reach this objective include: selecting a hybridoma clone that produces immobilizing monoclonal antibody against Ich, sequencing the variable regions of the IgG gene of the hybridoma clone, designing *in silico* an Ich-svFv, and evaluating *in vivo* the effectiveness of different delivery systems of the Ich-svFv. In this conference, preliminary results will be presented.
This work was supported by the EU H2020 research and innovation programme ParaFishControl (634429).
keywords: *Ichthyophthirius multifiliis*, Ich, rainbow trout, single chain antibody, scFv.

Corresponding author.
E-mail address: dsep@aqua.dtu.dk (D. Sepúlveda).

P-027.

Effect of salinity on immunological responses in striped catfish (*Pangasianodon hypophthalamus*) in larvae and juvenile stages

Dang Quang Hieu [1,2,#], Bui Thi Bich Hang [2], Do Thi Thanh Huong [2], Nguyen Thanh Phuong [2], Frédéric Farnir [3], Patrick Kestemont [1].

[1] Research Unit in Environmental and Evolutionary Biology, Institute of Life, Earth & Environment (ILEE), University of Namur, Namur, Belgium
[2] College of Aquaculture and Fisheries, Can Tho University, Can Tho city, Vietnam
[3] Department of Animal Production, Faculty of Veterinary Medicine, University of Liège, Liège, Belgium

Abstract
Effect of salinity in aquatic animals has been investigated in many species with special attention to osmoregulation capacities but how it affects the immunomodulatory responses in fish remains largely unknown. In this study, striped catfish larvae (10-day post-hatching) and juveniles (20-25 g) were chronically exposed to different salinities (namely 0, 5, 10, 15 and 20 ppt during 10 and 20 days respectively). Then the larvae were heat shocked at 390C while the juveniles were submitted to a challenge test with a virulent bacteria *Edwardsiella ictaluri.* The results showed that lysozyme activity in larval fish increased proportionally to the increase of salinity, with significant differences in groups submitted to 15 and 20 ppt (28.3 and 30.6 U/mg protein respectively). Additionally, lethal time LT50 after heat shock were 5 times higher in fish exposed to 5 and 10 ppt treatments in comparison with 0 and 15 ppt treatments ($p<0.05$). In juveniles, hyperosmotic exposure led to a significant decrease of hematocrit during both salinity exposure period and bacterial challenge, with the highest hematocrit values found in 0 ppt treatment and the lowest in 20 ppt treatment ($p<0.05$). On the other hand, blood osmolality and ion concentrations significantly increased with salinity exposure, confirming the low capacity of striped catfish to osmoregulate. The lysozyme activity reached the highest values in fish reared at 10 ppt after bacterial challenge ($p<0.05$), without significant differences with fish at 15 ppt. Histopathological observations indicated some alterations of gills (*e.g.* reduction of interlamellar cell mass, increase of epithelial cell thickness) and head kidney (*e.g.* edema between melanomacrophages, reduction of hematopoietic tissue) after salinity exposure. Complement activity did not show any significant difference between salinity treatment, neither in larvae nor in juveniles. These results support the hypothesis that hyperosmotic stress may affect the striped catfish larvae and juveniles, with a higher sensitivity observed at the larval stage.
keywords: Hyperosmotic exposure, striped catfish, immunity, histopathology, salinity.

Corresponding author.
E-mail address: quanghieudang.87@gmail.com (D.Q. Hieu).

P-028.

Recombinant VP1 and VP2 of infectious pancreatic necrosis virus trigger lymphoid cell changes and induced cytokine transcriptional expression in rainbow trout head kidney

Wong Valentina [1], Trujillo Agustin [1], Barraza Felipe [1], Ruiz-Higgs Daniela [1], Vergara Claudio [1], M. Sandino Ana [2], Wang Tiehui [3], Maisey Kevin [4], J. Secombes Christopher [3], Imarai Monica [1,#].

[1] Laboratorio de Inmunologia, Centro de Biotecnologia Acuicola, Departamento de Biologia, Quimica y Biologia, Universidad de Santiago de Chile, Santiago
[2] Laboratorio de Virologia, Centro de Biotecnologia Acuicola, Departamento de Biologia, Quimica y Biologia, Universidad de Santiago de Chile, Santiago, CL
[3] Scottish Fish Immunology Research Centre, University of Aberdeen, Aberdeen, GB
[4] Laboratorio de Inmunologia Comparada, Centro de Biotecnologia Acuicola, Departamento de Biologia, Quimica y Biologia, Universidad de Santiago de Chile, Santiago, CL

Abstract
Infectious pancreatic necrosis (IPN) is a disease that affects salmonid fish producing mortality and economic losses in the salmon industry. The agent responsible for this disease is the IPN virus (IPNV), which has a double-stranded RNA genome of two segments. The segment A encodes proteins VP2, VP3, VP4 and VP5 and the segment B encodes the VP1 protein, which is an RNA- dependent RNA polymerase.
In this work, we assessed the effects of VP1 and VP2 recombinant proteins on the lymphoid cell populations and cytokine expression in the head kidney of the rainbow trout (Oncorhynchus mykiss). Fish were i.p immunized with VP1 or VP2 and the IgM+, CD3+ and CD4+ lymphoid cells of the anterior kidney were analyzed by flow cytometry. The results showed that the percentage of IgM+ B cells did not change in the kidney of immunized fish whilst significant variations of CD3+ and CD4+ lymphoid cells were observed after VP1 and VP2 immunization, respectively. In addition, transcripts of cytokines related to the lymphoid immune response, i.e., IFNg, IL-4/13A, IL-4/13B1, IL-4/13B2, IL-2, IL-22, IL-10 and TGFb were quantified by qRT-PCR. The results showed significant increase of the cytokine transcripts and distinct expression profile in VP1 and VP2 immunized fish. In summary, recombinant VP1 and VP2 trigger distinct immune responses in the head kidney of rainbow trout, which can be essential to develop fish immunity against IPNV.
keywords: Rainbow trout, Immune response, IPNV, lymphoid cells, cytokines.

Corresponding author.
E-mail address: monica.imarai@usach.cl (I. Monica).

P-029.

Immune responses of European seabass (*Dicentrarchus labrax*) juveniles to chronic inflammation

D. Peixoto [1,2,#], M. Machado [1,2,3,4], B. Costas [1,2].

[1] CIIMAR - Centro Interdisciplinar de Investigacão Marinha e Ambiental, Matosinhos, Portugal
[2] ICBAS - Instituto de Ciências Biomedicas Abel Salazar, Universidade do Porto, Porto, Portugal
[3] i3S -Instituto de Investigacão e Inovacão em Saude, Universidade do Porto, Porto, Portugal
[4] IBMC - Instituto de Biologia Molecular e Celular, Universidade do Porto, Porto, Portugal