Biomarker of Dyskinesia to Customize Medication or Deep Brain Stimulation for Parkinson's Disease Patients

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Technology description

The investigators at UCSF have identified a narrowband increase in power in primary motor cortex during periods of dyskinesia in patients implanted with chronic electrocorticography (ECoG). This peak emerges at approximately 73Hz when the dyskinesias are induced by medications and DBS. The emergence of the peak has been reliably monitored chronically. There is also a smaller peak at the same frequency in sub-thalamic nucleus (the DBS target), which keeps a consistent phase and amplitude relationship with the bigger peak. Monitoring of this biomarker could help improve the devastating side effect of PD treatment in patients by triggering a signal to withhold additional medications or automatically adjust DBS parameters.

This invention has provided methods for detecting dyskinesia in Parkinson’ s disease patients and provided a way to titrate current treatment to maximize benefits while minimizing side effects.

Data Availability

Patient data, Under CDA / NDA

Related Materials

Swann et al. Gamma Oscillations in the Hyperkinetic State Detected with Chronic Human Brain Recordings in Parkinson's Disease. J Neurosci. 2016

Related Technologies

Novel, less invasive biomarker to detect and monitor Parkinson's disease and other movement disorders

Advantages

Parkinson's disease (PD) is the second most common neurological movement disorder, affecting approximately 0.5% of the population. After prolonged treatment with medications such as levodopa, PD patients often show involuntary movements that are called dyskinesia. It can be uncomfortable, socially stigmatizing, and even dangerous over time. However, current PD medication doses are based on observations of the patient or by adhering to a schedule of times that are not customized to the situation of dyskinesia of the patient. For mid-stage PD patients who are no longer optimally improved by medications, the treatment of choice is chronic deep brain stimulation (DBS) delivered in an open loop fashion without adjustments based on the patient’ s internal state or symptoms. It can also

induce dyskinesia due to overstimulation. Therefore, it is critical to develop a reliable marker associated with dyskinesia to help customize medications or stimulations for individual patient.

A robust biomarker of dyskinesia that can be reliably monitored for a year

Provides an important brain signal that can be used to customize medication doses or create “smart” stimulation paradigms for the DBS system

“Closes the loop” for DBS to prevent overstimulation and minimize dyskinesia

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