Long-term stability of local field potentials recorded from the subthalamic nucleus and effects of deep brain stimulation

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Canada

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Long-term stability of local field potentials recorded from the subthalamic nucleus and effects of deep brain stimulation

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Research Abstract

Deep brain stimulation (DBS) involves an operation to place electrodes in the deep part of the brain, which is then connected to an implanted, programmable battery pack to deliver electrical current to the brain. Although DBS is an established treatment for Parkinson’s disease (PD), many PD symptoms are still not well treated. Difficulties with walking and falls are particularly disabling problems there do not respond well to available treatment. The current DBS devices

do not adjust stimulation settings according to the patients' conditions. DBS will be improved by utilizing brain signals to automatically adjust to the best stimulation setting, called "adaptive" or "closed-looped" DBS. A major obstacle in the development of adaptive DBS is to determine what brain signal can be used to adjust the DBS setting. This study will use a new DBS device capable of recording deep brain signals (known as local field potentials, LFP) from the DBS electrodes over the long term in 10 PD patients. How the deep brain signal changes over time, how it is related to different stimulation settings, intake of medications, performance of different movements and walking difficulties will be tested immediately after insertion of the DBS electrodes and at different time points up to 18 months after surgery. The safety of 3 months of adaptive DBS will also be tested. The study will determine whether the deep brain signals correspond to the fluctuating status of PD patients, whether they are stable over time and how they can be use to control closed-looped DBS to improve treatment of PD. It will help to design future studies of adaptive DBS.

Further information available at:

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