QUANTITATIVE & SYSTEMS BIOLOGY COLLOQIUM:

Estrogens as coordinators of temperature balance in mice

Stephanie Correa

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Date:
10/9/2025

Time:
10:30 AM - 11:45 AM

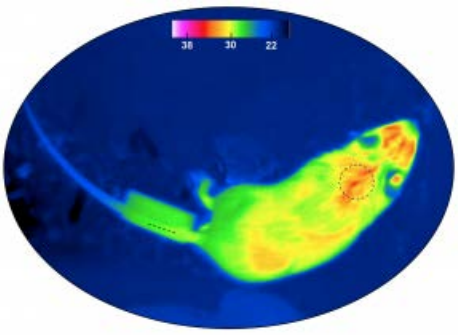
Location:
SSB 130

About the Speaker:

Stephanie Correa has a BA in Biology from Pomona College and a PhD in Neurobiology and Behavior from Cornell University. Her dissertation research with Elizabeth Adkins-Regan and Patricia Johnson tested the effects of ovarian steroids on sex determination in birds. Her postdoctoral research at Boston University Medical Center identified strain differences in the testis determination pathway in mice. Postdoctoral research with Holly Ingraham at UCSF identified neurons in the hypothalamus that regulate physical activity and body weight in female mice. Research in her lab aims to understand the effects of sex steroids on the neural circuits that control temperature and energy balance.

Abstract:

Estrogen levels fluctuating across reproductive life stages potently modulate body temperature. We propose that estrogens simultaneously modulate multiple brain regions and neural circuits to coordinate temperature balance to meet the unique thermal and metabolic demands of reproduction. We previously showed that estrogen receptor alpha (ERα) neurons in the preoptic area (POA) can induce torpor in mice. Our current work has focused on testing the effects of ERα signaling in the POA on torpor and temperature homeostasis across reproductive contexts. Late pregnancy in mammals is marked by a decrease in core temperature, an adaptation that is thought to optimize fetal development by reducing heat stress and enhancing thermal stability. ERα neurons in the POA show enhanced estrogen signaling and transcriptional upregulation of hormone-sensitive pathways in pregnant mice relative to diestrous mice. In vivo calcium imaging of ERα neurons reveals a correlation with Tc in nulliparous females, which disappears in late pregnancy and returns after parturition, suggesting a context-specific tuning of ERα neuronal activity to changes in Tc. Finally, inhibiting activity or ablating estrogen signaling in ERα neurons neurons blunts the pregnancy-associated decrease in Tc. Together these findings demonstrate that ERα in the POA orchestrates adaptive thermoregulatory changes in pregnancy.



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