Determining the Effects of Insulin on Serotonin Levels With and Without Vitamin D3 Using Drosophila melanogaster as a Model Organism

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Alzheimers, a degenerative brain disorder, affected 6.1 million Americans in 2021. This debilitating disease is affecting more individuals each year. It disrupts an individual's cognitive ability because of the significant loss of neurons. Studies suggest that Vitamin D can prevent the severity of the disease. The vitamin activates the enzyme which converts to the amino acid that sends serotonin to the brain. Previously, it has been hypothesized that an increase in Vitamin D can increase the levels of serotonin and slow the progression of Alzheimers. Recent studies have shown a correlation between the development of insulin resistance in the brain degrading the nerves at a much faster rate. The high blood sugar commonly seen in diabetes causes Beta Amyloid to clump together and sit in between nerve cells. This blocks the signal receptions to the brain for motor function. Therefore, it is hypothesized that by administering insulin, with and without Vitamin D3, it will synergistically help increase serotonin levels, potentially affecting alzheimers. In order to test this hypothesis, Drosophila Melanogaster (common fruit fly) were used as a model organism. The four treatment groups (Control, Vitamin D3 fed, Insulin Injected, and Vitamin D3 fed and Insulin Injected), were all left to feed for four (4) days. The flies were then decapitated and tested using the ELISA Serotonin Test Kit. The acetylated plate was then read at 450 nm wavelength. The treatment group that was fed 0.50mcg/mL and injected with 0.01.µL of insulin yielded the highest serotonin level. More research is necessary to directly correlate the results to Alzheimer’s.

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