13th Annual Meeting of Midwest Neurobiologists

University of Wisconsin
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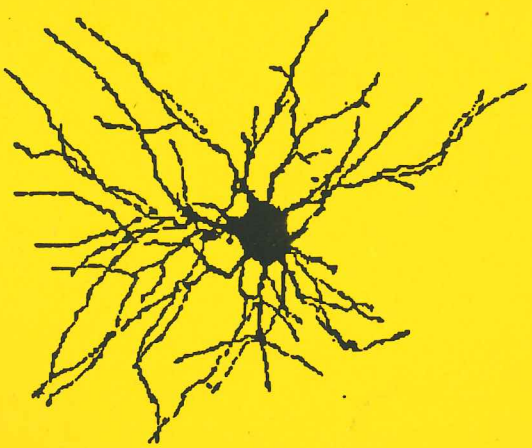

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Opsin Gene Expression: Control by Vitamin A in the Rat vs. Fly Stark, William S. and Christianson, J. Scott. Division of Biological Sciences, The University of Missouri, Columbia, MO 65211.

In rat, vitamin A deprivation (10, 18 & 26 weeks) decreases rhodopsin, protein with chromophore spectrophotometrically measured; yet opsin remains high in rod outer segment disc membranes (P-face freeze fracture particles & morphometry of anti-opsin EM immunogold) (M. L. Katz, W. S. Stark, R. H. White, C.-L. Gao & M. Kutryb, "ARVO "90," *Invest. Ophthal. Vis. Sci. Suppl.* 1990). The *Drosophila* situation is strikingly different: Deprivation (egg to adult) decreases ERG sensitivity 100x (Stark *et al. Naturwissen. 63*, 513-518, 1976) by lowering rhodopsin (spectrophotometry) along with opsin (freeze fracture) (Harris, Ready, Lipson, Hudspeth & Stark, *Nature 266*,648-650,1977). Opsin & rhodopsin recover in unison in carotenoid replacement (EM immunocytochemistry & microspectrophotometry) (R. Sapp, W. Stark, S. Christianson, L. Maier & K. Studer, "ARVO "90,"); labeling is high in rough endoplasmic reticulum after 1 day. We propose that vitamin A regulates the opsin gene (transcription, translation or post-translational modifications) in fly but not rat, logical from respective photochemistries: the fly's photointerconvertible, non-bleaching rhodopsin 480 - metarhodopsin 580 system need only be synthesized once except for the housekeeping of some daily turnover (Stark *et al., J. Neurocytol. 17*, 499-509, 1988); in rat rods, light bleaches rhodopsin into opsin & chromophore, the latter recycled through supportive retinal pigment epithelial cells & reapplied for rhodopsin recovery using opsin synthesized earlier in rods.

Abstract of a slide presentation (by William S. Stark) presented to the 13th Annual Meeting of Midwest Neurobiologists, April 20-22, 1990, Madison, Wisconsin.