The DiSCoVeR Project: Examining the synergistic effects of a cognitive control videogame and a home-based, self-administered non-invasive brain stimulation on alleviating depression (DiSCoVeR)

Project Coordinator: Dr. Mor Nahum, School of OT, Faculty of Medicine, Hebrew University, Jerusalem, Israel

Project Partners:

Prof. Daphne Bavelier, Faculty of Psychology and Education Sciences, University of Geneva, Geneva, Switzerland

Prof. Friedhelm Hummel, Clinical Neuroengineering, EPFL, Sion, Switzerland

Prof. Frank Padberg, Department of Psychiatry and Psychotherapy, University Hospital, Ludwig Maximilian University (LMU) Munich, Munich, Germany

Prof. Omer Bonne, Department of Psychiatry, Hadassah Medical Center, Jerusalem, Israel

Prof. Elmars Rancans, Department Department of Psychiatry and Narcology, Riga Stradins University, Riga LV, Lativa

Major depressive disorder (MDD) is a common, often chronic, disorder. Many patients do not satisfactorily respond to antidepressant interventions, which calls for novel treatment options. Impairment of cognitive control, the process which supports goal-directed behavior, has emerged as a critical factor contributing to pathophysiology of MDD. Deficits in cognitive control, in conjunction with altered prefrontal connectivity, were repeatedly demonstrated in MDD. Novel treatment approaches, focused on ameliorating impaired prefrontal dysfunction either through short-term cognitive control training or by applying non-invasive brain stimulation (NIBS), have shown promise in several studies to date.

Our goal in the current project is to examine efficacy, ease of use and safety of a remotely supervised, self-administered NIBS approach, i.e. transcranial direct current stimulation (tDCS) over the prefrontal cortex, combined with an emotional cognitive control game, as potential treatment for depression. Our interdisciplinary team will first create the remotely-supervised, home-administered tDCS and game intervention. This will be followed by a multi-site randomized controlled trial, investigating the efficacy, ease of use and safety of this approach in 108 MDD patients. Cognitive control will be assessed as a change mechanism. If successful, this novel approach has the potential to change the landscape of depression treatment, providing a novel, cost-effective and safe treatment.