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Perturbation of neurotransmitter profile in the central nervous system of zebrafish (*Danio rerio*) in relation to neurobehavioral changes induced by a neuroactive environmental contaminant Fluoxetine

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There are increasing concerns about the occurrence of pharmaceuticals in our aquatic environment. Several reports have already demonstrated that behaviors of aquatic life were significantly altered by exposure to very low levels of neuroactive pharmaceutical pollutants. Many such neuroactive pharmaceuticals are not able to be removed effectively by conventional wastewater treatment processes and are directly discharged to the receiving aquatic environment. Assessment of their environmental risks is complicated by their relatively low lethal toxicity. In our previous studies, we developed an analytical method for the profiling of classical neurotransmitters and their metabolites in the CNS of a small model fish. We found that their profiles are very sensitive to *in vivo* neurotoxicological impacts. Zebrafish (*Danio rerio*) is an increasingly recognized vertebrate model for neurobehavioral studies and is also an ideal model for translational neuroscience research. In this work, we exposed zebrafish to a commonly prescribed antidepressant, which is also an emerging environmental contaminant, Fluoxetine (Prozac™), for a period of 14 days. Afterwards, novel tank test was conducted to evaluate behavioral effects of the drug to the fish. Immediate after behavioral test, the whole brain tissue of the fish was subjected to neurotransmitter profiling. Multivariate analysis was conducted to correlate the perturbation of the neurotransmitter profile with behavioral changes induced by the drug. Results of our study provide metabolomic information to link the neurotoxicological effects of neuroactive chemicals with their in vivo neurobehavioral impacts. This profiling approach can also become a new tool for environmental risk assessment of neuroactive contaminants.

Biography

Man Shan Yau is a PhD student in Environmental Science from the City University of Hong Kong. Her current research focuses on the optimization and validation of a neurotransmitter profiling platform for environmental neurotoxicological assessment.

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