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### Biological responses of marine flatfish exposed to effluent

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#### ABSTRACT

There is an increasing concern about the presence of pharmaceutical compounds, personal care products, and other chemicals collectively known as contaminants of emerging concern (CECs) in municipal effluents. Yet, knowledge about potential environmental impacts related to these compounds is still limited. In this study we conducted laboratory exposures that examined estrogenic, androgenic, and thyroid-related endocrine responses in marine hornyhead turbot (*Pleuronichthys verticalis*) exposed to CECs from municipal wastewater effluents with two degrees of treatment. Plasma concentrations of estradiol (E2), vitellogenin (VTG), 11-keto testosterone (11-KT), and thyroxine (T4) were measured to assess endocrine responses. In addition, 32 effluent CECs were analyzed using gas chromatography/mass spectrometry to investigate the presence of these compounds in the effluents. Several pharmaceuticals and personal care products were present in the effluent treatments used during the exposures. No significant responses were observed in fish exposed to environmentally realistic concentrations of effluent. Elevated E2 concentrations were observed in males exposed to ammonia concentrations similar to those found in effluents. Exposure to ammonia did not result in high male VTG concentrations. The results of this study highlight the importance to conduct research with sentinel organisms to understand the environmental significance of the presence of CECs in aquatic systems.

#### Full Text

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