Analyzing the Effects of Turmeric & Curcumin on Tau Aggregation & Amyloid Beta Plaques on Caenorhabditis elegans and Its Further Implications Into Alzheimer's Disease

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Alzheimer's Disease is a brain disorder that slowly deteriorates a person's cognitive function, which controls their executive functions and processing speed. Amyloid-Beta plaques & Tau-Aggregation are regarded as the main hallmarks of Alzheimer’s and cause inflammation in the brain. Turmeric and curcumin have been shown to have anti-inflammatory properties that may aid in slowing the progression of neurodegenerative diseases. The purpose of this experiment was to analyze the effects of different concentrations of turmeric and curcumin on known Tau-Aggregation and Amyloid-Beta Plaques caused symptoms, using genetically modified Caenorhabditis Elegans. C. Elegans are negative phototrophic organisms, however with these mutations their cognitive function declines, making them indifferent to the light. Hence, it was hypothesized that if the treatments were added to the mutated C. Elegans diets, their cognitive response would improve, resulting in an increased response to light. The treatments would prevent the inflammatory response caused by the mutations and prevent cognitive function decline. The mutated Caenorhabditis Elegans responses to light stimuli was recorded under a microscope and then compared to the control group. Concentrations of turmeric and curcumin added were also manipulated in order to investigate dosage differences. The C. Elegan’s response to the light stimuli were recorded, and the average speed (micrometer/second) of each C.Elegan was tracked using ImageJ. The evidence supported the hypothesis, since the mutated C. Elegans given treatment, had an increased response to the light. This new connection may open the door to possible cures or perhaps a more affordable and available treatment for Alzheimer's.

Awards Won:

London International Youth Science Forum CIC: Full scholarship to attend the London International Youth Science Forum, and a $1,500 cash stipend for travel expenses.

University of Texas at Dallas: Back-up scholarship recipients