[Psychiatry] Antidepressant Efficacy and Mechanisms of Newer Forms of Brain Stimulation



新型態腦神經刺激的抗鬱療效及機轉

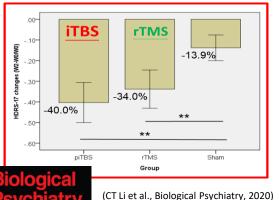
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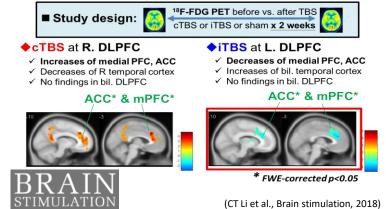
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First sham-controlled study confirmed that iTBS has non-inferior antidepressant efficacy to 10-Hz rTMS



◆ Prefrontal TBS mainly modulates the fronto-cingulate circuit, but no direct effects on the targeting DLPFC

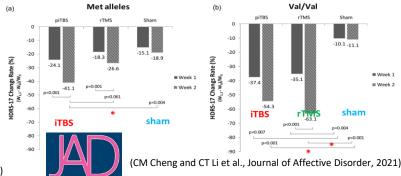


◆ iTBS could have similar antidepressant effects as low-dose ketamine for treating TRD

HDRS rTMS ketamine Group effect: p < 0.001 10 Time effect: p < 0.001 G*T effect: p < 0.001 Covariates appearing in the model are fixed at the following values: Baseline HDRS = 22.93

> Day 28 Month 3 -0.5mg/kg ketamine → Normal saline → iTBS → 10Hz rTMS → Sham stimulation (MH Chen and CT Li et al., in submission)

◆ Clinical trial showed BDNF genotypes have significant impacts on antidepressants effects of brain stimulation, including iTBS



How iTBS improve depression in SSRI-resistant animal model

Improve the neuronal activity

Baseline

Repetitive transcranial magnetic stimulation (rTMS) non-invasive stimulation which can exploited by electromagnetic induction to change the magnetic field and cause electric currents to flow in targeted brain regions.

Day 7

Improve altered dendritic morphology Reverse aberrant Long-Term Plasticity

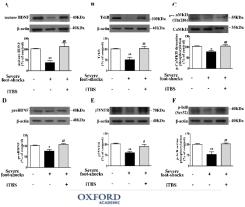
Increase expression of BDNF-related protein,

synaptic proteins and mTOR signaling pathway

a 2 second train of TBS was repeated with 10 second intervals in 200 second, applied with five trains at 15 min intervals

SSRI-resistant animal model

Animal study showed BDNF is critically involved in the mechanisms of iTBS



Cerebral CORTEX

(CW Lee, CT Li, HC Lin et al., Cerebral Cortex, 2020)