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818 Nutritional, hormonal and environmental effects on colostrum in sows. C. Farmer*[1] and H. Quesnel[2], [1]*Agriculture and Agri-Food Canada, Dairy and Swine R & D Centre*, *Sherbrooke, QC, Canada*, [2]*Institut National de la Recherche Agronomique, UMR SENAH*, *Saint Gilles, France*.

The essential role of colostrum for growth and survival of neonatal piglets is evident, yet very little is known about the factors that can affect its yield and/or composition. Concentrations of IgG in colostrum vary widely between sows and are influenced by parity, season and genotype. Standard colostrum composition is also altered by genotype suggesting that selection strategies could be used to further improve it. Little is known on the environmental effects on sow colostrum; heat stress was shown to decrease IgG concentrations and alter fatty acid composition of colostrum. Endocrine status undoubtedly affects colostrogenesis and the induction of farrowings reduces both colostrum yield and fat content of colostrum. On the other hand, providing growth hormone or prolactin in late-gestation increases colostral fat content. A drastic reduction in feed allowance in late gestation also increases colostral fat content, yet protein intake per se seems to have no effect on colostrum composition. In fact, it is very difficult to change the amino acid composition of colostrum. Supplementing the diet with fat in late gestation not only increases total lipids in colostrum but the source of fat used alters lipid composition. Indeed, inclusion of fish oil in the gestation diet of sows increases the amount of PUFA in colostrum and, interestingly, dietary conjugated linoleic acid also increases colostral IgG content. Dietary supplementation with vitamin E, but not C, increases its concentration in colostrum and, even though increases in vitamins A and E in the gestation diet do not alter colostral concentrations of IgG, they improve the IgG status of piglets via unknown mechanisms. Lastly, mineral intake appears to have no effect on mineral content in colostrum. In conclusion, it is apparent that new management strategies to enhance yield and/or composition of sow colostrum could be developed and further research in that area is definitely warranted.

Key Words: Colostrum, Management, Swine

819 Defining gene networks during involution of the mammary gland in dairy cows. P. Piantoni*, W. L. Hurley, S. L. Rodriguez-Zas, R. E. Everts, H. A. Lewin, and J. J. Loor, *University of Illinois*, *Urbana*.

Gene expression networks in the mammary gland during involution remain largely unknown. Objectives were to evaluate temporal changes in mammary gene network expression profiles due to cessation of milking at peak lactation. At 42 DIM, Holstein cows underwent a period of 5 d during which they were milked once daily until complete cessation of milking. Percutaneous mammary biopsies (n = 5/time point) were obtained on d 1, 5, 14, and 21 relative to the start of once-a-day milking. A 13,257 bovine oligonucleotide (70-mers) array and qPCR were used for gene expression profiling. Annotation was based on similarity searches using BLASTN against human, mouse and bovine RefSeq, human, mouse, and bovine UniGene, and bovine TIGR. Cy3- and Cy5-labelled cDNA from mammary gland and a reference standard were used for hybridizations (40 arrays). ANOVA (false discovery rate = 0.05) identified 75, 374, and 379 differentially expressed genes (DEG) with expression changes >1.5-fold on d 5, 14 and 21, respectively, relative to d 1. Among DEG, gene network/pathway analysis identified apoptosis (n = 65), cellular growth and proliferation (n = 73), and immune response (n = 38) as the most significant upregulated molecular and cellular functions on d 21 vs. 1. In contrast, lipid metabolism (n = 17) and cellular development (n = 12) were among the most significantly dowregulated functions in the same comparison. Downregulated genes on both d 14 and 21 vs. 1 included TNFA (cytokine activity), CD36 (fatty acid transport), SDHD (TCA-cycle), and SREBF1 (transcription factor); whereas, LTF (peptidase activity), CLU (apoptosis), and SPP1 (cytokine activity) were upregulated. Top upregulated signaling pathways among DEG on d 14 and d 21 vs. 1 included epidermal growth factor signaling and acute phase response signaling. Observed gene network expression patterns during "forced" involution were in large part a reflection of diminished milk synthesis and metabolism as the mammary gland transformed into a non-secretory tissue. Immune response-related genes seem to play a central role during mammary involution.

Key Words: Mammary gland, Involution, Oligonucleotide array

820 Mastitis control on organic and traditional dairies. P. L. Ruegg*, *University of Wisconsin*, *Madison*.

The U.S.D.A. National Organic Program specifies that organic dairy products may not originate from animals that have received hormones or antibiotics for any reason. As a consequence, organic dairy producers utilize a variety of strategies to manage disease. The purpose of this paper is to review research that describes mastitis control and treatments used on U.S. organic dairy farms. Several studies have indicated that fewer cases of clinical mastitis were reported by ORG farms but there are philosophical differences in the detection of disease and perception of cure and it is possible that more diseases are recorded on CON farms because there are more treatment options. Control of contagious mastitis can be a challenge for ORG farms because use of intramammary antibiotics is prohibited. In a WI study, about half of ORG farms reported administration of a variety of non-antimicrobial products at dry-off. Ultra filtered bovine whey products were most common treatment but other products included vitamin or microbial supplements or vitamin C. Both CON and ORG farmers had similar appraisal of products used at dry off. Organic farmers consistently report that they do not use antimicrobials to treat clinical mastitis. Treatments for clinical mastitis included various intramammary compounds such as isoflupredone, vitamin C, apple cider, aloe vera, and microbial supplements. A bovine whey product was the most common product administered by a parenteral route at both dry off and for treatment of clinical cases. Organic producers also reported the use of garlic tincture administered per os, or in the vulva. While efficacy data for these compounds is not available, the perception of cure after treatment of clinical mastitis was not significantly different between CON and ORG farmers. About half of CON farmers and one third of ORG farmers estimated that less than 50% of the treated cases of mastitis were cured as a result of treatment. Almost 74% of ORG farmers using compounds to treat clinical mastitis were satisfied or very satisfied, while only 40% of CON farmers were satisfied or very satisfied with the products used.

Key Words: Mastitis, Organic, Dairy

821 Association of prion protein genotypes with milk production and milk cheese-making properties in two breeds of dairy ewes. Y. Moussaoui, G. Caja, A. A. K. Salama*, E. Albanell, R. Casals, X. Such, D. P. Jaramillo, and A. J. Trujillo, *Universitat Autònoma de Barcelona*, *Bellaterra, Barcelona, Spain*.

Scrapie is a widespread transmissible spongiform encephalopathy of sheep, which is under official eradication programs. Infectious protein (prion) is encoded by an autosomal gene (*PRNP*). Degree of resistance to scrapie depends on *PRNP* polymorphisms: VRQ and ARR haplotypes being the most and least susceptible, respectively. Frequency of haplotypes varies between breeds, but is currently being modified by selection programs. Very little information is available on association of *PRNP* genotypes with sheep dairy traits. In order to improve this knowledge, 28 Manchega (ARR/ARQ, n = 9; ARQ/ARQ, n = 19) and 34 Lacaune dairy ewes (ARR/ARQ, n = 14; ARR/ARR, n = 20) were used to evaluate lactational performance and milk cheese-making properties. Management and feeding was similar for all ewes. Milk yield was recorded and milk sampled at wk 9 of lactation for analysis of main milk components, Na, K, fatty acid profile, SCC and cheese-making properties. Statistical model included, for each breed, the covariate of SCC, the fixed effects of genotype and parity, the random effects of animal and residual error. *PRNP* genotype had no effect on milk yield and most milk components. Exceptions were: log SCC, which was greater in ARR/ARR than ARR/ARQ (5.58 vs. 5.09; $P < 0.05$) in Lacaune; milk fat, which tended to be lower in ARQ/ARQ than ARQ/ARR (7.47 vs. 8.03%; $P = 0.064$) in Manchega; and, C17:0, which tended to be lower in ARR/ARR than ARR/ARQ (1.34 vs. 1.50%; $P = 0.065$) in Lacaune. Regarding cheese-making properties, milk coagulation pH was lower (6.59 vs. 6.70; $P < 0.05$) and curd DM tended to be greater (35.7 vs. 34.9%; $P = 0.098$) in ARQ/ARQ than ARR/ARQ in Manchega. On the other hand, rennet clotting time (12.7 vs. 10.9 min) and cheese whey protein (2.10 vs. 1.82%) were greater ($P < 0.05$) in ARR/ARR than ARR/ARQ in Lacaune. These results indicate that increasing the ARR frequency in Manchega and Lacaune dairy ewes does not seem to have negative effects on milk and cheese-making traits. However, selection towards ARR haplotypes in Lacaune ewes could have a negative impact on SCC, rennet clotting time and cheese whey proteins.

Key Words: Scrapie, Milk, Dairy Sheep

822 Management effects on colostrogenesis in small ruminants. N. Castro*[1], J. Capote[2], R. M. Bruckmaier[3], and A. Argüello[1], [1]*Las Palmas de Gran Canaria University*, *Arucas, Spain*, [2]*Canarian Agronomic Science Institute*, *La Laguna, Tenerife, Spain*, [3]*University of Bern*, *Bern, Switzerland*.

Colostrum feeding in small ruminants is crucial during their first hours after birth because it is the only immunoglobulin (Ig) source during early life, due to the lack of Ig transfer during pregnancy via the placenta. In addition the immune system of the neonate is unable to produce Ig during the first month of life. Colostrogenesis, i.e. prepartum transfer of Ig from blood into mammary secretions, starts several weeks prepartum. In goats plasma IgG concentration decreased by around 38% from third month of gestation until parturition, which coincided with the dry period (DP). Thus, the management during dp is crucial for the course of colostrogenesis. The colostrum synthesis is affected by nutrition during the DP but the transfer of Ig seems to be independent. The administration of conjugated linoleic acid (CLA) during the DP to dairy goats caused a less pronounced decrease of plasma IgG concentration (6%) but it did not change colostral IgG levels. In cattle IgG1 is transported from blood into colostrum by an IgG1 specific receptor located on the surface of alveolar epithelial cells during colostrogenesis which is most likely similar in small ruminants. Via inactivation of this receptor, the Ig transfer is downregulated by the increase of prolactin (PRL) during the final stage of lactogenesis. It was recently demonstrated in goats treated with PGF2α in order to induce parturition that lower colostrum IgG concentrations occurred concomitantly with an earlier increase of plasma PRL as compared to untreated animals. Litter size did not affect colostral IgG concentration in goats and ewes. Contrary to cows, the number of lactations did not affect IgG in colostrum of goats.

Key Words: Colostrum, IgG, Immune System

823 Haptoglobin, cortisol, A/G ratio and IGF-1 in goat kids around weaning. D. Magistrelli*, L. Pinotti, and F. Rosi, *University of Milan*, *Milan, Italy*.

Weaning is the most stressful event in the life of young ruminants. Since stress can affect endocrine and immune functions, weaning often results in a period of growth stasis and risk of disease. In light of this, the aim of this study was to evaluate the effect of weaning on growth and on some physiological mediators of stress and immune function.

Eleven Saanen goat kids were studied from day 3 to day 50 of age. Kids were randomly divided into two groups: MILK (6 animals) and WMIX (5 animals). All were fed goat milk to age 29 days. After that, MILK kids continued to receive milk, while WMIX group underwent weaning, in which milk was gradually replaced by solid feed. WMIX kids were completely weaned on day 48.

During the experimental period, dry matter intake (DMI) and body weights (BW) were recorded and blood was analyzed for metabolic traits, for indicators of health status (cortisol, haptoglobin and albumin/globulin - A/G ratio) and for IGF-1, which has a crucial role in postnatal development.

Starting from day 37 of age, DMI began to lower in WMIX group. On day 50, glucose, amino acids and urea were significantly lower in WMIX kids. On the same day, plasma IGF-1 was also lower in WMIX kids, as possible consequence of the lower plasma glucose and amino acids. Despite these differences, BW did not differ between groups, throughout the entire period.

Along the experimental period, plasma cortisol was always low in both groups, signaling no stressful condition, even if from day 44 to 50 of age, cortisol level significantly increased in MILK kids. This last result may indicate a function for cortisol as metabolic hormone involved in glucose homeostasis, rather than as telltale sign of poor health. In fact, no difference was observed neither in plasma haptoglobin, nor in A/G ratio, which are useful tools for suggesting when the animal is pathologically or physically challenged.

Results imply that a gradual transition from milk to solid feed does not affect the health status of goat kids, but it can decrease plasma cortisol, as hormone involved in glucose metabolism.

Key Words: Health, Weaning, Goat Kids