White Matter Connectivity and PD Cognitive Phenotypes

https://neurodegenerationresearch.eu/survey/white-matter-connectivity-and-pd-cognitive-phenotypes/

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Country

USA

Title of project or programme

White Matter Connectivity and PD Cognitive Phenotypes

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

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Start date of award

25/09/2013

Total duration of award in years

2

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

white matter, processing speed, Parkinson Disease, Episodic memory, Parkinson's Dementia

Research Abstract

DESCRIPTION (provided by applicant): Parkinson’s Disease (PD) affects at least 1.5 million people in the United States alone. One of the most severe non-motor symptoms of PD is cognitive dysfunction involving reduced processing speed/working memory, and/or episodic

memory. Relative to other neurodegenerative disorders with cognitive impairment, we know little about the neuroanatomical correlates of cognitive decline in PD. In preliminary work, we have examined brain connectivity associated with cognition in a group of idiopathic non-dementia PD relative to non- PD age-matched peers. Three distinct cognitive phenotypes were observed: a) slow information processing speed with preserved episodic memory, b) episodic memory difficulty with subtle slow information processing speed; and c) normal functioning with no deficits relative to age matched peers. Preliminary results of high angular resolution diffusion imaging suggest unique white matter and gray matter profiles: PD with episodic memory deficits exhibited mesial temporal circuit disruption (i.e., entorhinal-hippocampal connectivity); PD with primary processing speed deficits displayed aberration in the frontal-subcortical white matter circuitry (DLPFcircuit) between the dorsolateral prefrontal cortex and caudate; and PD without cognitive deficits showed circuitry similar to age-matched controls. The present study will recruit from one of the largest movement disorder databases in the country to investigate working hypotheses regarding memory and processing speed/executive difficulties and regional white matter connectivity within the temporal and frontal-subcortical regions, respectively. Three specific aims will be addressed. Aim 1: to demonstrate the association between memory function and the connectivity between the entorhinal cortex and hippocampus; Aim 2: to examine the relation between reduced processing speed/working memory and integrity within the DLPF cortex to caudate; and Aim 3: to reveal the significance of regional brain connectivity on memory or executive function decline at one and two years post-baseline. A research team specialized in movement disorders, functional and diffusion imaging, neuropsychological assessment, reliable change analyses, and longitudinal statistical modeling will carry out these aims. Study methods will draw from unique PD patient database, state-of-the art imaging techniques, and resources from the General Clinical Research Center within the Clinical and Translational Science Institute.

Lay Summary
PUBLIC HEALTH RELEVANCE: Dementia related to advancing Parkinson’s disease (PD) is more common than in the standard population. PD dementia profiles are heterogeneous and warrant close examination if we are going to facilitate clinical interventions and stall dementia development. We propose three aims to examine hypotheses relating specific regions of white matter connectivity to memory/ cognitive functions in idiopathic non-dementia PD. The study incorporates possibly one of largest clinical databases of PD for recruitment, advanced high resolution neuroimaging approaches, and annual neuropsychological testing to examine the proposed hypotheses. We will use the findings to direct behavioral interventions designed to reduce PD cognitive decline.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

Diseases:
Parkinson's disease & PD-related disorders

Years:
2016

Database Categories:
N/A

Database Tags:
N/A