AK-102 is an effective intervention for body weight reduction with a good safety profile.

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T8:PO.126

The effect of pioglitazone in combination with DPP-4 inhibitors on liver function and glycemic control in type 2 diabetes patients with nonalcoholic fatty liver disease.

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Introduction: Liver cancer is now the main cause of death in type 2 diabetes patients. Nonalcoholic steatohepatitis, which can develop to liver cancer, often coexists with type 2 diabetes sharing the same risk factors including insulin resistance. Pioglitazone is effective in treating nonalcoholic steatohepatitis, and recently, it has been reported that DPP-4 may involve in exacerbating nonalcoholic fatty liver disease. We investigated effects of pioglitazone in combination with DPP-4 inhibitor in type 2 diabetes patients with nonalcoholic fatty liver disease.
Methods: Pioglitazone was administered to type 2 diabetes patients with nonalcoholic fatty liver disease who had been taking DPP-4 inhibitors. Liver function, HbA1c, fasting blood glucose and markers for liver fibrosis were monitored for 12 months.
Results: HbA1c and fasting blood glucose significantly decreased (7.8 ± 0.4 to 6.4 ± 0.2%, 148 ± 9 to 123 ± 6 mg/dl). ALT decreased remarkably and reached the normal range (75 ± 9 to 32 ± 8 IU/l). Type collagen 7S decreased significantly (5.1 ± 0.3 to 4.4 ± 0.3 ng/ml) in 12 months following the additional medication of pioglitazone.
Conclusion: Combination of pioglitazone with DPP-4 inhibitors markedly ameliorated liver damage from fat deposits with improvement of glycemic control, leading to improvement in liver fibrosis marker. This combination therapy may be useful in treating type 2 diabetes patients with nonalcoholic fatty liver disease.

T8:PO.127

Evaluation of the use of The Malory Band in patients attending the Rotherham Institute for Obesity (RIO)

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Introduction: The Malory Band is a soft, narrow, adjustable cord that is worn around the waist. It is intended to help prevent over-consumption by tightening around the waistline as food is consumed, therby potentially increasing awareness of food intake and reducing overall intake. To date there has been no evaluation of its use, in terms of effectiveness as a weight loss aid or patient satisfaction, in a clinical setting.
Methods: 76 patients (age=45 +/- 13.6 yrs; BMI=41.5 +/- 8.4 kg/m^2) who were currently engaged with a weight management programme at the Rotherham Institute for Obesity (RIO) were involved in a 12 week study. 38 patients gave consent to trial the Malory Band, and to give subjective feedback regarding the product. A further 38 were matched for age and initial BMI to act as a control group for comparison. Weight, waist circumference and questionnaires were completed at baseline, 6 weeks and at 12 weeks.
Results: At baseline, participants loved the idea of the Malory Band, were confident in the method by which it intended to work, and expected it to control food intake. Participants wore the band for 10–15 hours per day, for 3–4 days per week. However, by week 12, 29 (76%) of the participants in the study group had withdrawn, of which 8 reported „unable to tolerate the band" as the primary reason. A significant decline in perceived helpfulness was reported by the end. The group wearing the Malory Band appeared to have done better with primary outcomes than the matched group, but there was no statistically significant difference between them for weight loss or waist circumference loss.
Conclusion: The Malory Band appears to be a new and novel intervention to assist with weight maintenance. However, initial study results suggest that patient compliance with using the product may not be high, and we were unable to demostrate and statistically significant improvements in weight loss or waist circumference loss.

T8:PO.128

Obesity clinic for teenagers - a successful spinoff project, bicycling around the country

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Introduction: Many projects and teams treating obesity in older children have faced the challenge of keeping their subjects motivated for physical activity. In this project we describe a novel approach that reached a number of children and led to a personal victory for many of them.
Methods: When children come to the Health School, the obesity team of the National childrens hospital, our aim is to find out what activity is most likely to motivate them. Teens were referred to a physiotherapist and a fanatic cycling enthusiast, forming groups for regular biking exercises. Standardized questionnaires were asked before and after the season.
Results: The adherence was very good, and a large proportion kept on cycling that summer, challenging themselves. The questionnaires revealed that the self-esteem and belief in own ability was significantly better. Valdi was crazy enough to drop the idea that if the teens would be willing to work hard, he would do everything in his power to take them to the biggest bike race in Iceland. In accordance with the power of the children the challenge was taken on to compete in the annual WOW-Cyclothon, a biking relay-race around Iceland (1332 km). A team of 6 children, 2 parents and 2 trainers completed the race. The goal was set and reached on finishing last, but at the same time to have every team-member win him/herself, to win the media attention and the fundraiser for the National Hospital. This won the group a flight ticket and a biking tour in Lyon, France, in September 2014. The aim for 2015 is to have at least 3 teams from Hjólakraftur.
Conclusion: This is an example of a successful spin off project which was made possible by the newly formed obesity clinic, enthusiastic trainers and good will towards obesity treatment in the society.

T8:PO.129

Effects of α-lipoic acid and eicosapentaenoic acid on inflammation and cardiovascular risk markers in overweight/obese women following an energy-restricted diet

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There is strong evidence that the pro-inflammatory state accompanied by the enlargement of the adipose tissue plays an important role in the appearance of related obesity metabolic comorbidities. The aim of this trial was to evaluate the additional effects to body weight loss on some inflammatory markers of dietary supplementation with α-lipoic acid and eicosapentaenoic acid (EPA) separately or in combination in healthy overweight/obese women following a hypocaloric diet.
Methods: Seventy-seven Caucasic healthy overweight/obese sedentary women (38.7 ± 7.2 years old) were assigned to one of the four experimental groups: Control, EPA (1.3 g/d), α-lipoic acid (0.3 g/d), and EPA+α-lipoic acid (1.3 g/d+0.3 g/d). All groups followed a 10 weeks intervention with a personalized hypocaloric diet. At beginning and at the end, inflammatory markers were measured in plasma using the appropriate ELISA kits.
Results: The treatment with α-lipoic acid, significantly ($P < 0.05$) reduced circulating levels of C-reactive protein (CRP) and Asymmetric dimethylarginine (ADMA) while prevented ($P < 0.01$) the fall of apelin levels observed during weight loss. Additionally, the α-lipoic acid reduced leukocyte count, even adjusting by weight loss and initial level ($P < 0.01$). The changes in leukocyte count were significantly and positive correlated with changes in CRP and waist circumference ($P < 0.01$).
Conclusions: The dietary supplementation with α-lipoic acid appears to improve some inflammatory and cardiovascular risk markers, suggesting additional positive effects of this antioxidant in combination to hypocaloric diet in obesity-related metabolic disorders.

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