Structure determination by vibrational spectroscopy

https://neurodegenerationresearch.eu/survey/structure-determination-by-vibrational-spectroscopy/

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Country

USA

Title of project or programme

Structure determination by vibrational spectroscopy

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

€ 1,175,728.44

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15/04/2007

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2

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Late Onset Alzheimer Disease, Spectrum Analysis, Thermodynamics, Amyloid Fibrils, amyloid structure

Research Abstract

? DESCRIPTION (provided by applicant): The “”cause”” of “”late-onset”” Alzheimer’s disease (LOAD) remains largely unknown despite decades of increasingly intense study. More than 5

million people currently have this disease, it is the 6th leading cause of death in the US, and there are no treatments available that alter its relentless course. The disease is characterized by the accumulation of Aß peptides in the brain as fibrils, and the collection of fibrils together as histologically observable plaques sounded by dead neurons. We hypothesize that Aß peptides assume at least several distinct conformations in morphologically indistinguishable fibrils, and that these conformations vary in their thermodynamic stability. It is likely that fibrils approach increasingly stable structures as they mature, so the spectroscopic signals that evolve in the course of maturation should reveal the nature of the interactions that determine stability. Accordingly, our specific aims are to link the conditions of fibril formation to the stability of te fibrils that form and determine the factors that lead to fibrils that are sufficiently stable to pesist in brain tissue. This is a “”driving biomedical project”” in the Ultrafast Optical Processes Laboratory at the University of Pennsylvania, an NIH-sponsored Research Resource. Relevance: Our approach has the potential to uncover specific chemical mechanisms that govern amyloid formation in Alzheimer’s disease, which would represent a giant step forward in our understanding of its pathogenesis.

Lay Summary
PUBLIC HEALTH RELEVANCE: We hypothesize that Aß peptides assume at least several distinct conformations in morphologically indistinguishable fibrils, and that these conformations vary in their thermodynamic stability. It is likely that fibrils approach increasingly stable structures as they mature, so the spectroscopic signals that evolve in the course of maturation should reveal the nature of the interactions that determine stability. Our approach has the potential to compare the various paths to fibril formation and identify the features most likely to be involved in pathogenic states.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

Diseases:
Alzheimer's disease & other dementias

Years:
2016

Database Categories:
N/A

Database Tags:
N/A