

ABSTRACT

Subclinical inflammation plays a pivotal role in the development of obesity-related complications including type 2 diabetes mellitus, hypertension and cardiovascular diseases. Macrophages are considered important players participating in the initiation and progression of subclinical inflammation within as well as outside of adipose tissue.

The first part of this dissertation thesis was focused on macrophage characterization and their quantitative and qualitative changes accompanying metabolic improvements after bariatric surgery. We have demonstrated that the number of macrophages in subcutaneous adipose tissue is reduced regardless of their M1 or M2 polarization manifested as positivity of both the M1-associated CD40 antigen and the M2-associated CD163 and CD206 antigens 6 months after bariatric surgery. Thus, as suggested by previously published data, subcutaneous adipose tissue macrophages seem to have a mixed phenotype. We further confirmed a higher number of non-classical monocytes, which play a role in the control of vascular integrity, in obese subjects as well as a classical monocyte-derived origin of CD163 positive monocytes. Our data also support the previous suggestion of the soluble form of CD163 antigen being a suitable marker of metabolic complications of obesity.

The second part of the dissertation thesis was focused on the determination of proteins belonging to the angiopoietin-like protein family - ANGPTL6, 4 and 3, which have been shown to influence glucose, lipid and energy metabolism. We found increased ANGPTL6 levels in patients with anorexia nervosa suggesting its dependence on nutritional status. Determination of ANGPTL6 mRNA expression in adipose tissue suggests a possible local function of ANGPTL6 protein in adipose tissue. ANGPTL4 levels were higher in obese patients both with and without diabetes and decreased after bariatric surgery, while being reduced in subjects with anorexia nervosa. ANGPTL3 concentrations showed an opposite pattern compared to ANGPTL4.

The data presented in this thesis might contribute to a better understanding of regulatory mechanisms involved in the development of subclinical inflammation and type 2 diabetes mellitus in obese patients and to more efficient and precisely tailored treatment options.