

Reactive oxygen species might be removed or inactivated by diet-derived (exogenous) antioxidants. The aim of this study was to investigate whether a diet rich in red beetroot products would affect the antioxidant capacity of human plasma.

**Methods:** A randomized, study was executed in group of fifteen obese women, age 65y (+/-4y), suffered from ischemic heart disease (IHD). All subjects received during 6 weeks red beetroot juice or fat free beetroot crisps in determined daily portions. Nutritional status (body composition, skinfold thickness), and lipid profile were estimated before and after dietetic intervention as well as concentration in plasma Total Antioxidants Status (TAS). The nutritional value of the daily diet (antioxidants vitamins, saturated fatty acids supply), was controlled during the whole intervention period by 24h recall.

**Results:** The six weeks long administration of red beetroot products, caused a significant increase TAS about 11%. No changes in nutritional status parameters and nutritional density of diets (antioxidants vitamins, fat supply) were observed.

**Conclusions:** Daily intake selected beetroot products can significantly improve the plasma antioxidant capacity of obese, suffered from IHD women.

### T3:PO.111

#### Anti-melanocortin-4 receptor autoantibodies in obesity

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**Introduction:** The melanocortin-4 receptor (MC4R) is part of an important pathway regulating energy balance. In a previous study, we have demonstrated that the generation of antibodies (Abs) against the N-terminal domain of the MC4R in rats induced a mild obese phenotype associated with insulin resistance. These findings prompted us to search for functional anti-MC4R autoAbs in sera of obese patients.

**Methods:** Anti-MC4R autoAbs were detected after screening sera from 216 patients with different body mass index (BMI) by using direct and inhibition ELISA with an N-terminal sequence of the MC4R. Binding to the native MC4R was evaluated by flow cytometry with HEK-293 cells expressing the human MC4R and pharmacological properties of the autoAbs were assessed by measuring adenylyl cyclase activity.

**Results:** Positive results in all tests were obtained in 5 patients with overweight or obesity (prevalence: 3.6%) but not in normal weight patients. The selective binding properties of the anti-MC4R autoAbs were confirmed by surface plasmon resonance and immunoprecipitation with the native MC4R. Moreover it was demonstrated that these autoAb acted as non-competitive antagonists in vitro. One of these autoAbs was evaluated in vivo and increased food intake in rats after passive transfer via intracerebroventricular injection.

**Conclusion:** The fact that functionally active autoAbs were only present in overweight and obese but not in normal weight subjects strongly suggests a possible pathogenic role. Such inhibitory anti-MC4R autoAbs might therefore contribute to the development of obesity in a small subpopulation of patients.

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### T3:PO.112

#### Tungstate central effect on leptin pathway: possible antiobesity mechanism

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**Introduction:** Tungstate has proved to be a novel antiobesity agent, acting on energy expenditure and body weight gain through leptin pathway, and modifying brain neuropeptide levels. Based on these results we investigated the molecular targets of tungstate on the CNS.

**Methods:** A hypothalamic cell line was cultured with or without leptin, tungstate, MAPK and JAK2 inhibitors (including overexpression of SOCS3). We analyzed gene and protein expression, and intracellular location of different leptin pathway proteins. We administrated tungstate to wistar rats by ICV at the 3V as an in vivo model. We performed proteomic analysis from isolated hypothalamic nucleus (ARC, LHA and PVN) using obese/control mice, treated or not with oral tungstate.

**Results:** In-vitro, tungstate treatment increases P-JAK2 (2,5 fold, p<0,05), but does not alter the P-Tyrosine-STAT3. Treatment also increases P-ERK (7,6 fold, p<0,001) and P-Serine-STAT3 (2,6 fold, p<0,01), favouring its accumulation in the nucleus (1,8 fold) to induce gene expression. Tungstate ICV administration entails a 27,6% food intake reduction and a 25,6% body weight gain reduction. Proteome analysis of hypothalamic nucleus showed different protein expression profile between lean/obese and W treated/non-treated animals.

**Conclusions:** We have identified ERK in the leptin pathway as the molecular tungstate target in neural cells. This increase in P-MAPK induces an increase in P-Serine-STAT3, modulating gene expression. Tungstate administration decreases food intake and body weight gain (ICV) and modifies hypothalamic protein expression profile. As a whole, these results demonstrate a direct central effect of tungstate modulating energy homeostasis.

### T3:PO.113

#### Homocysteine and Folic Acid Levels in Obese Children

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**Introduction:** Childhood obesity is associated with increased cardiometabolic risk. Several risk factors have been described, namely homocysteine plasma levels.

**Methods:** 56 children (29 boys; 27 girls; BMI>95<sup>th</sup> percentile) between 7-9 year-old participated in a lifestyle intervention program. Assessment at baseline included weight, height, BMI, BMI-Zscore (BMI-Zs), waist circumference (WC), Tanner stage, blood pressure (systolic (SBP) and diastolic (DBP)) and fasting serum level of glucose, insulin, C-peptide, total cholesterol, HDL, LDL, triglycerides (TG), leptin, interleukin 6 (IL-6), homocysteine and folic acid. Insulin resistance (IR) was calculated by FGIR method. Results with statistical significance (p<0.05) are presented.

**Results:** At baseline, all children presented with abdominal obesity (WC>90<sup>th</sup> percentile). IR (FGIR<6) was observed in 9% of children and 40% showed hypertension. Total cholesterol ≥180 mg/dl and TG≥100 mg/dl were found in 36% and 16%, respectively. Correlation analysis showed a linear relationship between BMI and the following variables: SBP, insulin, C-peptide, IR, leptin and TG. WC correlated positively with BMI, BMI-Zs, SBP, C-peptide, insulin, IR, leptin and homocysteine, and negatively with folic acid. IR correlated linearly with SBP, C-peptide, TG, leptin and homocysteine, and inversely with folic acid. The plasma levels of homocysteine showed a positive correlation with weight, insulin, C-peptide, leptin, IL-6 and TG. However, folic acid levels were inversely correlated with homocysteine, BMI, DBP, insulin, C-peptide, leptin and TG.

**Conclusions:** These obese children showed a significant prevalence of dyslipidemia, IR and hypertension, which were correlated with higher homocysteine levels. In contrast, folic acid seems to have a protective role.

**Conflict of interest:** None declared. **Funding:** No funding

### T3:PO.114

#### Comparative effects of amylose vs amylopectin starch on lipid metabolism in rats with dietary-induced obesity

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**Introduction:** Dietary carbohydrates have been shown to impact lipid metabolism and cardiovascular disease (CVD) risk. The objectives of this study were to compare the effects of high vs low glycaemic diets on plasma lipids and genes involved in hepatic lipid metabolism in rats with dietary-induced obesity (DIO).

**Methods:** Male Sprague-Dawley rats (n=45) with established DIO were divided into 4 groups and fed low glycaemic amylose (AMO) or high glycaemic amylopectin (AMN) starch diets in an ad libitum or energy-restricted (ER) paradigm for 4 weeks. At the end of the experiment, overnight-fasted rats were killed, and blood and liver were harvested for serum lipid and gene expression analyses.

**Results:** AMO led to lower serum concentrations of triglycerides, total and HDL-cholesterol than AMN, but only when rats were fed ad libitum (p<0.05). Semi-quantitative RT-PCR showed lower relative mRNA levels for 7 $\alpha$ -hydroxylase in the liver of rats fed ad libitum vs ER-AMN (p<0.05). On the other hand, relative levels of the LDL-receptor mRNA were higher in ER vs ad libitum feeding, independent of the diet (p<0.01). The type of starch did not affect relative mRNA levels of HMG-CoA reductase or fatty acid synthase. Western blot analyses of hepatic lipoprotein receptors are in progress.

**Conclusions:** A low glycaemic diet improves lipid metabolism under free feeding conditions, but has no advantage over a high glycaemic diet when energy intake is restricted. Differences in relative mRNA levels of genes involved in hepatic lipid metabolism account only partly for the benefits of the low glycaemic diet.

### T3:PO.115

#### Efficacy and tolerance of a protein optimised infant formula with lactose as sole carbohydrate. A randomised and controlled trial.

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**Background:** An excess in protein intake could lead to obesity and surely overload the immature renal function of the infant. A formula with the protein ratio of 1.2g/100ml confirmed its efficacy and tolerance in a clinical trial (Turck et al. JPGN 2006, 43:364-371). Several studies have enlightened the positive role of the lactose on colic flora and absorption of micronutrients.

**Objectives:** To evaluate a new infant formula with a carbohydrate fraction of 100% lactose and 1.2g/100ml proteins.

**Methods:** On term new-borns (< 7 days) were randomized to receive until the end of the 4th month (M4) exclusively, the studied formula (Group L) with 7.5 g/100 ml lactose, or the former formula (Nidal Novaia 1®, Group N) with 6.4g/100ml lactose and 1.1g/100ml maltodextrin. Both formulas are otherwise strictly identical. Formula L's non inferiority was evaluated with the average daily weight (ADW) variation by an ANCOVA analysis of the Per Protocol (PP) population. Tolerance was assessed as secondary criteria on the Intention To Treat population (ITT).

**Results:** Were included 184 newborns (ITT=178 infants; PP=137 infants). ADW was under the non inferiority range (+/-2.5g/d). The daily intake in ml/kg was significantly lower in the group L (ITT =-5.28ml/d/kg; p<0.007). Frequency of undesirable events including transit disorders were similar in the two groups.

**Conclusions:** These results validate the efficacy and tolerance of this formula and prove that a formula should be seen in its globality. Protein and carbohydrate changes of the formula leads each time to lower intake suggesting a better proteino-energetic use.

### T3:PO.116

#### Age-Dependent Neurochemical And Behavioural Effects Of Developmental Treatment With Pufas In Rats

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**Introduction:** Polyunsaturated fatty acids (PUFAs) composition of neural membranes is a key factor for brain development and function including cognition.

**Methods:** In rat studies supplementation and moderate deficiency of PUFAs were maintained during fetal development and early postnatal age and their impact on fatty acid composition of different phospholipids and on behavioural development and cognition ability up to old age were followed. Four ages were compared: 12<sup>th</sup> postnatal day, puberty, adult (12-month) and old (28-month) ages. Fatty acids were determined by gas chromatography. Spatial learning behaviour in Morris water maze was tested in the adult and 28 months old ages and behavioural stress sensitivity was also investigated at the adult age.

**Results:** As a result of PUFA supplementation the content of n-3 docosahexaenoic acid (DHA) increased in most of the phospholipid fractions starting from the age of 12 days up to the one year old adult age. By the old age no difference in the fatty acid composition of nervous tissue membranes were detected any more between groups, however behavioural effect could be found even in the 28 months old age. The PUFA supplementation improved spatial learning, while the moderate PUFA deficiency acted into the opposite direction in cognition and decreased resistance against psychic stress.

**Conclusion:** Both the supplementation and the deficiency of PUFAs during development have long-term effect on fatty acid composition of nervous tissue membrane phospholipids up to adult age, but the functional consequences on cognition lasted even longer up to the old age of 28 months. Supported by Hungarian Scientific Research Fund (OTKA) K68875 and Ministry of Health Research Grant (ETT) 21/2006 to CN

### T3:PO.117

#### Changes in leptin receptor (Ob-R and Ob-Rb) mRNA in human peripheral blood mononuclear cells (PBMC) with obesity and age.

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**Introduction:** The expression of total leptin receptor (Ob-R) and the long-signalling form (Ob-Rb) were measured by real time RT-PCR in PBMC to determine whether changes could be detected with obesity and ageing in humans.

**Methods:** Blood was sampled from lean (n= 8; BMI, 20-26 kg.m<sup>-2</sup>) and obese (n= 5; BMI 30-36 kg.m<sup>-2</sup>) young (23-38 years) men as well as lean (n= 9; BMI, 20-26 kg.m<sup>-2</sup>) and obese (n= 7; BMI 30-36 kg.m<sup>-2</sup>) older men (50-64 years). Reverse transcribed cDNA from PBMC cells was ampli-