Site Specific, On Demand Deep Brain Stimulation For Enhancement Of Memory

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SUMMARY

UCLA scientists have developed an advanced surgical procedure to enhance memory formation and learned task completion in humans. The invention identifies critical brain regions and deep brain stimulation protocols to enhance memory performance.

BACKGROUND

Loss of the ability to transform present experience into recallable memory is one of the most dreaded afflictions of the human condition. As the principal feature of Alzheimer's disease and age-related cognitive impairment, memory decline is becoming an increasing public health burden as life expectancy increases. In addition, effective drugs for cognitive impairment and neurodegenerative disorders are scarce and remain vastly underrepresented in pharmaceutical pipelines. Alternatively, direct deep brain stimulation has long served as an intervention for severe, drug-resistant CNS diseases and remains relatively uncharacterized as a therapy for memory decline. Deep brain stimulation has documented benefits in treating chronic pain, depression, and Parkinson's disease, which are all associated with memory impairment. Thus, innovative techniques combining neurosurgery and deep brain stimulation represent an attractive avenue to treat diseases afflicting memory formation.

INNOVATION

Scientists at UCLA have developed an advanced surgical procedure that utilizes electrical deep brain stimulation with intracranial electrodes to enhance memory function. In controlled human experiments, the procedure confers significant improvements in spatial learning tasks. The researchers discovered specific brain regions that improve memory task performance over others. The results of these studies suggest that deep brain stimulation is a highly translational and efficacious approach to treating memory and cognition disturbances in a variety of diseases.

APPLICATIONS

- Treatment of Alzheimer's disease
- Treatment of mild cognitive impairment (MCI) associated with aging or mutation
- Treatment of memory loss associated with central nervous system trauma

ADVANTAGES

- The procedure's ability to significantly enhance declarative memory has been validated in human subjects
- Effective deep brain stimulation requires site-specific stimulation within the brain
- The stimulation threshold required for memory improvement does not elicit seizures or adverse behavioral effects

STATE OF DEVELOPMENT

Researchers have conducted controlled human studies to investigate the potential of deep brain stimulation mediating enhanced memory performance. The studies have identified specific brain regions and stimulation parameters essential to induce memory improvement. Additional studies are underway to elucidate the specific effects of the procedure on memory encoding, storage, and retrieval.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,159,839	12/25/2018	2011-330
United States Of America	Issued Patent	9,403,010	08/02/2016	2011-330

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Minimally Invasive Implantable Brain Stimulation Devices And Methods For Implanting Same
- Wireless Implantable System To Restore Memory

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.

INVENTORS

- Fried, Itzhak

OTHER INFORMATION

KEYWORDS

Alzheimer's disease, cognitive impairment, CNS, deep brain stimulation (DBS), memory loss, neurosurgery

CATEGORIZED AS

- **Medical**
  - Devices
  - Disease: Central Nervous System
  - Therapeutics

RELATED CASES

2011-330-0

UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920,Los Angeles,CA 90095

https://tdg.ucla.edu

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu