114.6

OCULAR DOMINANCE PLASTICITY IN MICE LACKING *a*CaMKII OR PKCy. J.A. Gordon, T.K. Hensch, D. Cioffi, C. Chen, A.J. Silva, S. Tonegawa, and M.P. Stryker. Keck Center for Integrative Neuroscience, University of California, San Francisco, CA 94143; Cold Spring Harbor Laboratory, Cold Spring Harbor, NY 11724; & MIT, Cambridge, MA 02139.

The recent characterization of plasticity in the mouse visual cortex permits the use of mutant mice to investigate the cellular mechanisms underlying activity-dependent development. As calcium-dependent signaling pathways have been implicated in plasticity, we examined plasticity in the visual cortex of mice with mutations in the genes encoding the *a*-isoform of calcium / calmodulin-dependent protein kinase II (*a*CaMKII) and the y-isoform of Protein Kinase C (PKCy).

In wildtype mice, brief occlusion of vision in one eye during a critical period reduces responses to that eye in the visual cortex. In half of the *a*CaMKII-deficient mice, visual cortical responses developed normally, but visual cortical plasticity was greatly diminished. Even after intensive training, spatial learning in the Morris water maze remained severely impaired in a similar fraction of mutant animals. These data indicate that loss of *a*CaMKII results in a severe but variable defect in neuronal plasticity.

Visual cortical plasticity was examined both *in vivo* and *in vitro* in PKCy-deficient mice. Visual cortical responses developed normally in these animals, and ocular dominance plasticity in response to monocular deprivation remained intact. In visual cortical slices taken from these animals, LTP and LTD were also intact. These data indicate that PKCy is not required for visual cortical plasticity. Since the refinement of climbing fiber innervation onto Purkinje cells is profoundly disrupted in these mice, the activity dependent organization of connections must occur via different molecular substrates in neocortical and cerebellar development. *Supported by HFSP, ARCS, & HHMI.*