

## **Study of the resilience of *Mytilus galloprovincialis* to microplastics pollution and its link with genetic variability**

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### **Abstract**

Microplastics (MPs) are small pieces of plastic, less than 5 mm in length, that occur in the environment as a consequence of plastic pollution. MPs pollution is one of the most widespread emerging environmental problems we face today. However, criteria used for the extraction of MPs from biological tissues have yet to be clarified. Novel methods to reduce artifact and clearly assess the fate of MPs in biological tissues needs to be identified to determine whether MP particles are truly internalized and accumulated in the biological samples.

The Mediterranean mussel *Mytilus galloprovincialis* is an ecologically and economically relevant edible marine bivalve, highly invasive and resilient to biotic and abiotic stressors. Although these traits have been linked with the maintenance of a high genetic variation within natural populations, the factors underlying the ability of this species to counteract toxic effects of pollutants remain unclear.

In this project proposal we want to use the MPs naturally present in the environment, ranging from 1-5  $\mu\text{m}$ , and develop novel tools to extract and quantify MPs from biological tissues. We will assay the toxic effects of these MPs on the male and female gonads of adult *Mytilus* animals and will define a series of scale parameters for the selection of different animals with greater or lesser capacity to counteract the toxic effects of MPs. Finally, we will perform RNAseq analyses on these selected gonads to investigate the different expression of the so called "dispensable genes" with the aim to correlate the presence/absence of specific genes to their ability to survive and to counteract the toxic effects of MPs.

These advancements will be obtained through the following main steps:

- Assessment of MPs acute and chronic effects on the reproductive system of *M. galloprovincialis*.
- Set up of novel protocol(s) for MPs extraction and quantification from mussel tissues
- Differential RNAseq analyses from gonadal tissues treated with MPs and with different degrees of alterations
- Assessment of the role of Dispensable Genes differentially expressed in gonads with different indices of alterations. These genes might be the key to explain the resilience to pollution and invasiveness of this *Mytilus* species.