CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Matthew H. Bronars

Project Number

J2203

Project Title

Does Mom's Diet Affect Survival? The Effect of a High Fat Larval Diet on Drosophila. A Model for Human Experimentation

Abstract

Objectives/Goals

This experiment tests the effect of a high fat diet during a fruit fly#s larval stage on its ability to respond to stress as a grown fly.

Methods/Materials

In this experiment two groups of flies were tested, a control group on a regular diet, and a treated group on a high fat diet (containing 20% coconut oil). This experiment used Petco flightless fruit flies, 72 test tubes, 25 plastic containers, bananas, applesauce, vinegar, coconut oil, oatmeal, and cotton balls. Two stress tests were performed on the fruit flies, a starvation test and a cold test. In the cold stress test, flies were placed in empty test tubes and put in the refrigerator for 12 hours. The number of mobile flies was recorded 30 and 60 minutes after being removed from the refrigerator. In the starvation test, flies were left in test tubes with only a damp piece of paper towel for hydration. The number of living flies was recorded approximately every three hours until all the flies were dead.

Results

In the starvation test the first flies to die were two control flies at the 10 hour mark. After 17 hours the first treated fly died. 40 hours into the test, around the middle, the treated group had a 32 percentage point greater survival rate then the control group (39% vs. 61%). The last control fly died 74 hours into the test, at this point 1% of the treated flies were alive. The last treated flies died between 81-86 hours. The average lifespan was 37 hours for the control and 44 hours for the treated (19% longer). In the cold stress test, 30 minutes after being taken out of the refrigerator 33% of the control flies and 36% of the treated flies were mobile. 60 minutes after being removed from the refrigerator 84% of the control flies and 80% of the treated flies were mobile.

Conclusions/Discussion

The results of this experiment showed the treated flies lived substantially longer than the control flies in the starvation stress test. It can be concluded that a high fat diet during a fruit fly#s larval stage is beneficial to its ability to respond to the stress of starvation. In the cold stress test there was little difference between the treated and control groups. It can be concluded that a high fat larval diet does not have on an effect on a fruit fly#s ability to respond to the stress of a cold environment. These results show that a high fat diet during pregnancy may benefit the child.

Summary Statement

This project uses fruit flies as model organisms for humans to predict the effect of a high fat diet during pregnancy on the child's ability to respond to stress.

Help Received

My mother, father, sister, and teacher helped edit my work. Dr. Heinrichsen mentored me and helped me decide what stress tests to use and how much coconut oil there should be in the diet.