

MicroRNAs as Biomarkers for Personalized Antiplatelet Therapy

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MicroRNAs (miRNAs) are small, single-stranded, noncoding RNAs (~22 nucleotides) with a central role in posttranscriptional regulation of gene expression. Notably, miRNAs also circulate in blood, predominantly in microparticles, acting to shuttle gene-regulating signals between cells.^{1,2} The presence of specific miRNAs in blood marks specific pathological changes in tissues and may therefore serve as a disease biomarker.^{1,2} The search for specific miRNAs as disease biomarkers has exploded with over 27,000 total PubMed publications (4,724 from 2020 alone), demonstrating an enormous interest in circulating miRNAs in all areas of medicine.

Recent findings have shown the potential of miRNAs as biomarkers of platelet function and therapeutic efficacy.³ As the effectiveness of antiplatelet therapy varies substantially between patients, there is a strong need for biomarkers to aid in providing personalized antiplatelet therapy.

In this issue of *Thrombosis and Haemostasis*, Garcia et al⁴ identify an important role of miR-204-5p on in vitro platelet production and function. miR-204-5p-transfected megakaryocytes exhibited cytoskeletal alterations and generated more compact and more numerous platelet-like structures, which showed increased glycoprotein IIb/IIIa expression and activation. The authors provide an intriguing insight into the genetic control of platelet production and function by miR-204-5p. Importantly, the authors' data suggest miR-204-5p as a potential biomarker reporting on high platelet reactivity.

This in vitro work by Garcia et al⁴ supports the group's previous ex vivo work,⁵ which demonstrated the potential of miR-204-5p as a biomarker for high on-treatment platelet

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reactivity, an indicator of future thrombotic events. As such, miR-204-5p promises to be a miRNA biomarker that reports on the effectiveness of antiplatelet therapy and will thus allow adjustments to dosage and treatment (changing to a more effective P2Y12 inhibitor). Thereby, this miRNA biomarker holds the promise to facilitate personalized antiplatelet therapy and exemplifies the potential use of circulating miRNAs in personalized medicine.

Conflict of Interest

None declared.

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