

Sea bass (*Dicentrarchus labrax*) - a model organism for assessing multi-level responses to estrogenic chemicals in marine surface waters

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There is growing concern that aquatic wildlife in surface waters of the European Union is exposed to natural and man-made chemicals that have the ability to mimic estrogens and lead to reproductive dysfunction. Estrogenic responses in fish are the net result of complex chains of events involving the uptake, distribution and metabolism of test agents until they interact with their target sites. Typically these aspects cannot be modelled in short-term cell-based assays, only studies with vertebrates offer the opportunity to assess potential interactions of test compounds at higher organisational levels. The most widely studied biological response in fish to environmental estrogens is the production of vitellogenin (Vtg). However, few studies have attempted to link this endpoint with effects on xenobiotic biotransformation enzymes and genotoxic responses. This work is part of a study focusing on the combination effects of mixtures of estrogenic chemicals in marine and freshwater organisms. As test organism the sea bass (*Dicentrarchus labrax*) was selected, a common species in European marine systems. Juveniles were exposed under a flow-through system for 14 days to the natural estrogen 17 β -estradiol and ethynylestradiol. Actual chemical concentrations in the water-column were determined by gas chromatography with ion trap detection. Effects at subcellular level were analysed using Vtg as a reference endpoint [1]. Its relevance is evaluated by further investigations on liver 7-ethoxyresorufin-O-deethylase (EROD) activity and erythrocytic nuclear abnormalities [2]. These measurements were integrated with organism level endpoints (i.e. condition factor, hepatosomatic index) to provide evidence for cause-effect of estrogenic contamination. The general suitability of the sea bass as a model organism for the screening of estrogenic chemicals in the marine environment is discussed.

References: [1] Mañanós, E; Núñez S.; Zanuy, M.; Carrilo, M. and Menn, F.L. Comp. Biochem. Physiol. 107B: 217-223.

[2] Pacheco, M and Santos, M.A. (1998). Ecotoxicology and Environmental Safety 40, 71-76.

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