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Plasma biomarkers of disease progression in Parkinson's disease

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Introduction: Plasma neurofilament light chain (NfL) has been identified as one of the most promising biomarkers for predicting disease progression in several conditions, including Parkinson's disease. Recent studies reported the utility of plasma phospho-tau, beta-amyloid and glial fibrillary acid protein (GFAP) for diagnostic and prognostic purposes of Alzheimer's disease and other neurodegenerative conditions. In this study, we evaluated the ability of a panel of plasma biomarkers to predict disease progression in PD patients.

Methods: We measured plasma p-tau181, p-tau231, Aβ40, Aβ42, GFAP and NfL using Single molecule array (Simoa) assays in healthy controls (HC) and consecutive PD patients who underwent an extensive motor and non-motor assessment at baseline and two to five years of follow-up. Differences in biomarkers level between PD and HC were evaluated adjusting for the effect of age and sex. In PD patients, the correlation between plasma biomarkers and motor scores at baseline and at follow-up were evaluated using partial correlation analyses. Linear regression and Cox regression analyses were applied to evaluate the best combination of biomarkers able to predict motor progression and disability milestones adjusting for the effect of age, sex disease duration and baseline severity.

Results: One hundred seventy PD and 106 HC entered the analyses. PD patients exhibited higher p-tau181, p-tau231 and lower Aβ42 compared with HC but similar NfL, GFAP and Aβ40 levels. All biomarkers correlated with age and disease duration, whereas NfL, GFAP and ptau181 additionally

correlated with baseline motor severity. At follow-up, NfL emerged as best predictor of motor progression (linear regression analyses).

Conclusion: The present findings confirm plasma NfL as the best predictor of motor progression in PD in comparison with other plasma biomarkers. Larger on-going studies with longitudinal plasma assessment are needed to evaluate the potential value of other biomarkers for identifying co-pathologies or defying subtypes of disease suitable of different intervention strategies.