Neuroprosthetic Tools for Repair of the Injured Brain

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Research Abstract:
Increasingly, neuroscientists, computer scientists and engineers are beginning to envision and develop neuroprosthetic brain-machine interface systems for the treatment of neurological conditions such as epilepsy, Parkinson's disease, stroke, traumatic brain injury and spinal cord injury. The focus of our recent research has been to develop adaptive, closed-loop microdevices that can be chronically implanted in damaged brains. Our model focuses on the ability for closed-loop devices to regulate synaptic potentiation in long-distance pathways in the nervous system, particularly cortico-cortical pathways between different functional areas. Our recent demonstration that such an approach can potentiate somatosensory-motor communication, resulting in rapid recovery of motor function after experimental traumatic brain injury in a rat model suggests that closed-loop neuroprosthetic microdevices have potential for pathway-specific treatment of neurological disorders.

References

Figures from Guggenmos et al., 2013