

Sofía Blanco
González University
of Vigo Nationality:
Spanish

Orientation: Sustainable use of marine
resources **Specialization Area:** Aquaculture
Research Area: 2.15. Genetics and genomics applied to
aquaculture



PhD project: Study of the mechanisms underlying double uniparental inheritance (DUI) of mtDNA and sex determination in *Mytilus spp.* mussels by 'shotgun' proteomic analysis

Supervisors: Ángel E. Pérez Diz (Universidade de Vigo)

Summary: The *Mytilus edulis* marine mussel complex is a relevant economic resource in aquaculture. In addition, they are particularly interesting from an ecological-evolutionary point of view because of their ability to hybridise in coastal regions where the distribution of the different species overlaps. This makes it possible to study the reproductive barriers that maintain the genomic integrity of the different mussel species. They are also exceptional because of their unusual mode of inheritance of mitochondrial DNA, known as double uniparental inheritance (DUI). In addition, there is an important connection between DUI and sex determination through the different behaviour of paternal mtDNA in fertilised oocytes that will develop as males or females. Disruption of the DUI has also been observed in hybrids. The molecular mechanisms underlying these processes and their possible connection with reproductive isolation are still unknown. Several genetic models based on maternal effects have been proposed attempting to explain the mechanism of DUI and its link to sex determination in mussels. They assume that maternal nuclear genes encode factors that will determine the fate of paternal mitochondria in the oocyte after fertilisation, a phenomenon that is non-causally linked to the sex of the embryo. By increasing sample size and using massive high-throughput transcriptomic and proteomic analyses and customised databases, we are attempting to increase the number of candidate proteins implicated in sex determination and DUI in mussels to rule out or confirm previously discovered targets.

