Effects of Bisphenol A and Methoxychlor on *Xenopus Laevis* Embryos

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Background

Model Organism: Xenopus Laevis

Due to their aquatic reproduction, amphibians make an apt model to study the effects of aqueous environmental contamination on embryogenesis. Primordial germ cells (PGCs) are stem-like cells that will eventually differentiate into oocytes and sperm cells in the mature adult organism (Strome and Updike, 2015).

Bisphenol A is a synthetic monomer used for the production of polycarbonate plastics and epoxy resins and is found in numerous consumer products. Over six billion pounds of BPA is produced per year, resulting in the release of BPA into the environment (Soochrist et al., 2016; Howdeshell et al., 1999). Previous work has demonstrated the link between Xenopus embryonic exposure to BPA and alterations to the reproductive system and somatic tissue development (Luey et al., 2004; Postof et al., 2012;Javaheri et al., 2013; Adamkiewicz et al., 2016; George et al., 2009; Sone et al., 2004).

Research Question: How does Bisphenol A and Methoxychlor effect the primordial germ cells in Xenopus Laevis embryos

Approach

Primordial germ cells are visualized via PGC marker xpat. Embryos are incubated with an mRNA probe complementary to xpat and tagged with the protein Digoxigenin (DIG). An an antibody for DIG is conjugated with alkaline phosphatase and allows for the formation of a visible precipitate at the location of PGCs.

Bisphenol A

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(A) Experimental Schematic: Monitoring embryo response to various BPA concentrations (B) Percentage of dead *Xenopus laevis* embryos after exposure to 100 μg/ml, 10 μg/ml, 5 μg/ml, and 1 μg/ml BPA starting at 3 hours post fertilization.

Methoxychlor toxicity: Percentage of dead *Xenopus laevis* embryos after exposure to 100 μg/ml, 50 μg/ml, and 10 μg/ml MXC starting at 3 hours post fertilization.

Conclusions and Future Work

BPA at concentrations higher than 1 μg/ml was found too toxic for embryo survival, so exposure studies were conducted at 1 μg/ml at both pre-gastrulation and post-gastrulation times. Embryos exposed at pre-gastrulation had lower PGC abundance whereas embryos exposed at post-gastrulation remained the same.

MXC proved less lethal, with embryos surviving up to 100 μg/ml. Exposure at neither pre- nor post-gastrulation affected PGC abundance. However, melanocytes disappeared and earlier locomotion was observed (data not shown). Histology analysis of MXC-exposed embryos showed no significant difference in musculature when comparing the head, trunk, and gut.

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