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2-AMINO-3-PHOSPHONOPROPIONATE (AP3) BLOCKS INDUCTION OF ASSOCIATIVE LONG-TERM DEPRESSION (LTD) IN HIPPOCAMPAL FIELD CA1. S. Chattarji, P.K. Stanton¹ and T.J. SejnowskiSalk Institute, La Jolla, CA 92037 and ¹Albert Einstein Coll. Med., Bronx, NY 10461.

A test input, which by itself does not elicit long-term potentiation (LTP), exhibits an associative form of LTP when it is activated at the same time as a separate conditioning input. Recently, we have reported an associative long-term depression (LTD) in field CA1 that is produced when a low-frequency test input (TEST) is negatively correlated in time with a high-frequency conditioning input (COND). LTD can also be produced by activating presynaptic terminals while a postsynaptic neuron is hyperpolarized. The present study investigates the effect of 2-amino-3-phosphonopropionate (AP3), a putative antagonist for a metabotropic quisqualate receptor, on the induction of LTD in hippocampal field CA1.

Extra- and intracellular recordings were made in rat hippocampal slices (400 μ m thick) in an interface chamber at 34°C. The COND stimulus, activating Schaffer collateral/ commissural fibres, was trains of 10 bursts of 5 pulses each (100 Hz burst frequency, 200 msec interburst interval). The TEST stimulus, activating separate subicular inputs, was a 5 Hz train of single shocks. The single shocks of the TEST input were given either superimposed on the middle of each burst of the COND input (*in phase*), or symmetrically between the bursts (*out of phase*).

In control experiments, the TEST stimuli alone induced no change and the COND stimuli alone induced homosynaptic LTP of the COND input without affecting the TEST input. In extracellular experiments, *out of phase* stimulation induced associative LTD at the TEST input (Δ epsp slope = $-25.1 \pm 2.1\%$, Δ pop. spike = $-44.2 \pm 3.7\%$, $n=17$). In contrast, 25 μ M bath applied AP3 blocked induction of LTD at the TEST input (Δ epsp slope = $+5.6 \pm 2.2\%$, Δ pop. spike = $-2.9 \pm 1.6\%$, $n=13$), without affecting LTP of the COND input. In intracellular experiments, pairing of hyperpolarizing current injection with synaptic stimulation elicited LTD (Δ epsp slope = $-26.4 \pm 4.6\%$, $n=6$), which was blocked by AP3 (Δ epsp slope = $+18.7 \pm 14.9\%$, $n=8$). Thus, a metabotropic quisqualate receptor may be involved in the induction of LTD.