

JANUARY 2024

# Sheep reproduction RD&A alert

**This sheep reproduction RD&A alert is an initiative of the Sheep Reproduction Strategic Partnership (SRSP).**

Are you a Western Australian Livestock Advisor ready to build your skills and networks? MLA & Pinion Advisory are running their *Livestock Advisor Essentials* program in Western Australia in 2024. This professional development program designed for early career professionals will provide attendees with:

- practical skills, tools and knowledge to enhance your client offering
- confidence and capability to provide holistic, high quality advice to livestock license regarding feedbase, business, value chain, genetics & reproduction and people & extension.
- new communication approaches to effectively engage with clients
- the opportunity to expand your network of industry contacts to share learning and advice.

Registrations are now open and close on 8 March 2024. For more information and to register, visit the [Livestock Advisor Essentials webpage](#).

The SRSP aims to help sheep producers to profitability and sustainably increase lamb production through increasing lamb survival and weaning rates and will coordinate a national approach to improving sheep reproductive performance.

## Program coordinator

Dr Sue Hatcher

M: 0407 006 454

E: [sue@makinoutcomes.com.au](mailto:sue@makinoutcomes.com.au)

## Feature project update

### Fit to lamb

#### Background

Dystocia (including stillbirths and perinatal deaths with evidence of hypoxic injury) has been associated with more than 50% of lamb mortalities in Australia. A recent review ([Jacobson et al. 2020](#)) identified significant knowledge gaps regarding the risk factors and mitigation strategies for the incidence and severity of dystocia. This project will collate and analyse existing Australian and international datasets from countries with similar sheep production systems to quantify risk factors for dystocia. A key outcome of this project will be the development of a fit to lamb database, hosted by Animal Health Australia, that can be built on and maintained as an industry resource to advance best practice management practices for lamb survival.

#### Aim

To quantify the risk factors for lamb mortality and develop management and selection strategies specific to ewe age, lamb birth type and breed across a range of production environments.

#### Project objectives

- Develop comprehensive baseline data for dystocia risk (plus other causes of death) to inform benchmarking and assessment of progress in reducing dystocia-related mortalities.
- Establish a database to determine lamb mortality risk and cause of death, combining data from multiple research projects and centres and modelling to inform decision-support tools.
- Identify opportunities to use genetics, nutrition and management to reduce impacts of dystocia and improve lamb survival for a range of sheep genotypes and production systems.

### Current progress

A meta-analysis of existing databases including phenotypic and genetic components has commenced and identified some draft research and development priorities.

For more information on the Fit to Lamb project contact Caroline Jacobson ([c.jacobson@murdoch.edu.au](mailto:c.jacobson@murdoch.edu.au)).

## Scientific papers

### Understanding placentation in ruminants: a review focusing on cows and sheep

Gregory A. Johnson ([gjohnson@cvm.tamu.edu](mailto:gjohnson@cvm.tamu.edu)), Fuller W. Bazer, Heewon Seo, Robert C. Burghardt, Guoyao Wu, Ky G. Pohler and Joe W. Cain

Reproduction, Fertility and Development, Volume 36, Issue 2

DOI <https://doi.org/10.1071/RD23119>

#### Abstract

Mammals differ regarding their placentae, but in all species placental trophoblasts interact intimately with the uterine endometrium to mediate the transfer of nutrients from the mother to the embryo/fetus through the closely juxtaposed microcirculatory systems of the uterus and placenta. Placentation in ruminants is intermediate between the non-invasive type, as observed in the epitheliochorial placenta of pigs, and the invasive type, as observed in the haemochorial placentae of mice and humans. In ruminants, placental trophoblast cells invade uterine endometrial tissue, but invasion is believed to be limited to the endometrial luminal epithelium (LE). In the LE there are varying degrees of syncytialisation among species, with syncytialisation being more extensive in sheep than cows. The hallmarks of placentation in ruminants include: (1) an extended period in which conceptuses (embryos and associated placental membranes) elongate and must be supported by secretions (histotroph) from the uterus; (2) a cascade involving an array of adhesion molecules that includes integrin-mediated attachment of the conceptus trophoblast to the endometrial LE for implantation; (3) syncytialisation of the developing early placenta, a process for which there is currently limited understanding; and (4) development of placentomes that define the cotyledonary placentae of cows and sheep, and provide haemotrophic support of fetal development.

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### Ewes with higher embryo survival rear lambs that grow faster

Paul R Shorten ([paul.shorten@agresearch.co.nz](mailto:paul.shorten@agresearch.co.nz)), Anne R O'Connell and Jenny L Juengel

Translational Animal Science, Volume 7, Issue 1 **OPEN ACCESS**

DOI <https://doi.org/10.1093/tas/txad052>

#### Abstract

A key economic driver of a meat producing sheep flock is the total kilograms of lamb liveweight at weaning per ewe exposed to the ram. Optimization of key reproductive steps is required to achieve peak performance of a sheep flock. The goal of this paper was to use more than 56,000 records from a commercial flock to investigate the key reproductive steps affecting flock reproductive performance. We also applied a maximum-likelihood based technique to predict the embryo survival and ovulation rate for daughters of

individual sires based on measurements of the number of fetuses at midpregnancy (detected by ultrasound-scanning). The model was used to determine how changes in pre-mating liveweight, age, predicted ovulation rate, embryo survival, number of fetuses at midpregnancy, lamb survival, and lamb growth rate affect the total lamb liveweight at weaning per ewe exposed to the ram in the flock. The data from the commercial flock was also used to investigate the role of ewe age and pre-mating liveweight on each reproductive step. Sensitivity analyses were performed to identify the key reproductive steps affecting flock reproductive performance. The elasticity for embryo survival was 80% of that for lamb survival. There was also significant between sire variance in the estimates of ovulation rate and embryo survival. The reproductive performance of daughters of sires with high (top 50%) and low (bottom 50%) embryo survival was investigated. Embryo survival was 0.88 in the high group and 0.82 in the low group (a 6% reduction in embryo survival). The expected total weight of lambs weaned per ewe exposed to the ram was 42 kg in the high embryo survival group and 37 kg in the low embryo survival group (a 12% reduction in the total weight of lambs weaned per ewe exposed to the ram). The proportion of twin litters was 70% in the high group and 60% in the low group, highlighting the potential importance of embryo survival for the rate of twinning in flocks with ovulation rates greater than two ova. Although lamb survival was similar between the high and low embryo survival groups, lamb growth was reduced by 10% in the low embryo survival group for the same litter size ( $P < 0.001$ ). This novel positive phenotypic association between embryo survival and lamb growth rate can potentially be exploited to improve flock performance.

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### Effect of progesterone infused controlled internal drug releasing (CIDR) device and timing of gonadotropin stimulation using P.G. 600 on reproductive success in ewes bred out of season

Reid R Redden, Tammi L Neville, Danielle N Black, Mellissa R Crosswhite and Carl R Dahlen

([Carl.Dahlen@ndsu.edu](mailto:Carl.Dahlen@ndsu.edu))

Translational Animal Science, Volume 7, Issue 1 **OPEN ACCESS**

DOI <https://doi.org/10.1093/tas/txad081>

#### Abstract

Objectives of this study were to determine effects of exogenous progesterone (via controlled internal drug releasing devices; CIDR) in combination with exogenous gonadotropins (PMSG/hCG) use either at CIDR removal or 1 d before CIDR removal to induce estrus and cyclicity and subsequently enhance the proportion of ewes lambing, lambing rate, prolificacy, and days to lambing in ewes bred out of season. Multiparous ewes ( $n = 414$ ) were randomly assigned to one of four treatments: untreated (U,  $n = 122$ ), 7 d CIDR (C,  $n = 97$ ), 7 d CIDR plus P.G. 600 (240 IU pregnant mare serum gonadotropin [PMSG] and 120 IU human chorionic gonadotropin [hCG]) at CIDR removal (CPG0,  $n = 97$ ), and 7 d CIDR plus P.G. 600 (240 IU PMSG and 120 IU hCG) 1 d before CIDR removal (CPG-1,  $n = 98$ ). Rams ( $n = 15$ ) were joined with ewes immediately after CIDR removal and remained with ewes for a 21 d breeding period. Lambing data were summarized for the first 10 days of the lambing season and overall. Categorical data were analyzed using the GLIMMIX procedure of SAS whereas non-categorical data were analyzed using the mixed procedure. Proportion of ewes lambing in the first 10 d was greater ( $P < 0.05$ ) for CPG0 and CPG-1 ewes compared with C ewes, which was greater ( $P < 0.0001$ ) compared with U ewes. Overall proportion of ewes lambing was greater ( $P \leq 0.0001$ ) in all treatments utilizing CIDR compared with U ewes, but no differences ( $P \geq 0.84$ ) due to P.G. 600 were detected compared with C. Lambing rate in the first 10 d was greater ( $P < 0.05$ ) for CPG-1 than C, with CPG0 being intermediate, and all CIDR-treated ewes being greater than U ( $P < 0.0001$ ). Overall lambing rate increased ( $P \leq 0.0001$ ) in all treatments utilizing CIDR compared with U ewes, but no differences ( $P \geq 0.76$ ) due to P.G. 600 were detected compared with C. Prolificacy was similar among all treatments both for the first 10 d of the lambing season ( $P = 0.86$ ) and overall ( $P = 0.80$ ). Day of lambing in the lambing season was reduced ( $P \leq 0.03$ ) for CPG0 and CPG-1 compared with CIDR-treated ewes, which was reduced ( $P < 0.0001$ ) compared with U ewes (days

10.6, 9.0, 13.4, and  $24.4 \pm 0.9$  for CPG0, CPG-1, CON, and U, respectively). Though timing of P.G. 600 did not influence results, the combination of CIDR and P.G. 600 enhanced the proportion of lambs born earlier in the lambing season, and incorporating a CIDR with or without P.G. 600 enhanced the overall proportion of ewes lambing and lambing rate in out-of-season breeding scenarios.

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## Identification of risk factors for ewe mortality during the pregnancy and lambing period in extensively managed flocks

K.J. Flay ([kateflay@cityu.edu.hk](mailto:kateflay@cityu.edu.hk)), A.S. Chen, D.A. Yang, P.R. Kenyon and A.L. Ridler

BMC Veterinary Research Volume 19, 257 **OPEN ACCESS**

DOI <https://doi.org/10.1186/s12917-023-03822-x>

### Abstract

#### Background

Ewe mortality during pregnancy and lambing is an issue for sheep producers globally, resulting in reduced productivity and profitability, compromised ewe welfare, and poor consumer perception. Despite these negative consequences, there was little investigation into factors associated with ewe death during this time. Therefore, this study aimed to assess associations between ewe body condition score (BCS), weight, reproductive parameters, and risk of mortality during pregnancy and lambing.

#### Methods

Four cohorts from three commercial New Zealand farms participated, with 13,142 ewe lambs enrolled and followed over time. Data were collected for five consecutive lambings. Visits aligned with key on-farm management times, specifically: prior to breeding, at pregnancy diagnosis (PD), prior to lambing (set-stocking), and, at weaning of their lambs. At each visit, ewes were weighed, BCS assessed and reproductive status was recorded when relevant (litter size at PD and lactation status after lambing). Ewes that died or were culled were recorded, and any ewes that were absent from consecutive visits were presumed dead. Logistic regressions were developed to assess the relationship between weight and BCS at each visit, PD result (single or multiple-bearing) and lactation status (wet or dry) in each year, and, risk of mortality during the pregnancy and lambing period in each year.

#### Results

In the PD to weaning period, mortality incidence ranged from 6.3 to 6.9% for two-tooth (18-months-old at breeding) to mixed-age (54-months-old at breeding) ewes. For ewe lambs (7 to 8-months-old at breeding), mortality was 7.3% from set-stocking to weaning. Heavier ewe lambs at PD were less likely to die during lambing (OR: 0.978,  $p = 0.013$ ), as were those with greater set-stocking BCS. In subsequent years, BCS was a predictor of ewe death, with odds of mortality greatest for ewes  $< \text{BCS } 2.5$ . Additionally, for poorer BCS ewes, increasing weight reduced risk of mortality, but there was no impact of increasing weight in greater BCS ewes.

#### Conclusions

This study identified risk factors associated with ewe mortality during the pregnancy and lambing period. Flock owners can use these to either cull at-risk ewes or proactively intervene to reduce likelihood of mortality, thereby improving flock productivity, profitability and welfare.

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## Sex of co-twin in utero environment does not alter reproductive fitness of Australian Merino sheep

David O. Kleemann ([dave.kleemann@sa.gov.au](mailto:dave.kleemann@sa.gov.au)), Simon K. Walker, Jennifer M. Kelly A and Raul W. Ponzoni  
Animal Production Science, Volume 64, Issue 1, January 2024

DOI <https://doi.org/10.1071/AN22357>

## **Abstract**

### Context

Reproductive efficiency in ewes can vary widely depending on their fertility (pregnancy rate) and fecundity (litter size) and on their ability to rear multiple litters. Litter size and sex are important factors that contribute to lamb mortality, and hence reproductive efficiency. However, little is known about their interaction when fetuses of either sex grow in utero as co-twins, nor the impact that this interaction has on subsequent performance in domestic flocks.

### Aims and methods

We examined the effect of type of birth (single, twin) and of sex of co-twin (F, F[F], F[M], M, M[M], M[F] where the symbol within brackets indicates sex of co-twin) on birth weight, survival to weaning, weaning and hogget liveweights and scrotal circumference. In addition, reproductive performance (fertility, fecundity, lamb survival, weaning rate) of female progeny was examined as well as the performance of their lambs (birth and weaning weight). This large-scale study (>13 000 lambing observations) was conducted with Australian Merino sheep from four studs, mated over nine annual cycles.

### Key results

Sex of co-twin had no effect on birth weight and on later stages of growth. Sex of co-twin altered survival, with fewer of the M[M] class surviving to weaning compared with other co-twin classes ( $P < 0.05$ ). Scrotal circumference did not vary between the male classes. Although reproductive performance (fecundity, lamb survival, weaning rate) was greater in ewes twin to a male (F[M]) than in single females (F) ( $P < 0.05$ ), this difference could be due to greater genetic merit of twin versus single-born progeny.

### Conclusions

Reproductive performance of females with a male co-twin exceeded that of single females; the difference could be due to greater genetic merit of twin-born ewes rather than a direct effect of in utero environment. There was no difference between females with a male co-twin and females with a co-twin of the same sex. Reproductive capacity of males was not affected by co-twin class or type of birth.

### Implications

These results suggest that an increase in twinning rate by managerial or genetic means will not result in undesirable side effects due to sex of co-twin in utero.

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## **Litter size affects ovulation and pregnancy rate after a hormonal treatment without influencing expression of estrus in the anestrus season in ewes**

Juan Pedro Bottino ([jpeditobgvvet@gmail.com](mailto:jpeditobgvvet@gmail.com)), Raquel Pérez-Clariget and Rodolfo Ungerfeld

Small Ruminant Research, Volume 230, January 2024

DOI <https://doi.org/10.1016/j.smallrumres.2023.107145>

## **Abstract**

The aim of this study was to determine if litter size affects the response to hormonal treatments for inducing estrus and ovulation during the non-breeding season. A total of 124 Corriedale ewes were utilized, consisting of 56 ewes that had given birth during the spring and were currently nursing either a single lamb (Single,  $n = 30$ ) or twin lambs (Twin,  $n = 26$ ). Additionally, a control group of ewes that had not given birth (Con,  $n = 68$ ) was included. Estrus was induced 38 days after lambing using intravaginal sponges containing medroxyprogesterone acetate, which were left in place for 7 days. Furthermore, 350 IU of eCG was administered at the time of sponge removal. Upon detection of estrus, the ewes were inseminated, and transrectal ultrasonography was performed 8 and 40 days later to determine the presence of a corpus luteum (CL) and pregnancy, respectively. Expression of estrus did not differ due to postpartum status. However, a higher proportion of Con ewes than Twin ewes had a corpus luteum ( $P = 0.02$ ), while the Single group did not differ from the other groups. Conception and pregnancy rates were higher in the Con group than in both, the

Single and Twin groups ( $P \leq 0.03$ ). The litter size did not have a significant effect on the estrous response; however, postpartum status and/or lactation negatively impacted the pregnancy outcome.

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### Reduction of cryopreservation-induced structural, functional and molecular damages in ram sperm by hydrated C60 fullerene

İbrahim Halil Güngör ([ihgungor@firat.edu.tr](mailto:ihgungor@firat.edu.tr)), Gaffari Türk, Serap Dayan Cinkara, Tutku Can Acisu, Ahmet Tektemur, Deniz Yeni, Fatih Avdatek, Gözde Arkali, Recep Hakkı Koca, Şeyma Özer Kaya, Meltem Sagiroglu, Ebru Etem Önalın, Mustafa Sönmez, Seyfettin Gür and Abdurrauf Yüce

Reproduction in Domestic Animals, Volume 59, Issue 1, January 2024

DOI <https://doi.org/10.1111/rda.14513>

#### Abstract

This study aimed to investigate the morphological, functional and molecular changes in frozen–thawed ram sperm using an extender containing different concentrations of hydrated carbon 60 fullerene (C60HyFn), a nanotechnological product. Semen taken from each of the seven Akkaraman rams were pooled. Semen collection was done twice a week and it continued for 3 weeks. Each pooled semen sample was divided into six equal groups and diluted with tris + egg yolk extender including 0 (control), 200, 400, 800 nM, 1 and 5  $\mu$ M concentrations of C60HyFn at 37°C. They were then frozen in liquid nitrogen vapour at  $-140^{\circ}\text{C}$ , stored in liquid nitrogen container ( $-196^{\circ}\text{C}$ ) and thawed at 37°C for 25 s before analysis. In comparison with control, C60HyFn addition prior to freezing procedure provided significant increases in total and progressive motility rates, glutathione peroxidase, catalase activities and percentage of highly active mitochondria, and significant decreases in dead and abnormal sperm rates, lipid peroxidation, caspase-3 and DNA fragmentation levels in frozen–thawed ram semen. When compared to control, C60HyFn supplementation significantly down-regulated the expression levels of miR-200a and KCNJ11, and significantly up-regulated the expression levels of miR-3958-3p (at the concentrations of 200, 400, 800 nM and 1  $\mu$ M), CatSper1 (at the concentrations of 200, 400 nM and 5  $\mu$ M), CatSper2 (at the concentrations of 1 and 5  $\mu$ M), CatSper3 (at the concentrations of 200, 400 nM, 1 and 5  $\mu$ M), CatSper4 (at all concentrations), ANO1 (at the concentrations of 800 nM, 1 and 5  $\mu$ M) and TRPV5 (at the concentrations of 200, 400 and 800 nM). The addition of C60HyFn had no effect on global DNA methylation rates. As a result, C60HyFn supplementation to ram semen extenders may be beneficial in reducing some of the functional, structural and molecular damages in sperm induced by the freeze–thawing procedure.

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### Evaluation of pharmacological alternatives to reduce the pain and discomfort produced by electroejaculation in rams

Mariana Karla Francolino da Silva, Leonardo de Almeida Gélio, Eunice Oba, Douglas Anderson de Freitas, Renata Elisa Green, Marcílio Nichi, André Maciel Crespilho ([acrespilho@prof.unisa.br](mailto:acrespilho@prof.unisa.br))

Reproduction in Domestic Animals, Volume 59, Issue 1, January 2024

DOI <https://doi.org/10.1111/rda.14528>

#### Abstract

Electroejaculation (EE) represents the main technique for semen collection from domestic and wild animals independently of libido. However, the technique is associated with intense involuntary muscle contractions, vocalization, ataxia and lying down, caused by the electric stimulation of the nerves in the caudal epigastric region. These clinical manifestations represent important indicators of discomfort. In this context, the objective of this study was to evaluate two protocols of local anaesthetic blockade and two anatomical access for pharmacological desensitization of the caudal epigastric innervation as alternatives to promote comfort



and reduce stress associated with EE in rams. For the study, four clinically healthy Dorper rams were selected. All animals were subjected to a design consisting of five semen collection treatments (n = 3 collections per treatment): T1—control, conventional EE without local anaesthetic blockade; T2, EE with ventral blockade (VB) of epigastric innervation using lidocaine hydrochloride 2%; T3, EE with VB of epigastric innervation using a combination of lidocaine hydrochloride 2% and fentanyl citrate; T4, EE with blockade of epigastric innervation through the perineal access using lidocaine hydrochloride 2%; T5, EE with blockade of epigastric innervation through the perineal access using a combination of lidocaine hydrochloride and fentanyl citrate. Seminal samples resulting from EE were subjectively evaluated for sperm motility and concentration, vigour and volume. Additionally, blood serum samples were collected for quantification of cortisol and creatine kinase (CK) enzyme. Assessments of stress and discomfort were conducted by measuring blood pressure, heart rate (HR) and respiratory rate (RR), as well as observing involuntary muscle contractions, ataxia and animal vocalization. No variations in blood pressure, sperm motility, vigour, CK, and cortisol were observed among the treatments. Individual variations were observed for the occurrence of vocalization ( $p = .0066$ ), but there were no differences between the groups. Anaesthetic blockades conducted using the combination of lidocaine and fentanyl resulted in a lower incidence of ataxia during EE ( $p < .0001$ ). It is concluded that the combination of fentanyl citrate and lidocaine hydrochloride results in less discomfort for animals undergoing EE, regardless of the anatomical access used for local anaesthetic blockades.

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### Assessment of the pharmacokinetics and pharmacodynamics of injectable Lidocaine and a Lidocaine-impregnated latex band for castration and tail docking in lambs

Joseph A. Ross, Steven M. Roche, Kendall Beaugrand, Crystal Schatz, Ann Hammad, Brenda J. Ralston, Andrea M. Hanson, Nicholas Allan and Merle Olson ([merle@avetlabs.com](mailto:merle@avetlabs.com))

Animals, Volume 14, Issue 2, January 2024 **OPEN ACCESS**

DOI <https://doi.org/10.3390/ani14020255>

#### Simple Summary

Tail docking and castration in lambs are common husbandry practices, both of which cause pain and discomfort, for which many industries recommend or require pain management. The objectives of this study were to assess the effects of the current standard-of-care for pain mitigation in lambs (injectable lidocaine) and assess the ability of a lidocaine-impregnated elastration ligation band to deliver the drug into the contacted tissues over time. The use of injectable lidocaine provides effective short-term anesthesia for 120 to 180 min following the injection; however, additional strategies are needed to manage long-term pain. The use of a ligation band impregnated with lidocaine could provide a useful alternative, as it appears to offer local anesthesia for at least 3 days when compared to a control band. Further studies are needed to compare the use of an injectable local anesthetic to the Lidocaine-Loaded Bands (LLBs).

#### Abstract

The objectives of this study were to assess the pharmacokinetics and pharmacodynamics of the current standard-of-care for pain mitigation in lambs during castration and tail docking (injectable lidocaine) and assess the ability of Lidocaine-Loaded Bands (LLBs) to deliver therapeutic concentrations into the contacted tissues over time. The study was comprised of four different trials: (1) investigation of in vitro release of lidocaine from LLBs; (2) pharmacokinetics and pharmacodynamics of injectable lidocaine in scrotal and tail tissue; (3) pharmacokinetics and pharmacodynamics of in vivo delivery of lidocaine with LLBs placed on the tail and scrotum of lambs; and (4) a “proof-of-concept” study comparing the sensation of control- versus LLB-banded tail tissue over time. The use of injectable lidocaine provides effective short-term anesthesia for 120 to 180 min following the injection; however, additional strategies are needed to manage long-term pain. The use of an LLB could provide an alternative where tissue lidocaine concentrations meet or exceed the EC50

for at least 21–28 days and, based on electrostimulation data, provides local anesthesia for at least 3 days when compared to a control band. Further studies are needed to compare the use of an injectable local anesthetic to the LLBs.

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### MitoQ preserves the quality and fertility of liquid-preserved ram sperm

Reza Masoudi ([rezamasoudi@ut.ac.ir](mailto:rezamasoudi@ut.ac.ir)), Navid Dadashpour-Davachi ([navid.d.davachi@gmail.com](mailto:navid.d.davachi@gmail.com)), Nader Asadzadeh, Ali Hatefi and Parisa Alipour-Jenaghard

Theriogenology, Volume 216 March 2024

DOI <https://doi.org/10.1016/j.theriogenology.2023.12.023>

#### Abstract

Supplementing the semen extender with some antioxidants may preserve sperm quality following liquid preservation. The aim of the current study was to evaluate the influence of the use of MitoQ in the semen extender on quality parameters and fertility of liquid-preserved ram semen. In this study, diluted semen samples were divided into five parts and supplemented with 0, 1, 10, 100 and 1000 nM MitoQ. The prepared samples were stored at 3–5 °C for up to 50 h. Motility, viability, mitochondrial activity, membrane integrity, and malondialdehyde concentration of the chilled sperm were assessed at 0, 25, and 50 h. To evaluate reproductive performance, artificial insemination was performed with semen liquid-preserved for 25 h. In results, at 0 h, no difference between the groups was observed. The use of 10 and 100 nM MitoQ resulted in higher ( $P \leq 0.05$ ) total motility, progressive motility, membrane integrity, mitochondrial activity, viability, and lower malondialdehyde concentration than the other groups after 25- and 50-h storage. Pregnancy, parturition and lambing rates were higher ( $P \leq 0.05$ ) when ewes were inseminated with 25-h chilled semen samples containing 10 and 100 nM MitoQ compared to the control. Therefore, supplementing the semen extender with MitoQ (10 and 100 nM) could be an efficient method to improve the quality and fertility rate of liquid-preserved ram semen.

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### Uteroovarian pathway for embryo-empowered maintenance of the corpus luteum in farm animals

O.J. Ginther ([oj.ginther@wisc.edu](mailto:oj.ginther@wisc.edu))

Theriogenology, Volume 216 March 2024

DOI <https://doi.org/10.1016/j.theriogenology.2023.12.028>

#### Abstract

The first luteal response to pregnancy in farm animals at 12–18 days after ovulation involves maintenance of the corpus luteum (CL) if pregnancy has occurred. In most common farm species, regression of the CL results from production of a luteolysin (PGF<sub>2</sub>α) by the nonpregnant uterus, and maintenance of the CL involves the production of an antiluteolysin (PGE<sub>2</sub>) by the pregnant uterus and conceptus. The proximal component of a unilateral pathway from a uterine horn to the adjacent CL for transport of PGF<sub>2</sub>α and PGE<sub>2</sub> is the uterine venous and lymphatic vessels and the distal component is the ovarian artery. The mechanisms for venolymphatic arterial transport of PGF<sub>2</sub>α and PGE<sub>2</sub> from a uterine horn to the adjacent CL ovary and transfer of each prostaglandin through the walls of the uteroovarian vein and ovarian artery occur by similar mechanisms probably as a consequence of similarities in molecular structure between the two prostaglandins. Reported conclusions or interpretations during the first luteal response to pregnancy in sows and ewes are that PGE<sub>2</sub> increases in concentration in the uteroovarian vein and ovarian artery and counteracts the negative effect of PGF<sub>2</sub>α on the CL. In cows, treatment with PGE<sub>2</sub> increases circulating progesterone concentrations and prevents spontaneous luteolysis and luteolysis induced by estradiol, an



intrauterine device, or PGF2 $\alpha$ . The prevailing acceptance that interferon tau is the primary factor for maintaining the CL during early pregnancy in ruminants will likely become tempered by the increasing reports on PGE2.

## Upcoming events

Date	Event	Location
13 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Carrieton, SA
14 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Wunkar, SA
15 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Coonalpyn, SA
15 Feb 2024	<a href="#">Supplements for success</a> Sheep Connect NSW	Webinar
15 Feb 2024	<a href="#">Managing ewes in confinement</a> Facey Group & MLA PDS	Webinar
20 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Robertstown, SA
21 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Lock, SA
21 Feb 2024	<a href="#">Optimising ewe lamb joining outcomes</a> SheepMetrix, Productive Livestock Systems & MLA PDS	Eurongilly, NSW
22 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Ceduna, SA
26 Feb 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Kangaroo Island, SA
28 Feb 2024	<a href="#">RAMping Up Repr</a> Sheep Connect NSW	Tooraweenah, NSW
7 Mar 2024	<a href="#">Sticky Beak Day – Containment Feeding</a> Sheep Connect SA, Livestock SA & SA Drought Hub	Lucindale. SA
22 Mar 2024	<a href="#">Winning With Weaners</a> Sheep Connect NSW	Parkes, NSW

## Funding calls

Program	Open	Close
<a href="#">Livestock Genetics R&amp;D Project Call</a> Meat & Livestock Australia	November 2023	15 March 2024