

Animal name: Felids



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Contraceptive methods	GnRH agonist (implant) RECOMMENDED	GnRH agonist (injection)	Progestagen (injection) CAUTION	Progestagen (oral) CAUTION	Progestagen (injection) NOT RECOMMENDED	Progestagen (implant) NOT RECOMMENDED	Progestagen (implant) NOT RECOMMENDED	Surgical/Permanent
Contraceptive Product:	Deslorelin acetate	Luprolide acetate	medroxyprogesterone acetate;	Megestrol acetate	proligestron 100mg/ml	Levonorgestrel 2x 75mg	Etonogestrel 68 mg	N/A
Commercial Name:	Suprelorin®	Lupron®	Depo-Provera®, Depo-Progevera®	Ovarid®	Delvosteron®	Jadelle®	Implanon® Nexplanon®	N/A
Product Availability:	4.7mg ('Suprelorin 6') and 9.4 mg ('Suprelorin 12') widely available through veterinary drug distributors in the EU.	Luprolide acetate licenced for human use	Manufactured by Pfizer. Widely available throughout Europe through human drug distributors.	Manufactured by Virbac, available through veterinary distributors.	Manufactured by MSD animal Health UK, Intervet Europe. Licenced for use in female dogs, cats, and ferrets; available through veterinary distributors.	Manufactured by Organon. Available through human drug distributors	Manufactured by Bayer Schering Pharma AG. Available through human drug distributors	N/A
Restrictions and/or permit required by Importing Country:	EGZAC recommends: always check with your local licencing authority	Data deficient	EGZAC recommends: always check with your local licencing authority	EGZAC recommends: always check with your local licencing authority	EGZAC recommends: always check with your local licencing authority	EGZAC recommends: always check with your local licencing authority	EGZAC recommends: always check with your local licencing authority	N/A
Mechanism of action:	GnRH agonist suppress the reproductive endocrine system, preventing production of pituitary and gonadal hormones. As an agonist of the GnRH initially stimulates the reproductive system -which can result in oestrus and ovulation in females or temporary enhancement of testosterone and spermatogenesis in males- therefore additional contraception needed during this time. Please see below and refer to Deslorelin datasheet in our Product Recommendations section for detailed information	GnRH agonist suppress the reproductive endocrine system, preventing production of pituitary and gonadal hormones	Anti-estrogenic activity. Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation. Progestagen contraceptives are associated in felids with progressive uterine growth that can result in infertility, infections, and sometimes uterine cancer; mammary tissue stimulation also can result in cancer.	Anti-estrogenic activity. Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation. Progestagen contraceptives are associated in felids with progressive uterine growth that can result in infertility, infections, and sometimes uterine cancer; mammary tissue stimulation also can result in cancer.	Anti-estrogenic activity. Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation	Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation	Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation	Castration and Ovariohysterectomy/ovariectomy - recommended Permanent contraception by surgical gonadectomy, with similar side effects to those in domestic species - weight gain, loss of secondary sex characteristics Vasectomy - Caution Surgical procedure in which the ductus deferens are cut, tied, cauterized, or otherwise interrupted. Generally considered irreversible though reversible techniques have been successful in certain species. Vasectomy of males will not prevent potential adverse effects to females from prolonged, cyclic exposure to endogenous steroids associated with the obligate hormonal pseudo-pregnancy that follows ovulation in most felids. Endogenous steroids and steroid contraceptives cause similar side effects.
Insertion/Placement:	Sub-cutaneous, in a place where it can be easily detected or seen for removal at a later date (proximal medial aspect of forelimb or hindlimb; loose fleshy skin at base of pinna; umbilical area, side of neck); refer to Suprelorin Product Recommendation sheet for effective method of implant placement (tunnelisation)	Injectable	Injectable intramuscular	Orally daily	Injectable subcutaneously - do not inject intradermally or into subcutaneous fat or scar tissue	Intramuscular or subcutaneous. EGZAC recommends subcutaneous, upper inner arm for visibility (aid for later removal)	Intramuscular or subcutaneous. EGZAC recommends subcutaneous, upper inner arm for visibility (aid for later removal)	N/A
Females	RECOMMENDED	Data deficient	CAUTION - see side effect below	CAUTION - see side effects below	Not recommended	Not recommended	Not recommended	Ovariohysterectomy/ovariectomy - recommended
Dose	Gonadotropin Releasing Hormone Agonists are considered the safest reversible contraceptives, but dosages and duration of efficacy are not well established for all species; side effects are generally similar to those associated with gonadectomy, especially the potential for weight gain unless diet is controlled. Dosages and duration of efficacy have not been well established for exotic felid species. As a guide: 1 implant x 4.7 mg for a minimum of 6 months; 1 x 9.4 mg for a minimum of 12 months. The average duration of efficacy however is about 1 year for 4.7mg and 2 years for the 9.4 implant. Current dosing recommendations are a single implant for felids upto and including cheetah/leopard size; and 2 implants for the larger species.		5 mg/kg body wt. every 2 months, no more than 2 consecutive seasons. If a progestin is used, treatment should only be short term, because of the increased likelihood of side effects with prolonged exposure.	2-5mg/kg daily orally for seasonal breeders but not more than for 2 consecutive seasons. Or used avoid the stimulation phase associated with GnRH implant (see GnRH recommendations)				

<p>Latency to effectiveness:</p>	<p>3 weeks average as GnRH agonist initially stimulates the reproductive system- please refer to Deslorelin datasheet on this website for detailed information - separation of the sexes or additional contraception is needed during this time in order to suppress the initial stimulation phase (see product data sheet. ~2-5mg/kg Megestrol acetate pills /Ovarid® daily 7 days before and 8 days after has been used to suppress initial stimulation phase)</p> <p>Treatment MUST commence when the female is in anoestrus. Ovarid is designed to be fully reversible however there are no cases of reversal recorded in this species on the database.</p> <p>In felids progestagen contraceptives can increase the risk of developing moderate to severe endometrial hyperplasia, endometrial mineralisation, pyometra, hydrometra (amongst other conditions), which would cause permanent infertility in affected animals. There is also the increased risk of mammary and uterine cancer.</p>		<p>If a progestin is used in felids, treatment should start well BEFORE any signs of proestrus, since the elevated endogenous estrogen can exacerbate side effects of the progestin.</p>	<p>If a progestin is used in felids, treatment should start well BEFORE any signs of proestrus, since the elevated endogenous estrogen can exacerbate side effects of the progestin.</p>				
<p>Oestrus cycles during contraceptive treatment:</p>	<p>Initial oestrus and ovulation (during the 3 weeks of stimulation) may occur and then no oestrus cycle. To suppress the initial oestrus and ovulation with the concomitant progesterone production and the associated deleterious effects of this you MUST follow the megestrol acetate protocol mentioned above.</p>							<p>Precautions - Vasectomy is not recommended for species with induced ovulation because mating will result in female pseudopregnancies with prolonged periods of progesterone elevation, which can cause pathology of uterine and mammary tissue. Endogenous progesterone and progestin contraceptives cause similar disease. In lions vasectomy commonly results in repeated mating many times without ovulation. Females get tired of being harassed and sometimes this results in fighting between sexes. As a result some collections have resorted to "switching off" females with deslorelin when they have a vasectomised male</p>
<p>Use during pregnancy:</p>	<p>Not recommended</p>		<p>Progestins should not be used in pregnant animals, since they may suppress uterine contractions necessary for normal parturition. Thus, progestins should only be administered to females CONFIRMED non-pregnant.</p>					
<p>Use during lactation:</p>	<p>no contraindications once lactation established</p>							
<p>Use in prepubertals or juveniles:</p>	<p>data deficient in this group, see product information sheet Deslorelin 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 cats and lions. GnRH agonist use in prepubertal domestic cats was followed by reproductive cycles after treatment ceased. However, species differences may occur.</p>							
<p>Use in seasonal breeders:</p>	<p>Data deficient. Should start at least 1 months prior the breeding season. In females, GnRH agonists can induce estrus and ovulation even during the non-breeding season in some taxa</p>		<p>If a progestin is used in felids, treatment should start well BEFORE any signs of proestrus, since the elevated endogenous estrogen can exacerbate side effects of the progestin.</p>	<p>If a progestin is used in felids, treatment should start well BEFORE any signs of proestrus, since the elevated endogenous estrogen can exacerbate side effects of the progestin.</p>				
<p>Duration</p>	<p>duration of efficacy has not been well established as a guide: 4.7 mg implants will suppress for a MINIMUM of 6 months; 9.4mg will be effective for a MINIMUM of 12months. The average duration of efficacy however is about 1 year for 4.7mg and 2 years for the 9.4 implant. Individual variation occurs but durations tends to be regular for a particular individual's contraceptive bout.</p>		<p>Duration of efficacy, and thus latency to conception following last injection, can be extremely variable and has been seen to vary from 4 weeks to 2 years in some individuals. In general, the recommended dose (2.5-5 mg/kg BW) is effective for at least 2 months in most species. Treatment should only be short term, because of the increased likelihood of side effects with prolonged exposure in felids.</p>					

Reversibility	<p>Considered reversible but every species has not been tested. Reversibility has been demonstrated on average 3 years after implantation with this product in female felids. 7 of these reversals have been in lion species; cycling has begun 1.5 years after treatment and conceptions have been recorded between 2-4 years after treatment. However it must be noted that reversal time is dependent on the individual and their age at reversal; some animals will reverse earlier or later than others. It is currently felt that the more implant repeats a female has the less likely they are to reverse.</p> <p>Cheetah and leopards have been seen to reverse 2 years after a single 4.7mg implant. Lions and tigers where reversal is definitely required, 2x4.7mg rather than 1x 9.4mg implants are being recommended.</p> <p>Data from studies of domestic cats and from African lions have identified a transition phase of about 6 months during the process of reversal, when follicles grow and produce estrogen sufficient to stimulate recurring signs of estrus and even mating behavior but without ovulation. These observations indicate that reversal is a process that may extend for 6 months, when abnormal or irregular cycles may be seen in females or a period of increased aggression may be seen in males. It should be possible to hasten or avoid this process by removing the implant(s).</p> <p>Removal of implant to aid reversibility is recommended. (see product data sheet on this website for recommendations)</p>		Duration of efficacy, and thus latency to conception following last injection, can be extremely variable and has been seen to vary from 4 weeks to 2 years in some individuals. In general, the recommended dose (5 mg/kg BW) is effective for at least 2 months in most species					
Effects on Behaviour	Similar to those seen with gonadectomy but should be reversible.							
Effects on sexual physical characteristics	Similar to those seen with gonadectomy but should be reversible. Weight gain has been observed.							
Males		Data deficient	N/A		N/A	N/A	N/A	Castration - recommended; vasectomy caution
Dose	<p>Data deficient.</p> <p>Generally not used for contraception in males as effectiveness is harder to monitor (ensuring continued absence of sperm requires regular ejaculate examination). It can, however, be used to ameliorate aggression in males of some species, but higher doses than in females are required (about double). In cheetah 4.7mg implants can be repeated at 12 month intervals to successfully stop breeding. Keep away from females at least 2 months after implant as in vasectomy.</p>							N/A
Latency to effectiveness:	Depending on the species there may be fertile sperm present in vas deferens for 6-8 weeks post treatment or even longer. Testosterone decreases after 3-4 weeks but sperm can stay fertile for many weeks after. Generally 2 months is recommended as in vasectomy.							post vasectomy allow 6-8 weeks post surgery to ensure no viable sperm in ejaculate. Keep sexes apart during this period or keep females contracepted
Use in prepubertals or juveniles:	Data deficient in this group, see product information sheet. Deslorelin 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 cats. GnRH agonist use in prepubertal domestic cats was followed by reproductive cycles after treatment ceased. However, species differences may occur. There appear not to be any such problems in cheetahs.							
Use in seasonal breeders:	Data deficient. In males, GnRH agonists can transiently stimulate testosterone production even during the non-breeding season. Treatment should begin more than two months prior to the anticipated breeding season to prevent initiation of spermatogenesis, because it appears that suppression of sperm production is more easily accomplished before it has commenced.							
Duration and Reversibility	Duration of efficacy has not been well established as a guide: 4.7 mg implants will suppress for a MINIMUM of 6 months; 9.4mg will be effective for a MINIMUM of 12months. Deslorelin is considered reversible and reversibility has been demonstrated in the domestic cat and a black footed cat. Cheetah take 18-24 months to reverse after a single 4.7mg implant.							Vasectomy generally considered irreversible, however some successful reversible techniques have been used in certain species, but no publications in exotic felids.
Effects on Behaviour	Data deficient in this group, see product information sheet. Testosterone related aggression is likely to decrease. Loss of secondary sex characteristics (as with castration) eg lions will lose their manes).							Vasectomy does not affect male behaviour Castration will alter male sexual behaviour and may alter aggression if related to male hormones
Effects on sexual physical characteristics	Body size may decrease, decrease testicular size, feminisation of males. Similar to gonadectomy but reversible. In cheetahs, use for up to 10 years has not reduced body size or weight. There have been no signs of feminisation and behaviour, excepting for aggression is normal in the group situation.							vasectomy - no loss of secondary sex characteristics castration - results in loss of secondary sex characteristics
General:								
Side effects	Deslorelin first stimulates then suppresses estrus in females. Species with induced ovulation (e.g., felids, some mustelids, and bears) may ovulate and become pseudo-pregnant (which also occurs in canids) when first treated. In males, initial stimulation may be accompanied by increased aggression or sexual interest. Estrous behavior or even copulation may occur during a transition phase near the end of the period of contraceptive efficacy. Pseudopregnancy, endometrial hyperplasia and pyometra may be associated with the use of GnRH agonist as a result of high progesterone levels during the stimulation phase. A more recently developed Suprelorin®/ deslorelin protocol using Ovarid®/megestrol acetate to prevent the initial stimulation phase, followed by implant removal when reversal is desired, may be a safer contraceptive option.		<p>Progestagen contraceptives are associated in felids with progressive uterine growth that can result in infertility, infections, and sometimes uterine cancer; mammary tissue stimulation also can result in cancer.</p> <p>Risk of pseudopregnancy, endometrial hyperplasia and pyometra increases with exposure to prolonged circulating progestagens/ progesterone</p>		<p>Risk of pseudopregnancy, endometrial hyperplasia and pyometra increases with exposure to prolonged circulating progestagens/ progesterone</p>	<p>Risk of pseudopregnancy, endometrial hyperplasia and pyometra increases with exposure to prolonged circulating progestagens/ progesterone</p>	<p>Risk of pseudopregnancy, endometrial hyperplasia and pyometra increases with exposure to prolonged circulating progestagens/ progesterone</p>	Vasectomy of males will not prevent potential adverse effects to females from prolonged, cyclic exposure to endogenous steroids associated with the obligate hormonal pseudo-pregnancy that follows ovulation in most felids. Endogenous steroids and steroid contraceptives cause similar side effects.

<p>Warnings</p>	<p>Causes initial gonadal stimulation that MUST be suppressed (see above); correct administration essential - see product information sheet</p>		<p>SHOULD NOT BE USED PRIOR TO GnRH IMPLANT PLACEMENT Depo-Provera® should not be substituted for megestrol acetate, because its initial high levels and prolonged release can interfere with Suprelorin® efficacy.</p>				<p>Precautions - Vasectomy is not recommended for species with induced ovulation because mating will result in female pseudopregnancies with prolonged periods of progesterone elevation, which can cause pathology of uterine and mammary tissue. Endogenous progesterone and progestin contraceptives cause similar disease. In lions vasectomy commonly results in repeated mating many times without ovulation. Females get tired of being harassed and sometimes this results in fighting between sexes. As a result some collections have resorted to "switching off" females with deslorelin when they have a vasectomised male</p>
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Reporting Requirements: In order to increase our knowledge of the efficacy of contraception methods in the Cebidae family it is recommended that all individuals on contraception be reported to EGZAC

References:

- 1) The use of deslorelin implants for the long-term contraception of lionesses and tigers H. J. Bertschinger, M. A. de Barros Vaz Guimarães, T. E. Trigg, A. Human; October 2008 Wildlife Research 35(6) 525-530 <http://dx.doi.org/10.1071/WR07141>
- 2) Contraception in Carnivores; Karen E Dematteo in Wildlife Contraception: Issues, Methods, and Applications edited by Cheryl S. Asa, Ingrid J. Porton; pg 105-118
- 3) Repeated use of the GnRH analogue deslorelin to down-regulate reproduction in male cheetahs (*Acinonyx jubatus*) H.J. Bertschinger, M. Jago, J.O. Nöthling, A. Human; Theriogenology Volume 66, Issue 6, Pages 1762-1767, October 2006
- 4) Control of reproduction and sex related behaviour in exotic wild carnivores with the GnRH analogue deslorelin: preliminary observations. Bertschinger HJ, Asa CS, Calle PP, Long JA, Bauman K, DeMatteo K, Jöchle W, Trigg TE, Human AJ; Reprod Fertil Suppl [2001, 57:275-283]
- 5) Induction of contraception in some African wild carnivores by down-regulation of LH and FSH secretion using the GnRH analogue deslorelin. BERTSCHINGER, H.J., TRIGG, T.E., JÖCHLE, W., HUMAN, A. (2002) Reproduction Supplement 60: 41-52
- 6) Contraceptive applications of GnRH-analogs and vaccines for wildlife mammals of southern Africa: Current experience and future challenges. Bertschinger, H.J., E.S Sills. 2013. In: Gonadotropin-releasing hormone (GnRH). Production, structure and function. ES Sills (ed). Nova Science Publishers Inc., New York, ISBN: 978-1-62808-478-8 (eBook) 278 pp: 85-107

Disclaimer: EGZAC 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