

Pygmy hippo (Choeropsis liberiensis)

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We would recommend assessing any contraceptive bout with behavioural and hormone monitoring. For more information on this, please contact contraception@chesterzoo.org

| Contraceptive methods | GnRH agonist (implant) | GnRH agonist (injection) | GnRH vaccine (injection) | Progestagen (implants) | Progestagen (injection) | Progestagen (oral) | Progestagen (oral) | PZP vaccine | Surgical/Permanent |
|---|--|---|---|--|--|---|---|---|---|
| Contraceptive Product: | Desiorelin acetate | Luprolide acetate | GnRH protein conjugate | Etonogestrel 68 mg | medroxyprogesterone acetate; | Altrenogest | Chlormadinone | 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 succination and Freund's incomplete adjuvant for boosters). | - |
| Commercial Name: | Suprelorin ® | Lupron ® | Improvac® (150ug/ml) | Implanon® Nexplanon® | Depo-Provera®, Depo-Progevera® | Regu-mate® | Antifertil®, Belara®, Prostan®, Luteran® | Porcine Zona Pellucida | Vasectomy |
| Product Availability: | 4.7mg (Suprelorin 6) and 9.4 mg (Suprelorin 12) widely available through veterinery drug distributions in the EU. | Luprolide acetate licenced for human use | Available through veterinary drug distributors. | Manufactured by Bayer Scheinig Pharma AG. Available through human drug distributors | Manufactured by Pitzer Widely available throughout Europe through numan drug distributors: | Regy-mate® Equine 2.2ml/mg oral solution and Regy-mate® Poncine 0.4% w/v oral solution widely available through wterinary drug distributors. | Available through veterinary drug distributors. | Not commercially available in Europe, PZP is available to the high of Europe, it is available to ship to Europe, it is available to the high of Europe is available to the entire of the entire of dugs to debtain a permit to import PZP. Once all recessary authorisations and approvisit have been complete and property of the entire of the entire of complete and consensation Center 25 Science and Center 25 Scien | · |
| Restrictions and/or permit required by Importing Country: | The EAZA RMG recommends: always check with your local licencing authority | Data deficient | Current knowledge: widely available throughout European countries. The EAZA RMG recommends: always check with your local licencing authority | The EAZA RMG recommends: always check with your local licencing authority | The EAZA RMG recommends: always check with your local licencing authority | The EAZA RMG recommends: always checking with your local licencing authority | The EAZA RMG 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 | - |
| Mechanism of action: | GrRH agonst suppress the reproductive endocrine system, preventing production of pituliary and gonadal hommores. As an agonst of the GrRH initially stimulates the reproductive system which can result in cesture and outside in iteration or temporary cestures and outside in iteration or temporary in males- therefore additional continueption needed during this time. Priesars are below and refor to Desirorisin datasheet for detailed information | GnRH agonist suppress the reproductive endocrine system, pre-enting production of pluttary and gondel homones | Production of arti. GaRH antibodies by the immune system, restabilizing endoprous GaRH scitity, the results in a reduction of FSH and LH production anterior printary by the anterior printary and, ultimately, in a reduction of owarian follicular development and for inhibition of tectosterone secretion from the testes and spermatogenesis. | Interference with fertilization by thickening central mucus, interrupting garnete transport, disruption of implantation, inhibition of IA surge necessary for oxidation | Anti-estrogenic activity, Interference with fertilization by thickening certical mous, interrupting gamele transport, description of emploration, inhibition of L1 stuge recessary for outside of the superior outside | Interference with fertilization by thickening cervical mucus, interrupting gamete transport, disruption of implantation, inhibition of LH surge necessary for oxulation | cervical mucus, interrupting gamete transport, disruption of implantation, | The PZP artiblodes 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 interrupted |
| insertion/Placement: | 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 Supreboin fact sheet for effective method of implant placement (tunnelisation) | lnjectable | Injectable inframuscular or subcutaneously | Intramuscular or subcutaneous. The EAZA RMG recommends sub- cutaneous, upper inner arm for visibility (aid for later removal) | Injectable intramuscular | Administered orally in feed or by syringe. Gloves must be worm when administering Regu-mate® (absorption through the skin can cause disruption to the menstrual cycle and prolongation of pregnancies in humans). | Administered orally | Injectable Intramuscular | Surgical |
| emales | | | | Data deficient | Data deficient | | | | |
| Dose | Data deficient. 2-3 implants are recommended depending on the body weight of the individual. 4.7mg is recommended for a minimum duration of 8 months and 9.4mg is recommended for a minimum duration of 12 months. Please contact the EAZA RMG for specific dosage advice. | There are various formulations available lasting from 1-6 months. Dosing information is not available, best place to staff. Please contact the EAZA RMG with specific desage advice. | Two injections of 400ug are given 35 days apart and boosters are usually administered every 36 morths, although duration can avel between species. 450-600ug have successfully been used in common hippo. | 2-3 implants (0.068g) are recommended for successful contraception in this species. As a guideline 1 implant/100kg. | As a guide 5mg/kg BW every 45-00 days. Please contact The EAZA RMG for specific dosage advice. | Regar-mate® Equine: 0.044mg/kg daily: Regar-mate® Porcine: 5ml daily: administered orally through feed or syringe. | 55 a tablet should be administered daily (-10- 12 mg, although this varies depending on the product). | 100 μg potein is recommended. The first injection would consist of 0.5mr £27 + 0.5mr, adjuster and the second injection should be given no less than 14 days after this. In species with longer breeding season, if the vaccine is given 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, booster should be administrated every 7-8 morths. It is assessoral breeder with a well defined and short breeding season (2-3 morths) then it is 1-2 morths before the treeding season. | - |
| Latency to effectiveness: | Desionein will have a latency to effect of 3-4 weeks during which a stimulation of the reproductive system will occur. For this reason separation of both sees is recommended for approximately 3-4 weeks, see the control of the sees of the sees of the sees of simulation phase, the first contracephe but must be supplemented with an onal projestagen such as megentral exceller [8] (Oudan/Megach) or affercogest (Regumatell) daily, 7 days before and 8 days after the regions are seen to see the sees of projects in sentent. | 3 weeks average as CnRH agonists initially stimulates the reproductive system-please refer to Desfore find statishest for detailed a separation of the second Committee and Separation of the second Committee and Separation of the second Committee and Separation of the Separation of | Latency to effectiveness can be up to 6 weeks sollowing primary vaccination (2 ejections) so separation of the sexes is recommended if possible. | In general inhibition of oxulation after 1 day when inserted on day 1-5 of cycle or when replacing oral progestogen. As the right stage during oesture cycle is often unknown, it is advised to use other contraceptive methods for at least 7-14 days after insertion of the implant depending on aministration route (IM or SC). | 1-3 days post injection. However, if the cycle stage is not known then extra time must be allowed, theetone, separation of the save the stage is not known them extra time the least 1 week. Oral progestigen such as megestral acetate pills (Osarid) or alternopest regions are not recommended to the supplement the contraceptive boot. | In mares, 95% treated with Regu-mate will be suppressed within 3 days however separation of the sexes should be used for 7-14 days after contraceptive methods, if this not possible then other contraception methods should be used for this time. | Latency to effectiveness should be approximately 3 days; however it is recommended that the sexes are either separated for one week, or alternate contraception is used at this time. | Latency to effectiveness is approximately 2.3 weeks after the final injection in year therefore expension of the seem form in finish liyer to real 2 weeks after the final injection is commended primary course of vaccination 2 injections 2-4 weeks apart, preferable 3 injections). | - |
| Destrus cycles during contraceptive treatment: | Initial cestrus and oxulation (during the 3 weeks of stimulation) then down-regulation. To prevent the stimulation phase, the megestrol acetate protocol described above is recommended. | Initial cestrus and oxulation (during the 3 weeks of stimulation) then down-regulation. To prevent the stimulation phase, the megestrol acetate protocol described above is recommended. | In a group of 57 mares, 50% were ancestrus after the primary vaccination and 100% after the booster vaccination, the intenal from treatment to ancestrus was 2-3 weeks. | 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 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 in inhibited. | Data deficient. | PZP should not suppress cestrous cycles and may extend the breeding season beyond what is considered typical, resulting in additional cestrous cycles. | - |
| Jse during pregnancy: | Not recommended as may cause abortion | Not recommended as may cause abortion | Unknown | Progestagens are not recommended in pregnant animals because of the possibility of prolonged gestation leading to dystocia, stillbirth and abortion in some species. | 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. | Not recommended for use in pregnant animals because of the risk of prolonged gestation, stillbirth or abortion. | Does not interrupt pregnancy or affect foetus | ÷ |
| | No contraindications once lactation established: however. | No contraindications once lactation established; however, treatment during pregnancy may impede | Unknown | Considered safe for nursing; Does not affect lactation, but etonogestrel is excreted in milk. | Considered safe for nursing infant. | Data deficient. Considered safe for nursing infant. | Data deficient. Considered safe for nursing infant. | No known contraindications | - |
| Jse during lactation: | treatment during pregnancy may impede proper mammary development. | proper mammary development. | | excreted in milk. | | | | | |
| | treatment during pregnancy may impede proper | | Unknown | The use of synthetic progestagens in pre-pubertals or juverilles 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. | Data deficient. The use of synthetic progestogens in pre-pubertals or juveniles has not been fully assessed. Possible long-term effects on fertility are not known. | Data deficient. The use of synthetic progestogens 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 | - |

| 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 12months | 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-fived antibodies in the domestic pig (antibody production starts to decline -7-8 weeks following second injection). Suppresses cesturs for a full season in mares after the first booster. | The duration of this product can last 2.5 to 3 years. | 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 cestrus. | No more than 10-12mg each day. Chlomadinone must be given daily to maintain suppression of oestrus. | Species -dependant: most species 1 year | Permanent |
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| Reversibility | Desionelin is designed to be fully reversible however there are no current cases of neereds in this species. Remosal of lengths may hashen time to reversible. | LuproviD is designed to be fully reversible however there are no current cases of reversal in bouldes. | Improve is not designed to be reversible, although reversibility has been demonstrated in some wild animal species. We have one record of reversal in common hippon bewer, the date of oblighing birth was not provided so time to conception could not be calculated. | Implanon is designed to be fully reversible however we do not have any records of reversal in this species. | Designed to be fully reversible but individual variations can occur. We have several records of reversal in common lippos, with time to conception ranging between 1 most and 7 years blowling the estimated expiry of the product. | It should be neversible after cessation of treatment. Signs of cestrus in equids have been observed 5 days after the end of treatment but will vary depending on the individual. We have one record of reversal in a common hippor in which the female conceived approximately 3 months following the cessation of treatment. | Chlomadinone should in theory be revensible, however this has not been researched in this species. We have one record of a reversal in a common hippo, in minedalely bloding the end of treatment that had lasted 6 months. | Species differences on reversibility, Reversibility differs between species; Nower the looper 27 to jeen the longer at takes for a female to become shelica gain. Treatment for one fyews that been associated with reference of the special s | |
| Effects on Behaviour | Data deficient | Data deficient | Similar to surgical castration but short-acting (duration of antibody effect). No cestrus behaviour in mares. | Data deficient | Effects on behaviour have not been studied, there may be individual variation in response. Medicopyringsetienne sectate (not all progestins are andogenic, so important to clarify) brinds readily to articogenic recording and section enables to and design exception and entitle artifestiogenic (ternises may experience maller like of the programme of the programme in the male secondary organizations lists), etc.) Further research in the subject is necessary. | Regu-mate® can be used to alleviate temperament changes and aggression. | Effects on behaviour have not been studied; there may be included variation in response. | 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 feer-anging elephants treated for up to 5 years. In some species the failure to conceive can results in lorged than usual breeding seacon and in onne 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. | GnRH agonists may cause the suppression of physical secondary sexual characteristics. | Similar to surgical castration but short-acting (duration of antibody effect). | | Because Medroxyprogesterone acetate binds readily to androgen receptors and is antiestrogenic, fernáles may experience male-like qualities (increased aggression, development of male secondary sex characteristics, etc.) | Data deficient | Data deficient | Data deficient | - |
| Males | Data deficient. Not Recommended as GnRH agonists are seemingly not effective in male ungulates | Data deficient. Not Recommended as GnRH agonists are seemingly not effective in male ungulates | | Not recommended | Not recommended | Not recommended | Not recommended | Not recommended | |
| Dose | - | - | Two injections of 400ug are given 35 days apart and boosters are usually administered every 3-6 months, although duration can vary between species. | - | - | - | - | - | - |
| Latency to effectiveness: | - | - | Latency to effectiveness can be up to 6 weeks so separation of the sexes is recommended if possible. | - | - | • | ٠ | - | Depending on species and individual, perhaps as long as 2 months or more |
| Use in prepubertals or juveniles: | - | - | Data deficient | - | - | - | - | - | Data deficient |
| Use in seasonal breeders: | NA. | NA | NA | NA | NA NA | NA | NA | NA . | NA NA |
| Duration and Reversibility | | | Liberoom for most appeales. Improace!! Induces an immune response that prevales short-fived satisfaction and the domestic plantition process and the domestic plantition production statis to decline -78 weeks following second injection; This state - 5 to 9 most in buil elephant when used for most received to the process of the received the process of | · | | · | · | | The procedure should not be used in males likely to be recommended for subsequent breeding as reversal is unlikely |
| Effects on Behaviour | · | | 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. | - | | | | | Vasectomy will not affect androgen- dependant behaviours |
| Effects on sexual physical characteristics | - | - | Similar to surgical castration but short-acting (duration of antibody effect). | • | - | - | - | - | - |
| General: Side effects | In general weight gain as would be seen with outrectiony or castration. Increased appetite will result in weight gain, overall weight floor replaced by Mt. Males may become the size (weight of lemiles. Some dichromatis species may change colour. The EAZA RMG recommends always reading the manufacturer's data sheet | In general weight gain as would be seen with owiercomy or castration. Increased appetite with owier and the separation in the case of appetite with may be resuscle and overall weight flor replaced by all. Makes may be | Swelling at the vaccination site may be observed-need to inject deep internuscular in elephants and horses. In some cases, feer and lameness are seen. The EAZA RMX recommends always reading the manufacturer's data sheet. | | Possible deleterious effects on the endometrium fallowing protonged use. Progestims are likely to literature. Depo Prosessib has been linked to literature. Depo Prosessib has been linked to modo changes. Because it hinds realized to anotopen receptors and is anti-estrogenic, emakes may experience masculmisation emakes may experience masculmisation with a continuation of the continuat | species. Possible deleterious effects on uterine and mammary tissues vary greatly by species. Can cause endometritis in domestic horses and cystic follicles in suids | Progestagens likely cause weight gain in all species. Possible deleterious efficts on useriers and mammay (tasses way greatly by species. Can cause endomentis in domestic horses and oystic Brildes in suds at all states of the second of the | Treatment for over 5 years has been associated with oranian listure is some species (species differences), riskbits, mice and domestic sheep. Osphoritis surkovan if makes the common state of the common state of the conceive can results in longer than usual breeding season (aggression and social disruption) | · |

| Warnings It should be handed with extreme case to anoth hander to make a previous or current history of testiment, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added to an increased install requirement, it is added to a fine the product to extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to anoth hander to an increased install requirement, it is added the extreme case to another the product of the surface of the surface and the extreme case to another the product of the sur |
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1) Ass, C.S. & Porton, I.J. (eds.) (2005) Widdle Contraception: Issues, Methods, and Applications. The Johns Hopkins University press: Baltimore. 2) Flacke, Cl., Schwarzenberger, F., Pendid, LM, Walker, SL, Martin, GB, Millar, RP, Paris, MCJ. (2017). Characterizing the reproductive biology of the female pygmy hippopotamus (Choeropsis liberiensis) through non-invasive endocrine monitoring. Theriogenology. 102:126-138. doi: 10.1016/j.theriogenology. 2017.07.017.

Disclaimer. The EAZA RMG 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 reatment for an individual