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TargetFish highlight

TargetFish brings together leading European research groups that are experts on the fish immune system and enterprises from the Biotech and Veterinary sectors that aim to commercialize fish vaccines for European fish farming. By developing a targeted vaccination strategy, TargetFish will prevent important fish diseases in European aquaculture industry.

This highlight is part of monthly progress updates by the TargetFish consortium.

targetfish.eu

Activators of gene transcription lead to reporter assays for monitoring fish disease status in Atlantic salmon

Key pathways in the innate immune response are the interferon (IFN) type I and type II (IFN γ) signalling pathways, known to play very important roles in protection against, in particular, viruses. Signal Transducer and Activator of Transcription (STAT) molecules are crucial parts of these pathways and were recently described to be incorporated into luciferase reporter constructs by researchers at Marine Scotland, Aberdeen (2014: *Fish and Shellfish Immunology* 40: page 644-7).

The activation of STAT1 and STAT2 leads to their translocation to the nucleus of the cell after which these molecules bind to elements in promoters of antiviral

genes, leading to antiviral proteins. Thus, activation of these crucial molecules generates protection based on anti-viral immunity associated with type I and type II IFN signalling. In simple words, activation of these STAT molecules provides a simple, cell-based reporter system for detection of the presence of an activator, such as a virus, in for example, blood samples.

Gene constructs based on these STAT molecules were expressed in two different fish cell lines, providing new in vitro detection assays based on light emission (luciferase activity) induced by the detection of a virus. A first test confirmed that the constructs could successfully detect the presence of salmonid alpha virus (SAV) in the cell lines. The new STAT-expressing cell lines not only provide an important assay to study interferon signalling and inhibition of IFN signalling by some fish viruses but, maybe even more important, also provide cell-based functional assays for monitoring of fish disease status.

From a practical viewpoint, the aquatic animal health industry is becoming increasingly sophisticated as the aquaculture industry worldwide continues to grow in importance and value. Rapid, accurate and early disease diagnosis is paramount in a well-run fish health programme and the industry is rapidly adopting the routine use of rapid diagnostic and predictive tools and this study will help add to our 'diagnostic armoury'.



TargetFish 2nd Industry Workshop

Following the great success of the 1st TargetFish Industry Workshop held during the 16th International Conference of the European Association of Fish Pathologists (EAFP) in Tampere, Finland in September 2013 a second Workshop is planned for the 17th EAFP Conference in Gran Canaria, Spain in September 2015.

The 1st Industrial Workshop was held relatively close to the commencement of the TargetFish project and basically covered the content of the various Work Packages. Two years on most of the Work Packages have now achieved a number of significant discoveries relevant to the aquatic animal health industry. These findings will be described during the Industry Workshop and an opportunity for the researchers and industry partners to meet and discuss the significance and application of these findings on the development of new vaccines, vaccination techniques/strategies, treatments and diagnostics and how they may be taken forward into commercial applications.

For more information, please please visit www.targetfish.eu or contact the consortium via targetfish.cbi@wur.nl



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