Non-invasive Markers of Neurodegeneration in Movement Disorders

https://neurodegenerationresearch.eu/survey/non-invasive-markers-of-neurodegeneration-in-movement-disorders-2/

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Country

USA

Title of project or programme

Non-invasive Markers of Neurodegeneration in Movement Disorders

Source of funding information

NIH (NINDS)

Total sum awarded (Euro)

€ 1,851,612.84

Start date of award

24/09/2012

Total duration of award in years

1

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

Multiple System Atrophy, Essential Tremor, Progressive Supranuclear Palsy, Movement Disorders, Basal Ganglia

Research Abstract
DESCRIPTION (provided by applicant): Parkinson's disease (PD) is the second most common

neurodegenerative disorder after Alzheimer's disease. Other movement disorders that commonly mimic symptoms of PD include the Parkinsonian variant of multiple system atrophy (MSA), progressive supranuclear palsy (PSP), and essential tremor (ET). Taken together, these movement disorders affect over 10 million people in the United States alone. Current diagnostic approaches for PD, MSA, PSP, and ET are based on behavioral signs and clinical judgment, and this can often lead to the incorrect diagnosis, especially early in the course of the disease. In fact, it is estimated that 15% of patients in disease modifying drug trials for early PD do not have PD. Objective, valid, non- invasive, and biologically relevant markers of PD, MSA, PSP, and ET are pivotal for early and accurate diagnosis (trait), and for tracking disease progression (state). Our group has recently shown that diffusion tensor imaging (DTI) and functional magnetic resonance imaging (fMRI) can be used to identify mechanisms for basal ganglia dysfunction in individuals with Parkinson's disease. Our preliminary data indicate that DTI and fMRI measures from the basal ganglia and cerebellum show excellent promise for differentiating PD, MSA, PSP, and ET, and for tracking longitudinal disease-specific changes in neurodegeneration. We will recruit 150 individuals for the study: 30 patients with PD, 30 patients with MSA, 30 patients with PSP, 30 patients with ET, and 30 control subjects. In Aim 1, we will use DTI and fMRI of the basal ganglia and cerebellum to focus on the development of a sensitive and specific trait marker for each movement disorder. In Aim 2, we will test the same individuals following 2 years using DTI and fMRI of the basal ganglia and cerebellum to develop state markers of neurodegeneration for each movement disorder. With the large and carefully diagnosed patient population at the Center for Movement Disorders and Neurorestoration and the state-of-the-art MRI facility at the McKnight Brain Institute, our group is uniquely positioned to complete the proposed study. The proposed research is innovative because it will utilize structural and functional imaging modalities with a 32-channel head coil performed on a state-of-the-art 3 Tesla MRI unit. The proposed research is significant because it will be the first stud to develop non-invasive trait and state markers of four debilitating movement disorders that affect over 10 million people in the United States.

Lay Summary
PUBLIC HEALTH RELEVANCE: Parkinson's disease (PD), multiple system atrophy (MSA), progressive supranuclear palsy (PSP), and essential tremor (ET) affect over 10 million people in the United States. These debilitating movement disorders can be very difficult to distinguish from each other, have different prognoses, and can respond very differently (if at all) to availabl therapies. The purpose of this grant is to identify structural and functional changes in the brain using non-invasive neuroimaging techniques to develop sensitive and specific markers for each of these diseases, and then to track how these markers change as each disease progresses to a 2 year time point.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

Diseases:
Parkinson's disease & PD-related disorders

Years:

2016

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N/A

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