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Funding Source: Life Sciences Undergraduate Research Opportunity Program

Role of the white gene in heat-box spatial learning paradigm in *Drosophila*

The white gene in *Drosophila melanogaster* codes for a half-size ABC transporter. We have identified a role of this transporter in heat box spatial learning. In the heat box paradigm, flies are allowed to move freely in a small dark chamber. During the training phase, when a fly enters a specified half of the chamber, the whole chamber adjusts to the heated probe temperature. When the fly moves to the other half, the chamber temperature adjusts to the preferred reference point. Flies can be conditioned within minutes to avoid the half of the chamber associated with negative temperature. This is especially important in understanding reinforcement processing, a key aspect of learning that is distinct from memory acquisition. An intriguing finding is that mutant eye color severity can be dissociated from performance deficits in the heat box. This finding leads to the hypothesis that systems requiring white-ABC Transporter function for conditioning are not similarly sensitive to the mutations as eye coloration. However, these behavioral measurements were done in flies with an undefined background, therefore leaving open room for several possible alternative explanations. In order to re-assess the eye-color/performance relationship, the same white mutant alleles tested previously were out-crossed to our wild-type strain and will be tested in heat box conditioning. These results will challenge the hypothesis that there are differently sensitive sites at the white locus for eye-pigment and memory formation.