## Antilocapridae

**Fact Sheet Compiled by: Charlotte Cox**

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**Fact Sheet Reviewed by: Mary Agnew & Gidona Goodman**

| **Contraceptive methods:** | **GnRH agonist (implant)** | **GnRH agonist (injection)** | **Progestagen (implants)** | **GnRH Vaccine** | **Progestagen (injection)** | **Progestagen (oral)** | **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).** | **Surgical/ Permanent** |
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| **Contraceptive Product:** | Deslorelin acetate | Leuprolide acetate | Etonogestrel 68 mg | GnRH protein conjugate | Depot medroxyprogesterone acetate | Altrenogest | 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). | N/A |
| **Commercial Name:** | Suprelorin ® | Lupron ® | Implanon® Nexplanon® | Improvac® | Depo-Provera®, Depo-Progevera®, | Regu-mate® | Porcine Zona Pellucida | Vasectomy |
| **Product Availability:** | 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® 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 | 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 | EGZA recommends: always checking with your local licencing authority | License required UK and France; all other Countries unknown. EGZAC recommends always checking with local licencing authority | N/A |
| **Mechanism of action:** | GnRH agonists suppress the reproductive endocrine system, preventing production of pituitary and gonadal hormones. GnRH agonists initially stimulates the reproductive system which can result in oestrus and ovulation in females or temporary enhancement of testosterone and spermatogenesis in males therefore supplementary contraception is recommended during this time. | GnRH agonists suppress the reproductive endocrine system, preventing production of pituitary and gonadal hormones. GnRH agonists initially stimulates the reproductive system which can result in oestrus and ovulation in females or temporary enhancement of testosterone and spermatogenesis in males therefore supplementary contraception is recommended during this time. | Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for ovulation | Production of anti-GnRH antibodies by the immune system, neutralising endogenous GnRH activity.<br>This results in a reduction of FSH and LH production by the<br>anterior pituitary and, ultimately, in a reduction of ovarian follicular development and /or inhibition of testosterone<br>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 | 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 surround 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 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. | 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. 2x implants have been used successfully in a female Pronghorn antelope. 4.7mg is recommended for a **minimum** duration of 6 months and 9.4mg is recommended for a **minimum** duration of 12 months. | There are various formulations available lasting from 1-6 months. Dosing information is not available; extrapolation from human literature is likely the best place to start. | There are no cases using Nexplanon/Implanon in this species although it has been used successfully in other female ungulates, as a guideline it is 1 implant/100kg. | Unknown for Antilocapridae. In equids a 3ml injection has been given, followed by a booster 3 weeks later. Follow up injections have then been given every 3 months. | 2-5 mg/kg body weight every 2-3 months | Regu-mate® Equine: 0.044mg/kg daily; Regu-mate® Porcine: 5ml daily | ~ 10 ug of protein. Recommended dose is 2 injections given typically 2-6 weeks apart for species with well defined and short (2-3 months) breeding season, given 1-2 months prior to the breeding season and the second inoculation no later than 1-2 weeks prior to breeding activity.In species with longer breeding season, if the vaccine is give at a time other than prior to the breeding season the primary vaccination course should be given at day 0, day 21 and day 45. In African elephants a primary vaccination has been used followed by two boosters 4-6 weeks apart during the first year. This is followed by an annual booster in some species and in year-round breeders booster inoculations should be given every 7 to 8 months. One-shot vaccine for year one is being developed. | N/A |

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| **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. | 3 weeks average as GnRH agonists initially stimulates the reproductive system- **please refer to Deslorelin datasheet for detailed information** - separation of the sexes OR supplemental 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). | In general inhibition of ovulation after 1 day when inserted on day 1-5 of cycle or when replacing oral progestogen. It is advised to use other contraceptive methods for at least 7-14 days after insertion of the implant depending on administration route (Im or SC) | 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 down-regulation. To prevent the stimulation phase, the megestrol acetate protocol described above is recommended. | | Unknown but oestrus should be suppressed; highly successful at inducing anoestrus in domestic horses. | Oestrus behaviour may be observed. Cycling and even ovulation can occur in adequately contracepted individuals (but is unlikely and the degree of suppression is dose dependent). | Oestrus is inhibited | PZP should not suppress estrous cycles and may extend the breeding season beyond what is considered typical, resulting in additional estrous cycles. | N/A |
| **Use during pregnancy:** | Not recommended | Not recommended as may cause abortion | | Unknown | Not recommended for use in pregnant animals because of the risk of prolonged gestation, stillbirth or abortion, etc. in some species, although the effect may depend on dose. | Not recommended for use in pregnant animals because of the risk of prolonged gestation, stillbirth or abortion. | Does not interrupt pregnancy or affect fetus | 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. | Unknown | Considered safe for nursing infant. | Considered safe for nursing infant. | No known contraindications | N/A |
| **Use in prepubertals or juveniles:** | **Data deficient** in this group, see product information sheet. Lupron® may prevent epiphyseal closure of the long bones, resulting in taller individuals. | **Data deficient** in this group, see product information sheet. Lupron® may prevent epiphyseal closure of the long bones, resulting in taller individuals. | | 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 on fertility are not known. | PZP-treated prepubertal white-tailed deer and feral horses were fertile as adults. Not associated with side effects in elephants. But there are no data for other species | N/A |
| **Use in seasonal breeders:** | **Data deficient.** Should start at least 2 months before start of breeding season. | **Data deficient.** Should start at least 2 months before start of breeding season. | | Unknown but if used should be done at least 6 weeks prior to the breeding season. Effective in the horse. Use before cycling starts at the onset of 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. | 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 | Lupron® is available in various formulations lasting from 1 to 6 months, but because the release of hormone from the depot formulation varies by individual, actual duration of efficacy can vary considerably. | | 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 mares after the first booster. | Dose dependant: 45-90 days in general. However, effects could last 1-2 years in some individuals. | No more than one dose each day. Regu-mate® must be given daily to maintain suppression of oestrus. | Species -dependant: most species 1 year | N/A |
| **Reversibility** | Deslorelin is designed to be fully reversible however there are no current cases of reversal in antilocapridae, and there are also no cases of this contraception failing. Removal of implant may hasten time to reversal. | Lupron® is designed to be fully reversible however there are no current cases of reversal in antilocapridae, and there are also no cases of this contraception failing. | | Unknown for most-species. Short-lived antibodies, presumed to be fully reversible. | Designed to be fully reversible but individual variation can occur. There are no current cases of reversal in Antilocapridae. | 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. | 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. There are no records of reversals in antilocapridae, however reversals have been seen in 3 zebra. | N/A |
| **Effects on Behaviour** | Data deficient | Data deficient | | Similar to gonadectomy but short-acting (duration of antibody effect). No oestrus behaviour has been seen in mares. | Effects on behaviour have not been studied; there may be individual variation in response. Medroxyprogesterone acetate [not all progestins are androgenic, so important to clarify] binds readily to androgen receptors and are 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 oestrus behaviour may be present. | 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. | 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. | | 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 | Data deficient | N/A |
| Males | **Not Recommended** | **Not Recommended** | **Not Recommended** | | **Not Recommended** | **Not Recommended** | **Not Recommended** | |
| **Dose** | N/A | N/A | N/A | Unknown for Antilocapridae. In equids a 3ml injection has been given, followed by a booster 3 weeks later. 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 booster. | N/A | N/A | N/A | Depending on species and individual, perhaps as long as 2 months or more |

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| **Use in prepubertals or juveniles:** | N/A | N/A | N/A | Data deficient | N/A | N/A | N/A | Data deficient |
| **Use in seasonal breeders:** | N/A | N/A | N/A | Unknown but if used should be done at least 6 weeks prior to the breeding season. Effective in the horse. Use at the onset of the breeding season before cycling starts. | 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) Lasts about 5 to 9 months in bull elephants when used for the control of musth. | N/A | N/A | N/A | The procedure should not be used in males likely to be recommended for subsequent breeding as reversal is unlikely |
| **Effects on Behaviour** | N/A | N/A | N/A | Similar to surgical castration but short-acting (duration of antibody effect). Decrease male aggression due to down regulation of testosterone synthesis. Can prevent, terminate or reduce aggression/musth behaviour in bull elephants. | N/A | N/A | N/A | Vasectomy will not affect androgen-dependant behaviours |
| **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 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. In the 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.** | 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 unknow 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. 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 | | 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, 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 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 the Antilocapridae family it is recommended that all individuals on contraception be reported to EGZAC**

**References:**

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