Methods: Altogether 79 volunteers with elevated fasting plasma glucose (5.5-6.9 mmol/l), BMI 25-36 kg/m^2 and age 43 to 72 years participated in the 12-week parallel randomized controlled trial with four groups. The fatty fish group consumed 4 meals of fatty fish per week to provide ~ 1 g EPA and DHA per day. The lean fish group consumed 4 meals of lean fish per week. The ALA group ingested camelina sativa oil in order to get 10 g ALA per day. The control group consumed lean meat products. Control and ALA groups were allowed to eat 1 fish meal per week. The study diets were isocaloric. Oral glucose tolerance test (OGTT) and frequently sampled intravenous glucose tolerance test (FSIGT) were performed and blood samples for analyses of serum lipid profile, fatty acids, inflammatory markers and metabolomics and lipidomics profiles were drawn at the beginning and at the end of the intervention. ANCOVA models adjusted for age, gender, use of statins and baseline value was used for comparing changes between the groups.
Results: There were major changes in the fatty acid composition of phospholipids, cholesteryl esters and triglycerides in eicosapentaenoic acid, docosahexaenoic acid in the fatty fish group and ALA in the ALA group, which reflect good compliance to the diets. No significant changes in glucose and insulin metabolism were found based on OGTT or FSIGT. Concentrations of total and LDL cholesterol (C), LDL-C/HDL-C ratio and Apo B/Apo A-I ratio changed significantly differently between the groups. The biggest changes were seen in the ALA group where the total and LDL-C concentrations decreased compared with the fatty fish group and the lean fish group, and LDL-C/HDL-C and Apo B/Apo A-I ratios decreased compared with the lean fish group. Inflammatory markers - high sensitivity C-reactive protein (CRP), Interleukin 1 receptor antagonist (IL-1Ra) and Interleukin 1 beta (IL-1 beta) - did not change during the intervention.
Conclusion: The results suggest that a diet enriched in ALA could improve the serum lipid profile in subjects with impaired glucose metabolism. Changes in lipid metabolism are going to be studied in-depth utilizing metabolomics and lipidomics methods.
Protocol registration: ClinicalTrials.gov NCT01768429
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Short Oral Abstract 3 - A High-Protein Diet Reduces Liver Fat Content and Improves Glomerular Filtration Rate in Subjects with Type 2 Diabetes (Mariya Markova, Germany)

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Objective: Previous studies reported both favourable and adverse impacts of high-protein diet in type 2 diabetes. In our study, we evaluated in detail the effects of two isocaloric high-protein diets of animal (AP) and plant (PP) origin in type 2 diabetic patients.
Methods: Individuals with type 2 diabetes were randomized to either high-animal or high-plant protein diet (30% protein, 40% carbohydrates, 30% fat) for 6 weeks. The AP diet was rich in meat and dairy foods, while the PP group received products with high amount of dietary pulses and pea protein. Blood samples were collected every two weeks to measure routine parameters. Magnetic resonance imaging was performed at the beginning and at the end of the study.
Results: The study included 30 subjects (age 65±6 years, BMI 30.5±3.6 kg/m^2, HbA_{1c} 7.0±0.6%). We observed reduction of cholesterol, LDL- and HDL-cholesterol in all participants. Levels of liver parameters (AST, ALT, GGT) in blood improved significantly after diet intervention in both groups.