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Sertraline Chronic Exposure: Impact on Reproduction and Behavior on the Key Benthic Invertebrate Capitella teleta

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Abstract : Chemicals in modern society are fundamental in many different aspects of daily human life. We use a wide range of substances, including polychlorinated compounds, pesticides, plasticizers, and pharmaceuticals, to name a few. These compounds are excessively produced, and this has led to their introduction to the environment and food resources. Municipal and industrial effluents, landfills, and agricultural runoffs are a few examples of sources of chemical pollution. Many of these compounds, such as pharmaceuticals, have been proven to mimic or alter the performance of the hormone system, thus disrupting its normal function and altering the behavior and reproductive capability of non-target organisms. Antidepressants are pharmaceuticals commonly detected in the environment, usually in the range of ng L^{-1} and µg L^{-1}. Since they are designed to have a biological effect at low concentrations, they might pose a risk to the native species, especially if exposure lasts for long periods. Hydrophobic antidepressants, like the selective serotonin reuptake inhibitor (SSRI) Sertraline, can sorb to the particles in the water column and eventually accumulate in the sediment compartment. Thus, deposit-feeding organisms may be at particular risk of exposure. The polychaete Capitella teleta is widespread in estuarine organically enriched sediments, being a key deposit-feeder involved in geochemistry processes happening in sediments. Since antidepressants are neurotoxic chemicals and endocrine disruptors, the aim of this work was to test if sediment-associated Sertraline impacts burrowing- and feeding behavior as well as reproduction capability in Capitella teleta in a chronic exposure set-up, which could better mimic what happens in the environment. 7 days old juveniles were selected and exposed to different concentrations of Sertraline for an entire generation until the mature stage was reached. This work was able to show that some concentrations of Sertraline altered growth and the time of first reproduction in Capitella teleta juveniles, potentially disrupting the population’s capability of survival. Acknowledgments: This Ph.D. position is part of the CHRONIC project “Chronic exposure scenarios driving environmental risks of Chemicals”, which is an Innovative Training Network (ITN) funded by the European Union’s Horizon 2020 research and innovation program under the Marie Sklodowska-Curie Actions (MSCA).

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