

Rational Design of Electrotherapy Devices: Translational Neural Engineering at CCNY BME



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Abstract: Clinical application of electrical stimulation is a promising treatment for a range of neurological and psychiatric disorders. Despite the establishment of therapeutic electrical stimulation as a standard treatment for several diseases (including Parkinson's and Depression), fundamental challenges remain in the design of safe and effective technology. This talk summarizes ongoing basic and translational research studies by our group, with the overall goal of developing targeted electrotherapies. Experimental tools ranging from single cell recording and complex morphological reconstruction to system level finite-element-modeling and prototyping are used by our group toward the rational design of therapy treatments. Non-invasive (rTMS, tDCS, TES, ECT) and invasive (DBS, SCS) approaches, diverse cell targeting (neurons, glia, endothelial cells), concurrent drug delivery (Blood-Brain Barrier permeabilization). spatial focality, and safety optimization (joule heat, electroporation) are considered.

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