A method for direct stimulation of deeper regions in the human brain while minimizing surface stimulation

Published date: June 6, 2019

Technology description

The most commony-used tool for stimulating the human brain non-invasively is transcranial magnetic stimulation (TMS). This invovles very brief energizing of a copper wire coil, which generates a transient magnetic field that crosses through biological tissue (scalp, skull, cerebrospinal fluid) and creates a transient electric field that excites neurons underlying the coil in superficial cortex. This method is limited however in that the magnetic field falls off roughly with the square of distance from the coil, making it hard to deliver sufficient energy to deeper brain (including deeper cortical) regions. These regions are particularly important in neuropsychiatric disorders. Moreover, in order with present methods to deliver sufficient energy at depth, superficial cortical regions are heavily over-stimulated. Our method solves this problem and will allow deeper cortical stimulation while minimizing superficial stimulation. The same principle will allow for sharpening the spatial spread of stimulation and steering of the location of the magnetic field electronically to optimize stimulation more readily and precisely. Stanford researchers have developed a new method for using transcranial magnetic stimulation (TMS) to stimulate deeper regions of the brain with more specificity. Current methods for non-invasive brain stimulation focus primarily on the use of TMS, which forms of the basis for the only currently FDA-approved brain stimulation treatment for psychiatric disorders such as depression. However, these current methods are either limited to being only able to stimulate superficial cortical regions, or they over-stimulate superficial regions in order to stimulate the deeper brain regions, which may lead to multiple unwanted consequences. The inventors have developed a new TMS coil design that allows direct stimulation of deeper brain regions while eliminating or greatly attenuating superficial stimulation. This new method optimizes the impact of such stimulation by sharpening the spread of the magnetic field and permitting users to guide the location of stimulation electronically. For the first time, physicians can non-invasively modulate the deeper brain regions that are central to a broad range of neuropsychiatric disorders.Stage of ResearchThe inventors plan to test on human subjects.

Application area

Potential therapeutics across the range of neuropsychiatric disorders Research into targeted deeper brain regions Brain stimulation and neuromodulation

Advantages

More specific stimulation of variety of deeper brain regions Treatment utilizes spatial specificity in the brain Deeper cortical stimulation than most current TMS methods Non-invasive

Institution

Stanford University

Inventors

Gary Glover

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com