

533.2

Confocal Imaging of Calcium Transients and Whole-Cell Recording from Pyramidal Cells in Area CA1 of Rat Hippocampal Slices. R.J.Adams and T.J.Sejnowski. Computational Neurobiology Laboratory, The Salk Institute, La Jolla, Ca 92037.

Calcium transients are considered to be important mediators of synaptic plasticity in the hippocampus and elsewhere in the nervous system. We are using confocal microscopy to image changes in intracellular calcium ion concentration in pyramidal cells in area CA1 of 400 μ m thick slices of rat hippocampus. Cells about 100 μ m below the surface of the slice are recorded from using whole-cell techniques using electrodes of about 5M Ω resistance. The recording electrode filling solution includes fluo-3 as a fluorescent indicator of calcium ion concentration. Low noise electrical recording with simultaneous high temporal- and spatial-resolution imaging can be achieved with this technique.

Synaptic stimulation from axons of the Schaffer collateral/commissural pathway produces calcium transients in the dendrites and soma of these cells. Changes in intracellular calcium in response to a single excitatory postsynaptic potential, causing the firing of a single action potential, can be detected in the proximal dendrites and soma.