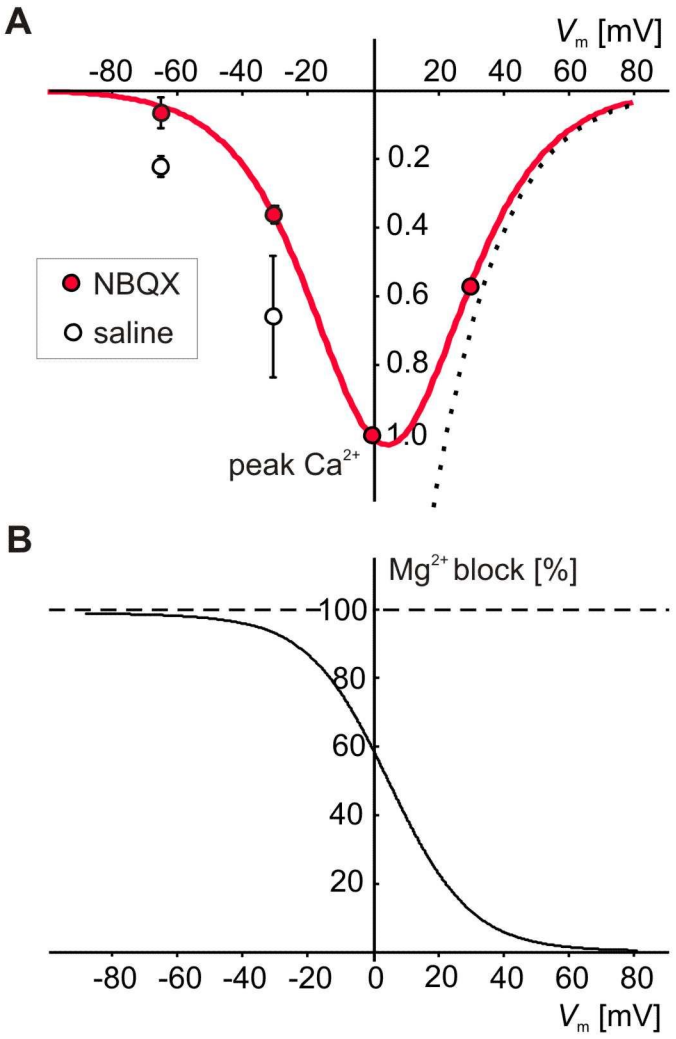

Supplemental Figure 1. Voltage-dependence of synaptically evoked spine calcium transients.

(A) Red circles: Amplitude of spine calcium transients at different holding potentials normalized to the amplitude at the synaptic reversal potential (0 mV). To improve space clamp, Cs^+-based intracellular solution was used and AMPA currents were blocked by NBQX (10 µM). The voltage-dependence of the current is well fit by combining the Goldman-Hodgkin-Katz current equation for Ca^{2+} (dotted line) with the voltage-dependent gating function of the NMDA receptor (red curve). In experiments without AMPAR block (white circles), spines escaped the somatic voltage clamp and depolarized, resulting in larger calcium transients.

(B) Voltage-dependent gating function of synaptic NMDARs, extracted from fit in (A).

$$g(V_m) = 1/[1 + \exp(-0.08V_m)(C/0.69)],$$

where V_m is the membrane potential and C is the extracellular Mg^{2+} concentration in mM.