Combating Familial Alzheimer's Disease: A Study of Resveratrol's Effects on a Presenilin Model of Drosophila melanogaster

Chun, Elizabeth (School: Ardsley High School)

Familial Alzheimer’s Disease (FAD) is a hereditary neurodegenerative disease in which patients experience neurodegeneration and symptoms such as worsened memory, trouble learning, and motor dysfunction in their thirties or forties. There is currently a lack of effective, approved treatments for FAD. Research on this specific form of Alzheimer’s Disease is limited, so treatments that are primarily intended for late-onset Alzheimer’s Disease (LOAD) are administered to FAD patients as well; furthermore, these treatments merely target the symptoms of Alzheimer’s Disease, rather than changing the course of the disease pathology. This study used presenilin Drosophila melanogaster as a model of FAD to assess the effectiveness of resveratrol, a natural polyphenol found in red grapes and wine, as a potential treatment. The effect of resveratrol on the morphology of the mushroom bodies (the region of the Drosophila brain governing memory and learning) and motor function was assessed by conducting an anatomical study and Rapid Iterative Negative Geotaxis (RING) assay, respectively. It was found that when resveratrol was administered to flies upon reaching adulthood, it slowed mushroom body degeneration in presenilin Drosophila, but did not affect motor function; when it was administered to flies immediately upon birth, it both slowed mushroom body degeneration and improved poor motor function in presenilin Drosophila ($p<0.05$). The effectiveness of resveratrol, especially when administered early in the development of Drosophila, demonstrates its strong potential as a modifiable lifestyle factor, a lifelong dietary supplement to slow the onset of FAD.

Awards Won: