

## ABSTRACTS

### LIMITING AND OPTIMISABLE CONDITIONS IN rTMS OF DEPRESSION AND OTHER MENTAL DISEASES

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Repetitive transcranial magnetic stimulation (rTMS) is one of the brain stimulation methods which may help to overcome the stuttering development of the treatment of psychiatric disorders as can be seen in pharmacotherapy. After the first clinical trials in the 90's scientific based evidence shows the efficacy of rTMS in depression and other mental diseases. It is now the time to work on further developments to increase efficacy of rTMS by identifying limiting conditions and by optimizing available protocols. In the present symposium we will show how or if medication, gender, age, personality and similar aspects has influence on the efficacy of rTMS on the example of depression (Martin Schecklmann, Chis Baeken). We will also highlight the clinical perspectives of deep TMS (Maud Rotharmel) and the combination of different neurostimulation techniques (Virginie Moulrier). The findings presented in this symposium may help to pave the way for future applications of rTMS in psychiatry.

### INFLUENCE OF TMS, CLINICAL AND DEMOGRAPHIC PARAMETERS ON THE EFFICACY OF rTMS IN DEPRESSION

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Repetitive transcranial magnetic stimulation (rTMS) was shown to be effective in the treatment of depression. A amelioration of symptoms for over 50% or full remission takes place in 30-40% of the treated patients. The number needed to treat is about 4-5 against placebo treatment. Up to now limited evidence is available which patient will benefit from rTMS. In a retrospective analysis of a cohort of 505 patients with depression treated in a naturalistic clinical setting the Hamilton depression rating scale was used as treatment outcome. Parameters such as age, gender, motor threshold, stimulation intensity, type of depression, medication were analysed. The overall cohort shows an effect size of about 0.9 according to Cohen's d. Preliminary analyses show significant influence of gender, antipsychotic medications and benzodiazepines. In conclusion, treatment in normal care fits to the positive controlled clinical trials. Data from large scaled data bases may help developing individual probability signatures for treatment response.

### BRAIN PERFUSION PATTERNS AS CLINICAL (NON) PREDICTOR TO aiTBS TREATMENT IN MEDICATION-RESISTANT DEPRESSION

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Accelerated intermittent Theta Burst Stimulation (aiTBS) has been put forward as an effective treatment to alleviate depressive symptoms. In this arterial spin labeling (ASL) brain imaging study 50

medication-resistant depressed patients received twenty sessions (5 per day) of neuronavigated left DLPFC aiTBS in an accelerated sham-controlled crossover fashion, where all stimulation sessions were spread over four days (Trial registration: <http://clinicaltrials.gov/show/NCT01832805>). Active aiTBS, in contrast to sham, resulted in prompt perfusion increases in functionally connected brain regions such as the ventromedial prefrontal cortex, the left (para)hippocampus, and the right posterior cerebellum. Stronger individual baseline interregional covariance perfusion connectivity patterns between the subgenual Anterior cingulate cortex and the individual left dorsolateral prefrontal cortical (DLPFC) targets predicted response and/or remission. Furthermore, responders and remitters with higher Behavioural Inhibition (BIS) scores displayed stronger baseline interregional perfusion connections. Our perfusion findings indicate that active aiTBS treatment promptly affects brain regions functionally and structurally connected to the stimulated area and known to be part of deregulated brain circuits when clinically depressed. However, targeting the left DLPFC with aiTBS based on personal structural imaging data only may not be the most optimal method to enhance meaningful antidepressant responses. Additional therapies dealing with behavioural inhibition may be warranted.

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## **BEYOND CLINICAL SYNDROMES: UNDERSTANDING MECHANISMS OF NEUROMODULATION FROM A DIMENSIONAL PERSPECTIVE**

**Joan A. Camprodon<sup>1</sup>, Marta Cano<sup>2</sup>, Kristen Ellard<sup>1</sup>, Tracy Barbour<sup>1</sup>, Benjamin Ward<sup>3</sup> & Zhi Deng<sup>4</sup>**

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Clinical syndromes in Psychiatry include great heterogeneity, biological and also phenomenological. Dimensional approaches to psychopathology, pathophysiology, biomarker discovery and treatment development have prompted a paradigm shift in neuropsychiatry. That said, this framework is still relatively uncommon to study and optimize treatment development with device neuromodulation technologies. This symposium will present early work introducing dimensional analyses (beyond syndromal clinical severity) of device neuromodulation therapies for depression. We will highlight how this framework allows a more direct identification of structural and functional circuit dynamics characterizing maladaptive pathophysiological processes with translational implications. We will explore these questions across neuromodulation methods, including transcranial magnetic stimulation (TMS), electroconvulsive therapy (ECT) and magnetic seizure therapy (MST).

Dr. Kristen Ellard will discuss the impact of TMS on emotional regulation in major depressive disorder, the role of executive function in mediating these effects, and the circuit-level mechanisms of action.

Dr. Tracy Barbour will present on the effects of TMS and ECT on positive valence processes, including affective (anhedonia) and behavioral (approach/avoidance) components, and dissect the convergence and differences of these 2 treatment modalities.

Dr. Benjamin Ward will outline recent work using machine learning to predict dimensional changes in depressive symptoms in response to ECT and serial ketamine infusion using neuroimaging data.

Dr. Zhi Deng will present a secondary data analysis comparing the efficacy of ultrabrief pulse, right unilateral ECT and MST, using an exploratory factor analysis with the 24-item HAMD (primary outcome of the study) to define clinical dimensions and assess longitudinal response trajectories and predictors of response.

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