Neural Plasticity

Special Issue on
Glial Cells and Synaptic Plasticity

CALL FOR PAPERS

Historically, glial cells were thought to provide only metabolic and physical support for neurons, serving as the primary source of energy for neurons and controlling the ionic homeostasis. In the past decades, many studies have discovered more important roles of astrocytes, including providing energetic substrate to neurons, taking up neurotransmitters, maintaining ion homeostasis, releasing gliotransmitters, and signaling molecules as well as maintaining and regulating the extracellular matrix. Structurally, Astrocytes have irregularly shaped cell bodies and are characterized by an abundance of leaflet-like processes, enwrap most synapses to form a tripartite in the CNS, and exhibit remarkable plasticity resulting from crosstalk. The interactions within the tripartite are dynamic are required for normal synaptic physiology and plasticity, as well as for the development and refinement of the neuronal circuit. Recent reports have also demonstrated that astrocytes can actively regulate synapses with intracellular Ca^{2+} wave regulated signaling pathways. Although much progress has been made in our understanding the cellular and molecular mechanisms and ongoing research are adding new information, but we are still at the early stage of understanding the relationship between astrocytes and synaptic plasticity, and new questions are still emerging regarding the role of glial cells in the CNS development, function, and diseases. For example, even though many astrocytic changes are found during pathological conditions, it is still unknown whether the astrocytic changes induced the disease or the reverse.

In this special issue, we invite investigators to contribute original research articles as well as review articles that will stimulate the continuing efforts to seek to understand the relationship between glial and neural plasticity, with a particular focus on astrocytes and microglial cells.

Potential topics include, but are not limited to:

- Astrocytic/microglial changes and synaptic plasticity in physiological and pathological conditions
- The mechanisms of glial cells modulating synaptic plasticity in physiological and pathological conditions, such as D-serine, homeostasis, glutamate, ATP, and lipid
- The treatment of the glial cells in pathological conditions, such as Alzheimer's, Parkinson's, epilepsy, and depression
- New methods of imaging studies that directly show the roles of astrocyte in the synapse changes, such as Channelrhodopsin studies
- Neuromodulators with astrocytes/microglia and synapse changes

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

Lead Guest Editor
Fushun Wang, University of Rochester Medical Center, Rochester, USA
fushun_wang@urmc.rochester.edu

Guest Editors
Jason Huang, Texas A&M HSC College of Medicine, Temple, USA
jhuang@sw.org

Tifei Yuan, Nanjing Normal University, Nanjing, China
ytf0707@126.com

Alfredo Pereira, São Paulo State University (UNESP), São Paulo, Brazil
alfredo.pereira@gmail.com

Alexei Verkhratsky, University of Manchester, Manchester, UK
alexej.verkhratsky@manchester.ac.uk

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