

Noninvasive Biomarkers to Advance Emerging DBS Electrode Technologies in Parkinsons Disease

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Country

USA

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Noninvasive Biomarkers to Advance Emerging DBS Electrode Technologies in Parkinsons Disease

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NIH (NINDS)

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The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

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Deep Brain Stimulation, Electrodes, Parkinson Disease, Biological Markers, Electrocorticogram

Research Abstract

ABSTRACT It is easy to underestimate the importance of normal movement in daily life, until that ability is altered or taken away by disease. Used in more than 150,000 patients worldwide, deep brain stimulation (DBS) is often an effective therapy for Parkinson's disease and other movement disorders, however symptomatic improvement varies substantially in individuals, across clinical trials, and over time. DBS is now proposed for earlier disease stages in Parkinson's disease and for new indications in neurology and psychiatry, potentially exposing larger numbers of patients to this invasive therapy. Emerging segmented or "directional" DBS lead technology provides unprecedented opportunities to optimize clinical improvement and tolerability and to drive innovation in neuromodulation. We have pioneered new putative biomarkers that measure patient-specific cortical physiology elicited by DBS with combined electrocorticography and electroencephalography. Our findings demonstrate robust within-participant changes in cortical activation that distinguish effective versus ineffective stimulation sites. Here we will leverage this knowledge to guide efficient implementation of current steering with novel directional DBS lead technology. Our primary goal is to deliver innovative approach to tailor and optimize field shaping with novel directional lead technology to improve the efficacy and tolerability of DBS in patients with advanced Parkinson's disease. Additionally, our results will provide foundational knowledge (1) to better understand the concept of DBS dose; (2) to refine surgical targeting in real time; (3) and to inform emerging closed loop stimulation paradigms.

Lay Summary

PROJECT NARRATIVE Deep brain stimulation (DBS) is an established therapy for Parkinson's disease, yet outcomes vary significantly in individuals and across clinical trials. The purpose of this research is to use minimally invasive, patient-specific cortical physiology elicited by DBS to guide the use of emerging segmented ("directional") DBS electrode technologies. Our results will provide novel methods to predict and personally optimize efficient implementation of current steering to improve the efficacy, safety, and tolerability of DBS therapy for advanced Parkinson's disease.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

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Parkinson's disease & PD-related disorders

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