Finding the Fountain of Youth:

Uncovering Molecular Mechanisms Controlling Aging

Tejoni Johnson
Mentor: Dominique Houston Faculty Advisor: Denise Montell
Department of MCDB, University of California, Santa Barbara

Introduction

Using a fully sequenced population of flies, known as the Drosophila Genetic Reference Panel (DGRP), we are attempting to uncover the regulation of molecular pathways and genes involved in the aging process.

Methods

We observed two phenomenon in the fly: lifespan extension via diapause induction and lifespan extension via drug screening. We were able to conduct a Genome Wide Association Study (GWAS), mapping any genetic variants to our phenotype.

Diapause Induction:

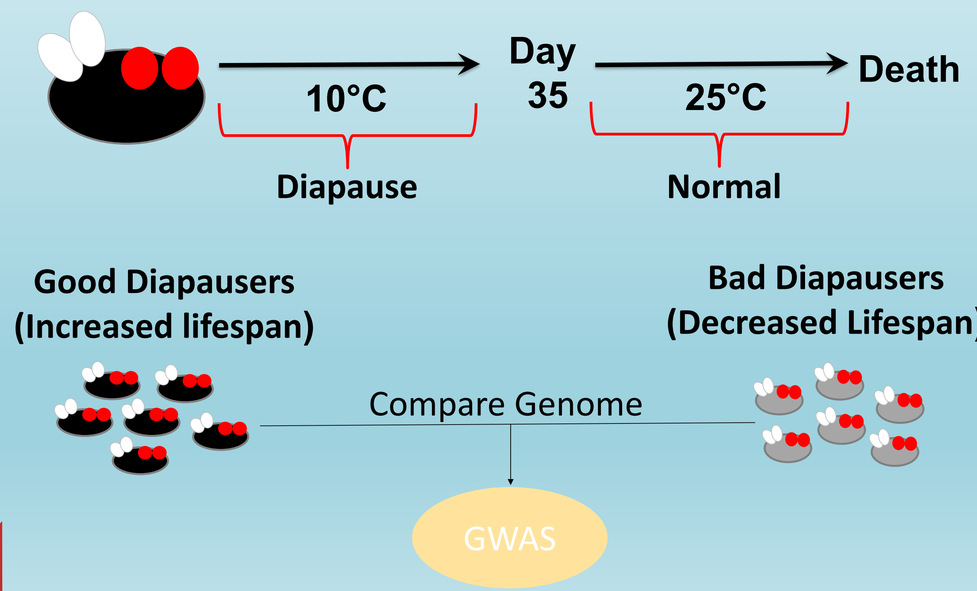


Figure 1.
Change in Lifespan for Diapausing Flies

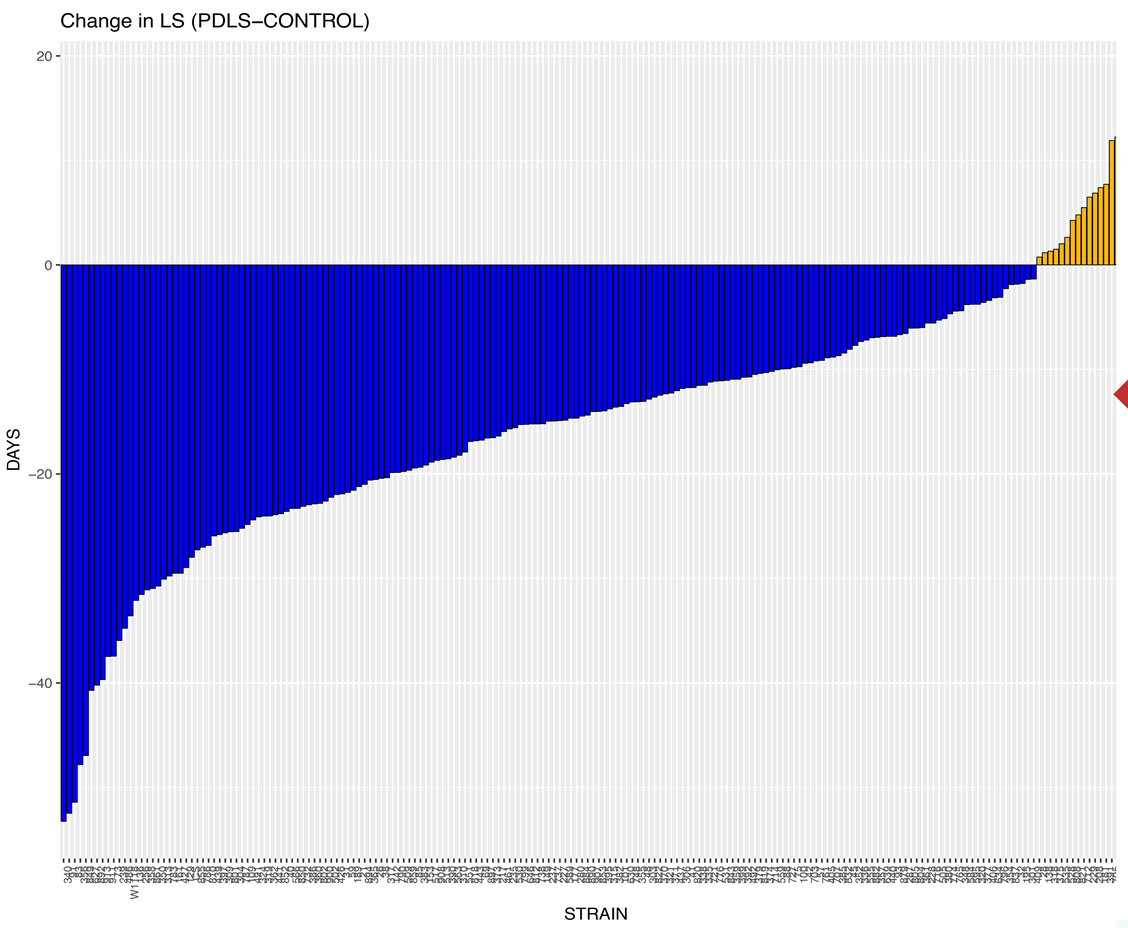
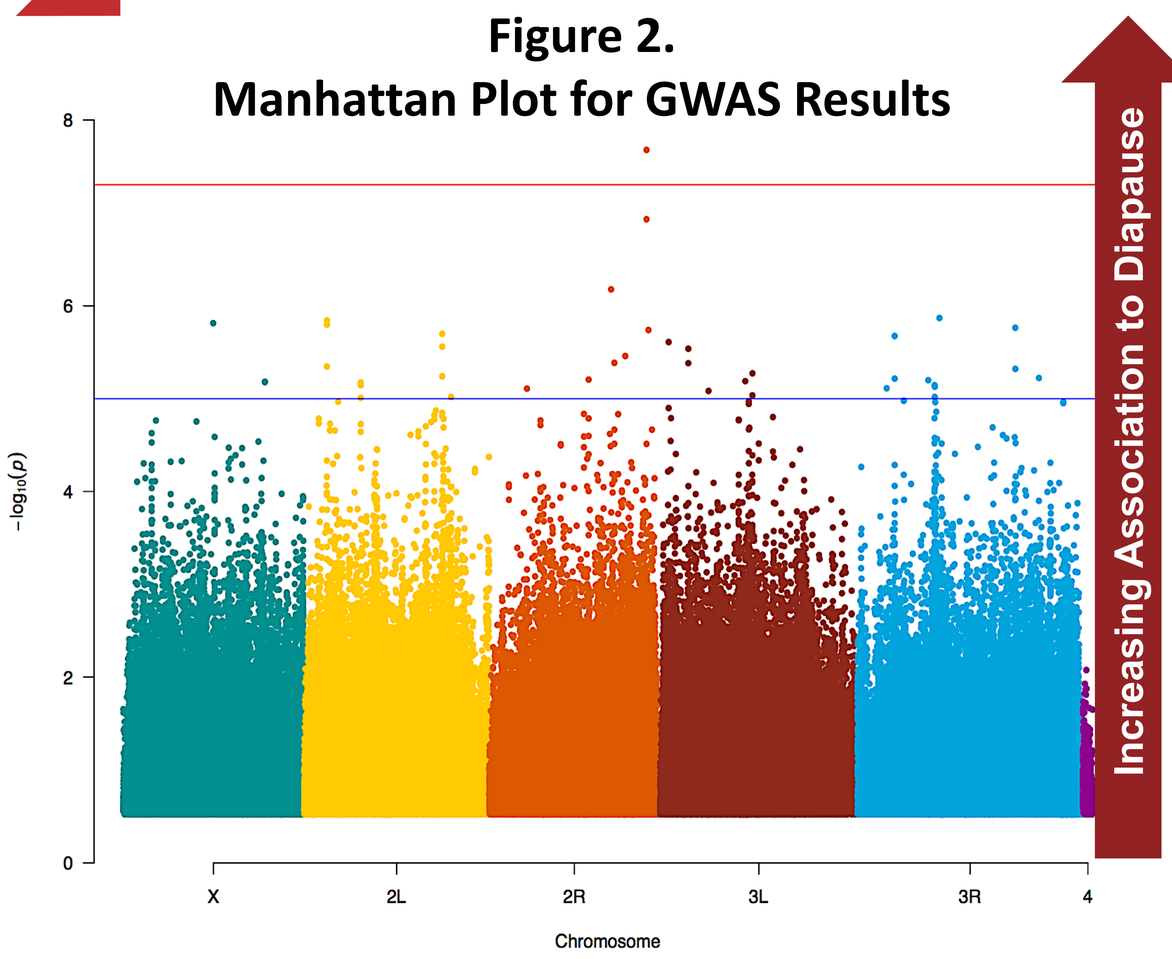


Figure 2.
Manhattan Plot for GWAS Results



Results

Figure 1 illustrates our results for the change in lifespan for our diapausing flies; we found that only a handful our flies are actually capable of diapause. This data was run through our GWAS which gave us 69 genetic variants associated with our trait (Figure 2). From these preliminary findings, we have narrowed down our search to 5 candidate genes whose expression will be examined using qPCR analysis.

Discussion

Comparing our initial GWAS hits from our diapausing flies to those produced in the future by the drug induced lifespan extension, we hope to identify novel players shared between the two models that may be involved in the complicated progression of aging. Future work also involves observing the effects of diapause and our drugs on the stem cell niche of our flies.

Literature Cited

Wen Huang, et al. *Natural Variation in genome architecture among 205 Drosophila Melanogaster Genetic Reference Panel lines*. CSH Press. 2014.
Trudy F. C. Mackay, et al. *The Drosophila melanogaster genetic Reference Panel*. Nature Vol. 482. 2012.
Xiaolan Ye, et al. *A pharmacological network for lifespan extension in Caenorhabditis elegans*. Aging Cell. 2014.

Acknowledgements

Thank you to Denise Montell, Dominique Houston, Michael Petrascheck, the EUREKA program, and CSEP. Partial funding for the project came from the National Institute of Health.

For further information

Please contact tejoni.johnson@umail.ucsb.edu. More information about this and related projects is available at:
www.labs.mcdb.edu/montell/denise