



SYMPOSIUM: NEURAL AND COGNITIVE EFFECTS OF TRANSCRANIAL MAGNETIC STIMULATION: EVIDENCE FROM NEUROIMAGING AND META-ANALYSIS

Organizers

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Short description

Transcranial magnetic stimulation (TMS) is a relatively novel non-invasive brain stimulation technique that is used experimentally and clinically for treatment of psychiatric and neurological conditions, including major depressive disorder. Because it is well tolerated and non-invasive it is paramount to investigate its use to improve versatility in treatment options (with e.g. less risk of drop-out due to side effects of medication). Interest in TMS has steadily increased over the years because of its potential to address more precise targets. Although our knowledge has expanded and its application as a clinical treatment tool could be promising in many clinical diagnoses, the field is in need of more evidence regarding the cognitive and neural changes relevant for TMS and/or induced by TMS. During this symposium, state-of-the art research will present evidence from clinical intervention trials as well as quantitative systematic review evidence.

Prof. Dr. André Aleman will discuss findings of their multicenter study on apathy in schizophrenia, involving two weeks of iTBS. He will also show effects of a single session of this iTBS protocol on functional brain connectivity as measured with resting state fMRI in healthy volunteers.

Marieke Begemann will present meta-analytic findings on the procognitive effects of two common techniques: transcranial magnetic stimulation (TMS) and transcranial Direct Current Stimulation (tDCS). Based on 83 studies (n=2800), she presents results currently available for schizophrenia, depression, dementia, Parkinson's disease (PD), stroke, traumatic brain injury (TBI) and multiple sclerosis (MS). Furthermore, new approaches now utilize patients' individual fMRI data to identify superficial cortical stimulation targets that are functionally connected to deeper regions of the brain, thus enabling the modulation of previously inaccessible potential targets for antidepressant therapy.

Clemens Mielacher will discuss differential effect of TMS on various depressive symptoms, namely how specific type of TMS over the DLPFC is more efficient for treatment of depressive symptoms, while parieto-hippocampal stimulation may benefit depressed patients with cognitive deficits. Intriguingly, this approach might enable the indirect modulation of functional connectivity. Finally, Branislava Ćurčić-Blake, will introduce simultaneous use of TMS with functional Near-Infrared Spectroscopy (fNIRS) to investigate causal connectivity in patients with schizophrenia. Combining different modalities by use of TMS, fNIRS and fMRI is an innovative approach that will be highlighted.

Objectives and Outline

With this series of presentations, this symposium will cover novel developments in non-invasive brain stimulation techniques for improving treatment efficacy in neuropsychiatric disorders and investigation of brain connectivity.

Keywords

transcranial magnetic stimulation, brain stimulation, depressive disorder, TMS, schizophrenia, depression, dementia, Parkinson's disease (PD), stroke, traumatic brain injury (TBI), multiple sclerosis (MS).