




PPR Virus



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Peste des petits ruminants (PPR) virus

- ▶ Causes severe disease, PPR in small ruminants, particularly sheep and goats
- ▶ Also referred to as **goat plague**, **Ovine rinderpest**, **kata**, **syndrome of stomatitis-pneumoenteritis**
- ▶ FAO and OIE use the French name "**peste des petits ruminants**"
- ▶ Caused by morbillivirus, peste des petits ruminants virus (PPRV), which is closely related to other members of genus
- ▶ Grouped into four distinct lineages based on the sequence of the F protein, but there is only one serotype
- ▶ High morbidity and high mortality rates



Transmission

- ▶ Close contact with infected animals is required
- ▶ occurs by aerosols
- ▶ carrier state not known, subclinical infection occurs
- ▶ Virus is excreted for several days before the onset of significant clinical signs, facilitates spread of infection
- ▶ disease is generally more severe in goats
- ▶ Different breeds of goat show different morbidity rates
- ▶ course of disease is generally more severe in young animals



Pathogenesis

- ▶ After entering into the organism, it multiplies first in the oropharynx and local lymphoid tissues
- ▶ Infection of immune cells, target for virus multiplication
- ▶ Subsequent viremia, leukopenia, and systemic infection
- ▶ Principally involving lymphocytes, macrophages, dendritic cells, and the epithelial cells lining the alimentary tract
- ▶ Mucosal erosions and profuse diarrhoea are features of the condition
- ▶ During the acute phase of the disease, virus is shed in all secretions and excretions

Clinical signs

- In goats, a febrile response occurs at 2-8 days after infection
- The disease is particularly severe in young animals
- Affected goats exhibit fever, anorexia, dry muzzle and a serous nasal discharge which becomes mucopurulent
- Erosions on mucous membrane of buccal cavity accompanied by marked salivation
- Necrotic stomatitis and gingivitis
- Ulcers develop in the mucosae of the alimentary, respiratory and urinary tracts
- Conjunctivitis with ocular discharge is a feature of the disease
- Profuse diarrhoea- results in dehydration within days of infection
- Signs of tracheitis and pneumonia are common

Severe leukopenia facilitates secondary bacterial infection

Pulmonary infections caused by *Pasteurella* sp. common in the later stages of the disease

Pregnant animals may abort

Mortality rates in severe outbreaks >70%

Acutely affected goats may die within ten days of exposure

The course of the disease may be:

- peracute, acute, or chronic, depending on strain of virus, age, immune status, and breed of host



purulent eye and nose discharges



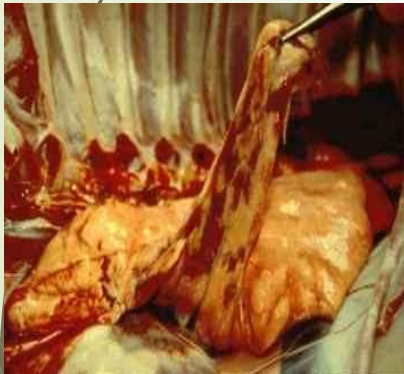
In sheep

- Infection with PPRV is subacute
- Characterized by:
 - fever
 - nasal catarrh
 - mucosal erosions
 - intermittent diarrhoea
- Affected animals usually recover after ten to 14 days

Lesions

Extensive erosions and necrosis in the mucosal lining of the oral cavity, esophagus, abomasum, and small intestine

- Bran-like deposits-discrete tiny necrotic ulceration or foci in the mucous membrane
- Regional lymph nodes enlarged
- Interstitial pneumonia
- In the posterior part of colon and rectum, discontinuous streaks of congestion (“Zebra” stripes or “Zebra markings”) on the mucosal folds are observed, which are typical of PPR



Lesions of pneumonia



“zebra striping” in large intestine (lines of haemorrhage)



Early pale, grey areas of dead cells on the gums



The membrane lining the mouth is completely obscured by a thick cheesy material

Diagnosis

- Specimens in acute phase of the disease
- Suitable specimens include nasal and ocular swabs, unclotted blood and scrapings of buccal and rectal mucosae
- Samples of lung, spleen and lymph node from animals slaughtered early in the course of the disease
- **Laboratory confirmation:**
- Virus isolation in tissue culture
- antigen detection - ELISA, immunoelectrophoresis and agar gel immunodiffusion
- Antibodies detection- virus neutralization, ELISA
- PCR



Control

- ▶ Slaughter policies, movement restrictions apply in countries free from PPR
- ▶ Quarantine and vaccination are used in regions where the disease is endemic
- ▶ Live-attenuated vaccine (Sungri strain)
- ▶ The first PPR control vaccination trials were done with Rinderpest vaccine
- ▶ A global eradication programme developed by the Food and Agriculture Organization (FAO) and the World Organisation for Animal Health

-have set the goal of eradicating PPR by 2030



PPR Vaccine

Currently, 6 Attenuated PPR Vaccine strains are available:

- ▶ PPRV Nigeria 75/1 (Nigeria, lineage II, goat origin)
- ▶ PPR Sungri 96 (India, Lineage IV; goat origin)
- ▶ Arasur 87 (India, lineage IV; sheep origin)
- ▶ Coimbatore 97 (India, lineage IV; goat origin)
- ▶ Titu (Bangladesh, lineage IV; goat origin)
- ▶ 45G37/35-K PPR Vaccine (Kazakhstan)