ABSTRACT

THESIS: Effects of developmental exposure to neurotoxic algal metabolites on predator-prey interactions in larval minnows

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Anthropogenic environmental change can modify the expression of behavior within individuals, and the outcomes of interactions between individuals. One way that this can happen is through changes that compromise an animal's ability to correctly recognize and respond to salient stimuli (e.g., predators, prey, or mates). Two contexts of behavior critical to organismal fitness—foraging and predator evasion—are negatively affected by exposure to a variety of anthropogenic contaminants. However, less is known about how organisms respond to elevated concentrations of naturally occurring contaminants, such as the toxic metabolites produced by cyanobacteria in harmful algal blooms. In this study I examined the effects of a potent algal neurotoxin, β-methylamino-L-alanine (BMAA), on the development and behavior of larval fathead minnows, *Pimephales promelas* during predator-prey interactions. I exposed eggs and larvae to environmentally-relevant concentrations of BMAA for 21 days. I then tested subjects in prey-capture and predator-evasion assays designed to isolate the effects of exposure at sequential points of the stimulus-response pathway. Exposure was associated with changes in the ability of larvae to detect and respond to environmental

stimuli (i.e., a live prey item and a simulated vibrational predator), as well as changes in behavior and locomotor performance during the response. My findings suggest that chronic exposure to neurodegenerative cyanotoxins could alter the outcomes of predator-prey interactions in natural systems by impairing an animal's ability to perceive, process and respond to relevant biotic stimuli.