Characterizing the Behavior Profile of Healthy Cognitive Aging

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Country

USA

Title of project or programme

Characterizing the Behavior Profile of Healthy Cognitive Aging

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7

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Acquired Cognitive Impairment... Aging... Alzheimer's Disease... Alzheimer's Disease Related Dementias (ADRD)... Alzheimer's Disease including Alzheimer's Disease Related Dementias (AD/ADRD)... Behavioral and Social Science... Brain Disorders... Cerebrovascular... Clinical Research... Clinical Research - Extramural... Dementia... Lewy Body Dementia... Neurodegenerative... Neurosciences... Prevention... Vascular Cognitive Impairment/Dementia

Research Abstract

? DESCRIPTION (provided by applicant): Prevention of cognitive decline in old age ranks among the most important public health challenges. Identification of healthy cognitive aging has long been considered an essential step. However, despite decades of research, the profile of healthy cognitive aging remains unknown because pathologic processes that impair cognition often are present but not accounted for in studies of healthy cognitive aging. Most of the available studies have examined cognitive change in persons without dementia. However, many persons without cognitive impairment who come to autopsy have extensive neuropathologic evidence of common diseases known to cause cognitive impairment in old age (i.e., AD, CVD, and LBD). Moreover, recent data suggest that additional neuropathologies also are common in persons without dementia (e.g., TDP-43, hippocampal sclerosis, white matter disease). Further, most older persons exhibit a precipitous decline in cognition in the years just prior to death (i.e, terminal decline). Terminal decline represents a separate pathologic process that has not been accounted for in studies of healty cognitive aging. We propose a novel conceptualization of healthy cognitive aging as the cognitive change not accounted for by pathologic processes known to impair cognition in old age (i.e., neuropathologies and terminal cognitive decline). The overall goal of the proposed continuation is to identify the profile of healthy cognitive aging and distinguish it from pathologic and terminal cognitive decline. Our research capitalizes on data from two ongoing studies of aging, the Religious Orders Study and the Memory and Aging Project, that collect the unique longitudinal cognitive and detailed post-mortem data required to identify healthy cognitive aging. We will first quantify the cognitive change due to neuropathologic and terminal cognitive decline (i.e., pathologic cognitive aging). Then, we will identify healthy cognitive aging (i.e., the residual cognitive change). Toward this end, the proposed study will employ a multimodal approach to quantify several new pathologic indices (i.e., neuropathologic indices of TDP- 43, hippocampal sclerosis, white matter disease, and multiple indices of brain integrity derived from neuroimaging) and use innovative analyses to examine their contribution to cognitive trajectories, above and beyond AD, CVD, and LBD. The proposed study offers a rare opportunity to identify the profile of healthy cognitive aging and distinguish it from neuropathologic and terminal cognitive decline. We are not aware of other studies that quantify essentially all of the pathologic processes known to impair cognition in old age as will be done here and in which similar analyses could be performed. The proposed study offers an innovative approach to address a fundamental and longstanding challenge in cognitive aging research. Knowledge of the trajectory of healthy cognitive aging is essential for the early identification of persons who will benefit most from effective intervention and, ultimately, for th prevention of cognitive decline in old age.

Lay Summary

PUBLIC HEALTH RELEVANCE: Identifying healthy cognitive aging has long been considered essential to prevent cognitive decline in old age; however, despite decades of research, the profile of healthy cognitive aging remains unknown because pathologic processes that impair cognition often are present but not accounted for in studies of healthy cognitive aging (i.e., neuropathology and terminal decline). The proposed study will employ a multimodal approach to determine the contribution of several new neuropathologic indices (i.e., TDP-43, hippocampal sclerosis, and white matter disease derived from traditional neuropathologic assessment, and multiple indices of brain integrity derived from post-mortem neuroimaging) to trajectories of cognitive change, above and beyond the common causes of dementia (i.e., AD, CVD, and LBD). This study also will determine the rate of cognitive decline during life that signifies the

onset of neuropathologic and terminal cognitive decline, as needed to facilitate early identification of persons most likely to benefit from intervention; thus, the proposed study offers a rare opportunity to identify the profile of healthy cognitive aging and distinguish it from neuropathologic and terminal cognitive decline.

Further information available at:

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Alzheimer's disease & other dementias

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