Chemical Sterilization

History of Non-surgical Sterilization Methods

In 1963 it was discovered that drugs called synthetic progestins could suppress oestrus (the heat cycle) in female cats. Denmark was one of the first countries to try the drug progestin megestrol acetate when, in 1971, several colonies of outdoor cats were administered low doses (2.5 to 5 mg) orally once per week to prevent oestrus. Out of the nearly 500 females to whom the bait was available, 20 became pregnant and of that number, five aborted, one died giving birth, and 14 produced normal litters. In some instances, cats developed mammary and cystic tumors as well as pyometra (a serious and potentially deadly condition in which the uterus becomes infected and filled with fluid) (Kristensen, 1980).

In 1977, Dr. Jenny Remfry worked with the Universities Federation for Animal Welfare to carry out several field trials for megestrol acetate in the United Kingdom. At the end of the study Remfry concluded, "Even the most reliable helper may be unable to ensure that a feral cat receives her weekly dose. Therefore trapping and spaying is probably still the best method available to stabilize cat populations" (Remfry, 1978).

In 1984, a study conducted in Billings, Montana used megestrol acetate on cats. Approximately 70 percent of the cats did not produce kittens. However, there were still some kittens born in the colony because some female cats did not receive adequate doses of the drug (Kirkpatrick and Turner, 1985).

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Chemical sterilization is being investigated as an alternative to traditional surgical procedures, as it could provide a cheaper and less labor-intensive method of sterilizing large numbers of cats quickly in remote or hard-to-reach locations.

In 2000, the Alliance for Contraception in Cats and Dogs (ACC&D) was founded by Drs. Henry Baker, Stephen Boyle, and Brenda Griffin as a program of Auburn University. The organization's mission is to develop non-surgical birth control methods to manage cat and dog populations. In many developing nations where poverty is endemic, veterinary care and population control are non-existent. Surgical sterilization, especially for large populations of feral cats and dogs, is not feasible in these areas. Providing non-surgical methods of sterilization would make population control easier, faster, and cheaper ("Our Mission and Values," accessed 2023).

Types of Non-surgical Sterilization

Chemical Castration

Several methods of chemical castration exist, with some already approved by the

FDA and others undergoing field trials. Chemical castration has been studied for nearly 60 years and targets the destruction of gonadal cells in males causing infertility by a lack of sperm production (Hedge, 2013).

Immunocontraception

Researchers at the USDA Animal and Plant Health Inspection Service National Wildlife Research Center (NWRC) developed a GnRH (gonadotropin-releasing hormone) immunocontraceptive vaccine called GonaCon. When the GnRH vaccine is injected, the body's immune response neutralizes the hormone's function, resulting in infertility in both males and females (National Wildlife Research Center, 2011). Scientists say the vaccine shows great promise as a wildlife infertility agent to be used instead of lethal control (Levy et al., 2011).

In 2011, scientists at the University of Florida found that a single dose of GonaCon controls fertility for at least five months and up to five years in adult female cats. Single dose vaccinations were given to 15 female cats and placebos to five others. All five cats given placebos became pregnant. Of the cats treated with GonaCon, 93 percent remained infertile for the first year, 73 percent for two years, 53 percent for three years, and 27 percent were still infertile five years later as the cats' antibodies to the vaccine decreased (Carey, 2011).

"We're hoping this research will lead to a nonlethal method of control for feral cat populations that is less expensive, labor-intensive, and invasive than current methods, such as surgical sterilization," said Julie Levy, DVM, Ph.D., lead researcher of the study and director of the Maddie's Shelter Medicine Program at the University of Florida (Carey, 2011).

A 2018 study of GonaCon's efficacy and longevity on horses found that the vaccine's effects wore off considerably after two years, but that a second shot of the vaccine provided strong fertility control for more than three years (Baker et al., 2018).

Sex Steroid Hormones

Megestrol acetate (MA) is used as an oral contraceptive for female cats and dogs to prevent oestrus ("Cat Adoption Team Megestrol Acetate Clinic", accessed 2022). It is available in several countries under different brand names. In the U.S., the drug has not been approved by the FDA ("Cat Adoption Team Megestrol Acetate Clinic", accessed 2022) and is sold as Ovaban and Ovarid; it was previously sold as FeralStat. It is also used to treat health and behavior problems in cats.

Long-term use and higher dosages can produce serious side effects, including pyometra, diabetes mellitus, mammary gland swelling or cancer, and adrenal gland suppression ("Cat Adoption Team Megestrol Acetate Clinic"). Many of these side effects are reversible upon discontinuation of MA.

GnRH Agonists

GnRH agonists suppress reproductive hormones in both males and females, leading to sterility. One such drug, Suprelorin, is a subcutaneous implant that releases a continuous dose of the synthetic hormone, deslorelin, which prevents the production of male fertility hormones, including testosterone. It takes about six weeks from implantation for an animal to become infertile ("Suprelorin® (Deslorelin Acetate)," accessed 2022), and lasts from one to three years.

The drug is currently approved by the Food and Drug Administration (FDA) only for use in male dogs. Conceptually, the drug should work to sterilize female dogs as well as both male and female cats. However, for a short period after implantation, Suprelorin can actually induce estrus in female

dogs and cats. This would be a problem for outdoor animals, as they could still become pregnant during that window.

Studies thus far have also shown that Suprelorin does not work reliably in cats. Additionally, in some studies, a percentage of female dogs and cats implanted with Suprelorin have developed uterine diseases.

Gene Transfer

In May of 2021, the Michelson Found Animals Foundation and the *Michelson Prize & Grants Program* announced that "research of a single-dose sterilant for female cats [had] completed a second-year breeding study, and results were extremely promising," ("Gene Transfer," 2021). The Alliance for Contraception in Cats & Dogs (ACC&D) reports with excitement on their website, "We believe that this progress could represent the onset of lifetime sterility in these cats while also preventing estrus and related behaviors," ("Gene Transfer," 2021).

Shaida Tala Sabin

Chemical sterilization could be used to treat feral cats where they are, in large, open spaces.

In the study, genes that could suppress reproduction are introduced into cats via a single shot. This method will not control fertility in males, but does have the potential to work for female dogs ("Gene Transfer," 2021). Determining whether the sterilizing effects of this treatment are permanent will require a lengthy trial.

Other Methods

Another set of studies that will explore non-surgical fertility control options are beginning in 2023. One at the University of Georgia will look at the possibility of creating an oral vaccine for male cats that will reduce reproductive hormones, thereby decreasing the cats' fertility. A study at Tufts University will investigate an injectable medication that could do the same for female cats (Morris Animal Foundation, 2022).

Conclusion

Alley Cat Rescue believes that chemical sterilants *can* have a place in controlling cat colonies in the U.S. but at this time, they cannot adequately *replace* surgical sterilization. Chemical sterilants are still in trial phases and a long way from being approved by the FDA. Most also require the cats to be trapped in order to administer the dose, and cats need to be dosed regularly in order to be effective.

Thus, Trap-Neuter-Return (TNR) is still the *best* method of community cat population control. TNR not only reduces populations, it also improves the health of the cats. Spaying/neutering greatly reduces the risk of reproductive cancers, while vaccinations, proper diet, and parasite treatments help boost the immune system. Providing a contraceptive drug alone would do nothing to protect cats from certain diseases or parasites, and chemical sterilants can have adverse side effects.

ACR does recognize, however, the urgent need for chemical sterilants in developing countries and areas with large, extensive open space. In areas where veterinary care is already limited, surgical methods of ster-

ilization are not feasible. Also, vast areas of open wilderness provide another hurdle for implementing TNR programs, so administering a chemical sterilant would be most helpful. Populations of stray cats and dogs are commonly poisoned, shot, drowned, or electrocuted to control their numbers. The newer methods of oral contraception could certainly prevent this suffering and needless loss of life, and hopefully engender a new ethic in these places for humane control.