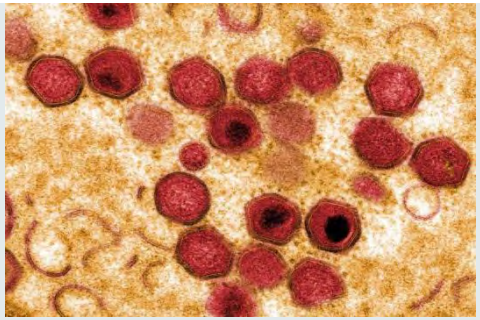
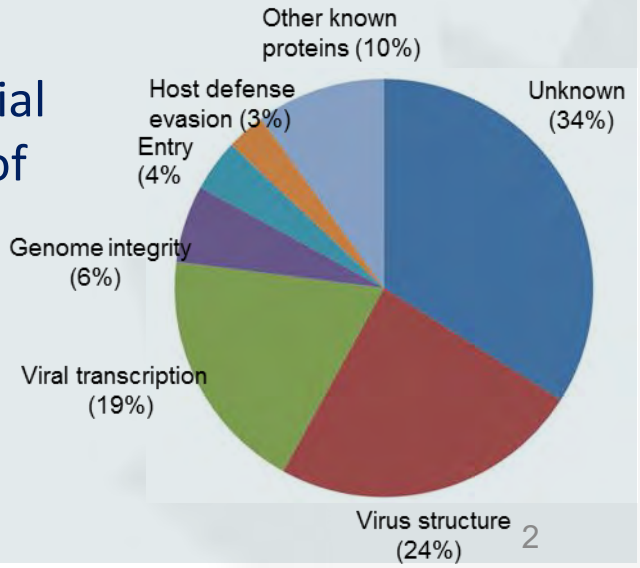
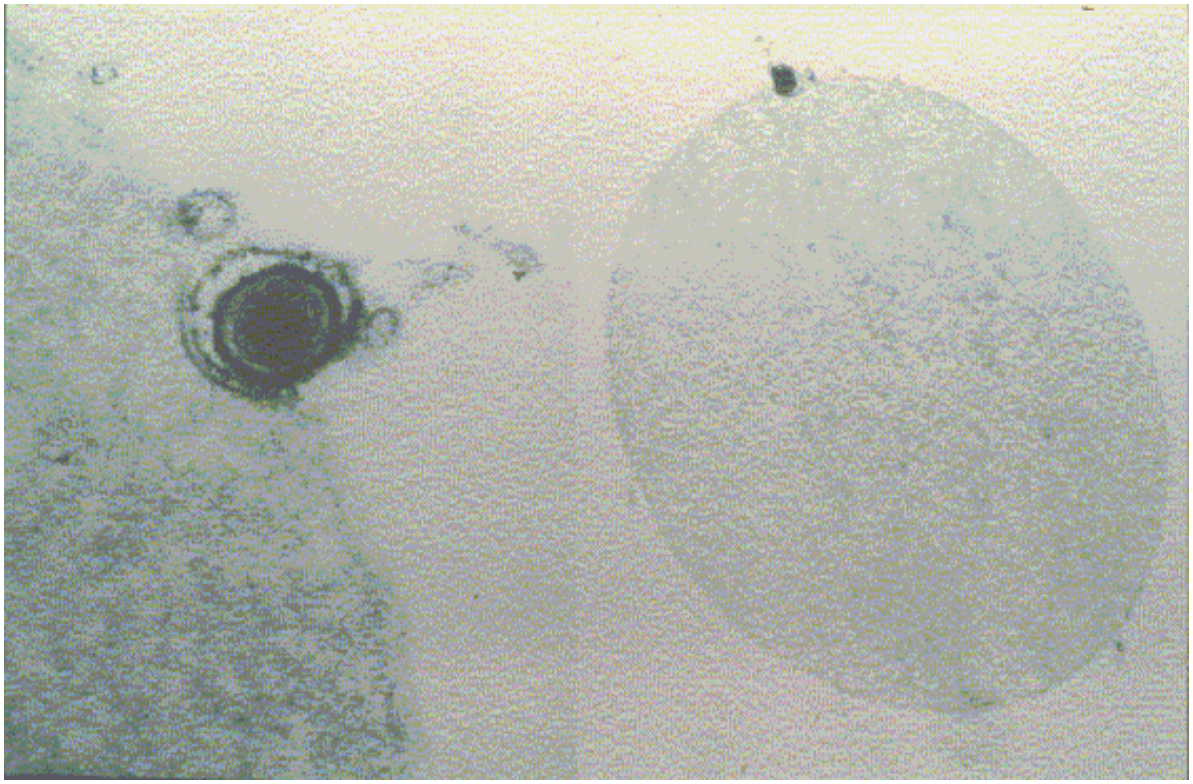
Disease Recognition

African Swine Fever Virus

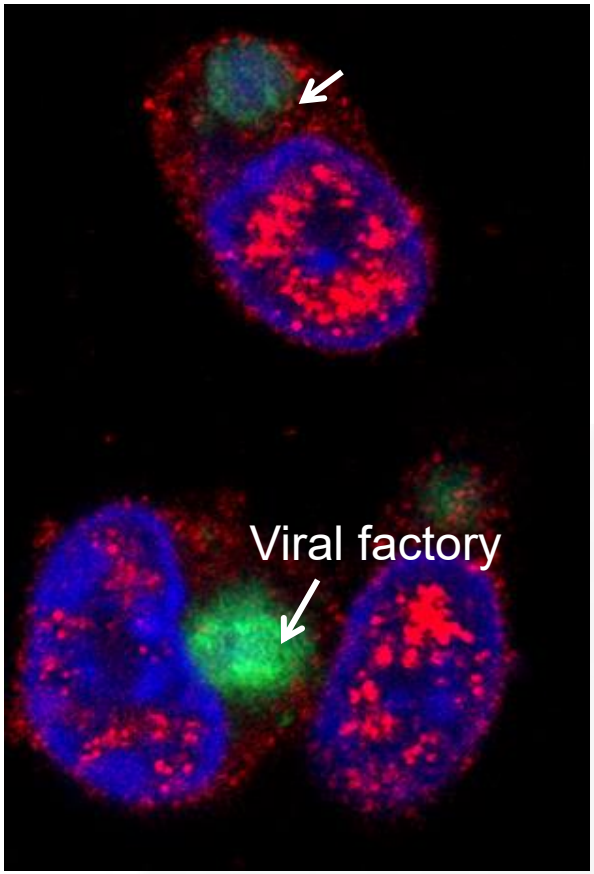
- Asfavirus genus within the family Asfaviridae
- Virion is 200 nm in diameter and enveloped
- Double-stranded DNA genome varying in length from 170 to 190 kilobases
- Encodes 150 to 167 genes
- An estimated 1/3 to 1/2 of all genes are non-essential for virus replication but play other roles eg. evasion of host defenses
- The only known DNA arbovirus
- No effective vaccine







Courtesy USDA/APHIS



J. Virology (2011) 85: 8263-8269

Virus Survival and Inactivation

- **Resistant** to inactivation.
- **Virus** can **survive** for several weeks or **months** in frozen, fresh or uncooked meat as well as salted dried **meat products.**
- Virus can survive in blood stored at 4°C for 18 months and in putrefied blood for 15 weeks
- Virus can **survive** in animal **feed** for **30 days** under simulated shipping conditions
- Inactivated by lipid solvents and commercial disinfectants based on iodide and phenolic compounds, hypochlorites
- Inactivated at pH < 3.9 and > 11.5
- **Inactivated** in cooked or canned hams when these products are heated to **70°C.**
- Inactivated in cured Serrano and Iberian hams and shoulders at **122-140 days** of curing.

Susceptible Species

Phacochoerus africanus

Ornithodoros moubata

Sus scrofa

Sylvatic Cycle

Photamochoerus larvatus

Hylochoerus meinertzhageni

ASF Clinical Presentation

For purposes of the Terrestrial Code ASF is defined as an infection of suids (domestic and captive wild pigs, wild and feral pigs, and African wild suid species) with ASFV.

- ASFV has been isolated from samples from a suid
- ASFV nucleic acid or antigen has been detected in samples from suids showing clinical signs or lesions suggestive of ASF
- ASFV specific antibodies have been detected in samples from suids showing clinical signs or lesions consistent with ASF

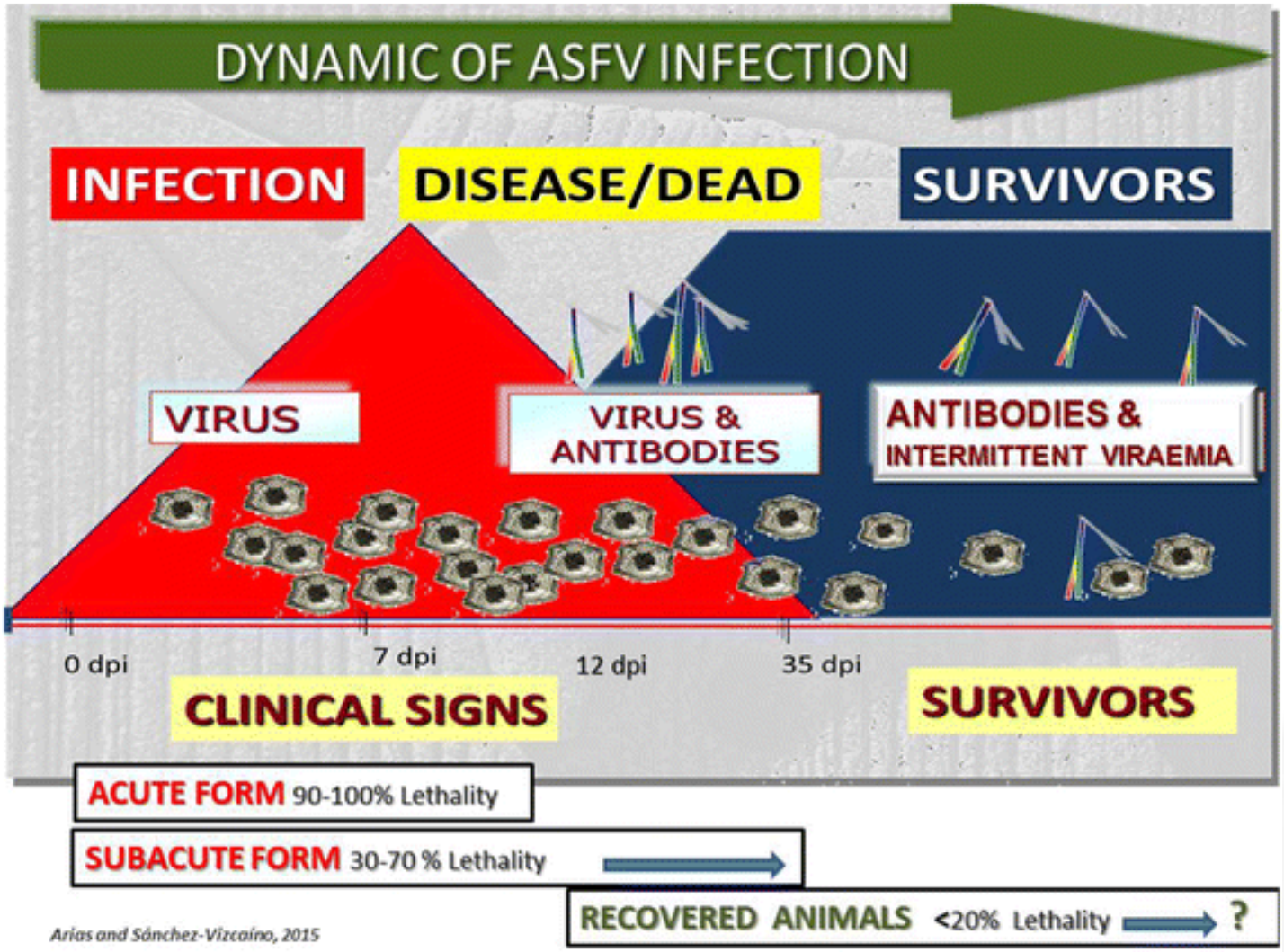
Disease is characterized by a range of syndromes Including peracute, acute, chronic and persistently infected carriers.

- The biological basis for persistence of ASFV is still not understood

ASFV Infection and Pathogenesis

- Primary replication in monocyte-macrophage lineage cells
- Additional cell types (endothelial cells, kidney, liver) become infected later in the disease
- Cytokine-mediated lesions including apoptosis of uninfected lymphocytes and TNFα induced vascular permeability
- Activation of endothelial cells and the coagulation system which leads to a consumption coagulopathy
- Impairment of host innate immune function eg inflammation associated with the pathological dysregulation of the NF-κB pathway

Viral virulence factors and the mechanisms of disease are incompletely understood



Gallardo et al. (2015) Porcine Health Management 1: 21

ASFV Transmission

- Oronasal
  - Uncooked contaminated pork scraps (swill feeding)
  - Blood or bloody exudates from infected animals
  - ASFV titers in blood can range from 10^7 to 10^8 HAD_{50}/mL

- Bite from infected tick
  - Soft (Argasid) ticks
  - *Ornithodorus moubata* – Africa
  - *Ornithodorus erraticus* – Europe

African Swine Fever

How do wild boars become infected?

Carcase
Carcase or possibly blood from an infected wild boar

Materials
Contaminated materials, of hunters for example

Feed
Kitchen waste, food residues and meat products from infected pigs and wild boars

Boar
Direct contact with infected wild boar

Soft tick
Ticks are a source of infection in Africa, but there are no indications of this in Europe.

How do pigs become infected?

Materials
Contaminated materials and livestock transport trucks

Pig
Direct contact with infected pig

Soft tick
Ticks are a source of infection in Africa, but there are no indications of this in Europe.

Feed
Kitchen waste, food residues and meat products from infected pigs and wild boars

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Clinical Signs

Highly Virulent

- Fever – 40.1° to 41.7°C
- Moderate anorexia
- Reddened skin
- Leukopenia and thrombocytopenia
- High viremia
- Death in 5-12 days following first clinical signs
- ~100% mortality
- DIC and hemorrhage

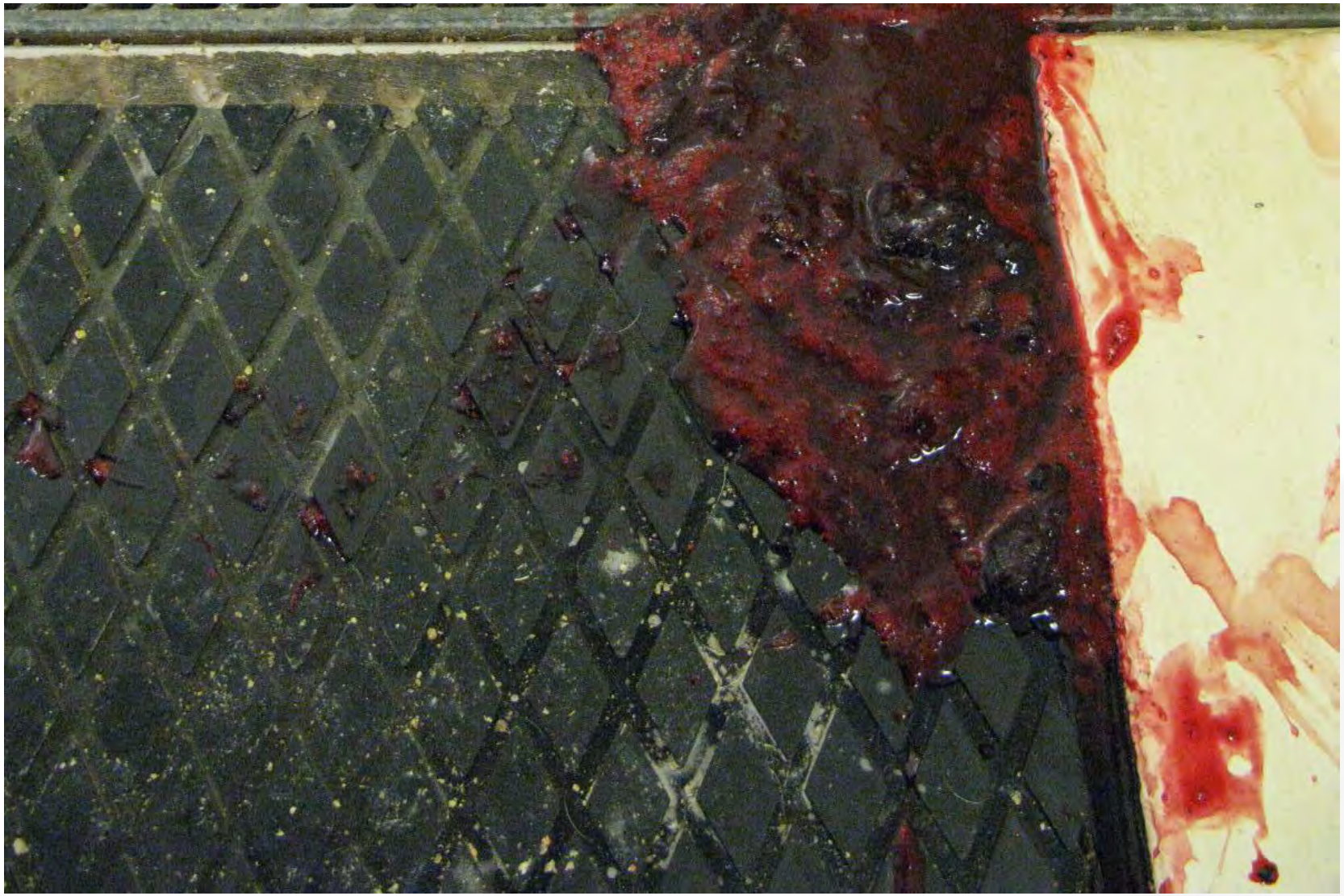
Moderately Virulent

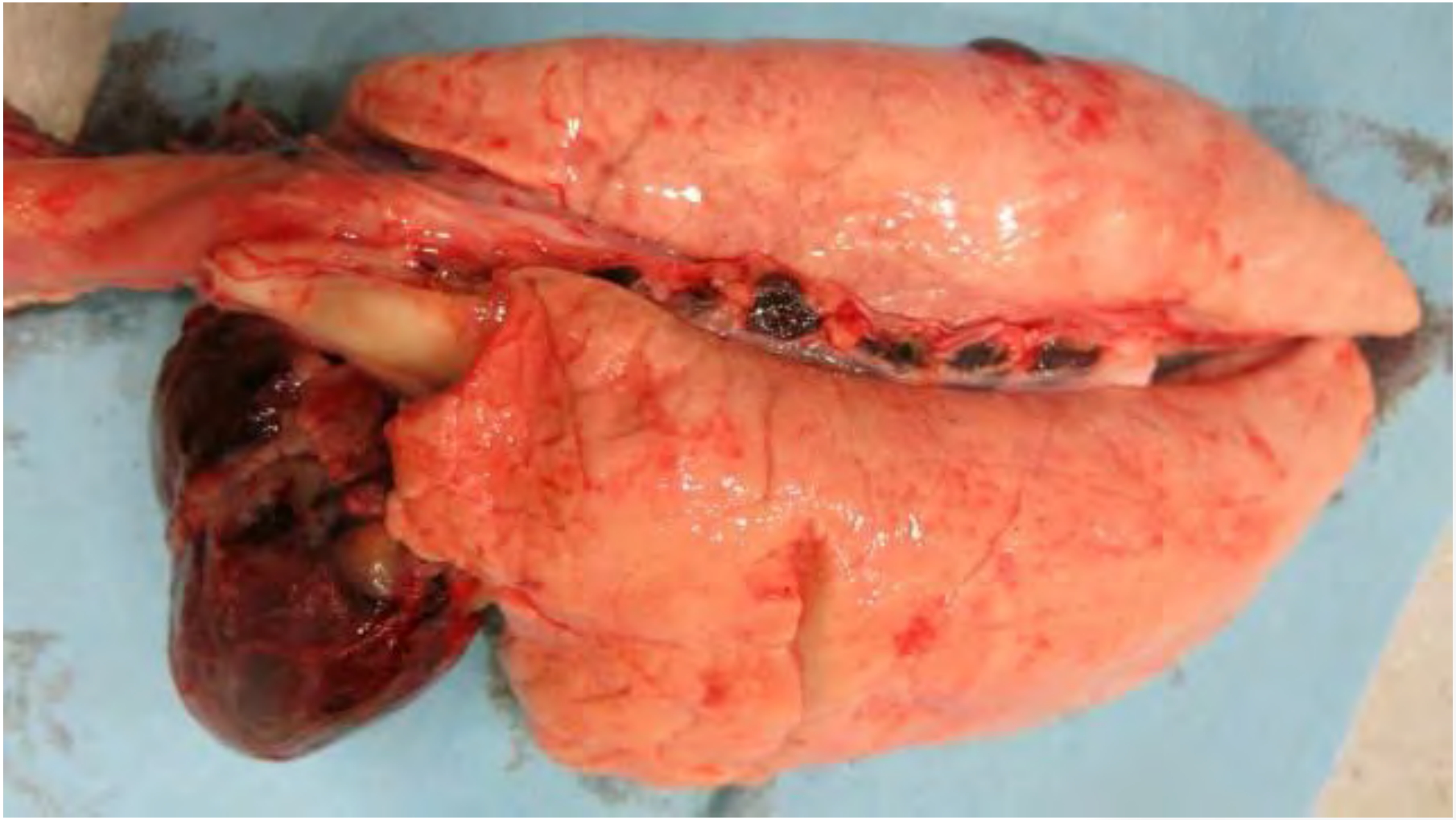
- Fluctuating to continuous fever
- Moderate anorexia
- Reddened skin
- Abortions
- Leukopenia
- Lower viremia
- Death in 12-14 days following first clinical signs
- 30-70% mortality
- Survivor pigs can recover and are protected against challenge with a lethal dose of related virulent viruses

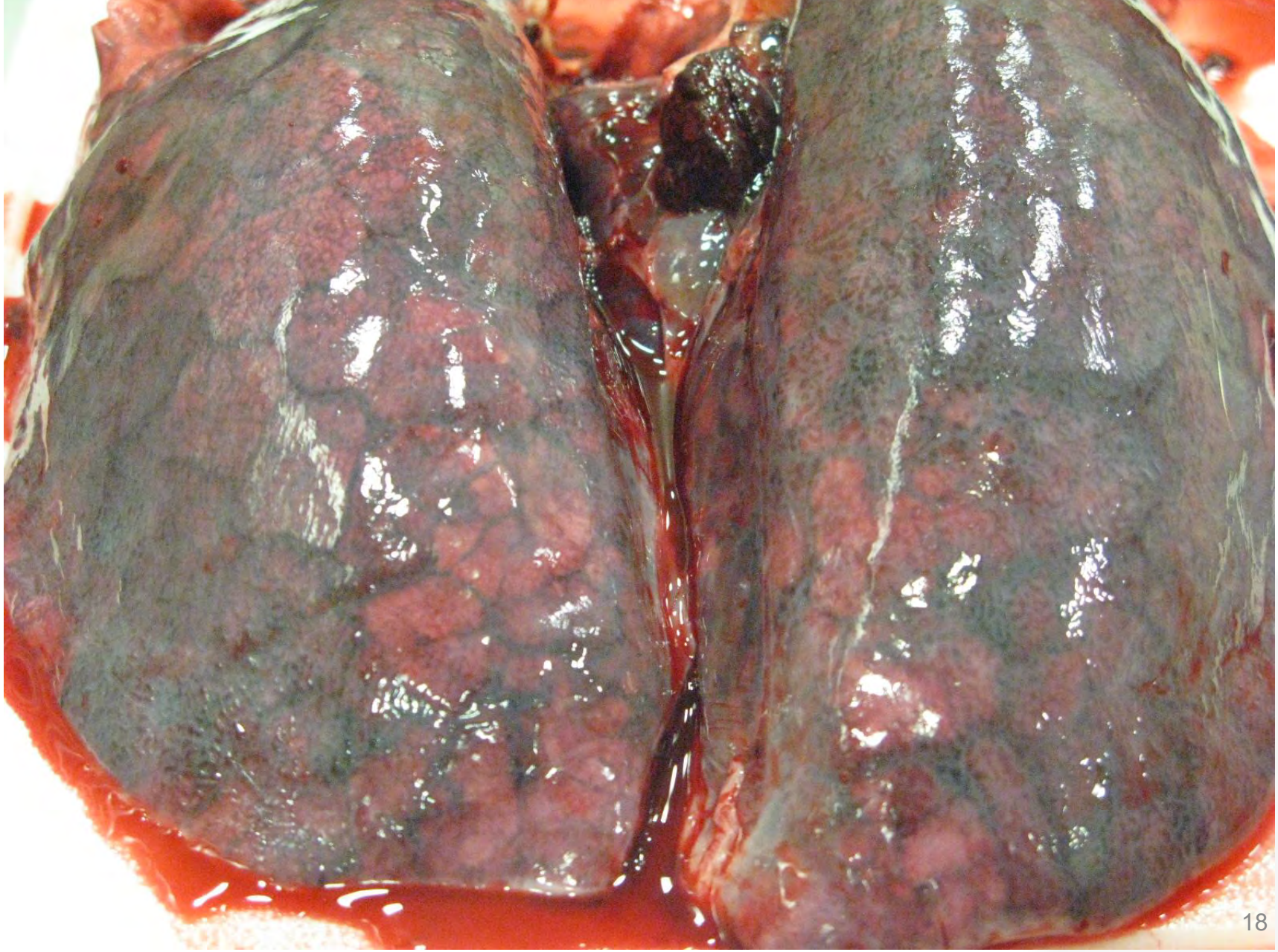
Low Virulent

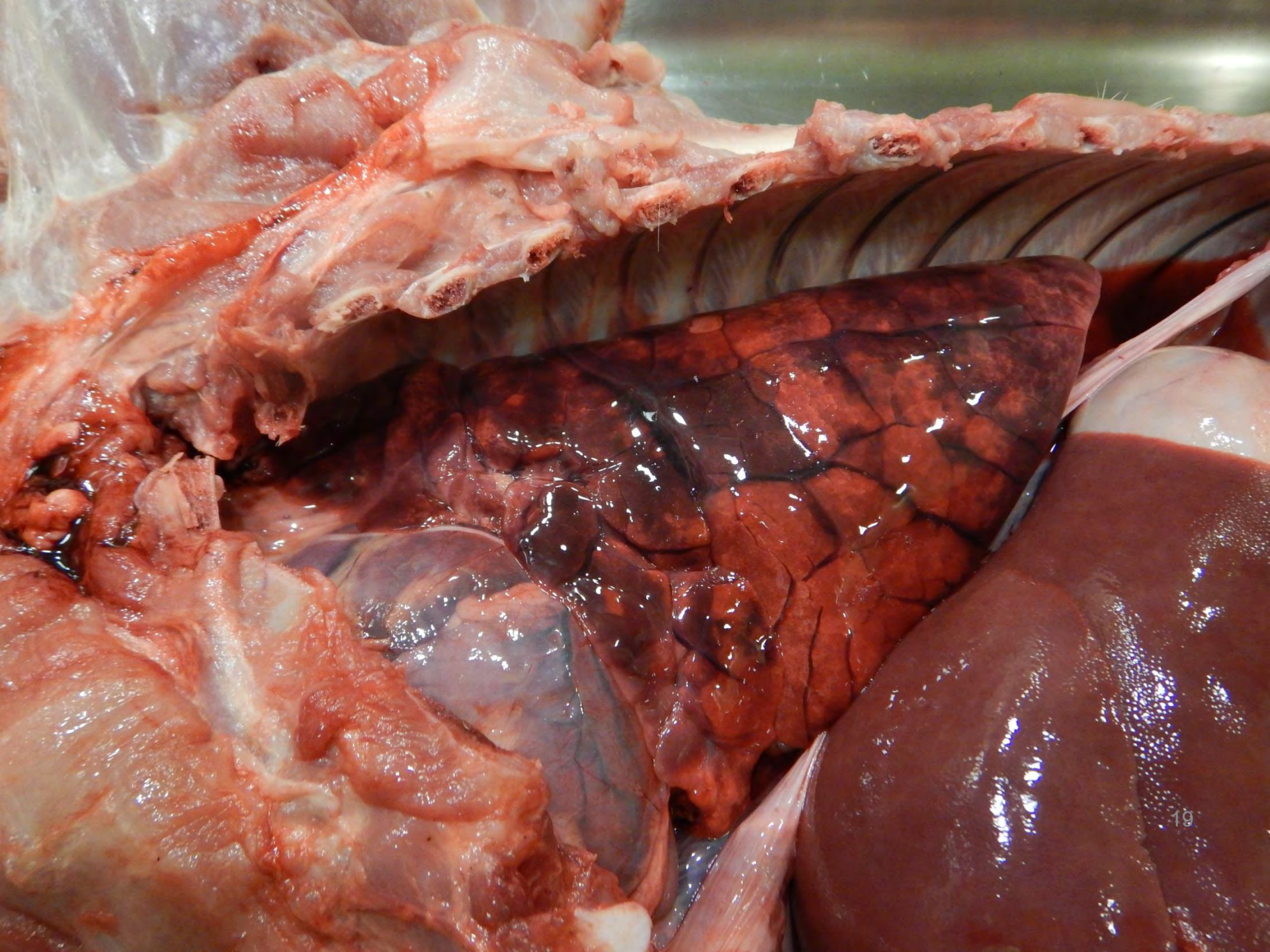
- Low viremia and fever
- Few deaths
- Chronic skin ulcers
- Arthritis
- Virus in tissues
- Persistently infected pigs

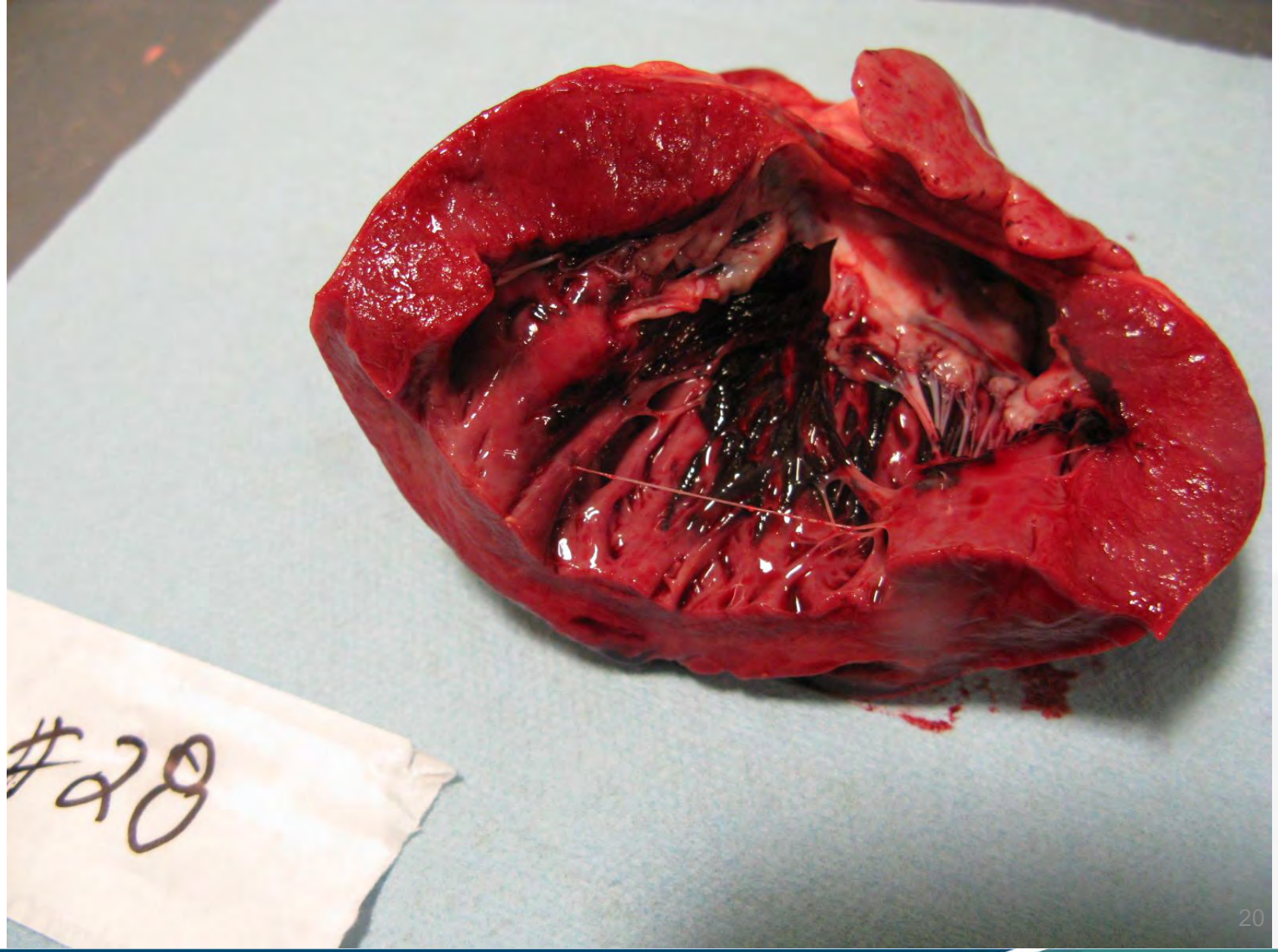
Compared with CSF, the progression to death in the acute form of ASF tends to be more rapid. Animals can appear mild to moderately ill and then deteriorate rapidly.







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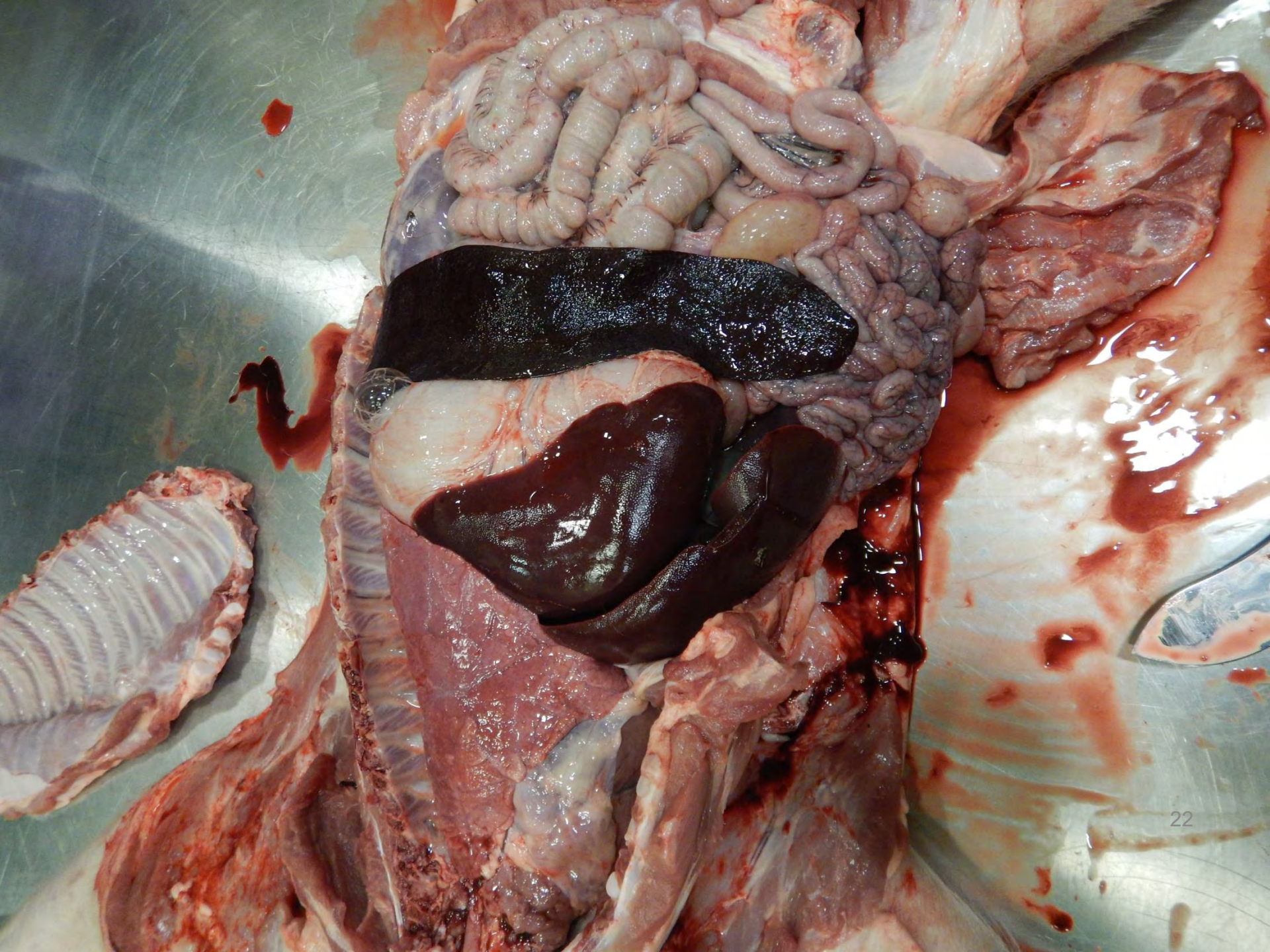

Pig 8
Lemna
X