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Circulating levels of BDNF and microRNAs are associated with progression of idiopathic Parkinson ś 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 re fect 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 specifc 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 fndings presents that miRNA can be treat as one of the diagnostic markers.

- Roser, Anna Elisa et al. "Circulating miRNAs as Diagnostic Biomarkers for Parkinson's Disease." Frontiers in neuroscience vol. 12 625. 5 Sep. 2018, doi:10.3389/fnins.2018.006255.
- Scalzo P, Kümmer A, Bretas TL, Cardoso F, Teixeira AL: ‚Serum levels of brain-derived neurotrophic factor correlate with motor impairment in Parkinson's disease." J. Neurol. 2010; 257, 540–545