

Near Infrared Light Photobiomodulation and *C. longa* Mitigates the Neurological Effects of Mutant Amyloid Beta Precursor Protein Pathway in *D. melanogaster*

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Alzheimer's Disease affects an estimated 5.4 million people, making it the sixth leading cause of death in the United States. Seeking to increase therapeutic gains, near infrared light (NIR) and *Curcuma longa*, two forms of treatment previously found to be efficacious when applied on their own, were combined in this study. Two *Drosophila melanogaster* mutants, one with a ds-RNA tau protein mutation (181) and another with a human tau gene mutation (28891) were exposed to treatment of NIR in combination with a diet consisting of *Curcuma longa*. Effects of this combined treatment on the symptoms in the tau mutated *Drosophila melanogaster* sample were investigated over the course of two, five-day-long data collection periods, repeated over six trials, with NIR exposure lasting one hour per-day and *Curcuma longa* continuously implemented in the diet. The flight patterns and behaviors of the tau mutated *Drosophila melanogaster* samples treated with the proposed combined treatment were recorded and compared to tau mutated and control wild types samples treated with either NIR or *Curcuma longa* alone using CTRAX. The symptomatology was measured through the variables of mean speed, displacement, and angular velocity. Using t-tests to compare the difference in means between the groups, results showed a statistically significant ($p < 0.05$) decrease in symptoms using the proposed combined treatment compared to utilizing the treatments individually in the mutated sample groups. The evidence presents a significant link to the decrease in symptoms due to the multiplicity of cellular mechanisms that both NIR and *Curcuma longa* interfere with in the normal pathology of Alzheimer's.

Awards Won:

Third Award of \$1,000