

NEUROPLASTIC MODULATION WITH CORTICAL ELECTRICAL STIMULATION IN RODENT MODELS

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Various forms of non-invasive brain stimulation, such as repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS), have been utilized to modulating motor cortical excitability through plasticity-like mechanisms and thus might have therapeutic potential for neurological diseases. To better understand the neural mechanisms underlying cortical neuromodulation and enable translational research in rodent disease models, we developed a focused brain stimulation method using cortical electrical stimulation (CES; that mimics rTMS) in the motor cortex of anesthetized rats. This work presents a novel CES with theta burst stimulation (TBS) paradigm which was developed to explore the neuroplastic mechanisms underlying cortical neuromodulatory effects in rodent models. A series of animal experiments were conducted to determine the effects of TBS in anesthetized rats. The results demonstrated that the cortical plasticity can be manipulated by the selection of CES-TBS paradigm. We believe that these findings may have translational relevance for establishing new therapeutic CES applications in neurological disorders.