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Novel paradigm of the development of preclinical diagnosis of Parkinson's disease

Motor symptoms first appear in Parkinson's disease (PD) many years after the onset of the degradation of the nigrostriatal system, at a loss of most dopaminergic (DA-ergic) neurons and depletion of neuroplasticity, which explains low efficiency of current therapy. Therefore, the development of the diagnostics of PD at the preclinical stage is of the highest priority. It is mainly based on a search for biomarkers as a change in the composition of plasma and expression of specific genes and phenotype of blood cells in untreated patients at the early clinical stage although there is no guarantee that biomarkers, found at the clinical stage are also characteristic of preclinical stage. That is why, in addition to patients, we searched for biomarkers in the blood in MPTP-treated mice at the early symptomatic stage and pre-symptomatic stage of Parkinsonism. According to our data, the concentration of some markers in plasma, e.g., L-DOPA, were modified in the same way in PD patients and mice at both stages of Parkinsonism. The concentration of others, e.g., DOPAC differed at the pre-symptomatic stage in mice from those in mice at the symptomatic stage and patients. Apparently the former markers are more reliable than the latter. Moreover, in experimental models, we developed a new approach to preclinical diagnosis of PD by using a pharmacological provocation test (reversible inhibitor of dopamine synthesis), which induces a short-term increase in failure of the nigrostriatal system and the appearance of motor disorders. Development of preclinical diagnostics of PD basing on the search for biomarkers in the blood in untreated PD patients and experimental models and the use of a provocative test would allow using neuroprotective pharmacotherapy for slowing down neurodegeneration and thereby prolongation of an asymptomatic period.

Biography

Michael V Ugrumov is the Head of Laboratory of Neural and Neuroendocrine Regulations in the Institute of Developmental Biology RAS. He is graduated from Moscow University Medical School (USSR), obtained PhD at the Institute of Evolutionary Physiology and Biochemistry RAS (Leningrad, USSR) and Professorship in Anatomy and Physiology at Institute of Developmental Biology RAS and in Radiology and Pharmacology at State Medical University (Moscow, Russia). He was elected as a Full Member of the Russian Academy of Sciences, European Academy of Science and Arts, Serbian Academy of Sciences and Arts, French National Academy of Pharmacy and nominated as a visiting Professor in Japan (Tokushima University Medical School), US (SUNY Upstate Medical University, Syracuse, NY), France (University P. et M. Curie, Paris, University of Tours) and Germany (University of Ulm). He is a Chair Person of the Scientific Council on Neuroscience and Neurotechnologies at the Ministry of Education and Science of RF President of the Russian Society for Neurochemistry. His main interests include: developmental neurobiology and neuroendocrinology and neurodegenerative diseases.

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