

White and brown fat cells (adipocytes) play a prominent role in maintaining energy homeostasis and metabolism. White adipose tissue is a specialized energy storage and an endocrine organ which is able to release energy during negative energy balance. However, alerted accumulation of fat tissue leads to obesity which is a serious health problem. In obesity fat cells produce hormones and metabolites which promote development of cardiovascular diseases type 2 diabetes or several types of cancer. On the other hand, another type of fat tissue, termed brown adipose tissue, produces heat, promotes energy expenditure and, consequently, protects from body weight gain. It is important to note that there is a growing evidence showing that obese individuals have reduced content of brown adipose tissue as compared to lean subjects. Interestingly, it was demonstrated that cold stimulation or exercise can induce brown phenotype in white adipocytes (browning of white adipocytes). Importantly, browning of white fat cells improves obesity-associated metabolic abnormalities. Thus, all over the world great efforts are made in order to identify tools able to induce brown adipocytes development, browning of white fat cells and improve adipose tissue functions. Our recent data showed that newly discovered peptide hormone termed as phoenixin stimulates white adipogenesis. However, the role of this hormone in controlling generation of brown fat cells, as well as browning and functions of white adipocytes and obesity is unknown. Therefore, in this project we are going to evaluate the role of phoenixin in the development of brown adipocytes as well as in browning of white fat cells. Furthermore, we will study the effects of phoenixin on lipid and glucose metabolism and endocrine functions of rodent and human white adipocytes. In addition, the effects of phoenixin on metabolic status and adipose tissue functions in mice with experimentally-induced obesity will be investigated.

We expect that the results of this project will improve our understanding of phoenixin functions in brown and white fat tissue and provide information about its potential role in therapy of obesity and obesity-related diseases.