

Aquareovirus

I. Causative Agent and Disease

Aquareovirus is a recent new genus in the virus family Reoviridae. These icosahedral (60-80 nm) double-stranded RNA viruses (over 50 isolated) with 11 genome segments have been isolated in cell culture from a variety of marine and freshwater aquatic animals worldwide including finfish and bivalve molluscs. There are several reports of reo-like viruses observed in crustaceans but these viruses have fewer or more genome segments and most have not been cultured. Genetic analyses have identified 7 (A, B, C, D, E, F, G) different genotypes of aquareoviruses. Except for isolates reported from 7 fish species, most of these viruses produce self-limiting infections of low pathogenicity in fish that are not associated with extensive disease or mortality. In bivalve molluscs these viruses are most likely bioaccumulated by the filter feeding mechanism. These viral agents in shellfish are most often isolated from asymptomatic adult animals during routine virus screening examinations.

II. Host Species

Currently, aquareoviruses appear to be mostly of finfish origin with a wide host range of marine and freshwater species. In Alaska, *Aquareovirus* has been isolated from ovarian fluids of returning chinook salmon (genotype F) and adult geoduck clams (genotype A). Because aquareoviruses appear to be widespread in many fish host species, it is likely other bivalve mollusc species in Alaska may bioaccumulate these viruses from marine fish. Other isolates of aquareovirus (13p2) from bivalve molluscs have been reported from eastern oysters in waters off Long Island, New York.

III. Clinical Signs

Fish and bivalve molluscs are generally asymptomatic carriers and vectors, respectively, of the virus.

IV. Transmission

Transmission is horizontal via water. Isolates from bivalve molluscs likely represent virus bioaccumulated by filter feeding after the virus is shed into the water column from a nearby fish host.

V. Diagnosis

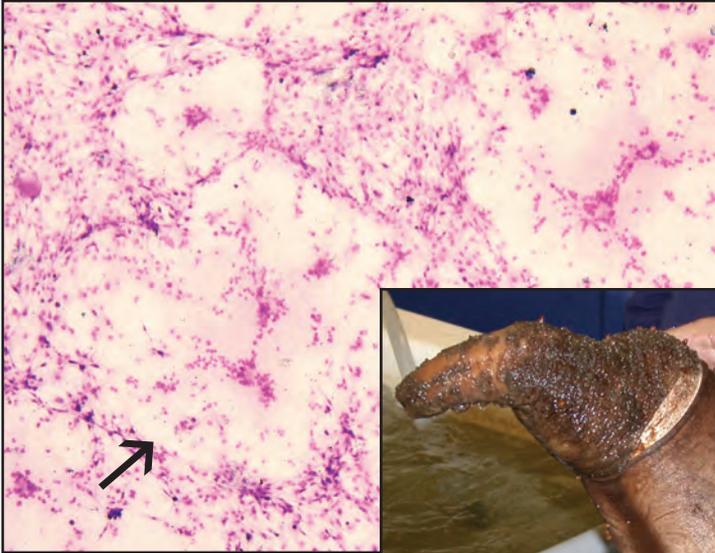
Detection of aquareoviruses is accomplished by isolating the virus in cultures of susceptible fish cell lines that have been inoculated with contaminated shellfish tissue. Nearly all of these viruses cause a unique cytopathic effect (CPE) characterized by focal areas of cellular fusion (syncytia) and cytoplasmic destruction creating a vacuolated or foamy appearance. An exception is the grass carp *Aquareovirus* that produces a diffuse CPE. Presumptive identifications are based on the typical CPE and confirmed serologically, by electron microscopy or by polymerase chain reaction (PCR). There are no established bivalve mollusc or crustacean cell lines for isolating viruses, although there has been some success in culturing primary cell monolayers from certain shellfish species.

VI. Prognosis for Host

Bivalve molluscs are asymptomatic vectors of the viruses which are transiently present in the water column.

VII. Human Health Significance

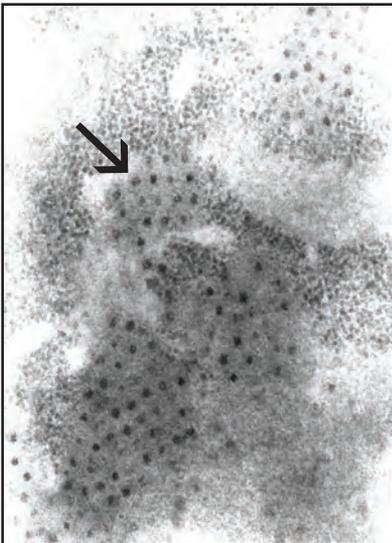
There are no zoonotic human health concerns associated with aquareoviruses.



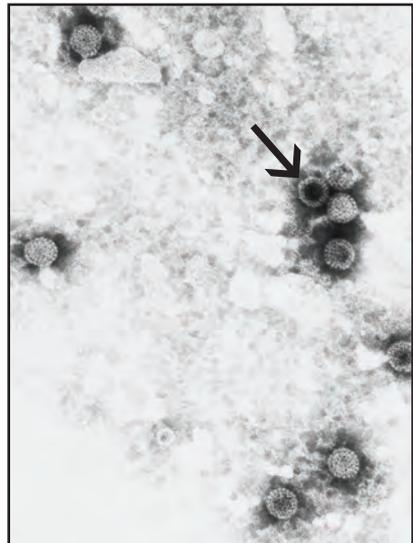
Stained focal area of syncytial CPE (arrow) of geoduck *Aquareovirus* in bluegill fry cells.



Adult geoduck clam, a vector species for *Aquareovirus* in Alaska.



TEM showing cytoplasmic arrays of geoduck *Aquareovirus* particles (arrow) in cultured bluegill fry cell



Negative stain of virus particles (arrow) showing double capsid morphology