**Supplementary Figure 1. Method for quantifying the percentage of GFP\(^+\) fibers projecting into the ipsilateral optic tract.** *Left,* Representative coronal sections through the anterior, middle and posterior optic tract used for analysis. Phase images are overlaid with neurofilament staining (red) to visualized optic tracts. Scale bar = 250 µm. *Right,* GFP signal is taken (from higher power images) in the ipsilateral (I1, I2, I3) and contralateral (C1, C2, C3) optic tracts to calculate the percentage of GFP\(^+\) signal in the ipsilateral optic tract for each embryo.

**Supplementary Figure 2. Alignment of EphB1 and EphB2 intracellular sequences.** Red Y’s = tyrosine residues mutated for 2Y-E EphB1 mutant and Y929F EphB1 mutant, green K = residue mutated for KD EphB1 mutant. The transmembrane (TM) domain, kinase domain, SAM domain, and PDZ binding motifs are highlighted. The juxtamembrane (JM) region lies between the transmembrane domain and the kinase domain.