Supplemental Figure S1. Comparison of I-V curves and steady-state inactivation curves of recombinant currents arising from Ca\textsubscript{v}3.2 WT and Ca\textsubscript{v}3.2 Cys(4) constructs in HEK293 cells.

A. Figure shows average values of normalized peak currents in Ca\textsubscript{v}3.2 WT (filled symbols) and Ca\textsubscript{v}3.2 Cys(4) mutated channels (open symbols). There is very little difference in fitted values of midpoint of current activation between the Ca\textsubscript{v}3.2 WT (-38.0 ± 1.3 mV, n=6) and Ca\textsubscript{v}3.2 Cys(4) (-35.0 ± 1.0 mV, n=6, p>0.05).

B. Normalized peak T-current steady-state inactivation curves from the experiments in Ca\textsubscript{v}3.2 WT (filled symbols) and Ca\textsubscript{v}3.2 Cys(4) mutated channels (open symbols). Steady-state inactivation was estimated using 15 s prepulses to the indicated potentials followed by a test pulse to -20 mV to measure availability. Peak currents were normalized to the peak observed after holding at -110 mV. The average steady-state inactivation curve is shifted to the right by about 5 mV in Ca\textsubscript{v}3.2 Cys(4). The average values of the fits gave midpoint of inactivation -75.0 ± 1.8 mV for Ca\textsubscript{v}3.2 WT (n=4), and -69.6 ± 1.0 mV for Ca\textsubscript{v}3.2 Cys(4) (n=6, p<0.05).

Supplemental Figure S2. Potent Zn\textsuperscript{2+} inhibition of Ca\textsubscript{v}3.2 Cys(4) mutants.

A. Representative current traces in a HEK cell expressing Ca\textsubscript{v}3.2 Cys(4) constructs in control conditions, during applications of 1 µM and 10 µM Zn\textsuperscript{2+}, and after Zn\textsuperscript{2+} was washed out.

B. Time course from the same cell presented on panel A of this figure showing a rapid and reversible current inhibition by 2 different concentrations of Zn\textsuperscript{2+}.

C. Concentration-response relationship for Zn\textsuperscript{2+} inhibition of T-current in recombinant Ca\textsubscript{v}3.2 Cys(4) channels. All points are averages from applications of Zn\textsuperscript{2+} in multiple cells (n = 2-4) with vertical lines indicating ± SEM. Solid line is the best fit (equation # 1,
see Methods) yielding IC$_{50}$ of 0.70 ± 0.07 µM and slope coefficient 1.0 ± 0.1. Fit was constrained to maximal 100 % inhibition of the peak of T-current. Dotted line represents Zn$^{2+}$ concentration-response curve for WT Ca$_{V}$3.2 channels (Nelson et al., 2007a) with an IC$_{50}$ of 0.89 ± 0.05 µM and slope coefficient 0.87 ± 0.04.