

CIRCADIAN FACETS OF SENSITIVITY, RHODOPSIN & RHABDOMERE IN *DROSOPHILA*. D.-M. Chen, J. S. Christianson*, R. J. Sapp* and W. S. Stark. Div. Biol. Sci., Univ. of Missouri, Columbia, MO 65211.

Microspectrophotometry (MSP) had shown that R1-6 receptors in white-eyed *Drosophila*'s compound eye have a daily visual pigment rhythm (decreasing to 60% 4 hr after light onset, then recovering, Stark *et al.*, *J. Neurocytol.* **17**, 499-509, 1988); the rhythm persists for 2 days in constant darkness (Stark *et al.*, *Invest. Ophthalmol. Vis. Sci. Suppl.* **30** 291, 1989); the affect of *period* mutants was equivocal. In attempting to relate visual pigment turnover, membrane cycling and sensitivity, we followed our MSP with electron microscopy (EM), morphometry and electrophysiology (the electroretinogram, ERG). EM revealed that the cytoarchitecture of membrane cycling (autophagy and renewal) in white-eyed *per*⁺ controls remained constant throughout a 12 : 12 :: L : D cycle. Morphometry showed that there were no significant changes in rhabdomere cross sectional area in this diel photoperiod. However, the ERG corroborated the L:D and D:D cycles of visual pigment, with these details: (1) sensitivity varied about twice as much as visual pigment; (2) sensitivity decreases preceded visual pigment decreases by several hours; (3) UV and blue sensitivities varied in parallel in L:D but UV sensitivity decreased preferentially in D:D; (4) *per* mutants (*L* = long and *s* = short) had little influence on the timing of the ERG cycle in D:D; (5) *per*^s had less visual pigment and lower sensitivity. Supported by NSF grant BNS 88 11062 and NIH grant RO1 EY 07192 to WSS.

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