DEPARTMENT OF BIOLOGY | UNIVERSITY of WASHINGTON

Biology Seminar

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https://scholarworks.brandeis.edu/esploro/profile/willem_laursen/overview

Up close and personal: Short-range heat and humidity detector for mosquito host-seeking and egg-laying behaviors

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Mosquitoes use multiple host-associated cues to efficiently locate sources of blood. While detection mechanisms for longer-range cues like CO2 and odors have been widely studied, less is known about how mosquitoes sense the short-range heat and humidity gradients surrounding hosts. We recently demonstrated that heat-seeking in the malaria vector *Anopheles gambiae* is driven by cooling-activated neurons requiring the Ionotropic Receptor (IR) subunit *IR21a*. Although heat is a powerful short-range mosquito attractant, genetic disruption of heat seeking alone only modestly impacts overall host detection, suggesting other cues act in parallel with heat near hosts. We now show that *An. gambiae* and the arbovirus vector *Aedes aegypti* both require another IR, *IR93a*, to maintain host attraction and feed efficiently on warmed blood. By genetically targeting *IR93a*, we identify the mosquito humidity-sensing (hygrosensory) system, and show that *IR93a* is required for hygrosensation and thermosensation (in *IR21a*+ neurons). These systems function in parallel to drive host proximity detection. After blood feeding, gravid females also require *IR93a* to seek water for egg-laying. These data show that two major vectors of human disease use similar mechanisms to locate hosts and oviposition sites and demonstrate the overall importance of short-range cue detection for complex mosquito behaviors.

Seminar Speaker Host: Jeff Riffell