Newsletter No 1, summer 2013

TargetFish Industry Forum

Welcome to the first newsletter for the TargetFish project.

Firstly we would like to thank you for your letters of support which we are sure had a beneficial effect on the outcome of the application.

The project was successful in receiving its funding and the first 'kick-off' meeting was held at the University of Wageningen in November 2012. This meeting allowed the various partners to meet with each other both in a work and social environment and to finely tune the various workpackages.

TargetFish is an ambitious project embracing a variety of technologies with the ultimate goal of improving on existing and developing new vaccines against the major diseases of farmed fish in Europe although there is bound to be considerable spin –off into aquaculture in other countries outside Europe.

The Industry Forum

As a result of your support this project was funded by the EC and we would now like you to become involved and hopefully reap the benefits of this research allowing you to not only gain a greater knowledge of the fish immune system and how it reacts to vaccination, but also to improve on the efficacy and duration of efficacy of existing vaccines and offer you new vaccines based on 'second generation' technologies which you can take to the market place.

The Industrial Forum will be managed by professor Patrick Smith who was one of the pioneers of fish vaccines in the late 1970s/early 1980s and has a unique knowledge of both fish vaccine research and the commercialization of fish vaccines.

It is intended to develop a specific TargetFish website where you can receive regular updates on progress with the various workpackages. In addition, we plan to have regular TargetFish seminars where you can listen to presentations on some of the workpackages and meet with some of the key researchers.

In the interim, we welcome you to interact with the project and we encourage contact with the project by e-mailing Professor Patrick Smith at : patrick.tethysaquaculture@gmail.com who will try to answer any questions that you may have or set up a meeting with the relevant researcher.

INTRODUCTION

European aquaculture production provides direct employment to approximately 65,000 people with a turnover of Euro 3 billion. Furthermore aquaculture will play an increasingly important role in World food security programmes worldwide providing a source of health-giving and high quality protein to the world's burgeoning populations. Furthermore word production of fish by aquaculture has now exceeded the wild fish catch where most fisheries are, at least not expanding ('Zero increment') or are in decline.

However, the lack of authorised veterinary medicinal products and the consequent disease outbreaks in farmed fish species are costing the sector in excess of production values.

The most effective method for diseases control, both on economical, environmental and ethical grounds, is disease prevention by vaccination.

TargetFish will advance the improvement of existing and the development of new prototype vaccines against the most socio-economically important viral and bacterial diseases of Atlantic salmon, rainbow trout, common carp, sea bass, sea bream and turbot. The project will develop targeted vaccination strategies for currently sub-optimal and for novel vaccines.

Improved vaccines will be brought closer to industrial application by addressing practical issues such as efficacy, safety and delivery route. TargetFish will also establish a knowledge- and technology-base for rational development of 'second generation' fish vaccines.

To achieve these challenging tasks, TargetFish has brought together 29 partners from 11 EU member states, 2 associated countries and 1 International Cooperation Country (ICPC). In this large multidisciplinary consortium an approximately equal number of RTD and SME partners will cooperate closely while keeping an intensive communication with the major vaccine producers and feed and nutritional suppliers via an '**INDUSTRY FORUM '**.

Specifically, TargetFish will:

- Generate knowledge by studying antigens and adjuvants for mucosal routes of administration while analyzing the underpinning protective immune mechanisms;
- Validate this knowledge with response assays for monitoring vaccine efficacy and study safety aspects, including those associated with DNA vaccines;
- Approach implementation of prototype vaccines by optimizing vaccination strategies thus:
- Shortening the route to exploitation.

Thereby, this project will greatly enhance targeted disease prophylaxis in European fish farming.

OUTLINE OF WORK PACKAGES

The TargetFish project is subdivided into ten distinct Work packages as follows:

WP1: Antigens for vaccine development.

WP2: Development of novel mucosal delivery systems.

WP3: Adjuvants for the improvement of performance of fish vaccines.

WP4: Dissect protective immune response.

WP5: Monitoring vaccine efficacy.

WP6: Side effects and safety.

WP7: Optimising vaccination strategies to field conditions.

WP8: Financial and contractual management.

WP9: Scientific coordination.

WP10: IPR and capacity building.

The workpackages in detail

The following gives more detail of the deliverables within each scientific workpackage:

WP 1

- Preparation of inactivated bacterial and viral pathogens
- Expression of recombinant antigens
- DNA vaccine constructs for reference screening, efficacy and safety trials using i.m. injection
- DNA vaccine constructs for mucosal delivery
- Live recombinant viral vaccines

WP 2

- Assessment of alginates as an oral or immersion delivery method
- Use of patented MicroMatrix technology for oral delivery of vaccines
- Assessment of bacteriophages, transformed bacteria or baculoviruses as live DNA vectors
- Assessment of silkworm-produced recombinant antigens for mass delivery methods
- Assessment of delivery of vaccine antigens using recombinant ESV
- Use of commensal carp bacteria for oral delivery of SVCC and KHV antigens

WP 3

- New commercially-available adjuvants screened in fish
- Chemokines and cytokines as molecular adjuvants
- Pattern recognition receptor-based assays for adjuvant analysis
- PAMP and DAMPS as adjuvants
- Definition of innate immune pathways triggered by effective adjuvants + antigen combination

WP 4

- Sampling after vaccination with established successful vaccines or newly-developed vaccines
- Sampling after challenge of fish vaccinated with successful and newly-developed vaccines
- Dissecting immune pathways after injection vaccination with established or newly-developed vaccines
- Dissecting immune pathways after mucosal vaccination with established or newly-developed vaccines
- Characterization of long-term B and T memory cells and factors influencing immune memory in fish

WP 5

- Optimization of challenge model for different fish pathogens
- Production of specific antibodies against IgD/IgT in several species
- Correlation of cellular immunity with protection
- Chemokine receptors as markers for lymphocyte activation
- Development of assays for discrimination between vaccinated and infected fish with KHV and VHSV

WP 6

- Characterization of side-effects in improved and newly-developed vaccines
- Evaluation of fate and persistence of DNA vaccine
- Evaluation of fate and safety of live viral vaccines
- Evaluation of fate and safety of live vectors

WP 7

- Evaluation of protection across pathogen variability by bacterial vaccines under experimental conditions
- Results from mucosal prime-boost vaccination under experimental conditions
- Results from mucosal prime-boost vaccination under field conditions
- Results from field trial of semi-automatic vaccination machine adapted for vaccination of very small fish
- Report on immune response and safety in field DNA vaccination trial
- Recombinant RTFS and IPNV vaccine providing general protection across pathogen protection variability under experimental conditions
- Q-PCR assays for differentiation between pathogen variants
- Q-PCR assays for differentiation between vaccinated and infected fish

The TargetFish Partners

The partners in the TargetFish project are as follows:

Wageningen University (The Netherlands)

Technical University of Denmark (DTU)

University of Aberdeen (Scotland)

Marine Scotland (Scotland)

Friedrich Loeffler Institute (Germany) Instituto Nacional de Investigacion Tecnologia Agraria y Alimentaria ((INIA) (Spain)

University of Barcelona (UAB) (Spain)

University Degli Studi Della Tuscia (UTUS) (Italy)

Institut National de la Recherche Agronomique (INRA) (France)

Norwegian School of Veterinary Science (Norway)

University of stirling (Scotland)

Instituto Zooprofilattico Sperimentale delle Venezie (Italy)

University of Copenhagen (Denmark)

Veterinary Research Institute (VRI) (Czech Republic)

The Hebrew university of Jerusalem (Israel)

University of Murcia (Spain)

Tethys aquaculture Ltd (UK)

Patogen Analyse AS (Norway)

Fishlab Hestelaboratoriet (Denmark)

Naxo Ltd (Estonia)

Ridgeway Biologicals Ltd (UK)

Rossi International AS (Denmark)

Ingeniatrics Technologias SL (Spain)

BigDNA Ltd (Spain)

W42

Industrial Biotechnology GMBH (Germany)

Centro Vet Limited (Chile)

Aquark (Greece)

Dansk Akvakultur Forening (Denmark)

Biomar A/S (Denmark)

Bionaturis (Spain)

TargetFish Meetings

It is proposed to hold our next Steering Committee and Scientific Meeting on the 23rd and 24th June 2013 as a satellite meeting of the First international Conference of fish and Shellfish Immunology to be held in Vigo, Spain, between June 25th and June 28th 2013.

Essentially, this will be a closed meeting of the TargetFish partners but attendance at least to some of the meeting may be obtained on request.

Our 'Industry Forum' Meeting which has open attendance and where there will be presentations highlighting some of the current findings will be held as a satellite of the 11th meeting of the European Association of Fish Pathologists (EAFP) to be held in Tampere, Finland, between the 2nd and 6th September 2013.

Details of this will appear on the TargetFish website and in future Industrial Forum newsletters.