

The Olfactory Bulb-Entorhinal Cortex Axis as an Early Biomarker for Alzheimers Disease

<https://neurodegenerationresearch.eu/survey/the-olfactory-bulb-entorhinal-cortex-axis-as-an-early-biomarker-for-alzheimers-disease/>

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Country

USA

Title of project or programme

The Olfactory Bulb-Entorhinal Cortex Axis as an Early Biomarker for Alzheimers Disease

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NIH (NIA)

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15/04/2015

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2

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... Behavioral and Social Science... Brain Disorders... Dementia... Neurodegenerative... Neurosciences... Prevention... Translational Research

Research Abstract

? DESCRIPTION (provided by applicant): Early detection of Alzheimer's disease (AD) is a critical factor in combating this devastating disease. The discovery that pathological changes underlying brain degeneration and cognitive loss begin at least 10-20 years before dementia onset has provide an important target for the improvement of disease diagnosis and therapy. The development of biomarkers to detect neuropathology associated with early-stage AD will allow the implementation of preventive treatments much earlier in the pathological process, maximizing treatment efficacy. Notably, olfactory dysfunction precedes symptoms of dementia and memory loss, which has made olfactory tests a commonly used tool in early AD detection. As olfactory decline also occurs in normal aging, an accurate diagnosis of AD relies in the proper distinction between these processes. Interestingly, it is well established that the entorhinal-hippocampal circuit, a key pathway for learning and memory, exhibits early neuropathology in AD, and that olfactory information is relayed to the hippocampus via the entorhinal cortex. Unfortunately, the mechanisms underlying olfactory deficits in AD and natural aging remain largely unknown. Here we propose to unravel the mechanisms by which olfactory information is conveyed to the entorhinal cortex and the adaptations that precede olfactory dysfunction in naturally aging mice and in a transgenic mouse model of AD. To achieve this goal, our team of investigators will use a multidisciplinary approach that combines viral-assisted retrograde labeling, electrophysiology, optogenetics, and behavioral assessment.

Lay Summary

PUBLIC HEALTH RELEVANCE: Olfactory dysfunction precedes symptoms of dementia and memory loss, making olfactory tests a useful tool in early detection of brain neuropathology, including Alzheimer's disease (AD). Here, we propose to determine the mechanisms by which olfactory information is conveyed to the entorhinal cortex (EC), a key component of brain circuits important for learning and memory, which also exhibits early neuropathology in AD. Importantly, we will determine the neural components of the olfactory bulb-EC circuit, and how the function of this circuit is affected in normal aging and in an animal model of AD.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Alzheimer's disease & other dementias

Years:

2016

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