

# Malignant Catarrhal Fever: Summary of Recent Research Progress

Over the past 3 years there has been significant progress toward understanding of the group of malignant catarrhal fever (MCF) viruses, and how they are transmitted from animal to animal. New observations have been made that reflect on transmission of the viruses and diagnosis of the disease in bison, cattle, deer, sheep, and other domestic and exotic carrier species. The points below summarize some relevant developments that have originated from studies at Washington State University, the USDA-Agricultural Research Service, the University of Saskatchewan, and the University of Wyoming. Citations to the veterinary literature addressing these points can be obtained by contacting the authors, Drs. T Crawford and H. Li (see bottom for contact information).

## **1. Sheep between the ages of 6 and 9 months shed much more virus than do sheep at other ages.**

The vast majority of MCF virus shedding from sheep occurs during sporadic, intense shedding episodes. These episodes occur predominantly between 6 and 9 months of age, after which the frequency of episodes declines. It is this age of sheep that is most dangerous to susceptible species. It largely coincides with the ages at which lambs are brought into feedlots for fattening.

## **2. Nasal secretions are the predominant vehicle by which MCF virus is shed from sheep.**

Molecular and biochemical studies have demonstrated very high levels of intact virus in sheep nasal secretions during intense shedding episodes. Consistent transmission of MCF virus from sheep to sheep by experimental aerosolization of these nasal secretions has been accomplished.

## **3. Under appropriate circumstances, MCF virus can be transmitted from sheep to bison over distances exceeding 2 miles.**

When large numbers of sheep within the 6-to-9 month age range are concentrated in a small area, large amounts of MCF virus are shed, and the potential for transmission of MCF rises dramatically. Transmission to bison has recently been documented over distances of 2.5 to 3 miles, against the prevailing winds and in the absence of common water sources. The possible means by which the virus can be transported from sheep to susceptibles are not yet well defined.

## **4. MCF is not transmitted from bison to bison.**

Studies from several laboratories over the past 2 years have generated convincing evidence that a bison with clinical MCF does **NOT** serve as a source of virus for infecting other bison in the herd. These studies include investigations of natural outbreaks, forced co-habitation experiments, and laboratory studies to detect the presence or absence of virus in secretions. Bison with MCF or with detectable MCF virus DNA in blood in secretions do not represent a threat to bison herdmates.

## **5. MCF can occur in bison in the total absence of sheep, apparently by reactivation of latent infections.**

Field observations have noted sporadic cases of MCF in herds of bison in extremely remote areas, where no sheep exist within hundreds of miles. The only known explanation at this time is recrudescence of long-held latent infections. No estimate of the rate or probability of recrudescence of latent infections is yet possible.

## **6. The domestic goat has been added to the list of MCF carriers.**

Goats are endemically infected with their own strain of MCF virus. The caprine agent is distinct from, but closely related to, the sheep-associated virus (OvHV-2). It has been named caprine herpesvirus-2 (CpHV-2). Early indications are that it may be moderately less virulent than the sheep-associated MCF virus. To date it has been observed causing disease only in deer, but little information about this virus in other clinically-susceptible species is yet available.

## **7. Many ruminant species are carriers of their own strains of well-adapted rhadinoviruses in their lymphocytes.**

**The viruses are closely related to known MCF viruses, but most are not known to cause any disease.**

Studies have found that many species of ungulates are endemically infected with well-adapted rhadinoviruses (a genus of herpesviruses) that are members of the same group to which the classic MCF viruses from sheep and wildebeest belong. In most instances, pathogenicity of the viruses has not been observed. These species include both domestic and exotic species, such as the muskox, oryx, and ibex. These viruses, being close genetic relatives, are also close antigenic relatives, thus antibody against them reacts in MCF antibody tests. Positive MCF antibody assay results in lesser-studied species such as these should be interpreted, therefore, with considerable caution.