DEVELOPMENTAL BIOLOGY

Regeneration swims into view

Newts can do it so why can't we? The ability to regenerate damaged tissues would have obvious medical applications. Although amphibians and, more recently, zebrafish have proved to be good models for regeneration studies, our limited understanding of the mechanisms that underlie this process has frustrated developmental biologists. Mark Keating and colleagues have now identified a new signalling factor — Fgf20 — that is required for the specific, early stages of zebrafish fin regeneration. Intriguingly, Fgf20 might be specifically required for regeneration.

The gene was identified from a forward genetic screen of adult fish for regeneration defects. One mutant, *dob*, showed a recessive regeneration defect 2 days after fin amputation. Although *dob* begins the regeneration process by forming an epithelium over the wound, the epithelium does not adopt the correct cuboidal morphology, which seems to be required for regeneration to proceed. None of the subsequent steps in fin regeneration, which involve cellular reorganization and proliferation, occurs in *dob* mutants.

The mutation was mapped to the *fgf20a* locus on chromosome 1. The missense mutation — an adenine to cytosine transversion at position 443 — converts a highly conserved tyrosine to a serine. By conducting a series of mutant *fgf20a* overexpression studies, the authors show that the mutation is likely to be a null.

So *fgf20a* — a new member of the FGF family — seems to be specifically required for the initiation stages of regeneration. Zebrafish *fgf20a* is expressed in mesenchymal cells, the cells that need to hyperproliferate during fin regeneration, whereas in other organisms, it is expressed in cancer cell lines and promotes myocardial proliferation and differentiation. It remains to be seen if Fgf20a will provide a handle on the regenerative potential of other vertebrates.

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Whitehead, G. G. *et al. fgf20* is essential for initiating zebrafish fin regeneration. *Science* **310**, 1957–1960 (2006)