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Neurochemical correlates of functional plasticity in the mature cortex of the brain of rodents

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H I G H L I G H T S

•Classical conditioning duration is involved in synaptic connections of S1 cortex.
•Aversive and appetitive training differently contribute in synaptic connections of S1 cortex.
•Associative changes promote cortically regulated GABA-ergic inhibition in S1 cortex.

A B S T R A C T

It is commonly accepted that increase of input to sensory structures in mammals is known to produce marked changes in cortical recipient areas. This paper reviews the data concerning manifestations of changes in primary somatosensory cortex of adult animals caused by classical conditioning with reinforcement: aversive (whisker-shock) and appetitive (whisker-water) trainings. These include: anatomical, electrophysiological responses, receptor autoradiography, expression of GABA, GAD at mRNA and protein levels, expression of neuronal and astroglial GAT-1 puncta and inhibitory synaptogenesis in the hollows of ‘‘trained’’ barrels of the adult mouse. Here we have quoted the discovery in an earlier work of the creation of a picture of the extended perimeter of the neuronal mechanisms of coding and mediating in experience-dependent changes in the barrel cortex.

Keywords: barrel cortex; classical conditioning, plasticity