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What happens when nerve cells lose their way?

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During normal embryonic development of the zebrafish, axons of the retinal ganglion cell (RGC) navigate from the eye to a region of the brain known as the tectum. In common with other axons, retinal axons are believed to reach their target by sensing and responding to cues in their immediate environment telling them where to go and where not to go - a process called pathfinding.

In the 20 April issue of [Science](#), Cornelia Fricke and colleagues of the [Department of Neurobiology and Anatomy](#), University of Utah Medical Center, identify a number of mutations in the *astray* (*ast*) gene that lead to a variety of pathfinding errors. Instead of relocating to the tectum, RGC axons in *ast/ast* embryos are misprojected to other parts of the brain - anteriorly into the diencephalon and telencephalon, and posteriorly into the ventral hindbrain - and sometimes into the opposite eye. The axons often recrossed the midline, suggesting that *ast* function is required for midline crossing as well as for several other axon guidance decisions (*Science* 2001, **292**:507-510).

By a combination of mapping and sequence analysis, Fricke *et al.* determined that *astray* is the zebrafish homolog of *roundabout2* (*robo2*), a *Drosophila* gene that is also required for axon guidance and crossing of the central nervous system midline.

References

1. Fricke C, Lee J-S, Geiger-Rudolph S, Bonhoeffer F, Chien CB: *astray*, a zebrafish roundabout homolog required for retinal axon guidance. *Science* 2001, 292:507-510., [<http://www.sciencemag.org>]
2. Department of Neurobiology and Anatomy, University of Utah Medical Center, [<http://www-na.med.utah.edu/>]