The Effectiveness of a Standardized Mixture of Antioxidants as a Preventative Treatment for PTSD and Its Symptoms in C. elegans

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Antioxidants can be used to help prevent neurodegeneration and reduce reactive oxygen species (ROS) associated with Post Traumatic Stress Disorder (PTSD) in a C.elegans model. The ROS can trigger the sympathetic nervous system in bodies, causing the fight or flight reaction associated with PTSD. 1/11 people are diagnosed with PTSD and this number is increasing. PTSD affects everyday life, since flashbacks and nightmares may occur at any time, causing a fight or flight or avoidance reaction. Previous studies have shown a link between oxidative stress and PTSD, as well as that antioxidants can reduce oxidative stress caused by reactive oxygen species. It was predicted that if the natural substances work, then the ROS of the test group and their avoidance behavior (movement backwards) caused by a trigger molecule should be similar to non-PTSD worms. The N2 C. elegans strain was put through an avoidance assay to simulate PTSD by having a trigger molecule: diacetyl. The antioxidant mixture was mixed with LB and E. coli, and then plated as a food source on growth medium. ROS was measured using the LD1171 strain put through the same conditioning, a fluorescent microscope, and Image J software. The 32°C & diacetyl group that had antioxidants in their food source avoided a statistically smaller average amount of diacetyl drops compared to either control group without diacetyl present in the conditioning, and the LD1171 worms conditioned and treated also expressed less GFP. This study lays the groundwork for investigating the relationship between associations and PTSD, and future actions include investigating epigenetics to see if PTSD behaviors and ROS expression will reoccur in the offspring using histone methylation.

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