



CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

Name(s) Leane S. Nasrallah	Project Number S1727
Project Title Effects of Induced Diabetes on Development and MIOX Expression in Fruit Flies	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals MIOX (myo-Inositol oxygenase) is an enzyme found in human kidneys that catalyzes the first committed step in the catabolism of myo-inositol. MIOX has been found to be upregulated in diabetic animal models. (Choi et al. 2012). myo-Inositol is an isomer of inositol that is related in insulin regulation. Alterations of the levels of inositol have been linked to Type 2 Diabetes.</p> <p>Methods/Materials The organism <i>Drosophila melanogaster</i> is used as a model because it has a short generation time, and is easy to maintain. Furthermore, the entire <i>D. melanogaster</i> genome has been sequenced and published (Celniker et al., 2002). <i>D. melanogaster</i> have been shown to have insulin-like proteins and a diabetic-like state (Type II) can be induced by high sugar diet (Pasco & Leopold 2012). In order to examine MIOX expression, In Situ Hybridizations were performed using developing embryos. Development of flies was also monitored by recording the number of eggs laid, then the number of those eggs that hatched after 24 hours in defined media with increased sugar concentration (5X). A control group of flies with normal sugar concentration (1X) was also monitored. Growth of flies in high sugar (and flies in regular sugar concentration) was observed by placing a specific number of flies in a controlled environment and recording the number of deaths each day for 10 consecutive days.</p> <p>Results After pooling data from 3 separate trials, there was no evidence that the flies grown under increased sugar had a different survivability than the flies grown under normal sugar conditions.</p> <p>Conclusions/Discussion Preliminary data show that flies grown under increased sucrose concentration showed substantial developmental delay. This developmental delay might be due to the disruption of insulin-like proteins (Dilps) that are involved in growth and metabolic homeostasis. Unexpectedly, preliminary data show that there is no difference in embryo hatching percentage in flies grown under different sucrose concentrations. The data shows that survivability of adult flies is not affected by the concentration of sucrose added to their medium.</p>	
Summary Statement My objective was to analyze the effect of induced diabetes on fruit fly development and the expression of a protein (MIOX) that is related to Type 2 Diabetes.	
Help Received Used lab facilities/equipment at Cal State University, Long Beach, under the supervision of Dr. Lisa Klig and Eliseo Villarreal; Parents drove me to and from the lab	