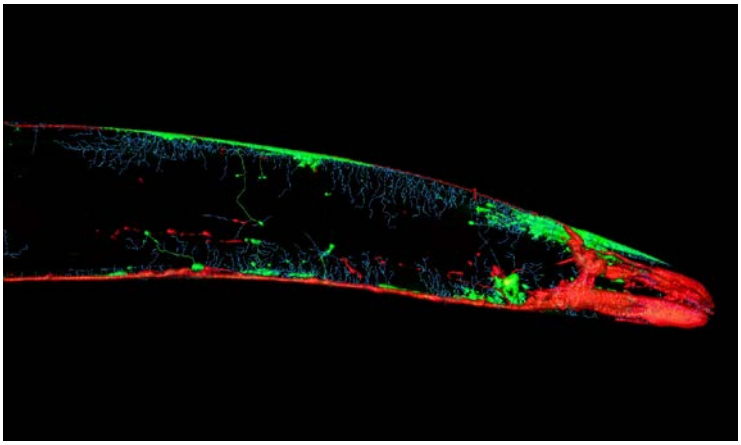
Biology Seminar

Dr. Peter Douglas

Molecular Biology
University of Texas Southwestern Medical Center

Modeling Blunt Force Trauma in *C. elegans*: What can a Worm Teach us about Neurotrauma?

Despite the prevalence of head injuries in today's active lifestyles, little is known about the cellular responses to blunt force trauma. These fundamental questions involving how different tissues manage membrane deformation caused by physical stress appear to hold important biomedical significance. We have established a high-throughput trauma model in the nematode, *C. elegans,* to study the ramifications of mechanical stress on neurological function. Blunt force injury to adult animals recapitulates several immediate and long-term physiological, molecular, metabolic, and pathologic phenotypes observed in human trauma patients. Interestingly, different neural subsets in the nematode display varying degrees of dysfunction and progressive neurodegeneration. We further show that modulating the activity of newly identified stress responsive genes can prevent progressive degeneration of sensitized neurons. In particular, our screening system has identified a conserved, stress-activated phosphatase which has profound effects on JUN amino-terminal kinase function and long-term neuroprotection. As a proof of principle, the same JUN kinase ortholog in mammals has been consistently linked with neural trauma yet its mechanism of action in brain injury remains unclear. Thus, modeling blunt force trauma in *C. elegans* provides a fast, informative method to uncover new molecular events that are fundamental to long-term neural health.



C. elegans neurons

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