

Pathway-based Monitoring of Biological Effects at Great Lakes sites

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The Great Lakes region suffers from degradation of water and environmental quality due to release of chemicals of emerging concern. Critical issues remain in delisting Areas of Concern (AOC) including determining sources of chemicals causing fish health impacts, relating health impacts to chemical exposure, and identifying causes of adverse health effects such as reproductive effects. Causal information would enable decision makers to identify more appropriate remedial actions thereby facilitating delisting of AOC.

Fish placed in floating cages at different locations within AOC can be used to rapidly monitor the impacts of chemicals on fish health by analyzing chemicals in water, fish, and resulting impacts to fish health. Specific changes found in fish organs such as gonads and liver can be associated with specific effects. Here we show how a systems approach using transcriptomics, metabolomics, and other physiological endpoints has the potential to identify the health impacts caused by high-priority AOCs. We will also use changes at the molecular level to identify possible chemicals of concern based on associations with specific chemical exposures in the laboratory. We expect that this work will identify any potential health effects in fish leading to more accurate assessment of contaminant effects.

STICs Field	Entry
1 – Influence/profile	Not applicable
2 – Clearance tracking no.	Assigned automatically
3 – Principal Investigator / Project Officer	DL Villeneuve
4- Product title	Copy and paste from abstract
5 - Authors	See abstract
6a- Product type	Presentations and technical summaries
6b-Product subtype	Abstract
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7b- Product description	Paste in abstract
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10 – Tracking and Planning Product	(1) Case study on use of pathway-based effects data for exposure characterization: Using pathway-based effects in fish to characterize exposures associated with waste-water treatment plant discharges and/or agricultural runoff.
11 – Copyright permission	No
12 - QA	not applicable
13 – Policy implications	No
14 - Keywords	adverse outcome pathway, endocrine disruptors, surface water, monitoring

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