Synergistic Effect of Combined Heavy Metal Exposure on Dopaminergic Neurodegeneration and Associated Behaviors in C. elegans as a Model for Parkinson's Disease

Pressoir, Marvia (School: Elmont Memorial Junior-Senior High School)

Neurodegenerative disorders affect more than 6 million people in the United States alone. Heavy metal exposure has been implicated in the progression of disorders such as Parkinson’s Disease. Simultaneous exposure to methylmercury, a known neurotoxin, and copper, a dopamine transport inhibitor, may amplify the neurodegenerative properties of the individual metals. Longer exposure time may also increase the health risks associated with metal neurotoxicity. To assess the role of combined heavy metal exposure on dopaminergic neurodegeneration, C. elegans were exposed to varying concentrations of methylmercury, copper, and both metals together for varying lengths of time. Concentrations ranged from 0 to 100 uM and 0 to 20 mM for methylmercury and copper respectively. No significant decrease in reproductive ability with C. elegans co-exposed to methylmercury and copper was observed, but locomotion was significantly impaired with high concentrations of methylmercury. Significant dopaminergic neurodegeneration was observed with long term co-exposure, but individually, copper showed reduced neurotoxicity. These results suggest that combined metal exposure magnifies Parkinson’s related symptoms and warrants further research into the synergistic effects of heavy metals.

Awards Won: