

## Streszczenie w języku angielskim

Type 2 diabetes mellitus (T2DM) is the most common metabolic disorder. Chronic hyperglycemia can cause dysfunction and failure of the eyes, kidneys, nerves, heart, and blood vessels. The most common and dangerous complication of diabetes is ischemic heart disease (IHD). Currently, there is no dedicated tool to predict the early development of IHD in patients with T2DM. Coronary angiography or echocardiography are invasive methods and can diagnose the disease at an advanced stage. There is an urgent need to identify new non-invasive biomarkers for detecting IHD in patients with T2DM. Circulating microRNAs (miRNAs) from serum have great potential to serve as a marker for early diagnosis of IHD and identification of individuals with a predisposition to its development. MiRNAs are short, single-stranded, non-coding, endogenous RNAs that play a pivotal role in gene expression regulation and are involved in processes such as proliferation, differentiation, angiogenesis, oncogenesis, and cell apoptosis.

The main aim of this study was to analyse the profile of miRNAs and identify potential diagnostic biomarkers in the serum of patients with IHD as a complication of T2DM. Among the 69 subjects qualified for further analysis, the following subgroups were identified: patients with T2DM and IHD, patients with T2DM without IHD, patients with IHD, and a control group without T2DM and IHD. Collected serum samples served as material for miRNA profiling. The expression of miRNAs was profiled using NanoString's nCounter platform. The results were validated by RT-qPCR. Analysis of the results was performed using STATISTICA and nSolver 4.0 software. Ingenuity Pathway Analysis software, STRING database, Cytoscape, g:Profiler, and Metascape programs were used for functional analysis. Six miRNAs (miR-615-3p, miR-3147, miR-1224-5p, miR-5196-3p, miR-6732-3p, and miR-548b-3p) were identified as significantly upregulated in T2DM IHD group. Functional analysis showed that genes regulated by the selected miRNAs are involved in processes leading to cardiovascular dysfunction. All identified miRNAs have high diagnostic power and may serve as novel, non-invasive biomarkers for the early detection of IHD in T2DM patients. A diagnostic classification model created using logistic regression based on miR-615-3p and miR-3147, most accurately distinguished T2DM patients with IHD from T2DM patients without IHD (AUC= 0.935).