

# Closed-Loop Stimulation Device for Enhancing Motor Function After Stroke

Tech ID: 25993 / UC Case 2016-130-0

## INVENTION NOVELTY

This novel brain stimulation device enhances motor function after stroke by modulating the neural network to be more excitable in a task-dependent manner.

## VALUE PROPOSITION

Stroke is the leading cause of motor disability in the United States, affecting over 700,000 patients each year. While there have been important strides taken towards optimizing rehabilitation, a substantial proportion of patients continue to experience significant disability. Therefore, it is critical to develop novel technologies to improve motor function after stroke.

Although other neuromodulatory techniques (tDCS: transcranial direct current stimulation, TMS: transcranial magnetic stimulation, ECS: epidural cortical stimulation, PNS: peripheral nerve stimulation) have shown some promise in promoting motor learning and recovery, results have been inconsistent and marginal. Importantly, these techniques use an 'open-loop stimulation' design where the electric stimulation is continuously turned on for an extended period of time. As a result stimulation is uncoupled to behavior and is unsuited for task-based function.

## TECHNOLOGY DESCRIPTION

UCSF investigators have developed a closed loop stimulation neural interface device to restore function and reduce disability after stroke for patients with moderate impairment. "Closed-loop" stimulation (CLS) directly targets and enhances specific patterns of neural activity, coupling electrical stimulation to task-based brain activity. UCSF researchers have identified neural activities associated with motor learning and function and have generated algorithms to target and enhance stimulation. Using a rodent model of stroke, researchers have shown that their CLS technique generates improved forelimb reaching function after stroke.

## LOOKING FOR PARTNERS

To develop & commercialize the technology as medical device

## STAGE OF DEVELOPMENT

Pre-clinical

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

Stroke, Brain injury, Motor learning, Motor recovery, Close-loop stimulation, Brain stimulation, Neural plasticity

### CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ Health
- ▶ **Medical**
- ▶ Devices
- ▶ Disease: Central Nervous System

### RELATED CASES

2016-130-0

## RELATED MATERIALS

▶ Not available at this time

## DATA AVAILABILITY

Animal data available under CDA

## PATENT STATUS

Country	Type	Number	Dated	Case
Germany	Issued Patent	60 2017 065 259.8	01/04/2023	2016-130
France	Issued Patent	3458147	01/04/2023	2016-130
United Kingdom	Issued Patent	3458147	01/04/2023	2016-130
United States Of America	Issued Patent	<a href="#">11,147,971</a>	10/19/2021	2016-130

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