

Next Generation of Therapeutics for Brain Disorders

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Disorder of the central nervous system such as Parkinson's and Alzheimer's are difficult to treat with conventional pharmaceutical interventions. These disorders required a new class of therapies known as neuromodulation. Neuromodulation therapies rely on implantable medical devices which use therapeutic electrical stimulation to treat central nervous system disorders such as Parkinson's. Most neuromodulation system use metal wires as conductors and electrodes (tissue interfaces) on the order of millimeters which limits their therapeutic efficacy. Further, current therapies use constant stimulation based on settings established in the clinic. However, a new class of neuromodulation systems are being developed which therapeutic stimulation based on physiological biomarkers as well as having higher spatial resolution. Leveraging advanced neural interface and micropackaging technologies, the next generation of neuromodulation system are being developed which have spatial resolution on the order of individual neurons with embedded electronics to support simultaneous recording and stimulation from multiple regions of the brain. These neuromodulation systems also have embedded processors that can implement algorithms for closed-loop neuromodulation based on physiological biomarkers providing the next generation of therapeutics.