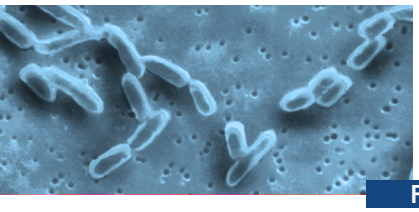
charles river





Infectious Agent Sheet:

# *Bordetella bronchiseptica*

## Classification

Small Gram-negative rod

## Family

Alcaligenaceae

## Affected species

Clinically significant in guinea pigs and in rabbits. Of minor importance as a natural infection in rats and mice. Experimental reports only in gerbils. No reports in hamsters.

## Frequency

Rare in modern laboratory animal facilities. More likely in pet rodents and rabbits, especially those exposed to other species (cats, dogs). Prevalence in wild rodent and rabbit populations is unknown. Possible transmission from human caretakers to animals.

## Transmission

Transmission is via aerosol, direct contact, or contact with nasal secretions of infected animals.

## Clinical Signs and Lesions

The organism is harbored in the upper respiratory tract and trachea, and may adhere to ciliated epithelium. Pathogenic forms of *B. bronchiseptica* produce adhesins and cytolytic toxins. Inapparent infections are seen and carrier states with chronic shedding appear to be common. *B. bronchiseptica* can form biofilms in vitro that may serve to protect the bacterium from host defenses.

In guinea pigs, morbidity and mortality are most commonly seen in young guinea pigs, although clinical signs are rare in modern colonies even when *Bordetella bronchiseptica* is detected, suggesting that past disease outbreaks may have been due to combined infections of *Bordetella* and some other agent. For example, most reports of *Bordetella* pneumonia in guinea pigs are from a time before guinea pig adenovirus pneumonia was recognized. Affected guinea pigs appear ill, with ruffled fur, labored breathing, and anorexia. They may also have a mucopurulent or catarrhal exudate at the nares. At necropsy, cranioventral areas of the lungs are consolidated and there may be purulent exudate in the airways. The tympanic bullae may also be affected. Histologic examination reveals a suppurative bronchopneumonia with heterophilic and mononuclear infiltration of the airways and affected alveoli.

In rabbits, the pathogenicity of *Bordetella* is uncertain. It may contribute to “snuffles” (rabbit upper respiratory tract infections) and is often found as a co-infection with *P. multocida*. The organism has been noted to prefer the cilia of the respiratory epithelium in rabbits and so infection with *B. bronchiseptica* may impair mucociliary clearance and allow for the entry of more pathogenic organisms, although this is unproven.

Mice (such as C3H/HeJ mice) and rats with defects of the innate immune system may be more susceptible to clinical disease caused by *B. bronchiseptica*, although no naturally occurring disease has been reported.



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## Diagnosis

*B. bronchiseptica* infection is best diagnosed through direct culture. The organism grows well on blood agar and is usually readily isolated from affected animals. An ELISA is also commercially available, but not used by Charles River. PCR of suspect bacterial colonies is also possible.

## Interference with Research

Clinically ill animals are unfit for use in research or testing. Since *B. bronchiseptica* adheres to the respiratory ciliated epithelium, asymptomatic carriers may not be suitable for use in pulmonary or airway research. Animals carrying *B. bronchiseptica* may serve as a source of infection for others in the room or facility.

## Prevention and Treatment

Prevention is best accomplished by exclusion of *B. bronchiseptica*-carrying animals from animal facilities. If rabbits or other rodents and guinea pigs are to be housed together, all should be free of *B. bronchiseptica*, given the guinea pigs reported susceptibility to this infection.

*B. bronchiseptica* is susceptible to most common disinfectants used in animal facilities. Any chemical or mechanical sterilant will also serve to remove *B. bronchiseptica* from the environment. *B. bronchiseptica* is a relatively fragile organism. *B. pertussis*, a closely related and very similar human pathogen, survives only a few days on a dry surface. Treatment of animals with antimicrobials may serve to treat illness, but rarely, if ever, resolves the carrier state, nor will antibiotic treatment eliminate bacteria from the bedding or cage surfaces. Thus, treatment is only recommended to ameliorate clinical signs. To obtain a *B. bronchiseptica*-free colony, animals should be rederived through embryo transfer or hysterectomy into/onto *B. bronchiseptica*-free dams.

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