

## **ABSTRACT**

Obesity and its associated comorbidities increase the risk of mortality. The development of subclinical inflammation associated with obesity also plays a significant role in this. In our work, we focused on changes in the endocrine and mitochondrial function of adipose tissue and their relationship to cardiovascular complications.

The first part of the thesis focuses on determining the expression of mitochondrial and endoplasmic reticulum genes in epicardial and subcutaneous adipose tissue, intercostal muscle or right myocardial atrium in patients with atherosclerotic coronary artery disease. Patients with coronary artery disease had reduced expression of several mitochondrial chain genes in epicardial adipose tissue compared to subcutaneous adipose tissue and other tissues, while no change in endoplasmic reticulum gene expression in the above-mentioned tissues has been demonstrated. Based on decreased mitochondrial gene expression in patients with coronary artery disease, we conclude that mitochondrial dysfunction of epicardial adipose tissue may contribute to the development of coronary atherosclerosis.

The second part of the thesis is focused on neudesin, new potential regulator of energy metabolism, in obese patients with type 2 diabetes mellitus (T2DM), who underwent various weight reduction interventions, such as the duodeno-jejunal sleeve liner (DJBL), gastric plication (GP) or acute starvation. We demonstrated different regulation of serum neudesin levels in acutely fasting patients compared to patients with chronic weight loss. In patients with DJBL, higher levels of neudesin were detected 6 and 10 months after the insertion of DJBL, while these changes did not occur in patients after GP. Acutely fasting patients had lower levels of neudesin after 48 and 72 hours of fasting and 2 hours after refeeding. Neudesin mRNA expression was temporarily increased 6 months after GP in obese patients with T2DM compared to patients without T2DM. No differences in neudesin mRNA expression between subcutaneous and visceral adipose tissue during the GP procedure were demonstrated.

The results of this thesis emphasize the importance of mitochondrial and endocrine dysfunction of adipose tissue in the regulation of energy metabolism and the development of atherosclerotic complications.

**Key words:** adipose tissue, subclinical inflammation, energy metabolism, cardiovascular disease, obesity, neudesin