CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
S2204

Project Title
Apoptosis in Drosophila Germline Stem Cells

Abstract

Objectives/Goals
Apoptosis carries out the task of eliminating damaged cells through programmed cell death, and is therefore crucial in maintaining the health of the body. Here, we explore the limits of the germline stem cells (GSCs) of drosophila (fruit flies) through both an application of stress (starvation), and heat shocking. The main goals of my experiment are:
- To study Drosophila
- To experiment with new methods of inducing apoptosis
- To find out if p53 is expressed in germline stem cells (GSCs) upon starvation stress
- Discover the minimum time needed for the occurrence of apoptosis upon heat shocking {i.e., for the Reaper (rpr) gene}

Methods/Materials
To induce apoptosis by starvation, flies are starved for a few days, and then analyzed under the microscope. And, in inducing apoptosis through heat shocking, we monitor the time it takes for the drosophila to display multiple morphological hallmarks of apoptosis after the introduction of a heat shock promoter. This indicates the minimum heat shocking time necessary to induce apoptosis in drosophila.

Results
From our research, we conclude that starvation is not a strong stimulus; although it is effective and an increase in starvation time causes an increase in p53 expression. Also, we found that 5 minutes is sufficient in beginning to induce apoptosis within the Drosophila ovaries.

Conclusions/Discussion
In other research, it has been found that radiation stress is a strong stimulus in activating the p53 protein (Wylie et al., 2014). From our research, we conclude that starvation is not as strong a stimulus; although it is effective and an increase in starvation time causes an increase in p53 expression. Also in other studies, 90 minutes of heat shock rpr promoting has proven to indicate apoptosis (Abdelwahid et al., 2007), whereas we have found that 5 minutes is sufficient in beginning to induce apoptosis within the Drosophila ovaries.

Summary Statement
Apoptosis carries out the task of eliminating damaged cells through programmed cell death. Here, we explore the limits of the germline stem cells of drosophila (fruit flies) through the application of stress/starvation and heat shocking.

Help Received
I was a participant in the Research Mentorship Program at UC Santa Barbara (summer 2014).