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Abstract

Bioinformatic Profiling of miRNAs in Coronary Artery Disease: Insights into Atherosclerosis and Inflammation †

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1. Introduction

Coronary artery disease (CAD) stands as the predominant global cause of mortality. Inflammation and the formation of atherosclerotic plaques constitute the primary pathological processes underlying CAD. Triggered by deposited lipids and compromised endothelial integrity, immune cells become activated and mobilized, instigating the initiation of plaque formation. MicroRNAs (miRNAs), 22-nucleotide-long non-coding RNA molecules, play an important role in regulating gene expression and present promising prospects for groundbreaking therapeutic and atherosclerosis in CAD.

2. Method

This investigation employed the Genetic Testing Registry (GTR), sourced from the National Center for Biotechnology Information (NCBI), for the identification of genes associated with coronary artery disease (CAD) featuring inflammation and atherosclerosis. Subsequently, gene enrichment analysis was conducted using ShinyGO, and predictions of conserved 8-mer miRNA targets were made utilizing three tools: TargetScan, miRWalk, and miRBase.

3. Results

Our data analysis unveiled a convergence of targeted miRNAs that were shared among genes associated with coronary artery disease (CAD), atherosclerosis, and inflammation. Noteworthy examples include miR-218-5p/96-5p/9-5p/20-5p/93-5p/106-5p/519-3p/506-3p/124-3p.2. These miRNAs exhibit the potential to play a pivotal role in the development of highly effective therapeutic approaches. Additionally, a distinct set of miRNAs, encompassing miR-19-3p/195-5p/29-3p/181-5p/27-3p/200a-3p/107/199-3p, was identified specifically for CAD and atherosclerosis. Similarly, miRNAs, such as miR-15-5p/424-5p/101-3p.2/30-5p/21-5p/124-3p.1, were selected for CAD and inflammation examination. Remarkably, these miRNAs were found to be common, targeting more than one gene in each pathological condition.

4. Conclusions

In conclusion, our findings highlights potential miRNAs that hold promise for enhancing therapeutic strategies against coronary artery disease (CAD) featuring inflammation and atherosclerosis. However, further research is warranted to assess their specific potential for each respective condition.

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