

The worldwide prevalence of overweight and obesity is increasing. In 2014, more than 1.9 billion adults were overweight. Where of over 600 million were obese. Obesity is generally associated with metabolic abnormalities and increases the risk of type 2 diabetes, hypertension, and cancer. Inappropriate nutrition habits of obese people may lead to caloric excess and fat deposition but also to micronutrients deficiency. A link between body weight and the so called one-carbon metabolism has been recently recognized. One carbon metabolism is a group of biochemical reactions, which involve changes of methionine and folate. The above-mentioned link has been not sufficiently investigated.

The main objective of the project is to answer to the question whether or not obesity is associated with changes in one-carbon metabolism. We plan to enroll a group of normal-weight and overweight/obese people and to compare several parameters in both groups.

Food intake assessment will be done by the dietary records method. Anthropometric measurements will include body mass and height measurements, as well as analyses of body composition. Biomarkers of one-carbon metabolism will be analyzed: including homocysteine, cysteine, choline, trimethylamine oxide, betaine, and folic acid. We also plan analyze how polymorphisms of genes encoding enzymes of one-carbon metabolism may affect those parameters. *PEMT* and *MTHFR* enzymes are the most important for one-carbon metabolism. For that reason *PEMT* and *MTHFR* genes will be analyzed.

Obtaining the answers to the research questions of this proposal is important for the development of basic knowledge on human metabolism. In particular, on interactions between lipid and the one-carbon metabolism. The results can also be translated into practice. Possibly unfavorable health effects of long-term intake of an imbalanced diet (based on energy dense foods) may be diminished by a dietary intervention targeted at decreasing deficiencies of specific nutrients.