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Pharmaceuticals, and other chemicals, effects in non-target aquatic species

Marta Ferreira
University of South Pacific, Fiji Islands
CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, Portugal

Chemical compounds, including pharmaceuticals, are constantly released to the environment. The aquatic environment is finally sink with several compounds from natural or anthropogenic origins, thus the effects of these contaminants in organisms exposed to them have to be thoroughly investigated in order to ascertain their impacts to wild life and to the ecosystems. Pharmaceuticals are considered emerging contaminants because their toxic effects and risk to the environment may not be known. The widespread detection of pharmaceuticals in the environment has raised concern about the potential impact. The concern regarding the ecotoxicological effects of pharmaceuticals is based on the assumption of evolutionary conservation of the specific molecular targets, by acting in a specific mode, targeting human receptors or enzymes; they can elicit unwanted responses in non-target species at low concentrations. In fact, in the last decades, several studies have reported the negative impacts of these contaminants to aquatic organisms. For example, psychopharmaceuticals (PP) that compensate the abnormal functioning of the neurotransmitter systems by targeting metabolism and secretion of neurotransmitters can affect neurotransmitter systems in fish thereby impeding fitness and survival on a population scale. Pharmaceuticals can also interfere with efflux transporter proteins that have a role in the elimination of pharmaceuticals, determining the effective concentration of drug administration in patients. These proteins are also relevant in bioavailability of contaminants in aquatic species and their inhibition in fish can increase toxicity of normally effluxed compounds. In conclusion, it is of extreme importance to wild and human life to investigate the real effects of pharmaceuticals to aquatic ecosystems.

Biography

Marta Ferreira has completed her PhD in Biomedical Sciences at the age of 31 years from Porto University and postdoctoral studies from CIIMAR - Interdisciplinary Center for Marine and Environmental Research. Currently, she is a researcher at CIIMAR, a research and advanced training institution at University of Porto, and a senior lecturer at the School of Marine Sciences, Faculty of Science, Technology and Environment at the University of South Pacific. Marta Ferreira is an environmental toxicologist, studying the effects of anthropogenic compounds to aquatic organism, with more than 25 papers published in reputed journals in the area of expertise. She has also participated in several national and international research projects and student supervision.

mferreira@ciimar.up.pt

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