Abstract

Extensive practice on auditory learning tasks dramatically alters the functional organization and response properties of neurons in the auditory cortex. The cellular mechanisms responsible for this auditory learning-induced cortical plasticity are unclear; however, changes in synaptic function involving NMDA receptors have been strongly implicated. To test this hypothesis, we measured the change in gene expression of NMDA receptors and associated proteins in the auditory cortex of adult rats trained to perform an auditory identification task. NMDA receptor 2A and 2B gene expression in auditory cortex decreased significantly as auditory discrimination improved whereas expression of Arc, an immediate early gene involved in memory stabilization, increased. These results suggest that changes in NMDA receptors 2A and 2B and Arc enhance synaptic plasticity, thereby facilitating experience-dependent cortical remodeling and auditory learning.

Citation

Sun, W., E. Mercado III, P. Wang, **X. Shan,** T. C. Lee, and R. J. Salvi. "*Changes in NMDA Receptor Expression in Auditory Cortex after Learning*", Neuroscience Letter, 374(1): 63-68, 2005.