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Poster Presentation

MicroRNA as a Therapeutic Tool to Prevent Blood Brain Barrier Dysfunction in Neuroinflammation

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Abstract

Endothelial cells present in brain are unique and differ from other peripheral tissues in a number of ways, which ensures specific brain endothelial barrier properties. Endothelial dysfunction is the earliest event in the initiation of vascular damage caused by inflammation. Various microRNAs (miRNA) have been discovered in different cellular components of the blood bran barrier (BBB). miRNAs are a family of non-protein-coding small RNA molecules that negatively regulate protein expression. Brain endothelial miRNAs regulate barrier function and orchestrate various phases of the neuroinflammatory response, including endothelial activation in response to cytokines as well as restoration of inflamed endothelium into a quiescent state. For instance a recent study showed that miRNA-181c triggered the toll like receptor 4 pathway, resulting in microglial activation and neuroinflammation. This observation suggest the miRNAs are a new set of controllers of BBB permeability under stress and pathological conditions. Pro-inflammatory cytokines affect several families of brain endothelial miRNAs that have important roles in BBB function and in angiogenesis; however, it remains to be elucidated whether these families of miRNAs cooperate during neuroinflammation and whether they form a link between neuroinflammation and angiogenesis in diseases that affect the CNS. Infiltration of leukocytes across the BBB has an important role in neuroinflammatory conditions. Some miRNAs may be able to reduce leukocyte addition to and migration across endothelium in neuroinflammation conditions. Among the highly modified miRNAs, let-7 and miR-98 were predicted to target the inflammatory molecules, CCL2 and CCL5. Further studies can clarify role of these miRNAs in prevention of BBB dysfunction in neuroinflammation.

Keywords: BBB, Neuroinflammation, MicroRNA, Endothelium

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