

MicroRNA: Effective Therapeutic Strategy in Neurological Disease

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Abstract

Although there are many treatments for neurological disease, but they are not always curative and there are still intriguing aspects about effectiveness, mechanisms and safety. MicroRNA, a small non-coding RNA, regulates mRNA by direct binding through the 3'- untranslated region (3'UTR). These molecules are vital regulators in the nervous system. MicroRNAs play crucial roles in differentiation of oligodendrocyte progenitor cells, promoting oligodendrocytes maturation and remyelination and cognitive function so it can be a potential therapeutic option for demyelinating disease such as multiple sclerosis. Moreover, treating with antagonists of NMDA receptors reveal the undeniable role of microRNAs in schizophrenia. Additionally, miRNAs are clock regulators and modulate the length of the circadian-clock period. This leads to mood instability, which is implicated in the fluctuation of phases in bipolar patients. These molecules modulate tau toxicity in Alzheimer's disease by decrease tau mRNA and downregulate synthesis of three tau kinases which leads to inhibition of abnormal hyper phosphorylation of tau. These small regulators have also protection effect against seizure through negatively regulation brain receptors. Furthermore, the studies demonstrated there is a correlation between Parkinson's disease and miRNA down regulation. Some more studies proved overexpression of spinal miRNAs prevent and reverse chronic inflammation pain. On the other hand, Brain-enriched microRNAs can inhibit proliferation, suppress invasion, and induce apoptosis in tumor's cell. In this review, we compare and summarize the microRNA therapeutic effects and mechanisms on the central nervous system disorders and illustrate how this information will change the future of gene therapy.

Speaker Publications:

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2. Baek D, Villén J, Shin C, Camargo FD, Gygi SP, Bartel DP. The impact of microRNAs on protein output. *Nature*. 2008 Sep 4;455(7209):64–71. [PMC free article]
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Biography:

I am MSc student at pharmacy faculty of Isfahan University of Medical Sciences. My research field is about gene delivery for neurological disease.