

Neutron scattering studies of co-aggregation of amyloid proteins and lipids

<https://neurodegenerationresearch.eu/survey/neutron-scattering-studies-of-co-aggregation-of-amyloid-proteins-and-lipids/>

Principal Investigators

Sara Snogerup Linse

Institution

Lund University

Contact information of lead PI

Country

Sweden

Title of project or programme

Neutron scattering studies of co-aggregation of amyloid proteins and lipids

Source of funding information

Swedish Research Council

Total sum awarded (Euro)

€ 737,758

Start date of award

01-01-2015

Total duration of award in years

4

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

Research Abstract

The overall goal is to explore the use of isotope labels and neutron scattering to detect, quantify and obtain structural information of aggregated protein species in neurodegenerative disease. The study is focused on α -synuclein, a protein found in amyloid aggregates in Parkinson disease. α -syn monomer is more or less unfolded, but may self-assemble into aggregates, amyloid fibrils, rich in β -sheet. Many substances, including lipid membranes, affect the

aggregation process. This may lead to co-aggregation of protein and lipid, influencing both the formed aggregates and the membrane. Our study is based on previous indications of co-aggregation by confocal microscopy, cryo-TEM, solid-state NMR, and reports linking α -synuclein aggregation to the interaction with lipid membranes. We will develop fluidics devices for well-defined mixing that transform reaction time to delay line length. We will use neutron scattering and reflectometry with selective deuteration of protein or lipid and different solvent contrasts to study an ongoing reaction in time-resolved mode. Our aim is to detect co-aggregates, quantify molar ratio of co-aggregated species, and to gain structural information on both transient and final aggregated species. Studies of transient on-pathway species may reveal key information on surface-catalyzed nucleation, of relevance for disease spreading. The study will open new ways to use neutrons in cutting-edge biomolecular science.

Lay Summary

Further information available at:

Types:

Investments > €500k

Member States:

Sweden

Diseases:

Parkinson's disease & PD-related disorders

Years:

2016

Database Categories:

N/A

Database Tags:

N/A