BOTSTIBER INSTITUTE
FOR WILDLIFE FERTILITY CONTROL

FACT SHEET

GonaCon™

Brand name: GonaCon™
Common name: Mammalian Gonadotropin Releasing Hormone (GnRH)
Type: Mammalian contraceptive/sterilant
Class: Hormonal Immunocontraceptive

Regulatory Status: Registered by the U.S. Environmental Protection Agency (EPA) for use in wild horses, wild burros and white-tailed deer
Producer: U.S. Department of Agriculture, APHIS, Pocatello Supply Depot, 238 East Dillon St., Pocatello, ID 83201

General Description

GonaCon™ is a 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).

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.

Efficacy

The effectiveness and longevity of the vaccine depends upon the species, the individual animal and its response to the vaccine. In field studies with free-ranging white-tailed deer in semi-enclosed urban settings, a single shot of GonaCon™ prevented pregnancy in 67-88 percent of the deer in the first year and in 47-48 percent the second year.[i] [ii] A second shot given the same year or in subsequent years can increase effectiveness, potentially rendering animals infertile for an extended period or for life. Long-term field efficacy data on white-tailed deer does not exist, but an ongoing study on the use of GonaCon™ to manage a herd of wild horses at Theodore Roosevelt National Park in North Dakota demonstrated that an initial inoculation followed by reimmunization could result in greater reduction in population growth rates over time.[iii]

Health Effects

The health effects associated with GonaCon™ are minimal. Vaccinated animals showed a decrease in sexual activity and breeding behavior. Injection site reactions occur in some treated animals, but this observation is not uncommon in other animal vaccines.

Secondary Effects

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 female white-tailed deer. 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.

Applications

In addition to wild horses and deer, GonaCon™ has proven effective for use with other wildlife species, including California ground squirrels,[iv] prairie dogs,[v] wild pigs,[vi] elk,[vii] kangaroo[viii] and feral cattle.[ix]

Authorizations

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

Additional Information

For more information on GonaCon™, go to https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nwrc/research-areas/SA_Reproductive_Control/CT_Gonacon

(continued)

[i] Gionfriddo J, Denicola A, Miller L, Fagerstone K. Efficacy of GnRH immunocontraception of wild whitetailed deer in New Jersey. Wildl Soc Bull 2011; 35: 142–148.

[ii] Gionfriddo J, Eisemann J, Sullivan K, Healey R, Miller L, Fagerstone K et al. Field test of a single-injection gonadotrophin-releasing hormone immunocontraceptive vaccine in female white-tailed deer. Wildl Res 2009; 36: 177–184.

[iii] Baker DL, Powers JG, Ransom JI, McCann BE, Oehler MW, Bruemmer JE, et al. (2018) Reimmunization increases contraceptive effectiveness of gonadotropin-releasing hormone vaccine (GonaCon-Equine) in free-ranginghorses (Equus caballus): Limitations and side effects. PLoS ONE

[iv] Nash, B., Paul & K. James, David & T. Hui, Lucia & A. Miller, Lowell. (2004). Fertility Control of California Ground Squirrels using GnRH Immunocontraception. Vertebrate Pest Conference. 21.

[v] Yoder C.A., Miller, L.A. (2010). Effect of GonaCon™ vaccine on black-tailed prairie dogs: immune response and health effects. Vaccine. Dec 16;29(2):233-9.

[vi] Massei, Giovanna; Cowan, Dave P.; Coats, Julia; Bellamy, Fiona; Quy, Roger; Pietravalle, Stéphane; Brash, Matthew; and Miller, Lowell A., "Long-term effects of immunocontraception on wild boar fertility, physiology and behaviour" (2012). USDA National Wildlife Research Center - Staff Publications. 1164.

[vii] Powers, Jenny & Monello, Ryan & Wild, Margaret & Spraker, Terry & P. Gionfriddo, James & Nett, Terry & Baker, Dan. (2014). Effects of GonaCon Immunocontraceptive Vaccine in Free-Ranging Female Rocky Mountain elk (Cervus elaphus nelsoni). Wildlife Society Bulletin. 38. 650-656

[viii] https://www.environment.act.gov.au/__data/assets/pdf_file/0003/1195077/Technical-Report-Fertility-Control-of-Eastern-Grey-Kangaroos-in-the-ACT-Assessing-Efficacy-of-a-Dart-Delivered-Immunocontraceptive-Vaccine-March-2018.pdf

[ix] Massei, Giovanna & Koon, Ka-Kei & Benton, Steven & Brown, Richard & Gomm, Matt & S Orahood, Darcy & Pietravalle, Stéphane & Eckery, Douglas. (2015). Immunocontraception for Managing Feral Cattle in Hong Kong. PloS one. 10. e0121598. 10.1371/journal.pone.0121598.