

Abstract

Arsenic is a known human carcinogen, pervasive in freshwater ecosystems across the globe, though its mechanisms of action are still unclear. Previous studies in mammalian cells *in vitro* revealed that chronic exposure to arsenite (As III), in low to moderate concentrations inhibits caspase activity, highlighting a possible connection to tumorigenesis which warrants further investigation. Thus, this study aimed to determine if As III exposure would produce a similar inhibitory effect of caspase 3/7 activity in invertebrates using the model organism *Daphnia magna*, a freshwater planktonic crustacean. *D. magna* were exposed to concentrations of 0.2 µg/ml, 0.02 µg/ml, and 0.002 µg/ml As III for either a 48-hour, acute or seven-day, chronic treatment conditions after which protein extractions were performed. Caspase 3/7 activity was measured using the Caspase-Glo 3/7 assay, and results were normalized to protein concentrations determined by a BCA Protein assay. We found no significant effect of acute exposure to any level of As III concentration tested on caspase activity of *D. magna*. However, we found a significant inhibition of caspase 3/7 activity in the chronic condition at the low and medium As III concentrations, while no inhibition was observed at the high dose. These findings are consistent with previous research on As III and mammalian cells and suggest caspase inhibition as a possible contributor to arsenite's carcinogenic effects.