Abstract

A behavioral analysis and differential proteomics approach to study effects of pharmaceuticals in the zebrafish

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Pharmaceuticals are widely used by humans, for food production or for veterinary purposes, but they may also enter the environment. However, many pharmaceuticals (if not all) have unknown mode of actions in the different environmental niches. Especially neuro-active drugs are of particular concern when acting on non-target species as the neural system is essential for the regulation of various physiological processes and behaviors.

In this research we will study effects of chemical pollutants in aquatic environments, on different levels of complexity. In this respect, we will use the zebrafish (*Danio rerio*) which is known as a valid ecotoxicological model. We aim to study altered zebrafish behavior using 3D video tracking as a consequence of exposure to defined pharmaceuticals, like the psychoactive drug mianserin. Next, by adopting differential proteomics, we aim to reveal mechanistic information of toxicity at the molecular level, or at least aim to provide a picture of (biochemical) pathways that are affected. Doing so, a tandem mass tag (TMT) labeling method was combined with liquid chromatography and tandem mass spectrometry to analyze effects of mianserin. These subsequent monitoring of molecular changes, allows obtaining mechanistic and functional insights underlying aversive physiological and behavioral effects of pharmaceuticals.