UC RIVERSIDE

BCH 252 Seminar Series

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Seminar Title: "ShK Domains from a Parasitic Nematode are Toxic to *Drosophila melanogaster*"

Abstract: ShK domains are small peptides of 27-35 amino acids which are known as inhibitors of the K^+ channel. Because of their important role on K^+ channel in effector memory T cells, they are considered promising pharmacological compounds. One analog of ShK peptides, Dalazatide has completed phase I clinical trial for treating plaque psoriasis, a common autoimmune skin lesion. ShK domains were first discovered in the sea anemone *Stichodactyla helianthus* venom. Later ShK-domain-containing proteins were found in both plants and animals, including nematodes. ShK domains have six conserved cysteines that form three disulfide bonds with the connectivity of C1-C6, C2-C4, and C3-C5. In this study, we are reporting the function of ShK domains from excreted/secreted products (ESPs) of the parasitic nematode *Steinernema carpocapsae*. *Steinernema carpocapsae* releases approximately 500 venom proteins including ShK domains into the insect host as ESPs during infection. The crude ESPs showed toxicity effects in a variety of insects. Our goal is to find out the role of ShK domains in this host-parasite interaction. We generated recombinant versions of ShK domains using the *E.coli* expression system and purified them by chromatographic techniques. Using the model organism *Drosophila melanogaster*, we tested the *in vivo* activity of the domains. Injecting ShK domains into fruit flies shows significant toxic effects. Since ShK domains are known as K^+ channel blockers, they can lead to uncontrolled hyperexcitability, followed by paralysis and death of insects. Studying these toxins could be useful to find novel insecticides that can be used in pest management, in addition to increasing our understanding of how *S. carpocapsae* kills host insects.

Tuesday, May 30, 2023 12:00 p.m. - 12:50 p.m. PST

In-Person: Genomics Auditorium 1102A

Hosts: Dr. Maria Ninova