IMMUNOCYTOCHEMISTRY & MORPHOMETRY OF CAROTENOID REPLACEMENT IN *Drosophila*. Randall Sapp, William Stark, Scott Christianson, Linnette Maier & Kent Studer. Div. Biological Sciences, Univ. Missouri, Columbia 65211.

Carotenoids apparently control expression of invertebrate opsin genes: deprivation blocks opsin synthesis (deCouet & Tanimura, *Eur. J. Cell Biol*. *44*, 50-56, 1987) and deployment (Harris *et al.*, *Nature 266*, 648-650, 1977). Rhabdomeric P-face particles (opsin) and spectrophotometrically measured visual pigment are reduced without disrupting microvilli (Harris *et al.*). We discovered that rhabdomeres are substantially smaller in flies reared from egg to adult on deprivation medium. Rhabdomeres enlarge and microspectrophotometrically determined visual pigment increases when adults are sustained on carrot juice only. We used a monoclonal antibody to the opsin (Rh1) in the R1-6 subset of receptors in the compound eye (deCouet & Tanimura) (also another to the opsin [Rh2] in simple eyes, ocelli, Shieh *et al.*, *Nature 338*, 67-78, 1989) to study the cytoarchitecture of recovery in such carotenoid replacement therapy. A secondary antibody conjugated with 10 nm colloidal gold particles permitted opsin identification and quantification of the increase in rhabdomeric opsin. R1-6 rhabdomeres, but not rhabdomere caps, stain fairly selectively with Rh1 antibody. Though opsin may be sequestered in structures of turnover - breakdown (autophagy of plasmalemma and rhabdomere, Stark *et al. J. Neurocytol. 17*, 499-509, 1988), two facts argue against this: (1) Rh1 staining is low in multivesicular bodies; and (2) there is substantial turnover in carotenoid deficient animals. Density of Rh1 immunogold, specific to R1-6 (vs. R7), increases between days 1 and 3 of replacement as rhodopsin and rhabdomeres recover. After one day of replacement, as opsin is just beginning to recover in rhabdomeres, immunogold labelling is high in rough endoplasmic reticulum. Witnessing this early biosynthetic step suggests that the opsin gene has been activated. **In summary,** rhodopsin, opsin and the opsin-containing organelle recover during carotenoid replacement therapy in carotenoid deprived *Drosophila*. **Supported by** NSF grant BNS 88 11062, UM's Graduate Research Council Support and NIH grant EY07192.

Abstract of poster presentation (Monday morning, April 30, 1990) Visual Transduction and Retinal Metabloism Session, Opera House. Association for Research in Vision and Ophthalmology (ARVO) Meeting, Sarasota, FL. Investigative Ophthalmology and Visual Science Supplement vol. 31, "ARVO 90," 1990.