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Connectome’s Research Hub – Projekte

**Intracranial electrophysiological measurements in patients with Movement Disorders and Deep Brain Stimulation**

**Key Points**

Subject area: Neuroscience

Project type: Clinical Research

Timespan: Ongoing, just reach out!

Location: On-site, at Charité Bettenhochhaus, CCM

University: Charité – Universitätsmedizin Berlin

Supervisor: Dr. med. J.K. Behnke, J. Kaplan, Prof. Dr. med. A.A. Kühn

**(Specials, Applicant Requirements):** Enthusiasm about Neurology and Neuroscience! Prior patient contact is of advantage, but not a prerequisite. Basic knowledge about common movement disorders, especially Parkinson’s disease, is helpful. Some fun basal ganglia anatomy might also be advantageous, as well as basic coding skills.

**Summary of the project**: Parkinson’s disease (PD) is a neurodegenerative disorder, in which the degeneration of dopaminergic cells in the substantia nigra leads to symptoms, particularly involving the motor system (i.e., slowness of movements, rigidity, and rest tremor). Medical treatment aims at restoring the concentration of dopamine in the central nervous system and usually provides excellent symptomatic relief. However, in advanced stages of the disease, strong and bothersome fluctuations of symptoms often occur and invasive treatment options like Deep Brain Stimulation (DBS) can be considered. Electrodes, surgically inserted into deep brain structures (in PD, the subthalamic nucleus), allow for stimulating neural tissue with electrical current. Later, these electrodes are connected to an implantable pulse generator. In between the electrode implantation and the second surgery connecting the pulse generator, an exciting window of opportunity opens for research. We can record activity from the depth of the brain and administer stimulation. Our lab is interested in linking brain activity to symptom severity. For example, neural activity in the beta frequency range is known to correlate with the severity of slowness and rigidity. Ultimately, our goal is to develop an intelligent adaptive form of stimulation that adjusts itself in real-time according to the patient’s symptoms. With new DBS systems, it is now feasible to record activity from deep brain structures in the chronically implanted state. We can connect to the DBS system and initiate streaming of local field potentials, making possible the characterisation of neural biomarkers over extensive periods of time. In summary, we offer the opportunity to assist in (1) externalised recordings (in between surgeries) and (2) chronic recordings after implantation of the pulse generator. Students will get in contact with patients with movement disorders and learn how to acquire neural data in form of local field potentials. Apart from Parkinson’s disease, we also investigate patients suffering from dystonia and essential tremor, albeit patients with PD are the predominant group in our clinic. Please feel free to reach out, we look forward to introducing you to the exciting field of neuromodulation research!

Contact: Please contact us at jennifer-kim.behnke@charite.de and jonathan.kaplan@charite.de with some information on why you are interested and your qualifications.