

## Poster #21

### Diversity and Expression of Estrogen Receptor-Related Receptors (ERRs) in the Killifish *Fundulus heteroclitus*

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**Estrogen receptor-related receptors (ERRs)** are orphan nuclear receptors that were originally identified through sequence similarity to estrogen receptors. Three ERR genes have been identified in mammals, ERR $\alpha$  (NR3B1), ERR $\beta$  (NR3B2) and ERR $\gamma$  (NR3B3). Additional diversity of ERR genes has been identified in pufferfish (*Fugu rubripes*, 6 genes) and zebrafish (*Danio rerio*, 5 genes), consistent with wide-scale gene or genome duplication in the teleost lineage. Here we report the cloning of four full-length ERR genes from the killifish *Fundulus heteroclitus*. Like pufferfish and zebrafish, *F. heteroclitus* has additional diversity of ERR genes compared with mammals, including putative homologs of the mammalian ERR $\alpha$ , ERR $\beta$  and ERR $\gamma$ , but we have not detected a homolog to the teleost ERR $\delta$  in killifish. We show that like the mammalian ERRs, the four *F. heteroclitus* ERR genes have distinct, partially overlapping expression patterns in adult fish; expression patterns were similar in male and female fish. FhERR $\alpha$ , like its mammalian ortholog, was widely expressed and detectable in all tissues studied. In adult mammals, ERR $\beta$  is expressed at low levels in a few tissues; FhERR $\beta$ 1 was also apparently expressed at low levels, primarily in eye and brain. FhERR $\beta$ 2 was detected primarily in gonad, eye, brain and kidney, whereas FhERR $\gamma$  was expressed primarily in heart and gill. The roles of various ERR genes in both mammals and fishes are still being determined, and it is unknown whether ERR signaling in humans or wildlife is vulnerable to disruption by environmental contaminants. *Supported by The Seward Johnson Foundation and Superfund Basic Research Program (P42ES07381).*

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