

PhD POSITION TO APPLY TO THE SPANISH FPU PROGRAM

Research Project - **BIOPLAS**

New Approach Methodologies for evaluating the toxicity of biodegradable plastics and additives

PhD Supervisors: Dr. Montserrat Solé (ICM) and Dr. Cinta Porte (IDAEA)

Centre: Institut de Ciències del Mar (ICM-CSIC) and Institut de Diagnòstic Ambiental i Estudis de l'Aigua (IDAEA-CSIC)

Project description

The occurrence of plastic and its associated chemicals in the aquatic environment is an issue of great social and economic concern. Investigating the toxic effects of plastics and associated chemicals is a challenging task. In the context of this project, the role of carboxylesterases (CEs) in lipid metabolism of aquatic organisms exposed to plastic-derived chemicals will be explored. The aim is to better understand the mechanisms involved in lipidic/metabolic disruption, as well as to predict the effects of the chemicals studied in the project taking into account their affinity to CEs. Carboxylesterases are a multi-gene family of enzymes with broad substrate specificity, including compounds with ester, amide, or thioester bonds (pyrethroids, carbamates, some pharmaceuticals). They have been largely applied in pharmacology but their application in environmental sciences is still at its infancy. They are also robust enzymes that express in multiple tissues/organs, including conservative matrices such as plasma and mucus. Their study as biomarkers of a broad range of environmental chemicals, including plasticizers, deserves consideration. The expression of carboxylesterase in mammals is affected by PXR ligands and they play a key role regulating the hydrolysis of endogenous lipids. However, no such information is available for aquatic organisms. Thus, this Ph.D. proposal aims to:

- a. investigate the roles of carboxylesterases in lipid metabolism
- b. the mechanisms by which carboxylesterases exert their role, substrate specificity and the active compounds that modulate their activity
- c. the application of CEs to cell free systems as biosensors of metabolic disruptors.

Requirements of the candidate

A degree in biological sciences: biology, biochemistry, biotechnology or similar.

Hosting research team

Both ICM and IDAEA are recognized as a Severo Ochoa Excellence centres with a demonstrated commitment towards training junior researchers in ocean and environmental sciences. The PhD theses supervised at both institutes have always achieving the highest qualifications and have generated a remarkable number of international publications. The broad diversity of research groups and topics at these institutes and their complementarity, as well as the international scientific collaborations will provide the necessary human and academic support to the Ph.D. candidate. At ICM level, the novel Talent Development and Work Environment Unit and the Professional Development Task Force will manage the internal training program. As such, after joining ICM, the Talent Development and Work Environment Unit will help on the design of a suitable Career Development Plan adapted for the PhD candidate, who will also become a member of the ICM Young Researchers Association. Moreover, ICM will offer courses on scientific and technical aptitudes, as well as soft skills. The internal ICM training offer will be completed by CSIC course portfolio and Career Development events. Likewise, IDAEA offers to the candidate state-of-the-art instruments for chemical and toxicological assessment of environmental and biological samples. IDAEA's laboratories. Equipment includes mass spectrometers coupled with different chromatographic systems for the determination of organic compounds and metabolomic studies. IDAEA also offers cell culture facilities, organism housing facilities, histology rooms, behavioural platforms, microscopy facility room and genomics services.

Both PhD supervisors hold an ample experience in the field of ecotoxicology with several publications in high impact journals, book chapters and PhD supervisions in this field of research.

M. Solé is part of the ICM group "Functioning and vulnerability of marine ecosystems" and C. Porte of the IDAEA group "Environmental Toxicology group. More information can be found in the ORCID database: M. Sole (0000-0002-9920-5051) and C. Porte (0000-0002-3940-6409).

How to apply

- At the first step, the applicant will be evaluated based on the university degree. If appropriate, selected candidates could be invited for an interview. In case you are interested, please contact ASAP the PI of the project attaching your CV and your transcript record.
- At the second step, selected applicants, together with the PhD project, will be evaluated for a final selection.
- Applications to the FPU scholarships must be submitted through the official link call, to be published. The period of application will probably open in November - December 2022.



Pg. Marítim de la Barceloneta, 37-49
08032 Barcelona
+34 932 309 500
www.icm.csic.es

Interested candidates, please contact the Principal Investigators:

Dr. Montserrat Solé (msole@icm.csic.es) and

Dr. Cinta Porte (cinta.porte@idaea.csic.es)
