Johns Hopkins University

Department of Biology Seminar Series

Thursdays, 4:00pm

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Zoom link: https://zoom.us/j/97925356454?pwd=bjNuTlY1dU9BcXcvRFdleis2TVNadz09

April 18th, 2024 - Mudd 100

Miriam Goodman

Professor and Chair of Molecular and Cellular Physiology

Stanford University

Host: Andrew Gordus

"Deciphering where and how touch happens"

Touch is the first sense to develop, the last to fade and the least well understood of the five basic senses. We have long understood that ion channels convert the mechanical energy delivered in a touch or the bend of a limb into neural signals and are the first responders of touch sensation. Yet, the identity of the proteins forming such channels remained elusive for decades. Research in my group and others has identified at least four classes of proteins that can form these so-called mechanoelectrical transduction (MeT) channels in mammals and invertebrates: DEG/ENaC/ASIC sodium channels, TMC cation channels, TRP cation channels, and Piezo cation channels. The DEG/ENaC/ASIC and TMC channels are thought to activate through a force-from-filament activation mode, while the others operate in a force-from-lipid mode. We hypothesize that the subcellular position of MeT channels is tightly regulated and helps to determine the threshold and dynamic range of touch sensation (Sanzeni et al, eLife, 2019; Katta et al, J Gen Physiol, 2019). Work in our research group integrates genetic dissection with cellular biophysics, molecular imaging, and techniques for controlled delivery of force its effect on ion channel activity and cellular tension. We focus on the touch receptor neurons in C. elegans as an ideal platform for integrating studies at the molecular, cellular, and behavioral levels. This talk will discuss present new evidence that touch sensitivity depends on the molecular architecture the sensory neuron-skin cell interface and a breakthrough in our efforts to identify the protein partners that determine and maintain MeT position (Das et al, biorxiv, 2023; in revision for peer review).