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Structural plasticity of cortical inhibitory neurons: Implication for mental disorders

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Neuronal structural plasticity is known to have a major role in cognitive processes and in the response of the CNS to aversive experiences. This type of plasticity involves processes ranging from neurite outgrowth/retraction or dendritic spine remodeling, to the incorporation of new neurons to the established circuitry. However, the study of how these structural changes take place has been focused mainly on excitatory neurons, while little attention has been paid to interneurons. The exploration of these plastic phenomena in interneurons is very important, not only for our knowledge of CNS physiology, but also for understanding better the etiology of different psychiatric and neurological disorders in which alterations in the structural remodeling of interneurons in the adult brain, both in basal conditions and after chronic stress or sensory deprivation. We will also describe studies from our laboratory on the putative mediators of this interneuronal nets. These molecules are expressed by some interneurons in the adult CNS and, through their properties, may participate in the remodeling of their structure and connectivity. Finally, we will describe recent findings on the possible implications of PSA-NCAM and perineuronal nets on the remodeling of inhibitory neurons in certain psychiatric disorders and their treatments.