Clostridium perfringens type A toxoid based on long history of experience

Clostridium perfringens type A toxoid may be the first product of its kind for poultry, but is based on a long history of experience that dates back to the 1800s.

A toxoid is a bacterial toxin or poison that is too weak to cause disease but is able to stimulate the formation of antibodies that provide immunity against a bacterium, explains Dr. Jayappa Huchappa, a researcher with Schering-Plough Animal Health.

Toxoids were developed at the end of the 19th century when researchers in the laboratory of Robert Koch, a German physician, discovered that animals injected with tetanus and diphtheria toxins produced antitoxins that could be inoculated into other animals to cure these diseases and provide future immunity against them. The "serum therapy" was tested at Berlin's Charite hospital at the end of 1891, and commercial antitoxin serum production began soon after, he says.

Toxoids are used widely

Today, toxoids similar to the new NE toxoid for poultry are widely used in people and animals around the world. According to information from the U.S. Department of Agriculture, about 200 to 250 million doses of clostridial toxoid vaccines were used in US animals in 2003 alone. Species that receive clostridial toxoids include cattle, pigs and sheep and, with the addition of NE Vaccine, those numbers are expected to rise significantly, Huchappa notes.

An example of a toxoid familiar to most people is tetanus toxoid. It is derived from *Clostridium tetani*, which is a neurotoxin that causes the disease commonly known as "lockjaw." Another example is *Clostridium botulinum*, which causes a type of serious food poisoning. Vaccination with these toxoids protects people against two of the most serious and potentially deadly toxins known to man, he says.

Toxoids against tetanus and botulinum are also available for animals. Most U.S. veterinarians and cattlemen are familiar with the 7- and 8-way clostridial toxoid vaccines for cattle, such as Electroid® 7, Siteguard® MLG and Covexin®, which are sold in the United States and manufactured by Schering-Plough Animal Health Corporation.

The company, in fact, has over 40 years experience with clostridia research, maintains an active clostridia research program and sells clostridial toxoids in over 40 countries, says Huchappa, who played a

key role in the development of the NE toxoid for poultry and has vast experience developing other toxoids for animals.

Provides passive immunity

With *Clostridium perfringens* type A toxoid, he says, "We are applying the same principals used with other toxoids. We are vaccinating the hen and she passes on antibodies against the *C. perfringens* alpha toxin — the antitoxin — to her chicks. This is a type of immunity known as passive immunity."

The NE toxoid for poultry is unique because it is the first toxoid for necrotic enteritis in chickens and because it conveys immunity from hens to chicks via the egg yolk, since chicks do not nurse. In contrast, other toxoids used to provide passive immunity in animals, such as cows and pigs, are conveyed via colostrum in mother's milk. Toxoids, of course, are also used to prevent disease in the vaccinated animals, not just to progeny, the scientist says.

In chickens, vaccinating hens to provide passive immunity to progeny broiler chicks is a much more practical option than vaccinating individual broilers. Vaccinating each hen with two doses of the NE toxoid provides protection to all progeny throughout the hen's entire laying cycle of about 65 weeks — and one hen will lay up to about 156 eggs, yielding about 130 hatched chickens.

"Vaccinating flocks of breeder hens is far more cost effective and makes a lot more sense than vaccinating thousands of individual broilers," Huchappa notes.

"Research has demonstrated that chicks from hens vaccinated with the *Clostridium perfringens* type A toxoid will have plenty of toxin-neutralizing antibodies that provide an excellent aid in the control of necrotic enteritis," he says.

-end-