The Effect of Spermidine on β-Amyloid Peptide Toxicity in C. elegans: A Model System for Understanding Alzheimer's Disease

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Alzheimer’s disease (AD) is a fatal neurological disease that affects millions of people worldwide. Spermidine, a soybean extract and a polyamine compound found in ribosomes and many natural foods, has been shown to prolong and protect cell life through the induction of autophagy. At a molecular level, spermidine’s major process is autophagy. The objective of this research is to study if spermidine could be a cheaper, healthier, and safe alternative treatment for AD. The purpose of this experiment is to investigate the effects of spermidine on C. elegans with AD. If transgenic C. elegans were exposed to varying concentrations of spermidine then, as the concentration increases it will reduce the phenotype of paralysis induced by temperature upshift. The worms were distributed onto 3 plates with varying concentrations of spermidine. After 2 days the A□ toxicity was induced within the worms. In this experiment the effects of spermidine were observed on the rate of growth, motor skills, and rate of paralysis of the transgenic worms.The C. elegans that were exposed to the 10mM concentration of spermidine exhibited a better rate of growth. After Generation 1, these worms had a significantly higher rate of growth than their counterparts with 0-1 mM concentrations of spermidine, on average 10.2% more growth was seen. This generational change suggests that spermidine may have an epigenetic impact on these worms. Spermidine’s ability to inhibit histone acetylation, may play a role in preventing the C. elegans from expressing the genes associated with an excess amount of A□ plaque. 3 in 5 Americans will suffer from a nervous system disease like AD. The results reported here show that a small addition of spermidine to transgenic C. elegans may reduce the symptoms of AD.

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