

Evaluation of toxicity of neuroactive drugs based on lipidomic alterations in mussel digestive gland Precision Cut Tissue Slices (PCTS) coupled with LC-HRMS

Project description

Neuroactive compounds are highly consumed worldwide for treatment or diagnosis of diseases. As a consequence, these compounds or the residues of human metabolism have been detected in wastewater and surface water. However, the toxicological implications of the presence of such persistent compounds in the aquatic environment and the effects on the biota remain largely unknown.

The aim of this study was to further assess the toxicity of different psychiatric pharmaceuticals such as lamotrigine, primidone, sertraline and venlafaxine in the digestive gland of Mediterranean mussels. The digestive gland represent a valuable model for investigating molecular and cellular responses to environmental contaminants. In addition, the use of precision-cut tissue slices preserves all cell types present in their original tissue matrix configuration and allows the detection of metabolic/lipidomic disturbances. This *ex vivo* approach offers the main advantages of *in vitro* systems, preserving the architecture of an organ mini-model that closely resembles the natural architecture of the tissue/organ from which it is prepared.

This project will assess the toxicity of the selected psychiatric pharmaceuticals, together with changes in the lipidome and the accumulation of the compounds in mussel digestive gland section by using high resolution LC-HRMS/MS systems (Orbitrap or Time-of-Flight spectrometers, available at IDAEA).

The activities that the student will carry out as part of the study are:

- Literature research on the toxicity of selected drugs in the aquatic environment,
- Sample preparation (Precision Cut Tissue Slices) from mussels digestive gland and exposure experiments
- study of toxicity and effects on lipidome by LC-HRMS/MS.

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