

A Longitudinal Analysis Stream for FreeSurfer

<https://neurodegenerationresearch.eu/survey/a-longitudinal-analysis-stream-for-freesurfer/>

Principal Investigators

FISCHL, BRUCE

Institution

MASSACHUSETTS GENERAL HOSPITAL

Contact information of lead PI

Country

USA

Title of project or programme

A Longitudinal Analysis Stream for FreeSurfer

Source of funding information

NIH (NINDS)

Total sum awarded (Euro)

€ 2,274,205.50

Start date of award

01/05/2014

Total duration of award in years

3

The project/programme is most relevant to:

Neurodegenerative disease in general

Keywords

longitudinal analysis, Stream, image processing, Neuroanatomy, Huntington Disease

Research Abstract

DESCRIPTION (provided by applicant): Human neuroanatomy is enormously variable across subjects – a factor that limits the power of brain studies to detect effects of interest. While degeneration in subcortical structures and cortical gray matter is manifest in many conditions such as aging, Alzheimer's disease, Huntington's disease, multiple sclerosis and schizophrenia, large studies are needed in order to find robust and stable effects that separate groups.

Furthermore drug development becomes highly costly as detecting small reductions in atrophy can take years and hundreds or thousands of subjects. These factors raise the importance of longitudinal studies, in which one acquires data at multiple time points and examines the differences in temporal trajectories. Compared to a cross-sectional approach, the longitudinal design can provide more sensitivity and specificity for examining subtle associations by reducing the confounding effect of between-subject variability. Moreover, a serial assessment can be the only way to unambiguously characterize the effect of interest in a randomized experiment, such as a drug trial. Finally, longitudinal studies provide unique insights into the temporal dynamics of the underlying biological process, such as disease progression. Taking full advantage of a longitudinal design requires the optimization of the computational tools that perform image processing and hypothesis testing. In this project, we propose to design, develop and distribute intrinsically longitudinal image processing and hypothesis testing tools and validate them in the study of a set of neurodegenerative diseases.

Lay Summary

PUBLIC HEALTH RELEVANCE: The analysis of longitudinal imaging data holds the promise of more accurate computer- aided diagnosis of neurodegenerative disease as well as more effective and efficient quantification of the effects of potential therapeutic interventions. The successful completion of the proposed project would provide a set of accurate, specific and sensitive tools to the thousands of clinicians and researchers that currently use FreeSurfer, improving the power of a wide array of NIH-funded studies to quantify disease and drug effects.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Neurodegenerative disease in general

Years:

2016

Database Categories:

N/A

Database Tags:

N/A