CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34702

Project Title

Quantitative Analysis of Mitochondria's Role in Drosophila Lifespan

Abstract

Objectives/Goals

Determine the role that mitochondria plays in Drosophila melanogaster lifespan.

Methods/Materials

Flies and Daily Care: This experiment uses flies with mitochondria that are tagged with green fluorescent protein (GFP) The flies were used in conjunction with cameras that could quantify fluorescence in order to portray a representation of mitochondrial quantity. The cameras used programs called VideoGrabber and FloureScore to gather video of individual flies and quantify the amount green fluorescence, respectively.

The cohort had eighty-eight flies and was aged out to twelve days before being video assayed. Each fly was kept in an individual vial capped with a Rayon ball.

Vials were stored at 25 degrees Celsius. Flies were fed a dextrose based food. Every other day, flies were moved into vials with fresh food. Flies were moved from vial to vial by tapping the vial so that the fly fell to the bottom and then quickly inverting and dumping the fly into a new vial, which was quickly capped with a Rayon ball.

The cameras utilized the VideoGrabber software to capture the videos of each individual fly with the FloureScore program to quantify GFP. Flies had GFP measured in the video assay center and then were observed until death, when the length of each fly's lifespan was recorded. In the lifespan assay, the length of lifespan for each fly was recorded and paired with its respective number and GFP quantity in an Excel spreadsheet.

Excel spreadsheet data were then plotted with the amount of GFP on the y-axis and the lifespan of the fly on the x-axis. A regression analysis was conducted in order to determine if there was a relationship between GFP (which was assumed to be representative of the amount of mitochondria) on the y-axis and lifespan on the x-axis.

Results

slope: y=.3513x+132.02
p value= .0248
r^2 value: .0585
Lifespan Avg. =64.5 Days
GFP Avg. =194.56

Summary Statement

Mitochondrial quantity is indicative of lifespan in Drosophila melanogaster flies.

Help Received

John Tower and Chaitanya Nadig helped answer my genetics questions and assisted in camera usage, respectively.

Preliminary