**Species:** Black lemur (*Eulemur macaco*)

<table>
<thead>
<tr>
<th>Contraceptive method</th>
<th>GnRH agonist (implant)</th>
<th>Progestagen (implants)</th>
<th>Progestagen (injection)</th>
<th>Progestagen (injection)</th>
<th>Surgical/Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial Name:</strong></td>
<td>Suprelorin®</td>
<td>Implanon®/Replens®</td>
<td>Depo-Provera®, Depo-Progesterone®</td>
<td>Delanezole®</td>
<td>Contraception: hysterectomy; ovariohysterectomy; tubal ligation; vasectomy</td>
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<tr>
<td><strong>Product Availability:</strong></td>
<td>4.7 mg (Suprelorin® 62.5 and 11.4 mg [Suprelorin® 122] widely available through veterinary drug distributors</td>
<td>Manufactured by Bayer Schering Pharma AG. Available through human drug distributors, N/A</td>
<td>Manufactured by Pfizer. Widely available throughout Europe through human drug distributors</td>
<td>Manufactured by BD. Available for use in female dogs, cats, and ferrets; available through veterinary distributors</td>
<td>N/A</td>
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<tr>
<td><strong>Restrictions and/or permits required by importing Country:</strong></td>
<td>The EAZA RMG recommends: always check with your local licensing authority</td>
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<td>N/A</td>
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<tr>
<td><strong>Mechanism of action:</strong></td>
<td>GnRH agonist suppresses the reproductive endocrine system, preventing production of pituitary and gonadal hormones. GnRH agonists initially stimulate the reproductive system which can result in estrus and ovulation in females, or temporary enhancement of testosterone and spermatogenesis in males. Therefore additional contraception is required during this time. Please see below and refer to Deslorelin datasheet.</td>
<td>Interference with fertilisation by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation</td>
<td>Antiestrogenic activity. Interference with fertilisation by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation</td>
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<td>Contraception: surgical removal of the ovaries; hysterectomy; surgical removal of the uterus; ovariohysterectomy; surgical removal of the ovaries and uterus; tubal ligation: surgical procedure where the fallopian tubes are blocked or removed; vasectomy: surgical procedure in which the ductus deferens are cut, tied, cauterized, or otherwise interrupted</td>
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<tr>
<td><strong>Insertion/Placement:</strong></td>
<td>Subcutaneously, in a place where it can be easily detected or seen for removal at a later date (i.e. Upper inner arm); refer to the Suprelorin® fact sheet for effective methods of implant placement (tunnellation).</td>
<td>Subcutaneous in upper inner arm or for visibility (set for later removal)</td>
<td>Injectable intramuscular. As hand-casting is possible in prepubertals, this provides greater assurance the appropriate dose is delivered</td>
<td>Injectable subcutaneously do not inject intradermally or into subcutaneous fat or scar tissue</td>
<td>Surgical</td>
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<tr>
<td><strong>Notes:</strong></td>
<td>A dose of 50 mg/kg of Delanezole® has been used in a collection for short-term contraception being effective for approximately 3 months.</td>
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<td><strong>Duration:</strong></td>
<td>6-8 weeks recommended for a minimum duration of 6 months. In females who will not breed again or who suffer from reproductive pathology: 1x 4-8 mg is recommended for a minimum duration of 12 months. <strong>DO NOT CUT THE IMPLANT!</strong></td>
<td>Recommended 1/3 to 1/2 implant, depending on weight. Doses are not well established.</td>
<td>A-dose is delivered approximately 3 months</td>
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<td><strong>Surgical Effectiveness:</strong></td>
<td>3 weeks average as GnRH agonists initially stimulate the reproductive system - please refer to Deslorelin datasheet for detailed information - additional contraception is needed during this time (see product datasheet). 4.3 mg Megestrol acetate given daily 7 days before and 8 days after has been used to suppress initial stimulation phase.</td>
<td>Implants should be placed at least 1 month before the breeding season starts. Should be injected at least 1-2 weeks before the breeding season starts. Should be injected at least 1-2 weeks before the breeding season starts.</td>
<td>Oestrus behaviour may be observed. Ovulation and cycling may occur in adequately ovariectomised individuals (but is unlikely and the degree of suppression is dose dependent).</td>
<td>If ovaries are left in place, oestrus will continue to occur.</td>
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<td><strong>Oestrus cycle during contraceptive treatment:</strong></td>
<td>Initial oestrus and ovulation (during the 3 weeks of stimulation) then a normal cycle. As long as suppression on oestrus and ovulation is maintained, the megestrol acetate protocol mentioned above.</td>
<td>Oestrus is inhibited.</td>
<td>Oestrus behaviour may be observed. Ovulation and cycling may occur in adequately ovariectomised individuals (but is unlikely and the degree of suppression is dose dependent).</td>
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<td><strong>Effective in prepubertal or juvenile:</strong></td>
<td>Data deficient in this group, see product information sheet. Suprelorin implants should be used with caution as females that are too young to breed are not usually in season and fertility have not been assessed when used in prepubertal animals.</td>
<td>The use of synthetic progestagens in pre-pubertals or juveniles has not been fully assessed. Possible long-term effects on fertility are not known.</td>
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<td><strong>Use in seasonal breeders:</strong></td>
<td>Use 34.7 mg implant at least 1 month prior the breeding season. In some prosimians, females implants were inserted in November and both females came into oestrus within a week, after which oestrus was effectively suppressed for the entire breeding season.</td>
<td>The use of synthetic progestagens in pre-pubertals or juveniles has not been fully assessed. Possible long-term effects on fertility are not known.</td>
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<td><strong>Insertion of ovariectomy or vasectomy:</strong></td>
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</table>
## Vasectomy

### Duration

- 4.7 mg implants are recommended. 8.4 mg implants should be used in females who are not destined for breeding or who suffer of a reproductive pathology. Duration of efficacy has not been well established as a guide; 4.7 mg implants will suppress for a minimum of 6 months. 8.4 mg will be effective for a minimum of 12 months.

- 2-3 years in various primates

- Dose dependent: 30-40.00 days in general. However, effects could last 1-2 years in some individuals. In black lemurs, contraception with medroxyprogesterone acetate can extend the breeding season to as much as 9 months; this requires an extension of the period of contraceptive treatment.

- Close dependent: 30-90 days in general.

### Reversibility

- We have 3 records of reversal in black lemurs following contraception with 1x4.7mg implant (100% reversal rate), with most individuals conceiving in the next breeding season. Duration to reversibility extremely variable. Removal of implant to aid reversibility is recommended but often implant is difficult to recover. Implants should be placed in locations with thinner skin i.e. the armpit to ensure that locating and removing the implant when replacing contraception or if animals receive a breeding recommendation is easier.

- None observed in non-human primates

### Effects on Behaviour

- Effects on behaviour have not been studied, every individual may react differently. Because progesterone can suppress ovulation it can be expected that courtship and mating behaviour will be affected in some way. Further research in the subject is necessary.

- Effects on behaviour have not been studied; every individual may react differently. It’s likely that males will exhibit less aggressive behaviour than is required for contraception.

- Designed to be fully reversible but individual variations can occur.

### Use in seasonal breeders:

- Males

- Use in prepubertals or juveniles:

- Use in established as a guide: 4.7 mg implants will suppress for a minimum of 6 months. 8.4 mg will be effective for a minimum of 12 months.

- Depending on species there may be fertile sperm present in vas deferens for 6-8 weeks post treatment or even longer. Testosterone related aggression is likely to decrease. Limited success as tool for aggression control in black lemurs and ring-tailed lemurs, however this may have been as too low a dose was used.

- None observed in non-human primates

### Dose

- Data deficient. 1x 4.7mg is recommended for a minimum duration of 6 months and 1x 9mg is recommended for a minimum duration of 12 months. Usually a higher dose is needed to moderate aggressive behavior than is required for contraception.

- Depending on species the recommended dose is 1x 4.7mg for 6-12 weeks post treatment or even longer. Testosterone decreases after 3-4 weeks but sperm can stay fertile for many weeks after. Further additional contraception or separation of the sexes is required for this time.

### Data deficient

- In lemurs, genital odours of contracepted females are dramatically altered, which affect the behavioural response in males. Females may darken in colour. See Above

### Data dependent

- Data deficient in this group, see product information sheet

- Data deficient. Should start at least 3 months prior the breeding season.

### Data dependent

- Data deficient in this group, but deslorelin is considered reversible by product information sheet. We have 1 record of reversal in this species, where the male sired offspring 3 years after the placement of 1x6 mg implant. The implant was not removed. We also have 6 records of reversal in ring-tailed lemurs, with time to conception ranging from 2-4 breeding seasons after the estimated contraception expiry date. Removal of implant to aid reversibility is recommended but often implant is difficult to recover. Implants should be placed in locations with thinner skin i.e. the armpit to ensure that locating and removing the implant when replacing contraception or if animals receive a breeding recommendation is easier.

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### Effects on Behaviour

- Testosterone related aggression is likely to decrease. Limited success as tool for aggression control in black lemurs and ring-tailed lemurs, however this may have been as too low a dose was used.

- In lemurs, genital odours of contracepted females are dramatically altered, which affect the behavioural response in males.

- Vasectomy will not affect androgen-dependent behaviours

### Effects on sexual physical characteristics

- Similar to gonadectomy but temporary. Female colouration will darken.

- Male secondary sex characteristics, etc. Further research in the subject is necessary.

- Male-related secondary sex characteristics, (e.g. darkening of males).

### Duration and Reversibility

- Data deficient in this group, but deslorelin is considered reversible by product information sheet. We have 1 record of reversal in this species, where the male sired offspring 3 years after the placement of 1x6 mg implant. The implant was not removed. We also have 6 records of reversal in ring-tailed lemurs, with time to conception ranging from 2-4 breeding seasons after the estimated contraception expiry date. Removal of implant to aid reversibility is recommended but often implant is difficult to recover. Implants should be placed in locations with thinner skin i.e. the armpit to ensure that locating and removing the implant when replacing contraception or if animals receive a breeding recommendation is easier.

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### Data deficient

- Data deficient, N/A

### Data recommended

- Not recommended, N/A

### Data not recommended

- Not recommended, N/A

### Data insufficient

- N/A
Side effects

Similar to gonadectomy; especially weight gain. Some dichromatic species may change color.

Possible weight gain, possible increased or decreased frequency of bleeding during menstruation. The EAZA RMG recommends always reading the manufacturer’s data sheet. Lemurs can develop severe endometrial hyperplasia in response of progestagen contraceptives, particularly when used long-term.

Long term use is not recommended since it can have possible deleterious effects on the uterus and mammary tissue. Progestins are likely to cause weight gain in all species. In the human literature, Depo-Provera® has been linked to mood changes. As it binds mostly to androgen receptors and is anti-estrogenic, females may experience male-like qualities (increased aggression, development of male secondary sex characteristics, etc.). In some diabetic animals (Delvosteron® has led to an increased insulin requirement; it is advised that the product be used with caution in diabetic animals and that urine glucose levels are carefully monitored during the month after dosing. The EAZA RMG recommends always reading the manufacturer’s data sheet.

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Warnings

Causes initial gonadal stimulation; correct administration essential - see product information sheet.

Interaction with other drugs are known to occur and may influence protection against pregnancy. In some diabetic animals progestagens have led to an increased insulin requirement; it is advised that the product be used with caution in diabetic animals and that urine glucose levels are carefully monitored during the month after dosing. The EAZA RMG recommends always reading the manufacturer’s data sheet.

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Infection of the surgical wound might occur. Intradermal closure of the skin is advised together with prophylactic antibiotic treatment and NSAID.

Reporting Requirements: In order to increase our knowledge of the efficacy of contraception methods in the Prosimian family it is recommended that all individuals on contraception be reported to the EAZA RMG.

References:


Disclaimer: The EAZA RMG endeavours to provide correct and current information on contraception from various sources. As these are prescription-only medicines it is the responsibility of the veterinarian to determine the dosage and best treatment for an individual.