High-Resolution Structural and Functional Brain Imaging of Medial Temporal Lobe i

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Country

USA

Title of project or programme

High-Resolution Structural and Functional Brain Imaging of Medial Temporal Lobe i

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

€ 2,049,178.90

Start date of award

15/09/2009

Total duration of award in years

8

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... Bioengineering... Brain Disorders... Clinical Research... Clinical Research - Extramural... Dementia... Diagnostic Radiology... Mental Health... Neurodegenerative... Neurosciences

Research Abstract
DESCRIPTION (provided by applicant): Our memory changes as we age. Age-related memory decline in and of itself represents a significant public health impact, but cognitive decline – and in particular memory decline – has been shown to be an important risk factor for Alzheimer's Disease (AD). Examining neurocognitive aging will help us better characterize pathological and non-pathological changes in the brain throughout the lifespan and identify preclinical markers for cognitive decline. This project extends our prior work into the exact nature of age-related memory decline and into its neural bases. Like our prior project, this proposal draws heavily on animal models of aging and computational models of memory to test specific hypotheses about age-related memory decline. In our prior funding period, we focused almost exclusively on the hippocampus, demonstrating age- related disruptions in the hippocampal circuit that parallel those found in the rodent and demonstrating how these changes affect specific kinds of memory. In particular, we showed how the human hippocampal dentate gyrus is critically involved in episodic memory by virtue of its exceptional capacity for performing pattern separation, or the ability to isolate similar memories from each other. We also showed how this circuit is disrupted gradually over the course of aging and how this is linked to age-related loss of the detail or episodic components of a memory. One goal of the project is to build extensively on the behavioral tasks that we have pioneered and that are being widely adopted in the field so that we can develop and neurobiologically validate an entire suite of behavioral tasks that are maximally sensitive to hippocampal function and to age- related cognitive decline. As this loss is not confined to the hippocampus, but includes changes in the adjacent medial temporal lobe cortices and in the prefrontal cortex, we propose to examine in detail changes in these regions and in their interactions with the hippocampus. Here again we draw heavily on neurobiological findings from the rodent to test specific hypotheses about age-related changes in regions like the perirhinal cortex and to assess changes in the functional contributions of and interrelationship between hippocampal and prefrontal age-related changes in memory. Like our prior work, we propose to collect a comprehensive suite of behavioral and neuroimaging data from a large sample of adults. By collecting an extensive set of measures on each participant, we can examine interrelationships that would otherwise be impossible. In addition to our own specific questions and hypotheses, the extensive set of measures (which includes longitudinal assessment of participants from our prior work) will be valuable to other researchers. As before, we will make all components of the data widely available to others.

Lay Summary
PUBLIC HEALTH RELEVANCE: The percentage of the world's population aged 65 and older is expected to be triple what it was several decades ago and double the current proportion, representing a huge demographic shift. The incidence of dementia (e.g., Alzheimer's Disease, Vascular Dementia, etc.) increases dramatically with age. Outside of dementia, there are also clear cognitive effects of age, particularly in the domain of memory. Understanding the neural mechanisms that underlie these age-related deficits is crucial for understanding the effects of aging and dementia, and paving the way to improve treatments for both normal and pathological

changes in memory and for early prevention.

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