



## Canids

*Please note that these options are not recommendations for a particular taxon, but possible choices that depend on individual circumstances. It is the responsibility of the veterinarian and animal care staff to determine the dosage and best treatment for an individual based short-term and long-term reproductive goals, facility considerations, and logistical concerns.*

### THE CURRENT OPTIONS FOR FEMALES INCLUDE:

Suprelorin® implants (GnRH agonist)

Lupron® injections (GnRH agonist)

*Note: Progestins should only be used in special, short-term cases (see cautions below)*

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### GNRH AGONISTS

#### Suprelorin® Implants (deslorelin acetate)

- Duration of efficacy: 4.7mg implants are effective a minimum of 6 months, and 9.4mg implants are effective a minimum of 12 months but either formulation may be effective much longer; there is also individual and species variation in duration of efficacy.
- Route of administration: Subcutaneous via trocar in a place where it can be easily detected (e.g., base of the ear, inner thigh, or umbilical region) to facilitate removal when new ones are placed or when a breeding recommendation is received, even if implants are “expired”, to reduce duration of efficacy (see [Suprelorin Product Page](#)).
- Latency to effectiveness: About 3 weeks for females, 2 months for males; implanted females must be separated from males for 3 weeks or oral megestrol acetate ([Ovaban or Megace](#)) must be used for 7 days prior through 7 days after implant placement to prevent the agonist-induced stimulation phase (see [Suprelorin Product Page](#)). Implanted males must be separated from females or the females must be treated with an alternative contraceptive for at least 2 months, until residual sperm either degenerate or are passed.
- Dosing: Doses vary by taxon. Dosage guidelines can be obtained by emailing the RMC at [contraception@stlzoo.org](mailto:contraception@stlzoo.org).
- Estrous cycles during contraceptive treatment: Estrus and ovulation are possible during the 3 weeks of stimulation, then down-regulation occurs. To prevent the stimulation phase, the oral megestrol acetate protocol described above is recommended. Some follicle growth may continue, even following down-regulation.
- Use during pregnancy: Not recommended; may cause abortion or if pregnancy progresses, mammary development may be suppressed impairing milk production.
- Use during lactation: No contraindications once lactation is established.
- Use in seasonal breeders: GnRH agonists can induce estrus in females and transiently stimulate testosterone production in males even during the non-breeding season. When used in seasonal

breeders, implants should be placed in females at least 1 month before and in males at least 2 months before the time of first seasonally anticipated estrus.

- **Reversibility:** Designed to be reversible, but time to reversal can be quite variable. To decrease time to reversal, implants should be removed.
- **Use in prepubertal animals:** Although data on prepubertal use in wildlife species are limited, studies on domestic kittens and puppies have shown successful postponement of puberty with subsequent documentation of reproductive capacity. As in treatment of adults, there was considerable individual difference in duration of effect. Epiphysial closure was delayed, but body size was not affected.
- **Behavioral effects:** In general, the effects should be similar to those from ovariectomy or castration; possible increased appetite can result in weight gain, especially in females, unless food intake is monitored.
- **Effects on physical characteristics:** In general, the effects should be similar to those from ovariectomy or castration such as suppression of physical secondary sexual characteristics. In males, muscle loss may result in overall weight loss unless replaced by fat. In sexually dimorphic species, males may become the size (weight) of females.
- **Other:** The RMC is only able to distribute Suprelorin implants to AZA-accredited institutions or for animals managed under an SSP or Recovery SAFE Program. Suprelorin F® is commercially available in the U.S. through veterinarians, but solely for the treatment of ferret adrenal disease. For institutions outside of the U.S., Suprelorin is commercially available in the U.K., Europe, Australia, and New Zealand. To order implants, a [Suprelorin Registration Form](#), found on the [Suprelorin Product Page](#), must be submitted.
- **Caution:** Depo-Provera should not be substituted for oral megestrol acetate to suppress the Suprelorin stimulation phase because its prolonged initial high levels can interfere with Suprelorin-mediated down-regulation of the reproductive system.

#### **Lupron® Injections (leuprolide acetate)**

- **Caution:** Since data for Lupron are limited, most of this information is extrapolated from the use of Suprelorin.
- **Duration of efficacy:** Available in formulations for human use effective from 1 to 6 months, but duration of efficacy and time to reversal in wildlife species may vary.
- **Route of administration:** Injectable.
- **Latency to effectiveness:** About 3 weeks for females, 2 months for males; implanted females must be separated from males for 3 weeks or oral megestrol acetate ([Ovaban or Megace](#)) must be used for 7 days prior through 7 days after implant placement to prevent the agonist-induced stimulation phase. Implanted males must be separated from females or the females must be treated with an alternative contraceptive for at least 2 months, until residual sperm either degenerate or are passed.
- **Dosing:** Doses vary by taxon. Dosage must be extrapolated from human dosing regimens due to limited use in other wildlife.
- **Estrous cycles during contraceptive treatment:** As with Suprelorin, estrus and ovulation may occur during the 3 weeks of stimulation, then down-regulation occurs. To prevent the stimulation phase, the oral megestrol acetate protocol described above is recommended.

- Use during pregnancy: Not recommended; may cause abortion or if pregnancy progresses, mammary development may be suppressed impairing milk production.
- Use during lactation: No contraindications once lactation is established.
- Use in seasonal breeders: GnRH agonists can induce estrus in females and transiently stimulate testosterone production in males even during the non-breeding season. When used in seasonal breeders, implants should be placed in females at least 1 month before and in males at least 2 months before the time of first seasonally anticipated estrus.
- Reversibility: Duration of efficacy/time to reversal may vary.
- Use in prepubertal animals: The lack of data on pre-pubertal treatment and potential long-term effects on fertility contraindicates recommending contraception before puberty. Also, because Lupron suppresses gonadal steroids, its use may delay epiphyseal closure of the long bones, resulting in taller individuals, similar to the effects of pre-pubertal spaying and neutering in domestic dogs and cats.
- Behavioral effects: In general, the effects should be similar to those from ovariectomy or castration; possible increased appetite can result in weight gain, especially in females, unless food is restricted.
- Effects on physical characteristics: In general, the effects should be similar to those from ovariectomy or castration, such as suppression of secondary sexual characteristics. In males, muscle loss may result in overall weight loss unless replaced by fat. In sexually dimorphic species, males may become the size (weight) of females.
- Other: Lupron, approved for treatment of prostate cancer in men, is expensive but can sometimes be acquired through donation from the manufacturer. In wildlife, it has been used primarily in males to suppress testosterone and sperm production. It has rarely been used in zoo animals since the late 1990s due to cost.

## **OTHER CAUTIONS**

### **Special Progestin-Related Cautions**

- Progestins should not be used in canids except for special short-term cases (e.g., if a female will be getting a breeding recommendation in <2 years) because progestins have been associated with endometrial hyperplasia, pyometra, and/or mammary cancer in canids.
- Progestins should not be used for more than 2 consecutive years or 2 breeding seasons, preferably followed by pregnancy. Progestins should not be used for more than a total of 4 years during the female's lifetime.
- If a progestin is used, treatment should only be short-term and should start well BEFORE any signs of proestrus, since the elevated endogenous estrogen can exacerbate side effects of the progestin.
- Pregnant females contracepted with progestins may experience suppression of uterine contractions; thus, treatment should be stopped or implants removed before anticipated parturition.
- Oral megestrol acetate (0.5-1.0 mg/kg body weight daily) or MGA implants are the preferred progestins for short-term use, since administration can be easily stopped or implants can be easily removed; for that reason, Depo-Provera is not recommended due to the potentially very long duration of effect.

### **Androgen-Related Cautions**

- Mibolerone, a synthetic androgen, is sometimes used in female domestic dogs; however, because it can also increase aggression, it is not recommended for exotic canids.

### **Vasectomy-Related Cautions**

- Vasectomy of males will not prevent potential adverse effects to females from prolonged exposure to endogenous progesterone associated with the hormonal pseudo-pregnancy that follows ovulation. Endogenous progesterone **and** progestin contraceptives cause similar side effects.

### **Porcine Zona Pellucida-Related Cautions**

- PZP vaccine efficacy and safety has not been demonstrated in carnivores, aside from bears and pinnipeds.

***For more details on each of these products, please refer the specific product page.***

***Reporting requirements:*** Any use of Suprelorin implants in the United States must be reported to the RMC via our online contraception survey website (<https://www.zoocontraceptiondata.org>), including any and all adverse events associated with product use. Additionally, in order to increase our knowledge of the efficacy and reversibility of other contraception products, it is recommended that all individuals on contraception be added to the RMC's contraception database via our online contraception survey website (<https://www.zoocontraceptiondata.org>).

### ***Ongoing Studies for which sample collection is encouraged:***

- ***RHSP Archive*** - The RMC and the Reproductive Health Surveillance Program (RHSP) request that facilities submit complete reproductive tracts to the RHSP anytime an animal dies or has their reproductive tract removed, to be available for investigations of reproductive health. See the RHSP website ([www.stlzoo.org/RHSP](http://www.stlzoo.org/RHSP)) for more specifics.
- ***Deslorelin Assay Validation*** - The RMC requests that facilities using Suprelorin implants, which contain deslorelin as the active ingredient, collect serum samples any time the animal is in hand after implant placement to help us establish a database of effective deslorelin concentrations and dynamics.
- ***Uterine Health of African Painted Dogs*** - The RMC requests that facilities collect whole blood, serum, and uterine tissue samples from females at necropsy or following ovariohysterectomy to be used in investigations of uterine health. Please contact the RMC for more information and to request a sample collection kit.

***Disclaimer:*** The RMC strives to provide accurate and current contraception recommendations based on various sources (e.g., publications, AZA RMC/EAZA RMG database records); however, as these are prescription-only medicines, it is the responsibility of the veterinarian and animal managers to determine the dosage and best treatment for an individual.