What's in the Water?: The Links Algae May Have to Alzheimer's and Parkinson's Disease

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Eutrophication resulting in algal and cyanobacteria (aka blue-green algae) blooms are an increasing problem in surface waters of the world. Just this year, Professor Paul Cox, writing in the journal Proceedings of the Royal Society B, has found direct evidence that a toxin called BMAA produced by algae can trigger neurological diseases including Alzheimer's and Motor Neuron Disease (MND). Since our own Lake Mitchell experiences such blooms, we wished to determine if they might affect the nervous system of the common blackworm Lumbricularis variegatus. Pure cyanobacteria cultures of Microcystis aeruginosa, Oscillatoria, Anabaena, and Nostoc were obtained from a biological supply company. They were then sub-cultured and quantified using total cell counts and dry weight (in order to calculate final concentrations) after which they were placed in the environment of the worms whose behaviors were observed twice weekly for activity levels, mortality, and abnormal swimming. All worms exposed to each of the algal types exhibited less activity and increased twitchy behavior as compared to a control group. Slow or absent movement with twitchy behaviors reminiscent of Parkinson's were observed at longer exposure times for all algal types. Shorter exposure times also produced lethal results with Oscillatoria being the most toxic of the species. Further studies could determine whether common algae poses a potential threat to humans through contact, as it propagates through the food chain through ingestion, as well as damage to aquatic ecosystems.

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