

## Supplemental Document

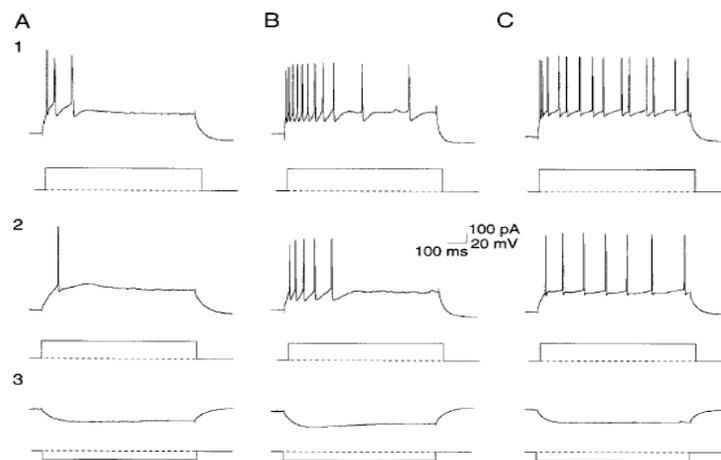
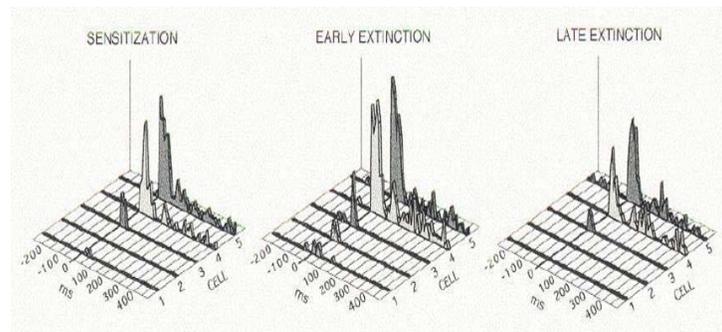


FIG. S1. *A-C*: firing patterns for 3 cells that show the extremes (*A* and *C*) and middle (*B*) of the range of responses observed in LA (Faber et al. 2001). Responses to a large current injection (600 ms, 400 pA), a current injection near the threshold and a hyperpolarizing current injection of (100 pA) are shown in row 1, 2 and 3 respectively.

A



B

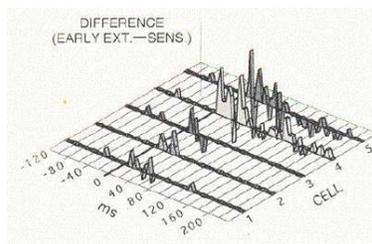


FIG. S2. The tone responses of simultaneously recorded neurons in LA at different points during training (Quirk et al. 1995). *A*: representative time histograms showing 5 neurons from LAd simultaneously recorded prior to conditioning (sensitization), 1 hr after conditioning (early extinction), and following 30 extinction trials (late extinction). Bin width is 10 ms and 10 trials are summed at each phase. *B*: a difference time histogram showing the conditioned responses of the 5 cells. Spike counts during sensitization were subtracted from counts during early extinction. Bin width is 4 ms and 10 trials are summed.

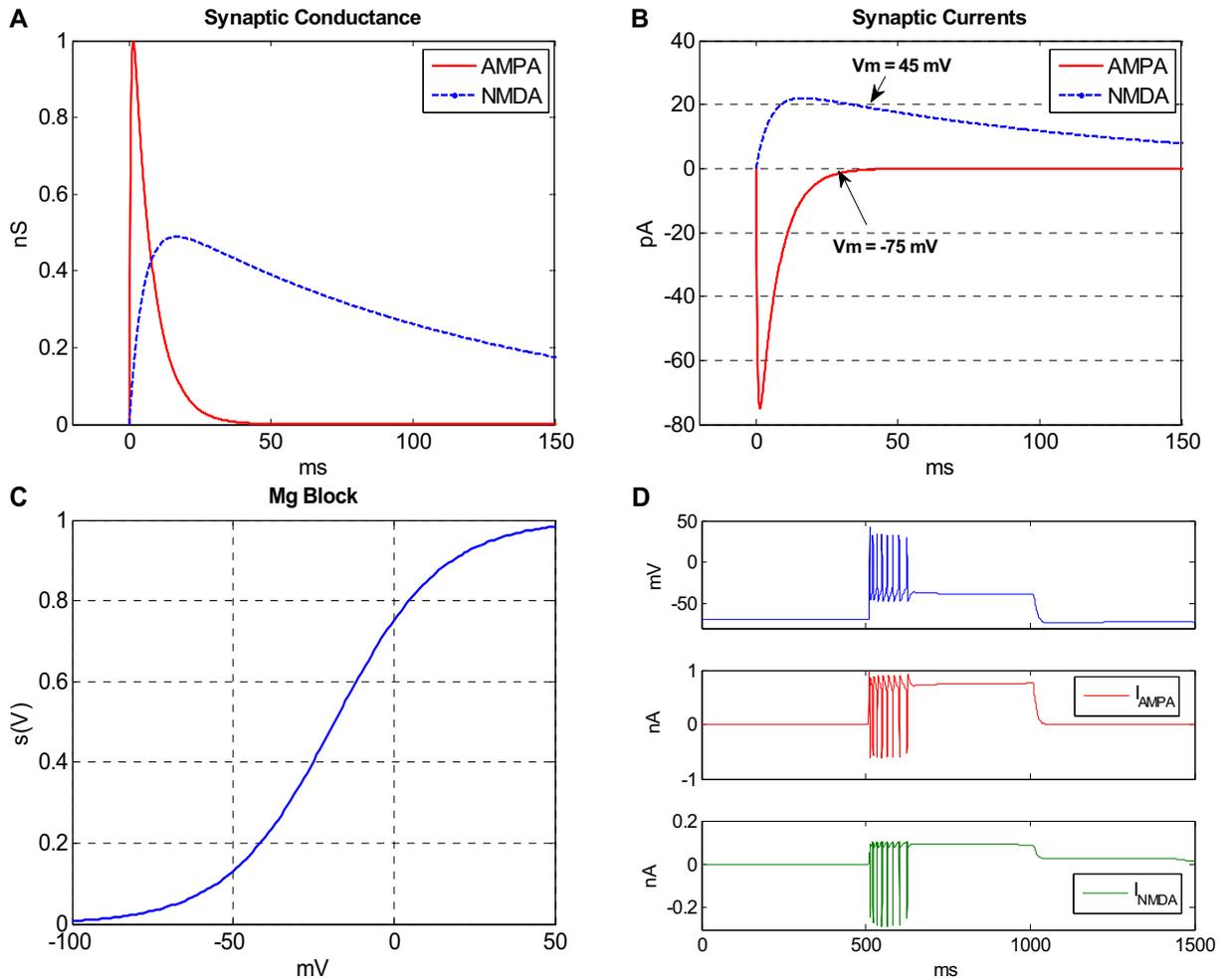


FIG. S3. Synaptic properties of pyramidal cells. *A*: AMPA and NMDA synaptic conductance in response to one single spike input ( $w = 1$ ). *B*: AMPA and NMDA synaptic currents in response to one single spike input (compare to Fig. 3*A*, Weisskopf and LeDoux 1999). The ratio (total charger transfer) of AMPA to NMDA current is 1:4.6. *C*: the Mg-block function for NMDA current. *D*: top panel: voltage response of a single type A pyramidal cell to tone input (200 Hz from 500 to 1000 ms;  $w = 20$ ); middle panel: AMPA current; low panel: NMDA current.

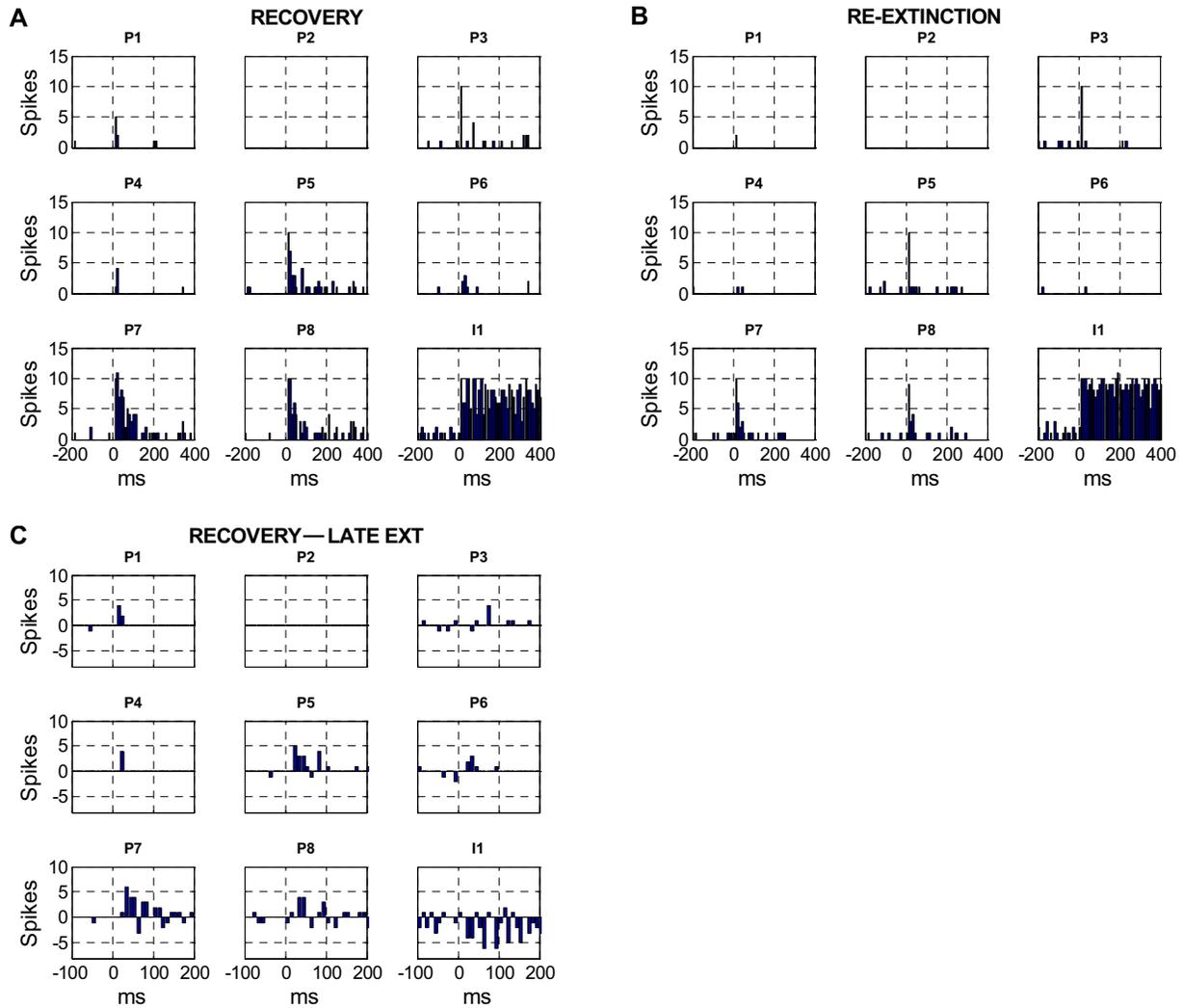


FIG. S4. Spontaneous recovery of fear and re-extinction. *A*: tone responses of all pyramidal cells and one interneuron during the early part of re-extinction (first ten tones) showing recovery. *B*: tone responses during the late part of re-extinction (last ten tones). *C*: difference between recovered responses and the responses during the late part of first extinction. Tone started at  $t = 0$ ; bin width was 10 ms and spike counts during 10 trials were summed together.

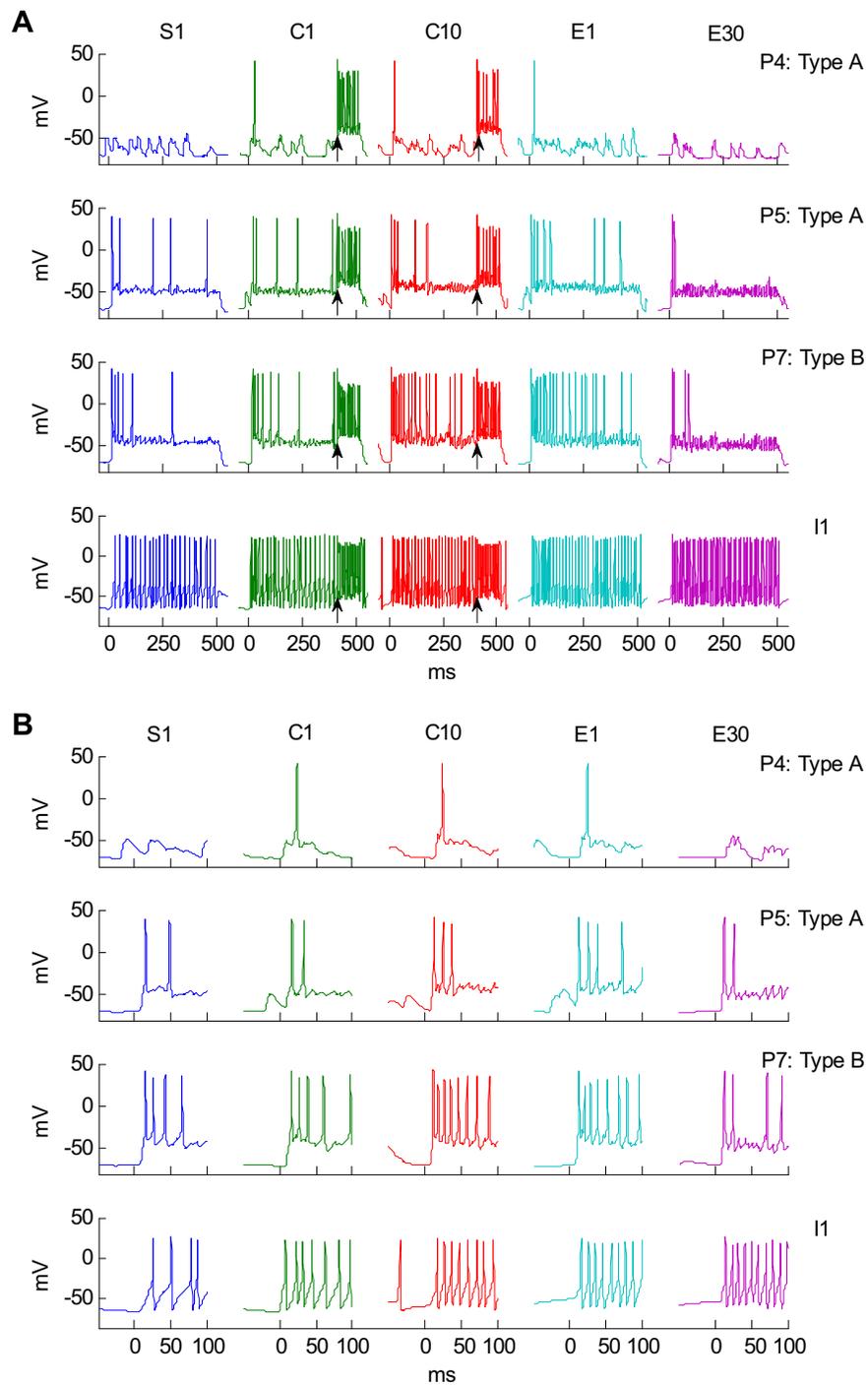


FIG. S5. The tone/shock evoked membrane potential fluctuations with *A*: a slow (entire tone) and *B*: fast (tone onset) time base for three representative pyramidal cells (P4, P5 & P7) and one interneuron (I1) at various phases of the training. S1: tone 1 in sensitization; C1: tone 1 in conditioning; C10: tone 10 in conditioning; E1: tone 1 in extinction; E30: tone 30 in extinction. Tone started at  $t = 0$  and black arrows indicate the start of shock input.