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*Published in:*

5th NordicRAS Workshop on Recirculating Aquaculture Systems Berlin, Germany, 7-8 October 2019: Book of Abstracts

*Publication date:*

2019

*Document Version*

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Vendramin, N., Sørensen, J., Cuenca, A., Dahle, M., Olsen, A. B., Iburg, T., Rimstad, E., & Olesen, N. J. (2019). Piscine orthoreovirus-3 (PRV-3), a new pathogen for farmed rainbow trout. In J. Dalsgaard (Ed.), *5th NordicRAS Workshop on Recirculating Aquaculture Systems Berlin, Germany, 7-8 October 2019: Book of Abstracts* (pp. 39-39). DTU Aqua. DTU Aqua-rapport No. 350-2019

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

Niccolò Vendramin<sup>1\*</sup>, Juliane Sørensen<sup>2</sup>, Argelia Cuenca<sup>1</sup>, Maria Dahle<sup>3</sup>, Anne Berit Olsen<sup>4</sup>, Tine Iburg<sup>1</sup>, Espen Rimstad<sup>2</sup>, Niels Jørgen Olesen<sup>1</sup>

<sup>1</sup>DTU AQUA, Technical University of Denmark, Kgs. Lyngby, Copenhagen; <sup>2</sup>Department of Food Safety and Infection Biology, Norwegian University of Life Sciences, Oslo, Norway; <sup>3</sup>Norwegian Veterinary Institute, Oslo, Norway; <sup>4</sup>Norwegian Veterinary Institute, Bergen, Norway

### 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.

Acknowledgements: This research was funded by Henriksens Fond.

\*niven@aqua.dtu.dk