Morphological Analysis of New Cytopathological Hallmarks in Dopaminergic Enteric Neurons of Parkinson's disease

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Abstract

Parkinson's disease (PD) is the second most frequent neurodegenerative disease in the world. The main histological hallmark is the accumulation of misfolded α-synuclein, conforming Lewy bodies and Lewy neurites and loss of dopaminergic neurons in substantia nigra pars compacta (SNpc). Th ere have been described alterations in Golgi apparatus (GA) organization, which is the central organelle of intracellular traffic, in PD and other neurodegenerative diseases. Our previous studies, using cellular models of PD, demonstrate that GA fragmentation is an early event previous to α-synuclein aggregation and cytoskeletal alterations (1) and recently we have found that the SNARE protein syntaxin 5 forms extracellular aggregates resembling the amyloid plaques characteristic of Alzheimer's disease in dopaminergic neurons in human samples of SNpc of PD patients (2).

Moreover, there is also evidence of this pathology not only in the central nervous system, but also in the enteric nervous system (ENS) neurons, which has drawn attention in the last years. Recently, gastrointestinal symptomatology, previous to motor symptoms in PD, has been the reason to think that lesions in ENS could develop earlier in the course of the disease, therefore, the study of ENS could help to understand this pathology. The purpose of this study was to analyze, using morpho-logical techniques, the structure of GA, and cytoskeleton organization of enteric dopaminergic neurons of an experimental hemiparkinsonian rat model induced by 6-OHDA. The results obtained showed alterations in GA cytoarchitecture, cytoskele-ton microtubules organization and Sintaxin-5 (SNARE). These findings support the ENS as object of study of possible specific biomarkers for early diagnosis of PD.