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Substance P is increased in serum of patients with Parkinson's disease and correlates with motor disturbances

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Introduction: Substance P (SP) is a neuropeptide belonging to the family of tachykinins, which acts as neurotransmitter, neuromodulator, and neurotrophic factor in central nervous system. The expression of SP is particularly high in nervous structures critically involved in Parkinson's disease (PD) pathogenesis, including enteric nervous system, vagus nerve, autonomic centers, neocortex and limbic areas, and especially substantia nigra [1,2]. Levels of SP might thus track neurodegeneration in these systems.

*Objective: T*o measure SP levels in serum of PD patients and healthy subjects and evaluate the possible associations with clinical parameters, such to establish a potential value for SP as disease biomarker.

Methods: SP serum levels were measured in 22 PD patients and 12 age-/sex-matched healthy controls (CTRLs) by a competitive commercial ELISA kit; patients underwent comprehensive clinical assessment by Unified Parkinson's Disease Rating Scale Part III (UPDRS III), Non Motor Symptom Scale, Mini-mental State Examination, levodopa equivalent daily dose calculation. Biochemical data were compared between the groups and correlated with clinical parameters.

Results: Serum SP was significantly higher in PD patients than in CTRLs [t (32) = 4.3; P = 0.0001]. Receiver operating characteristic analysis provided an area under the curve of 0.89 (P = 0.0001). The cutoff value of 85.6 pg/mL differentiated PD from CTRLs with a sensitivity of 82% and a specificity of 83.3%. Linear regression demonstrated direct association between serum SP and UPDRS III (B = 0.84; P = 0.01), even when dopaminergic therapy was considered as covariate (B = 0.96; P = 0.025).

Conclusion: This pilot study showed that SP serum content was higher in PD patients than CTRLs, and increased proportionally to the severity of motor disturbances, suggesting a potential value either as potential biomarker or candidate therapeutic target in PD. Further studies are now needed to confirm and extend these preliminary findings.

References:

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