ECOTOXCHIP

Why these six animal models?

BACKGROUND INFORMATION

To establish EcoToxChips we focus on a core set of carefully selected key vertebrate species of relevance in ecological and chemical risk assessment. In doing so we plan to demonstrate that EcoToxChips can inform studies on key animal models used worldwide in regulatory ecotoxicity testing AND also be ported to a range of native species that are of commercial, recreational, and Aboriginal interest. In addition to "whole animals", we will study early-life stages since these: a) are generally considered more sensitive to chemicals; b) are not considered live animals until they feed independently - and therefore represent an alternative model; and c) require less demanding facilities to maintain for exposure studies.

WHY VERTEBRATE MODELS?

- **Current testing programs, such as those mandated under Canada's Chemicals Management Plan (CMP) mainly rely on data from vertebrates**
- **Vertebrate tests, especially long-term, are very costly and require sophisticated facilities**
- **Early-life stage models (e.g., embryos) not considered animals = 'alternatives' of interest**
- **Invertebrates do not fall under animal ethics legislations, and thus no comparable urgency to replace these tests with alternatives**

WHY THESE PARTICULAR SPECIES?

- **Phase 1: standard lab models used worldwide for regulatory testing with internationally-accredited test guidelines available for multiple life stages**
- **Phase 2: native species of commercial, recreational, and/or Aboriginal concern in Canada, and also ones monitored actively by Environment and Climate Change Canada**
- **Our team has conducted many studies on these species, and are keenly aware of their natural histories, developmental biology, toxicogenomic responses, roles in regulatory testing, etc.**

PHASE 1 "MODEL" SPECIES

Fish: Fathead minnow (*Pimephales promelas*)
- **OECD210 (early-life stage)**
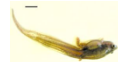- **OECD229 (adult)**

Bird: Japanese quail (*Coturnix japonica*)
- **ECCC method (early-life stage)**
- **OECD223 (adult)**

Frog: African clawed frog (*Xenopus laevis*)
- **OECD241 (early-life stage)**

PHASE 2 "NATIVE" SPECIES

Fish:
Rainbow trout
(*Oncorhynchus mykiss*)

Bird:
Double-crested cormorant
(*Phalacrocorax auritus*)

Frog:
Northern leopard frog
(*Litobates pipiens*)

TAKE AWAY

By focusing on highly relevant fish, birds, and frogs – in regulatory settings as well as in natural ecosystems – we aim to showcase that EcoToxChips can be scaled across species, applications, and life stages. In doing so, EcoToxChips can be developed for a limitless number of species.

References
Images from Wikipedia
Species information: http://animaldiversity.org/
OECD: http://www.oecd-ilibrary.org/books