

Ovarian suppression following PZP vaccination in pony mares and donkey jennies

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Immunocontraceptive vaccines target one or more selected proteins essential to a critical step in fertility. Examples include anti-gonadotrophin release hormone (GnRH) and native porcine zona pellucida (PZP) vaccines. The successful application of PZP vaccines over several decades for population management in feral horse populations in the USA is well described. The currently-hypothesised mechanism responsible for this vaccine's contraceptive effect is the prevention of sperm-zona binding, sperm penetration of the zona and thus fertilisation of the oocyte, which is prevented for as long as antibody titres are sufficiently high whilst treated females continue to cycle normally. Our group's recent research projects investigated PZP vaccination of pony mares in South Africa and donkey jennies in the Caribbean. These trials included intensive clinical and laboratory monitoring and clearly showed that the majority (85.7%) of both mares and jennies treated with the vaccine formulated with either Freund's complete modified (primary) or Freund's incomplete (booster) adjuvants developed small inactive ovaries. This was accompanied by baseline serum progesterone concentrations typical of anoestrus. All mares resumed normal cyclic activity after approximately 7-8 months during the following physiological breeding season. We additionally measured the concentrations of anti-Müllerian hormone (AMH) at strategic times during the mare study to better define the mechanism of ovarian shut-down. Notably, AMH, which is reportedly well correlated with small antral follicle counts in the mare, was not detectable during the intervals of ovarian suppression. Of further interest was an AMH rebound observed coincident with the recovery of ovarian cyclicity. As normal ovarian function was re-established in all mares, an inflammatory process (with or without cellular invasion) seems an unlikely explanation for this ovarian response. These results showed vaccination was followed by a period of ovarian suppression related to the loss or malfunction of small antral follicles and suggested that prevention of fertilisation was not the only potential mechanism responsible for infertility in PZP-immunocontracepted mares.