

AVBS3001 Virology

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Parvoviridae

Family Parvoviridae

Features of Parvoviridae

- Single stranded DNA virus (ssDNA virus)
- Non-enveloped
- Small (~20nm)
- Icosahedral
- Extremely stable in the environment
- Very resistant: heat, disinfectants, pH tolerance (range from 3-9)
- Only replicate in the nucleus of **dividing cells** (intranuclear inclusion bodies → inclusion bodies is the factory for viral replication)
- Parvovirus (Genus)

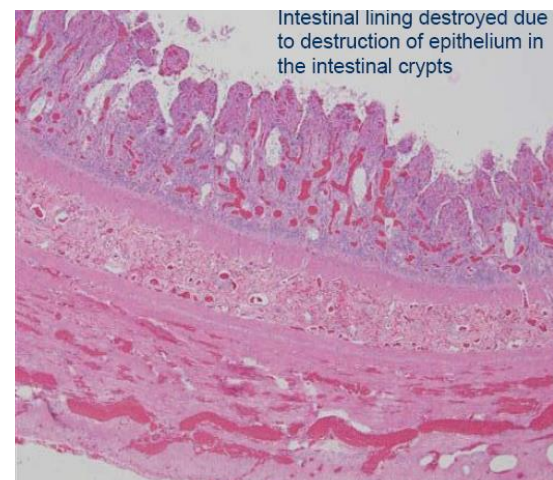
Significant animal pathogens

Canine parvovirus (CPV)	CPV1, CPV2, CPV2a, CPV2b and CVP2c <ul style="list-style-type: none">• Highly contagious enteric disease (particularly young animals)• <i>In utero</i> or perinatal infection Big infectious disease concern in small animal veterinary clinics
Feline panleucopaenia virus (FPV)	<ul style="list-style-type: none">• Highly contagious enteric and systemic disease common in weaned kittens• Abortion and cerebellar ataxia in neonatal kitten
Porcine parvovirus (PPV)	<ul style="list-style-type: none">• Major cause of stillbirths, mummified fetuses, embryonic deaths and infertilities (SMEDI syndrome) → reproductive disorder
Bovine parvovirus	<ul style="list-style-type: none">• Sporadic outbreaks of diarrhea in calves
Goose/ Chicken/ Duck parvovirus	<ul style="list-style-type: none">• Highly contagious, fatal disease of goslings → Derzsy's disease

Pathogenesis and epidemiology

Pathogenesis of parvovirus

- Usually entry via **nasal** or **oral route** and replicate initially in oropharyngeal and intestinal lymphoid tissue before viraemia occurs
- Critical requirement for replication
 - Dividing cells
 - Need for the host DNA replication machinery
 - S phase or early G2 phase of cell cycle
 - Replicates in the nucleus and leaves intranuclear inclusion body
- Newborns and foetus (greatly influenced)
 - Lots of cell division in many organs
 - Widespread disease consequences
- Older animals have a narrower tissue range
- Variation in types of tissue affected between species
- At all ages:
 - Bone marrow and intestinal crypts → continuous replication
 - Highly susceptible to infection → enteritis (intestine infection) and leucopaenia



Parvovirus immunity

FMD – clinical signs



Pigs trotter showing ulcerated and very painful lesion.
Pigs feet are often more severely affected than cattle, goats or sheep



Interdigital vesicle in cattle



Ulcerative lesions of the gum and tongue in cattle

FMDV – Diagnosis

- Disease is notifiable
- All testing of samples are conducted at the Australian Animal Health Laboratory (Geelong, Victoria)
- Samples to test
 - Vesicular fluid
 - Epithelium tissue from ruptured vesicles
 - Blood
 - Fluids
 - Post mortem samples
- ELISA for viral antigen
- Cell culture for virus isolation
- PCR (RT-PCR)
- Need to distinguish FMDV from:
 - Orf and other poxviruses of cattle, sheep, goat and swine
 - Swine vesicular disease virus
 - Vesicular exanthema of swine virus (Calicivirus)
 - Vesicular stomatitis virus (Rhabdovirus)

FMDV – Disease Management (control and prevention options)

FMDV Control

- Very difficult
 - Highly contagious → rapid replication at peripheral sites
 - Multiple hosts
 - Viral stability in the environment
 - High morbidity, low mortality