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Genetics and fMRI as combined biomarkers of dementia in recently diagnosed Parkinson´s disease patients: ICICLE-PD study

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Parkinson's disease (PD) pathology is characterised by the presence of alpha synuclein positive Lewy bodies in numerous neural structures including the brainstem and cerebral cortex. However the degree and pattern of pathology varies as does the clinical phenotype of patients and their cognitive deficits and evolution. The ICICLE-PD study (Incidence of Cognitive Impairment in Cohorts with Longitudinal Evaluation - Parkinson's Disease) was set up to identify reliable markers of cognitive decline, what would allow for the early detection of patients at-risk of developing the dementia of PD.

An incident PD cohort (n=169) and a matched control group (n=85) were recruited at two sites within UK and underwent full clinical, neuropsychological assessment, fMRI (evaluating working memory, visuospatial and memory encoding abilities) and genotyping for rs4680 (COMT Val158Met polymorphism), rs9468 (MAPT H1 vs H2 haplotype) and rs429358 (ApoE genetic variations).

Anatomical, functional, genetic and behavioural data support the so-called "Dual Syndrome hypothesis" for PD´s cognition, with (i) an executive syndrome that is frontally mediated, modulated by COMT genotype and dopamine-dependent versus (ii) a temporo-parietal system subject to MAPT and ApoE modulation, but not dopaminergic, required for visuospatial and memory tasks. Our results showed that the cognitive deficits seen early in PD are heterogeneous with a specific neural activation pattern which can be explained in part by the patients' genetic background.

Biography

Cristina Nombela Otero received his university degree in Psychology and Ph.D. in Neuroscience at the University of Murcia (Spain). Since January 2010 he holds the Research Associate position from University of Cambridge (UK), at Clinical Neuroscience Department. His research is focused on the identification of biomarkers of dementia in Parkinson's disease and funded by Parkinson's UK. His current PI's are Prof. Roger Barker, Prof. David Burn and Prof. Adrian Owen. Additionally, he conducts several projects in non-motor symptoms in Parkinson's disease as impulsivity and alternative therapies based on musical rhythm.

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