



Biomedical Engineering Seminar Series



Johns Hopkins School of Medicine and the Whiting School of Engineering

King-Wai Yau, PhD

Professor
Department of Neuroscience
Johns Hopkins University

Monday, February 13, 2012, at 1:30

Medicine Campus, Talbot Library, Traylor 709
Video-conferenced to Homewood Campus,
Rome Room, Clark 110

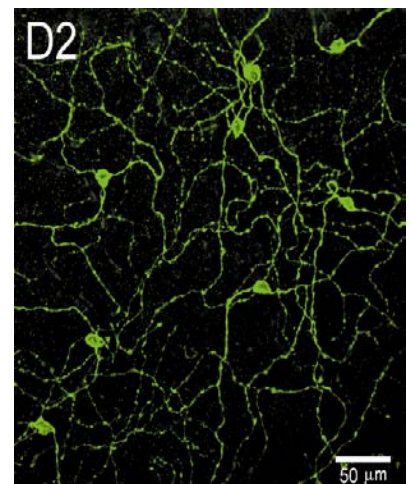
Host: Dr. David Yue

Light lunch will be served in Traylor 709



Melanopsin Signaling in the Eye

Abstract: Besides rods and cones, additional photoreceptors exist in the retina in the form of a small population of intrinsically-photosensitive retinal ganglion cells (ipRGCs) expressing the visual pigment, melanopsin. These cells innervate largely non-image-vision centers in the brain to activate, for example, circadian photoentrainment and pupillary light reflex. In mouse, the ipRGC expresses a surprisingly low level of melanopsin, about 10^4 - 10^5 times less than the rhodopsin content in a retinal rod photoreceptor. Nonetheless, phototransduction is highly efficient, such that a single absorbed photon is able to elevate the basal firing of an ipRGC by about 3-fold, most likely sufficient for detection by the brain. The ipRGCs also adapt to light effectively, with flash sensitivity being reduced by background light according to the Weber-Fechner relation as in rods and cones. The phototransduction mechanism in ipRGCs does not use a cGMP-mediated signalling pathway as found in rods and cones, but uses a PLC-mediated signalling pathway highly homologous to that found in rhabdomeric (i.e., microvillous) photoreceptors such as in fly.



Upcoming Seminars

February 27: Michael Smith, Boston University

March 5: Graham Wright, University of Toronto

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