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MicroRNA Profiling Reveals Novel Circulating Biomarkers in Acute Phase of Myocardial Infarction

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Abstract : Introduction and aims: Acute myocardial infarction (AMI) is one of the most severe cardiovascular diseases affecting millions of patients each year worldwide. An early and accurate diagnosis of AMI is essential for optimal treatment. Therefore, new approaches that can complement and improve current strategies for AMI diagnosis are urgently needed. Recent studies have revealed the presence of stable circulating myocardial-derived microRNAs (miRNAs) in human peripheral blood, suggesting that such miRNAs could serve as potential biomarkers of infarction. The present study aimed to identify differentially expressed circulating miRNAs in ST-segment elevation myocardial infarction (STEMI) patients. Materials and methods: miRNA expression profile analysis was performed using Exiqon Serum/Plasma Focus microRNA PCR panel in plasma samples of n=16 patients on the first day of AMI (admission) and in samples from the same patients collected six months after AMI. Selected miRNAs were validated by RT-qPCR using serum samples from an independent set of n=14 AMI patients. Results: The profiling study identified 46 species of plasma miRNAs that were differentially expressed ($p < 0.05$) on admission compared to six months after AMI. The validation in the independent group of patients confirmed that miR-133b and miR-22-5p were significantly up-regulated upon AMI. Conclusions: Our results suggest that miRNA expression profiling provides better understanding of the changes that occur in the acute phase of MI in the myocardium and could be useful in determination of the potential role of extracellular miRNAs as paracrine signaling molecules. miR-22-5p represents a novel promising biomarker for the diagnosis of acute myocardial infarction.

Keywords : acute myocardial infarction, circulating microRNAs, microRNA expression profiling, miR-22-5p
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