

# From Cells to Organs on Chips: Development of an Integrative Microfluidic Platform

<https://neurodegenerationresearch.eu/survey/from-cells-to-organs-on-chips-development-of-an-integrative-microfluidic-platform/>

## **Principal Investigators**

### **Institution**

### **Contact information of lead PI**

### **Country**

European Commission

## **Title of project or programme**

From Cells to Organs on Chips: Development of an Integrative Microfluidic Platform

## **Source of funding information**

European Commission FP7-Seventh Framework Programme

## **Total sum awarded (Euro)**

€ 2,260,000

## **Start date of award**

01/07/2013

## **Total duration of award in years**

5.0

## **The project/programme is most relevant to:**

Alzheimer's disease & other dementias

## **Keywords**

### **Research Abstract**

We shall develop a microfluidic and microsystems toolbox allowing the construction and study of complex cellular assemblies ("tissue or organ mimics on chip"), in a highly controlled and parallelized way. This platform will allow the selection of specific cells from one or several populations, their deterministic positioning and/or connection relative to each other, yielding functional assemblies with a degree of complexity, determinism and physiological realism unavailable to current in vitro systems We shall in particular develop "semi-3D" architectures, reproducing the local 3D arrangement of tissues, but presenting at mesoscale a planar and periodic arrangement facilitating high resolution stimulation and recording. This will provide biologists and clinicians with new experimental models able to bridge the gap between current in vitro systems, in which cells can be observed in parallel at high resolution, but lack the highly

ordered architecture present in living systems, and in vivo models, in which observation and stimulation means are more limited. This development will follow a functional approach, and gather competences and concepts from micr-nano-systems, surface science, hydrodynamics, soft matter and biology. We shall validate it on three specific applications, the sorting and study of circulating tumour cells for understanding metastases, the creation of “miniguts”, artificial intestinal tissue, for applications in developmental biology and cancerogenesis, and the in vitro construction of active and connected neuron arrays, for studying the molecular mechanisms of Alzheimer, and signal processing by neuron networks. This platform will also open new routes for drug testing, replacing animal models and reducing the health and economic risk of clinical tests, developmental biology , stem cells research. and regenerative medicine.

### **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