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Insight into neural plasticity: An overview

Subhashree Sarangi, A P K Mahapatra, A K Kundu and S Mohapatra
Orissa University of Agriculture & Technology, India

Plasticity is a prominent feature of mammalian brain, particularly the visual cortex. Although such neural changes are most evident during development, adult cortical circuits can be modified by a variety of manipulations, such as perceptual learning and visual deprivation. Elucidating the underlying mechanisms at cellular and synaptic levels is an essential step in understanding neural plasticity in mature animal. Notable differences between developmental and adult plasticity may be attributed to developmental cortical changes at multiple levels. These range from shifts in molecular profiles of cortical neurons to changes in spatiotemporal dynamics of network activity. In this review, we will discuss earlier developments, recent progress and remaining challenges in understanding neural plasticity as a whole. Optical imaging and multielectrode recording techniques have greatly expanded our ability to study neuronal populations in awake behaving animals which will ultimately allow us to understand how cortical plasticity operates in natural sensory and behavioral contexts

subhashreesarangi2010@gmail.com