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Piscine orthoreovirus-3 (PRV-3), a new pathogen for farmed rainbow trout

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Abstract

Piscine orthoreovirus – PRV have emerged as relevant pathogens for salmonid aquaculture worldwide. Three different subtypes of this viral species have so far been described:

- PRV-1 is the causative agent of heart and skeletal muscle inflammation (HSMI) in Atlantic salmon and is associated with jaundice syndrome in farmed Chinook salmon
- PRV-2 causes erythrocytic inclusion body syndrome (EIBS) in Coho salmon
- PRV-3 causes heart pathology resembling HSMI in rainbow trout

PRV-3 was firstly discovered in 2013 in Norway during disease outbreaks affecting farmed rainbow trout. The Norwegian PRV-3 isolate has been characterized by performing full genome sequencing and demonstrating causative relationship between the infection and the development of heart pathology in Rainbow trout.

An experimental infection study with purified virus demonstrated that PRV-3 infects rainbow trout and induces pathological heart lesions similar to Heart and Skeletal Muscle Inflammation (HSMI)

During 2017 the presence of PRV-3 was also reported in different countries in Europe. Interestingly, these viral isolates appear to be genetically distinct from the Norwegian isolate leading to proposition of two separate clades within PRV-3 viral type (PRV-3a and PRV-3b).

In Denmark the virus has been associated with severe disease outbreaks in recirculating aquaculture systems. Clinical signs are represented by reduced appetite followed by uncoordinated swimming behavior and increased mortality; necropsy findings include severe anemia and ascites. Such outbreaks are complex disease cases where different bacterial (including *Flavobacterium psychrophilum* and *Renibacterium salmoninarum*) and viral pathogens (IPNV) are present at the farms. Notably PRV-3 load increases in the target organs (heart, spleen) before the clinical disease appear, whereas the other pathogens are not detected in a systematic pattern.

In 2018 in cooperation with the Danish aquaculture industry, the presence of the virus has been mapped in the country, and a comparative study including the 2 PRV-3 subtypes conducted.

The preliminary results show suggests that PRV-3b is capable of faster replication than PRV-3a inducing higher innate inflammatory response and more severe heart pathology.

Results will be presented and discussed.

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