

# Imaging Dementia: Brain Matters

<https://www.neurodegenerationresearch.eu/survey/imaging-dementia-brain-matters/>

## Principal Investigators

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## Institution

Erasmus MC

## Contact information of lead PI

### Country

Netherlands

## Title of project or programme

Imaging Dementia: Brain Matters

## Source of funding information

ZonMw

## Total sum awarded (Euro)

€ 500,000

## Start date of award

01/09/2015

## Total duration of award in years

4.0

## The project/programme is most relevant to:

Alzheimer's disease & other dementias

## Keywords

### Research Abstract

The "Imaging Dementia: Brain Matters" project is a Medical Delta Imaging Institute project that brings together two University Medical Centers (Erasmus MC and LUMC), one Technological University (TU Delft), a multinational (Philips Healthcare), and three SME's (Biotronics3D, Quantib and Vodera).

The aim of this consortium is to develop image-based technology for better understanding of the early stages of dementia, and to develop image-based tools for the early diagnosis and improved prognosis of dementia. This will pave the way for more effective and tailored

treatment, and more effective psycho-educational support.

Expected outcomes of the project will be (i) improved quality of life for the patient, (ii) reduced costs per patient and less stress on relatives and the healthcare system, (iii) novel user-friendly and efficient tools and technology for the physician, and (iv) new business opportunities for the medical imaging industry.

#### Background:

In the coming decades, dementia will pose an increasing burden on society. For example, the number of persons suffering from late-onset Alzheimer's disease is expected to quadruple by 2050. There is thus an urgent need to develop effective preventive and therapeutic strategies. This requires tools to identify individuals at risk and those most likely to benefit from (preventive) therapy, ideally very early in the disease process.

In the past decades, two prevailing pathways for Alzheimer's disease have emerged: (I) amyloid accumulation in brain parenchyma and vascular structures, leading to neurotoxicity and consecutive neurodegeneration; and (II) vascular risk factors causing atherosclerosis, arteriolosclerosis and associated hypoperfusion resulting in accumulating vascular damage in the brain. The clinical picture of patients with Alzheimer's disease varies widely, as does the underlying brain pathology, which is more often mixed than a single, unique pathology. Accordingly, there is an urgent need to better understand and unravel brain damage resulting from different dementia pathways during life, in order to aid diagnosis and ultimately enable tailored, personalized prevention and treatment strategies.

#### Project results:

Brain MRI is one of the most promising, non-invasive and relatively low-cost tools to gain information on the multitude of processes involved in dementia. In this proposal will develop novel MR image acquisition methods for highly specific and sensitive quantification of microstructural brain damage, and tools to enable automated and integrated assessment of (patterns of) the following markers: cerebral microbleeds, infarcts, enlarged perivascular spaces, brain perfusion, and functional brain connectivity.

We will apply these tools in the framework of the Rotterdam Study, one of the largest longitudinal population-based neuroimaging studies on dementia, and on clinical neuroimaging data from memory clinic patients in Erasmus MC and LUMC, thus greatly improving our understanding of (the early stages of) dementia, and improving its early detection and differential diagnosis.

The uniqueness of the proposal is the in the integration of information on different pathways leading to dementia, and the comprehensive analysis of all known MRI signatures of the disease related to neurodegeneration and vascular damage.

#### Valorization:

By integrating the tools in a user-friendly prototype workstation environment, we enable efficient translation to the clinic, and support exploitation and valorization of the results of the project. Also, we will build on the expertise of the industrial partners in the consortium, and our track

record in public-private collaboration and technology transfer, to maximize valorization of the project's results.

### **Lay Summary**

**Further information available at:**

#### **Types:**

Investments > €500k

#### **Member States:**

Netherlands

#### **Diseases:**

Alzheimer's disease & other dementias

#### **Years:**

2016

#### **Database Categories:**

N/A

#### **Database Tags:**

N/A