Targeting fish vaccination

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Abstract

Some 5 years ago the TargetFish project kicked off with 30 partners from 10 EU member states, 3 associated countries (Norway, Israel) and one International Cooperation Partner Country (Chile), to 'improve fish vaccination strategies to help prevent important diseases in the European aquaculture industry'. The characteristic of TargetFish has been the close cooperation between academic research groups and enterprises, both more or less equally represented in the consortium. The project brought together researchers on fish pathology and immunology who all shared one main interest: fish vaccination. The ambitious consortium chose to target vaccination against more than 10 important viral or bacterial pathogens of Atlantic salmon, rainbow trout, common carp, sea bass, seabream and turbot with the overall aim of 'advancing the development of existing (but sometimes insufficient or suboptimal) and new prototype vaccines'. Please find below, not a summary of progress for all pathogens and vaccines addressed in the context of the TargetFish project, but a number of highlights of this large collaborative project funded by the European Commission under the 7th Framework Programme for Research and Technological Development (FP7) of the European Union (Grant Agreement 311993). The 5 year project finished on 1st October 2017.

Bacterins have proven and are still proving excellent vaccines

Rainbow trout fry syndrome (RTFS) is caused by *Flavobacterium psychrophilum*, one of the most devastating and pathogenic bacteria affecting the European rainbow trout industry. So far the success of experimental vaccines has been limited and these have provided only poor levels of protection upon heterologous challenge. For bacterial pathogens specific antibody responses may be sufficient to confer protection, so we tested if vaccines composed of inactivated microbes could be enough to trigger adequate protection against RTFS. Such bacterins typically are produced by inactivating the bacteria (and their products) through agents such as formalin, while assuring that the antigenic fragment(s) against which the antibody response is directed remain(s) intact. We assumed that these nonself molecules should be recognised by immunoglobulins (Ig) on the cell surface of B lymphocytes, differentiating into antibody-secreting plasma cells.

Because typically, B lymphocytes have evolved to recognise a great variety of antigens we first studied pathogen and thus antigen variability for *F. psychrophilum*. We found a significant strain variability among >300 isolates of *F. psychrophilum*, and used three representative isolates to produce a trivalent vaccine which was administered intra-peritoneally (with an oil-based adjuvant). The first trials indicated very good protection upon intraperitoneal chal-

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