



Treating epilepsy via targeted therapy to the endopiriform nucleus (EPN)

A system and method for treating epilepsy and other neurological disorders by deep brain stimulation targeted to the EPN using ultrahigh field MRI.

IP Status: US Patent Issued; Issued Patent No. 12,082,905

Applications

- Neuromodulation therapy for epilepsy and other neurological disorders
- High resolution brain imaging

Key Benefits & Differentiators

- **Reduction in seizures:** Deep Brain Stimulation of the EPN leads to a decrease in the frequency of seizures
- **High resolution mapping of EPN:** Ultrahigh field MRI enables localization of the EPN
- **Safe placement of electrodes:** Novel stereotactic techniques enable consistent placement of electrodes in the expected sites of the EPN
- **Novel target:** The EPN represents a new target for treatment of epilepsy and other neurological disorders

Overview

Approximately one-third of patients with epilepsy do not achieve freedom from seizures using anti-seizure medications. Of these patients, a minority are candidates for safe epilepsy ablative surgical procedures, and many patients who undergo these procedures will still have residual seizures after surgery. Electrical stimulation of neural structures is an alternative approach that can be performed to interfere with seizure generation. However, there are only 3 types of electrical stimulation using FDA-approved devices for epilepsy, and fewer than 20% of patients achieve complete seizure control with any of them.

Researchers at the University of Minnesota have developed a novel approach for treating epilepsy with deep brain stimulation that targets the endopiriform nucleus (EPN). The EPN has been shown to regulate cortical hypersynchronous excitability and the propagation of seizures, deeming it a relevant target for neuromodulation therapy for epilepsy. Use of ultrahigh field MRI enables high-resolution localization of the EPN, allowing electrode placement via stereotactic techniques. Deep brain stimulation of the EPN in a rodent model has shown a promising reduction in the duration and overall occurrence of seizures. This novel method could offer increased efficacy in the treatment of epilepsy patients while also providing improved neural visualization and surgical techniques that could be beneficial for other neurological disorders.

Phase of Development

TRL: 3-4

Proof-of-concept has been demonstrated in rodent models of partial epilepsy. A safety proof-of-concept study of human subjects is being planned.

Technology ID

2019-225

Category

Life Sciences/Human Health
Life Sciences/Medical Devices
Life Sciences/MRI &
Spectroscopy
Life Sciences/Neuroscience

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