Abstract

Energy metabolism involves processes of energy intake and energy expenditure, including storage of excessive energy in a form of lipids. White adipose tissue stores energy and plays an important role in maintenance of energy homeostasis. Animals obtain energy by oxidation of substrates from diet. Indirect calorimetry is a method for assessment of energy expenditure based on a measurement of oxygen consumption and carbon dioxide production. The VCO_2/VO_2 ratio (Respiratory Quotient) indicates oxidation of specific metabolic substrates. Metabolic flexibility is the ability of an organism to match substrate oxidation to its availability. The decrease of a metabolic flexibility is linked to inability to adapt to available substrate and with excessive lipid storage in the body. In this thesis we evaluated correlation between the metabolic flexibility defined by indirect calorimetry and the adipose tissue metabolism in two strains of mice, C57Bl/6J and AJ, that differ in their propensity to diet-induced obesity. Increased whole-body metabolic flexibility in A/J mice was connected to higher ability of adipose tissue to release and uptake lipids. The study of reaction to high-fat diet enables us to distinguish „metabolically healthy“ and „metabolically unhealthy“ adipose tissue. The knowlegde of these mechnisms forms a basement for further development of anti-obesity drugs.

Key words:

Energy metabolism, white adipose tissue, energy homeostasis, indirect calorimetry, Respiratory Quotient, metabolic flexibility, obesity