Parameters of STN neuronal activity were not different among the two groups of patients neither the oscillatory activity.

Conclusions: Although the number of patients included in this study should be increased results suggest that the R1441G mutation does not determine clinical severity or STN activity.

Key message: Characteristics of STN neurons in LRRK2–R1441G PD patients are similar to idiopathic PD.

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ID 152 – Paired pulse TMS-EMG and TMS-EEG in epilepsy—A.A. de Goede [a], M.J.A.M. van Putten [a,b] ([a] Clinical Neurophysiology, University of Twente, Enschede, The Netherlands, [b] Clinical Neurophysiology, Medisch Spectrum Twente, Enschede, The Netherlands)

Objective: Epilepsy is characterized by an enduring predisposition to generate seizures, due to an increased cortical excitability (CE). Although the routine electroencephalogram (EEG) can assist in identifying increased CE, its sensitivity is low (30–55%). Therefore, we will investigate whether transcranial magnetic stimulation (TMS), another technique to measure CE, can be used to improve the diagnostic process in epilepsy.

Methods: Paired pulse TMS (ppTMS) is combined with electromyography (EMG) of the abductor pollicis brevis and 64-channel fullband EEG. Both motor hot spots are stimulated with 50 paired pulses (intensity 120% of resting motor threshold) at interstimulus intervals (ISIs): 50–300 ms, with 50 ms increments.

Results: ppTMS-EMG-EEG measurements on four healthy subjects are consistent with literature (Badawy et al. 2014; Premoli et al. 2014): ppTMS-EMG shows facilitation at ISI 50 ms and inhibition for ISIs 100–300 ms, while ppTMS-EEG (ISI 100 ms) shows inhibition below 70 ms and above 135 ms.

Conclusions: Based on pilot measures in healthy subjects, we will study first seizure patients to investigate differences in CE between patients diagnosed with epilepsy afterwards and those who are not. So far, ppTMS-EMG-EEG has never been applied in epilepsy.

Key message: ppTMS-EMG-EEG is a promising technique that may find application in the diagnostic process of epilepsy.

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ID 178 – Longitudinal simultaneous DBS fMRI in the rodent brain—N. Van Den Berge [a], C. Vanhove [a], B. Descamps [a], I. Dauwe [b], P. van Mierlo [a], R. Raedt [b], K. Vonck [b], P. Boon [b], R. Van Holen [a] ([a] Medical Image and Signal Processing Group, Ghent University-iMinds Medical IT department, Ghent, Belgium, [b] Laboratory for Clinical and Experimental Neurophysiology, Neurobiology and Neuropsychology, Ghent University Hospital, Ghent, Belgium)

Objective: The effects of Deep Brain Stimulation (DBS) have been studied primarily by electrophysiological and neurochemical studies, which lack the ability to elucidate DBS-related responses on a whole-brain scale. With this study our aim is to investigate DBS-induced global neuronal network activation in rats with functional Magnetic Resonance Imaging (fMRI).

Methods: Three times FMRI was done in seven rats, which were stereotactically implanted with a MR-compatible DBS-electrode in the right hippocampus. High frequency Poisson distributed stimulation was applied using a block-design paradigm. Response maps ($p < 0.05$) were obtained with Independent Component Analysis.

Results: Our data indicate that real-time hippocampal DBS evokes a uni- or bilateral BOLD response in hippocampal and mesolimbic structures, depending on the applied stimulation intensity. Results were reproducible in time and in-between subjects.

Conclusions: We present that DBS-fMRI can be used to detect whole-brain responses to circuit activation with different stimulation intensities, making this technique potentially powerful for exploring DBS-induced cerebral changes for preclinical and clinical DBS.

Key message: A better understanding of the whole-brain effect of DBS is necessary to improve treatment efficacy in patients. Successful translation of this research to patients might reduce the number of non-responders to this invasive and expensive treatment.

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ID 186 – Repetition suppression in resting motor evoked potentials evidenced by increase in intracortical inhibition—E. Kallioniemi, P. Julkunen (Department of Clinical Neurophysiology, Kuopio University Hospital, Kuopio, Finland, Department of Applied Physics, University of Eastern Finland, Kuopio, Finland)

Objective: To evaluate the repetition suppression (RS) in resting and active motor evoked potential (MEPs) and in corticospinal silent period (cSP) using navigated transcranial magnetic stimulation (nTMS). MEPs can be though to represent the activity of the excitatory system, whereas SPs represent the inhibitory effect of the GABAergic interneurons.

Methods: Seven healthy right-handed subjects (4 females, age: 24–35 years) were studied. nTMS was focused on the left cortical representation of first dorsal interosseous muscle by applying stimulus trials including 4 stimuli at 1s intervals. Total of 30 trials were given 20s apart. Resting MEPs were measured with a stimulation intensity of 120% of the resting motor threshold. Active MEPs and cSPs were measured during voluntary muscle contraction at 120% of the silent period threshold (SPT) with 20 trials.

Results: RS was evidenced in the resting MEPs ($F = 44.11$, $p < 0.001$), whereas no RS was observed with the active MEPs ($p = 0.193$). Instead of RS, the cSPs significantly lengthened during the stimulation trials ($F = 19.97$, $p < 0.001$).

Conclusions: While the resting MEPs demonstrate RS, active MEPs stay intact and SPs lengthen indicating potential intracortical inhibition as the mechanism of RS.

Key message: RS appears specific to resting MEPs and may occur due to increasing intracortical inhibition.

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