

Tau, amyloid, & white matter burden interact to impact brain networks in preclinical Alzheimer's disease

<https://neurodegenerationresearch.eu/survey/tau-amyloid-white-matter-burden-interact-to-impact-brain-networks-in-preclinical-alzheimer%20s-disease/>

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Country

USA

Title of project or programme

Tau, amyloid, & white matter burden interact to impact brain networks in preclinical Alzheimer's disease

Source of funding information

NIH (NIA)

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€ 3,802,550.46

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01/09/2016

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1

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Acquired Cognitive Impairment... Aging... Alzheimer's Disease... Alzheimer's Disease including Alzheimer's Disease Related Dementias (AD/ADRD)... Basic Behavioral and Social Science...

Research Abstract

PROJECT SUMMARY This project investigates the unique and joint impact of tau and amyloid pathology associated with Alzheimer's disease and of white matter hyperintensities of presumed vascular origin on brain network function and cognition, including memory and executive abilities. The overarching hypothesis is that tau, amyloid, and white matter burden interact to specifically disrupt the function of brain networks in which the burden occurs, and will lead to declines in cognitive abilities associated with the disrupted networks. The proposed work builds on recent advances in the connectomics of functional networks within individuals using magnetic resonance imaging and a recently-developed positron emission tomography marker for the visualization of tau burden in humans. The first specific aim tests for differential and interactive influences of tau, amyloid and white matter burden when these pathological markers occur within a brain network. The second specific aim tests for how interactions between tau, amyloid, and white matter burden may lead to declines in cognition over a 3-year period. The proposed work provides novel extensions of recent cross-sectional findings relating network function, pathology, and cognition to critically test whether tau and amyloid burden interact with white matter burden to impact regional network integrity and cognition during the preclinical stage of Alzheimer's disease. If successful, these aims will provide evidence that localized preclinical tau and amyloid pathology and white matter hyperintensities of presumed vascular origin have an interactive impact that contributes to the functional network and cognitive declines commonly observed during aging. This work will help to differentiate processes attributed to typical aging and development from the pathology associated with Alzheimer's disease at its earliest stages. If successful, this work will improve our understanding of how the location of pathology impacts specific brain networks and cognitive abilities, and will provide measures to improve early diagnosis of network or cognitive dysfunction attributable to the location of these pathological markers in individual patients.

Lay Summary

PROJECT NARRATIVE This project investigates the regional impact of tau and amyloid associated with Alzheimer's disease and of white matter hyperintensities of presumed vascular origin on the function of brain networks and associated cognitive abilities. This work will benefit public health by providing evidence of links between these neurodegenerative markers in humans and by providing imaging markers for use in the diagnosis and eventual treatment of network disruption during aging and neurodegeneration.

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

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