The Role of Maternally Supplied Cell Death Components in Primordial Germ Cell Development of *Drosophila melanogaster*.

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Why fruit flies:
• Model organism
• 75% known human diseases have a recognizable match in the genome of flies
• 50% of fly protein sequences have mammalian homologs
• Guides our understanding of:
  • Cancer
  • Heart disease
  • Malformations
  • Disorders
Introduction

Half of the Primordial Germ Cells Die During the Early Phases of Migration

![Graph showing decrease in total number of PGCs over developmental stages.](image-url)
Cell Death Pathway

- Drosophila genes are shown in black, mammalian homologues are shown in red.
- We are examining embryos lacking all maternal contributions of cell death.
Methods

Hypothesis: maternally supplied apoptosis regulators are mediating germ cell death
## Anticipated Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Supports hypothesis</th>
<th>Rejects hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother</strong></td>
<td>Eggs lack cell death factors</td>
<td>Eggs lack cell death factors</td>
</tr>
<tr>
<td><strong>Father</strong></td>
<td>Sperm lacks cell death factor/Balancer</td>
<td>Sperm lacks cell death factor/Balancer</td>
</tr>
<tr>
<td><strong>Embryos</strong></td>
<td>Lacks all cell death factors</td>
<td>Cells are capable of dying</td>
</tr>
<tr>
<td><strong>Embryo B</strong></td>
<td></td>
<td><strong>Embryo A</strong></td>
</tr>
</tbody>
</table>

**Reject Hypothesis - Wild-type**

**Supports Hypothesis - Excess germ cells**
Future Directions

• Count the number of germ in the embryos collected from the final cross described.

• Evaluate hypothesis.

• Live imaging of cell death with markers of cell death if data supports the hypothesis.

• If hypothesis is not supported, determine if another form of cell death plays a role in the death of the germ cells through screens of proteins involved.
References


Genetic Details

FLP = heat-shock FLP
M = Dark82 Deletion
+ = wild-type
Fs = Dominant Female Sterile
FRT = Forced Recombination Site
## Anticipated Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Mother</th>
<th>Germ-line</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother</strong></td>
<td>Dark/OvoD</td>
<td>Dark/OvoD</td>
<td>Dark/Dark</td>
</tr>
<tr>
<td><strong>Father</strong></td>
<td>Dark/Dark</td>
<td>Dark/Dark</td>
<td>Dark/Cyo-LacZ</td>
</tr>
<tr>
<td><strong>F1</strong></td>
<td>Dark/Dark</td>
<td>Dark/Cyo-LacZ</td>
<td></td>
</tr>
<tr>
<td><strong>Mother mRNA</strong></td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>F1 mRNA</strong></td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

- **Supports Hypothesis**
- **Excess germ cells**
- **Wild type**

A - Reject Hypothesis

B - Supports Hypothesis
Thank You!

- Dr. Coffman
- Megan Merolla
- Jasmine Anderson
- Caitlin Grudzinski
- Iowa State University McNair Program