Lifestyle changes, including diet may negatively affect the function of the gastrointestinal (GI) tract. Not without reason, the intestines are called the “second brain”; they are responsible not only for controlling of the digestive processes but also via neurons connecting to the brain, participate in the stress response and a range of immune defence mechanisms. In case of pathogen invasion, they send the signal to the main control centre in the body- the brain, which guides all processes to maintain homeostasis. Therefore, the type of diet and the variability of nutrients including proteins, carbohydrates, fats and vitamins, have undoubtedly an immense impact on the proper functioning of the gut and entire body.

Irritable bowel syndrome (IBS) is a chronic, relapsing functional bowel disorder associated with altered GI motility, secretion and sensation. It is the most commonly diagnosed GI condition in the population worldwide with no identifiable etiopathology. Currently, anti-IBS therapy consists mainly of symptomatic treatment. In line, the up-to-date studies suggest the positive impact of a diet modification i.e. the elimination of the consumption of fermentable oligo-, di-, monosaccharides and polyols (FODMAP), wheat products and insoluble fibre, in alleviating the symptoms of IBS. Besides the general assumptions that diet rich in high-fat, particularly saturated fat, delays the GI transit, the mechanism behind it remains uncertain.

Through this project we address the question whether changes in the fatty acids (FAs) intake with simultaneous inhibition of the fatty acid binding protein 4 (FABP4), a protein responsible for the uptake, metabolism and transport of FAs, affect GI motility, stool consistency and visceromotor function and thus can be useful in the treatment of IBS. The project consists of three phases: phase 1 includes animal studies, in which mice will be allocated to one of three groups fed with either normal chow, diet supplemented with evening primrose oil or with coconut oil, and injected with the selective FABP4 inhibitor for 8 consecutive weeks. After that time, the lower GI transit in both physiological and pathophysiological conditions and visceral pain (mouse models mimicking IBS), will be assessed. Tissues will be collected and the expression of FABP4 at the protein and mRNA level will be measured in each animal. FABP4 is secreted mainly by white adipose tissue (WAT), hence, in phase 2 we will determine the effect of FABP4 inhibition on differentiation, viability, proliferation and lipogenesis of adipocytes. Finally, phase 3 includes determination of the expression of FABP4 in the serum obtained from IBS patients and control group. Moreover, dietary questionnaires will serve as additional information about the fat intake of each patient.

A vast majority of IBS patients notice a substantial amelioration of symptoms just after the introduction of dietary modifications in their daily life. This study is expected to extend our knowledge regarding the role of FABP4 in the pathophysiology of IBS. FABP4 may become a novel therapeutic target in the treatment of IBS.