

circRNA-miRNA Cross-Talk in the Transition From Paroxysmal to Permanent Atrial Fibrillation

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Abstract

Background: Atrial fibrillation (AF) is the most prevalent cardiac arrhythmia in western countries. The factors governing the progression of AF to a permanent chronic condition are still not well characterized. Among epigenetic factors, non-coding RNAs (ncRNAs) such as miRNAs and lncRNAs have been recently described as important players involved in the AF progression. We hypothesize about the existence of additional regulatory layers in AF involving an intricate cross-talk between different ncRNA species, namely miRNAs and circRNAs for the establishment of a chronic AF condition.

Methods and results: We have performed an unbiased study analyzing the expression profile for miRNAs and circRNAs in left-atrial biopsies from patients with paroxysmal and permanent AF by RNA-seq. The transition from paroxysmal to permanent AF is characterized by a pattern of down-regulated miRNAs, concomitant to the appearance of specific circRNA species. The analysis of the sponging activities of the circRNAs exclusively expressed in permanent AF samples, allowed us to determine that they could be responsible for the downregulation of specific miRNAs in establishment of a permanent AF condition.

Conclusion: Sponging activity of circRNAs sequestering specific miRNAs is an important factor to be considered for the determination of the molecular mechanisms involved in AF progression.

Keywords: Atrial fibrillation; Circular RNAs; Micro-RNAs; RNAseq; Regulatory networks.