Immunocontraception – PZP proteins (Native PZP vaccine)

Fact Sheet Complied by: Yedra Feltrer

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Commercial Name:	Native PZP vaccine
Contraceptive Product:	Vaccine derived from porcine zona pellucida (PZP) proteins
Product Category:	Immunocontraception
Product Availability:	Not commercially available in Europe. Available in USA, Dr. Jay Kirkpatrick and Kimberly Frank, The Science and Conservation Centre, Zoo Montana, sccpzp@hotmail.com (research only not commercially available)
Restrictions and/or permit required by Importing Country:	Current knowledge: License required UK; License required France; all other countries unknown. **EGZAC recommends always checking with your local licensing authority**
Mechanism of action:	The vaccine stimulates the production of antibodies against the glycoprotein components that comprise the PZP. 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.
Product information	Used with females, mostly ungulates (artiodactyls, perissodactyls), pinnipeds, elephants and bears. It is not effective in suids. 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). This is a non-hormonal form of contraception
Delivery Route and dose:	Injectable intramuscular (manual or via dart). **See taxon sheets**. 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 a 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. This is followed by an annual booster in some species 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. ***Please contact Montana zoo for further information when considering it for a particular species.***
Females:	
Latency to effectiveness:	Generally 2-3 weeks after the last vaccination during year 1 (primary course of vaccination 2 injections 2-4 weeks apart, preferable 3 injections).

Oestrus cycles during contraceptive treatment:	PZP should not suppress oestrus cycles and may extend the breeding season beyond what is considered typical, resulting in additional oestrus cycles.
Management of latency period:	Separation of the sexes from the beginning of the initial vaccination course until at least 2 weeks after the last injection during the first year
Use during pregnancy:	Does not interrupt pregnancy or affect foetus
Use during lactation:	No known contraindications
Use in prepubertals or juveniles:	Data deficient. PZP-treated prepubertal white-tailed deer and feral horses were fertile as adults. **See taxon sheets**
Use in seasonal breeders:	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.
Duration	Species -dependant: **See taxon sheets**, most species 1 year. Most members of *Ovidae* and *Capridae* a single years treatment provides 3-4 years of contraception
Reversibility	Species differ on reversibility. **See taxon sheets**. 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.
Effects on Behaviour	Since usually the vaccine doesn't suppress oestrus cycles it has almost no effects on social behaviour. In some species the failure to conceive can result in longer than usual breeding seasons and in some cases this can result in aggression and social disruption.
Effects on sexual physical characteristics	Data deficient
Males:	
Latency to effectiveness:	N/A
Use in prepubertals or juveniles:	N/A
Use in seasonal breeders:	N/A
Duration and Reversibility	N/A
Effects on Behaviour	N/A
Effects on sexual physical characteristics	N/A
General:	
Side effects	Treatment for over 5 years has been associated with ovarian failure in some species (**see taxon sheets**). Significant ovarian disruption has been noted in dogs, rabbits, mice and domestic sheep. Indications of oophoritis - unknown if transient or permanent. In some species the failure to conceive can result in longer than usual breeding season (aggression and social disruption) **EGZAC recommends always reading the manufacturer's data sheet**

Warnings	The only adjuvant used with PZP is Freund's Modified adjuvant, which DOES NOT CAUSE TB+ TEST RESULTS, injection site reactions are less than 0.05%. Following the initial treatments, boosters are required, using only Freund's Incomplete adjuvant. In rabbits and possibly canids PZP vaccine can cause depletion of oocytes, and in some primates it can cause temporary cessation of oestrous cycles.
Reporting Requirements: In order to increase our knowledge of the efficacy of contraception methods it is recommended that all individuals on contraception be reported to EGZAC	

References:
1) Wildlife contraception: issues, methods and applications, C.S. Asa, I.J. Porton (2005) The Johns Hopkins University Press
3) www.stlzoo.org/contraception
1) Immunocontrol of reproductive rate and aggression in African elephants. HJ Bertschinger, A Delsink, JF Kirkpatrick, JJ van Altena, H DeNys, M Bates (2009) Proceedings for the BVZS 2009 Atumn Meeting, York UK.
4) A COMPARISON OF FREUND'S COMPLETE AND FREUND'S MODIFIED ADJUVANTS USED WITH A CONTRACEPTIVE VACCINE IN WILD HORSES (EQUUS CABALLUS). Robin O. LydaB.S., J. Ron HallB.S., Jay F. Kirkpatrick Ph.D.(2005) Journal of Zoo and Wildlife Medicine 36(4):610-616.
5) http://www.pzpinfo.org
6) The practical side of immunocontraception: zona proteins and wildlife. JF Kirkpatrick, A Rowan, R Wallace, K Frank, R Lyda (2009) Journal of Reproductive Immunology 83: pp151-157
7) Background Information for the Immunocontraception of Captive Exotic Species with Porcine Zonae Pellucidae. KM Frank. The sicence of Consevation Centre. Zoo Montana. sccpzp@hotmail.com
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