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Asfarviridae

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African Swine Fever

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This is a new family for a category that was referred to previously as the African swine fever-like viruses. It consists of one genus and one species, the cause of African swine fever.

Viral Characteristics

- The virions of African swine fever are large, complex and in some structural respects resembles poxviruses.
- This DNA virus consists of a nucleoprotein (70 - 100 nm in diameter) surrounded by an icosahedral capsid and externally by a lipid layer (see Fig. 14-1).
- The genome is linear, double stranded (170 - 190 kb in length), and encodes 150 - 200 proteins.
- Virus replication takes place in the cytoplasm of host cells (swine macrophages *in vivo* and *in vitro*) and in soft ticks of the genus *Ornithodoros*. Thus asfarviruses are the only known DNA arboviruses.
- The dsDNA is used as a template for both mRNA and progeny genomes.
- The virus particles are stable in the environment being considerably resistant to heat and pH changes. For example, the virus is stable for 70 days in blood on wooden boards and 140 days in salted dried hams.



Figure 14-1. Asfarviridae (175 - 215 nm). The icosahedral capsid is surrounded by a lipid-containing envelope. - To view this image in full size go to the IVIS website at www.ivis.org . -

Classification

This family has only one genus, Asfivirus, and one species that causes African swine fever.

Asfivirus

African Swine Fever (ASF)

(Wart-hog disease virus)

Cause

African swine fever virus. The only species of the only genus Asfivirus.

Occurrence

The disease occurs in domestic and wild swine in sub-Saharan Africa. Natural infections also occur in wart hogs, bush pigs and giant forest swine and they may serve as reservoirs. Outbreaks have occurred in the Portugal, Spain, France, Malta and Italy. It has been eradicated from major European countries. The disease has also appeared sporadically in Cuba, Haiti, the

Dominican Republic, and Brazil.

Transmission

Spread is by direct and indirect contact. The mode of infection is principally by the oronasal route, but also by tick vectors that may remain infectious for long periods.

The virus may be present in uncooked pork products and may be spread by the feeding of waste food from ships and airplanes.

Pathogenesis

After infection by the oronasal route the virus replicates in the pharynx, tonsils and dependent lymph nodes. Viremia is followed by infection of bone marrow, lymph nodes, lungs, kidneys and liver where further replication takes place in cells of the lymphoreticular system.

Clinical & Pathologic Features

The disease resembles somewhat hog cholera (swine fever), with mortality reaching up to 95 - 100% when first introduced. In hog populations in which the infection is endemic, the disease is less severe and may be mild and even subclinical.

The incubation period varies from a few days to two weeks. In peracute cases death may occur in 1 - 2 days with no other sign than high fever. Signs in the acute disease resemble those of acute swine fever. They may include high fever, inappetence, dehydration, dullness, coughing, partial paralysis, convulsions, mucopurulent ocular and nasal discharges and blood-tinged diarrhea. Death usually occurs about a week after the onset of fever.

Pigs dying of the peracute disease may show no gross lesions. Gross and microscopic lesions in the acute disease closely resemble those of acute hog cholera. The vascular system is severely affected with severe hemorrhages involving all organs and lymph nodes. In contrast with hog cholera, however, button ulcers are not usually seen, and severe edema of the lungs is present, with marked increases in pericardial, pleural, and peritoneal fluids.

Diagnosis

- Clinical specimens: Blood, spleen, tonsil, and lymph nodes.
- Presumptive diagnosis is usually based on clinical features and pathologic changes; however, definitive diagnosis requires isolation and identification of the virus in cultures of porcine macrophages or by direct fluorescent antibody examination of affected tissues.
- The ELISA is considered the most useful serologic test for detecting antibodies to ASF virus. Other procedures have been used including complement fixation and indirect immunofluorescence.
- Although the PCR can be used to detect virus in tissues it is not usually required.

Prevention

- Effective immunization procedures have not yet been developed. Strict quarantine and slaughter are recommended.
- Waste food from international aircraft and ships should be routinely incinerated.

Glossary

Arbovirus: Any virus of vertebrates that is transmitted via arthropods.

Wart Hog: A wild African pig with tusks and wart-like protuberances on the face.

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