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 a 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 crisp in determined daily portions. Nutritional status (body composition, skinfold thickness), and lipid profile were estimated before and after dietary 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**


1. Applied Pharmacology, Biozentrum, University of Basel, CH 4056 Basel, Switzerland. 2. CNRS UPR 9021, Laboratory of Therapeutic Immunology and Therapeutic Chemistry, Institut de Biologie Moleculaire et Cellulaire, 15, rue René Descartes, F 67000 Strasbourg, France; 3.Forenape Therapeutic Discovery, 11, rue Humann, F 67000 Strasbourg, France; 4. Medizinische Klinik I, Stadtklinik Baden-Baden, Balgerstrasse 50, D 76532 Baden-Baden, Germany; 5. Endocrinology, Nutritional Diseases, Hopitaux Universitaires de Strasbourg, F 67000 Strasbourg, France

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 adenyl 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 sub-population of patients.

Conflict of interest: None disclosed. Funding: No funding

**T3:PO.112**

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


1. Ciber de Diabetes y Enfermedades Metabólicas Asociadas, Laboratorio de Diabetes y Obesidad, IDIBAPS, Hospital Clinic, Barcelona, Spain. 2. UMR 5241 UPS-CNRS, IFR 109, CHU Rangueil, Toulouse, France.

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 localization 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 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 royal/unroyalized animals.

Conclusions: We have identified ERK in the leptin pathway as the molecular target of tungstate. This increase in P-STAT3 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**

Pedrosa, C.; Albuquerque, I.; Guimarães, J.; Simões-Pereira, C.; de Almeida, M.D.V.; Correia F.

1. Hospital Infantile D.Pedro, Aveiro, Portugal 2. Faculty of Nutrition and Food Sciences - University of Porto, Porto, Portugal.

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>95th percentile) between 7-9 year-old participated in a lifestyle intervention program. Assessment at baseline included weight, height, BMI, Z-score (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 FRIIR method. Results with statistical significance (p<0.05) are presented.

Results: At baseline, all children presented with abdominal obesity (WC>90th percentile). IR (FQIR<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, 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.

Conflict of interest: None disclosed. Funding: No funding
Comparative effects of amylose vs amylopectin starch on lipid metabolism in rats with dietary-induced obesity

Aziz, A.;* Goulet, B.;+ Kenney, L.;* Cockell, K.;* Griffin, P.*
1Health Canada, Ottawa, Ontario, Canada
2University of Ottawa, Ottawa, Ontario, Canada

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 7α-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.

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

1Hôpital Jeanne de Flandre, Lille, France
2Hôpital Ambroise Paré, Boulogne Billancourt, France
3Nestlé Nutrition Infantile, Nestlé France, Noisiel,France
4ICD, Strasbourg, France
5Hôpital Armand Trousseau, Paris, France

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 newborns (<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-energy use.

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

Hoggard, N.;* Bashir, S.;* Cruickshank, M.;* Tsolfiou, F.;* Jackson, D.M.;* Fyfe, C.;* Horgan, G.;* Sneddon, A.A.;* Williams, L.M.*
1Obesity & Metabolic Health Division, Aberdeen Centre for Energy Regulation and Obesity (ACERO), University of Aberdeen Rowett Institute of Nutrition and Health Aberdeen, Scotland, UK.
2Biostatistics and Statistics Scotland, Aberdeen, Scotland, UK.

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/m²) and obese (n=6; BMI: 30-36 kg/m²) young (23-38 years) men as well as lean (n=9; BMI, 20-26 kg/m²) and obese (n=7; BMI: 30-36 kg/m²) older men (50-64 years). Reverse transcribed cDNA from PBMC cells was ampli-