

Seminar Series

Presents

“Sending and Receiving the Sonic Hedgehog Signal”



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Abstract: The Sonic Hedgehog (SHH) signaling pathway provides crucial instructional cues during developmental tissue patterning, participates in post-developmental tissue homeostasis, and when corrupted, can induce developmental disorders and cancers. As such, defining the molecular mechanisms controlling signal release, reception, and activation will have direct relevance to human health. I will discuss two projects focused on these important problems. The first aims to determine how SHH ligands are deployed from signal producing cells, and trafficked to distantly localized target cells through specialized filopodia called cytonemes. We discovered that SHH is trafficked along cytonemes in a trimeric complex containing the SHH deployment protein Dispatched, and the adhesion molecule BOC/CDO. The complex is transported by the actin motor protein Myosin 10, which when mutated, attenuates cytoneme-based SHH delivery. The second project examines how SHH-regulated lipid metabolism links signal initiation with fitness of the primary cilium, a sensory organelle that orchestrates the SHH response in ligand-receiving cells. We find that SHH activation of phospholipase A2 (cPLA2) enhances ciliary length through prostaglandin signaling, and that cPLA2-generated arachidonic acid binds to the SHH signal transducing protein Smoothed to promote its ciliary entry and signaling activity.

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11:00 am – 12:00 pm

Arizona Health Sciences Center, Rm 8403