Novel Biomarkers for Alzheimer's disease to improve early diagnosis and development of novel therapies

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Country

Sweden

Title of project or programme

Novel Biomarkers for Alzheimer's disease to improve early diagnosis and development of novel therapies

Source of funding information

The Wallenberg Foundations

Total sum awarded (Euro)

€ 635,800

Start date of award

08/07/1905

Total duration of award in years

4.0

The project/programme is most relevant to:

Alzheimer's disease and other dementias|Parkinson's disease & PD-related disorders

Keywords
Research Abstract
Background: Alzheimer's disease (AD) and Parkinson's disease (PD) are major causes of disability, institutionalization and premature death in the elderly, and the costs are vast and

increase dramatically worldwide. We have shown that the pathologies of AD and PD start 10-20 years before overt clinical symptoms, opening a window for early diagnosis and treatment. With novel accurate diagnostic methods we could already today initiate symptomatic treatments at an earlier stage. Numerous clinical phase III studies have been performed evaluating new disease-modifying therapies for AD and PD, but all have yet failed. New treatments designed to stop the key disease pathologies of AD and PD will most likely only be effective if initiated during the very early stages of the diseases, before widespread and irreversible neurodegeneration has already occurred. We therefore develop diagnostic algorithms with novel biomarkers and brain imaging methods, which will be crucial for future clinical trials. Our studies will also unravel the early disease mechanisms in subjects affected by AD and PD to accelerate the development of new and effective therapies. Purpose and aims: 1) To identify and validate cost effective blood-based biomarkers to improve the diagnostics of AD- and PD-related disorders in a primary care setting. 2) To develop diagnostic algorithms including advanced brain imaging and cerebrospinal fluid biomarkers to be able to diagnose the diseases earlier and more accurately in specialized healthcare clinics. 3) To develop novel tools enabling efficient clinical trials, i.e. methods improving i) accurate patient selection, ii) relevant stratification of patient populations and iii) assessment of treatment effects on key drug targets in affected humans. 4) To investigate the underlying disease mechanisms of AD and PD in humans and to establish new disease models for human experimental research aiming at finding new relevant drug targets. Project description: We include well-defined, clinically relevant population- and clinic-based cohorts of patients with early symptoms and healthy elderly followed longitudinally and prospectively for 6 years. We perform detailed clinical assessments and analyze the blood and cerebrospinal fluid with state-of-the-art quantitative mass spectrometry and highly sensitive immune-based approaches. Advanced high-field magnetic resonance (MR) is used to unravel the structural and functional connectivity in the brain and newly developed positron emission tomography (PET) ligands are used to detect regional tau and amyloid pathology. The project's unique strength is that clinically relevant and very well-characterized cohorts are examined with world-leading technologies in protein chemistry and brain imaging. Further, in vivo microdialyses in humans and animal models are used together with infusion of 13C-labeled leucine to further understand the mechanisms behind amyloid accumulation in these neurodegenerative disorders. We also develop novel and relevant human-derived cell models to understand disease pathology and facilitate drug discovery.

Lay Summary
Further information available at:

Types:
Investments > €500k

Member States:
Sweden

Diseases:
Alzheimer's disease & other dementias, Parkinson's disease & PD-related disorders

Years:
2016

Database Categories:
N/A

Database Tags:
N/A