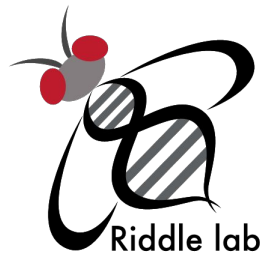




Absence of SOD1 Effects Aging in *D. melanogaster*



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Background and Methods

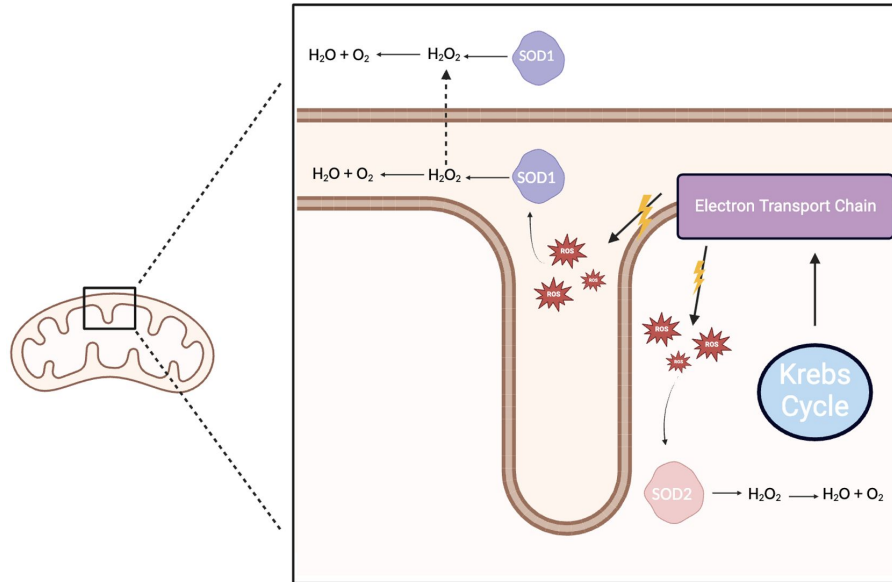


Figure 1: Functionality of SOD1 and SOD2 in the Mitochondria

- The electron transport chain (ETC) produces reactive oxygen species (ROS) called superoxide anions
 - These superoxide anions are linked to oxidative damage which effects the longevity of organisms
- SOD1 (superoxide dismutase 1) is an enzyme that uses molecules of copper and zinc within its structure to breakdown ROS into diatomic oxygen and hydrogen peroxide which is further processed and released from the body safely as oxygen and water

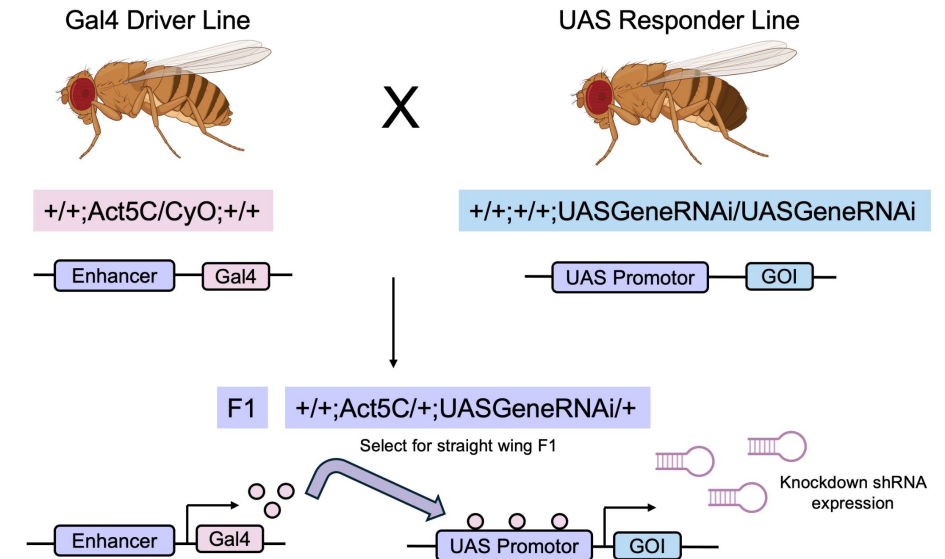


Figure 2: Genetic Cross

- The Gal4/UAS system induces expression of a hairpin structure (shRNA) which silences target gene expression via RNAi
- RNAi (RNA interference) is a genetic modifying technique initiated by short interfering RNAs (siRNAs) or microRNAs (miRNAs) that target messenger RNAs for degradation or translational inhibition in a sequence-specific manner



Background and Methods

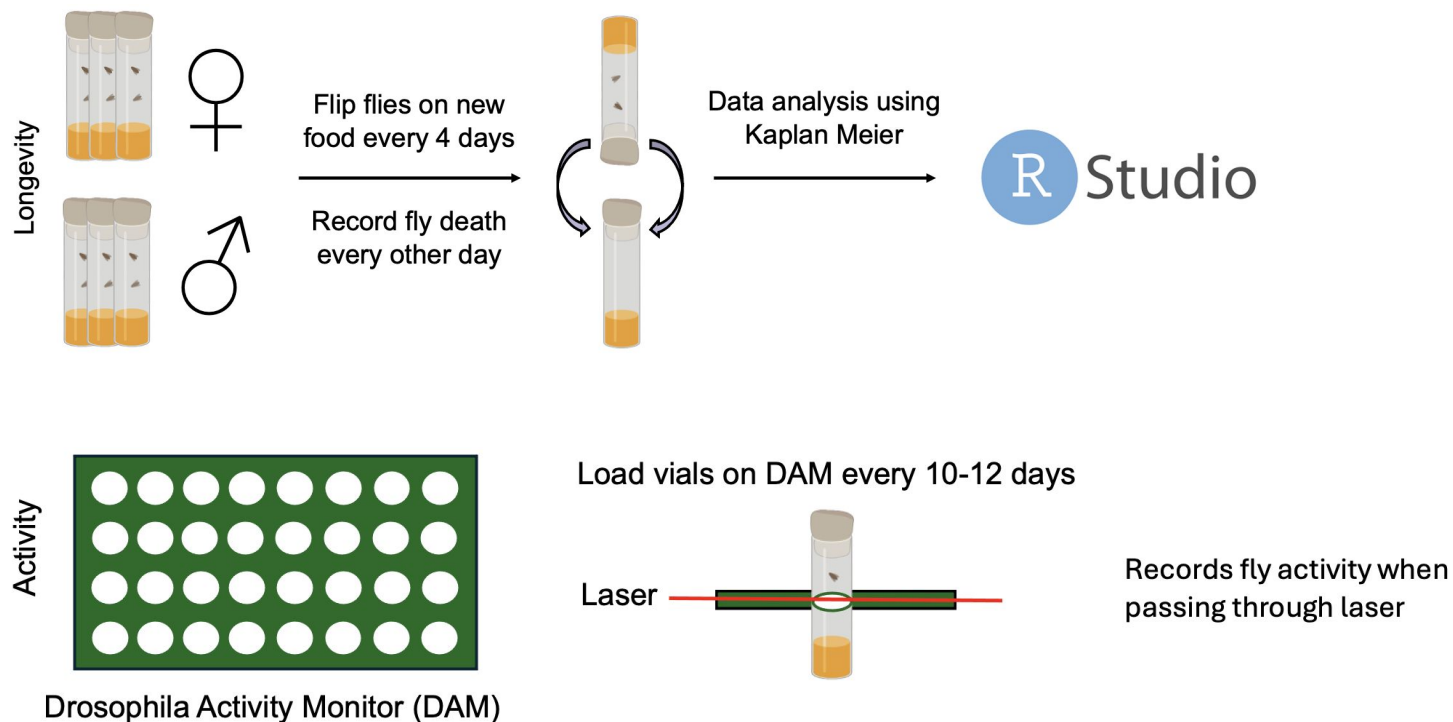


Figure 3: Fly Lifespan and Activity Protocol

- Three genetically different lines of flies used: Act5C (Gal4 driver), SOD1-01291 (UAS-RNAi responder), and Cross (Gal4/UAS-RNAi knockdown)
- Flies were collected as virgins with a 24hr span and separated by sex and genotype
- 60 vials total with 10 flies in each
- Lifespan counts (counting of deceased flies in each vial), sanity checks (counting of living flies in each vial), flips (process of transferring living flies into new food vials), and DAM cycles (technology used to measure fly activity) were performed periodically



Results

Figure 4: Circadian Rhythm

Across all genotypes, the females seem to have a more regulated circadian rhythm compared to the males.

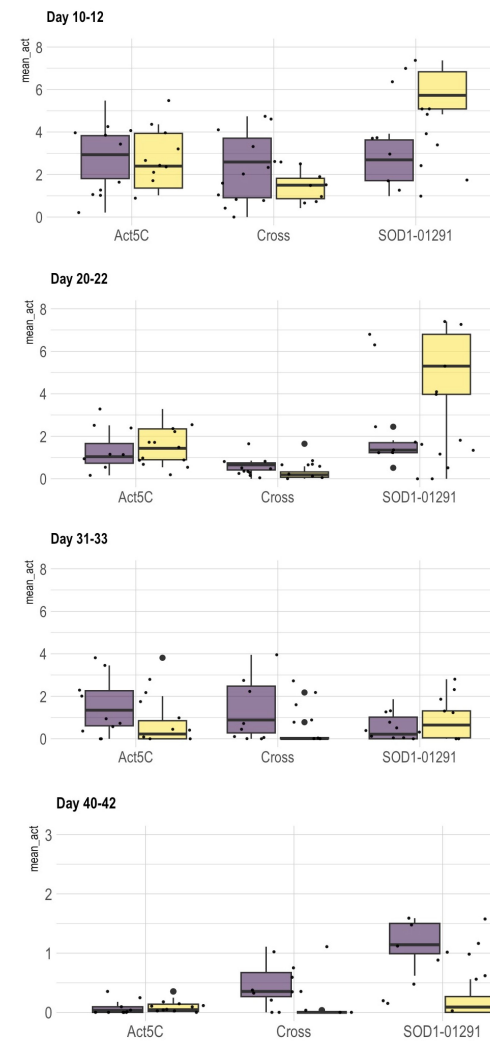
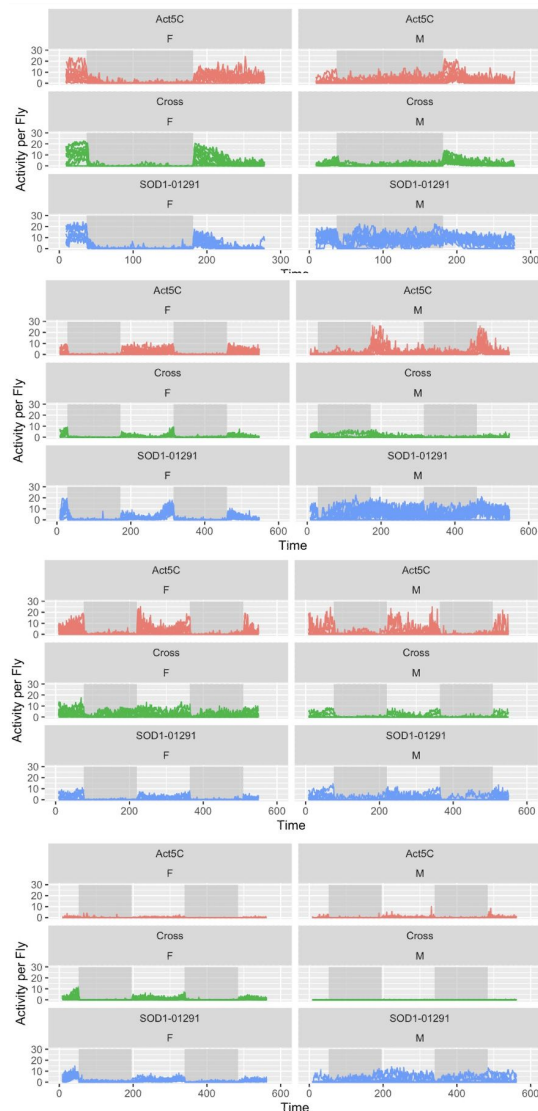


Figure 5: DAM Mean Activity

The graph on the right shows the mean activity per fly on the y-axis over 48 hours with genotype on the x-axis with males (yellow) and females (purple).



Conclusion and Future Directions

- Preliminary data show the survival probability of the flies with the SOD1 knockdown is decreased as expected.
- Preliminary observations suggest that males with the SOD1 knockdown have lower activity levels.
- The current cohort lifespan assay is almost completed with a second cohort lifespan assay currently in progress.
- There are also flies “aging out” for each cohort that will be used to run RNA seq, ATAC seq, Seahorse, and Comet assay.