Utility of circulating microRNAs in cardiovascular disease

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Since their first description in mammalian cells, more than 2,500 microRNA molecules have been predicted or verified within human cells. Recently, extracellular microRNAs have been described, protected from degradation by specialized packaging in extracellular vesicles or RNA-protein complexes. Such microRNAs, circulating in the bloodstream and extracellular space, have been proposed as attractive candidates as both diagnostic and prognostic biomarkers in a variety of conditions, including a spectrum of cardiovascular disease. Moreover, consistent with our evolving understanding of the role of exosomes and microvesicles in intercellular communication, it has been proposed that delivery of active microRNAs to recipient tissues may serve as a primary mode of intercellular communication. Indeed, the transfer of functional microRNAs has been demonstrated in several *in vitro* models and has been reported in a few *in vivo* contexts. In addition, therapeutic application of extracellular microRNAs has also been explored.

Over recent years, increasing attention has been paid to the utility of circulating miRNAs in cardiovascular disease. As biomarkers and intercellular communicators, circulating miRNAs could play important roles in the prediction, diagnosis, and tailored treatment of cardiovascular diseases in the near future. For successful clinical application, however, a better understanding of circulating miRNAs from packaging and release to uptake should be forthcoming in the next phase of scientific investigation.