Cocoa’s Cognitive Triumph: The Rescue of the Alzheimer’s Model of Drosophila melanogaster With Theobroma cacao Supplementation

Ho, Kaitlin (School: North Shore High School)

Alzheimer's disease, the most prevalent form of dementia affecting over 24 million people worldwide, is characterized by cognitive decline and progressive neurodegeneration; this is mainly due to the presence of amyloid-ß plaques, which increase with oxidative stress. Other hallmark pathology of Alzheimer’s includes decreased cerebral blood flow and an increase in neuronal apoptosis. Currently, there is no established preventive treatment for Alzheimer's. Nevertheless, research suggests that flavanols in cocoa may have preventive effects, exhibiting neuroprotective mechanisms that positively impact Alzheimer's pathology such as increasing cerebral blood flow, rescuing the brain from oxidative stress, possibly blocking neuronal apoptosis, and disrupting the formation of amyloid-ß plaques. This study investigated whether a cocoa-supplemented diet can enhance the neuromuscular fitness and survival of a Drosophila melanogaster model of Alzheimer's disease. After determining the correct dosage of cocoa (1%) through acute-dose toxicity and CAFE assays, male wild type or Alzheimer's disease model of Drosophila were raised on either a 1% cocoa-supplemented or control diet; their neuromuscular fitness and survival were monitored over 40 days. The results demonstrated a significant improvement in neuromuscular fitness by day 20 and a significant increase in lifespan among both wild type and Alzheimer's model flies fed the cocoa-supplemented diet. This suggests that cocoa may serve as a preventive treatment for neurological aging and Alzheimer's disease. Further research in higher organisms is needed to establish the potential benefits of long-term high-flavanol cocoa supplementation, particularly for individuals with a high-risk or familial history of neurodegenerative diseases.

Awards Won:
Third Award of $1,000