

The Effects of Lithium Chloride, Potassium Chloride and Valproic Acid Treatment on the Development of *Drosophila Oregon-R* and Midline Mutant Eyes

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We have gathered genetic evidence suggesting that the T-box transcription factor gene *midline* (*mid*) functions within stress-reactive signaling pathways. Reduced levels of *mid* expression during early eye development result in significant interommatidial bristle loss, reduced pigmentation, and apoptosis within the adult compound eye (Das et al., 2013). To determine whether decreased expression of *mid* in eye tissues initiates apoptosis at the transcriptional level by changes in chromatin remodeling, we undertook a pharmacological approach and systemically treated wild-type, *Oregon-R* or *mid* mutant fruit flies either throughout their lifecycle with sodium valproate (VPA), an inhibitor of histone deacetylases (HDACs). Similarly, we treated flies with lithium chloride (LiCl), a drug known to inhibit glycogen synthase kinase 3 (GSK-3). Inhibition of GSK-3 under specific conditions prevents neuronal apoptosis. We repeated these pharmacological studies except that drugs were fed to one-day old third-instar WT or *mid* mutant larvae until eclosion (hatching). We predicted that VPA and LiCl treatment would rescue bristle loss, pigmentation and/or cell viability in *mid* mutant eyes in a dose-dependent manner. However, we obtained different results depending on the developmental window in which flies were treated with drugs.