Supplementary data 1.

**PTH induced by high-frequency trains in the calyx of Held has two kinetic components.**

(a) Representative traces showing PTHs after tetanic stimulation at 100 Hz for duration of 200 ms, 500ms, 1s, 3s and 5s holding at –80 mV using 5 mM EGTA pipette solutions in whole-cell current-clamp mode. Rectangles above the trace indicate the duration of stimulation. After a short train (e.g. 0.2s), the decay of PTH could be described using a single exponential function with a time constant (τ) ranging between 8 and 10s. However, after longer trains of stimuli (e.g. 0.5 to 5s) a double-exponential function was required to fit the PTH decay, indicating the presence of fast and slow components of PTH (τ_{fast} = 150 - 500 ms and τ_{slow} = 3-7s). The red line indicates the double-exponential fitting of PTH. (b) The peak amplitude of PTH (filled square) which was obtained by subtracting the resting membrane potential from the peak of PTH, and amplitudes of the fast and slow PTH components (τ< 500 ms and τ > 3s, open square and open circle, respectively), depend on the duration of stimulation. Time to peak of PTHs (c), the fast decay time constant of PTHs (d), and slow time constant of PTHs (e), are plotted against duration of stimulation. Thus, the peak amplitude and duration of the PTH increased, and the time to peak of the PTH became shorter, as the duration of the tetanic discharge increased. (f) PTH-membrane potential relationship was studied using depolarizing or hyperpolarizing current injections to change the holding potential (from –90 mV to –70 mV). PTH was elicited by stimulation at 100 Hz for 3 s and the amplitude of PTHs were measured from various holding potentials to the peak of PTH. The decay of PTH was fit using a single exponential function. Note that the fast decay component of PTH becomes slower at –70 mV (red). This fast decay component is dependent on the peak potential of PTH, not the amplitude of PTH. (g) Current-voltage relationship of PTH around the resting membrane potential. The amplitude of PTH exhibited a weak voltage-dependence, decreasing only slightly with depolarization of the calyx from the resting V_m of –90 mV to -60 mV. Inset: The initial potentials were normalized to the same baseline to compare the amplitude of the PTHs and the fast decay component of the PTHs.