

## Neuron, Volume 60

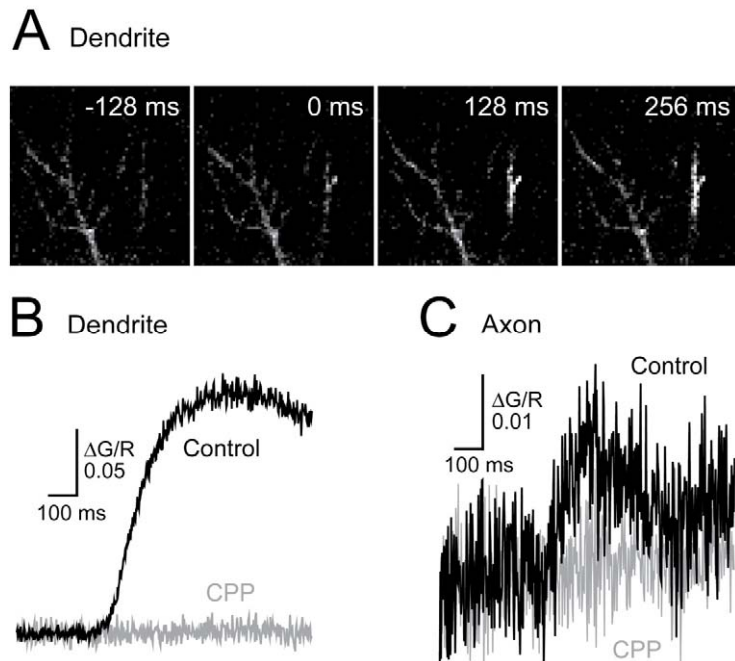
### Supplemental Data

## Dendritic NMDA Receptors Activate Axonal Calcium Channels

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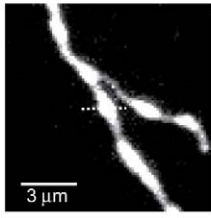
*Figure S1. PF-evoked  $Ca^{2+}$  transients in axons are NMDAR mediated*

(A) Sequence of frame scans showing the PF-evoked  $Ca^{2+}$  transient in the dendritic arbor (same cell as in Figure 7A and 7B). (B) PF-evoked  $Ca^{2+}$  transient recorded in a dendrite was blocked by (R)-CPP (20  $\mu$ M). (C) Similarly, (R)-CPP blocked the  $Ca^{2+}$  transient evoked in an axon varicosity by dendritic PF stimulation.

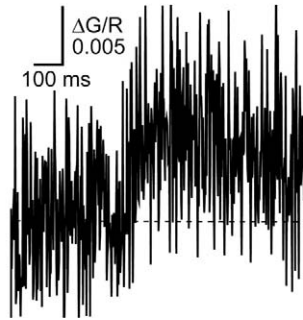
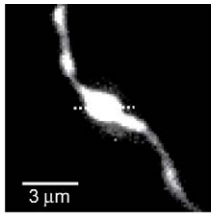


*Figure S2. Distance-dependence of PF-evoked  $Ca^{2+}$  transient in axon varicosities*

(A) Dendritic PF stimulation evoked a  $Ca^{2+}$  transient in a proximal axon varicosity. (B) A PF-evoked  $Ca^{2+}$  transient recorded from the same cell in a distal axon varicosity. Record from the same varicosity in which no stimulation occurred is shown for comparison. (C)  $Ca^{2+}$  transient amplitudes recorded in dendrites and axon varicosities to dendritic PF stimulation and somatically elicited action potentials versus distance from the axon hillock. A monoexponential curve, fitted to binned data (*binned points not shown*), is superimposed on the PF-evoked data collected from axon varicosities.

**A**

Site 1  
(52  $\mu\text{m}$  from soma)

**B**

Site 2  
(238  $\mu\text{m}$  from soma)

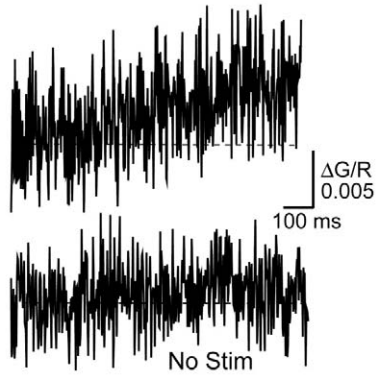
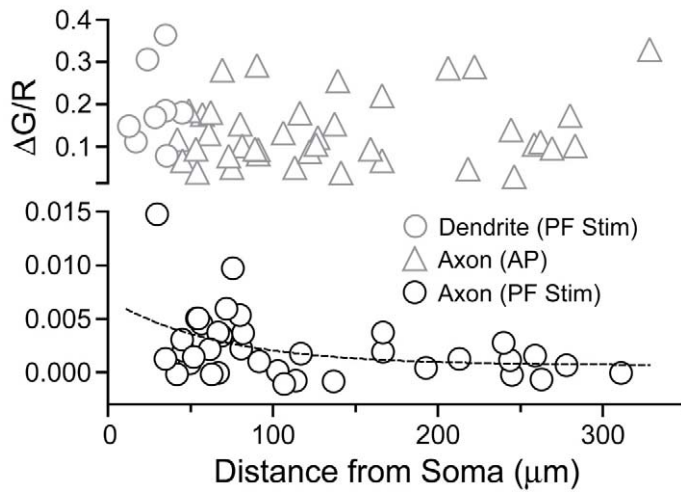
**C**

Figure S3. Action potential-evoked  $\text{Ca}^{2+}$  transients in dendrites reveal imaging sensitivity

(A) Stellate cell image shows a dendritic spicule (*inset*) and the line scan position used to record action potential-evoked  $\text{Ca}^{2+}$  transients. (B) Action potential-evoked  $\text{Ca}^{2+}$  transients (*single trials, solid lines*) recorded in the spicule and parent dendrite shown in (A) superimposed over the average response (*dashed lines*). (C<sub>1</sub>) Average  $\text{Ca}^{2+}$  transients for trials in which there was rapid influx of  $\text{Ca}^{2+}$  (success) and those where it did not (failures). (C<sub>2</sub>) Dendritic trials sorted based on spicule successes and failures.

