

How Does an Ipsilateral RGC Axon Interpret Ephrin and Shh as a Signal Not to Cross?

In the mouse eye, the Eph B1 receptor is expressed on those temporal axons that are repelled by the optic chiasm's ephrin B2, and those axons project to the side of the tectum on the same side as their eye; Eph B1 is nearly absent on axons that are allowed to cross over. Mice lacking the *Eph B1* gene show hardly any ipsilateral projections. This pattern of *Eph B1* expression appears to be regulated by the Zic2 transcription factor found in those retinal axons that do form ipsilateral projections (Herrera et al. 2003; Williams et al. 2003; Pak et al. 2004). In addition, loss of the alternative Shh receptor Boc results in the aberrant contralateral pathfinding of specific temporal RGCs that typically remain on the ipsilateral side. Furthermore, ectopic expression of Boc in typically contralateral axons will cause them to now project ipsilaterally (Fabre et al. 2010). These results suggest that both Eph B1/ephrin B2 and Boc/Shh are the major regulators of the decision to cross or not to cross the forebrain midline.

Literature Cited

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