

NON -TECHNICAL ABSTRACT: (State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project for California.)

To generate a neural circuit, neurons extend axons and dendrites (neurites) along stereotyped paths towards their final targets. Once targets are reached, mature neurites cease growing and transition to morphological stability. Regulation of this switch is not only precise, creating neurites of a specific length, but also continuous. For example, axons from the peripheral nervous system (PNS) can reinitiate growth following a catastrophic injury. Unfortunately, this is not true of axons within the central nervous system (CNS). What are the molecular changes that occur within peripheral axons to permit re-growth? Why do axons from the central nervous system fail to regenerate? To understand how to treat injury and disease to the nervous system, it is critical to understand the molecular mechanisms that initiate and maintain the transition from growth to stability during *normal development*. To this end, my lab exploits the experimental advantages and anatomical simplicity of the nematode, *Caenorhabditis elegans*. Specifically, our research focuses on a conserved molecular pathway required for mechanosensory neurite termination that currently includes two members, SAX-2 and the SAX-1 kinase. Importantly the fly counterparts function similarly in mechanosensory neurite termination and the human counterparts are expressed in the brain. In this proposal, I describe genetic experiments designed to identify additional members of the *sax-1/sax-2* signaling pathway and to characterize the sub cellular localization of *sax-2* in more detail. If funded, the state of California will also benefit by providing research opportunities for undergraduate and graduate students alike. Many of these students will soon join the workforce in biotech, an industry that thrives here in California. In addition, I plan to submit our research findings for publication, a prerequisite for writing competitive federal grants.