

## **Abstract**

Adipocytokines released by the adipose tissue play an important role in the regulation of immune and inflammatory responses. In obesity their production is dysregulated, which is one of the major factors contributing to the onset of a chronic low-grade systemic inflammation representing a risk factor for the progression of other diseases, such as atherosclerosis or type-2 diabetes. The main goal of this thesis was to analyze the secretion of selected adipocytokines (adiponectin, IL6 and MCP1) by in-vitro differentiated adipocytes, isolated from the adipose tissue prior to and after a dietary intervention, and this under basal conditions and during stimulated lipolysis. In case of adiponectin, the secretion of its isoforms was analyzed too. The concentration of adiponectin, IL6 and MCP1 was determined by the ELISA method, the Western Blot method was used to determine the distribution of the adiponectin isoforms.

The thesis also concentrates on the gene expression of ATF3, ATF4 and HSPA5, factors engaged in the ER stress in the course of the differentiation of adipocytes. The changes in the gene expression were measured by the quantitative Real Time PCR method. At the same time the development of the endoplasmic reticulum (ER) in the course of adipogenesis was monitored by indirect immunofluorescence.

Changes in the secretion of adipocytokines (adiponectin, IL6 and MCP1) resulting from the weight reduction induced by the dietary intervention were not proven.  $\beta$ -adrenergic stimulation caused a reduction in the secretion of adiponectin and a significant increase in IL6. Direct addition of cAMP led to even a higher secretion of IL6, but the secretion of MCP1 was, on the contrary, decreased. The analysis of the secretion of adiponectin isoforms showed that in vitro adipocytes predominantly produce the HMW isoform, while cAMP-induced decrease of HMW secretion was significant only in adipocytes derived before the dietary intervention.

The differentiation of adipocytes increased the expression of the genes engaged in the pathways activated predominantly by the ER stress (ATF3, ATF4 and HSPA5). These results suggest that the differentiation of adipocytes is related to the development of the ER or the ER stress.