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SHORT ORAL PRESENTATIONS

TOP 9 E-POSTERS

65. Effects of a maternal Maillard reaction products-rich diet on offspring somatic and motoric development and metabolic status in a mice model

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Background: Maternal diet may affect not only fetus development and outcomes of pregnancy, but also postnatal development of offspring, and their susceptibility to metabolic disturbances. Maillard reaction products (MRPs) are formed in foods during heat processing by non-enzymatic glycation. Dietary MRPs are partially absorbed into circulation. Their exaggerated intake may induce negative health effects, corresponding to those induced by advanced glycation end-products (AGEs) – *in vivo* formed analogues of MRPs. In adult rats, even a short-time consumption of MRP-rich diet induces pro-diabetogenic effects and behavioral disturbances. AGEs are maternally transferred to fetus. **Aim:** We investigated the impact of prenatal exposure to MRPs-rich diet on early development of mice offspring, and their metabolic status in young adulthood. **Methods:** During pregnancy, C57BL mice were administered either a standard rat chew (CTRL) or a MRP-rich diet (BC, pellets containing 25 % bread crusts and 75 % standard rat chew). After delivery, both groups of dams received a standard diet. In offspring, somatic, motoric, and neurological reflexes development (eye opening, ear unfolding, incisor eruption, ear twitch-, eyelid-, and auditory startle- reflexes, forelimb/hindlimb grasp, negative geotaxis, air and surface rightning, rope suspension) were monitored until weaning (day (D)21). After weaning, offspring (CTRL: n = 18; BC: n = 13) were placed on a standard diet. Reaching adulthood (D80 of age), their metabolic status was tested. **Results:** Both groups of dams consumed during pregnancy or lactation similar amounts of food. Body weight of newborn (D3) or weaned (D21) offspring of CTRL and BC dams did not differ significantly, while at D80 male offspring of BC dams were significantly heavier ($p < 0.02$) comparing with their CTRL counterparts. Offspring of BC dams developed ear twitch, eyelid, and auditory startle reflexes significantly earlier comparing with their counterparts from CTRL dams. They also performed surface rightning earlier and were better in its performance. In adulthood, both groups of offspring presented normal blood pressure, renal function, and similar measures of oxidative status. BC offspring maintained similar glycemia to that of their CTRL counterparts with significantly higher insulinemia (11.6 ± 5.0 uIU/ml vs. 24.4 ± 19.9 uIU/ml, $p < 0.042$), resulting in lower insulin sensitivity (HOMA: 3.6 ± 1.8 vs. 8.8 ± 7.2, $p < 0.026$). At sacrifice, both groups of offspring presented similar AGEs-associated fluorescence of plasma. A trend towards lower levels of soluble receptor for AGEs – sRAGE – was observed in BC offspring (648 ± 156 pg/ml vs. 553 ± 131 pg/ml, $p = 0.07$). No significant between-group difference in heart-, liver-, and kidney-to-body weight ratio; liver cholesterol or triacylglycerols content was revealed. **Conslusions:** Our findings indicate that in mice a maternal MRP-rich diet (even if consumed solely during pregnancy) may affect early somatic and motoric development, and in later life insulin sensitivity in offspring due to prenatal programming. Further work is needed to determine the underpinning mechanisms by which a maternal MRP-rich diet adversely affects neurobehavioral and metabolic pathways in offspring.

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66. Functional state of muscle mitochondria in seniors with impaired glucose tolerance and mild cognitive impairment

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Sedentary ageing accelerates the risk of chronic metabolic and neurodegenerative diseases. Within an initial pre-intervention part of our 3-month supervised aerobic/strength training study, we examined the whole body metabolism and muscle mitochondrial functions in association with glucose tolerance and cognitive state in 34 seniors. **Methods:** Glucose metabolism was examined by oGTT, insulin sensitivity by euglycemic hyperinsulinemic clamp, Resting Energy Expenditure (REE) and metabolic substrate preference (RQ) by indirect calorimetry (Ergostik, Geratherm). Cognitive functions were assessed with a battery of validated cognitive tests (MMSE, CogState, Memtrax). Biopsy of *m. vastus lateralis* was performed in local anesthesia using Bergström needle technique and functional state of muscle mitochondria was measured by O_2k high-resolution respirometry (Oroboros, n = 14) applying SUIT protocols RP1 and RP2. Oxygen consumption rate [pmol/(s.mg) tissue wet weight] was evaluated in saponin-permabilized muscle fibers. **Results:** Mitochondrial respiration rate was significantly decreased ($p < 0.05$) in a subgroup of individuals with impaired glucose tolerance (n = 7). Moreover, muscle mitochondrial oxidative phosphorylation (OXPHOS) capacity was negatively associated with age (R = -0.574; p = 0.032) and BMI (R = -0.548; p = 0.042) and maximal noncoupled respiration rate also decreased with age (R = -0.549; p = 0.042). More importantly, rotenone-induced inhibition of NADH-linked mitochondrial respiration was negatively associated with the reaction time in a short-term memory test (Memtrax, n = 14, R = -0.557; p = 0.037) and mitochondrial fatty acid oxidation rate was positively associated with short-term memory test score (CogState, n = 14, R = 0.616; p = 0.019). Insulin-induced change in resting energy expenditure (ΔREE, clamp) was positively associated with both coupled (n = 8, R = 0.797; p = 0.018) and noncoupled (n = 8, R = 0.717; p = 0.045) muscle mitochondrial respiration rate. **Conclusions:** Our results clearly show that functional state of muscle mitochondria is tightly linked with age, BMI, whole body metabolic state as well as with cognitive functions in seniors with mild cognitive impairment. Next, we plan to test the hypothesis that benefits of regular exercise are connected with improvements in mitochondrial function.

67. Nutrition management in bariatric metabolic surgery

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Introduction: Bariatric surgery is considered to be one of the most effective ways to treat extreme obesity. The surgical procedures modify the gastrointestinal anatomy and physiology including the alteration of the nutrient digestion and absorption. We work on the presumption that morbidly obese often have nutritional deficiencies, particularly in fat soluble vitamins. **Methods:** Two hundred patients underwent an elective bariatric surgery (*adjustable gastric band, sleeve gastrectomy, gastric plication and gastric bypass*) were included in the study. The available data from pre- and postoperative measurements of serum 25 hydroxyvitamin D have been analysed. As a satisfactory levels of serum 25 (OH) D was determined ≥ 30 ng/ml. All levels below this value have been evaluated as insufficient. Further, the serum levels of other vitamins, micronutrients and hormones (vitamins A, E, B_{12}, folic acid, iron and parathyroid hormone) were observed as their metabolisms may also be deteriorated. The collected data were evaluated and analysed. **Results:** The high prevalence of nutritional abnormalities in levels of all followed micronutrients has been detected. Most of them have been observed in gastric bypass patients, the least in gastric plication patients. Vitamin D deficiency and abnormal parathyroid hormone levels were the most common nutrient deficiency in our bariatric patients. **Conclusion:** There is an obvious need for a long term vitamin D levels monitoring as well as of other mentioned nutrients, as the levels are affected after bariatric surgeries. A careful nutritional follow-up is mandatory and should optimize nutritional status and significantly decrease a risk of nutritional deficiencies following bariatric surgery. The designed nutritional protocol works on the assumption that all bariatric patients would be best served by receiving perfect nutritional intervention and monitoring of serum nutrients starting preoperatively, ideally through the whole life.

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68. Type 1 diabetes patients eating behaviour analysis – alarming results

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Background: The increase of overweight and obesity among type 1 diabetes patients (DM1) is reported. Acquiring features of metabolic syndrome leads to the further worsening of patient´s prognosis. Balancing the need for optimal glycaemia and weight reduction in overweight/obese DM1 individuals is problematic because insulin dose must be adjusted accordingly. **Objective:** During the development of a diabetic application for smart phones we provided in DM1 patients' diet and glycaemia records analysis. Patients' diet was mostly unhealthy (high energy, fat and monosaccharides content) and dietary mistakes were the main cause of postprandial hyperglycaemia. We decided to obtain deeper insight into DM1 patient´s diet in a larger patient cohort. **Methods:** In this study 25 DM1 patients (14/11 F/M), treated by intensified insulin regime and educated according to standards in last two years, were involved. Their further characteristics are (median, range): age 39 years (20–55), DM1 duration 23 years (9–35), insulin dose 0.5 IU/kg (0.4–0.8), HbA_{1c} 66 mmol/mol (48–89) IFCC (International Federation of Clinical Chemistry), 11/25 already with chronic diabetic complications. Median of BMI was 25.6 (20.4–35.5). According to BMI 9/25 patients are overweight and 5/25 obese. All these overweight and obese patients (14/25) had waist circumference higher than recommended in treatment standards. Patients were instructed to document at least two weeks all food and drinks by smart phone camera, to weigh all food and to wrote log book including all physical activities (to evaluate an energy expenditure). Their diet records were analysed by using professional nutritional software (NutriPro EXPERT). According to results on carbohydrates and lipid intake patients were categorised into 3 groups with different compliance to diabetic diet (Group 1: all results within 100 % + 1SD, Group 2: none parameter > 100 % + 2SD, Group 3: at least one parameter > 100 % + 2SD; 100 % means 100 % of recommended value, SD was calculated from observed results for each parameter). Results (median, range) in % of recommended daily value: Energy intake: 117 % (94–180 %), total carbohydrates 109 % (80–120 %), mono + oligosaccharides 133 % (93–180 %), total fat 144 % (120–210 %), saturates 133 % (105–196 %), cholesterol 97 % (93–110 %), proteins 98 % (83–132 %), fiber 72 % (63–110 %). Only one patient had absolutely appropriate diet as well as energy expenditure. Twelve patients scored 3 (the worst category, 5 of these 12 patients are obese and 4 of them are overweight). We observed the correlation between the compliance category and sex (women scored better, $p = 0.049$) as well as with HbA1c level when patients scoring 3 had higher HbA_{1c} at baseline ($p = 0.019$) as well as after diet re-education combined with 5 weeks of continuous glucose monitoring ($p = 0.037$). Women energy expenditure was more frequently lower than recommended in comparison with men ($p = 0.028$). Patients did not evaluate their diet as unhealthy and they considered only total carbohydrate intake as important. **Conclusion:** We must pay an attention to DM1 patients eating behaviour to prevent their weight increase. In agreement with our previous observation the biggest problem was high fat intake. Re-education and psychological support are crucial at this point.

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69. Effect of chickpeas incorporation into „Mankoushe" on post prandial glycemia & lipidemia

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Consumption of refined carbohydrates is known to be associated with the development of chronic diseases. Mankoushe, a popular Lebanese breakfast, is made of white wheat flour that contains low-quality protein due to having lysine as limiting amino acid. The addition of pulses to cereals is known to improve their nutritional quality. Therefore, an experiment was conducted to investigate the effect of incorporating chickpeas into *"Mankoushe"* on postprandial glycemia and lipidemia. **Method:** A randomized cross-over study was performed on sixteen healthy Lebanese females aged between 20 and 40 years, having a BMI between 18.5 and 29.9 kg/m^2. Overnight fasted females were asked to consume two isoenergetic *(Mankoushe)* meals (200 g; 680 kcal) on two separate days, few days apart. One meal was the *"Regular Mankoushe"* and was made with white flour 100 % and the second meal was the *"Chickpeas Mankoushe"* that was made of a mixture of white/chickpea flour (70/30). Blood samples were collected 15 min before meal ingest and at 30, 90, 150 and 210 min, and serum glucose and triglycerides were measured. Results:

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Changes in serum glucose from baseline showed slightly but not significantly lower values at 30 and 90 min in the chickpeas group as compared to the control group. While the ingestion of the *"Chickpeas Mankoushe"* showed a significantly lower triglycerides level at 30 min as compared with the control group. **Conclusion:** The incorporation of chickpeas flour in the dough of *"Mankoushe Zaatar"* was able to reduce postprandial glycemia and lipidemia. Chickpea flour is a promising functional ingredient to be integrated into pastries to lower their glycemic index.

70. Screening for risk factors of NAFLD in Slovakia

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Background: Noncommunicable diseases are estimated to account for 90 % of total deaths in Slovakia compared to 68 % in Europe (WHO, 2014). Cardiovascular diseases, cancer, and diabetes are the cause of 78 % of all deaths in Slovakia. Premature death is accountable for 19 % of all deaths. Two major preventable risk factors of precocious mortality are: overweight and obesity present in 91 % (compared to 59 % in Europe) and alcohol consumption (12.5 l per person per year vs. 11 l in Europe) (WHO, 2015). Moreover, Slovakia is on the 6th lowest position in fruit and vegetable intake (463 grams per day) in Europe (Faostat, 2013) together with low fish intake. Therefore, liver mortality has been increasing over the last years. **Aim:** The aim of this study was screening of key lifestyle factors that contribute to nonalcoholic fatty liver disease (NAFLD) in Slovak liver outpatients. **Methods:** A total number of 923 patients (59 % women, 41 % men) aged 18 to 91 years were included in the period of 8 months from 13 hepatologic outpatient clinics in Slovakia. Self-managed anonymous questionnaires (Q) were filled in by patients in the waiting room and dropped into the box provided in the waiting room. Nine questions were included relating age, gender, education, weight and height, vegetable, fruit, fish and coffee intake, smoking and physical exercise. **Results:** Overweight or obesity were detected in 59 % of patients, insufficient fiber intake in 87 %, insufficient fish intake in 85 % and insufficient physical exercise in 68 % of patients. BMI over 25 together with risk alcohol consumption (Audit-C > 4 points) was present in 68 % of patients. Smoking was present in 19 % of patients and insufficient coffee intake from its hepatoprotective point of view in 35 %. According to our study, a total number of 75 % pts. were at risk for NAFLD. An absolute change of lifestyle is needed in 59 % of pts. with overweight or obesity. In our study, only 12 % had adequate fruit and vegetable supply (600 g or more). More physically active lifestyle is strongly recommended in 68 % of our pts. **Conclusions:** Anonymous Q is a useful tool for unravelling the risk factors leading to NAFLD. All mentioned lifestyle factors are modifiable and preventable. They are associated with higher risk for NAFLD, cancer, and premature cardiovascular death. Significantly lower number of men was included in dispensaries compared to women despite a known higher precocious mortality. Systematic national screening should help detect patients with risk behavior. Early intervention can catch 90 % of liver diseases and help avoid precocious and avertable deaths.

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71. Stability and changes in feeding cues and quality of mealtime interaction: A longitudinal cross-cultural study of British and Israeli mothers and infants

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Decisions about what and how to feed infants influences obesity risk. In support, early weaning and formula feeding are associated with rapid infant weight gain which is a risk factor for obesity development. Therefore, it is important to understand and to characterize the earliest interactions between mother and baby during feeding. This study aimed to explore stability and changes in mealtime interactions and feeding cues in a sample of Israeli and UK mothers and how these varied by maternal BMI and country. Mother-infant dyads (N = 41) from Israel and UK were filmed from birth and until two years old (every six months). Behaviours were coded using the Nursing Child Assessment Satellite Training (NCAST) and the Simple Feeding Element Scale (SFES). Positive mealtime interactions were seen in the first follow-up, however, with time; babies ate in a less ideal setting and were distracted during the feed. Breastfed babies showed higher levels of hunger and satiety cues in early life compared to bottle fed babies. UK mothers enjoyed the feeding interaction more than Israeli mothers, potentially explained by faster return to work in Israeli mothers compared to stay-at-home mothers in the UK. Healthy weight women used fewer feeding commands and fed their babies a healthier meal compared to overweight and obese mothers. Mealtime observations offer an insight into the quality of the early feeding experience and future research should continue to explore this within larger and more diverse populations.

72. The effect of 8 weeks of weight loss intervention on cardiometabolic parameters (ongoing study)

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Lifestyle interventions can prevent the deterioration of impaired glucose tolerance to manifest type 2 diabetes, and also prevent cardiovascular diseases, as it showed many studies [the Finnish Diabetes Prevention Study, Diabetes Prevention Program (DPP), the China Da Qing Diabetes Prevention Study, etc.]. Therefore the aim of our study was to compare the effect of intensified life style intervention on cardiometabolic parameters. **Methods:** It is ongoing randomized interventional clinical study (NCT02325804) focused on reduction of body fat. Patients are randomly assigned to one of two arms: 1) caloric restricted low carbohydrate diet (LCD) and intermittent interval exercise, or 2) classic caloric restricted diet and aerobic physical activity. In both arm diets restriction of calories 30 % and physical activity 150 minutes/week. Before and after 8 weeks of intervention all patients underwent complete medical examination [measurement of physical fitness, resting metabolic rate (RMR), body composition analysis, measurement of insulin resistance parameters, parameters of lipid metabolism, and other cardiometabolic risk factors]. **Results:** So far 25 patients finished the intervention. The average reduction of body weight was 6.8 + 4.9 kg (0–15 kg; $p = 0.0006$), accompanied with significant reduction of body fat percentage ($p \leq 0.0001$), amount of fat mass ($p = 0.03$), waist circumference ($p = 0.02$). Amount of lean mass and RMR remained unchanged. Systolic and diastolic blood pressure was reduced ($p = 0.01$, $p = 0.02$ resp.) as well as insulin sensitivity and were improved, however we were not able to find any differences in lipid parameters. **Conclusion:** Preliminary results of our study are in line of previous results about beneficial effect of intensive life style changes on reduction of cardiometabolic risk factors.

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73. Glucose metabolism, cognitive functions and physical (in)activity

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Introduction: Substantial evidence indicates that impaired glucose metabolism and sedentary lifestyle may accelerate cognitive decline, increasing the risk of Alzheimer's disease. Regular exercise represents an effective way of preventing both age-related metabolic and cognitive decline. **Objectives:** (i) to evaluate cognitive functions in seniors with prediabetes & amp; type 2 diabetes (T2D) and in controls with normal glucose tolerance (NGT); (ii) to evaluate associations of physical fitness and cognitive functions; (iii) to determine the effect of long-term aerobic-strength training on cognitive functions and metabolism. **Methods:** Study population (n = 52; 68.3 ± 7.9 yrs, M/F = 21/31) included patients with prediabetes & amp; T2D (n = 20). The level of physical activity was assessed by a validated questionnaire. Cognitive functions were determined by the battery of cognitive tests (Addenbrook's test, ACE-R; Mini Mental State Examination, MMSE; Montreal Cognitive Assessment, MoCA; computerized tests CogState and MemTrax). Glucose tolerance was evaluated by oral glucose tolerance test (oGTT) and hippocampal volume by Magnetic Resonance Imaging (MRI). Long-term supervised aerobic-strength training (2 × 1h/week, for ~12 months) was performed in a subpopulation of seniors (n = 16). **Results:** Performance in standardized cognitive tests MMSE, MoCA, ACE-R was negatively associated with 2h glycaemia (R = -0.46; R = -0.39; R = -0.43; p< 0.01) and positively with sport index (self-assessed sport activity) (MMSE, R = 0.31; ACE-R, R = 0.29, p< 0.05). Hippocampal volume negatively correlated with 2h glycemia (oGTT, R = -0.49, p< 0.05) and there was a trend towards a positive association with physical activity (leisure time index, R = 0.39, p = 0.063). Sport index and 2h glycemia were the strongest age, gender and BMI-independent predictors of cognitive functions (multiple regression analysis). Working memory test score was negatively (CogState, R = -0.47, p< 0.05) and reaction time was positively (MemTrax, R = 0.72, p< 0.05) associated with 2h glycemia. Supervised aerobic-strength training intervention improved cognitive performance in seniors with Mild Cognitive Impairment (MCI, n = 16; ACE-R, p< 0.05; learning & amp; working memory: CogState; p< 0.05). **Conclusions:** Impaired glucose metabolism and low physical activity were associated with impaired cognitive functions in seniors, supporting a role of active lifestyle in prevention of age-associated cognitive and metabolic decline. Long-term regular physical activity has a potential to improve cognitive functions in seniors with MCI.

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GUIDED E-POSTER PRESENTATIONS

74. The impact of obesity on alternative renin-angiotensin system pathways in adipose tissue

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The classical adipose renin-angiotensin system (RAS) has been found to be over-activated during the obesity and locally generated angiotensin (Ang) II may contribute to the obesity pathogenesis. The contemporary view on the RAS has become more complex with the discovery of its alternative pathways including angiotensin-converting enzyme 2 (ACE2)/Ang-(1–7)/Mas receptor and (pro)renin receptor (PRR). It has been proposed that Ang-(1–7) counteracts with most of the Ang II-mediated deleterious effects implying its beneficial role in the glucose and lipid metabolism, oxidative stress, inflammation and insulin resistance. PRR may play a role in the increasing the local