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Special Issue
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Exploration of Mechanisms in Cortical Plasticity

Cortical plasticity, also known as neural plasticity, neuroplasticity or brain plasticity, is defined as a neurobiological ability of the nervous system to change its biophysiological functions by forming new neural connections. Therefore, it is a constant and dynamic remodeling process that allows the incorporation of new information. Such structural changes in neuronal connectivity, by cortical and subcortical rewiring of neuronal circuits, are extremely important mechanisms to adapt and survive continuously changing environments. Despite the increasing scientific attention to the cortical plasticity, its mechanisms have not been fully understood due to their complicated and multifold nature. In the last decades, the understanding of basic molecular, functional and associate ultrastructural remodeling mechanisms has gained momentum in diverse neuroscientific fields. With the recent advance of new genetic tools and non-invasive neuroimaging systems in the context of in vivo and in vitro studies, the assessment of synaptic and neuronal network changes across different cortical regions is achievable. Moreover, some of those techniques are making it possible to monitor in real-time new neural connections induced by several neurorehabilitation interventions. Such potential adaptability in neuronal connectivity has also been observed in the situation of aging, injury, and neurodegeneration as a potential therapeutic approached to restore the loss in several cortical functions. Furthermore, since most of the neuronal damages induced by diverse neurological diseases are irreversible, and the next-generation therapies like stem cell transplantation and gene therapy are far from been widely used in clinical practice, treatments associated with cortical plasticity are expected to improve the disease's prognosis. In this topic, we are welcoming authors from any related basic and clinical fields to contribute with original research articles in a growing effort to illustrate different cortical plasticity mechanisms using diverse scientific methods. Therefore, the main goal of this topic is to provide the reader with a wide overview of current knowledge in the neuroplasticity field and the state-of-the-art application of novel cellular, animal and clinical experimental procedures to explore and enhance such mechanisms of neuronal restoration. Investigations using a "bench to bedside" translation approaches are particularly encouraged. Original research reports, review articles, communications, and perspectives are welcome in all areas pertinent to the topic.

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