

Q & A

Clostridium perfringens Type A: answers to frequently asked questions

Clostridium perfringens Type A is a pathogen that's being increasingly implicated in gastrointestinal disease outbreaks. In response to the need for a vaccine, Novartis Animal Health recently introduced the first-ever conditionally licensed *C. perfringens* Type A vaccine for cattle – **Clostridium Perfringens Type A Toxoid**. Following are answers to some of the most frequently asked questions about the pathogen and this new preventive option.

Q. Are there different types of *C. perfringens*?

A. Yes, there are five types of *C. perfringens* (A, B, C, D and E), which are identified by the main types of toxins they produce (alpha, beta, iota, epsilon and theta). *C. perfringens* Type A is the most common *C. perfringens* type. It is part of the normal gut flora in cattle. However, dietary changes or parasitism may produce a favorable growth environment, resulting in overgrowth and production of potent toxins.

Q. Why is *C. perfringens* Type A of concern?

A. *C. perfringens* Type A is a bacterial strain that can rapidly produce potent toxins, primarily alpha toxin. Alpha toxin is thought to be associated with a number of potentially deadly gastrointestinal diseases, such as hemorrhagic bowel syndrome (HBS) or “bloody gut,” which kills up to 85 percent of animals within 24 to 36 hours after the onset of symptoms. *C. perfringens* Type A is also commonly isolated in calves in cases where abomasal ulcers and abomasal hemorrhage are found.

Q. What about beta 2 toxin and enterotoxin?

A. These toxins can be found in some isolates of *C. perfringens* Type A. However, the literature suggests that these two toxins are not very important when it comes to cattle.¹

Q. Don't typical seven-way or Type C and D vaccines provide Type A protection?

A. Commercial clostridial vaccines do not demonstrate significant alpha toxin antigenic activity. This is because they are manufactured in a manner that does not generate any significant levels of alpha toxoid. **Clostridium Perfringens Type A Toxoid** is based on an isolate that is a prolific producer of alpha toxin and on a

unique manufacturing process to inactivate the toxin that maintains a high level of toxoid in the product. Thus, it stimulates a specific immune response against the alpha toxin of *C. perfringens* to neutralize the toxins.

Q. Is it difficult to diagnose a Type A problem?

A. Yes. For instance, in cases of HBS or “bloody gut,” animals are often found dead or dying with no warning signs. Only with exploratory surgery or necropsy does one find distinct sections of the jejunum distended by a large amount of blood. Clinical symptoms of an HBS case may include: sudden, complete anorexia; rapid pulse and respiratory rate; a severe drop in milk production; tar-like feces; and abdominal distention. Calves with *C. perfringens* Type A show signs of quick onset of abdominal distension with pain, bloat, depression, feed refusal and sudden death.

Product highlights

- First conditionally licensed *C. perfringens* Type A vaccine for cattle
- Offers Type A protection that seven-way clostridial vaccines don't have
- Produced double the level of international antitoxin units required by USDA in efficacy tests
- Contains a proprietary dual-component adjuvant system
- Field studies demonstrate product safety
- SubQ administration only



Q. Are Type A problems under-diagnosed?

A. Yes, mainly because necropsies aren't common. When a producer finds a dead cow that's bloated, it's often assumed to be a feed situation and necropsies aren't performed. When a necropsy is done, it's discovered that many of these are HBS-afflicted cows.

Q. What do you mean by "conditionally licensed?"

A. Conditional licenses are a mechanism that the USDA has for emerging diseases. In order to provide producers and veterinarians with a product that can help to fight these diseases, USDA issues very specific guidelines – setting levels for potency and also addressing safety issues. This allows vaccine manufacturers to provide a safe and efficacious product as quickly as possible.

Q. What is known about this product's efficacy?

A. To receive a USDA conditional license, **Clostridium Perfringens Type A Toxoid** had to pass a USDA standardized test. This test required a reasonable expectation of efficacy be demonstrated by the development of a serum antibody concentration of at least 4 international antitoxin units per mL in at least 80 percent of vaccinated animals that were seronegative prior to vaccination. **Clostridium Perfringens Type A Toxoid** produced a serum antibody concentration of 8 international antitoxin units per mL in 89 percent of vaccinated calves that were seronegative prior to vaccination. This means the level of circulating antitoxin in the blood was double that required by the USDA.

Q. Why would one select Clostridium Perfringens Type A Toxoid over a custom Type A vaccine?

A. **Clostridium Perfringens Type A Toxoid** contains an isolate from a real-world HBS or "bloody gut" case that produced a high level of alpha toxin. By using this isolate and carefully controlling the culture conditions and harvest conditions, Novartis was able to maximize the amount of alpha antitoxin in the vaccine. As a result, the conditionally licensed product should provide a more consistent, potent vaccine vs. most custom products.

Q. What is the ideal timing for administering this product in dairy cows? What about beef cows?

A. HBS or "bloody gut" usually strikes when

a dairy cow is about 100 days in milk. By vaccinating during the dry period or shortly after calving, the cow receives maximum protection in the first part of lactation. Beef cows can be vaccinated at pre-calving, such as at preg-check time.

Q. What about its use in calves?

A. The best way to protect calves is by vaccinating the pregnant cow prior to calving to provide the calf with passive immunity via colostrum. Novartis is currently conducting studies to determine how well **Clostridium Perfringens Type A Toxoid** affects colostrum antibodies in pregnant dams. In addition, this product can be safely injected subcutaneously into calves as young as one month of age.



Q. Is this product safe for use in all classes of cattle?

A. Yes, **Clostridium Perfringens Type A Toxoid** has been proven safe in trials with 867 dairy and beef cattle of various ages and breeds, both open and pregnant, and calves as young as one month of age. The product should only be used in cattle.

Q. What other things should I consider when trying to manage disease syndromes associated with Type A?

A. The best way to avoid problems with *C. perfringens* Type A is prevention. Management strategies to consider include:

- Evaluate and correct nutritional factors that may predispose cows to HBS
- Test silage to verify its quality
- Keep feed pushed up and remove leftover feed from the bunk daily
- Identify and correct problems that may lower cows' disease resistance

1. Bueschel DM, et al. Prevalence of cpb2, encoding beta2 toxin, in *Clostridium perfringens* field isolates: correlation of genotype with phenotype. *Vet Microbiol.* 2003;94(2):121-9.