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Multi-modal Neuromodulation Therapy Promotes Sleep

IP Status: Issued US Patent; **Application #:** 15/788,563

Detects Stage of Sleep; Induces and Maintains Stages of Sleep

A new multi-modal, targeted approach to deep-brain stimulation (DBS) therapy manages multiple symptoms simultaneously to treat various neurological and co-morbid conditions. In particular, the technology can help Parkinson's disease (PD) patients overcome co-morbid sleep disturbances by using DBS waveforms and stimulation parameters to promote sleep. The technology uses the same electrodes to deliver different stimulation at night to the same targets stimulated during the day. Sensing and stimulation algorithms detect and monitor stages and quality of sleep via electrophysiological recordings in the same deep brain targets used to stimulate and treat PD motor symptoms. Delivering waveforms and patterns/frequencies to these same targets at the appropriate times can modulate/induce the next stage of sleep. The method can be expanded to other severe sleep disturbances as well as other eventual DBS indications with sleep co-morbidity.

Extends DBS Therapeutic Efficacy, Optimized For Multiple Symptoms

DBS therapy treats PD motor symptoms when patients are awake, but no method currently exists to treat the common sleep disturbances that can be more disabling and resistant to treatment than the motor symptoms. Pharmacological treatments can cause undesired side effects and their efficacy is complicated by PD medication regimens. This precise DBS approach targets several relevant nodes within brain circuitry to provide stimulation therapy while monitoring multiple symptoms for efficacy. It can be used as an extra stimulation setting in already extant DBS devices (particularly those equipped for both stimulation and sensing). Many movement disorder patients with implanted DBS devices could benefit immediately from this approach, which extends therapeutic efficacy by optimizing DBS devices for multiple symptoms.

BENEFITS AND FEATURES:

- Multi-modal, targeted approach to deep-brain stimulation (DBS) therapy
- Treats various neurological and co-morbid conditions
- Parkinson's disease (PD) patients overcome co-morbid sleep disturbances
- Detects and monitors stages and quality of sleep
- Induces/enhances sleep when appropriate
- Monitors multiple symptoms for efficacy

APPLICATIONS:

- Parkinson's Disease
- Severe idiopathic sleep disorders
- DBS indications with sleep co-morbidity
- Movement disorders
- DBS patients

Phase of Development - Proof of concept.

Technology ID
20170066

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Engineering & Physical Sciences/Instrumentation, Sensors & Controls
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