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Welfare

Aquaculture researchers begin work on first non-lethal immunology testing kit for Atlantic salmon

17 October 2022

By Responsible Seafood Advocate

First-of-its-kind immunology tool could be 'final piece in the puzzle' for fish health

Researchers in Scotland are developing a first-of-its-kind immunology tool for Atlantic salmon that they say could be the "final piece in the puzzle" for monitoring all aspects of fish health from a single blood sample.

With funding support from the UK Seafood Innovation Fund (SIF) and the Sustainable Aquaculture Innovation Centre (SAIC), the project team of the University of the West of Scotland (UWS), WellFish Diagnostics, Bakka Frost Scotland, Vertebrate Antibodies Limited (VAL) and the University of Aberdeen's Scottish Fish Immunology Research Centre will develop antibodies to probe key markers in fish blood that indicate an immune system response to four of the most common health challenges.

During the five-month-feasibility project, the consortium will investigate immunological biomarkers for pancreas disease, complex gill disease, bacterial infection and cardiomyopathy syndrome (CMS) in salmon. In the second phase of the project, they will use these biomarkers to develop a commercially



Researchers are developing a first-of-its-kind immunology testing kit for Atlantic salmon that could monitor all aspects of fish health. Image courtesy of Sustainable Aquaculture Innovation Centre.

available “high throughput” blood testing platform based on WellFish Diagnostics’ existing rapid clinical chemistry-based health assessment kits.

“The kits we are aiming to develop through this project are the final piece of the puzzle for fish health,” said Brian Quinn, professor of ecotoxicology at UWS’s Aquaculture Health Laboratory. “Adding the ability to proactively monitor the immune response of salmon to existing diseases will enable quicker, preventative action to be taken when a challenge to fish health emerges – it will be a big step forward and allow farmers to see all aspects of fish health.”

A banner for the Responsible Seafood Summit 2023. On the left is a logo featuring a stylized eye with a fish inside, next to the text "Responsible Seafood SUMMIT". To the right, it says "SAINT JOHN NEW BRUNSWICK CANADA OCTOBER 2-5 2023". A red "REGISTER" button is positioned to the right of the text. The background is a dark teal with a faint world map and several red airplane icons. The Global Seafood Alliance logo is in the top right corner.

(<https://events.globalseafood.org/responsible-seafood-summit>).

“Because it is non-lethal, we can take larger sample numbers and obtain a broader view of the overall welfare of fish populations. Our aim is to facilitate an even more proactive approach to fish welfare in the aquaculture sector, building on the significant progress already made.”

Having access to immunological data from salmon stocks will provide farmers with a non-lethal early warning system for potential health issues, allowing them to monitor the progress of health challenges, check how the fish respond and establish which treatments have been most effective for fish recovery. The farmers can then take early and appropriate action to protect salmon.

“Using our existing clinical chemistry technology as a base, the new immunology kits will help salmon farmers gain a more holistic view of the health of their fish stocks and take remedial action to stop health challenges from growing and spreading,” said Dr. Josip Barisic, research and development manager at WellFish Diagnostics. “It will provide an early indication of the presence of a health challenge and what kind of challenge it was, allowing us to see early stages of disease.”

“While this is only the first step towards making this kit commercially available, we have already proved it can be done with our current health tests. When it is fully developed, it will also support our expansion plans into Norway, Canada, and Chile.”

The new approach – taken from similar immunological testing used for humans and agricultural animals – will separate infection-based responses from other potential stressors, such as nutritional and environmental factors to provide more accurate data. Blood sampling will also mean farmers can take larger, more representative samples from salmon populations.

“This project is another great example of taking what we know about human healthcare and testing for terrestrial animals and applying those principles to fish health,” said Heather Jones, CEO of SAIC. “It is exciting to see a company that was born out of a SAIC-funded project develop into a business with international expansion plans, providing a unique technology that could have a significantly positive impact on fish and aquaculture more generally. It is a testament to what can be achieved through the combination of academic expertise with sector knowledge, and supports our focus on enhancing fish health, reducing the environmental impact of aquaculture, and supporting a more sustainable sector.”

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