

GonaCon™–Birth Control for Deer: Questions and Answers

Q. What is GonaCon™?

A. GonaCon™ is a new gonadotropin-releasing hormone (GnRH) immunocontraceptive vaccine developed by scientists at the U.S. Department of Agriculture's (USDA) Wildlife Services' (WS) National Wildlife Research Center (NWRC). Presently, applications of GnRH are being researched in controlled field studies for potential use as a wildlife management tool.

Q. How does GonaCon™ work?

A. The single-shot, multiyear vaccine stimulates the production of antibodies that bind to GnRH, a hormone in an animal's body that signals the production of sex hormones (e.g., estrogen, progesterone, and testosterone). By binding to GnRH, the antibodies reduce GnRH's ability to stimulate the release of these sex hormones. All sexual activity is decreased, and animals remain in a nonreproductive state as long as a sufficient level of antibody activity is present.

Q. How does GonaCon™ stimulate the production of antibodies?

A. GonaCon™ causes an animal's body to make antibodies against its own GnRH. To do this, WS scientists synthesize and hook GnRH to a foreign protein. This material looks like a large, new molecule that the animal's immune system has never encountered. As a result, when it is injected into the animal's body, the body's immune response neutralizes the hormone's function, resulting in infertility.

Q. What are the health effects associated with GonaCon™?

A. The health effects associated with GonaCon™ are minimal. Vaccinated animals showed a decrease in sexual activity and breeding behavior. In field and pen studies, animals showed little to no visual evidence of inflammation at injection sites, and blood chemistry was similar among treatment and control groups. However, in some necropsied animals, granulomas were present at injection sites. Development of granulomas is a common side effect in vaccines with adjuvants, which are compounds used in many human and livestock vaccines to enhance a vaccine's effectiveness.

Q. Are there any dangers or secondary hazards to humans or other animals that eat meat from vaccinated deer?

A. There is no known danger associated to humans or wildlife from eating deer that have been vaccinated with GonaCon™. In 2005, the U.S. Food and Drug Administration (FDA) informed APHIS that white-tailed deer vaccinated with GonaCon™ do not raise a human food safety concern. As with other vaccines, such as those used with livestock, both the vaccine and the antibodies produced are proteins. Once ingested, they are broken down by stomach acids and enzymes. In 2003, the FDA approved the slaughter of experimentally vaccinated pigs with GonaCon™. Similar injectable hormone-altering products are used routinely in livestock applications.

Q. How long does GonaCon™ last?

A. It depends upon the individual animal and its response to the vaccine. Long-term field efficacy data currently does not exist. However, in pen studies, a single-shot of GonaCon™ has successfully kept 4 out of 5 female deer infertile for 5 years. A second shot given the same year or in subsequent years can significantly increase effectiveness, potentially rendering deer infertile for life.

Q. Can GonaCon™ be used with other wildlife species?

A. In addition to white-tailed deer, GonaCon™ has proven effective for use with other wildlife species, including California ground squirrels, Norway rats, feral cats and dogs, domestic and feral swine, wild horses, and elk. Since registering the contraceptive is time consuming and costly, WS has decided to focus registration efforts on use for female white-tailed deer. Future research will likely be directed toward registering GonaCon™ for use with other wildlife species.

Q. What are the benefits of GonaCon™?

A. Because it is a single-shot, multiyear vaccine, GonaCon™ may be a practical management tool. Deer may need to be injected only once to become infertile for up to 5 years. A boost injection could increase effectiveness to almost 100 percent and increase longevity of the contraceptive effect. The vaccine can be used in urban and residential areas, where other management methods, such as hunting, are not an option.

Q. What are the limitations of GonaCon™?

A. GonaCon™ must be injected into the muscle or

tissue of each animal. Eventually, WS scientists hope to produce an oral GnRH vaccine bait that will be attractive to deer but not other animals.

Q. How much does GonaCon™ cost?

A. The vaccine itself only costs \$2–\$10 per dose. The main cost of using GonaCon™ is associated with the time and money required to capture and vaccinate the deer. This cost can be several hundred dollars per deer depending upon many factors, such as how many deer need to be captured and whether the deer are easy or difficult to catch.

Q. How does GonaCon™ differ from porcine zona pellucida (PZP)?

A. PZP, another immunocontraceptive vaccine, has been used to sterilize dogs, coyotes, burros, wild horses, and white-tailed deer temporarily. The PZP vaccine, also known as SpayVac™, causes multiple estrus cycles in female deer. GonaCon™, however, prevents female deer from entering estrus.

Q. Is GonaCon™ currently available to Federal, State, and local wildlife management agencies?

A. No. Once registered, GonaCon™ will be under the authority of the Environmental Protection Agency (EPA). The GonaCon™ studies underway in Maryland, New Jersey, and Pennsylvania are being conducted as part of EPA's approval process. NWRC hopes to submit a registration application to EPA in early 2008 and anticipates a product registration approximately 18 months after submittal. NWRC is currently seeking a private-sector partner to take the vaccine to market.

Q. Who will be allowed to use GonaCon™?

A. GonaCon™ will be registered as a "Restricted Use" product. Although final label language has not been negotiated with EPA, NWRC anticipates the product will be labeled for use by USDA–APHIS Wildlife Services or State wildlife management personnel or persons working under their authority. GonaCon™ users will need to follow State authorization processes.

Q. Will GonaCon™ eliminate the need for hunting to control deer overpopulation?

A. No. Contraception alone cannot reduce overabundant deer populations to healthy levels. GonaCon™ is a tool to be used in conjunction with other wildlife management methods.

Q. What studies are currently being done with GonaCon™?

A. A field study near Silver Spring, MD, provided additional data on the efficacy of the vaccine on white-tailed deer. At a fenced military facility, 28 adult does were

captured in the summer of 2004, equipped with ear tags and radiotelemetry transmitters, and injected with GonaCon™. The reproductive behavior and reaction of these does were monitored for 2 years and compared with those of 15 unvaccinated adult does that inhabit an adjacent, enclosed parcel of similar habitat. Data show the vaccine to be 88 percent effective the first year and 47 percent effective the second year in treated deer.

In July 2005, a similar field study involving another 28 deer was started in Morris County, NJ, that showed 67 percent effectiveness the first year and 48 percent effectiveness the second year. Results from these studies will be submitted to the EPA during the registration process for GonaCon™.

WS scientists collaborated with Pennsylvania State University to conduct studies required by EPA on the toxicity and safety of GonaCon™ in captive deer. Responses of treated and control groups of deer were compared via blood and tissue analyses. Data showed no differences between treatment and control groups.

Q. What does WS hope to accomplish with these studies?

A. Data from field and pen studies will aid in the final EPA process for approving GonaCon™ as a contraceptive for use in wildlife and feral animals.

Q. What other agencies or organizations are involved in these studies?

A. USDA's WS is working with the following agencies and organizations to develop and test GonaCon™:

- Pennsylvania State University
- U.S. General Services Administration
- U.S. Department of Defense
- USDA's Veterinary Services

Q. What is the NWRC mission?

A. The NWRC is the research arm of USDA's WS program, a nonregulatory program that provides Federal leadership in managing conflicts with wildlife. NWRC applies scientific expertise to the development of practical methods to resolve human-wildlife conflicts and maintain the quality of the environments shared with wildlife.

Q. How do I obtain more information on this subject?

A. For more information on GonaCon™ and WS' National Wildlife Research Center, please go to http://www.aphis.usda.gov/wildlife_damage/nwrc/ on the Web.

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