

# Converting Alzheimers reactive astrocytes into functional neurons

<https://neurodegenerationresearch.eu/survey/converting-alzheimers-reactive-astrocytes-into-functional-neurons/>

## Principal Investigators

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## Contact information of lead PI

### Country

USA

## Title of project or programme

Converting Alzheimers reactive astrocytes into functional neurons

## Source of funding information

NIH (NIA)

## Total sum awarded (Euro)

€ 1,468,830.28

## Start date of award

15/07/2013

## Total duration of award in years

4

## 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)... Brain Disorders... Dementia... Neurodegenerative... Neurosciences

## Research Abstract

DESCRIPTION (provided by applicant): Alzheimer's disease (AD) is a prevalent

neurodegenerative disorder among elderly population, with over 5 millions of AD patients in the US and the social and economic cost exceeding 200 billion dollars in 2012. However, currently there is no effective treatment available for AD. Reactive astrocytes are an important pathological marker widely associated with neural injury and neurodegenerative disorders including AD. Astrogliosis is a major obstacle to prevent neuronal axon regeneration and axon re- entry into the injury or diseased areas. We have developed an innovative approach to trans-differentiate reactive astrocytes into functional neurons in AD mouse brain in vivo. This was achieved through the use of retrovirus to overexpress proneural transcription factor NeuroD1 in a transgenic AD mouse model (5xFAD). This proposal is to further evaluate this novel approach as a potential therapy to treat AD. The specific aims are: 1) To investigate local network remodeling in AD brains after converting reactive astrocytes into functional neurons. 2) To generate novel transgenic mouse models for efficient reactive astrocyte-neuron conversion. 3) To examine functional and behavioral improvement after reactive astrocyte-neuron conversion in AD brains. Our in vivo trans-differentiation approach to convert reactive astrocytes into functional neurons not only reduces the number of reactive astrocytes, but also generates new neurons in diseased areas for brain repair. This internal trans-differentiation strategy will avoid potential aversive effects associated with cell transplantation method. The trans-differentiation technology described in this proposal may be potentially developed into novel therapeutic treatment to reverse astrogliosis induced by brain injury or neurodegenerative disorders.

### **Lay Summary**

**PUBLIC HEALTH RELEVANCE:** There are over 5 million of Alzheimer's disease (AD) patients in the US and the social and economic cost is exceeding 200 billion dollars in 2012. However, currently there is no effective treatment available for AD. This proposal will develop an innovative approach to convert reactive astrocytes into functional neurons for internal brain repair to treat AD.

### **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