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Effect of Lead Exposure on *Drosophila melanogaster* and expression of the *Neur* gene

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**Introduction**
- *Drosophila melanogaster* (D. *melanogaster*) is a popular model organism in biology.
- *Nerualized* (*Neur*) is a gene responsible for the regulation of cell-cell interactions of organ development and cell reproduction.
- Lead Acetate is a toxin found in everyday products and primary water sources whose secondary effects are unknown.
- **Hypothesis:** If *D. melanogaster* was exposed to a concentration of 39µg/L of lead acetate then the expression of *Neur* would decrease along with larvae crawling mobility.

**Results**

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We would like to thank our faculty advisor, Dr. Stefanie Otto-Hitt for her superb guidance throughout this process.

**Conclusion**
- The Behavior assay proved significant in that Lead affected mobility as seen in Rd 2 with a *P*-value of 2.158E-05.
- Both qPCR rounds demonstrated that Lead exposure had no significant effect on the expression of *Neur* as seen in Figure 4.
- There was a slight decrease in mobility in *D. melanogaster* that were treated with lead as seen in Figure 3.
- The results disagreed with our hypothesis on gene expression, but agreed with our hypothesis for larvae crawling.

**Methods**
- **Primer synthesis:** Primers for *Neur* were designed using IDT Oligoanalyzer software.
- **Culturing:** *D. melanogaster* cultures were maintained by adding 10mL of potato flakes, along with 39µg/L of lead or sodium acetate solution and 6-7 grams of yeast to a culture vial. Cultures were maintained at 23°C for the treatment period. Both experimental and control groups underwent a total of 13 days of exposure before testing occurred.
- **RNA extraction:** RNA was extracted using Trizol and purified using Qiagen’s RNeasy Mini Kit.
- **Reverse transcription:** cDNA was synthesized using RevertAid.
- **qPCR** was performed using PowerUp SyBr Master Mix and primers targeting *GAPDH* and *Neur* (*n=2* cultures for each group; total of 4 cultures tested).
- **Behavior Assay:** Larval crawling was measured by placing larvae on an agar plate and timing them for a minute to determine the distance traveled (*n=10* for each round for each culture tube).

**References:**

**Figure 1:** Larvae on an agar plate before mobility assay

**Figure 2:** Larvae undergoing mobility assay which is measured by number of squares crawled in one minute.

**Figure 3:** Experiment round 1 and 2 average crawling after 1 minute. Error bars represent the Standard Deviation of the means (*P*=20 for Rd 1 exposure and *P*= 2.158E-05 for Rd 2 exposure)

**Figure 4:** Relative expression of *Neur* in Sodium Acetate and Lead Acetate-exposed *Drosophila*. (*P*=0.38)