



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Angelina E. Stone	Project Number S2212
Project Title Alzheimer's and Aluminum: The Effect of Low-Level Aluminum on <i>Drosophila melanogaster</i>	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this study is to see if Aluminum is linked to Alzheimer's disease by causing brain degeneration in fruit flies. Tested with both a behavioral assay and a protein analysis procedure.</p> <p>Methods/Materials I tested the behavioral differences between the experimental group (given 5 mM of AlCl₃ through their food) and the control group (not given any AlCl₃) using a choice chamber assay. In the chamber, the flies could either travel to the dark arm with a cotton ball saturated with tomato juice, the light arm that has a cotton ball saturated with lavender oil, or they could stay in place at the opening on top. One day they'd be tested with the cotton balls in the arms and the next day without the cotton balls. For the protein analysis procedure, I homogenized the fruit fly heads by placing the heads in the Bullet Blender, centrifuged them, and boiled the tubes for 10 minutes. Lastly, I will perform the western blots to see if there was over-expression of a-beta and tau proteins in the flies given AlCl₃.</p> <p>Results Significant P values were obtained based the actions taken in the choice chamber by the 5 mM and 0 mM for each testing period (2-3, 7-8, and 13-14). When comparing activity levels between the same groups, there seemed to be no difference between testing days 2-3 and 7-8. In both analyses, the 13-14 test day groups weren't able to obtain a P value due to all of the dead 5 mM flies. As for the death rate, the fruit flies administered AlCl₃ died about twice as fast as those not given the toxic metal. Although the protein analysis (western blot) procedure is still in progress, my intended results would be seeing an over-expression of the a-beta and tau proteins in the experimental group.</p> <p>Conclusions/Discussion In the behavioral assay, the AlCl₃ toxicity seemed to have an immediate effect on the flies' preferential (and learning) behavior based on the obtained P values. This proposes that Aluminum could be responsible for the behavioral and preferential differences often seen in humans with Alzheimer's disease. Also, since there was an immense lifespan difference between the 0mM and 5mM groups, it suggests the AlCl₃ leads to a shorter life expectancy. No significant P values were found for the activity analysis. Therefore, either this type of learning is not affected by AlCl₃, and/or the effects on learning are not observed in the first week (2-8 days), but may be in the second week.</p>	
Summary Statement I tested to see if Aluminum toxicity caused neurodegeneration in <i>Drosophila melanogaster</i> through a behavioral assay and protein analysis procedure.	
Help Received My project was done in a Neurobiology lab at CSU Fresno State under the professional guidance of a Neurobiology professor. Although I formulated what my procedures would consist of, my professor would give me feedback on how to improve my project to get the most accurate results. I performed the	