

MIR-423-3P AS A BIOMARKER OF DIABETIC RETINOPATHY IN PATIENTS WITH TYPE 2 DIABETES IN THE KAZAKH POPULATION

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Background: Diabetic retinopathy (DR) is a leading cause of blindness among working-age individuals globally. In Kazakhstan, the prevalence of type 2 diabetes mellitus (T2DM) is rising, making DR a significant public health concern. Early detection of DR is challenging due to its asymptomatic onset, necessitating the identification of reliable biomarkers for timely diagnosis.

Objective: This study aimed to evaluate the potential of plasma microRNAs (miRNAs) as biomarkers for DR in the Kazakhstani population.

Materials and Methods: We conducted a case-control study involving 100 T2DM patients with DR, 98 T2DM patients without DR, and 30 healthy controls. Plasma samples were collected from four medical institutions in Almaty between 2020 and 2021. Quantitative real-time PCR was employed to assess the expression levels of ten candidate miRNAs. Statistical analyses included Mann–Whitney U tests, Pearson’s χ^2 tests, Spearman’s correlation coefficients, and multiple linear regression. Receiver operating characteristic (ROC) analysis was performed to evaluate the diagnostic

performance of miRNAs.

Results: The expression level of miR-423-3p was significantly lower in DR patients compared to those without DR (pFDR = 5.4×10^{-3}). Additionally, miR-423-3p levels were reduced in DR patients compared to healthy controls (pFDR = 5.4×10^{-3}). However, the diagnostic accuracy of miR-423-3p was limited, with area under the curve (AUC) values ranging from 0.6 to 0.7, indicating poor diagnostic potential.

Conclusion: While miR-423-3p demonstrates differential expression in DR patients, its low diagnostic accuracy precludes its use as a standalone biomarker for DR in the Kazakhstani population. Further research is needed to identify more reliable biomarkers for early detection of DR.

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Key words: miR-423-3p, Diabetic Retinopathy, Type 2 Diabetes, Biomarker, Plasma microRNA, Kazakh Population