Effects of Arsenite on the Caspase 3/7 Activity of *Daphnia magna*

**Introduction**

Due to years of smelter pollution, arsenic is found in high levels in some lakes in the South Puget Sound. 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.

**Methods**

A BCA assay was performed to create a standard curve of protein concentration, which was used to standardize Caspase 3/7 activity observed through the Caspase-Glo luminescence assay.

Caspase activity of the acute exposure was significantly lower than the chronic exposure. Acute exposure to As III was shown to have no significant inhibitory effects on caspase activity in *D. magna* (Figure 1). Statistical analysis using one-way ANOVA resulted in a p-value of 0.46.

Chronic exposure of As III significantly decreased Caspase 3/7 activity in *D. magna* in the low and high As III concentrations. Caspase activity in the arsenite-exposed samples were lower than the control. Within the chronic exposures, the lower arsenite concentrations (0.002 and 0.02 mg/mL decreased caspase activity, while the highest concentration, 0.2 mg/mL increased caspase activity (Figure 2). Statistical analysis using one-way ANOVA resulted in a p-value of 0.004.

**Assays**

**Results & Discussion**

A one-way ANOVA analysis found no significant difference between caspase 3/7 activity of groups (n=4, p=0.46). Error bars represent standard error.

**References**

To view the references used, please scan the following QR code: