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Goal 4: Communities/Eco

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IDENTIFICATION OF GENDER-SPECIFIC TRANSCRIPTS BY MICROARRAY IN GONAD TISSUE OF LARVAL AND JUVENILE *XENOPUS TROPICALIS*

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Amphibian model species *Xenopus tropicalis* is currently being utilized by EPA in the development of a standardized *in vivo* reproductive toxicity assay. Perturbations to the hypothalamic-pituitary-gonadal axis from exposure to endocrine disrupting compounds during larval development have been shown to induce abnormal gonad differentiation resulting in either functional sex-reversal or intersex conditions. In an effort to develop a gene expression-based diagnostic tool we characterized male and female gonadal transcriptomes by microarray. Gonad tissues were harvested from Nieukoop and Faber (NF) stage 58 larvae, NF 66 froglets, one week and two week old juveniles. Individual animals were genotyped to confirm genetic sex and gonad RNA was extracted and pooled according to developmental stage and gender. Initial data analyses were performed with Agilent GeneSpring GX 11 and gene enrichment and ontology analyses were carried out with gender-specific gene lists using DAVID Bioinformatics Resources 6.7. Results confirm significant differences ($p \leq 0.05$ and differential expression ≥ 10 -fold) in expression in two week old juveniles between ovary and testis tissues of several enzymes involved in steroid hormone biosynthesis. Other ovary-specific profiles include oocyte-specific proteins and several proteins involved in progesterone mediated oocyte maturation and oocyte meiosis. Additional testis-specific profiles include a Leydig cell-specific peptide and hormone receptors. These data allow for further investigation of molecular interactions responsible for gonad differentiation and will provide candidate genes for use as expression-based biomarkers of gonad maturation. Examination of these expression profiles in gonad tissue influenced by xenobiotic exposure will provide insight into molecular mechanisms and processes leading to amphibian gonadal intersex and functional sex-reversal. *This abstract does not necessarily reflect U.S. EPA policy.*

Impact statement:

This research is being conducted in support of the EDSP Tier II Larval Amphibian Growth and Development Assay. The goal of this research is to develop less resource-intensive methods for reproductive toxicity assessments of amphibian gonadal development following xenobiotic exposure. A quantitative gene expression-based method for assessing gonadal development could potentially replace the need for expensive and protracted histopathology evaluations and may allow for shorter assays that still provide valuable information for ecological risk assessment.