



# Infectious Bovine Rhinotracheitis (IBR/Red Nose)

THE MERIAL BOVINE INFECTIOUS DISEASE SERIES

Infectious bovine rhinotracheitis (IBR) is a highly infectious respiratory disease caused by bovine herpes virus-1 (BHV-1) and manifests in various ages and types of cattle. Other syndromes caused by IBR virus include abortion, encephalitis and systemic disease in newborn calves.

## Etiology

The BHV-1 virus is ubiquitous and several different genotypes of the virus having been identified. Variations in severity of the respiratory form have been attributed to the different strains. Using “DNA fingerprinting,” BHV-1 viruses are now designated as BHV-1.1 and BHV-1.2. The latter is associated with infectious pustular vulvovaginitis (IPV), a venereal disease of cattle. These IPV-like viruses can be further subdivided into subtype 1.2a which is abortogenic and 1.2b which is not.

## Pathogenesis

In the respiratory disease syndrome, the virus replicates in the nasal cavity and the mucosa of the upper respiratory tract resulting in inflammation of the nasal cavity, larynx and trachea. The virus may spread to the eyes causing ocular lesions. The virus can become systemic and localize in various tissues including the placenta that results in fetal infection and abortion. Localization in the brain leads to encephalitis.

The systemic form in newborn calves is highly fatal and is characterized by severe inflammation and

cellular death in the respiratory and intestinal tracts. Kidney and brain infections can occur concurrently.

The role of BHV-1 in bovine “shipping fever pneumonia” has been extensively reviewed. The mechanism of action proposed is that the BHV-1 virus interferes with the function of the immune mechanism in the bovine lung, allowing bacteria such as *Pasteurella hemolytica* to proliferate and produce disease. This is an important feature in the treatment of bovine rhinotracheitis.

## Clinical Signs

The incubation period can be variable. In feedlot cattle the disease tends to occur 10-20 days after the introduction of susceptible cattle.

The variation in severity of clinical signs is dependent on the age and susceptibility of exposed cattle, the strain of the virus, the environmental conditions and management practices that result in cumulative stress.

Typical signs are a sudden onset of fever and anorexia. The nasal lining becomes reddened with multiple, discreet gray/white lesions. With increased severity, these lesions enlarge and the watery nasal discharge increases in consistency and cloudiness. There is increased salivation and a dry cough may be present. Respiratory rate is increased and the animal is generally intolerant to exercise. Conjunctivitis of either one or both eyes is a common but not a con-

stant sign. In some mild forms of the disease, it may be the only clinical sign noted. Corneal edema may be evident but there is no ulceration.

In dairy cattle there can be a dramatic drop in milk production.

Clinical signs in calves less than a week of age includes fever, lack of appetite, salivation, inflammation of the nasal mucosa and conjunctivitis. The mucous membranes of the mouth develop erosions covered with mucopurulent exudate. Respiratory distress is common due to swelling of the larynx and pneumonia. Some calves may develop diarrhea. Calves less than six months of age may develop encephalitis. Common neurological signs are incoordination, alternating periods of excitability and depression and death.

## Diagnosis

Diagnosis can be made on the typical clinical signs and lesions of infectious bovine rhinotracheitis. Serologically, acute and convalescent sera are diagnostic. Nasal swabs or virus isolation may also be used.

## Epidemiology

The virus for IBR/IPV is found in North America, Australia New Zealand, Africa and many countries in Europe and Asia. All ages and breeds of cattle are susceptible but it is most commonly found in young cattle over six months of age because of current management practices. Seasonal incidence is

again due to the management practice of assembling feedlot cattle rather than due to any true seasonal variance. Wild ruminants may serve as reservoirs.

The main sources of infection are infected droplets from nasal secretions, semen and fetal fluid / tissues. Aerosol infection is considered to be the method of spread for the respiratory disease; venereal transmission is the method of spread of genital diseases.

**Like other herpes viruses, BHV-1 has the ability to become latent following natural infection or with modified-live virus (MLV) vaccination.** The actual site of latency is still unknown but reactivation of the virus after a period of inactivity (recrudescence) can and does occur with stress as the initiator.

## Treatment

Antibiotics have no effect on viruses. However, broad-spectrum antibiotics should be considered with the respiratory form of IBR to prevent or decrease losses due to

secondary infection with *Pasteurella hemolytica*.

## Prevention and Control

Two main methods of control are eradication or vaccination. Eradication has been used in some European countries but is difficult due to the organism being ubiquitous and unpredictable.

Vaccination has been effective in preventing abortions and it will protect against respiratory disease if given prior to natural exposure. **Available vaccines are of two main types, MLV vaccines (two types) and inactivated vaccines.** The two main types of MLV vaccines are intramuscular or intranasal. Both stimulate the production of humoral antibodies. The intranasal vaccine also stimulates the production of local interferon, local antibody, but its principle use has been in pregnant cows as some MLV intramuscular IBR vaccines have been implicated with abortions.

Inactivated vaccines require that two doses given to stimulate protective antibody levels.

Vaccination programs must be adapted to the meet the management of the individual herd. **Ideally, beef calves should be vaccinated as part of a preconditioning program.** Feeder cattle obtained from outside sources should be vaccinated prior to introduction or upon arrival. Replacement animals, both heifers and bulls should be vaccinated no less than 2 weeks prior to breeding.

## Merial Bovine Vaccines Against IBR (BHV-1)

FUSION™ 3	RELIANT™ 3
FUSION 4	RELIANT 4
	RELIANT 8
IBR PLUS® 4-Way	RELIANT IBR
	RELIANT IBR/PI3
JOURNEY® 3	RELIANT IBR/BVD
JOURNEY 4	RELIANT IBR/LEPTO
	RELIANT IBR/BVD/LEPTO
J-VAC® 4L5	
	RESPISHIELD™ 4
	RESPISHIELD 4L5

## References

Radostits O, Blood D, Gay C, et al. *Veterinary medicine a textbook of the diseases of cattle, sheep, pigs, goats and horses 8<sup>th</sup> edition*. London: Balliere Tindall, 1994;1061-1070.