

# Effects of physical activity on brain function and network connectivity in MCI

<https://www.neurodegenerationresearch.eu/survey/effects-of-physical-activity-on-brain-function-and-network-connectivity-in-mci/>

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## Contact information of lead PI

### Country

USA

## Title of project or programme

Effects of physical activity on brain function and network connectivity in MCI

## Source of funding information

NIH (NIA)

## Total sum awarded (Euro)

€ 2,374,748.62

## Start date of award

15/09/2015

## Total duration of award in years

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)... Behavioral and Social Science... Bioengineering... Brain Disorders... Clinical Research... Clinical Research - Extramural... Clinical Trials and Supportive Activities... Dementia... Effectiveness Research... Health Services... Mental Health... Neurodegenerative... Neurosciences... Physical Activity... Prevention...

### **Research Abstract**

DESCRIPTION (provided by applicant): This is the revised application NIH R01-AG046928-01, titled "Effects of physical activity on brain function and network connectivity in MCI." The overall goal of this project is to assess the effect of physical activity on remediating early impairments in brain function in sedentary older adults at risk for Alzheimer's disease (AD). AD is the most common cause of cognitive impairment in older adults. The need for effective treatments has become imperative, as 36 million people worldwide are affected and counting. The results from several large pharmacological trials have been sobering with a lack of significant clinical outcomes, prompting a paradigm shift to initiate treatment earlier in the disease process and explore non-pharmacological interventions. Physical activity has recently emerged as a promising intervention for delaying disease onset and slowing cognitive decline in AD. However, the effect of physical activity on neurobiological mechanisms of action, such as brain activity and network function in at risk older adults with mild cognitive impairment (MCI), a preclinical stage of AD, remains largely unexplored. Thus, there is a need for well-designed randomized controlled trials (RCT) examining functional brain health outcomes of physical activity intervention in this vulnerable population. The objective of this proposal is to evaluate physical activity as an intervention for improving functional brain health by remediating hippocampal dysfunction and enhancing functional network connectivity in MCI. Using a unique interdisciplinary approach of modern neuroscientific methodology in an RCT, a comprehensive set of outcomes will be evaluated. This project will recruit 90 sedentary participants between 50-85 years of age with amnesic MCI. Consistent with the current Surgeon General's recommendation on moderate-intensity exercise, participants will be randomly assigned to one of three home-based groups for a 6-month intervention period: 1) aerobic walking for 150 mins/week, 2) stretching active-control for 150 mins/week, and 3) health education non-active control, with 30 participants in each group. We will examine the effects of physical activity on the primary neuroimaging outcomes of regional BOLD activity in the hippocampal, functional connectivity between the prefrontal cortex and hippocampus, and intrinsic connectivity of the default mode and executive networks. Additionally, we will examine secondary outcomes of brain volume, cognition, function, and serum biomarkers associated with physical activity. The effect of regional AD pathology on change in the outcome measures will be examined using amyloid PET.

### **Lay Summary**

PUBLIC HEALTH RELEVANCE: The proposed RCT will use a novel approach to investigate the effects of exercise on brain health in individuals with MCI using advanced neuroimaging of fMRI and amyloid PET. Results from this study will provide critical insight into the mechanisms of action that drive the benefits of exercise on cognitive outcomes and will give neuroscientific support for public health interventions to increase physical activity in older adults at risk for A.

### **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