Neural Plasticity

Hindawi

Special Issue on

Devising Novel Approaches in Neurorehabilitation: Lessons Learned from Motor Control and Motor Learning Studies

CALL FOR PAPERS

Neuronal networks exhibit considerable plasticity (from learning new motor skills to adapting to injury), given the appropriate stimulation. The neuroplastic potential of the mammalian neuronal circuitry renders it amenable to a wide variety of training interventions after damage and has obvious implications for neurorehabilitation. A crucial challenge, however, is to identify key principles from motor control and motor learning studies that will facilitate devising appropriate motor rehabilitation interventions.

Over the past decade, combinatorial approaches (e.g., pharmacology, electrical or magnetic stimulation, and/or motor training) have been devised to maximize functional motor recovery after a variety of experimental and clinical neurological injuries. The aim of these strategies is to tap into and synergize different mechanisms to facilitate motor recovery. The mechanisms through which physiologically based interventions impact motor recovery appear to be intrinsically linked to a) physiological linkage of neural structures, b) the reactivation of spared neuronal pathways and circuits, and/or to c) activity-dependent motor learning phenomena. These and similar key principles are being increasingly identified from motor control and motor learning studies to better explain the recovery of motor function and develop novel rehabilitation approaches.

The purpose of this special issue is to publish original research articles dealing with basic science and preclinical and clinical studies as well as review articles that address recent advances in the use of physiologically based interventions that take advantage of motor control and motor learning principles to facilitate functional recovery after CNS damage. Original, high quality contributions that are not yet published or that are not currently under review by other journals or peer-reviewed conferences are sought.

Potential topics include, but are not limited to:

- Basic science studying the plasticity and physiology of neuronal networks in the context of motor recovery after CNS damage:
  - Neural control of movement
  - Functional organization and/or coupling of neuronal networks
- Motor control or motor learning studies in the context of functional recovery after CNS damage:
  - Adaptive (beneficial) plasticity
  - Maladaptive (detrimental) plasticity
- Physiologically based strategies for motor rehabilitation after CNS damage:
  - Epidural spinal stimulation
  - Transspinal and transbrain direct current stimulation
  - Transcranial magnetic stimulation
  - Exercise-based rehabilitative strategies
  - Pharmacology
  - Combinatorial interventions (exercise, robotic, drugs, etc.)
- Studies investigating activity-dependent plasticity using the following:
  - Long term potentiation (LTP), long term depression (LTD), short term potentiation (STP), etc.
  - Associative conditioning
  - Closed loop stimulation
  - Activity triggered stimulation

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/np/dnan/.

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Manuscript Due
Friday, 3 June 2016

First Round of Reviews
Friday, 26 August 2016

Publication Date
Friday, 21 October 2016