Role of non-coding RNAs in cardiovascular disease development and progression.

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Introduction

Cardiovascular disease (CVD) is a leading cause of mortality worldwide, necessitating a comprehensive understanding of the molecular mechanisms underlying its development and progression. In recent years, non-coding RNAs (ncRNAs) have emerged as crucial regulators of gene expression and have garnered significant attention in cardiovascular research. This article reviews the role of various classes of ncRNAs, including microRNAs (miRNAs), long non-coding RNAs (lncRNAs), and circular RNAs (circRNAs), in CVD pathogenesis. We discuss their involvement in key processes such as cardiac remodeling, inflammation, endothelial dysfunction, and atherosclerosis. Furthermore, we explore the mechanisms by which ncRNAs modulate gene expression, interact with signaling pathways, and contribute to disease progression. Understanding the role of ncRNAs in CVD offers promising avenues for the development of novel diagnostic tools and therapeutic interventions [1].

Cardiovascular disease (CVD) represents a significant global health burden, necessitating further exploration of its complex molecular mechanisms. Non-coding RNAs (ncRNAs) have recently emerged as important regulators of gene expression and have shown considerable potential in cardiovascular research. This section provides an introduction to CVD and highlights the relevance of ncRNAs in gene regulation. MicroRNAs are short ncRNAs that post-transcriptionally modulate gene expression by binding to the 3' untranslated regions (UTRs) of target messenger RNAs (mRNAs). This section explores the dysregulation of specific miRNAs in CVD and their involvement in cardiac remodeling, inflammation, and atherosclerosis. We also discuss the diagnostic and therapeutic potential of miRNAs in CVD [2].

Long non-coding RNAs are a diverse group of transcripts that are longer than 200 nucleotides and play crucial roles in gene regulation. This section examines the dysregulation of lncRNAs in CVD and their impact on processes such as inflammation, endothelial dysfunction, and atherosclerosis. Furthermore, we explore the therapeutic potential and prognostic value of lncRNAs in CVD [3].

Circular RNAs are a recently discovered class of ncRNAs that form covalently closed loops and exhibit stability against degradation. This section investigates the emerging role of circRNAs in CVD, including their mechanisms of action and potential as diagnostic biomarkers and therapeutic targets. This section explores the intricate interplay between ncRNAs and various signaling pathways implicated in CVD. We discuss how ncRNAs modulate these pathways and contribute to disease development and progression. Understanding the role of ncRNAs in CVD opens up exciting opportunities for diagnostic and therapeutic advancements. In this section, we explore the potential of ncRNAs as diagnostic biomarkers and therapeutic targets in CVD management. We also discuss challenges and future directions in utilizing ncRNAs for personalized medicine approaches [4].

Non-coding RNAs (ncRNAs) have emerged as critical players in the development and progression of cardiovascular disease (CVD). MicroRNAs (miRNAs), long non-coding RNAs (lncRNAs), and circular RNAs (circRNAs) have been implicated in various aspects of CVD pathogenesis, including cardiac remodeling, inflammation, endothelial dysfunction, and atherosclerosis. Through their ability to modulate gene expression and interact with signaling pathways, ncRNAs exert significant influence on disease mechanisms. MiRNAs, as small regulatory molecules, have been shown to regulate key genes involved in cardiac remodeling, inflammation, and atherosclerosis. Dysregulation of specific miRNAs contributes to the development of CVD, and their detection in blood or tissue samples holds promise as diagnostic biomarkers. Moreover, targeting miRNAs therapeutically shows potential for mitigating disease progression [5].

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