

## Mercury toxicity on biomarker gene expressions of a freshwater amphipod at two temperatures

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Mercury (Hg) is a global contaminant resulting of both natural processes and human activities. In aquatic environments, studies conducted on vertebrates highlighted changes of gene expression or activity of antioxidant defence enzymes and oxidative stress in invertebrates. However, despite the fact that Hg is a very toxic compound in aquatic environments, only few studies have evaluated the sublethal effects of inorganic Hg on *Gammarus* sp. The present study aimed to evaluate the effect of two environmentally relevant inorganic mercury HgCl<sub>2</sub> concentration (50 and 500 ng/L) on the expression of 17 genes playing crucial roles in respiration, osmoregulation, apoptosis, immune system, endocrine system, and oxidative and general stress in males of the freshwater amphipod *Gammarus pulex* exposed at 16 °C and 20 °C, for 7 and 21 days. *G. pulex* mortality was dependent on Hg concentration and temperature; the higher the concentration and temperature, the higher the mortality rate. Additionally, the Integrated Biomarker Response showed that HgCl<sub>2</sub> toxicity depended on the concentration, time and temperature of exposure. Overall, oxidative and general stress genes, together with endocrine and immune system genes were more affected by the exposure, regarding the concentration, time and temperature tested. Other genes, involved in respiration and apoptosis were also over-expressed after the exposure, suggesting an attempt to compensate the deleterious effects caused by the exposure. On the other hand, osmoregulation was the less affected biological function. To conclude, oxidative and general stress, endocrine and immune system, and respiration gene modulations observed herein has the potential to disturb individual and population fitness at chronic exposures.

**Keywords:** Inorganic mercury, *Gammarus* sp., gene expressions, temperature