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Abstract Title:
A Comparison of Pathology Found in Three Marine Fish Treated with Endocrine Disrupting Compounds.

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Endocrine-disrupting chemicals (EDCs), such as the estrogen estradiol (E_2) have been reported to affect fish reproduction. This study histopathologically compared and evaluated the effect of EDCs in three species of treated fish. Juvenile male summer flounder (*Paralichthys dentatus*), cunner (*Tautogolabrus adspersus*), and sheepshead minnow (*Cyprinodon variegatus*) were treated in the laboratory with EDCs. Winter flounder and cunner were treated through an injected slow-release implant system and sheepshead minnows through waterborne exposures in laboratory aquaria. Low doses were 0.08 ug/L for sheepshead, 0.1 mg/kg for flounder, and 0.25 mg/kg for cunner; whereas, the high doses were 0.3 ug/L, 10.0 mg/kg, and 2.0 mg/kg respectively. Histopathological examination of fish from control treatments revealed no abnormalities in the liver, kidney, or gonad. Very few abnormalities were observed in fish at the low doses. In all three species, fish treated with high concentrations exhibited a proteinaceous intravascular fluid accumulation indicative of excessive vitellogenin (VtG) in liver, kidney, and testis. Liver changes included hepatocyte nuclei and nucleoli enlargement, hepatocyte hypertrophy and basophilia, and cytoplasmic vacuolization. Kidney nephropathy resulted in dilatation of Bowman's space filled with proteinaceous fluid, eosinophilic hyaline deposits in glomeruli, vacuolation of tubular epithelium, and hypertrophy of glomerular parietal epithelium. In addition to the accumulation of the proteinaceous intravascular fluids within the testis of all high dosed male fish, inhibition of testicular growth with atrophy and clusters of dead germ cells was prevalent in winter flounder, disruption of spermatogenesis and hemorrhaging testes was observed in cunner, and one male sheepshead displayed a testis-ova. Female sheepsheads at high dose showed similar nephropathy, proteinaceous intravascular fluid accumulation in the livers and kidneys, and increase of oocyte atresia. Overall, histopathological changes in liver, testicular, and renal glomeruli tissues appeared similar in all three species of fish and likely relate to excessive accumulation of VtG.

Keywords:
Endocrine disruption; Fish; Vitellogenin; flounder; cunner; sheepshead minnow

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