

PFAS 2024 Abstract Submission

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Abstract Title: *Effects of PFOS and GenX 10-day exposures on Hemoglobin expression and body size in Chironomus dilutus*

Abstract Submission Type: poster

Abstract Theme: challenges-tech

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Approval for abstract on website: yes

Approval for poster on website: yes

Effects of PFOS and GenX 10-day exposures on Hemoglobin expression and body size in *Chironomus dilutus*

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Although PFAS can be lethally toxic at high concentrations, they can also have sublethal effects at the molecular and apical levels. PFAS are proteinophilic and have been shown to bind to hemoglobin (Hb) proteins. Aquatic larvae of *Chironomus dilutus*, a species of non-biting midge, are both extremely sensitive to PFAS exposure and have hemolymph rich in Hbs, indicating a possible mechanism for toxicity via interference with oxygen transport. We hypothesized that Hb expression in *C. dilutus* would increase in response to PFAS exposure in a dose-dependent manner. We also hypothesized that body size would decrease in response to greater PFAS concentrations. This work is part of a larger study aiming to assess the toxicity of several binary PFAS mixtures and predict the toxicity of the multitude of untested mixtures. Based on *in silico* modeling conducted to predict the binding affinity of single PFAS to Hb, and the conformational changes associated with this binding, two PFAS predicted to have the highest toxicity to *C. dilutus* were selected for *in vivo* exposures. Cultured third-instar *C. dilutus* larvae were exposed to 1) Perfluorooctanesulfonic acid (PFOS) and 2) Hexafluoropropylene oxide dimer acid (GenX) in two separate 10-day exposures. Subsequently, larvae were measured and preserved for RNA extraction, cDNA synthesis, and qPCR targeting two Hb genes, HbC and Contig579. Future exposures will utilize other single PFAS, followed by binary mixtures, to continue our work on assessing whether PFAS mixture toxicity deviates from additivity.