Abstract

Glycosylation O-linked *β*-N-acetylglucosamine (O-GlcNAc) is post-translational modification of proteins, regulated by *β*-N-acetylglucosaminyltransferase (OGT) and *β*-N-acetylglucosaminidase (OGA). This intracellular glycosylation differs from the other glycosylation types – it is dynamically regulated, similarly to phosphorylation, *β*-N-acetylglucosamine serves as a nutrient and stress sensor in cell. Chronically dysregulated O-linked glycosylation by GlcNAc is associated with pathology of various diseases, such as diabetes mellitus type II, oncological and neurodegenerative diseases. Expression of enzymes OGT and OGA is very sensitive for homeostasis of GlcNAc, which is the product of hexosamine biosynthetic pathway. Changes in expressions of these ezymes could be used as a potencial blood marker, e.g. in early stage of diabetes.

The aim of this master thesis was to study changes in expression of genes encoding ezymes OGT and OGA in cohort of obese patients in comparison with healthy controls and also to compare the state before and after change of lifestyle (loosing weight). Analysed cohort comprised of 34 samples of isolated lymphocytes from peripheral blood from obese adolescent patients and 80 samples of adults patients. RNA was isolated by TriReagent, quantification of the expression of mRNA was measured by qPCR.

Analysis of relative gene expression of *OGT* in obese adolescent cohort cohort did not revealed any significant diferencies in comparison with controls. There was seen descending trend in expression of *OGT* during the time in obese adolescent group after change of healthy lifestyle. Study of connection of O-GlcNAc glycosylation with defined metabolic state could simplify finding of diagnostic and monitoring markers and also broaden our knowledge about pathophysiology of chronical diseases.

Key words: *β*-N-acetylglucosamin, *β*-N-acetylglucosaminyltransferase, *β*-N-acetylglucosaminidase, diabetes, nutrition