reported activation of CXCL12-CXCR4 signaling axis at the fetal-maternal interface in sheep but whether this axis is involved in modifying reproductive tissue or peripheral blood inflammatory responses is uncertain. We hypothesized CXCL12-CXCR4 signaling acts as a potentiator during early pregnancy in ewes by altering cytokine populations at the fetal-maternal interface and the luteal microenvironment. To test this hypothesis, CL tissue was collected from NP (d 10 of estrous cycle) and pregnant ewes on d 20 and 25. In a separate study, we utilized AMD3100, a potent CXCR4 antagonist, to disrupt CXCR4 signaling to determine inhibition effects on fetal-maternal cytokines. Mini-osmotic pumps were surgically installed on d 12 of gestation and delivered AMD3100 or PBS into the uterine lumen ipsilateral to CL for 7 d. Endometrium (caruncular and intercaruncular) and fetal membrane tissues were collected on d 23 of gestation. Gene expression of inflammatory cytokines were investigated using real time PCR. During gestation, proinflammatory cytokines increased ($P < 0.05$) in CL from pregnant compared with NP ewes. Similarly, CXCL12 and CXCR4 increased ($P < 0.05$) on d 20 of gestation in pregnant compared with NP ewes. Under hCG stimulation, interferon γ (IFNG) decreased ($P < 0.01$) on d 25 in CL tissue compared with control ewes. In AMD3100-treated ewes, transcripts for tumor necrosis factor (TNF; $P < 0.05$) and interleukin 12 (IL12A; $P < 0.01$) increased in caruncle, while transforming growth factor β 1 (TGFB1) and IL12A tended ($P = 0.2$) to increase in intercaruncular endometrium compared with control. Interleukin 10 (IL10) transcript from treated ewe fetal membrane tended ($P = 0.1$) to increase compared with control. Using immunofluorescence, IL10 protein was localized to uterine luminal and glandular epithelium, and TNF to uterine glandular epithelium and stroma. Using flow cytometry, we established peripheral blood T lymphocytes are CXCR4-positive. Our results highlight the role CXCL12-CXCR4 signaling may play in regulating localized inflammation at the fetal-maternal interface and immune cell trafficking in peripheral blood, contributing to pregnancy maintenance.

Key Words: chemokine receptor 4, cytokines, inflammation

MEETING TODAY'S ANIMAL CARE STANDARDS: ARE YOU READY?

0028 New *Ag Guide*—What should we expect?

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The first edition of the *Ag Guide* was published in 1988 to define standards of care for agricultural animals used in agricultural research and teaching. These standards were to accomplish two important objectives. One was to ensure that the agricultural animals used for research and teaching are fit subjects so as not to compromise outcomes by having poor condition. The other objective was to give regard to and preserve the wellbeing of these animals based on our growing recognition that they, by their nature, ought to be in the realm of human moral concern. The second edition of the *Ag Guide* came out in 1999, with an expanded authorship and chapters devoted to specific types of agricultural animals. The current third edition (2010) has 62 authors and additional chapters covering institutional policies and principles related to health care, husbandry, environmental enrichment, and handling and transport. The title of the third edition was changed to *Guide for the Care and Use of Agricultural Animals in Research and Teaching*, on the principle that the standards therein are applicable to agricultural animals in all research and teaching situations, not just those seen as strictly agricultural. The *Ag Guide* has become the reference document for agricultural animals by IACUC's nationwide, and has been adopted by AAALAC as a primary standard to evaluate animal care and use programs. At the last meeting of the FASS Scientific Advisory Committee on Animal Care (SACAC) in May 2015, it was decided to revise the *Ag Guide* to produce a fourth edition. Items were identified for each chapter and a tentative timeline was developed. The sale of ASAS and PSA interests in FASS to ADSA in 2015 provided for transfer of ownership of the *Ag Guide* to ADSA, ASAS, and PSA and dissolved the SACAC, temporarily suspending action on the *Ag Guide*. As of the writing of this abstract, the revision process has been initiated, but a determinable timeline for publication has not been established. The three societies recognize the vital importance of an up-to-date *Ag Guide* and intend to jointly publish a revised fourth edition.

Key Words: *Ag Guide*

0029 How ag research and teaching differs from "rodent" studies in AAALAC international accreditation.

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Ethical care of farm animals is required for conduct of farm animal research and teaching, journal article submission, and production on commercial farms. The highest standard of animal care is provided when an agricultural research and teaching institution becomes accredited by AAALAC International. Some people in animal agriculture are leery of AAALAC accreditation because they have experienced laboratory animal ethics applied to farm animal research and teaching. Here I argue that the fundamental ethical principles underlying farm animal care are often different than those that underpin laboratory animal care. The laboratory animal community lean heavily on the 3 R's (reduce, replace, and refine). I argue that these are not appropriate for farm animals as they are for laboratory animals. Agricultural research doesn't reduce the sample size, it optimizes the sample size. Agricultural animal researchers don't often replace animal models with a "lower" model species (say using a mouse rather than a chimp for a

human disease), they use the actual target species (say using a pig for pig research). Sample size is often optimized, not set at the lowest numbers possible. Field studies may use the building or barn as the experimental unit which greatly increases numbers of animals in an appropriate manner. Retailers and consumers may set ethical requirements on the entire market or niche markets that require certain production practices. Finally, animals used in teaching have entirely different ethical standards depending on if the learning is meant to be a demonstration or if the student is expected to be proficient at an animal procedure. In addition to budgetary pressures for university farms, animal science programs must determine if they can justify model animal farms for teaching purposes. In conclusion, laboratory animal ethical principles are different in some ways than the standards for agricultural animals used in farm animal research or teaching. Using laboratory animal standards like the 3 R's may not help and may harm farm animal welfare. AAALAC International utilizes the *Ag Guide* as its guiding document for farm animals in teaching and research. As long as overseeing bodies use the appropriate ethical framework, farm animal care will be protected in both farm animal research and teaching.

Key Words: animal care, accreditation, ethics

0030 Getting along with your IACUC and helping them understand agricultural species research.
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The Institutional Animal Care and Use Committee (IACUC) is responsible for ensuring the humane use and care of farm animals in research and teaching at Universities. Despite, the challenges IACUCs face in oversight of farm animals used in research in terms of the diverse animal facilities or farm or production settings, this does not change the acceptable guidelines for ensuring animal farm well-being. Farm animal care and use in research and teaching requires the same science-based practices that are outlined and supported by the *Guide for Care and Use of Agricultural Animals in Research and Teaching* (*Ag Guide*, 2010). It is necessary for IACUCs to have expertise on their committees that understand how to best apply these standards specifically to species in question in a particular setting. An IACUC that is adequately informed to consider species-specific issues within the context of the specific research being conducted can better ensure proper animal care while maximizing farm animal welfare. But, this can only be achieved if an IACUC has explicit knowledge of each species for which it has oversight which can be accomplish only if there is knowledgeable representation on the committee. The past few years, IACUCs have been faced with challenges from the public and other committee members that lack knowledge and understanding of the importance of the *Ag Guide* and animal unit specific standard operating procedures (SOPs) for farm animals. The objective is to give an overview of the importance of a good working relationship between IACUCs and animal scientists to ensure successful research programs that use agricultural species in research and teaching by emphasizing importance of *Ag Guide*, development of species-specific SOPs derived from science-based data and approved by IACUC, and when issues need to be addressed that a subcommittee of experts are part of the decision making process. Animal scientists and IACUCs must work together to ensure the best care for farm animals used in research and teaching at their respective universities.

Key Words: animal care, research, welfare

0031 Applying AAALAC international's peer review program to support agricultural research programs.
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Agricultural animal research is arguably more important today than ever before. The challenge of providing food for the world's population in a sustainable, ethical manner is no small task. Public awareness regarding animal production is increasingly focused on humane treatment and methods, while at the same time there is a significant lack of understanding about production animals, their needs, and the best practices to rear and care for them. Institutions that engage in animal research and production must ensure that high standards of animal care and use are used both to meet expectations of society and to be ethical stewards of the animals with which we work. AAALAC International provides a third party, peer review of all facets of the animal care and use program that has proven to be an effective mechanism to ensure institutions meet the standards of the *Ag Guide*, undergo continuous improvement, and demonstrate institutional commitment to high standards of animal care and use. Data from 671 AAALAC site visits highlight the common challenges faced by animal care and use programs and provide information to aid those engaged in research animal program management. Findings data in each of the six main areas of the animal program will be provided: institutional commitment and resources, personnel expertise and training, husbandry and veterinary care, occupational health and safety, facilities, and effective oversight by the institutional animal care and use committee. An AAALAC review by peers who are experienced in agricultural animal research is collegial, confidential, and outcome-based. It is designed to help identify strengths and weaknesses of the program, with the aim of ensuring high quality scientific outcomes and a high level of animal welfare.

Key Words: AAALAC, review, welfare

0032 AAALAC international agricultural animal research program accreditation at Purdue University: "The good, the bad, and the ugly." J. S. Radcliffe*, *Purdue University, West Lafayette, IN.*

Admittedly, most production animal researchers at Purdue where scared when Purdue decided to move forward with AAALAC International Agricultural Animal Research Program accreditation. Two main concerns dominated: (1) How would AAALAC deal with the unique issues of animals in a production setting versus a laboratory setting? And (2) Would AAALAC accreditation interfere with our research? Particular emphasis was placed on cost of accreditation in terms of making or keeping programs compliant, facility maintenance, enhanced workload on researchers, and the possibility of excessive or "unnecessary" oversight. As we navigated through the accreditation process, we found that expense was manageable and, that if the program was well run, already it easily fit within the AAALAC guidelines and, if improvements were needed, it helped to have the need for accreditation as the reason to force the necessary improvements. We also found that AAALAC itself was willing to have open discussions about issues specific to production animal research and work with Purdue to create solutions to any issues. Today, AAALAC accreditation and maintenance of our accreditation status allows Purdue to promote and advertise our high standards for research and animal care across all species, demonstrate our commitment to public accountability, lobby the university for continuous improvement, and market our accreditation to federal and industry funding sources.

Key Words: AAALAC accreditation, Purdue, welfare

ADSA PRODUCTION DIVISION SYMPOSIUM: ROBOTIC DAIRYING: ADAPTING FARM AND BUSINESS MANAGEMENT

0033 Changes in dairy farm management strategies with the adoption of robotic milking. J. Rodenburg*, *DairyLogix, Woodstock, ON, Canada.*

Adoption of robotic milking on dairies of up to 250 cows is improving the lifestyle of dairy families, and it is an effective way to reduce labor in herds of all sizes. Since milking is voluntary, and feed delivered during milking is the main enticer for attendance, feeding strategies that offer palatable pelleted concentrate in the milking stations, combined with low starch mixed feeds or forage at the feed fence, improve milking frequency and production. Barn layouts that encourage low-stress access by providing adequate open space near the milking stations and escape routes for waiting cows also improve milking frequency and reduce the number of cows requiring fetching. Lame cows present themselves less often for milking and produce less milk. Preventing lameness with comfortable stalls, clean alley floors, and effective foot bathing and treatment protocols is given greater emphasis on robotic dairies. Variable milking times create challenges for foot bathing, sorting and handling, and dealing with special-needs cows. These challenges must be addressed with appropriate cow routing and separation options at the milking stations, if the expected labor savings are to be realized. With less work, all protocols and the layout and gating of the barn should make it possible to complete handling tasks alone. Unattended milking demands reliance on sensors to monitor health and performance; but this, along with computer control of milking intervals and feeding levels, creates new opportunities to manage cows individually. Much of the potential to improve the productivity, health, and longevity of dairy cows, and to decrease feed costs through combining the use of sensor data with individual feeding and milking, is as yet unrealized. Free traffic and guided traffic systems have been adopted, and results are similar when excellent management is applied. In less-ideal circumstances, guided traffic and the use of commitment pens results in long standing times and stress, particularly for lower-ranking cows, while poor management with free traffic results in more labor for fetching nonattending cows. Robotic dairies require a smaller labor force than conventional dairies, but function best with skilled workers than can perform a variety of tasks.

Key Words: automatic milking, robotic milking

0034 Opportunities and challenges for herd health and reproduction with robotic milking. S. J. LeBlanc*, *Department of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, ON, Canada.*

There has been a rapid increase in the number of herds with automatic milking systems (AMS). This technology is a well-established means to harvest milk from cows. Robotic milking offers potential advantages in labor per cow, increased milking frequency, and integration of sensors and data collection that assist with estrus detection, and might help with detection of health problems or lameness. Activity monitoring (AM) systems (in AMS or parlor-milked freestall barns) have been shown to produce, on average, comparable herd pregnancy rates to alternative approaches to reproductive management. However, AM requires supplemental interventions for timely AI for approximately 20% of inseminations. AMS provide streams of a variety of data on activity, milking frequency and timing, quarter-level milk yield, and conductivity, and the daily cow-level variation in these metrics. The systematic collection of these data offers the promise of detection of some health problems earlier and with less variation. However, selection of valid, actionable indicators of health from