

# Multimodal MRI biomarkers of small vessel disease for older persons with and without dementia.

<https://neurodegenerationresearch.eu/survey/multimodal-mri-biomarkers-of-small-vessel-disease-for-older-persons-with-and-without-dementia/>

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### Country

USA

## Title of project or programme

Multimodal MRI biomarkers of small vessel disease for older persons with and without dementia.

## Source of funding information

NIH (NIA)

## Total sum awarded (Euro)

€ 4,868,752.29

## Start date of award

30/09/2016

## Total duration of award in years

2

## The project/programme is most relevant to:

Alzheimer's disease & other dementias

## Keywords

Microvascular Dysfunction, imaging biomarker, Dementia, Magnetic Resonance Imaging, Elderly

## Research Abstract

**ABSTRACT** Small vessel disease (SVD) pathologies are very common in the brains of older persons and are related to decline in cognitive abilities, MCI, and dementia. SVD pathologies include three common vessel diseases and an array of related tissue injuries. SVD pathologies may cause dementia on their own but more commonly coexist with Alzheimer's disease (AD) and other age-related pathologies where they lower the threshold for dementia. Effective participant selection into trials, and prevention and treatment would greatly benefit from having in-vivo biomarkers of this pathology. Current biomarkers are limited by lack of specificity for SVD (vs. AD) pathology and lack of pathologic validation. We propose to overcome these obstacles by (1) further developing specific ex-vivo MR imaging features of SVD pathologies after controlling for AD and other pathologies, in the brains of persons with and without dementia; (2) training a classifier using machine learning and multimodal MRI, and testing the classifier in persons without dementia, and whether it is related to cognitive status proximate to death; (3) translating the classifier into an in-vivo biomarker which can be investigated in relation to vascular risk factors and cognition, MCI, and dementia; and (4) validating the biomarker in a separate cohort (ADNI) and by autopsy confirmation of SVD pathologies in a large group of older persons followed longitudinally with MRI who agree to autopsy at death. Finally we propose to (5) share data, expertise and biomarker strategies within the UH2/UH3 consortium and cross-validate selected biomarkers in older persons followed longitudinally with cognitive testing, blood draws and brain autopsy at the time of death. We propose to leverage the resources of two longitudinal clinical-imaging-pathology cohorts, the Rush Memory and Aging Project (MAP) (R01AG017917) and Religious Orders Study (ROS) (P30AG010161), to accomplish these aims.

### **Lay Summary**

**PROJECT NARRATIVE** Successful development of small vessel disease (SVD) biomarkers will advance public health by changing the landscape of research, diagnosis, and treatment in vascular and AD dementias, which commonly have mixed pathologies. SVD biomarkers will specifically refine participant selection in clinical trials, improve diagnosis of the most common types of dementia, and advance target selection in studies of the prevention and treatment of dementia in older persons.

**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:**

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