

Special Issue

Neuronal Activity and Signalling: Evidence from Electrophysiological Research

Message from the Guest Editors

The biophysical and electrical properties of neural membranes could be used to investigate and modulate the basic mechanisms of the nervous system, ultimately influencing broader physiological and pathological processes. Among them, neuronal excitability is a basic feature of the nervous system, originating from the chemical and electrical gradients of its ionic milieu across the cellular membrane. Investigating the mechanisms that maintain ionic homeostasis and cellular excitability, together with the possible synaptic targets involved, adds invaluable knowledge to the functioning of neural transmission and signalling. The bench-to-bedside potential of the electrophysiological approach unveils diverse research opportunities via extracellular and intracellular recordings that encompass multiple scales of measurement for neural codes and networks. Whole-cell patch-clamp, two-electrode voltage-clamp, single-unit and multi-unit local field recordings, quantitative electroencephalography (EEG), and non-invasive brain stimulation (NIBS) are some of the wider techniques applied in the field that could allow hierarchy and integration, serving as a hub for the neural sciences.

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