Washington University in St. Louis
Office of Technology Management

ALPHAVIRUS-RESISTANT FISH

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Background: Aquaculture is the most resource-efficient method to produce protein, improve nutrition, and food security and is vital for supporting seafood production. The Food and Agriculture Organization of the United Nations estimates over 50% of all global seafood for human consumption is produced from aquaculture and has been increasing an average of 3.3% per year. Aquaculture safeguarding is necessary to ward off infection that can be deleterious to fish survival and growth. Atlantic salmon, the primary species for marine finfish aquaculture, and Trout, the third species for freshwater aquaculture, are both susceptible to alphavirus infection. Alphavirus infection can result in 70-100% infection, leading to 10 to 50% mortality with 15% of the remainder becoming runts from alphavirus induced Salmon Pancreas Disease or Sleeping Disease Syndrome (Figure 1). Significant fish deaths and diseases need to be reported and quarantine measures taken as alphavirus infection can have widespread and detrimental effects on the industry.

Figure 1. Growth impacted by Salmon Pancreas Disease (The Fish Site)

Technology Description: Scientists at Washington University School of Medicine have identified a mode of alphavirus entry in salmon and trout. A novel cell adhesion receptor, Mxra8, acts as an entry mediator facilitating alphavirus infection. A knockout Mxra8 allele was generated with CRISPR/Cas9 gene editing, in addition to Mxra8 mutant alleles. By editing the expression of Mxra8, alphavirus infection can be attenuated in salmon and trout.

Key Advantages:

- Limits alphavirus infection
- Improves aquatic animal health
- Reduces revenue loss

Patent: Pending

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