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Topic of Research: Integrative analysis to find key genes in Cardiorenal Syndrome comorbidities with CVD and CKD using a network approach

Summary of Abstract

Cardiorenal syndrome (CRS) is a condition that affects the heart and kidneys. This condition encompasses a wide range of clinical manifestations that impact the kidneys and heart, either acutely or chronically. Emerging evidence suggests that epigenetic changes occur as a result of CKD and CVD development. The present study deals with three objectives which were divided into three parts. Chapter 2, Chapter 3, and chapter 4 cover the first objective (Part I). Chapter 5 Cover the second Objective (Part II). chapter 6 and chapter 7 cover the third objective (Part III). This main goal is to identify overlapping Key Genes and the most influential nodes/genes in CVD and CKD. Using Cystoscope's MCODE plugin, we discovered 15 modules/clusters, 10 of which contained genes of interest, and determined that they were largely enriched in pathways. In these ten modules, 19 essential genes were discovered (11 down-regulated and 8 up-regulated). Modules 1 (RPL13 RPLP0 RPS24 RPS2) and 5 (RPL13 RPLP0 RPS24 RPS2) contain the most important genes (MYC COX7B SOCS3). We employed a new method (IVI, Integrated Value of Influence) to discover the most influential nodes in the native network in this chapter. The top 20 nodes in the native network were selected based on IVI values, hubness score, and Spreading score, with RPS27A non-seed gene being the most influential node. The RPS2 seed gene was the most essential node among all seed genes. The overall conclusion of this study is that only the CXCL8 gene was overlapped in two studies (Chapter 4 and Chapter 7), Moreover, after tracing key genes into the key genes network, the CXCL8 gene was identified as a key regulator gene at the motif level. CXCL8's role in CRS is unknown, but it has been connected to other genes in the heart and kidney in a few studies. Finally, wet lab tests were conducted on the genes, miRNAs, and their target drugs