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Circulating levels of BDNF and microRNAs are associated with progression of idiopathic Parkinson's disease

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Abstract

Previous studies have shown that brain-derived neutrophic factor (BDNF) regulates number of functions in the nigrostriatal system. Via activation of neuroprotective pathway it protects DA-gic neurons and improves both memory and motor activity. MicroRNAs (miRNAs) are small non-coding RNAs that regulate gene expression at the post-transcriptional level. They are widely expressed in the central nervous system and may play a functional role in the neurodegenerative diseases. Insuline growth factor – 1(IGF-1) plays an important role in neuroprotection and might be associated with the disease progression. Accumulating data indicate there is a regulatory negative feedback loop between brain-derived neurotrophic factor (BDNF) and miRNAs. However, it is not known if circulating levels of above mentioned variables reflect the severity of idiopathic Parkinson's disease (iPD). Therefore, in the present study we investigated if the circulation level of several miRNAs, IGF-1 and BDNF were correlated with progression of iPD. Selected miRNAs were determined by array cart and real-time qPCR using specific primers TaqMan miRNA assay (Life Technology, CA, USA) in the serum of patients with iPD and age-matched healthy subjects. Concentrations of BDNF and IGF-1 were determined by ELISA (R&D System, MN, USA). qPCR results indicated that the concentration of BDNF, of miR-1, miR-7, miR-16, miR-22, miR-23b, miR-29c, miR-30a-5p, miR-186 and miR-301were statistically lowered in the serum of patients with iPD compared with age matched healthy subjects. Serum BDNF and miRNAs levels are negatively correlated with the Hoehn&Yahr scale. No difference in IGF-1 level between control group and iPD was observed. These results indicate that the regulation of BDNF level by miRNA may play a role in preventing of neurodegeneration processes in nigrostriatal system. Decreasing of both miRNAs and BDNF levels are associated with severity of iPD. Those findings presents that miRNA can be treat as one of the diagnostic markers.

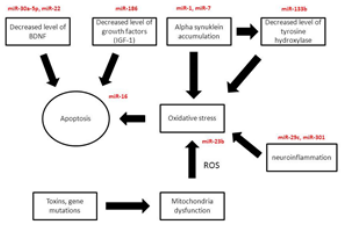

Figure: Link between miRNAs and biochemical changes in the Parkinson's disease

Biography

Paulina Malczynska is a PhD student in the Institute of Psychiatry and Neurology in Warsaw. For 5 years she is focused on the role of miRNA and BDNF in the Parkinson's Disease. Her last research interest focuses on the non-pharmacological treatment as a support to levodopa treatment. In the newest research she tries to find out if the high intensity interval training has a positive effect on circulating miRNA, inflammation, oxidative stress status in the serum of patients with idiopathic Parkinson's disease. Previous research was presented on the several international and polish conferences.

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