INDUCTION OF ASSOCIATIVE LONG-TERM DEPRESSION (LTD) IN HIPPOCAMPAL FIELD CA3 IS NOT MEDIATED BY NMDA RECEPTORS. S. Chattarji, P.K. Stanton[1] and T.J. Sejnowski. Salk Institute, La Jolla, CA 92037 and [1]Albert Einstein Coll. of Med., Bronx, NY 10461.

Brief, high frequency activation of excitatory afferents in the hippocampus produces long-term potentiation (LTP) of synaptic strength. In field CA3, pyramidal cells receive separate inputs via commissural/associational (COM/ASSOC) and mossy fiber (MF) synapses. LTP of COM/ASSOC synapses depends on activation of glutamate receptors of the N-methyl-D-aspartate (NMDA) subtype, but MF synapses do not. CA3 COM/ASSOC synapses exhibit an associative form of LTP when low frequency (LF) stimuli are *positively* correlated in time with a train of high frequency MF bursts (HF). Recently, we have shown that when LF COM/ASSOC stimulation is *negatively* correlated in time with HF stimulation of MF, associative long-term depression (LTD) at COM/ASSOC synapses is induced. Is associative LTD of COM/ASSOC synapses also mediated by NMDA receptors?

Extracellular recordings from rat hippocampal slices (400μm thick) were made in CA3 pyramidal cell somatic and apical dendritic fields. HF stimuli to MF consisted of trains of 10 bursts of 5 pulses each at a frequency of 100 Hz, with an interburst interval of 200 msec. The LF stimuli to COM/ASSOC, a 5 Hz train of single shocks, was given either superimposed on the middle of each burst (in phase), or symmetrically between bursts (out of phase).

In control experiments, the HF stimuli alone induced homosynaptic LTP of either COM/ASSOC or MF synapses, while LF stimuli alone induced no change. In bath applied AP5 (30μM), the HF stimuli alone elicited homosynaptic LTP at MF, but not COM/ASSOC synapses. In AP5, out-of-phase LF COM/ASSOC stimuli given with HF bursts to MF still elicited associative LTD, while associative LTP normally induced by in-phase stimuli was blocked. Thus, induction of associative LTD at CA3 COM/ASSOC synapses does not require NMDA receptor activation.