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Non-coding RNAs regulation of cardiac function and disease

Cardiovascular disease remains the leading cause of morbidity and mortality world-wide. Extensive studies in the past decades have identified numerous protein-coding genes that are highly expressed in the heart, playing essential roles in the regulation of cardiac gene expression, heart development and function. It is now recognized that majority of our genome is "non-coding", which produces a large amount of non-coding RNAs (ncRNAs), including microRNAs (miRNAs) and long non-coding RNAs (lncRNAs). Emerging evidence has indicated that these classes of non-coding RNAs participate in most (if not all) aspects of cardiac gene expression, cardiomyocyte proliferation, differentiation and cardiac remodeling in response to stress. We showed that miRNAs are essential for cardiac gene expression, the formation and function of myocardium. We have further identified cardiac-enriched miRNAs, including miR-1, miR-133, miR-208a and others. Our work demonstrated that miRNAs participate in a variety of cardiac function, including cardiac proliferation and regeneration, cardiac hypertrophic remodeling in response to stress and heart failure. Additionally, we demonstrated that dysregulation of miRNA expression is associated with human cardiovascular diseases. Most recently, we reported that lncRNAs are novel regulators of cardiac function. Here, we will discuss the function and molecular mechanisms of miRNAs and lncRNAs in the heart.

Biography

Da-Zhi Wang received his Ph.D. in 1998 from the Department of Biological Sciences of the University of Iowa in the laboratory of Prof. Jim Lin where he studied vertebrate development. Wang conducted his postdoctoral training in the laboratory of Prof. Eric Olson at the University of Texas Southwestern Medical Center at Dallas from 1998 to 2002. As a postdoctoral fellow and instructor, Wang identified a novel transcription factor, myocardin and demonstrated that myocardin is essential for cardiovascular development. In 2002, Da-Zhi Wang was recruited to UNC-CH as an Assistant Professor of the Department of Cell and Developmental Biology and a member of the Carolina Cardiovascular Biology Center (CCBC) to establish his independent research program. He was promoted to Associate Professor with tenure in 2008 at UNC. Wang was recruited to the Division of Cardiovascular Research of Children's Hospital Boston and Harvard Medical School in July 2009 and relocated his lab from Chapel Hill to Boston.

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