

Establishing an Atlantic Salmon (*Salmo salar* L.) Primary Gill Cell Line for Advancing Research on Infectious Salmon Anemia Virus (ISAV) HPRO



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Background:

- ISAV is a negative sense single stranded RNA virus that belongs to the genus *Isavirus*, and family *Orthomyxoviridae*.
- Responsible for the viral disease, infectious salmon anemia in Atlantic salmon (*Salmo salar* L.).
- Mortality in aquaculture facilities vary from 0-90%. (Weli et. al 2021).
- The disease ISA is caused by the virulent strains with deletions in a highly polymorphic region (HPR) and is designated as ISAV-HPRΔ.
- A low pathogenic variant (ISAV-HPRO) is thought to have an ancestral relationship with ISAV-HPRΔ (Godoy et. al, 2015).
- ISAV-HPRO has an affinity for Atlantic salmon gills

Method:

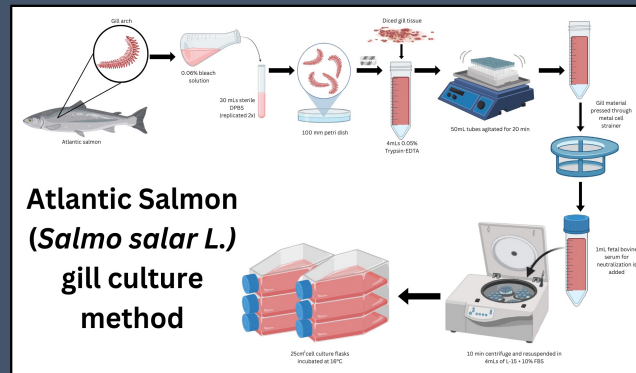


Figure 1: Workflow of establishing primary gill cells presented in a graphic. Courtesy of Corinne Noufi (Aquaculture Research Institute).

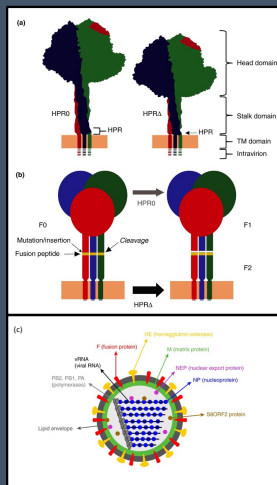


Figure 1: (a) Left: Full-length haemagglutinin-esterase (HE) protein. Right: The stalk-length reduced HPRΔ variant. (b) Fusion protein cleavage from F₀ to F₁ and F₂. (c) ISAV particle



Figure 2: Setup of all materials used during the primary gill cell culture procedure.

Aims:

- To generate a reproducible method of obtaining Atlantic salmon (*Salmo salar* L.) gill cells.
- Further investigation into infectious salmon anemia virus (ISAV) non-delete HPRO strain.
- Possible culture of ISAV-HPRO from Atlantic salmon gills that have tested positive for ISAV-HPRO

Conclusion/Future:

- A method to obtain primary gill cells has been obtained and shown to be reproducible.
- Next steps are to generate a method that contains a precise amount of tissue.
- Culturing primary cells from ISAV-HPRO positive fish.
- Testing salmon serum and/or various concentrations of fetal bovine serum

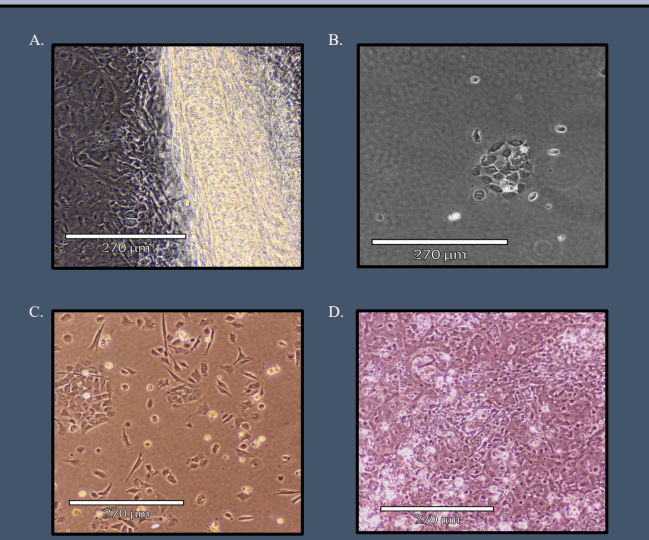


Figure 3: Various stages of confluency while culturing primary gill cells from Atlantic salmon (*Salmo salar* L.). (A) gill lamellae in middle with gill cells protruding out from tissue. (B) Primary gill cell cluster the second day after culture. (C) Primary gill cells three days post culture. (D) Full confluency of gill cells seven days post culture.