



## MALIGNANT CATARRHAL FEVER (MCF)

ANIMAL GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE ?	TREATMENT	PREVENTION & CONTROL
Domestic and captive species of Artiodactyla	Both vertical and horizontal transmissions occur in wildebeest. Horizontal transmission is the predominant mode in sheep. Horizontal transmission among clinically susceptible species is not well documented	Encrustation of the muzzle and nares; diffuse necrosis of the oral mucosa, fever, diarrhoea	Disease with generally high mortality	No consistently effective treatments	<i>In houses</i>  <i>in zoos</i> Hygiene, quarantine, molecular and serologic testing, separation of sheep and wildebeest from susceptible species, production of MCF virus-free sheep, goats or wildebeest in mixed species operations.

<b>Fact sheet compiled by</b> Kai Frölich, Institute for Zoo and Wildlife Research Berlin, Germany	<b>Last update</b> February 2002
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<b>Susceptible animal groups</b> Malignant catarrhal fever (MCF) is a generalized, often fatal lymphoproliferative disease of domestic and captive species of Artiodactyla. Two types of hosts exist: clinically susceptible hosts in which both clinical disease and latent infection occur and carrier hosts which are subclinically infected and are capable of transmitting the virus to clinically susceptible hosts. It has been described in many ungulates belonging to the families Bovidae, Suidae, Giraffidae, Cervidae, and Camelidae. Moreover, rabbits ( <i>Oryctolagus cuniculus</i> ), rats, and hamsters have also been experimentally infected.	
<b>Causative organism</b> <ul style="list-style-type: none"> <li><u>Alcelaphine Herpesvirus 1 (AIHV-1)</u>: It is characterised as a highly cell-associated, lymphotropic herpesvirus and was classified as a member of the family <i>Herpesviridae</i>, subfamily <i>Gammaherpesvirinae</i>. Members of the herpesviridae are characterised by a core-containing double-stranded DNA and an icosahedral capsid.</li> <li><u>Ovine Herpesvirus 2 (OvHV-2)</u>: The etiologic agent of sheep-associated MCF remains elusive. Despite numerous isolation attempts and reports, no virus that can be regarded as the causative agent has been isolated either from cases of this form of MCF or from sheep.</li> <li>A new MCF virus is recognized, causing classic MCF in white-tailed deer.</li> <li><u>Caprine Herpesvirus 2 (CpHV-2)</u>: The virus endemic in domestic goats is closely related to, but distinct from AIHV-1 and OvHV-2, and is pathogenic to some species of deer.</li> </ul>	
<b>Zoonotic potential</b> None.	



<b>Distribution</b> Animals: disease of domestic and captive species of Artiodactyla. Distribution of the disease is world-wide.
<b>Transmission</b> Transmission of AIHV-1 in wildebeest occurs both vertically and horizontally. Vertical transmission of AIHV-1 by transplacental infection has been proved by the recovery of virus from fetuses or the blood of wildebeest calves estimated to be 1 week of age or less. Transmission of AIHV-1 from wildebeest to other susceptible species occurs primarily by inhalation of aerosol droplets or ingestion of food or forage contaminated with AIHV-1 in nasal and ocular secretions. Transmission of OvHV-2 among sheep is still controversial. Placental transmission may rarely occur. Horizontal transmission through close contact is the major mode among sheep. No solid evidence indicates that horizontal transmission occurs among clinically susceptible species.
<b>Incubation period</b> Incubation periods in natural cases are not known. Experimentally in wildebeest-associated MCF, the incubation period has varied from 9 to over 70 days.
<b>Clinical symptoms</b> <u>Peracute form</u> : In this form, severe inflammation of the oral and nasal mucosa and haemorrhagic gastroenteritis occur with a course of 1-3 days. <u>Intestinal form</u> : Pyrexia, diarrhoea, hyperaemia of oral and nasal mucosa with accompanying discharges, and lymphadenopathy with a clinical course of 4-9 days is descriptive of this form. <u>Head-and-eye form</u> : This is the typical syndrome of MCF with 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. <u>Mild-form</u> : This form is usually not fatal. Clinical signs in exotic ruminants are usually manifested by conjunctivitis, photophobia, moderate corneal clouding that may be unilateral, fever, depression, variable lymphadenopathy, occasionally diarrhoea, and usually mild serous nasal discharge. Death in some species may be sudden, following a brief course of hemorrhagic diarrhoea.
<b>Post mortem findings</b> Animals that die peracutely may have few lesions other than hemorrhagic enterocolitis. In the more protracted intestinal and head-and-eye forms, the carcass may be normal, dehydrated, or emaciated. The muzzle is often encrusted and raw. Cutaneous lesions sometimes occur as generalized exanthema with exudation of lymph, crusting, and matting of the hair. Hyperemia is apparent in unpigmented skin. These lesions are frequently seen in the ventral thorax and abdomen, inguinal region, perineum and loins, and sometimes on the head. Generalized lymphadenopathy is common. Lymphoproliferative changes in the internal organs including CNS are highly suggestive of MCF. Typical herpesvirus inclusion bodies are not present.
<b>Diagnosis</b> Histopathology, Serology (CI-ELISA, IIFA, CF), PCR
<b>Material required for laboratory analysis</b> A set of tissues should be collected in a 10% solution of formalin for histological examination. Samples for serology should be paired when possible and taken first during the acute phase of disease and then during convalescence 3-4 weeks later or at death. For routine PCR assays, unfixed tissues or peripheral blood leukocytes are preferred, but formalin- or ethanol-fixed tissue held less than 3-4 weeks can also be used.
<b>Relevant diagnostic laboratories</b> Dr. H. Li, Animal Disease Research Unit, USDA-ARS and Department of Veterinary Microbiology and Pathology, Washington State University, Pullman, WA 99164-7030, USA Dr. H. W. Reid, Moredun Research Institute, Pentlands Science Park, Bush Loan, Midlothian, EH 26 OPZ, Scotland
<b>Treatment</b> There is no consistently effective treatment available. The recent availability of derivatives of acyclovir compounds that inhibit replication of herpesviruses shows promise in potential treatment regimens. A report of inhibition of the replication of the alcelaphine herpesvirus by using recombinant interferons could be considered in development of a treatment regimen for valuable hoofstock.
<b>Prevention and control in zoos</b> An effective vaccine is not available for MCF and, although some viral strains have undergone attenuation in



cell cultures, no efficacious vaccines have yet been developed. Since a vaccine does not currently exist, the most effective control is by prevention of contact of susceptible species with reservoir hosts (i.e. wildebeest, other alcelaphine species, sheep and goats). In mixed species operations, production of MCF virus-free sheep, goats or wildebeest is an alternative for control.

Additionally, the introduction of carrier species into game farms or zoological parks should require a quarantine period wherein extensive molecular and serologic testing can be conducted.

Precautions should also be taken that water, food, and bedding materials cannot serve to transmit infectious virus among housed species.

**Suggested disinfectant for housing facilities****Notification**

There is no evidence that isolates of MCF are infectious to humans.

**Guarantees required under EU Legislation****Guarantees required by EAZA Zoos****Measures required under the Animal Disease Surveillance Plan****Measures required for introducing animals from non-approved sources****Measures to be taken in case of disease outbreak or positive laboratory findings****Conditions for restoring disease-free status after an outbreak****Contacts for further information**

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