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

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OTHER INFORMATION

KEYWORDS

movement disorders,

biomarker, therapy, device

CATEGORIZED AS

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

RELATED CASES

2012-152-0

BACKGROUND

Parkinson's disease (PD) and primary dystonia are common brain disorders that affect movement. Performing daily activities becomes increasing difficult and medication is insufficient for treatment of symptoms as severity increases. The best current technology for treatment of these disorders is deep brain stimulation (DBS) which uses stimulator electrodes inserted in the basal ganglia to alter electrical signaling. Determination of optimal stimulation is based on a "trial & error" approach and there is no accurate way to guide the therapy. Stimulation is performed as an "open loop", meaning that there is no brain signal that can be used to monitor the effectiveness of therapy and control the stimulation automatically. Hence, programming of the stimulation requires several time consuming appointments before the optimal setting is determined; thus making it difficult to achieve immediate symptom relief. Identification of a novel method to guide DBS therapy for PD and dystonia is greatly needed.

TECHNOLOGY DESCRIPTION

Neurologists and Neurosurgeons at the University of California, San Francisco have identified a novel biomarker for Parkinson's disease and dystonia. The biomarker signature is a hallmark specific to these disorders and could be used to adjust DBS stimulator settings in real-time and could guide therapy with more accuracy, thus, leading to faster symptom relief. Additionally, the ability to quickly determine the most optimal stimulator setting could decrease or eliminate the neuropsychiatric side effects associated with current calibration methods. Furthermore, the biomarker is detected less invasively than previously proposed biomarkers, without damaging the brain tissue. The signal is stable over a long period and can be easily quantified using current hardware and software. The biomarker has been evaluated in human patients using available devices and measurement methods. Since current devices can easily incorporate the use of this biomarker, this technology can be rapidly incorporated into clinical use.

APPLICATIONS

- Deep Brain Stimulation for the treatment of movement disorders
- Parkinson's Disease therapy
- Primary dystonia therapy

ADVANTAGES

- Biomarker specific to movement disorders that arise from the basal ganglia, such as PD and dystonia
- Less invasive detection of movement disorder-associated markers
- Real-time guide for therapy
- Safer and simpler therapy
- Automated detection of movement disorder symptoms
- Potential for automated feedback control of the DBS stimulus generator
- Fast symptom relief

RELATED MATERIALS

▶ Exaggerated phase-amplitude coupling in the primary motor cortex in Parkinson disease. de Hemptinne C, Ryapolova-Webb ES, Air EL, Garcia PA, Miller KJ, Ojemann JG, Ostrem JL, Galifianakis NB, Starr PA. Published online before print March 7, 2013, doi: 10.1073/pnas.1214546110 PNAS March 7, 2013 201214546

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,604,056	03/28/2017	2012-152
United States Of America	Issued Patent	9,295,838	03/29/2016	2012-152

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