



# Bovine Coronavirus

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## INTRODUCTION

Bovine coronavirus (BCoV) is a causative agent of enteric and respiratory disease in cattle. BCoV has also been reported to cause various animal diseases and is closely related to humancoronaviruses, which has attracted extensive attention from cattle farmers and researchers.

However, there are few comprehensive epidemiological reviews, and key information regarding the effect of S-gene differences on tissue tendency and potential cross-species transmission remain unclear. In this review, we summarize BCoV epidemiology, including the transmission, infection-associated factors, co-infection, pathogenicity, genetic evolution, and potential cross-species transmission. Furthermore, the potential two-receptor binding motif system for BCoV entry and the association between BCoV and SARS-CoV-2 are also discussed in this review. Our aim is to provide valuable information for the prevention and treatment of BCoV infection throughout the world.

## CLASSIFICATION

Bovine coronavirus (BCoV) is a single-stranded positive-sense RNA virus with a lipid envelope belonging to the order *Nidovirales*, family *Coronaviridae*, subfamily *Orthocoronavirinae*, genus *Betacoronavirus*, and subgenus *Embecovirus*. The genus *Betacoronavirus* is also important for humans as it includes severe acute respiratory syndrome-related coronavirus, Middle-East respiratory syndrome-related coronavirus, and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). BCoVs are widespread worldwide due to rapid viral transmission via the fecal-oral and respiratory routes, as well as carrier animals within infected herds. BCoV is responsible for significant economic losses due to the high mortality of calves, reduced growth performance in feedlot cattle, and decreased milk production of adult dairy cattle.

In addition, different bovine-like coronaviruses have been identified as the potential etiologic pathogens of enteric and/or respiratory diseases in a diverse spectrum of ruminant species, dogs, and even humans, suggesting possible cross-species viral transmission. Unfortunately, there are few comprehensive reviews on BCoV origin, epidemiology, and co-infections with other intestinal and respiratory pathogens of BCoV. BCoV exhibits tissue tropism for both the intestine and respiratory tract and can cause serious damage to both organs. However, the key information regarding the Spike (S)-gene differences between intestinal and respiratory BCoV strains remains unclear.

### **SYMPTOMS**

Bovine corona virus infection induces Infections usually occur in calves that are one to four months old. Gastrointestinal symptoms include heavy diarrhea, decreased weight gain, dehydration, depression and anorexia. Respiratory calf infections can produce serous to purulent nasal discharge. Secondary bacterial infections may get worse clinical symptoms. Adult infections are usually subclinical, with the exception of winter dysentery, which affect cattle raised in winter. Medical symptoms comprise massive diarrhea and a important decrease in milk production throughout the outbreak of winter dysentery.

### **ECONOMIC IMPACT**

Although BCoV may be of great significance to the cattle industry and even human biosafety, many research challenges must be overcome. BCoV is responsible for significant economic losses due to the high mortality of calves, reduced growth performance in feedlot cattle, and decreased milk production of adult dairy cattle. In addition, different bovine-like coronaviruses have been identified as the potential etiologic pathogens of enteric and/or respiratory diseases in a diverse spectrum of ruminant species, dogs, and even humans, suggesting possible cross-species viral transmission.

### **Prevention and control can be done by:**

- Proper hygiene and sanitation to reduce the risk of disease occurrence.
- The newly purchase animal should be quarantined for two weeks.
- Appropriate. use of antibiotics. labeled for manage of. BRD.
- Excellent cattle handling and stress-reduction.
- Vaccination with biological products target viral and pathogens.
- Segregate sick animals. Ban visitors to the farm.