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New approaches to non-surgical sterilization for dogs and cats: opportunities and challenges.
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Researchers in reproduction have been investigating methods to non-surgically contracept animals for the past 40 years. Immunocontraception with gonadotropin releasing hormone (GnRH) and porcine zona pellucida (PZP) vaccines has been used in deer and wild horses to control populations. These vaccines are effective, but require boosters and do not provide lasting immunity. GnRH agonists such as deslorelin, have been formulated as implants (Suprelorin®) that provide up to one year of suppression of fertility in male dogs, are available commercially in Europe and Australia/New Zealand. None of these approaches provide permanent sterility from one treatment. A single dose, permanent treatment could replace surgical ovariohysterectomy and castration, currently the only methods of providing sterility over a dog or cat’s lifetime. A single dose non-surgical sterilant would be a valuable tool in dog and cat population control. The Michelson Prize and Grants (MPG) program was initiated in 2008 with the goal “to eliminate shelter euthanasia of healthy, adoptable companion animals and reduce populations of feral and free-roaming cats and dogs.” The program offers a $25 million US prize for a non-surgical sterilant that is effective in both male and female dogs and cats, and requires one treatment. Understanding that this is a tall order and will require new approaches using cutting edge technology, the MPG program has offered $50 million US in grant money to research novel approaches. The program has attracted scientists worldwide and committed over $15 million US in grants to more than 30 projects worldwide. Many approaches are under study, including delivery of fertility suppressing proteins such as Mullerian Inhibiting Substance and GnRH, using adeno-associated viruses (gene therapy). These viral vectors, when given one time, deliver genes that then are incorporated into tissues, and produce the target proteins over an animal’s lifetime. Other approaches use micro- or small interfering RNA to inhibit reproductive targets, or the delivery of cytotoxins to pituitary gonadotrophs or GnRH producing neurons in the hypothalamus. Deslorelin can suppress fertility when released continuously from an implant, and research in implant technology that could deliver it over an animal’s lifetime is underway. There may be new approaches to delivering antigens such as GnRH that could ‘self-boost’ to make immunocontraception useful as a single lifetime dose. Details of funded grants and results to date can be found at: http://www.michelsonprizeandgrants.org/michelson-grants/research-findings. Once a technology has been shown to be promising, the next steps will involve translating research findings into products that can achieve regulatory approval and be disseminated widely. The Alliance for Contraception of Cats and Dogs is helping to research practical methods of marking sterilized animals, to avoid costly re-treatment, as well as models that will help guide field workers in efficient use of resources for sterilization programs [1].

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