

Aerobic Exercise in Alzheimers Disease: Cognition and Hippocampal Volume Effects

<https://neurodegenerationresearch.eu/survey/aerobic-exercise-in-alzheimers-disease-cognition-and-hippocampal-volume-effects/>

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Contact information of lead PI Country

USA

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Aerobic Exercise in Alzheimers Disease: Cognition and Hippocampal Volume Effects

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NIH (NIA)

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01/08/2013

Total duration of award in years

3

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)... Behavioral and Social Science... Brain Disorders... Cardiovascular... Clinical Research... Clinical Research - Extramural... Clinical Trials and Supportive Activities... Dementia... Neurodegenerative... Neurosciences... Physical Activity... Translational Research

Research Abstract

DESCRIPTION (provided by applicant): Aerobic exercise holds promise for treating cognitive impairment and altering brain atrophy in Alzheimer's disease (AD). AD currently afflicts 5.4 million Americans and will affect 14 million by 2050 if no cure is found. Cognitive impairment is the hallmark symptom of AD and contributes to the manifestation of other symptoms that result in poor outcomes, including low quality of life, early institutionalization, and high costs (valued at \$202.6 billion in 2010). Exercise studies in AD are just emerging and have produced conflicting findings on cognitive outcomes, largely due to low doses, poor delivery of aerobic exercise, and lack of controls. This pilot randomized controlled trial (RCT) will be the first to investigate the effects of a novel 6-month, individualized, moderate-intensity cycling intervention on cognition and hippocampal volume in community-dwelling older adults with mild-to-moderate AD. Two complementary frameworks guide our study: the cardiovascular fitness hypothesis that suggests increased aerobic fitness improves cognition; and the biological mechanistic theory which addresses the lack of specificity of the first framework by identifying the mechanisms of action of aerobic exercise. Dr. Yu (PI), an Early-Stage Investigator, has successfully led her interdisciplinary team to develop and execute the 6-month cycling intervention, establish the feasibility of recruitment, retention, and adherence, and show positive cognitive results via 3 pretest posttest studies. This pilot RCT will randomize 90 subjects to the 6-month cycling intervention or attention control (sham exercise) groups using permuted blocks of 3 and 6 subjects randomly and a 2:1 allocation ratio, and follow them for another 6 months. Cognition will be measured by the AD Assessment Scale-Cognition (ADAS-Cog) at baseline, 3, 6, 9, and 12 months. Hippocampal volume will be measured by magnetic resonance imaging (MRI) at baseline, 6, and 12 months. The sample size will give us 80% power to detect at least a 2.5-point difference in within-group changes in ADAS-Cog at 6 months. The specific aims are: Aim I. Determine the immediate effect of the cycling intervention on cognition in AD. We hypothesize that intervention subjects will have a smaller within-group increase in ADAS-Cog at 6 months than placebo subjects in AD drug RCTs, while control subjects will have the same increase as placebo subjects in AD drug RCTs. Aim II. Examine if the cycling intervention slows cognitive decline in AD from baseline to 12 months. We expect that intervention subjects will show a smaller increase in ADAS-Cog over 12 months than control subjects. Aim III: Assess the effect of aerobic exercise on hippocampal volume in AD over 12 months using MRI. We expect that intervention subjects will have a smaller decrease in hippocampal volume over 12 months than control subjects. The study's broad impacts are to address the critical gap in knowledge of the therapeutic effects of aerobic exercise in AD and offer a potentially effective treatment for AD. This pilot study will inform a future full-scale RCT that will address our long-term goal of elucidating how aerobic exercise alters AD progression and provide important foundations for future research.

Lay Summary

PUBLIC HEALTH RELEVANCE: The proposed study will determine if 6-month aerobic exercise will affect the decline in cognition and hippocampal volume in older adults with mild-to-moderate

Alzheimer's disease (AD). This study could potentially reduce the public health impact of AD by providing an effective treatment, delaying nursing-home placement, increasing physical function, improving quality of life, and curbing the prohibitive health care costs for the growing population with AD and their 15 million family caregivers. This study could further help both the health care providers and the public to engage older adults with AD in aerobic exercise and address issues to advance future research.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Alzheimer's disease & other dementias

Years:

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