



Ben-Gurion University of the Negev
The Zlotowski Center for Neuroscience



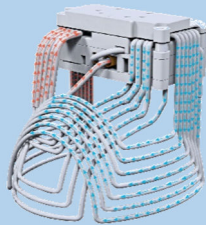
Prof. Abraham Zangen

Brain Stimulation and Behavior Lab

Ben-Gurion University, Israel



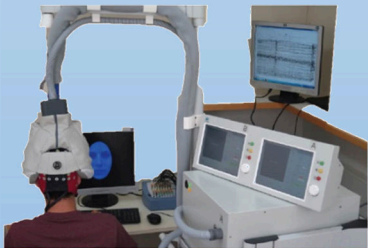
Pre-clinical studies



H-coil

Behavioral and electrophysiological modifications following application of:

- ❖ different deep & broad TMS H-coils (dTMS) in various psychiatric and neurological applications
- ❖ TMS-like patterns in animal models of addiction and depression



dTMS-EEG & PAS-EEG



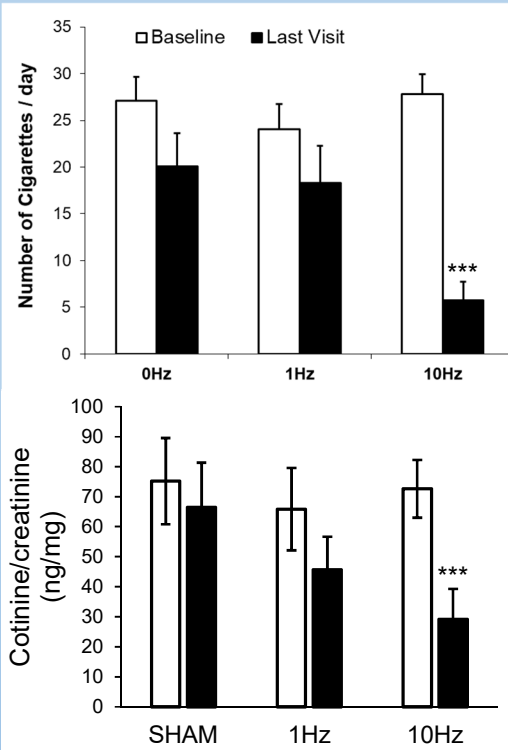
dTMS system

Addiction Research

dTMS combined with craving provocation cues

Smoking cessation

Dinur-Klein et al., Biol Psych (2014)
 Insula and vIPFC dTMS
 (H4-coil)

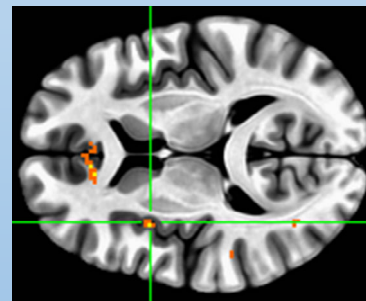
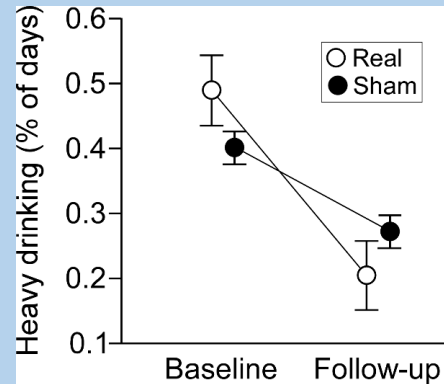


Behavior

Biology

Alcohol relapse

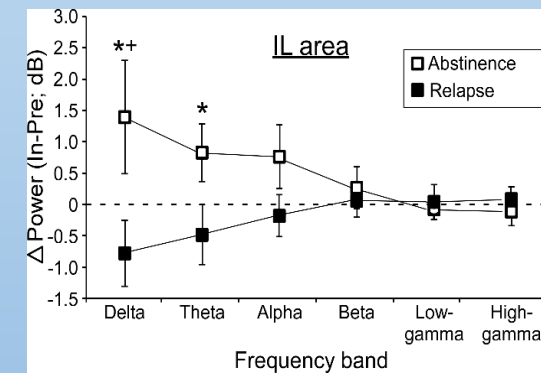
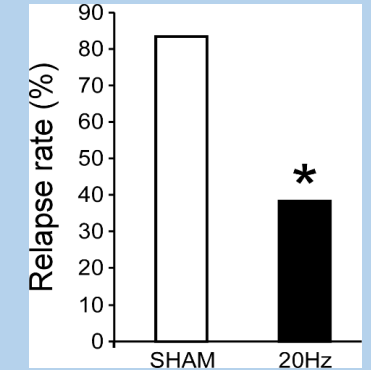
On-going
 ACC and mPFC dTMS
 (H7-coil)



Treatment-modified Insula-ACC
 functional connectivity at rest ($p < 0.01$)

Cocaine relapse

Pre-clinical
 Infralimbic Stimulation
 (TMS-like parameters, implanted electrodes)



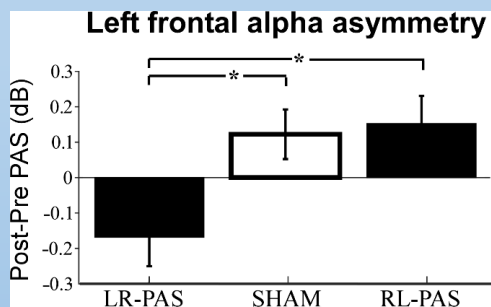
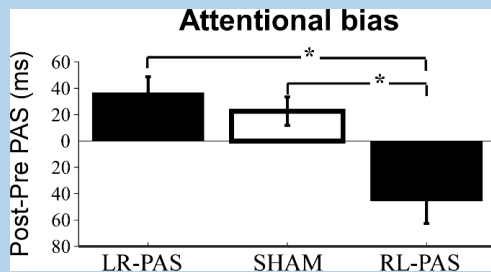
Paired associative stimulation (PAS)

Through the stimulation of two brain regions and precise coordination of two TMS pulses from two dTMS coils, it is possible to target the intervening connectivity



Basic research

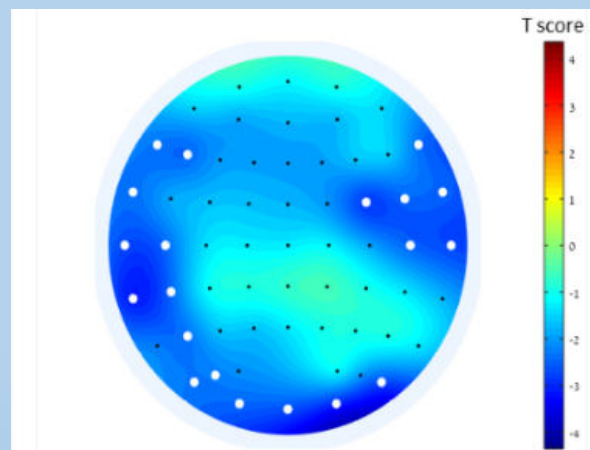
Zibman et al., 2018
rPFC $\leftarrow\rightarrow$ IPFC PAS



RL – right than left PFC
LR – left than right PFC

ADHD

On-going
rPFC $\leftarrow\rightarrow$ IPFC PAS

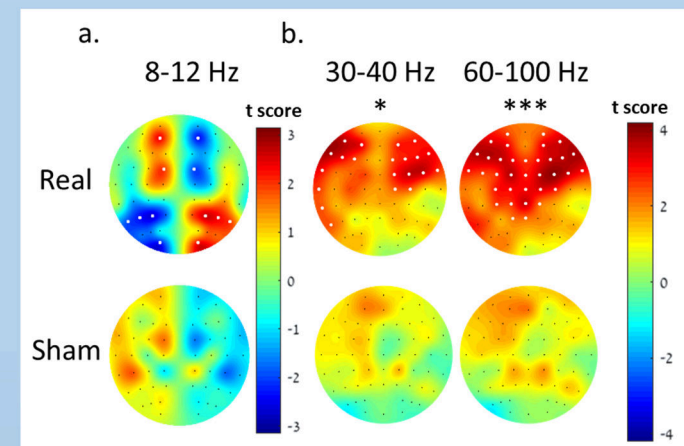


Real-SHAM &
Pre-Post treatment

Resting state EEG theta power
alterations induced by PAS
White electrodes - significant difference

Obesity

On-going
rPFC \rightarrow IPFC PAS



Short-term modification of alpha
laterality (a) and gamma activity (b)
by PAS stimulation.
White electrodes - significant difference