Western University of Health Sciences
College of Osteopathic Medicine of the Pacific

Latrotoxin action in the nervous system- Lessons from the black widow spider

Presented by

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Friday, February 15, 2019

12:00pm – 1:00pm

HEC Classroom A, Pomona

Lecture Hall 1, Lebanon

Lunch will be served with RSVP to emunoz@westernu.edu (Pomona) or kmack@westernu.edu (Lebanon) by noon, February 13, 2019

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Venom of the black widow spider contains a potent neurotoxin (alpha-latrotoxin), that is recruited to synapses to trigger uncontrolled vesicle release at presynaptic nerve terminals. Two families of synaptic cell-surface receptors have been identified as the molecular players responsible for the recruitment of alpha-latrotoxin to the synapse to elicit these neurotoxic effects: neurexins and latrophilins. While initially identified as molecules that are required for alpha-latrotoxin action, the endogenous functionality of neurexins and latrophilins is poorly understood.

My laboratory is currently exploring the native role of latrophilin molecules at synapses during brain development. Belonging to the enigmatic adhesion class of G-protein coupled receptors, the latrophilin family consists of three independent genes (ADGRL-1,2,3). Using newly generated conditional knockin and knockout mice specifically targeting latrophilin-2 expression, our initial studies have revealed that this cell-adhesion GPCR is indeed a synaptic molecule. However, latrophilin-2 is not ubiquitously localized to all synapses, and rather is subject to stringent trafficking mechanisms to place it to defined synaptic sites. At these sites, we find that the molecule functions as a synaptic target-recognition molecule controlling synapse assembly. This has implicated latrophilin-2 as a molecular component guiding brain neural circuit wiring development, by regulating the matching of postsynaptic sites with their respective presynaptic afferents.