

“MicroRNAs have it all”.

This book is the first edition of a series of scientific papers from Key Opinion Leaders' in the field of microRNAs and myocardial infarction. The reader will be guided through an extensive review of the available literature related to the role of microRNAs in myocardial infarction.

MicroRNAs (miRNAs) are small single-stranded RNA molecules that regulate target gene (messenger RNA) expression, either through inhibition of translation or activation of degradation. More than 2,500 mature human miRNAs have been characterized so far. They are ubiquitously expressed and are involved in virtually all pathophysiological processes.

In the heart, miRNAs have been extensively described. Some of them have been shown to be enriched in skeletal muscle, the so-called myomiRs (miR-1/133a-b/206/208a-b/486/499). These miRNAs have attracted a lot of attention for their potential to diagnose myocardial infarction or to aid in fighting heart failure. Since their discovery in the circulation (1), miRNAs have been the topic of a plethora of studies, which have been facilitated by the development and commercialization of multiple kits and molecular biology tools. These tools allowed to measure circulating miRNAs and manipulate their expression levels in cells, thereby allowing to test both their biomarker value and their therapeutic potential. Hence, miRNAs have appeared as promising candidates for Theranostics*, with some potential to advance the development of personalized and precision medicine. In the context of myocardial infarction, miRNAs have the potential to aid implementing personalized healthcare since they have some diagnostic and prognostic value and are involved in the development of heart failure that sometimes occurs after myocardial infarction (2).

However, much remains to be done for a complete knowledge of the role of miRNAs in atherosclerosis, plaque rupture, left ventricular remodeling, heart failure (...). Cost-effective molecular diagnostic kits have to be developed to allow a reliable measurement of circulating miRNAs. The therapeutic value of novel strategies to regulate the expression levels of miRNAs has to be tested.

This book gathers essential information on the emerging role of miRNAs in myocardial infarction, from biomarker to functional and translational studies. It provides directions for future research and reveals challenges that remain to be addressed before miRNAs can find their practical application for the benefit of myocardial infarction patients (3).

References

1. Mitchell PS, Parkin RK, Kroh EM, et al. Circulating microRNAs as stable blood-based markers for cancer detection. *Proc Natl Acad Sci U S A* 2008;105:10513-8.
2. Goretti E, Wagner DR, Devaux Y. miRNAs as biomarkers of myocardial infarction: a step forward towards personalized medicine? *Trends Mol Med* 2014;20:716-25.
3. Goretti E, Devaux Y. Which future for circulating microRNAs as biomarkers of acute myocardial infarction? *Ann Transl Med* 2016;4:440.

* Theranostics is a new biomedical field where targeted diagnostic tests are combined with specific targeted therapy.



Yvan Devaux

Yvan Devaux, PhD
Cardiovascular Research Unit,
Luxembourg Institute of Health, Luxembourg;
Cardiolinc Network
(Email: yvan.devaux@lih.lu)