White and brown adipose tissue play a prominent role in maintaining energy homeostasis. White adipose is specialized energy storage and endocrine organ. Its alerted accumulation leads to obesity. By contrast, brown adipose tissue generates heat, thus promotes energy expenditure and protects from obesity. Notably, obese individuals have reduced content of brown adipose tissue as compared to lean subjects. Obesity is one of the most series health problem. It is well known that obesity is associated with abnormal adipose tissue functions. Fat cells produce large numbers of hormones and metabolites which promote development of cardiovascular and liver diseases or cancer. Furthermore, obese individuals often suffer from type 2 diabetes mellitus. This disease is characterized by insulin resistance (insulin is the main hormone produced in pancreatic beta cells which controls blood glucose levels). However, during development of type 2 diabetes diabetic patients display beta cell loss and impaired insulin secretion. Thus, all over the world there are great efforts in order to identify tools able to improve adipose tissue and pancreatic beta cells functions in obese and diabetic individuals. There is growing evidence that one of them may be adropin. Adropin is a peptide hormone produced mainly in the liver and brain. It was found that in obesity adropin improves metabolism and insulin sensitivity. On the other hand, adropin deficiency was associated with higher risk of obesity and insulin resistance. Interestingly, the role of adropin in controlling white and brow tissue and pancreatic beta cell functions is unknown. Therefore, in this project we are guing to answer the questions about the role of adropin in the development of white and brown adipose tissue. Furthermore, we will study whether adropin modulates insulin sensitivity, metabolism and production of adipose tissue hormones. Furthermore, we are going to investigate the role of adropin in controlling biology of pancreatic endocrine cells including beta cells. Particularly, the project will focus on beta cell growth and death and insulin production and release. Moreover, experiment with type 2 diabetic mice should answer the question about the effects of adropin in adipose tissue and pancreatic endocrine cells in the living organism. We believe that the results of this project will improve our understanding of adropin functions and its potential role in the therapy of obesity and obesity-related diseases such as type 2 diabetes mellitus.