

Suid Herpesvirus 1

(Pseudorabies or Aujeszky's disease virus)

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(Pseudorabies or Aujeszky's disease virus)

- Virus belongs to genus *Varicellovirus*, subfamily *Alphaherpesvirinae*, family *Herpesviridae*
- Causes **Pseudorabies** (syn. Aujeszky's disease, named after Aujeszky an Hungarian pathologist & microbiologist)
- **Swine are the primary host and reservoir for the virus**
- Other animals (cattle, sheep, goats, dogs, cats etc.) are susceptible and infection in these incidental hosts is usually fatal
- Infections in horses are rare
- Reports of human infection are limited and are based on sero-conversion rather than virus isolation

Transmission

- Virus is shed in **saliva, milk, semen and nasal discharges** of swine, transmission can occur by licking, biting and aerosols
- **Ingestion of virus-contaminated material**, including pork, is probably the most common source of infection for carnivore hosts
- **Rats** may contribute to farm-to-farm transfer, and are probably the source of infection for dogs and cats
- **Transplacental transmission** occurs and aborted fetuses are a source of virus
- **Sheep are highly susceptible**, may acquire infection from direct contact with pigs or when sharing the same airspace

Pathogenesis

- Following infection, virus replicates in epithelium of naso-pharynx and tonsils, from these virus spreads to regional lymph nodes and CNS along axons of the cranial nerves
- Virulent strains produce a brief viraemia and become widely distributed around the body, particularly in the respiratory tract
- Virus replicating in alveolar macrophages interferes with their phagocytic function
- Trans-placental transfer results in generalized infection of fetuses
- Infected animals excrete virus for up to three weeks following infection
- Latency occurs in trigeminal ganglia and tonsils

Clinical signs

- Severity of clinical signs: Influenced by age, susceptibility of infected pigs and virulence of infecting strain, Pruritus is rare in swine

In piglets:

- **Fever, listlessness and anorexia** are quickly followed by tremors, seizures or other **signs of CNS involvement**
- Some piglets with hindleg paralysis may sit on their haunches in a "dog-like" position, others may become recumbent and paddle, or walk in circles
- **Mortality- very high (approaches 100%)**
- Once neurological signs develop, the animal usually dies within 24 to 36 hr
- **Most severely affected**, sudden death may also be seen
- Similar signs occur in slightly older piglets, but the mortality rate is lower. Vomiting and respiratory signs have also been reported in older age groups



In weaned pigs

- **Mainly a respiratory illness**
- Clinical signs include fever, anorexia, weight loss, coughing, sneezing, conjunctivitis and dyspnea
- CNS signs are occasionally seen
- Weaned pigs tend to recover after 5-10 days

In adults:

- Infection usually **mild or inapparent, with respiratory signs** predominating
- Some adult pigs may develop more severe respiratory signs progressing to pneumonia
- Neurological signs reported occasionally

Pregnant sows

- In fully susceptible herds, up to 50% of pregnant sows may abort in short duration of time, due to rapid spread of infection from an index case or carrier
- Infection of a sow in **early gestation results in death and resorption of embryos** (embryonic loss)
- Infection **later in pregnancy result in abortion**
- Infection in **late pregnancy** may terminate with delivery of a **mixture of mummified, macerated, stillborn, weak and normal piglet**
- **Up to 20%** of aborting sows are **infertile on the first subsequent breeding**, but do eventually conceive



Clinical Signs in Non-definitive Hosts

- Important secondary hosts include cattle (“mad itch”), sheep, dogs (“pseudorabies”), and cats
- Infection usually by ingestion, less commonly inhalation, and possibly via minor wounds

In cattle and sheep:

- The initial sign is usually **intense pruritus**, concentrated in a patch of skin, which presents as severe licking, rubbing or gnawing
- Self-mutilation is common
- Progressive involvement of the central nervous system seen
- Affected animals become progressively weaker, and eventually recumbent, before death
- Convulsions, bellowing, teeth grinding, cardiac irregularities and rapid, shallow breathing are also common



In dogs and cats:

- The **frenzy associated with intense pruritus**
- Paralysis of the jaws and pharynx, accompanied by drooling of saliva and plaintive howling, **simulates true rabies**
- However, **no tendency for dogs to attack other animals**
- In cats, disease may progress so rapidly that frenzy is not observed



Lesions:

- The **relative lack of gross lesions in young swine** is notable
- Tonsillitis, pharyngitis, tracheitis, rhinitis, and esophagitis occasionally may be evident, with formation of a diphtheritic pseudomembrane overlying the affected mucosa
- Discrete small white or yellow foci of necrosis may sometimes be present in the liver and spleen
- Microscopically, the principal findings in both swine and secondary hosts are in the central nervous system, seen as non-suppurative meningoencephalitis and ganglioneuritis

Diagnosis

- The history and clinical signs often suggest the diagnosis, which is confirmed by histopathology and virus detection methods
- Specimens of brain, spleen and lung from acutely affected animals are suitable for virus isolation
- Nasal swabs, collected from live animals, may also be used
- Serological tests- virus neutralization, ELISA and latex agglutination, for detecting ADV antibodies
- Immunohistochemistry or fluorescent antibody staining of frozen tissue sections
- PCR assay, virus isolation

Prevention and control

- Preventive measures in an endemic region include isolation and testing of new animals before adding to herd, and biosecurity measures to prevent entry on contaminated fomites, people and rodents
- vaccination can prevent the development of clinical disease
- Recombinant DNA, deletion mutant, live-attenuated, and inactivated vaccines are all available commercially
- Pseudorabies vaccine with thymidine kinase and a glycoprotein gene deleted, and E1 gene of classical swine fever (hog cholera) virus inserted, provides protection against both pseudorabies and classical swine fever
- Eradication of Aujeszky's disease from a herd include test and removal, offspring segregation, and depopulation