

Cardiomyopathy Syndrome Experimental Model in Atlantic Salmon

Cardiomyopathy Syndrome of farmed Atlantic salmon has become widespread since it was first recognised in Scotland and Norway in the 1980's and is responsible for significant losses particularly of larger, market size fish. Mortalities may be chronically elevated and acute mortalities may occur, often associated with a stressful event such as handling for sea lice treatment.

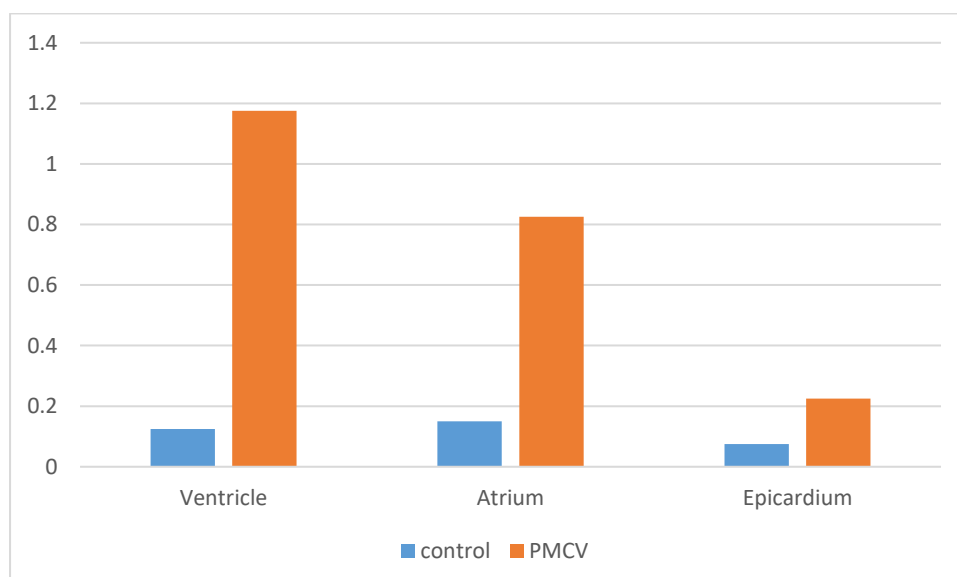
Affected fish may show no external signs other than sudden mortality. Clinical signs, where present, are typically those associated with heart failure. Histologically, characteristic changes including inflammatory cell infiltration, cell degeneration and cell necrosis are apparent in the heart muscle.

The primary cause of the condition is believed to be infection with piscine myocarditis virus (PMCV), a double-stranded RNA virus with genetic similarities to members of the family Totiviridae. To date, PMCV has not been isolated in pure culture and shown to reproduce disease and this impairs efforts to develop effective control measures.

Moredun Scientific has recently validated an experimental model of Cardiomyopathy Syndrome in Atlantic salmon post-smolts. The model is based on injection of fish with PMCV obtained from tissues from clinically affected fish. Source material was homogenised in tissue culture medium, and purified by filtration and centrifugation. Homogenates were screened by PCR to confirm the presence of PMCV and to exclude interfering viruses causing similar pathologies. Viability of the PMCV preparation was confirmed by demonstration of cytopathic effect using a susceptible fish cell line.

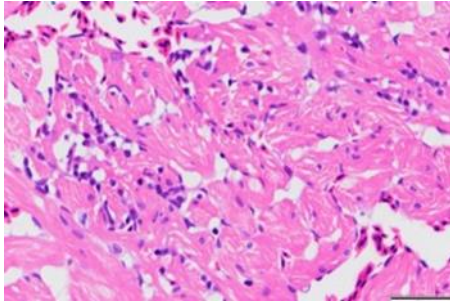
In the validation study, duplicate groups of 40 fish were challenged by intra-peritoneal injection with the PMCV preparation. 100% of experimental fish injected with the preparation were found to be PMCV positive at 4 weeks and 10 weeks post challenge. All control fish were PMCV negative. (Figure 1)

Figure 1. Heart histopathology scores



Experimentally challenged fish showed no clinical signs and the pathological effect was determined by scoring of histopathological changes in the heart. (Figure 2).

Figure 2. CMS Histology



Validation studies demonstrated that the challenge model resulted in a substantial increase in heart scores in affected fish. A range of promising clinical biomarkers have also been identified to support PMCV challenge studies.

The PMCV challenge is available for use in contract studies at Moredun Scientific. Please contact us for further information info@moredun-scientific.com

