VT School of Neuroscience
Faculty Recruitment Seminar

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"Cellular mechanisms of glial development and neuron-glia interactions"

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11:00am – 12:00pm
Biocomplexity Institute, Conference Center

Most glial functions depend upon their intimate morphological relationships with neurons. Neurons rely on glia to secrete trophic factors for neurite growth and guidance, remove neuronal debris during pruning or neural trauma, buffer extracellular ions and nutrients, and promote synapse formation, function, and plasticity; however, compromised glial function gives rise to devastating diseases such as cancer, neurodegenerative diseases, and neuropsychiatric disorders. Significant progress has been made in understanding neuron-glia signaling at synapses and axons, but how glia support neuronal cell bodies remains poorly defined. To better understand this phenomenon, I explore the growth and functions of *Drosophila* cortex glia, which associate almost exclusively with neuronal cell bodies. Cortex glia share many functions with mammalian glia including providing key factors for neuronal development and function, buffering the extracellular environment, and eliminating neuronal corpses and debris. Through the design and implementation of novel genetic tools, in conjunction with unbiased genetic screening, my research has identified the vesicle fusion protein NSF attachment protein alpha (αSNAP) as an essential molecule in the maintenance of cortex glial morphology and neuron-glia interactions. Interestingly, cortex glial depletion of a single secreted neurotrophin called Spätzle 3 (Spz3) could fully recapitulate the αSNAP phenotypes including: the loss of glial ensheathment at neuron cell bodies, increased neuronal cell death, aberrant outgrowth of neighboring astrocytes, and defects in animal behavior. This work has identified Spz3 as a novel signaling factor in glial development and the maintenance of neuron-glial interactions, demonstrated essential roles for glia at neuronal cell bodies in regulating CNS homeostasis, and established cortex glia as a genetic model for *in vivo* studies of neuron-glia interactions at the neuronal soma. I will discuss this work, as well as future directions for this model in understanding fundamental aspects of glial biology and neuron-glial interactions.

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