

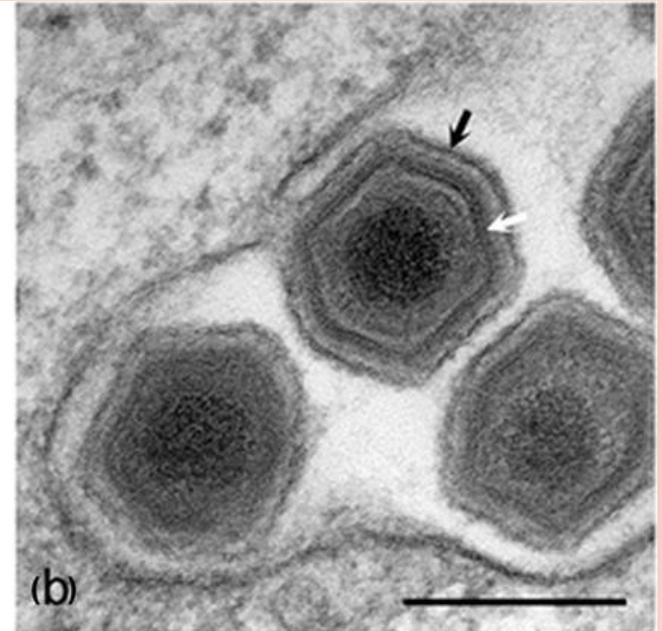
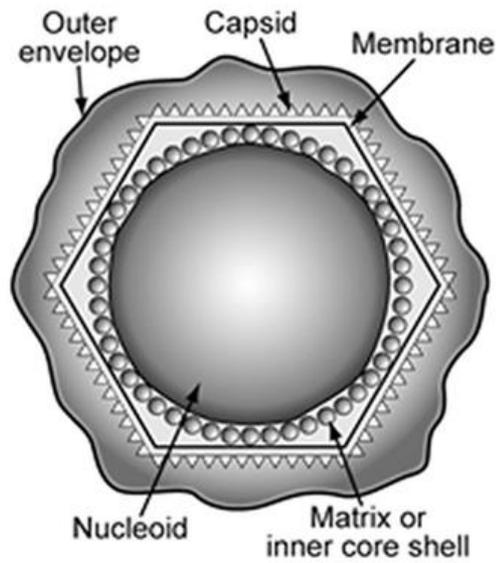
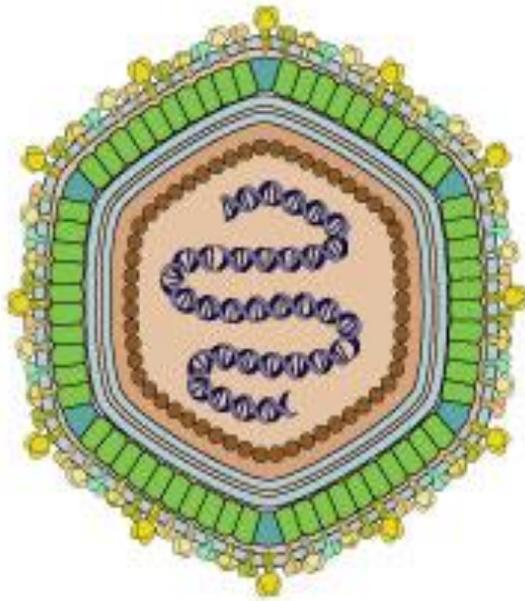
# *Asfarviridae*



**Dr. Savita Kumari**

Department of Veterinary Microbiology  
Bihar Veterinary College, BASU, Patna

# Structure of African swine fever virus



(Image source-Google)

# Characteristics

- (Asfar = African swine fever and related viruses)
- Family *Asfarviridae* contains single genus *Asfivirus*
- African swine fever virus (ASFV) is the type species
- Large, enveloped, ds DNA virus with complex icosahedral symmetry
- African swine fever virus- only known DNA arbovirus

# Characteristics

- Replication also occurs in soft ticks of genus *Ornithodoros* (biological vector)
- Stable over a wide range of temperature (4°C to 20°C) and pH (several hours at pH 4 or pH 13).
- Virus may persist for months and even years in refrigerated meat.
- Virus is thermolabile and sensitive to lipid solvents.

# Virus Replication

- Occurs primarily in cytoplasm, nucleus needed for viral DNA synthesis
- DNA transcribed by a virion-associated, DNA-dependent RNA polymerase
- Viral DNA is present in the nucleus soon after infection
- Designation “nucleocytoplasmic” - used for replication.
- Virus enters susceptible cells by receptor-mediated endocytosis.
- Virus release- by budding/ cellular disintegration.

# African swine fever

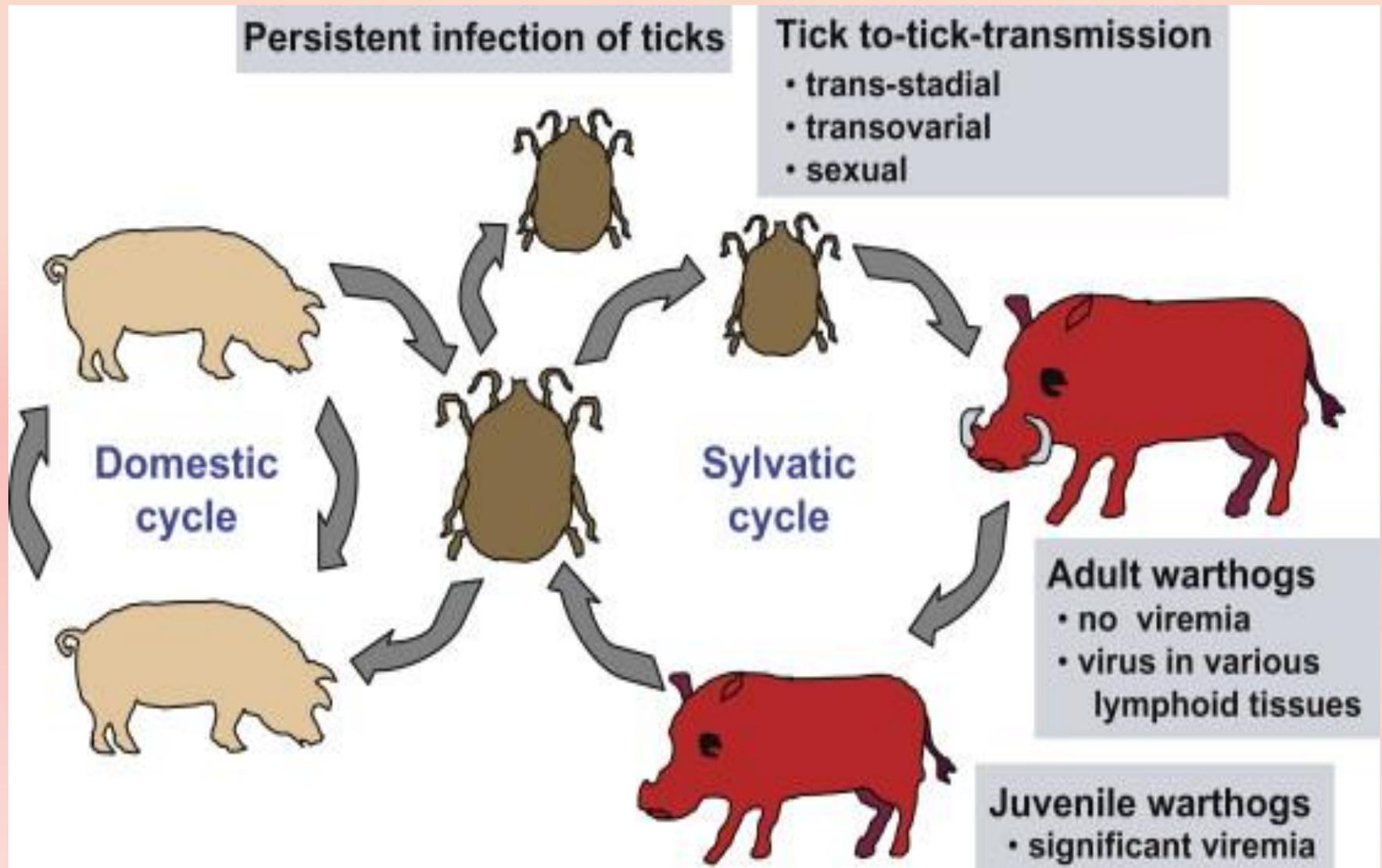
- No report of disease in India
- Infects domestic swine and other members of family *Suidae* (warthogs, bushpigs and wild boar).
- Two distinct patterns of transmission occur:
  - sylvatic cycle in warthogs and ticks in Africa
  - epizootic and enzootic cycles in domestic swine
- Sylvatic cycle involves soft ticks of genus *Ornithodoros* and inapparent infection of warthogs and bushpigs

## Sylvatic cycle

- **young warthogs** develop viraemia and are a major source of virus for soft ticks.
- Ticks are biological vectors of the virus.
- Both transovarial and trans-stadial transmission occurs.
- virus also transmitted between developmental stages of tick (trans-stadial transmission).

- Virus excreted in tick saliva, coxal fluid and Malpighian excrement.
- Infected ticks may live for several years.
- Can survive for long periods of time without taking a blood meal.
- Capable of transmitting the virus to swine at each blood meal.
- Older warthogs are persistently infected, but are seldom viremic.

# Patterns of transmission of African swine fever virus



(Fig. source: Google)

## Domestic Cycle

### ❑ Pigs get infected:

- By the bite of infected ticks
- Or, through consumption of tissues from acutely infected domestic pigs or warthogs

### ❑ High titers of virus present in nasopharyngeal excretions during onset of clinical signs

### ❑ Virus also present in other excretions (feces, urine etc.) in during acute disease.

## Mode of spread

- Ingestion of uncooked meat from infected warthogs or domestic pigs
- direct contact usually through oral or nasal secretions.
- by contact with blood shed as a result of fighting.

## Indirect transmission

- through contaminated transport vehicles, fomites, footwear
  - body fluids and tissues contain large quantities of virus until death or recovery occurs.

# Pathogenesis and pathology

- virus replicates initially in pharyngeal mucosa, tonsils and regional lymph nodes.
- spreads by bloodstream to other LN, bone marrow, spleen, lung, liver and kidneys.
- Secondary replication in these sites results in prolonged viraemia.
- virus replicates primarily in cells of lymphoreticular system
- also infect megakaryocytes, endothelial cells, renal epithelial cells and hepatocytes.

- Infection of domestic swine results in leukopenia, lymphopenia, thrombocytopenia.
- Apoptosis of lymphocytes and mononuclear phagocytic cells.
- swine may become persistently infected without ever showing clinical signs.
- Disease range from inapparent, peracute to chronic infection.
- Symptoms relate to challenge dose, virulence of virus and route of infection.

# Clinical signs

## Peracute disease

-die suddenly without premonitory clinical signs.

## Acute disease

- Fever, inappetence, depression and recumbency
- cutaneous hyperaemia, in some cases haemorrhages
- dyspnoea, conjunctivitis, diarrhoea, bleeding from the nose and rectum and abortion
- high mortality rate
- Sometimes cyanotic areas on ears, limbs and extremities

## Lesions

- splenic enlargement
- swollen haemorrhagic gastrohepatic and renal lymph nodes
- Subcapsular petechiation in the kidneys
- petechial and ecchymotic haemorrhages on serosal surfaces
- oedema of the lungs and hydrothorax

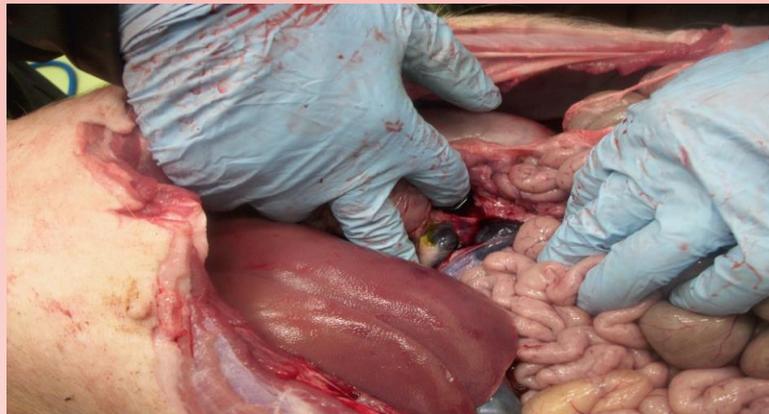
## Chronic disease

- cutaneous ulcers, pneumonia, pericarditis, pleuritis, arthritis and inappetence

# Clinical and pathological signs of ASF



Subcutaneous hemorrhages of ears and body



Enlargement and haemorrhage of the gastrohepatic lymph node and spleen

(Image source: Google)

# Diagnosis

- Suitable samples- blood, serum, tonsil, spleen and lymph nodes.
- Virus isolation in swine bone marrow or peripheral blood leukocyte cultures
- Immunofluorescence staining of tissue smears or frozen sections.
- ELISA, immunoblotting, CFT
- Polymerase chain reaction (PCR)

# Prevention and control

- Restriction of pig movement
- serological monitoring of carrier pigs
- prevention of contact between domestic pigs and warthogs or ticks
- Slaughter of infected pig
- Proper cooking of garbage before feeding
- Eradication of tick species which act as vectors of ASFV