Suidae

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Contraceptive methods:	**GnRH agonist (implant)**	**GnRH agonist (injection)**	**Progestagen (implants)**	**GnRH Vaccine**	**Progestagen (injection)**	**Progestagen (oral)**	**Surgical/ Permanent**	**PZP vaccine**
Contraceptive Product:	Deslorelin acetate	Leuprolide acetate	Etonogestrel 68 mg	GnRH protein conjugate	Depot medroxyprogesterone acetate	Altrenogest	N/A	PZP vaccine main components are antigens derived from porcine zona pellucida glycoproteins and an adjuvant to stimulate the immune response (Freund's modified complete adjuvant for primary vaccination and Freund's incomplete adjuvant for boosters).
Commercial Name:	Suprelorin ®	Lupron ®	Implanon®, Nexplanon®	Improvac®	Depo-Provera®, Depo-Progevera®,	Regu-mate®	Vasectomy	Porcine Zona Pellucida
Product Availbility:	4.7mg ('Suprelorin 6') and 9.4 mg ('Suprelorin 12') widely available through veterinary drug distributors in the EU. 9.4 mg ('Suprelorin 12') is also available through Peptech Animal Health, Australia.	Leuprolide acetate licenced for human use	Manufactured by Bayer Schering Pharma AG. Available through human drug distributors	Available through veterinary drug distributors.	Manufactured by Pfizer. Widely available throughout Europe through human drug distributors.	Regu-mate® Porcine 0.4% w/v oral solution widely available through veterinary drug distributors.	N/A	Not commercially available in Europe. Can be imported from the USA.
Restrictions and/or permit required by Importing Country:	EGZAC recommends: always check with your local licencing authority	Data deficient	Current knowledge: widely available throughout European countries. EGZAC recommends: always check with your local licencing authority	Current knowledge: widely available throughout European countries. EGZAC recommends: always check with your local licencing authority	EGZAC recommends: always check with your local licencing authority	EGZAC recommends always checking with your local licencing authority	N/A	License required UK and France; all other Countries unknown. **EGZAC recommends always checking with local licencing authority**
Mechanism of action:	GnRH agonists suppress the reproductive endocrine system, preventing the production of pituitary and gonadal hormones. As a GnRH agonist, deslorelin 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 is needed during this time.	GnRH agonists suppress the reproductive endocrine system, preventing the production of pituitary and gonadal hormones. As a GnRH agonist, deslorelin 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 is needed during this time.	Interference with fertilization by thickening cervical mucus which interrupts gamete transport, disrupts implantation, and inhibits LH surge necessary for ovulation.	Production of anti-GnRH antibodies by the immune system neutralises endogenous GnRH activity. This results in a reduction of FSH and LH production by the anterior pituitary gland; which then leads to a reduction of ovarian follicular development and /or inhibition of testosterone secretion from the testes and spermatogenesis.	Progestagens have negative feedback effects on GnRH and pituitary LH and FSH release, thus removing their stimulatory effects on follicle development and ovulation. This mimics endogenous progesterone.	Progestagens have negative feedback effects on GnRH and pituitary LH and FSH release, thus removing their stimulatory effects on follicle development and ovulation. This mimics endogenous progesterone.	Surgical procedure in which the ductus deferens are cut, tied, cauterized, or otherwise interrupted.	The PZP antibodies interfere with fertilisation by binding to the ZP glycoprotein receptors that surround the egg of the vaccinated female, blocking the binding and subsequent penetration of sperm. **PZP vaccine does not work in Suid spp as the antigen is not recognised as such.**
Insertion/Placement:	Sub-cutaneous, in a location where implant(s) can be easily detected or seen for removal at a later date; refer to Suprelorin fact sheet for effective method of implant placement (tunnelisation)	Injectable intramuscular or subcutaneously	Intramuscular or subcutaneous. EGZAC recommends sub-cutaneous, front inner leg for visibility (aid for later removal)	Injectable intramuscular or subcutaneously	Intramuscular Injection	Administered orally in feed or by syringe. **Gloves must be worn when administering Regu-mate® (absorption through the skin can cause disruption to the menstrual cycle and prolongation of pregnancies in humans).**	Surgical	Injectable Intramuscular
Females							N/A	N/A
Dose	Dosage depends on the body weight of the individual, female Suidae seem to need higher doses for full suppression. Between 2 and 4 implants are recommended, 4.7mg is recommended for a **minimum** duration of 6 months and 9.4mg is recommended for a **minimum** duration of 12 months. **Please contact EGZAC for species specific dosage recommendations.**	**data deficient**	There are no cases using Nexplanon/Implanon in this species, although it has been used successfully in other female ungulates. As a guideline dosage is recommended at 1 implant/100kg.	In wild suids 2ml - 3ml injection has been given, followed by a booster 3 to 4 weeks later. Follow up injections/boosters have then been given every 3 months, duration might vary among species.	**Data deficient:** 2-5 mg/kg body weight every 2-3 months has been used in other Artyodactyla (if oestrus occurs, dose can be increased incrementally until suppression is achieved).	**Data deficient in wild suids:** Regu-mate® Porcine is recommended in the domestic sow at 5ml daily, however higher doses might be needed for some wild suid species.	N/A	N/A
Latency to effectiveness:	At least 3 weeks as GnRH agonists initially stimulate the reproductive system **(please refer to Suprelorin datasheet for detailed information),** separation of the sexes OR supplementary contraception is recommended during this time (see product data sheet for details). Megestrol acetate pills (Ovarid) or oral porcine Regu-mate (etonorgestrel) daily, 7 days before and 8 days after implant insertion have been used to suppress the stimulation phase. The dose of Regu-mate is 5ml per animal in domestic pigs and the dose for Ovarid is 2 mg/kg in domestic dogs, but this must be extrapolated for other taxa (see datasheet for full dosing details).	**data deficient**	**Data deficient:** A minimum of 1 week post injection, since cycle stage is difficult to determine in species without obvious external signs. If the female is near ovulation then the process cannot be stopped by exogenous progestin. Separation of the sexes or alternative contraception should be used for at least 1 week.	Unknown for most species, minimum of 6 weeks. Separation of the sexes is recommended during this time.	**Data deficient:** A minimum of 1 week post injection, since cycle stage is difficult to determine in species without obvious external signs. If the female is near ovulation, the process cannot be stopped by exogenous progestin. Separation of the sexes or alternative contraception should be used for at least 1 week.	**Data deficient:** A minimum of 1 week post injection, since cycle stage is difficult to determine in species without obvious external signs. If the female is near ovulation, the process cannot be stopped by exogenous progestin. Separation of the sexes or alternative contraception should be used for at least 1 week.	N/A	N/A

Oestrus cycles during contraceptive treatment:	Initial oestrus and ovulation (during the 3 weeks of stimulation) then down-regulation occurs. To prevent the stimulation phase the progestagen protocol described above is recommended.	**data deficient**	**Data deficient**	Oestrus should be suppressed	Oestrous behaviour may be observed, cycling and even ovulation can occur in adequately contracepted individuals (the degree of suppression is dose dependent).	Ovulation and cycling can occur in adequately contracepted individuals (the degree of suppression is dose dependent).	N/A	N/A
Use during pregnancy:	Not recommended as may cause abortion or prevent adequate mammary development.	Not recommended as may cause abortion or prevent adequate mammary development.	Data deficient. Progestins can block parturition in other ungulates, which can kill both the mother and fetus.	Data deficient	**Data deficient**. Progestins can block parturition in other ungulates, which can kill both the mother and fetus.	**Data deficient**. Progestins can block parturition in other ungulates, which can kill both the mother and fetus.	N/A	N/A
Use during lactation:	No contraindications once lactation established, however treatment during pregnancy may impede proper mammary development.	No contraindications once lactation established, however treatment during pregnancy may impede proper mammary development.	Considered safe for nursing. Does not affect lactation, but etonogestrel is excreted in milk.	Data deficient	Considered safe for nursing infant.	Considered safe for nursing infant.	N/A	N/A
Use in prepubertals or juveniles:	**Data deficient in this group**. Because GnRH agonists suppress gonadal steroids, their use may delay epiphyseal closure of the long bones resulting in taller individuals. This is similar to the effects of pre-pubertal spaying and neutering in domestic dogs and cats. GnRH agonist use in prepubertal domestic cats was followed by reproductive cycles after treatment ceased. Species differences may occur however.	**Data deficient in this group**. Because GnRH agonists suppress gonadal steroids, their use may delay epiphyseal closure of the long bones resulting in taller individuals. This is similar to the effects of pre-pubertal spaying and neutering in domestic dogs and cats. GnRH agonist use in prepubertal domestic cats was followed by reproductive cycles after treatment ceased. Species differences may occur however.	**Data deficient**	In wild suids 2ml - 3ml injection has been given, followed by a booster 3 to 4 weeks later. Follow up injections/boosters have then been given every 3 months, duration might vary between species.	**Data deficient:** The use of synthetic progestagens in pre-pubertals or juveniles has not been fully assessed, possible long-term effects on fertility are not known.	The use of synthetic progestagens in pre-pubertals or juveniles has not been fully assessed, possible long-term effects on fertility are not known.	N/A	N/A
Use in seasonal breeders:	**Data deficient**. Should start at least 2 months before the start of the breeding season.	**Data deficient,** should start at least 2 months before the start of the breeding season.	**Data deficient**	**Data deficient**, but if used should be initiated at least 6 weeks prior to the breeding season.	Should be injected at least 1 month before the breeding season starts.	Treatment should begin at least one month before the anticipated onset of the breeding season.	N/A	N/A
Duration	Duration of efficacy has not been well established. As a guide 4.7 mg implants will suppress for a minimum of 6 months and 9.4mg implants will suppress for a minimum of 12 months.	**data deficient**	**Data deficient**	Unknown for most of species. Improvac® induces an immune response that generates short-lived antibodies in the domestic pig (antibody production starts to decline ~7-8 weeks following second injection). Suppresses oestrus for a full season in domestic horse mares after the first booster.	**Data deficient.** This is dose dependant, but it is 45-90 days in general. However, effects could last 1-2 years in some individuals.	No more than one day, Regu-mate® must be given daily to maintain suppression of oestrus. Clearance of regumate from the system can occur in a few days, however latency to conception can very between individuals.	Permanent	N/A
Reversibility	Deslorelin is designed to be fully reversible; however, time to reversal is difficult to predict due to individual variability. Removal of implant may hasten time to reversal. There are cases of reversal in this taxon in the EGZAC database and there are also no cases of this contraceptive failing.	**data deficient**	**Data deficient**	**Data deficient**. Short-lived antibodies, presumed to be fully reversible.	**Data deficient.** Designed to be fully reversible, but individual variation can occur. There are no current cases of reversal in Antilocapridae, camelidae and tragulidae. There are cases of reversal in bovid species occurring 1 month to 2 years after the final injection. In giraffidae species there are individuals having been reported as successfully conceiving from 6 months to over 5 years after their final injection. 4 Individuals of the hippopotamidae family conceived within a year of their final injection and reversibility has also been demonstrated in some cervidae species.	It should be reversible after cessation of treatment. Signs of oestrus have been observed 5 days after the end of treatment, but will vary depending on the individual.	N/A	N/A
Effects on Behaviour	Effects should be similar to those following ovariectomy in females or castration in males.	Effects should be similar to those following ovariectomy in females or castration in males.	**Data deficient**	Similar to gonadectomy, but short-acting. It has been used successfully in bearded pigs and domestic pigs to control aggression.	Effects on behaviour have not been studied; there may be individual variation in response. Medroxyprogesterone acetate [not all progestins are androgenic] 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.	Regu-mate® can be used to alleviate temperament changes and aggression. Synthetic progestins may not suppress follicle growth and some signs of oestrous behaviour may be present.	N/A	N/A
Effects on sexual physical characteristics	Similar to gonadectomy, GnRH agonists may cause the suppression of physical secondary sexual characteristics.	Similar to gonadectomy, GnRH agonists may cause the suppression of physical secondary sexual characteristics.	**Data deficient**	Similar to gonadectomy, but short-acting (duration of antibody effect).	Because Medroxyprogesterone acetate binds readily to androgen receptors and is antiestrogenic, females may experience male-like qualities (increased aggression, development of male secondary sex characteristics, etc.)	**Data deficient,** but thought not to cause any obvious changes in appearance.	N/A	N/A
Males	**Not recommended**	**Not recommended**	**Not Recommended**		**Not Recommended**	**Not Recommended**		**N/A**
Dose	N/A	N/A	N/A	Unknown. A 3ml injection followed by a booster 3-4 weeks later would be recommended (similar to the domestic pig). Follow up injections have then been given every 3 months.	N/A	N/A	N/A	N/A

Latency to effectiveness:	N/A	N/A	N/A	At least 2 weeks following the second injection.	N/A	N/A	N/A	N/A
Use in prepubertals or juveniles:	N/A	N/A	N/A	In domestic pigs it is designed for use in pre-pubertal pigs to control 'boar taint", reversibility is good in pigs that are not slaughtered.	N/A	N/A	N/A	N/A
Use in seasonal breeders:	N/A	N/A	N/A	Unknown, but if used should be initiated at least 6 weeks prior to the breeding season.	N/A	N/A	N/A	N/A
Duration and Reversibility	N/A	N/A	N/A	Unknown for most species. Improvac® induces an immune response that generates short-lived antibodies in the domestic pig (antibody production starts to decline ~7-8 weeks following second injection). This lasts approximately 5 to 9 months in bull elephants when used for the control of musth. **It must be taken in to consideration that younger males will take longer to reverse in comparison to older males.**	N/A	N/A	N/A	N/A
Effects on Behaviour	N/A	N/A	N/A	Similar to surgical castration, but short-acting (duration of antibody effect). Decreases male aggression due to down regulation of testosterone synthesis, which has successfully been used to control aggression in male warthogs. Can prevent, terminate or reduce aggression/musth behaviour in bull elephants.	N/A	N/A	N/A	N/A
Effects on sexual physical characteristics	N/A	N/A	N/A	Similar to surgical castration, but short-acting (duration of antibody effect).	N/A	N/A	N/A	N/A
General:								
Side effects	Similar to gonadectomy; especially weight gain. Increased appetite will result in weight gain, especially in females. Males may lose muscle and overall weight if not replaced by fat. Males may become the size (weight) of females. **EGZAC recommends always reading the manufacturer's data sheet**	Similar to gonadectomy; especially weight gain. Increased appetite will result in weight gain, especially in females. Males may lose muscle and overall weight if not replaced by fat. Males may become the size (weight) of females. **EGZAC recommends always reading the manufacturer's data sheet**		Occasional swelling at the vaccination site - need to inject deep intramuscular. **EGZAC recommends always reading the manufacturer's data sheet**	Possible deleterious effects on the endometrium following prolonged use. Progestins are likely to cause weight gain in all species. In human literature, Depo-Provera® has been linked to mood changes. Because it binds readily to androgen receptors and is anti-estrogenic, females may experience masculinisation (increased aggression, development of male secondary sex characteristics). **EGZAC recommends always reading the manufacturer's data sheet**	Progestagens likely cause weight gain in all species. Possible deleterious effects on uterine and mammary tissues vary greatly by species. Can cause endometritis in domestic horses and cystic follicles in suids at low doses. **EGZAC recommends always reading the manufacturers' data sheet.**	N/A	N/A
Warnings	Causes initial gonadal stimulation. Duration may be reduced if implant is broken. Do not cut the implant. If implant is not completely removed at the end of treatment, residual circulating levels of deslorelin may affect time to reversal. **Should not be used in conjuction with Depo-Provera.**	Causes initial gonadal stimulation. Duration may be reduced if implant is broken. Do not cut the implant. If implant is not completely removed at the end of treatment, residual circulating levels of deslorelin may affect time to reversal. **Should not be used in conjuction with Depo-Provera.**		It should be handled with extreme care to avoid handler accidents such as incorrect placement or human injury. **EGZAC recommends always reading the manufacturer's data sheet**	Interaction with other drugs are known to occur and may influence protection against pregnancy. In some diabetic animals progestagens 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. **EGZAC recommends always reading the manufacturer's data sheet.**	This product is contraindicted for use in females with a previous or current history of uterine inflammation. **EGZAC recommends always reading the manufacturer's data sheet**	The procedure should always be carried out under sterile conditions, potential for infection of the surgical wound.	N/A

Reporting Requirements: In order to increase our knowledge of the efficacy of contraception methods in Perissodactyla it is recommended that all individuals on contraception be reported to EGZAC	
References: **1)** **2)**	
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	