Electrophysiological signals identify Parkinson's disease subtypes

23 August 2018

The study focuses on the subthalamic nucleus, a part of the brain that makes up the basal ganglia system, which contributes to motor control, learning and carrying out behaviors and emotions. It is an area that is associated with certain movement disorders, and is one of the areas that is frequently targeted in the use of deep brain stimulation to treat Parkinson's disease.

"It is an area believed to show electrophysiological abnormalities that accompany the motor symptoms, but very limited data exists," said Dr. Joohi Jimenez-Shahed, associate professor of neurology and director of the Deep Brain Stimulation Program at Baylor. "In our study, we were able to find distinct patterns between these two most common phenotypes when recording local field potentials of the subthalamic nucleus."

Local field potentials are signals made by the combined activity of a group of neurons. Researchers studied 24 patients with Parkinson's disease, dividing them into two groups based on the physical symptoms – tremor-dominant or postural instability and gait difficulty subtypes. By analyzing recordings from multiple microelectrodes in sub-territories of the subthalamic nucleus, they were able to record electrophysiological abnormalities that distinguished between the two sets of motor symptoms.

"Deep brain stimulation of this region is an effective therapy for the treatment of these motor symptoms, but an important goal during this type of surgery is placement of the electrode within the motor territory of the subthalamic nucleus in a location that leads to the greatest therapeutic effect," Jimenez-Shahed said. "Our findings demonstrate the feasibility of using microelectrode local field potentials to identify physiological signatures of Parkinson's disease symptoms to further pinpoint these areas."

Researchers also added that being able to identify these precise areas could lead to more
individualized treatment for each patient, thereby resulting in greater benefits and fewer side effects.


Provided by Baylor College of Medicine

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.