

Article

Identification of potential microRNAs-mediated from sialic acid to MMP-9 pathway through integrative analysis

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Received 18 November 2019; Accepted 22 December 2019; Published 1 March 2020



Abstract

Sialic acids and MMPs play critical roles in inflammatory diseases. Furthermore, Interaction between Sialic acid and receptors such as siglecs leads phosphorylation of ITIM domains and promote downstream inhibitory signaling through SHP-1 phosphatases. SHP1 could positively regulate TNF- α and by control, the production of TNF- α could play a crucial role in inflammation. Besides, TNF- α could mediate the signaling pathway leading to MMP-9 gene expression. MMP-9 also is recognized as therapeutic targets in a variety of diseases including vascular pathologies, cancers, and auto-immuned diseases. The present *in-silico* study aims to identify the most potent micro-RNAs could control the signaling pathway from siglec to MMP-9. To this end, with review some articles and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment analysis 21 genes involved in this pathway have been selected. Then TARGET SCAN, DIANA-TarBase8, and miRDB database were utilized to predict the miRNAs which have the most effective to target genes. Finally, using bio-studying Software Cytoscape, three microRNA-mRNA networks were constructed for existing banks. We found shared micro-RNAs that in the three networks. Eventually, using miRTarBase database microRNAs that were linked to more genes in this path were assigned a higher privilege. The twenty-one selected micro-RNAs could be the proper options for experimental studies from sialic acid receptors (siglecs) to MMP-9. Among them miR-34a-5p could be the most interesting target.

Keywords miRNA-mRNA network; Cytoscape; DIANA-TarBase8; TARGET SCAN; miRDB; miRTarBase.

Network Biology
ISSN 2220-8879
URL: <http://www.iaees.org/publications/journals/nb/online-version.asp>
RSS: <http://www.iaees.org/publications/journals/nb/rss.xml>
E-mail: networkbiology@iaees.org
Editor-in-Chief: WenJun Zhang
Publisher: International Academy of Ecology and Environmental Sciences

1 Introduction

Sialic acids are nine-carbon sugar, which could be attached to the end of glycan chains in animals and could mediate a variety of pathological and physiological processes. The evidence also suggested that MMPs and sialic acids play key roles in inflammatory neurodegenerative diseases. Interaction between sialic acid and their receptors such as siglecs plays an important role in inflammation and neurodegenerative diseases. This leads to phosphorylation of immune-receptor tyrosine-based inhibitory motif (ITIM) and siglec signaling through the recruitment of SHP-1 phosphates (Bochner et al., 2015).

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