

Partnership for Magnetic Resonance Spectroscopy Biomarker Development

<https://neurodegenerationresearch.eu/survey/partnership-for-magnetic-resonance-spectroscopy-biomarker-development/>

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Institution

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Contact information of lead PI Country

USA

Title of project or programme

Partnership for Magnetic Resonance Spectroscopy Biomarker Development

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

€ 2,934,438.53

Start date of award

01/09/2015

Total duration of award in years

2

The project/programme is most relevant to:

Spinocerebellar ataxia (SCA)|Alzheimer's disease & other dementias

Keywords

biomarker development, Magnetic Resonance Spectroscopy, Spinocerebellar Ataxias, Reproducibility, neurochemistry

Research Abstract

? DESCRIPTION (provided by applicant): Clinical trials for neurodegenerative diseases are

hampered by the lack of quantitative and objective biomarkers that reflect treatment effects in the brain. Magnetic resonance spectroscopy (MRS) has potential to directly assess disease-modifying effects of therapeutic interventions in the brain. However, MRS has not made the transition to the clinical setting, largely due to lack of standardization of data acquisition and analysis methods and compromised data quality obtained with standard clinical packages, which result in poor reproducibility of neurochemical concentrations. The primary objective of this application is to facilitate translation of advanced MRS technology to the clinical setting in a strategic alliance between MR physicists, software engineers and physician scientists. This Partnership for MRS Biomarker Development is comprised of 3 phases and incorporates a gradual shift from MRI/MRS to clinical expertise at the sites involved: Phase I will establish an MR-technologist ready advanced MRS protocol on two widely-used clinical 3T platforms. An optimized semi-LASER (sLASER) sequence was chosen for this implementation because it is considered a top candidate for recommendation for high fields by the MRS Consensus Group. Phase II will assess the performance of the protocol under ideal conditions (efficacy), namely at sites where MRI/S and clinical trial expertise overlap. We focus on hereditary spinocerebellar ataxias (SCA) because the patient cohorts are well-characterized and they present the greatest need for multi-center investigations to sufficiently sample the patient population in trials. Four sites of the Clinical Research Consortium for Spinocerebellar Ataxias (CRC-SCA), which was formed to provide infrastructure for clinical trials in the common SCAs, will participate in this phase. Finally, Phase III will assess the performance of the protocol under ordinary conditions (effectiveness), i.e. in a clinical setting with rotating MR technologists. This phase will focus on Alzheimer disease (AD), the most common cause of age associated cognitive decline and dementia, and take advantage of large ongoing neuroimaging investigations. This application has a translational focus. The bioengineering focus areas of this project include advanced high field MRI technology for neuroimaging applications, validation and reproducibility assessment of spectral acquisition and analysis methods and non-invasive technology to assist monitoring treatment response in brain disorders. The partnership sites are the University of Minnesota (leading institution), Johns Hopkins University [Phases I and II], Duke University [Phase I], University of Florida [Phase II], Harvard University [Phase II], Mayo Clinic [Phase III] and University of Michigan [Phase III]. The deliverable of this project will be a turn-key advanced MRS data acquisition and analysis protocol that has been comprehensively evaluated in multiple patient cohorts, brain regions, platforms, and institutions, including the clinical setting. A high impact is expected in early diagnosis and treatment of neurodegenerative diseases.

Lay Summary

PUBLIC HEALTH RELEVANCE: The goal of this project is to build a multi-institute partnership to establish the feasibility of using advanced, quantitative imaging technology in the clinical setting for neurodegenerative diseases. The technology is intended for noninvasive monitoring of pathology and effects of treatments in the brain. A high impact is expected in moving potential therapies for a set of movement disorders, spinocerebellar ataxias, and for Alzheimer's disease from the laboratory to the bedside.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Alzheimer's disease & other dementias, Spinocerebellar ataxia (SCA)

Years:

2016

Database Categories:

N/A

Database Tags:

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