



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

Name(s) Richard Hsu	Project Number S0411
Project Title Investigating a Novel Lifespan Gene in <i>Drosophila melanogaster</i>	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal is to isolate a long live strain by affecting gene expression with the use of the enhancer promoters (EP) and driver P-element. Then identified the function and find the significance of this gene. If possible, find useful applications of this gene.</p> <p>Methods/Materials A lifespan analysis was perform to identify if EP3306, a fly line which has an overexpression of an unknown gene region, was long-lived. After EP3306 was shown to be long-lived, the next step was to find the overexpressed gene responsible for the extension of lifespan by conducting a plasmid rescue protocol. This resulted in the discovery of a putative gene, CG7900. A transgenic (clone) was made to verify that the gene, CG7900, was actually the gene responsible for longevity. Lastly, RT-PCR was perform to measure the amount of RNA levels for the EP3306 lines and the transgenic line to verify that the gene, CG7900, is actually be overexpressed.</p> <p>Results A screen for lifespan extension was performed using a driver line and a collection of EP lines. A driver line has a P-element which expresses the yeast transcriptional activator, gal4, while an EP line has a complimentary P-element which contains the DNA binding sequence of gal4. When a driver is crossed to an EP, the region downstream of the EP will be overexpressed. The mutant EP3306 was identified and found to have a reproducible lifespan extension. The EP3306 insertion site was found, and the putative gene overexpressed appeared to be an uncharacterized gene, CG7900. A genomic transgenic was constructed to verify that overexpression of CG7900 extends lifespan in an independent line. A recombinant was made between EP3306 and the daughterless-gal4 driver to look at interactions with other long-lived lines in the lab. Results show that CG7900 is the cause of increased lifespan and the gene itself seems to play a vital role in metabolism.</p> <p>Conclusions/Discussion In conclusion, the EP is located 300 base pairs upstream of the CG7900 gene, which has a high sequence similarity to a human protein. Hence, the understanding of how overexpression of CG7900 extends lifespan could be important to not only the understanding of fly aging, but also the aging process in humans.</p>	
Summary Statement The gene, CG7900, is found to increase lifespan in the fruit fly when being overexpressed and that there is a high possibility that this gene can be integrated into the human genome.	
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