



**Animal name: Bats (*Chiroptera*)**

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**It is suggested that prolonged separation of the sexes is not used as a method of contraception as an oestrogen dominant environment may result in proliferative changes to the uterine tissue.**

Contraceptive methods	GnRH agonist (implant)	GnRH agonist (injection)	Progestagen (implants)	Progestagen (implant)	Progestagen (injection)	Progestagen (injection)	Surgical/Permanent
<b>Contraceptive Product:</b>	Deslorelin acetate	Luprolide acetate	Etonogestrel 68 mg	Levonorgestrel 2x 75mg	medroxyprogesterone acetate;	proligestrone 100mg/ml	
<b>Commercial Name:</b>	Suprelorin ®	Lupron *	Implanon® Nexplanon®	Norplant® Jadelle®	Depo-Provera®, Depo-Progevera®	Delvosteron®	
<b>Product Availability:</b>	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 Bayer Schering Pharma AG. Available through human drug distributors	Manufactured by Organon. Available through human drug distributors	Manufactured by Pfizer. Widely available throughout Europe through human drug distributors.	Manufactured by MSD animal Health UK, Intervet Europe. Licensed for use in female dogs, cats, and ferrets; available through veterinary distributors.	N/A
<b>Restrictions and/or permit required by Importing Country:</b>	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	N/A
<b>Mechanism of action:</b>	GnRH agonist suppress the reproductive endocrine system, preventing production of pituitary and gonadal hormones. As an agonist of 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 for detailed information	GnRH agonist suppress the reproductive endocrine system, preventing production of pituitary and gonadal hormones	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	Anti-estrogenic activity. Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation	Anti-estrogenic activity. Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation	<b>Castration/Hysterectomy recommended</b> Permanent contraception by surgical oonadectomy; likely side effects include weight gain, loss of secondary sex characteristics
<b>Insertion/Placement:</b>	Sub-cutaneous, in a place where it can be easily detected or seen for removal at a later date (i.e. upper inner arm); refer Suprelorin fact sheet for effective method of implant placement (tunnelsation)	Injectable	Intramuscular or subcutaneous. EGZAC recommends sub-cutaneous, upper inner arm for visibility (aid for later removal)	Intramuscular or subcutaneous. EGZAC recommends sub-cutaneous, upper inner arm for visibility (aid for later removal)	Injectable intramuscular	Injectable subcutaneously - do not inject intradermally or into subcutaneous fat or scar tissue	Surgical
<b>Females</b>	<b>Data deficient</b>	<b>Data deficient</b>	<b>Data deficient</b>	<b>Data deficient</b>	<b>Data deficient</b>	<b>Data deficient</b>	<b>Hysterectomy</b>
<b>Dose</b>	<b>Data deficient.</b> Dosages and duration of efficacy are not well established for all species. As a guide: 1 implant x 4.7 mg for a <b>minimum</b> duration of 6 months; 1 x 9.4 mg for a <b>minimum</b> duration of 12 months.	<b>Data deficient:</b> Dosing information is not available.	<b>Data deficient.</b> Dosage and duration are not well established for all species. We have records of successful use of 1/6th of an implant in Egyptian fruit bats which conceived after 4 months, and 1/3 of an implant in Rodriguez flying foxes	<b>Data deficient.</b> Recommended 2/3 rod, depending on species and weight. Doses not well established.	<b>Data deficient.</b> Dosage studies have not been established in most species. Indications are that a dose 2-5 mg/kg BW (1/2 dose on each pectoral) every 2-3 months should be sufficient (higher dose in smaller species and the lower dose in larger species).	50mg/kg was effective in Egyptian fruit bats and effective for about 3 months	
<b>Latency to effectiveness:</b>	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)	Same as deslorelin with an initial stimulation phase and suppression should then occur 3-4 weeks later (please refer to deslorelin and lupron datasheet for more details)	7-14 days, separate sexes for 7-14 days after the implant is inserted.	7-14 days, separate sexes for 7-14 days after the implant is inserted.	1-3 days post injection. However, if the cycle stage is not known then extra time must be allowed. therefore, separation of the sexes or alternative contraception should be used for at least 1 week	1-3 days post injection. However, if the cycle stage is not known then extra time must be allowed. therefore, separation of the sexes or alternative contraception should be used for at least 1 week	

<b>Oestrus cycles during contraceptive treatment:</b>	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.	Same as deslorelin	Oestrus is inhibited	Oestrus is inhibited	Oestrus is inhibited	Oestrus is inhibited	
<b>Use during pregnancy:</b>	Not recommended	Not recommended	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.	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.	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.	Progestagens are not recommended in pregnant animals because of possibility of prolonged gestation, stillbirth, abortion etc in some species. Although the effect may depend on dose.	
<b>Use during lactation:</b>	No contraindications once lactation established	No contraindications once lactation established	Considered safe for nursing; Does not affect lactation, but etonogestrel is excreted in milk.	Considered safe for nursing; Does not affect lactation, but levonorgestrel is excreted in milk.		Considered safe for nursing infant	
<b>Use in prepubertals or juveniles:</b>	Data deficient	Data deficient	Data deficient	Data deficient		Data deficient	
<b>Use in seasonal breeders:</b>	Data deficient. Should start at least 2 month prior the breeding season. In females, GnRH agonists can induce estrus and ovulation even during the non-breeding season in some taxa	Data deficient. Should start at least 1 month prior the breeding season. In females, GnRH agonists can induce estrus and ovulation even during the non-breeding season in some taxa	To minimise progestin exposure implant 1 month before start of breeding season	To minimise progestin exposure implant 1 month before breeding season			
<b>Duration</b>	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 12 months. Individual variation occurs but durations tends to be regular for a particular individual's contraceptive bout.	Data deficient Not well established, duration of effect being likely related to the dose. Higher doses result in longer duration of effect.	Implanon is designed to last between 2-3 years, but this depends on the individual	Jadelle is designed to last between 2-3 years, but this depends on the individual.	2-3 months should be sufficient (higher dose in smaller species and the lower dose in larger species).	Dose dependant however, 30 days in general.	
<b>Reversibility</b>	Deslorelin is generally considered reversible. Our records show one female reversing within 4 months after the expected expiry of 4.7mg Suprelorin. Published research is variable - flying foxes demonstrated one female conceiving 6 months post implantation of 4.7mg; while 4 still had not conceived 8 months post implantation. It is recommended to remove the implant to aid reversibility.	Data deficient. Considered reversible but every species has not been tested. duration to reversibility extremely variable.	Implanon is designed to be fully reversible, however time to reversal can vary.	Jadelle is designed to be fully reversible, however time to reversal can vary.	Depo=Provera is designed to be fully reversible, however time to reversal can vary	Delvosteron is designed to be fully reversible, short acting, however time to reversal can vary	
<b>Effects on Behaviour</b>	Similar to those seen with gonadectomy but reversible.	Same as deslorelin	Because progestagens 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. Because it binds readily to androgen receptors and is antiestrogenic, females may experience male-like qualities (increased aggression, development of male secondary sex characteristics, etc.) Further research in the subject is necessary.			
<b>Effects on sexual physical characteristics</b>	Similar to gonadectomy	Similar to gonadectomy, sexual characteristics (testicular size, odour) influenced.	Data deficient	Data deficient	Data deficient	Data deficient	
<b>Males</b>	Data deficient	Data deficient	Not recommended	Not recommended	Not recommended	Not recommended	Castration
<b>Dose</b>	Data deficient. Dosages and duration of efficacy are not well established for all 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.	Data deficient: Dosing information is not available.	N/A	N/A	N/A	N/A	
<b>Latency to effectiveness:</b>	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. Research in black flying foxes shows reduced sperm motility after 1 month and aspermic ejaculations after 5 months.	Same as deslorelin with an initial stimulation phase and suppression should then occur 6-8 weeks later given that fertile sperm may remain present in the vas deferens (please refer to deslorelin and lupron datasheet for more details)	N/A	N/A	N/A	N/A	
<b>Use in prepubertals or juveniles:</b>	Data deficient in this group, see product information sheet	Data deficient	N/A	N/A	N/A	N/A	

<b>Use in seasonal breeders:</b>	<b>Data deficient.</b> Should start at least 2 months prior the breeding season.	<b>Data deficient.</b> Should start at least 1 month prior the breeding season. In females, GnRH agonists can induce estrus and ovulation even during the non-breeding season in some taxa	N/A	N/A	N/A	N/A	
<b>Duration and Reversibility</b>	Deslorelin is generally considered reversible. We currently have 1 record in our database of an individual siring offspring within 3 years of implantation. No information on when mate access was allowed. In black flying foxes, motile sperm was first seen in sperm 13 months after treatment with 4.7 mg. Variable flying foxes showed improvement in sperm motility after 3-4 months post implant for one male. Removal of implant to aid reversibility is recommended.	<b>Data deficient.</b> Considered reversible but every species has not been tested. duration to reversibility extremely variable.	N/A	N/A	N/A	N/A	
<b>Effects on Behaviour</b>	Testosterone related aggression is likely to decrease. <b>Data deficient</b> in this group, see product information sheet.	Same as deslorelin	N/A	N/A	N/A	N/A	Castration will alter male sexual behaviour and may alter aggression if related to male hormones
<b>Effects on sexual physical characteristics</b>	<b>Data deficient</b> in these taxa. Likely that body size may decrease, decrease testicular size, feminisation of males becoming size (weight) of females. Genital glands decreased which alters odour.	<b>Data deficient</b> in these taxa. Likely that body size may decrease, decrease testicular size, feminisation of males becoming size (weight) of females. Genital glands decreased which alters odour.	N/A	N/A	N/A	N/A	Castration results in loss of secondary sex characteristics
<b>General:</b>							
<b>Side effects</b>	Similar to gonadectomy; especially weight gain	Similar to gonadectomy; especially weight gain	Weight gain (progestins general)	Weight gain (progestins general)	Weight gain (progestins general)	Weight gain (progestins general)	
<b>Warnings</b>	Causes initial gonadal stimulation; correct administration essential - see product information sheet	Causes initial gonadal stimulation.	EGZAC recommends always reading the manufacturer's data sheet	EGZAC recommends always reading the manufacturer's data sheet	SHOULD NOT BE USED PRIOR TO GnRH IMPLANT PLACEMENT Depo-Provera® should not be substituted for megestrol acetate tablets, because its initial high levels and prolonged release can interfere with Suprelorin® efficacy.	EGZAC recommends always reading the manufacturer's data sheet	

**Reporting Requirements:** In order to increase our knowledge of the efficacy of contraception methods in the Chiroptera taxon it is recommended that all individuals on contraception be reported to EGZAC

**References:**

- 1] Reproductive seasonality and the effect of the GnRH agonist deslorelin as a contraceptive in captive male Black Flying-foxes (*Pteropus alecto*). D.F. Melville, G.M. O'Brien, E.G. Crichton, P. Theilemann, A. McKinnon, S.D. Johnston. *Theriogenology* 652-661 (2012)
- 2] Preliminary evaluation of deslorelin, a GnRH agonist for contraception of the captive variable flying fox *Pteropus hypomelanus*. Lara C. Metrione, John P. Versteegen, Darryl J. Heard, Dana LeBlanc, Allyson L. Walsh, Linda M. Penfold. *Contraception* 336-345 (2008)
- 3] Proliferative endometrial lesions in a group of Seba's short-tailed bats (*Carollia perspicillata*). Julia E. Napier, D.V.M., Shawn Caron, D.V.M, Drury R. Reavill, D.V.M., Dipl. A.C.V.P., Hayley Murphy, D.V.M., and Michael M. Garner, D.V.M., Dipl. A.C.V.P. *Journal of Zoo and Wildlife Medicine* 437-444 (2009)
- 4] The effect of contraceptive implants on the behavior of female Rodrigues fruit bats, *Pteropus rodricensis*. KT Hayes, ATC Feistner, EC Halliwell - *Zoo Biology* (1996)

**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