***Supplemental Figure Legends***

**Figure S1. Specific infection of proprioceptive neurons with *PVHTB* mouse line.**

A) Representative image of a lumbar spinal cord section showing GFP+ sensory neurons in the DRG of p10 *PVHTB* mice.

B) Examples of RV+; GFP+; PV+ sensory neurons after RV∆G-mCherry/EnvA L1 injection in p9 *PVHTB* mice.

C) Representative images of lumbar DRG and spinal cord sections showing RV+; GFP+ sensory neurons and absence of transsynaptic labeling after RV∆G-mCherry/EnvA L1 injection in p9 *PV::cre+/-; HTBf/+* (*PVHTB f/+*) mice.

**Figure S2. Post-sensory connectivity maps from *PVHTB* experiments.**

A) RV+ spinal neurons after RV∆G-mCherry/EnvA L1 injection in three p9 *PVHTB* mice.

B) Digital reconstruction of RV+ neuron positions in three *PVHTB* experiments.

**Figure S3. Subtype identities of post-sensory neurons labeled in *PVHTB* experiments.**

A-D) Representative images of Chx10+ (V2a, A), FoxP2+ (V1, B), Lhx1+ (V0/dI4, C) and calbindin+ (D) interneurons labeled in *PVHTB* experiments.

**Figure S4. Post-sensory connectivity maps from *TRPV1HTB* and *TRPM8HTB* experiments.**

A and B) Digital reconstruction of RV+ neuron positions in three *TRPV1HTB* (A, red)) and *TRPM8HTB* (B, blue) experiments.

C and D) Representative images of parvalbumin and tdTomato labeling of somatosensory neurons cell bodies and afferents in the DRG and spinal cord of *TRPV1::cre+/-; Ai14f/+* (C) and *TRPM8::cre+/-; Ai14f/+* mice.

E) Correlation analysis of post-sensory neurons Cartesian coordinates in *TRPV1HTB* and *TRPM8HTB* experiments.