Perissodactyla

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Contraceptive methods:	GnRH agonist (implant)	GnRH agonist (injection)	GnRH Vaccine	Progestagen (injection)	Progestagen (oral)	PZP vaccine	Surgical/ Permanent
Contraceptive Product:	Deslorelin acetate	Luprolide acetate	GnRH protein conjugate	Depot medroxyprogesterone acetate	Altrenogest	PZP vaccine main components are antigens dervied 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).	N/A
Commercial Name:	Suprelorin ®	Lupron ®	Improvac®	Depo-Provera®, Depo-Progevera®,	Regu-mate®	Porcine Zona Pellucida	Vasectomy
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.	Luprolide acetate licenced for human use	Available through veterinary drug distributors.	Manufactured by Pfizer. Widely available throughout Europe through human drug distributors.	Regu-mate® Equine 2.2ml/mg oral solution and Regu-mate® Porcine 0.4% w/v oral solution widely available through veterinary drug distributors.	Not commercially available in Europe. Can be imported from the USA. WWW.SCCPZP.ORG	N/A
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	EGZAC recommends: always check with your local licencing authority	EGZA recommends: always checking with your local licencing authority	License for importation is required. licence unavailable in the UK; all other Countries unknown. EGZAC reccommends always checking with 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.	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.	Production of anti-GnRH antibodies by the immune system, neutralising endogenous GnRH activity. This results in a reduction of FSH and LH production by the anterior pituitary and, ultimately, in a reduction of ovarian follicular development and /or inhibition of testosterone secretion from the testes and spermatogenesis.	Anti-estrogenic activity. Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation. **Depo-Provera appears not to be effective in mares, but has been found to be effective in other female perisodactyla**	Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation	The PZP antibodies interfere with fertilisation by binding to the ZP glycoprotein receptors that suround the egg of the vaccinated female, blocking the binding and subsequent penetration of sperm.	Surgical procedure in which the ductus deferens are cut, tied, cauterized, or otherwise interurrupted
Insertion/Placement:	Sub-cutaneous, in a place where it can be easily detected or seen for removal at a later date; refer Suprelorin fact sheet for effective method of implant placement (tunnelisation)	Injectable intramuscular or subcutaneously	Injectable intramuscular or subcutaneously	Injectable intramuscular	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).**	Injectable Intramuscular	Surgical
Females							
Dose	Dosage depends on the body weight of the individual. 4.7mg is recommended for a **minimum** duration of 6 months and 9.4mg is recommended for a **minimum** duration of 12 months. There is recorded use of 3 - 9.4mg implants having been used in a Malayan Tapir and a Wild Ass, while 2 - 4.7mg implants have also been used in a South American Tapir with success. **Please contact EGZAC for species specific dosage recommendations.**	Dosing information is not available; extrapolation from human literature is likely the best place to start.	Booster interval is not well established for this taxon and so they should be given from 3 months to 6 and a year.	2-5 mg/kg body weight every 2-3 months. **Lack of efficacy in the domestic mare, but proven to be effective in other female perissodactyla**	0.044 mg/kg daily. It is suggested that this dosage is ineffective in tapirs.	~ 100 ug of protein. Recommended dose is 2 injections given typically 2+ weeks apart then a booster. Booster interval is species dependent and advice will be given by the suppliers. For species with well defined and short (2-3 months) breeding season, give first dose 1-2 months prior to the breeding season and the second inoculation no later than 1 month prior to breeding activity. Year-round breeders booster inoculations should be given every 7 to 8 months.	N/A

Latency to effectiveness:	3 weeks average as GnRH agonists initially stimulates the reproductive system- **please refer to Deslorelin datasheet for detailed information** - separation of the sexes OR supplementary contraception is recommended during this time (see product data sheet. Megestrol acetate pills daily 7 days before and 8 days after implant insertion have been used to suppress stimulation phase. The dose for domestic dogs is 2mg/kg, but must be extrapolated for other taxa). (See Product data sheet. Regumate, 0.02 - 0.4 mg/kg daily 7 days before and 8 days after implant placement can also be used as an alternative method to suppress the stimulation phase).	3 weeks average as GnRH agonists initially stimulates the reproductive system- **please refer to Deslorelin datasheet for detailed information** - separation of the sexes OR supplementary contraception is recommended during this time (see product data sheet. Megestrol acetate pills daily 7 days before and 8 days after implant insertion have been used to suppress stimulation phase. The dose for domestic dogs is 2mg/kg, but must be extrapolated for other taxa). (See Product data sheet. Regumate, 0.02 - 0.4 mg/kg daily 7 days before and 8 days after implant placement can also be used as an alternative method to suppress the stimulation phase).	Unknown for most species, minimum of 6 weeks.	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.	Usually 1-3 days of treatment, however separation of the sexes or alternative contraception methods should be used for 7- 14 days after first treatment.	2-3 weeks after the last vaccination during year 1 (primary course of vaccination 2 injections 2-4 weeks apart, preferable 3 injections).	N/A
Oestrus cycles during contraceptive treatment:	Initial oestrus and ovulation (during the 3 weeks of stimulation) then down-regulation. To prevent the stimulation phase, the megestrol acetate protocol described above is recommended.	Initial oestrus and ovulation (during the 3 weeks of stimulation) then no oestrus cycle. To supress the initial osetrus and ovulation you can follow the megestrol acetate protocol mentioned above.	If contraceptive suppression is successful then oestrus should also be suppressed fully; highly successful at inducing anoestrus in domestic horses.	Oestrus behaviour may be observed. Ovulation and cycling can occur in adequately contracepted individuals (but is unlikely and the degree of suppression is dose dependent).	Ovulation and cycling can occur in adequately contracepted individuals (but is unlikely and the degree of suppression is dose dependent).	PZP should not suppress estrous cycles (**but will render them infertile**) and may extend the breeding season beyond what is considered typical, resulting in additional estrous cycles.	
Use during pregnancy:	Not recommended	Not recommended	Not Recommended	Progestagens are not recommended in pregnant animals because of the possibility of prolonged gestation, still birth, abortion, etc.	Progestagens are not recommended in pregnant animals because of the possibility of prolonged gestation, still birth, abortion, etc.	Is compatible with pregnant animals and should not interfer with the development of the foetus.	
Use during lactation:	No known contraindications once lactation has been established; however, treatment during pregnancy may impede proper mammary development.	No contraindications once lactation established	Unknown	Considered safe for nursing infant.	Considered safe for nursing infant.	Does not interrupt pregnancy or affect fetus	
Use in prepubertals or juveniles:	Because 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 dogs and cats. GnRH agonist use in prepubertal domestic cats was followed by reproductive cycles after treatment ceased. However, species differences may occur.	**Data deficient** in this group, see product information sheet	Unknown	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	PZP-treated prepubertal feral horses were fertile as adults. Not associated with side effects in elephants. But there is no data for other species. **Dependent on length of treatment, if used long term (approx 4 years) then infertility is entirely possible.**	
Use in seasonal breeders:	Treatment should be given more than 2 months prior to expected breeding season	**Data deficient.** Should start at least 1 months prior the breeding season.	If used should be done at least 6 weeks prior to the breeding season. Effective in the horse. Use on the onset of the breeding season before cycling starts.	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.	Can be used in seasonal breeders but initial treatment and annual boosters should be carried out 2 and 1 months before the start of the breeding season respectively.	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; 9.4mg will be effective for a **minimum** of 12 months	Not well established, duration of effect being likely related to the dose. Higher doses result in longer duration of effect. **This is extremely data deficient.**	Unknown for most of species. Improvac® generates short lived antibodies in the domestic pig (after 7-8 weeks following second injection antibodies start to decline). A full season in mares after the first booster. In a female black rhino boosters have been given every three months.	Dose dependant: 45-90 days in general. However, effects could last 1-2 years in some individuals.	Duration may not be more than one day, so has to be adminstered daily. Clearence of regumate from the system can occur in a few days, however latency to conception can very between individuals.	Boosters vacciantion required at regular intervals. Is used for short term use for no more than 3-4 years.	Permanent
Reversibilty	Deslorelin is designed to be fully reversible, however there are currently no cases of this within this taxon on the database. Cases of reversability have been demostrated, but this is individual and taxon dependent.	Considered reversible but every species has not been tested. Duration to reversibility extremely variable.	**Improvac is NOT designed to be reversible**, although reversibility has been reported in white-tailed deer**. Reversibility is** unknown for most species. It is presumed to be reversible when used in the short term due to short lived antibodies. The longer it is used, the longer the time required for reversal. **Long term effects on fertility are unknown and therefore EGZAC recommends caution when using for an extended period of time.**	Designed to be fully reversible although individual variations can occur.	Designed to be fully reversible although variations can occur.	Species differences on reversibility. Treatment for over 5 years has been associated with ovarian failure in some cases. The possibility of ovarian damage makes this method unsuitable for animals highly valuable to captive breeding programmes or where reversibility is important. Consectutive use for over 3-4 years can lead to possible reversal failure.	

Effects on Behaviour	Deslorelin is likely to supress some hormonal related behaviours and it has been used previously for aggression in the Somali Wild Ass with positive results.	Same as Deslorelin	Similar to surgical castration (duration of antibody effect). No oestrus behaviour in mares.	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. 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. Further research in the subject is necessary.	Since usually the vaccine doesn't suppress oestrus cycles it has almost no effects on social behaviour, and no undesirable behavioural effects have been registered in free-ranging elephants treated for up to 9 years. In some species the failure to conceive can results in longer than usual breeding season and in some cases this can results in aggression and social disruption.	
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.	Similar to gonadectomy (duration of antibody effect).	Because it binds readily to androgen receptors and is antiestrogenic, females may experience male-like qualities	Data Deficient	Data Deficient	
Males	**Not Recommended**	**Data deficient**		**Not Recommended**	**Not Recommended**	**Not Recommended**	
Dose	N/A	Usually a higher dose than in females are required in males. **Data deficient**	Recommended dose is 400µg per vaccine, booster interval is not well established for this taxon and so should be given from 3 months, to 6 months and a year.	N/A	N/A	N/A	N/A
Latency to effectiveness:	N/A	Depending on the species there may be fertile sperm present in vas deferens for 6-8 weeks post treatment. Testosterone decreases after 3-4 weeks but sperm can stay fertile for many weeks after. Additional contraception needed during this time or separation of the sexes.	At least 2 weeks following booster.	N/A	N/A	N/A	There will be a latency period I don't know what it would be for various species possibly 6-8 weeks
Use in prepubertals or juveniles:	N/A	**Data deficient** in this group, see product information sheet	No data available, therefore its use is not recommended.	N/A	N/A	N/A	N/A
Use in seasonal breeders:	N/A	**Data deficient.** Should start at least 2 months prior the breeding season.	If used should be done at least 6 weeks prior to the breeding season. Effective in the horse. Use on the onset of the breeding season before cycling starts.	N/A	N/A	N/A	N/A
Duration and Reversibility	N/A	**Data deficient**, but lupron is considered reversible. See product information sheet.	Improvac® is **NOT** designed to be reversible. Unknown for most of species. Improvac® generates short lived antibodies in the domestic pig (after 7-8 weeks following second injection antibodies start to decline). A full season in mares after the first booster.	N/A	N/A	N/A	N/A
Effects on Behaviour	N/A	Testosterone related aggression is likely to decrease. **Data deficient** in this group, see product information sheet.	Similar to surgical castration (duration of antibody effect). Decrease male aggression due to downregulation of testosterone synthesis. 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	Some dichromatic species may change colour if testosterone related. Decrease in body size, feminisation of males.	Similar to surgical castration (duration of antibody effect).	N/A	N/A	N/A	N/A
General:							
Side effects	Similar to gonadectomy; especially weight gain. Females of a species that are induced ovulators, may ovulate and become pseudo-pregnant when first treated.	In general weight gain as would be seen with ovariectomy or castration. 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. Females of a species that are induced ovulators, may ovulate and become pseudo-pregnant when first treated. **EGZAC recommends always reading the manufacturer's data sheet.**	Painful swelling at the vaccination site may occur (apparently is very common) - need to inject deep intramuscular in elephants and horses. **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. 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.**	Treatment for over 5 years has been associated with ovarian failure in some species (species differences). Significant ovarian disruption has been noted in dogs, rabbits, mice and domestic sheep. Oophoritis unknown if transient or permanent. In some species the failure to conceive can results in longer than usual breeding season (aggression and social disruption)	N/A

Warnings	Causes initial gonadal stimulation. Duration may be reduced if implant is broken. Do not cut the implant. Implants are designed to be left in and fully reversible, but removal of the implant may also aid reversibility. **Should not be used in conjuction with Depo-Provera.**	Causes initial gonadal stimulation	It should be handled with extreme care to avoid handler accidents. **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, as such this product is not recommended in diabetic animals. **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 only adjuvant used with PZP is Freund's Modified adjuvant, which DOES NOT CAUSE TB+ TEST RESULTS, and injection site reactions are less than 0.05%. Following the initial treatments, boosters are required, using only Freund's Incomplete adjuvant.	The procedure should always be carried out under sterile conditions, potential for infection of the surgical wound.

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:

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