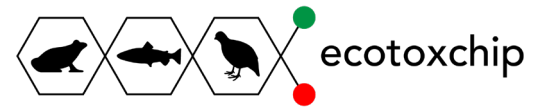


Mechanism of action (MOA): lead in *Xenopus*



BACKGROUND INFORMATION

Lead (Pb) is a widespread environmental toxicant and exposure to Pb has been reported to affect development, behaviour, reproduction, nervous system, and the hematological system of aquatic organisms with adverse outcomes including mortality, developmental abnormalities, endocrine disruption and altered behaviour.

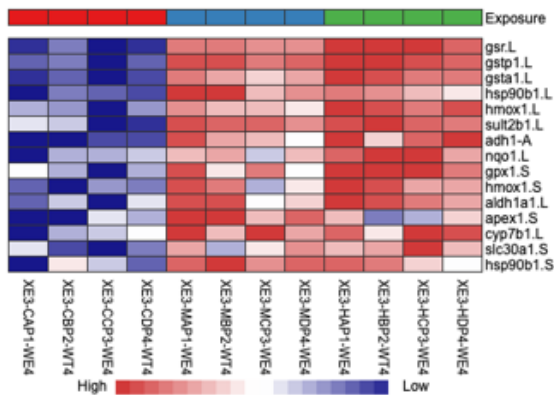
OBJECTIVE

To characterize the molecular mechanisms of action of lead (Pb) in exposed early larval stage (ELS) *Xenopus laevis* (XL) using the Version 1 (V1) XL EcoToxChip and EcoToxExplorer.

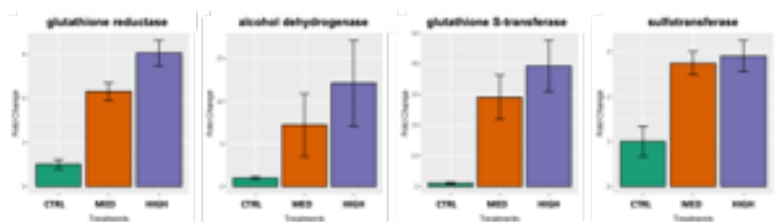
METHODS & RESULTS

XL larvae were exposed at 1 day post-hatch (dph) for 96h to two concentrations of Pb (210 and 630 ug/L) in quadruplicates. Whole larvae from each replicate group were pooled (5/replicate) and immediately flash frozen. RNA was extracted, cDNA run on the V1 XL EcoToxChip. The data were analyzed with [EcoToxExplorer.ca](https://ecotoxexplorer.ca) with key findings noted below.

1. Heatmap of top dysregulated genes by exposure (Ctrl, 210, 630 ug/L Pb)¹



2. Expression of select DEGs¹



3. EcoToxModules flagged²

Pathway	p-value
Metabolism - Other	0.0001
Metabolism - Xenobiotic and ROS	0.004
Metabolism - Amino Acids	0.008
Metabolism - Carbohydrates	0.53

TAKEAWAYS

We conclude that the majority of genes and main biological pathways affected by this exposure were those related to metabolism. Notable DEGs genes are expressed and EcoToxModules related to metabolism are flagged. As with fish, dysregulated metabolic pathways are expected with Pb and likely contribute the molecular mechanisms of action underlying lead toxicity in ELS amphibians.

Notes

Jois S, Selinger S, Masse A, Ewald J, Jeff Xia, Crump D, Basu N, Hecker H, and N Hogan. Presentation to: 42nd SETAC North America Annual Meeting, Nov. 14-18, 2021; Virtual Conference.

¹ p<0.05; ² EcoToxExplorer V1 settings were 1.2 for yellow and 1.5 for red