



Research Project Proposal
Academic year 2015-2016

Project Nº 45
Title: <i>Effect of Deep Brain Stimulation on the Neural Activity of the Primary Motor Cortex</i>
Department/ Laboratory <i>Clinical Neurophysiology Laboratory, Neurosciences Area, CIMA</i>
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Summary <i>Deep brain stimulation (DBS) is a neurosurgical procedure involving the implantation of a medical device that sends electrical impulses through implanted electrodes to specific parts of the brain. For treatment of Parkinson's disease, the most common targets are the Subthalamic Nucleus (STN) and the internal portion of the Globus Pallidus. Despite the long history and proved efficacy of DBS, its underlying principles and mechanisms remain unclear. First hypothesis justified the use of DBS in Parkinson's disease as a reversible functional therapy where high frequency stimuli would be blocking the target nucleus. Nowadays this hypothesis is considered to be too simplistic and it is accepted that other mechanisms must exist. Among others, additional mechanisms as the removal of abnormal oscillatory activity or prokinetic activities, the induction of oscillatory prokinetic activities, the restoration of neurotransmitter levels, the stimulation of fibres of passage or the stimulation of afferents to the nucleus could be proposed. Recent findings (from our group and others) suggest that DBS alleviates PD symptoms by reducing excessive synchronization in the motor cortex. To further investigate this hypothesis this project will use acute electrophysiological recordings on the primary motor cortex of anesthetized rats while electrically stimulating the STN. Multisite electrode arrays will be used in order to characterize the effect of DBS on both, unitary activity and local field potentials through different locations and layers of the motor cortex. Results from this work will constitute a significant step in answering how DBS works on the level of brain networks and will go further than just investigating on the effects of DBS where stimulus is being applied.</i>



POSSIBILITY OF PhD

YES *

* (PhD grant required)