

Pereiro González, Patricia

University of Santiago de Compostela

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Orientation: Sustainable Use of Marine Resources

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Research Area: 2.13 Pathology and immunology of cultured organisms



PhD project: Advances in the knowledge of the antiviral immune response and resistance to viral hemorrhagic septicemia virus (VHSV) in turbot (*Scophthalmus maximus*)

Supervisors: Dr. Beatriz Novoa García (Marine Research Institute-CSIC)

Dr. Antonio Figueras Huerta (Marine Research Institute-CSIC)

Summary: Turbot (*Scophthalmus maximus*) is an economically valuable fish in Europe and China. Currently, the culture of this fish is well established, although several pathogens can affect its health status, causing important economic losses in the sector. Viral Haemorrhagic Septicaemia Virus (VHSV) is one of the main threats in turbot farms due to the absence of commercially available treatments and vaccines for VHSV. The first goal of this doctoral thesis was to increase the amount of information available in public databases regarding the transcriptome sequences associated with the antiviral immune response of turbot. Due to the large number of sequences obtained, a microarray highly enriched in antiviral sequences was constructed. This microarray allowed us to conduct a broad transcriptome analysis of the response to VHSV infection and evaluate the activity of a DNA vaccine against VHSV, which was also designed during this doctoral thesis. This information led us to focus our attention on certain molecules or processes affected by the vaccine/infection. This was the case for two type I interferons (IFNs), which were characterized and studied for the first time in turbot. Type I IFNs are the main antiviral molecules in vertebrates, as they induce the expression of numerous molecules with the ability to block viral proliferation. To increase our knowledge about these genes, we also sought to investigate the role of the type II IFN (or IFN-gamma), which also acts in the defence against viruses but mainly functions as an immunomodulatory molecule.

