
Western Fisheries Research Center

Piscine reovirus

(Other names: piscine orthoreovirus, Atlantic salmon reovirus)

Key points

- The disease heart skeletal muscle inflammation (HSMI) was first observed in 1999 in farmed Atlantic salmon from Norway. Losses in aquaculture due to HSMI can range up to 20%, although morbidity can be greater. The disease is associated with histopathologic changes in the heart and skeletal muscle, including myocardial degeneration in the ventricle. The disease typically manifests 5 – 9 months after transfer of Atlantic salmon smolts from fresh water to seawater. [1]
- Piscine reovirus (PRV) is a novel virus that has been linked to (HSMI) in farmed Norwegian Atlantic salmon. While the virus is also ubiquitous in asymptomatic wild and farmed Atlantic salmon in both the marine and freshwater environments in Norway, HSMI is typically associated with elevated levels of PRV genetic material. [2,3]
- Norwegian researchers reported the isolation of a reovirus, identical in sequence to PRV, using the grouper fin (GF-1) cell line. Injection of first passage, cell culture derived material into naïve Atlantic salmon caused histopathologic changes consistent with HSMI [4]. However, the high prevalence of PRV in asymptomatic fish has raised questions about the exact relationship between PRV and HSMI. Additional host or environmental factors may need to be present for clinical signs of HSMI to occur. More research is required but it is very clear that the presence of PRV in fish tissues alone cannot be used to diagnose HSMI [4,5].
- A recent study indicates that PRV replicates preferentially in red blood cells (erythrocytes) of Atlantic salmon and creates inclusion bodies in the cytoplasm of infected cells that bear some resemblance to those caused by erythrocytic inclusion body syndrome (EIBS) virus [6]. However, PRV has not been associated with the syndrome typically associated with EIBS, which includes anemia and secondary infections [7].
- PRV genetic material has also been detected in farmed Atlantic salmon in Chile, Scotland and Ireland, as well as in trout and salmon from British Columbia, Canada [8,9]. A disease resembling HSMI has been reported in farmed Atlantic salmon in Scotland [10]. There have been no confirmed reports of HSMI disease in Ireland, Chile or British Columbia.
- Limited surveillance of Pacific salmon for PRV is currently being conducted in Washington State using a published polymerase chain reaction (PCR) assay [4] that detects viral genetic material. A total 724 samples representing 34 locations and five Pacific salmon and trout species were tested. PRV genetic material was detected in Chinook and Coho salmon originating from 6 different locations representing the Columbia River, Salish Sea and Washington Coast. There have been no confirmed reports of HSMI disease in Washington State.
- The global distribution of this virus is not presently known and there is limited characterization of strain diversity. Thus, it is premature to make inferences regarding epidemiological linkages.
- Presently, the ubiquitous nature of PRV and the lack of a clear association with disease suggest the virus poses a low risk to Pacific salmon. However, controlled laboratory challenge studies are needed to fully evaluate the risk.

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