CDB SEMINAR

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Division of Biological Sciences

University of California, San Diego

Friday, September 25, 2009

13:30~14:30 A7F Seminar Room

Genetic mechanisms of axon regeneration after injury in *C. elegans*: roles of second messengers and MAP kinase pathways

Summary

The axons of most neurons in many organisms have remarkable abilities to regrow following injury, and manipulation of axon regeneration has enormous potential for treatment of nervous system trauma and disease. The extent of axon regrowth is controlled by interplay of extrinsic factors, such as the glial microenvironment, and intrinsic factors, such as cell type and age. Progress in studying axon regeneration after injury has been hampered by the lack of a simple in vivo system in which to study genetic requirements for regrowth. *C. elegans* neurons are relatively simple and their axons can be labeled in vivo with genetically encoded fluorescent reporters. We showed that *C. elegans* axons can be precisely severed by laser surgery, and that many, but not all, *C. elegans* neurons can regrow after axotomy. The second messengers calcium and cAMP are critical determinants of regrowth. We find that the effects of Calcium and cAMP require a conserved MAPK cascade that regulates axonal translation of bZip transcription factor..

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