

Adipose tissue plays a prominent role in the organism – it accumulates lipids, prevents internal organs from injuries and secretes biologically active hormones (adipokines). However, excess of adipose tissue results in obesity, one of the diseases of civilization. Causes of weight gain are complex and are related to impaired metabolism. Expansion of adipose tissue may occur as a result of increased number and size of adipocytes. Obesity results in higher prevalence of other diseases, e.g. type 2 diabetes, cardiovascular disease, and hormonal disorders. Additionally, obesity is related to chronic adipose tissue inflammation. There are three main types of adipocytes – white, brown, and beige. Each type plays a different role in the body – white adipose tissue (WAT) accumulates lipids and may contribute to obesity, while brown adipose tissue (BAT) generates body heat, promotes energy expenditure and protects from body weight gain. Beige adipose tissue is an intermediate form between white and brown adipose tissue. White adipocytes may transform into beige adipocytes during browning process and play a similar role to brown adipocytes.

The aim of the project is to characterise the effects of newly discovered hormone neuronostatin on brown adipogenesis (development of new adipocytes). Moreover, the influence of neuronostatin on browning of white adipocytes will be studied. Furthermore, the effect of neuronostatin on lipid and carbohydrate metabolism and endocrine functions of white adipocytes will be evaluated. Furthermore, we will utilize mice with experimentally induced obesity to study the effects of neuronostatin on adipose tissue and metabolism during obesity.

Currently, the effect of neuronostatin on brown adipose tissue and mature white adipocytes remains unknown. Describing the mechanisms involved in neuronostatin effects on adipocytes, including adipogenesis and lipid and carbohydrate metabolism, will be an innovative contribution to adipose tissue research. Conclusions from this research may contribute to the development of new therapeutic strategies in obesity treatment and obesity-related disease. We expect that our study will contribute to better understanding of neuronostatin effects and its physiological role in the body.