Boehringer Ingelheim

March 2014

Bronchi-Shield® ORAL FAQ

Mucosal vaccines offer protection against agents that cause CIRD. These benefits include the ability to mimic natural infection, with no immediate booster required. In this piece, we hope to answer many of the common questions veterinarians have about protecting our canine patients from CIRD.

1 How important is IgG for protection against *Bordetella bronchiseptica* in dogs?

Correlation of amounts of IgG and protection against disease has not been established. IgG is not found in high levels in the mucous layer unless there is significant tissue damage. As an obligate aerobic bacteria, *Bordetella bronchiseptica* colonizes mucosal surfaces of the upper-respiratory tract. Multiple studies suggest high levels of IgG provide little or no protection against disease.

"There was no significant association between B. bronchiseptica-reactive serum antibodies at the time of presentation at a humane shelter and the subsequent development of respiratory disease."[1] – John Ellis, 2011

"Dogs with high antibody levels [IgG] were just as likely to contract respiratory disease as those animals with low titers."[2] – Victoria Chalker, 2003

"Systemic vaccination against these surface infections will provide limited immunity, since small quantities of IgG may be transferred from the serum to the mucosal surface."[3] – I.R. Tizard, 2009

2 How important is IgA for protection against *B. bronchiseptica* in dogs?

IgA is important for protection of the upper-respiratory system, including the nose, pharynx, larynx, trachea and bronchi. As opposed to IgG, which requires inflammation and disruption of the mucosal epithelium to reach high levels in the mucous layer where *B. bronchiseptica* is found, IgA is present at high levels in the mucous layer and is capable of preventing *B. bronchiseptica* from adhering to the mucosal epithelium and causing clinical signs. IgA is important for protecting dogs from disease caused by *B. bronchiseptica*.

"IgA titers correlated with the development of resistance to clinical infection and several authors found that local antibodies were protective against B. bronchiseptica. In fact, both Shade and Goodnow and Ellis et al, reported protection against B. bronchiseptica following intranasal vaccination."[2] – Victoria Chalker, 2003

3 Which vaccines result in IgA protection?

Modified-live mucosal vaccines, such as oral and intranasal vaccines, are capable of producing a significant IgA response.

> *"The only way a significant IgA response can be triggered is to use live vaccines where vaccine organisms can temporarily invade mucus membranes."*[3] – I.R. Tizard, 2009

4 Which vaccines result in IgG protection?

Both mucosal and injectable vaccines result in IgG responses, so both types of vaccines provide protection from *B. bronchiseptica* in the lower airways.

5 Do mucosal vaccines require initial boosters?

No, mucosal vaccines provide protection from *B. bronchiseptica* with a single dose.[4, 5] An annual revaccination is recommend.

6 Do injectable vaccines require boosters?

Injectable vaccines for *B. bronchiseptica* require a booster vaccine 2 to 4 weeks after the initial vaccination.[6]

7 Is protection greater if you follow a mucosal vaccine with a single injection of an injectable product?

This protocol has never been medically evaluated for effectiveness. No study has demonstrated this protocol provides greater protection than administering the mucosal vaccine alone. After a single mucosal vaccination, annual revaccination is recommended.

8 I have been told mucosal vaccines are effective in naïve dogs but not in dogs that have been previously vaccinated. Is this true?

A mucosal vaccine has been demonstrated to elicit anamnestic IgA and IgG responses to *B. bronchiseptica* in dogs with moderate to high levels of serum antibodies.[1] Mucosal vaccines are licensed for annual revaccination, and years of use in veterinary practices would indicate this practice is effective. We are unaware of any data demonstrating that mucosal vaccines would be ineffective as annual boosters. The purported issue is that previously vaccinated dogs have high levels of antibody that would block replication of a modified-live mucosal vaccine and prevent boostering. If dogs are so immune they cannot respond to a vaccine booster, neither a modified-live mucosal vaccine, nor an inactivated systemic vaccine would be of benefit. Both would be rendered inactive by antibody. This concern is simply not relevant.

We stand behind the protection our mucosal vaccines provide with our Pet Vaccine Guarantee.

9 Do attenuated live mucosal vaccines pose a significant health risk to clients?

We believe there is no significant risk for the vast majority of clients. Mucosal vaccines for *B. bronchiseptica* have a decades-long history of safety, both for dogs and their owners. Pathogenic strains of *B. bronchiseptica* can be zoonotic in severely immunocompromised people, highlighting the importance of protecting dogs from this significant pathogen.

There has never been a documented case of an attenuated vaccinal strain of *Bordetella bronchiseptica* confirmed to have caused illness in a person. There are two cases[7, 8] where it is speculated that a vaccinal strain of *B. bronchiseptica* may have contributed to a person's illness, but it was not determined in either case if the vaccinal strain was involved in the illness, and one of the two cases is not even confirmed to have been associated with *B. bronchiseptica* infection at all.

Ultimately, the balance of the risks and benefits of pet ownership, including the risks and benefits associated with the use of any vaccines in pets must be discussed between an immunocompromised person and their physicians.

10 Are mucosal vaccines an effective way to control *B. bronchiseptica*?

In a 2011 study an oral mucosal vaccine provided 93% efficacy in dogs challenged with *B. bronchiseptica*.[9] AAHA Canine Vaccination Guidelines recommend mucosal CIRD vaccines for dogs in high-risk environments. 83% of veterinarians in a recent survey believe that mucosal vaccination is the best way to protect against CIRD.[10]

Boehringer Ingelheim

References

1. Ellis, John, et al. “Seroepidemiology of respiratory (group 2) canine coronavirus, canine parainfluenza virus, and Bordetella bronchiseptica infections in urban dogs in a humane shelter and in rural dogs in small communities.” The Canadian Veterinary Journal 52.8 (2011): 861.
2. Chalker, Victoria J., et al. “Respiratory disease in kennelled dogs: serological responses to Bordetella bronchiseptica lipopolysaccharide do not correlate with bacterial isolation or clinical respiratory symptoms.” Clinical and diagnostic laboratory immunology 10.3 (2003): 352-356.
3. Tizard, I. R. “Veterinary immunology (8th edn.) Saunders Elsevier.” St Louis (2009): 253-254.
4. Bronchi-Shield®ORAL Product Insert.
5. BronchiShield® III Product Insert.
6. Bronchicine CAe™ Product Insert.
7. Strausbaugh, Larry J., and Ruth L. Berkelman. “Human illness associated with use of veterinary vaccines.” Clinical infectious diseases 37.3 (2003): 407-414.
8. Gisel, J. J., L. M. Brumble, and M. M. Johnson. “Bordetella bronchiseptica pneumonia in a kidney–pancreas transplant patient after exposure to recently vaccinated dogs.” Transplant Infectious Disease 12.1 (2010): 73-76.
9. T. Hess, et al. Evaluation of Oral Administration of Bordetella bronchiseptica Intranasal Vaccine When Used to Protect Puppies from Tracheobronchitis Due to B. bronchiseptica Infection. International Journal of Applied research in Veterinary Medicine, 9, No. 3, 2011.
10. Data on file. Boehringer Ingelheim Vetmedica, Inc.

Boehringer Ingelheim