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# African Swine Fever: An important disease in Pigs, its impact and control

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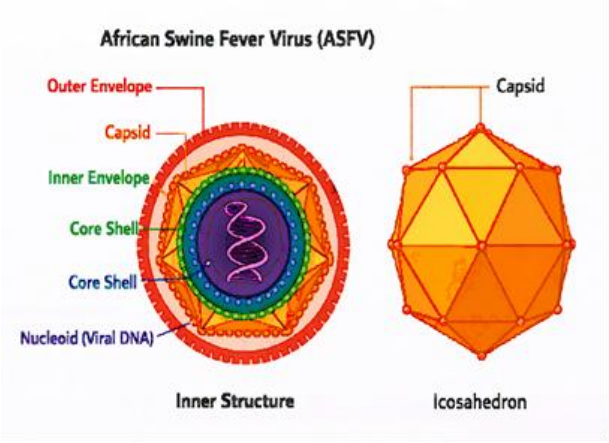
African swine fever (ASF) is a viral disease that can cause death in almost all infected pigs. The disease is prevalent in many countries across Africa, Europe and Asia, causing huge losses in pig farming. Because of this, it is becoming a serious problem for farmers, pork supply, and food security worldwide (Dixon et al., 2019). ASF is caused by the African swine fever virus (ASFV) a highly virulent virus and its complicated structure helps it's survival in pigs and environment. ASFV comprises a double-stranded DNA virus of the genus *Asfivirus* in the family *Asfarviridae* (Gaudreault et al., 2020). ASFV virions are icosahedral, 200–300 nm in diameter, and possess a complex structure: a nucleoid, core shell, inner envelope and an outer envelope acquired during budding (Salas & Andrés, 2013). Researchers have found 24 genotypes of ASFV based on their genetic makeup and is transmitted by soft ticks, which can carry the virus for a long time (Njau et al.,2021).

## History of Major Outbreaks

| Year / Period | Location | Description of Event | Reference |
|---|---|---|---|
| **1921** | Kenya & Sub-Saharan Africa | First ever detection of ASFV in domestic pigs. | Montgomery, 1921 |
| **1957** | Portugal | First European outbreak; later spread to Spain and other nearby countries. | Arias & Sánchez-Vizcaíno, 2002 |
| **1970s–1980s** | Caribbean & South America | ASFV spread to Cuba, Dominican Republic, Brazil | Costard et al., 2009 |
| **2007** | Georgia | Introduction of ASFV Genotype II; initiated rapid spread across Eurasia. | Sánchez-Vizcaíno et al., 2015 |
| **2018** | China | Outbreak leading to large economic losses and spread across Asia. | Zhou et al., 2018 |
| **2020** | Sub-Saharan Africa, Eastern Europe, Russia, China, Southeast Asia | ASFV remains endemic and continues to pose global risk. | Dixon et al., 2020 |

**Structural organisation of African swine fever virus (ASFV)**




**Infection Dynamics**

African swine fever virus enters the body of a pig through mouth, nose or open wounds. Upon entrance, the virus uses macrophages as its primary target. These infected immune cells help the virus spread quickly from one organ to another, including the spleen, lymph nodes, liver and lungs (Venkateswaran et al., 2024).

ASFV infection happens in two major phases

1. **Early infection phase**: The virus enters cells using proteins present in its envelope and starts copying its genetic material inside viral factories located in the cytoplasm. During this stage, the virus blocks early immune responses so the host cannot detect it quickly.
2. **Systemic spread phase:** In this virus multiplies very fast inside macrophages and causes damage to immune organs. The virus then travels through the blood to reach different tissues causing high fever, bleeding and strong inflammation.

ASFV has several genes that help it stick to pig cells, enter inside, and move within the cell cytoplasm. These include p12, p54, p30, E199L, and E248R. Research has shown that different types of ASFV strains can spread differently and the sickness they cause can vary from mild to very severe (Venkateswaran et al., 2024).

**Transmission and Spread**

ASFV can spread through several ways

**Direct Contact:** Healthy pigs can get infected by directly coming in contact with sick pigs or wild boars and coming into contact with saliva, blood, or waste (Costard et al., 2013).

**Indirect Contact:** The virus spreads through contaminated objects like tools, vehicles, clothes, feed or the surrounding environment (Sánchez-Vizcaíno et al., 2015).

**Vector Transmission:** Some insects and ticks can also spread the disease. Soft ticks (Ornithodoros moubata in Africa, O. erraticus in Europe) can carry the virus for long periods and infect pigs through bites. Stable flies (Stomoxys calcitrans) may also spread the virus, but their role is smaller.

**Swill Feeding**: Pigs can get infected by eating leftover kitchen waste that contains raw or undercooked meat from infected pigs.

**Human-Mediated Spread:** Humans unknowingly spread the virus by movement of infected pigs, transporting contaminated pork products or using dirty equipment.

**Environmental Persistence**: ASFV is very strong and can survive for months in pork meat, blood, or pig waste, making the disease harder to control.

**ASF spreads through**

- **Sylvatic cycle**: Spread between wild pigs (warthogs, bushpigs) and soft ticks.
- **Domestic cycle**: Spread between farm pigs, especially when biosecurity is poor.

**Clinical Symptoms**

The signs of this disease depend on the type of viral strain (genotype), how pigs get infected, and the pigs' health.

**Peracute form**

- Pigs may die suddenly with almost no visible signs.

**Acute form**

- Very high fever (40–42°C).
- Weakness, tiredness and loss of appetite
- Skin turns red or bluish
- May vomit or have diarrhoea
- Pregnant pigs may abort
- Pigs usually die within 7–10 days

**Subacute form**

- Similar to acute form but less severe
- Death rate: 30–70%, usually over 10–20 days

**Chronic form**:

Weight loss

- Skin wounds sores
- skin ulcers
- Lung infection
- Off-and-on fever.
- Lesions are less obvious

**Diagnosis**

African Swine Fever cannot be confirmed solely by examining sick pigs, as many other pig diseases can cause similar symptoms. To be sure, special laboratory tests are needed. Clinical samples are collected from pigs, including blood and serum for PCR and ELISA tests, as well as tissue samples from organs such as spleen, lymph nodes, tonsils, lungs, and kidneys, which contain high concentrations of virus. The PCR test is the most important, as it detects the virus's genetic material rapidly and precisely. In addition to animal samples, virus isolation methods can also be applied to environmental materials such as feed, pork products, soil, and farm equipment to detect virus contamination and prevent further spread.

**Prevention and Control**

**1. Biosecurity (Keeping the farm clean and safe)**

Regularly disinfecting pig houses using strong disinfectants like bleaching powder or other approved chemicals (sodium hypochlorite, caustic soda, glutaraldehyde). Not allowing unnecessary visitors, vehicles or tools to enter the farm. Changing clothes and clean boots before entering pig areas.

**2. Culling (Removing infected pigs)**

If pigs are confirmed infected, the whole infected group must be removed to stop the spread. Dead pigs must be buried or burned safely.

**3. Quarantine (Stopping movement)**

Restricting the movement of pigs or pork from infected areas, banning feeding kitchen waste or leftover meat to pigs.

**4. Surveillance (Testing and early detection)**

Regular testing (like PCR or ELISA) helps find the disease in early stages. Quick reporting to veterinarians prevents big outbreaks.

**5. Wildlife Management :** Domestic pigs must be kept away from wild boars. Ticks should be controlled in areas where they can spread the virus.

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