

# Brain Plasticity Measures in MCI

<https://www.neurodegenerationresearch.eu/survey/brain-plasticity-measures-in-mci/>

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### Country

USA

## Title of project or programme

Brain Plasticity Measures in MCI

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NIH (NIA)

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1

## 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... Clinical Research... Clinical Research - Extramural... Clinical Trials and Supportive Activities... Dementia... Mental Health... Neurodegenerative... Neurosciences... Prevention... Rehabilitation... Translational Research

## Research Abstract

? DESCRIPTION (provided by applicant): The goal of this proposal is to advance our understanding of the neurobiological substrates of mild cognitive impairment (MCI) that may lead to progressive age-related dementias such as Alzheimer's disease (AD), and develop a reliable assay for their early detection and longitudinal assessment. MCI patients who go on to

develop AD show evidence of increasing accumulation of amyloid beta (A $\beta$ ) in the brain cortex. We hypothesize that A $\beta$  toxicity directly impairs mechanisms of plasticity that will be demonstrable by a non-invasive neurophysiologic method and account for cognitive dysfunction. We will evaluate mechanisms of cortical plasticity in individuals with MCI and compare them to an existing cohort of intact healthy controls. Positron emission tomography (PET) imaging will be used to classify MCI individuals as A $\beta$ + and A $\beta$ -. Mechanisms of cortical plasticity will be explored by assessing the modulation of cortical reactivity induced by a specific repetitive transcranial magnetic stimulation (TMS) protocol known as theta burst stimulation (TBS). The comparison of the motor responses induced by single-pulse TMS before and following TBS provides a noninvasive measure of brain plasticity in humans. Cognitive testing and tasks of learning and memory will be used to demonstrate the behavioral correlates of this measure of plasticity. Our pilot studies demonstrate the feasibility of our approach and provide supportive evidence for our hypothesis. We anticipate that data from this study will address an important need for a rapid, noninvasive, reliable, repeatable, and safe method to directly assess the efficacy of neuroplastic mechanisms in MCI. If successful, TMS-based measures of cortical reactivity and plasticity will provide an objective assessment of pathophysiological changes in MCI and may serve as a translatable biomarker to assess cognitive dysfunction in MCI, inform the development of effective therapies and evaluate treatment response in future clinical trials.

**Further information available at:**

**Types:**

Investments < €500k

**Member States:**

United States of America

**Diseases:**

N/A

**Years:**

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**Database Categories:**

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**Database Tags:**

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