A Novel Approach to the Effect of Bisphenol A on the Neurodevelopment of Drosophila melanogaster Larvae

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This science fair project aims to explore the impact of early exposure to the environmental toxin Bisphenol A (BPA) on the neurobehavioral development of Drosophila melanogaster. Drawing parallels with human neurodevelopmental disorders, such as autism and attention deficit hyperactivity disorder (ADHD), the study investigates potential behavioral modifications induced by BPA, shedding light on its role as a possible environmental risk factor. Drosophila larvae were put into 4 groups, the control group, the 0.4 mM BPA concentration group, the 4.0 mM BPA concentration group, and the 44 mM BPA concentration group which were administered by my mentor. Larval behavior was recorded using a Sony Alpha 6000 camera. Video recordings were scrutinized for four common behavioral patterns displayed by third-instar Drosophila larvae: seeking behavior duration, peristaltic contraction frequency, linear movement, and angular movement. Linear movement distance provided insight into the extent of larval movement within 30 seconds, indicating heightened sensory exploration. Angular turns, alongside linear movement, reflect sensory exploration and locomotion. Seeking behavior serves as an indicator of altered sensory sensitivity linked to conditions like autism and other neurodevelopmental disorders. Peristaltic contractions, akin to repetitive and stereotyped motor behaviors seen in certain neurodevelopmental disorders, were measured in this experiment. While the use of ethanol to dissolve the BPA into the drosophila food caused significantly fewer larvae to be produced than expected, the introduction of BPA influenced the behavior of the larvae, suggesting a potential link between BPA exposure and its impact on human brains.

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