

## **Analysis of endocrine disruption in southern California coastal fish using an aquatic multi-species microarray**

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### **ABSTRACT**

Endocrine disruptors include plasticizers, pesticides, detergents and pharmaceuticals. Sentinel fish such as turbot are used to characterize the presence of chemicals in the marine environment. Unfortunately, there are relatively few genes of turbot and other flatfish in GenBank, which limits the use of molecular tools such as microarrays and quantitative reverse transcriptase polymerase chain reaction (qRT-PCR) to study disruption of endocrine responses in sentinel fish monitored by water quality agencies. A multigene cross species microarray was developed as a diagnostic tool to screen the effects of environmental chemicals in fish for which there is minimal genomic information. The array included genes that are involved in the actions of adrenal and sex steroids, thyroid hormone, and xenobiotic responses. This will provide a sensitive tool for screening for the presence of chemicals with adverse effects on endocrine responses in coastal fish species. A custom multi-species microarray was used to study gene expression in wild hornyhead turbot, collected from reference and contaminated coastal waters, and in laboratory male zebrafish following exposure to estradiol and 4-nonylphenol. Gene-specific expression in turbot liver was measured by qRT-PCR and correlated to microarray data. Microarray and qRT-PCR analyses of livers from turbot collected from contaminated areas revealed altered gene expression profiles compared to those from non-impacted areas. The agreement between the array data and qRT-PCR analyses validates this multi-species microarray. The microarray measurement of gene expression in zebrafish, which are phylogenetically distant from turbot, indicates that this multi-species microarray will be useful for measuring endocrine responses in other fish.

### **Full Text**

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