

Public Abstract

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Department:Biological Sciences

Degree:PhD

Title:Exploring ion channel mechanisms: From toxin-based tools to computational methods

Ion channels are the building blocks of cellular excitability, controlling the most basic functions necessary for life to the most complex behaviors. The research presented here addresses questions about the mechanisms by which different ion channels function, as well as, how various toxins from venomous animals can alter ion channel behavior. This was done using a combination of molecular biology, electrophysiology, and computational techniques. The results shed light on the specific structures of a channel required for proper function, and target by pharmacological agents. Importantly, these results have significance in developing animal toxins as research tools and as future therapeutic agents for ion channel associated diseases. Lastly, we demonstrate for the first time, a system to study a protein required for high temperature avoidance in fruit flies. This opens the door to addressing detailed questions about the most poorly understood of the five senses, temperature sensation.