

Abstract

MicroRNA (miRNA) are short non-coding RNA molecules that regulate gene expression at the post-transcriptional level. Many miRNAs are involved in the pathogenesis of cardiovascular diseases, which is associated with altered gene expression. This work compares miRNA gene expression profiles among various biological sources – whole peripheral venous blood (whole PB), plasma and plasma exosomes. For all tested groups combined, the expression levels of miRNA were maximal in whole PB and lowered in plasma and plasma exosomes, and the expression levels of miRNA were higher in plasma than in plasma exosomes, except miR-126-3p, which had a higher level detected in plasma exosomes compared to plasma. This work also compares expression levels of cardiovascular miRNA between women with anamnesis of gestational diabetes mellitus (GDM) and physiological gravidity 3-11 years postpartum in whole PB, plasma and plasma exosomes. In whole PB, 12 of 29 tested miRNAs were up-regulated in women with prior exposure to GDM. MiR-181a-5p was up-regulated in plasma exosomes and miR-499a-5p in plasma in women with prior exposure to GDM. The changes in whole peripheral venous blood seem to reflect the complex systemic response to the changes that occurred during the onset of GDM. Women with aberrant epigenetic profiles may have an increased risk of later development of cardiovascular disease and therefore may benefit from early implementation of primary prevention strategies.

Keywords: microRNA, whole peripheral venous blood, plasma, plasma exosome, gestational diabetes mellitus, cardiovascular disease