

infected fish, however proteases populations differed in metalloproteases and serine proteases when comparing infected and noninfected fish.

Keywords: Greater amberjack, Mucus, Skin, Proteomic, Ectoparasites

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O-115.

Comparative transcriptome analysis of pilchard orthomyxovirus (POMV) and infectious salmon anaemia virus (ISAV)

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Abstract

Pilchard orthomyxovirus (POMV) is an emerging virus of concern to the Tasmanian

Atlantic salmon industry. Originally isolated from pilchards in South Australia in 1998, this virus has now caused several high mortality events in Tasmanian farmed Atlantic salmon. Despite its classification as an orthomyxovirus, POMV is phylogenetically divergent from ISAV. While previous research has produced a formal case definition for clinical POMV, the molecular events that underpin viral infection have not been characterized. To this end we have undertaken a comparative transcriptome analysis of the response of Atlantic salmon kidney cells (ASK) to both POMV and ISAV. Despite their genetic divergence, both orthomyxoviruses induced significant, and in some cases similar, innate antiviral responses. Early up-regulation of the host pathogen recognition receptors, RIG-I and TLR3, was observed in response to both viruses and triggered downstream interferon responses. Analysis of transcription factor binding sites in the up-regulated gene sets revealed that the host response to both viruses was largely driven by interferon regulatory factor 1 and 2. Unique host responses were also observed for each virus which are likely a consequence of virus divergence. The potential to exploit these early host response genes as subclinical biomarkers specific to POMV will be discussed.

Keywords: Orthomyxovirus, transcriptome, interferon, biomarker, host-pathogen interaction

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O-116.

Characterization of flounder (*Paralichthys olivaceus*) CD4+ T lymphocyte subsets in response to Th-type antigens

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Abstract

The CD4+ T lymphocytes play crucial roles in the adaptive immune system. Naive CD4+ Th cells differentiate into a variety of effector T lymphocyte subsets, such as Th1, Th2, Th17 and regulatory (Treg) cells. These CD4+ T cells widely involved in immune regulation, immune pathogenesis and host defence through subsequent secretion of effector and regulatory cytokines. Two CD4 homologues have been reported in flounder

(*Paralichthys olivaceus*), one is like mammalian CD4 molecules, containing four extracellular Ig-like domains, named as CD4-1, and the other is a CD4-like molecule, containing two or three Ig-like domains, termed CD4-2. In this study, identification of CD4-1+ and CD4-2+ T lymphocyte subsets and the immune response to Th-type antigens in flounder were investigated. The epitopes peptides of CD4-1 and CD4-2 molecule were screened with high hydrophilicity, accessibility, flexibility, antigenicity and specificity. Two peptides were synthesized and immunized to the mouse, and then the monoclonal antibodies (mAbs) against flounder CD4-1 and CD4-2 were produced, respectively. The mAbs had high specificity in identifying flounder CD4-1+ and CD4-2+ T lymphocyte subsets. And then, three Th-type antigens, poly (I:C), PMA and β -glucan, were injected to flounder, respectively, the percentages of CD4-1+ and CD4-2+ T lymphocytes and the transcription factors and cytokines in sorted CD4+ cells subsets were detected. The results showed, CD4-1+ and CD4-2+ cells in peripheral blood, spleen and head kidney were all increased after stimulation. Notably, CD4-2+ cells were give stronger response to poly (I:C), which indicated that CD4-2+ cells may play a main role in the Th1-related immune responses. While the proliferation of CD4-1+ cells were showed no difference to three antigens. The Th cells transcription factors and related cytokines in sorted CD4+ cells were sharply up-regulated. These results demonstrate that the CD4+ cells in flounder have potentials to differentiate into different Th cells similar to mammalian.

Keywords: CD4+ T lymphocytes; monoclonal antibody; antigens; immune response

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O-117.

Functional additives in low fish meal and fish oil based diets for European sea bass (*Dicentrarchus labrax*): Effects on immune response, stress and disease resistance

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Abstract

The use of terrestrial raw materials to replace fish meals and oils in fish diets may affect fish growth performance and health. In the last years functional additives have been profiled as good candidates to reduce the effects on health and disease resistance derived from this replacement, via reinforcement of the fish immune system. On the present study four isoenergetic and isonitrogenous diets with 10% FM and 6% FO levels supplemented with 5000 ppm galactomannan oligosaccharides (GMOS), 200 ppm of a mixture of essential oils (PHYTO) and a combination of both products, 5000 ppm galactomannan oligosaccharides plus 200 ppm of a mixture of essential oils (GMOSPHYTO). Fish were fed the experimental diets in triplicate for 9 weeks and then fish were subjected to a stress confinement (S treatment) challenge combined or not with an experimental intestinal infection with *Vibrio anguillarum* (SI treatment). Along the challenge test, selected stress and immunological parameters were evaluated at 2h, 24h and 7 days post S or SI treatment. As stress indicators, plasmatic cortisol and glucose levels as well as gene expression of *cyp11 β -hydroxylase*, *hypoxia-inducible factor*, *steroidogenic acute regulatory protein*, *heat shock protein 70* and *heat shock protein 90* (CYP11 β , HIF, StAR, HSP70 and HSP90) were measured. As immune response markers, serum and skin mucus lysozyme levels, bactericidal and peroxidase activities as well as gene expression of *Caspase -3* (Casp 3) and *interleukin 1 β* (IL-1 β) were measured. Besides, fish survival rate to *V. anguillarum* was monitored at the end of the challenge test. Fish fed GMOS and PHYTO diets increased fish relative