

**SOCIETY OF ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY.
ANNUAL MEETING– November 2014**

<http://www.setac.org>

(Poster) Application of a custom-designed microarray to examine the transcriptome of hornyhead turbot exposed to environmental mixtures of PCBs and PBDEs

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Abstract

The hornyhead turbot is a marine flatfish commonly found near outfalls of wastewater effluents along the coast of Southern California. Hornyhead turbot is being considered as a sentinel species to monitor the effects of currently discharged and legacy contaminants in the aquatic environment. We have developed a high density microarray with over 80% of the probes annotated and representing important pathways such as cell cycle, cell death and reproduction. In this study, we evaluated its potential as a molecular toxicity evaluation tool by investigating the transcriptomic effects of a polychlorinated biphenyl (PCB) mixture³ and a polybrominated diphenyl ester (PBDE) mixture in laboratory-exposed fish, comparing the results to field collected fish. A 96-hour laboratory exposure was conducted using hornyhead turbot collected from Dana Point, a far-field site without a major wastewater outfall. After a 6-week acclimation period, fish were subjected to one of the following treatments: non-injected seawater control, peanut oil injection control, 0.5 mg/kg or 5 mg/kg of PBDEs injection, or 1 mg/kg or 10 mg/kg PCBs injection. The results indicate that PCBs- and PBDEs-exposure induced very different gene expression changes with no clear dose dependent effects. However, both treatments appeared to target similar pathways including heat shock stress response and oxidative stress. Comparisons of the laboratory-exposed fish with fish collected from Dana Point and a contaminated site revealed few similarities in the expression profiles. This suggests that other contaminants or non-chemical related factors contributed to our results. Chemical analyses will be conducted in the liver in order to better relate specific genes changes to the presence of specific classes of contaminants.