

PROGESTERONE LEVELS IN GOATS USING NORGESTOMET IMPLANTS AS PART OF AN ESTROUS SYNCHRONIZATION, SUPEROVULATION PROTOCOL DURING THE BREEDING SEASON

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In goats, exogenous progesterone is used during the breeding season as part of estrous synchronization and superovulation protocols to produce timed estrus for breeding and artificial insemination programs, as well as enable precisely timed production of oocytes and embryos used in cloning, transgenic, and cryopreservation programs. During the breeding season, progesterone levels in cycling goats have been reported to average over 6 ng/ml for 11–12 days. High progesterone levels prevent the luteinizing hormone surge, and inhibit the formation of dominant follicles. This study was designed to determine the levels of endogenous progesterone produced during the time of an exogenous progestagen ear implant (norgestomet, Crestar[®]) used in an estrus synchronization and superovulation protocol, and compare them to levels of progesterone produced during the natural estrous cycle. Due to the fact that norgestomet levels could not be assayed in this laboratory, it was not possible to correlate exogenous progesterone levels with ovulations, ova collected, or non-ovulated follicles.

Fifteen experimental and ten control animals were used. The experimental does received the following estrous synchronization, superovulation protocol, Day 0: insertion of norgestomet ear implant (Crestar Implant[®], Intervet, 3 mg norgestomet), Day 7: 50 mg PGF_{2α} (Lutalyse, Upjohn, 50 mg/ml), Day 12–15: 256 mg follicle stimulating hormone (Folltropin-V, Bioniche Animal Health, 400 mg/20 ml) or 10.56 mg follicle stimulating hormone (Ovagen, ICPbio, 17.6 mg NIADDK oFSH-17 per vial), Day 14: Crestar[®] implant removed, Day 16: 50 mcg GnRH (Cystorelin, Abbott Labs, 50 mcg/ml) and Day 17: oocytes surgically collected. Controls did not receive any synchronization or superovulation regime. Blood was collected daily from Day –2 or –3 to Day 17. Progesterone levels were determined using a solid-phase radioimmunoassay progesterone test (Coat-A-Count Progesterone Kit, Diagnostics Products Corporation).

Three patterns of endogenous progesterone emerged. Four animals produced little progesterone before or

during the cycle. All four animals exhibited heats and were used for surgical oocyte collection. Five animals started with 2 ng/ml or less of progesterone on the day of implant insertion, and levels gradually rose to 5–7 ng/ml. Two of these five animals did not exhibit heats and were not used for oocyte collection. Six animals started with 6–10 ng/ml of progesterone and exhibited falling levels of progesterone. One of these six animals was not used for surgical oocyte collection. None of the patterns seen under norgestomet implants resembled the levels and patterns of progesterone produced during natural estrus cycles.

This study showed that during the breeding season, norgestomet can be successfully used as part of an estrous synchronization and superovulation protocol in goats, but the levels and patterns of endogenous progesterone exhibited during this protocol do not resemble those produced during the normal estrous cycle. The data suggests that the patterns of endogenous progesterone are related to the progesterone levels at the time of implant insertion. Work still needs to be performed to determine if the exogenous progesterone levels are affecting the levels and patterns of endogenous progesterone, and how this might influence the quantity and quality of oocytes and embryos produced during estrous synchronization and superovulation.

Keywords: Goats; Progesterone; Norgestomet; Superovulation; Estrous synchronization

Competitive Session

EFFECT OF MELATONIN IMPLANTS ON CONTROL OF REPRODUCTION IN THE DOMESTIC CAT (*FELIS CATUS*)

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The female domestic cat is a seasonal breeder when exposed to natural photoperiod, with ovarian activity ceasing under decreasing photoperiod and resuming with increasing photoperiod. Melatonin secretion is controlled by the prevailing photoperiod, with higher concentrations during the dark phase. Previous research has shown that exogenous melatonin administered intravenously suppressed ovarian activity in queens maintained under a 24 h light photoperiod. Whereas intravenous melatonin administration in queens may no

be practical, melatonin implants are routinely used to manipulate the estrus cycles in ewes. Therefore, the aim of this study was to assess the efficacy of subcutaneous (SC) melatonin implants to reversibly suppress estrus in queens. The hypothesis was that SC melatonin implants would prolong anestrus in cycling queens without any side effects. Fourteen adult queens aged between 12 and 14 months and weight between 2 and 4 kg were maintained under artificial illumination (14 h light:10 h dark) in cages during an initial period of 45 days and then assigned to one of two treatments (TRT). At interestrus (IE), queens assigned to TRT1 received a SC melatonin implant (18 mg; Melovine[®], CEVA Sante Animal, France; $n = 9$; MEL), and queens assigned to TRT2 received a subcutaneous placebo implant without melatonin (0 mg; $n = 5$; PLA). At the next proestrus (PE), all queens received a new MEL or PLA implant. Blood samples were taken when queens showed proestrus signs to measure E_2 , and during inter-estrus to measure P_4 by RIA (Coat-A-Count, Diagnostic Product Corporation, Los Angeles, CA). No significant differences in interestrus length were observed in PLA animals whether the implant was placed in the IE or PE (6 days versus 14 ± 9 days). However, when MEL implants were placed in IE, the interestrus length were twice longer than when they were placed in PE (113 days versus 66 ± 7 days; $P < 0.001$, interaction of treatment by cycle phase). The E_2 and P_4 concentration were similar between queens with PLA and MEL implants (E_2 : $P > 0.23$; P_4 : $P > 0.37$) and between queens who received implants in PE or IE (E_2 : $P > 0.25$; P_4 : $P > 0.54$). Side effects were not observed. In conclusion, subcutaneous melatonin implants effectively suppressed estrus in queens for a period of 4 months with no side effects.

Keywords: Domestic cat; Contraception; Reversible; Melatonin implants

SEMEN QUALITY OF STALLIONS IN RESPONSE TO DEXAMETHASONE ADMINISTRATION

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Poor semen quality can have a dramatic economic impact to owners of breeding stallions. Semen quality may be affected by glucocorticoids (endogenous or exogenous) as they alter the release of male reproductive hormones and subsequently affect spermatogen-

esis. Dexamethasone, a glucocorticoid, is often used for anti-inflammatory therapy in stallions. There are anecdotal reports of decreased semen quality following administration of dexamethasone. The purpose of this study was to evaluate the effect of short-term anti-inflammatory doses of dexamethasone on sperm quality. Stallions ($n = 6$) with normal semen quality were collected for a 10 d period to determine their daily sperm output (DSO). Total sperm numbers on days 8–10 of semen collection were averaged and used to calculate DSO. After determination of volume and sperm concentration, semen was diluted with warmed (37°C) semen extender to a concentration of 25 million/mL. After dilution, sperm motility (total; TMOT and progressive; PMOT) and curvilinear velocity (VCL) were determined using computer assisted semen analysis. Following the 10 days collection period, stallions ($n = 3$ per group) were randomly assigned to treated (0.1 mg/kg of dexamethasone IV; DEX) or control (25 mL injection of saline IV; CON) groups, with the groups being balanced for semen quality. Treatments were administered twice at 24 h intervals. Three days post-treatment; semen from all stallions was collected again for 10 days to determine DSO. Sperm samples from the last day of the pre- and post-treatment 10 days collection periods were examined using differential interference microscopy ($1250\times$), to evaluate the morphologic profile. Total testicular volume (mL) was determined pre- and post-treatment via ultrasonography. A two way, repeated measures ANOVA was used to evaluate the effects of time, treatment, and time $\times$ treatment with $P < 0.05$ considered significant. Total sperm numbers did not differ between treatment groups ($P > 0.1$) before or after treatment nor between pre- and post-treatment within the DEX group ($P = 0.9$). Motion characteristics (TMOT, PMOT, and VCL) did not differ ($P > 0.3$) between or within groups before or after treatment. Percentage of normal sperm did not differ ($P > 0.5$) between or within groups before (CON = 66.3 ± 25.6 ; DEX = 74.7 ± 14.5) or after treatment (67.3 ± 24.4 ; DEX = 77.0 ± 5.0). Testicular volume also did not differ ($P > 0.3$) between or within groups before (CON = 319.6 ± 83.5 ; DEX = 290.4 ± 100.2) or after treatment (298.3 ± 50.9 ; DEX = 234.1 ± 25.9). Results of this study indicate that practitioners can give short-term anti-inflammatory doses of dexamethasone to stallions without adversely affecting sperm quality.

Keywords: Stallion; Sperm quality; Dexamethasone