"IMAQUANIM"

Technological knowledge-platform for a future improved immunity to infectious diseases in aquaculture

The use of antibiotics in European aquaculture has decreased markedly in the past decade, mostly due to the development of more efficient vaccines, better diagnosis of diseases that affect fish and improved sanitary controls. Bearing in mind that antibiotics can have harmful health effects on humans, this trend has been highly encouraged in the "Strategy for the Sustainable Development of Aquaculture in Europe". The development of new vaccines is therefore – and also to further reduce the prophylactic use of antibiotics - considered to be a research priority.

The immune system is not as well understood for finfish and shellfish as it is for mammals and other higher vertebrates. Successful bacterial vaccines were developed for salmon based mostly on trial and error. However, despite years of research, just a few vaccines have recently emerged against fish viruses, while none currently exist against fish parasites.

The European Union's Integrated Project **IMAQUANIM** has brought together 17 universities and governmental research institutes, as well as five small and medium size enterprises (SMEs) working to **develop technology to improve the disease immunity of Europe's major aquacultured species**, being Atlantic salmon, rainbow trout, sea bass, sea bream, carp, mussel and oyster.

For each species one expert group has been composed that works on the development of certain tools – like gene arrays and antibodies – and assays to monitor molecules and cell populations that are key components of the immunological systems, in order to get a **better understanding of how fish acquire immunity to diseases**.

Since **shellfish** do not have an acquired immune system, research on molluscs and oysters is focusing on their **innate** immune system.

The project has now been running for over a year. The work on disease models is ongoing: for all involved animal species infection/ exposure experiments have been initiated with selected bacterial, viral and parasite pathogens, and vaccination and immuno-stimulation trials have been performed in some species with selected available reference vaccines or killed pathogens. With the aim of testing and screening feed immuno-stimulants, the optimisation of a dose-response challenge model with *Vibrio anguillarum* in rainbow trout has been initiated. In the field of molecular and functional immunology, a number of new genes encoding immunological key molecules have been cloned for the involved host animal species.

The knowledge gained during this basic research will be used to develop efficient vaccines and feed-based immuno-stimulants for finfish species, and for the genetic typing, immunocompetence monitoring and diagnostic surveillance for both finfish and shellfish.

Project acronym:
IMAQUANIM

Full title of Project:
Improved immunity of aquacultured animals

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Web-site:
www.imaquanim.dfvf.dk

Coordinator
Mr. Niels Lorenzen
Danish Institute for Food and Veterinary Research
Department of Poultry, Fish and Fur-bearing animals
Hangøvej 2
8200 N Aarhus
Denmark

Phone : +45 72 34 68 29
Fax : +45 72 34 69 01
Email : nl@dfvf.dk

The IMAQUANIM project results will create a basis for the selective breeding of aquacultured animals that are immune to devastating infectious diseases. Finally, they will also provide a **technological basis for qualified strategies to rapidly counteract outbreaks of known or new diseases in aquacultured fish**. By contributing to **improved animal health**, IMAQUANIM will lead to **higher quality food products**, free of residuals of antibiotics or other chemicals, and to **more environmentally friendly and cost-efficient** fish farming.

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