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Experimental vaccination of small turbot against bacterial and viral pathogens.

E. Lorenzen[1], J. S. Rasmussen[1], T. E. Kjær[1], K. Einer-Jensen[1], K. Engell-Sørensen[2], I. Dalsgaard[1], J. Nylén[3], K. Buchmann[4] and N.Lorenzen[1].

[1]*National Veterinary Institute, Technical University of Denmark*
[2] *Fishlab*
[3] *Intervet Schering Plough, Animal Health*
[4] *University of Copenhagen, Faculty of Life Sciences*

Turbot (*Scophthalmus maximus*) is a highly estimated fish species within aquaculture due to its delicious and tasty meet. As with other fish species, turbot occasionally suffers from infectious diseases when reared under intensive farming conditions. Two pathogens, naturally occurring in seawater, have caused major problems in cultured turbot, namely the Gram negative bacterium *Vibrio anguillarum* and the RNA-virus viral haemorrhagic septicaemia virus (VHSV). *V. anguillarum* is primarily a problem at the early fry/fingerling size stages, while VHSV can cause problems at all life stages. The present studies were undertaken as a part of the DAFINET collaboration to analyse the protective effect of immersion vaccination against vibriosis and injection vaccination against VHS.

Turbot fry were vaccinated by immersion in commercial vaccines against *A.salmonicida* and *V.anguillarum* one, two or five times prior to challenge. Challenge was performed by immersion in a suspension of *V.anguillarum* bacteria. The results showed that on average, fish vaccinated more than once and last time only 5 weeks prior to challenge performed better compared to fish vaccinated only once and 12-13 weeks prior to challenge. For VHSV, the fish (approx. 5 g each) were vaccinated by intramuscular injection with a DNA-vaccine against VHSV. Challenge was performed by immersion in - or by ip-injection of VHSV 8 weeks post vaccination. The vhs-DNA vaccine protected the fish against VHSV independently of the challenge method and the results suggested that protection was mediated by specific immune mechanisms such as virus-neutralizing antibodies.