ILA vaksine – forskningsnytt

Espen Rimstad,
NMBU- Veterinærhøgskolen
Ultimate fish vaccine – requirements?

- Efficient
  - Induce disease protection
  - Reduce/stop shedding
  - Long-lasting immunity
  - Administered once

- Safe
  - No/little side effects
  - No/little environmental effects
  - No effect for consumer

- Low cost?

- Easy to administrate
  - Injectable versus oral or dip?
• ViVaFish is a platform project funded by Research Council of Norway (RCN)
Whole virus and subunit preparations

Live attenuated virus

Vectorized, propagation-defective

Exogenous antigen genes

Vaccine concepts

Espen Rimstad, NMBU
Immunology of long term protection

- Link between innate and adaptive immune responses
- Analyze adaptive CTL responses
- B-cell responses involved in long term protection

Espen Rimstad, NMBU
VIVAFISH
Platform for Fish Virus Vaccines

Optimization of delivery systems

Assays for long-lasting antiviral immunity

RNA seq / Array

Espen Rimstad, NMBU

Aluminium  Liposomes  Saponins  Oil-in-water, water-in-oil emulsions  TLR agonists
Improved prototypes for vaccines

**Efficacy**

**Safety**
- In target species
- Dissemination
- Reversion
- Latency

**Ecotoxicity**
- Target versus non-target species
- Host range.
- Establishment in the environment
- Potential for recombination

Espen Rimstad, NMBU


VIVAFISH
Platform for Fish Virus Vaccines

Espen Rimstad, NMBU
VIVAFISH
Platform for Fish Virus Vaccines

Pancreas disease virus is an Alphavirus
VIVAFISH
The use of PD virus as a vaccine vector

(IM injection to fish)

(Amplification+ dsRNA)

HH 5'UTR nSP1-2-3-4 Gene of interest 3' UTR pA T7t

pnSP -SDV

CMV/T7 promoters

nSP1234

Antigen

Ab (IgM)

Ag presentation

Cellular response

T cyto.

Antigen expressed intracellularly

Espen Rimstad, NMBU
VIVAFISH
The use of PD virus as a vaccine vector

IM injection to fish

(Amplification+ dsRNA)

nSP1-2-3-4 Gene of interest

5'UTR

3'UTR

pA

J

pnSP-SDV

CMV/T7 promoters

 pokkuvirus

pnSP

Cytosolic presentation of antigen

Antigen expressed intracellularly

Ab (IgM)

Cellular response

T cell

MHC

Espen Rimstad, NMBU
VIVAFISH
Platform for Fish Virus Vaccines

Infeksiøs lakseanemi - ILA
Wolf et al 2013, 2014

Espen Rimstad, NMBU
VIVAFISH
Platform for Fish Virus Vaccines

Cumulative % mortality

Days post challenge

Pankreas sykdom - PD       Hikke et al 2014

Espen Rimstad, NMBU
Oral vaccines

Oral booster after injections vaccines gives increased specific IgM

Oral vaccine alone gives some protection if it is packed into special microcapsules.

Tobar et al 2015 –CentroVet (Chile)

Caruffo et al 2016,–CentroVet (Chile)

Espen Rimstad, NMBU
• ISAV is a relative to Tilapia Lake virus.