Sensory Nerve Ending Regeneration during Development of the *C. elegans* Dopaminergic PDE Neurons

Xuemin Lu, Tori Hatch, Rita Droste, Robert Horvitz
HHMI, Department of Biology, MIT, Cambridge, MA 02139 USA

Neural regeneration is a fundamental issue in neuroscience. Successful regrowth or repair of neural tissues could play a vital role in patient recovery after nervous system injury. Despite our current knowledge about axon regeneration, much is still unknown about the regeneration of sensory endings, as in retinal regeneration in damaged retinas and hair cell regeneration after hearing loss.

To investigate molecular mechanisms and factors involved in neural regeneration, especially sensory nerve ending regeneration, we are using *C. elegans* to identify new molecules and pathways involved in this process. We are focused on a simple sensory structure in the posterior part of the worm, the postdeirid. Each of the two postdeirids encompasses three cells, the PDE dopaminergic neuron and two associated glial cells, the PDE sheath and PDE socket cells. The simple structure and relative isolation of the postdeirid makes it an excellent system for imaging in live animals and for genetic screens.

During development, the sensory ending of the PDE neuron in the postdeirid is shed with the cuticle during at least the L4 molt and regenerates in the adult. By combining fluorescent live-cell imaging techniques using a GFP reporter with electron microscopic techniques, we are investigating the structural and morphological changes of the PDE sensory ending during the last molt. We are also performing both RNAi screens using a sensitized genetic background (*sid-1* overexpression in neurons) and EMS screens in an effort to identify genes that function in PDE sensory ending regeneration. Genes indentified in either screen will be further characterized. We hope that our findings will reveal mechanisms of neural regeneration.

Poster
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