



**Fund “Nauka” Project № 22001 Resume – Competition-Based Session 2022:
“Role of selected plasma microRNAs as diagnostic and prognostic biomarkers in
myelodysplastic syndrome”**

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MicroRNAs have a key role in the regulation of hematopoiesis and it has been established that there is correlation between their different expression in myelodysplastic syndrome (MDS) and the clinical course of the disease and its transformation into acute myeloid leukemia (AML).

The aim of this research is to determine how specific plasma microRNAs influence the diagnosis and prognosis of patients with different forms and risk groups of myelodysplastic syndrome. Similar studies in foreign literature are scarce, and in Bulgaria – absent.

Patients over 18 years of age, diagnosed with MDS according to the 2016 WHO diagnostic criteria as well as healthy controls will be included in the study. Risk will be determined according to the revised International Prognostic Scoring System (IPSS-R) and patients will be divided into two groups: high-risk MDS, including the categories of very high and high risk, and low-risk MDS, including the categories of very low, low, and intermediate risk.

The aim of the study is to determine the expression levels of some plasma microRNAs in MDS patients compared to healthy individuals and to establish their role as non-invasive biomarkers with diagnostic and prognostic value.

The results showed significantly lower levels of miR-451a, miR-144, miR-16, and let-7a in MDS patients compared with healthy controls. Higher let-7a levels were associated with a higher percentage of bone marrow blasts and a higher R-IPSS risk, while lower levels of miR-144 and miR-451a were associated with intermediate cytogenetic risk. Correlations were identified between individual microRNAs and laboratory parameters (LDH and ferritin). A diagnostic model was developed in which miR-22 and miR-451a were identified as the strongest predictive biomarkers.

The results were reported through a peer-reviewed publication (*Scripta Scientifica Medica*, 2025) and presentations at an international conference (MDS 2025, Rotterdam) as well as a national scientific forum. In addition, the project supported the successful defense of a doctoral dissertation and the conferral of the PhD degree.