VMC 605:Systematic Animal Virology

“MALIGNANT CATARRHAL FEVER VIRUS”

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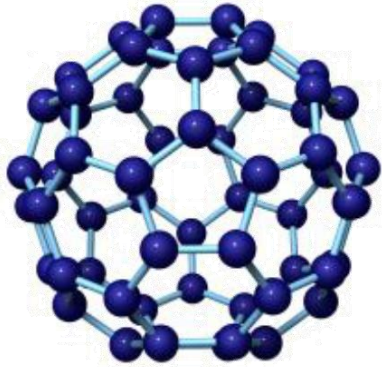
- MCF viruses are usually named after their reservoir hosts.
- **Other Scientific Names**
  - bovid herpesvirus 3
- **International Common Names**
  - **English:** alcelaphine BMC virus; malignant catarrhal fever virus; wildebeest-associated malignant catarrhal fever virus; wildebeest-associated virus
- **English acronym**
  - AHV-1
  - AlHV-1
  - MCFV
  - WA-MCFV

Taxonomic Tree



- Group: "ssDNA viruses"
- Baltimore Group I: "DNA viruses"
- Order: *Herpesvirales*
- Family: *Herpesviridae*
- Subfamily *: Gammaherpesvirinae*
- Genus: *Macavirus*
- Species: Alcelaphine herpesvirus 1

- Alcelaphine herpesvirus 1 (AlHV-1) belongs to the *Macavirus* genus of the *Gammaherpesvirinae* subfamily of the family *Herpesviridae*.
- The macaviruses are lymphotropic herpesviruses that share a common genome structure and are consistently associated with lymphoproliferation

- There are two major groups of MCF viruses
  i. Alcelaphinae group
  ii. Caprinae group.

The Alcelaphinae group

- Alcelaphinae/Hippotraginae group of MCF viruses contains
  - Alcelaphine herpesvirus 1 (AlHV-1)
  - Alcelaphine herpesvirus 2 (AlHV-2)
  - hippotragine herpesvirus 1 (HiHV-1)
  - MCFV-oryx.

The Caprinae group includes

- Caprinae group of MCF viruses contains
  - Ovine herpesvirus 2 (OvHV-2)
  - Caprine herpesvirus 2 (CpHV-2)
  - Caprine herpesvirus-3 (CpHV-3, previously called MCFV-WTD)
  - MCF virus-white tailed deer (MCFV WTD)
  - MCFV- ibex
  - MCFV-muskox
  - MCFV-aoudad

The two most important viruses causing MCF are

Alcelaphine herpesvirus 1 (AlHV-1)

- Causes wildebeest-associated MCF; endemic in wildebeest populations causing

Ovine herpesvirus 2 (OvHV-2)

- Causes sheep-associated MCF; endemic in most sheep populations

Cultivation of MCF viruses in cell culture

- OvHV-2 has never been propagated in monolayer culture
- AlHV 1 could be cultivated in cell culture

Malignant Catarrhal Fever (MCF)

“Malignant catarrhal fever is a sporadic disease affecting single cattle but occasionally severe outbreaks can occur in a group of cattle.”

Sources of virus

- Nasal and ocular secretions
- Faeces
- Semen

Transmission of MCF-associated viruses

- Transmission of AlHV-1 - vertical and horizontal within wildebeests herds.
- A1VH-1 is transmitted in nasal and ocular secretions, mainly in the cell-free form.

- Transmission of OvHV-2 - only from sheep to susceptible hosts
- OvHV-2 is transmitted by the respiratory route and intermittently in nasal secretions.
- Both viruses may also be found in feces and semen.
- Infection of cattle - through contact with young lambs/sheep.

Susceptible host

- It is principally a disease of Artiodactyla and affects domestic and captive species of families:
  - *Bovidae*
  - *Suidae*
  - *Giraffidae*
  - *Cervidae*
  - *Camelidae*

CLINICAL SIGNS

- Affected cattle are
  - Profoundly depressed with a high fever (40.5-42.0ºc)
  - Complete loss of appetite and the eyes are severely affected with corneal opacity causing blindness.
  - Affected cattle avoid bright light and sudden exposure to sunlight causes the eyelids to close
  - Copious muco-purulent nasal discharges
  - Encrustation of the surface of the muzzle and nares
  - Diffuse necrosis of the oral mucosa
  - Marked enlargement of all lymph nodes
  - Exudative dermatitis which affects the inner thigh and udder/teats.
  - Diarrhoea

Clinical symptoms

1. Peracute form
2. Intestinal form
3. Head-and-eye form
4. Mild-form

Clinical symptom: Peracute forms

- Severe inflammation of the oral and nasal mucosa
- Haemorrhagic gastroenteritis with a course of 1-3 days.
- Rapid onset of depression and high fever
- Haemorrhagic gastroenteritis with development of diarrhoea
- Death in 12–24 h after its onset.

Clinical symptoms: Gastrointestinal form

The symptoms of intestinal forms include:

- Pyrexia
- Diarrhoea
- Hyperaemia of oral and nasal mucosa with accompanying discharges
- Lymphadenopathy
- Clinical course is of 4-9 days.

Clinical symptoms: Head-and-eye form

- Most common manifestation of MCF
- Typical syndrome of MCF
  - Pyrexia
  - nasal and ocular discharges progressing from serous to mucopurulent
  - Encrustation of the muzzle and nares occurs in later stages, causing obstruction of the nostrils and dyspnoea, open-mouthed breathing, and drooling
  - There is intense hyperaemia and multifocal or diffuse necrosis of the oral mucosa, usually on the lips, gums, hard and soft palate, and buccal papillae, leaving them reddened and blunted
  - Necrotic skin lesions occasionally are seen, and horn as well as hoof wall may be loosened or sloughed.
  - The course of the head-and-eye form is usually 7- 18 days.

A bovine with severe respiratory distress, extension of the neck and laboured breathing

(Courtesy of the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, Private Bag X04, Onderstepoort, Gauteng, South Africa, 0081)

Clinical symptoms: Mild-form

- Clinical signs in exotic ruminants manifested by
  - Conjunctivitis
  - Photophobia, moderate corneal clouding that may be unilateral,
  - Fever
  - Depression
  - Variable lymphadenopathy
  - Occasionally diarrhoea
  - Mild serous nasal discharge.
  - Death may be sudden, following a brief course of hemorrhagic diarrhoea

- Mucopurulent nasal discharge in a bovine

(Courtesy of the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, Private Bag X04, Onderstepoort, Gauteng, South Africa, 0081)

Diagnosis

- Clinical signs
- Gross and histologic lesions
- Laboratory confirmation
- Serology
- Viral neutralization
- Immunoperoxidase
- Immunofluorescence
- Elisa
- PCR - allows sensitive confirmation of the presence of MCF viruses in infected animals

The World Organisation for Animal Health (OIE) recognises histopathology as the definitive diagnostic test

Thank you