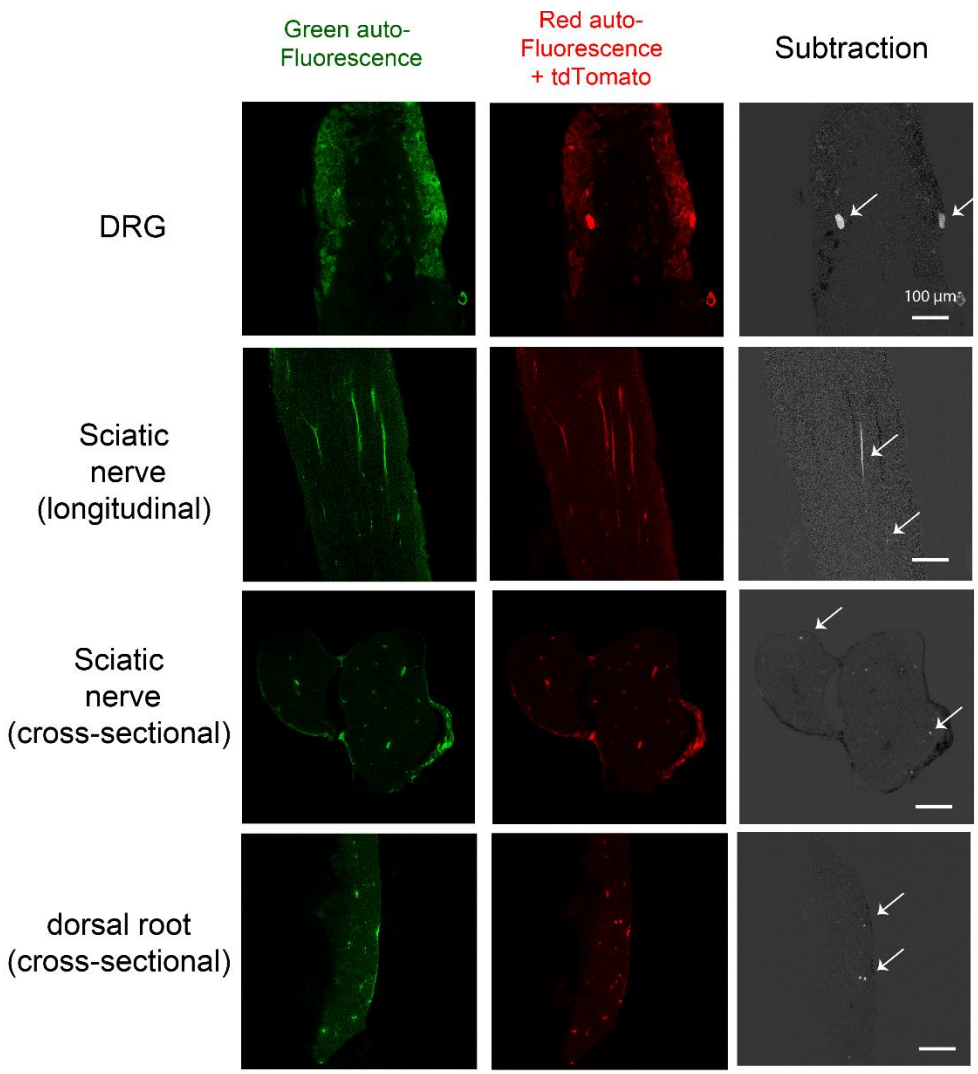
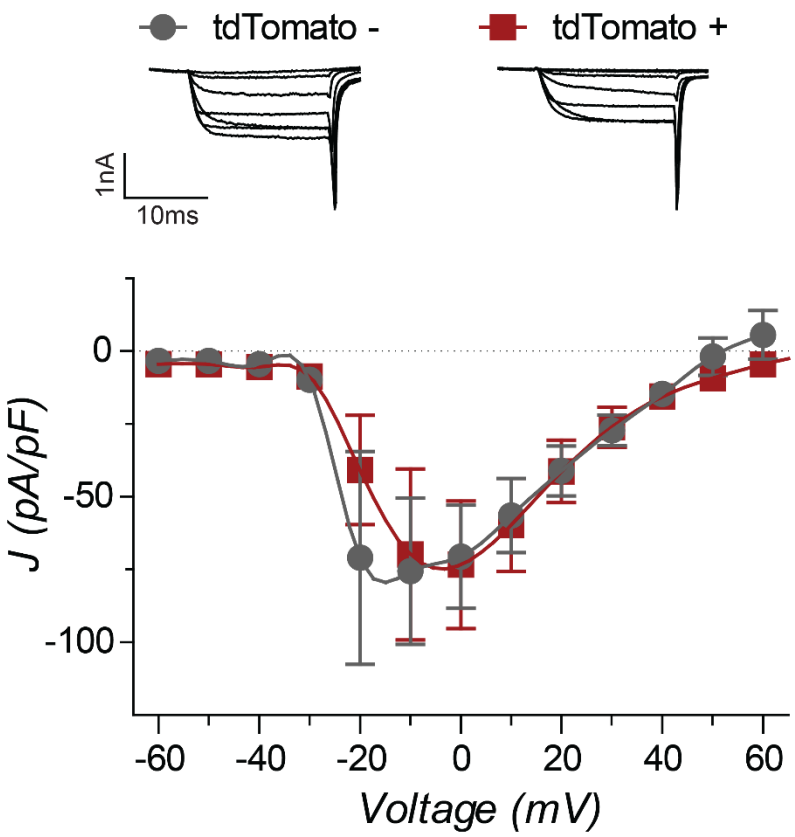
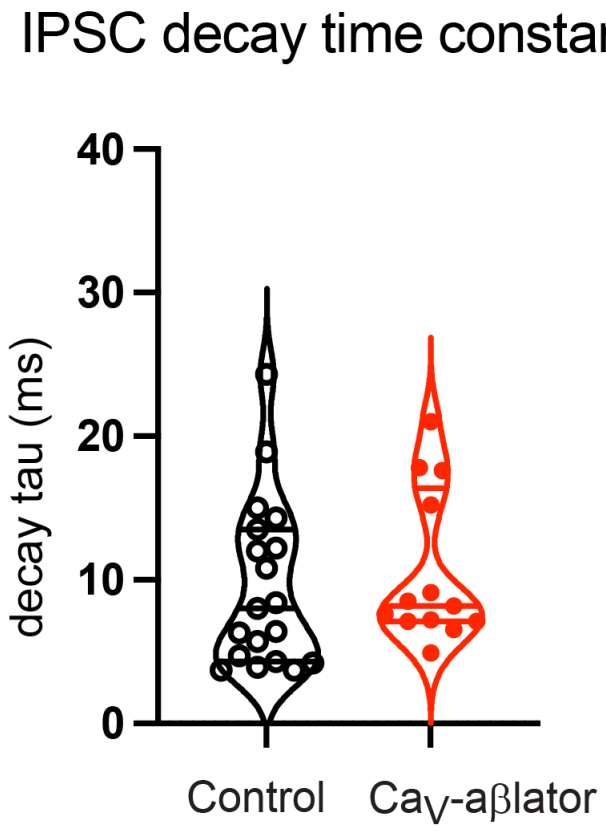


Supplemental Figure 1. Ca_V-aβlator is expressed in sciatic nerves, DRG neurons, and dorsal roots *in vivo* following Ca_V-aβlator AAV9 injection into the hind paws of the mice. The first column shows the autofluorescence of the tissue cryosections under the 500-550 nm filter set (green channel). The second column is the fluorescence under 570-620 nm filter set (red channel), which includes auto- and tdTomato fluorescence. The third column is the subtraction of column one images from column two images, representing tdTomato expression. Arrows indicate individual Ca_V-aβlator expression represented by tdTomato fluorescence. Both red and green channel images were normalized with 0.1% area saturation setting using Fiji Image J.



Supplemental Figure 2. HVA calcium channel-mediated currents in DRG neurons were not affected by tdTomato fluorescence. Upper panels are examples of HVACCs recorded from uninfected (tdTomato-) and AAV-CMV-tdTomato infected (tdTomato+) DRG neurons collected from Ca_V-aβlator injected mice. Lower panel shows the I-V curves of the HVACCs, demonstrating no change in currents between those recorded from infected and uninfected DRG neurons.



Supplemental Figure 3. Ca_V-aβlator did not change the proportion of glycinergic and GABAergic inhibitory input onto the dorsal horn neurons in the spinal cord. Summary of the decay time constants of the sIPSCs in dorsal horn neurons from control side and Ca_V-aβlator infected side of the spinal cord. Glycinergic IPSCs display faster decay rate than GABAergic sIPSCs do. Each dot represents the median decay time constant of the sIPSCs recorded from individual neuron. Middle lines indicate the median values and the upper and lower lines represent the 75% and 25% ranges of the samples respectively.