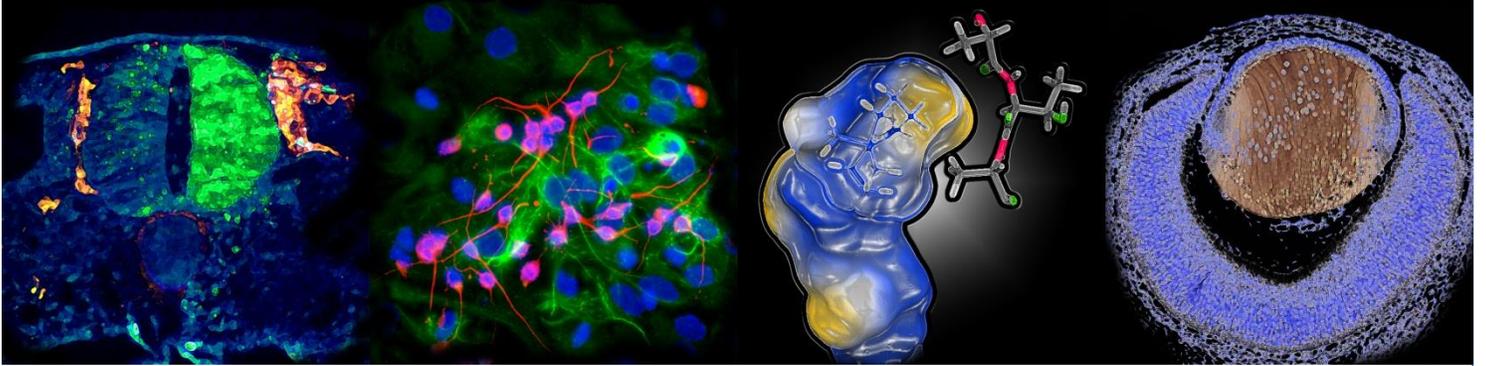


Cell Biology and Human Anatomy



The Department of Cell Biology and Human Anatomy and Center for Vision Sciences Seminar Series

Tuesday, November 19

GBSF 1005 - 10 AM

Samer Hattar, Ph.D.

Johns Hopkins University

***"Retinal and brain circuits underlying light effects on
behavior in mammals"***

The mammalian retina has an atypical type of photoreceptors, known as ipRGCs (intrinsically photosensitive retinal ganglion cells), in addition to the classical photoreceptors rods and cones. The ipRGCs act both as conduit for rod/cone signals to the brain and also as photoreceptors through the expression of the photopigment melanopsin. Studies from my laboratory have mapped out the circuits and diversity of how ipRGCs influence a variety of functions, which include circadian photoentrainment, the pupillary light reflex and sleep. For review on these studies, please refer to reference 1.

In this talk, I will discuss our recent publication (reference 2) on how aberrant light environments lead to mood and learning difficulties in mice. These disruptions occur despite minimal changes in sleep and circadian rhythms. I will discuss the circuits and brain regions that might mediate the disruptive light effects on mood and behavior. I will also provide future outlook on how the diverse populations of ipRGCs contribute to several novel functions in the retina that include image-forming pathways. I will conclude by providing a hypothetical model for the role of ipRGCs in regulating distinct and varied behaviors, which include simple reflexive functions such as the pupillary light reflex all the way to image formation and mood.

1- Schmidt, T., Chen, S.K., and Hattar, S. 2011. Intrinsically photosensitive retinal ganglion cells: many subtypes, diverse functions. *Trends Neurosci* 34, 572-80. PMC3200463

2- LeGates, T.A., Altimus, C.M., Wang, H., Lee, H.K., Yang, S., Zhao, H., Kirkwood, A., Weber, E.T., Hattar, S. 2012. Aberrant light directly impairs mood and learning through melanopsin-expressing neurons. *Nature* 491, 594-8. PMC3549331

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