

# Cellular determinants of neuronal plasticity on the level of single synapses in vivo

<https://www.neurodegenerationresearch.eu/survey/cellular-determinants-of-neuronal-plasticity-on-the-level-of-single-synapses-in-vivo/>

## Principal Investigators

### Institution

### Contact information of lead PI

### Country

European Commission

## Title of project or programme

Cellular determinants of neuronal plasticity on the level of single synapses in vivo

## Source of funding information

European Commission FP7-Seventh Framework Programme

## Total sum awarded (Euro)

€ 2,404,800

## Start date of award

01/05/2013

## Total duration of award in years

5.0

## The project/programme is most relevant to:

Alzheimer's disease & other dementias

## Keywords

### Research Abstract

The search for the fundamental mechanisms of learning and experience-dependent memory formation in the brain has long been a central quest in neuroscience. The neocortex is a particularly relevant region for plasticity because it is involved in sensory, motor, and cognitive tasks with strong learning components. However, despite many years of intensive research our knowledge of the neuronal mechanisms of plasticity on the level of single synapses in the intact living brain is still very limited.

Here I propose the use of cutting edge technology, including the ultrasensitive LOTOS procedure of in vivo two-photon calcium imaging that was developed in our laboratory, to investigate for the first time the functional properties and the plasticity of signal synapses in auditory cortical pyramidal neurons of layers 2/3, 4 and 5 in vivo. For the study of the cellular

determinants of synaptic plasticity we will focus on an associative learning paradigm underlying cued fear conditioning. Importantly, this paradigm can be rapidly and effectively induced not only in awake, but also in anesthetized animals and is therefore ideally suited for these studies. In addition to a comprehensive analysis of wild type animals, we will perform experiments in mouse models of Alzheimer's disease (AD), aiming to identify the cellular cause of the devastating impairment of memory formation observed in patients suffering from AD.

### **Lay Summary**

**Further information available at:**

#### **Types:**

Investments > €500k

#### **Member States:**

European Commission

#### **Diseases:**

Alzheimer's disease & other dementias

#### **Years:**

2016

#### **Database Categories:**

N/A

#### **Database Tags:**

N/A