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Questions and Answers: GonaCon™—Birth Control for Deer

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). It is registered by the U.S. Environmental Protection Agency (EPA) for use with female white-tailed deer 1 year of age or older.

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. In some necropsied animals, granulomas (e.g., thickened tissue filled with fluid) were present at injection sites. However, this observation is not uncommon in other livestock vaccines.

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 2009, the EPA determined there is little likelihood of dietary exposure or impacts to humans who consume meat from a treated doe. 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. 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 increase effectiveness, potentially rendering deer infertile for life.

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

A. GonaCon™ is registered for use in female white-tailed deer 1 year of age and older. In addition to deer, GonaCon™ has proven effective for use with other wildlife species, including California ground squirrels, prairie dogs, Norway rats, feral cats and dogs, wild horses, and elk. 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 by hand into the muscle or tissue of each animal. WS scientists are

working to produce an oral GnRH vaccine. Once an oral vaccine is developed, other technologies, such as baits that are attractive to deer but not other animals and/or exclusion devices, will also be needed. These technologies are currently not available but would be needed because orally delivered GonaCon™ could potentially affect non-target wildlife species if ingested.

Q. How much does GonaCon™ cost?

A. The vaccine itself costs very little 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. Yes. GonaCon™ is registered with the EPA. However, in order for GonaCon™ to be used in any given State, it must also be registered with the State and approved for use by the State fish and game/natural resource agency. GonaCon™ is available through WS or its licensed manufacturer to authorized organizations.

Q. Who is allowed to use GonaCon™?

A. Only USDA–WS or State wildlife management agency personnel or individuals working under their authority can use it.

Q. Does 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 future studies are planned with GonaCon™?

A. Future NWRC research with GonaCon™ will likely involve studies to support expanded registration to other species, develop oral delivery systems, and prevent transmission of wildlife diseases. Potential research areas include the following:

- Development of new formulations and delivery methods, including automated vaccine delivery systems for administering the injectable form of the GonaCon™ vaccine, as well as oral and nasal delivery systems.
- Prevention of the spread of brucellosis in bison. Brucellosis is a bacterial disease that causes infertility, abortions, and lowered milk production in cattle and bison. The disease is transmitted through contact with bodily fluids, such as milk and after-birth tissues, of infected individuals. GonaCon™ could potentially break the cycle of this disease and reduce transmission by preventing reproduction in infected animals.
- Combined rabies and GonaCon™ vaccine for reducing stray dog populations and rabies in developing countries.

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' NWRC, please go to http://www.aphis.usda.gov/wildlife_damage/nwrc/ on the Web.

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