were fed 4 diets: 1) control diet (CNTL; 500 IU vitamin E), 2) 2% fish oil, 0.5% soybean oil, and 500 IU of vitamin E (FSO), 3) 2% fish oil, 0.5% soybean oil, and 2000 IU of vitamin E (FSOE), and 4) 1% sorbitol (SORB, dry form; 500 IU vitamin E). Diets with oil reduced DMI (18.8 versus 22.7 kg/d), but DMI was similar between CNTL and SORB. Milk yield (31.7 kg/d) and MUN (17.0 mg/dl) were similar among diets. Diets with oil reduced milk fat and protein percentages (3.87, 2.50, 2.58, and 3.96%; 3.38, 3.09, 3.16, and 3.32% for CNTL, FSO, FSOE, and SORB, respectively). Rumen VFA were similar among diets. Concentrations of vaccenic acid (3.49, 8.03, 11.8, and 1.96% of FA, respectively) and CLA (0.63, 1.28, 2.00, and 0.39%, respectively) in milk were increased with the diets containing oil; concentrations of vaccenic acid tended to be higher and CLA was higher for FSOE versus FSO. Both breeds responded similarly to the dietary treatments with respect to performance and individual milk FA. Addition of soybean and fish oils increased CLA in milk, but the higher concentration of vitamin E in combination with the oils further increased milk CLA. Feeding the sorbitol resulted in similar responses as to feeding the CNTL diet.

Key Words: Fish oil, Sorbitol, Vitamin E

241 The effect of lactoferrin on the appearance of immunoglobulins in the peripheral blood of Holstein calves. W. Knauer* and J. M. Smith, *University of Vermont*, *Burlington*.

The objective of this study was to determine the effect of a single dose of lactoferrin on the appearance of immunoglobulins in the peripheral blood of Holstein bull calves. Shortly after birth, all calves were fed 3.8 L of whole milk supplemented with bovine serum immunoglobulin and with lactoferrin according to treatment. Treatment 1 (n=3) received 4 g lactoferrin; treatment 2 (n=3) received 8 g lactoferrin; treatment 3 (n=3) served as the control and received no supplemental lactoferrin. Subsequently, all calves were fed a 26% crude protein, 18% crude fat milk replacer, mixed at a 15% concentration, to provide dry matter at 2% of body weight per d, for 6 wk. Calves were offered starter grain from 3 d of age and were weaned at d 42. Ten ml of blood were drawn from each calf at 0, 2, 4, 6, 8, 12, 16, 24, 32, and 42 h after the first feeding and at wk 1, 3, 5, 7, and 9. At 24 h, plasma immunoglobulin measured by radial immuno-diffusion did not differ, being 1430 ± 268, 1020 ± 607, and 960 ± 664 mg/dl, respectively, for treatments 1, 2, and 3. This study will be repeated with 3 more blocks of calves before we can conclude whether lactoferrin affects immunoglobulin absorption in neonatal calves.

Key Words: Immunoglobulin, Lactoferrin, Dairy calf

242 Dairy farmers' perceptions and attitudes about lameness. A. M. Edgecomb*, C. L. Wickens, A. J. Zanella, and D. K. Beede, *Michigan State University*, *East Lansing*.

Lameness reduces productivity and welfare of dairy cattle. Incidence rates (IR) and severity of lameness in some herds are unacceptable. Various management strategies are recommended to reduce lameness; however, success is not observed in many instances. Our objective was to try to better understand the perceptions and attitudes of dairy farmers about lameness. A survey was mailed to all Michigan dairy farmers in July (n = 1,280) and December (n = 1,008). The survey asked four Likert Scale and 22 forced-choice questions. Survey return rate was 33%. Herd size profile of respondents was similar to Michigan's overall herd size profile. Data were analyzed using Statistical Package for the Social Sciences ® 13.0. Ninety-nine percent of respondents believed lame cows feel pain. Overall, 43% 'strongly agreed' or 'agreed' that lameness was a problem in their herds; 23% 'neither agreed nor disagreed', and 31% 'disagreed or strongly disagreed'. However, 53% of farmers indicated that their IR was <10%; 35% believed it was between 11 to 30%; and, only 7% believed their IR was ≥31%, suggesting that lameness was not perceived as a major issue. The actual severity and frequency of lameness in the survey herds was not known. Furthermore, 69% of respondents indicated that they do not use a specific method to record occurrence of lameness. In 38% of herds a professional hoof trimmer was not used, yet only 2% indicated a person on-staff who trimmed hooves. The owner was identified as the main person (79%) responsible for managing lameness; yet, 37% indicated that no other person was responsible to help the owner with lameness in their herd (e.g., no team approach). We conclude based on survey responses that Michigan dairy farmers may underestimate the potential seriousness of lameness on cow productivity and welfare; or, what they might do to reduce lameness. Thus, careful consideration should be given for the best approaches in extension education and research to affect perceptions and attitudes of dairy farmers about lameness to improve animal health, welfare and productivity.

Key Words: Farmers' perceptions, Animal welfare, Dairy lameness

Companion Animals: Advances in Companion Animals - BioMarkers

243 Gut microbial and immunological responses of dogs to diets containing alternative carbohydrates with properties similar to those of dietary fibers. I. S. Middelbos*, N. D. Fastinger, M. R. Godoy, and G. C. Fahey, Jr., *University of Illinois*, *Urbana*.

Several blends of carbohydrates containing fructooligosaccharides (FOS) and/or mannanoligosaccharides (MOS) from yeast cell wall were evaluated as proxies for traditional dietary fibers in animal protein-based diets fed to dogs. Six mixed breed dogs with hound bloodlines were fitted with ileal "T"-type cannulas. In a 6 x 6 Latin square design with 14 d periods, six diets with different carbohydrate sources were tested. Dogs were offered 175 g twice daily of a brewer's rice and poultry byproduct meal-based diet supplemented with: no additional fiber (CO); 2.5% cellulose (CL); 2.5% beet pulp (BP); 1.0 % cellulose + 1.5% FOS (CF); 1.0% cellulose + 1.2% FOS + 0.3% MOS (CFM1); or 1.0% cellulose + 0.9% FOS + 0.6% MOS (CFM2). Chromic oxide was provided in gelatin capsules as a digestion marker at each feeding. On d 11 through 14 of each period, ileal samples and total feces excreted were collected. On d 14, a blood sample was collected for a complete blood count. Additionally, a fresh fecal sample was collected for bacterial enumeration by serial dilution and plating on selective agars. Treatment least squares means were compared using a Tukey adjustment. Feed intake, fecal score, and fecal pH were similar among treatments, but wet fecal output tended (P = 0.09) to be higher for dogs fed BP compared with CFM1. Fecal *Bifidobacterium* concentrations were higher for CF (P = 0.02) and CFM2 (P = 0.09) than for CL, and tended to be higher (P = 0.06) for CF than for CO.

Lactobacillus concentrations tended to be increased (P = 0.07) for CF compared to CL and CO. Total anaerobic microbe concentrations were increased for CF (P = 0.04) and CFM2 (P = 0.05) compared to CL, while total aerobe microbe concentrations were increased for CF compared to CL (P = 0.05) and CO (P = 0.06). White blood cell counts and serum immunoglobulin concentrations were not affected by treatment. These data suggest that fiber blends containing FOS and/or MOS modulate intestinal microbial populations but do not appear to affect immunological status of the dog.

Key Words: Dog, Carbohydrates, Dietary fiber

244 Mapping QTL for osteoarthritis in dogs. R. G. Mateescu*[1], N. I. Burton-Wurster[1], G. Lust[1], K. Tsai[2], J. Phavaphutanon[3], and R. J. Todhunter[1], [1]*Cornell University*, *Ithaca, NY*, [2]*Texas A&M University*, *College Station*, [3]*Kasetsart University*, *Nakhon-Pathom, Thailand*.

Osteoarthritis (OA) is a common disease in dogs, with multiple risk factors, including a complex genetic pattern. The origins of cartilage degeneration in canine and human OA are still poorly understood, and fundamental questions regarding the precise molecular nature of this complex disease remain to be answered. The objective of this study was to identify QTL for OA in a dog model of the condition. A genome-wide scan was undertaken to identify QTL associated with this disease. An experimental canine pedigree was developed for linkage analysis by crossbreeding dysplastic Labrador Retrievers with unaffected Greyhounds. We used 100 dogs from this pedigree, including backcrosses to both parental lines and F2 individuals. At necropsy, the hip joints were examined macroscopically and a score (ranging from 0 to 4) was assigned to describe the degree of cartilage degeneration. A set of 342 microsatellite markers were genotyped on 100 dogs. Interval mapping was performed using the QTL Express package. To adjust for the effect of age of the animal at the time of necropsy, the age at necropsy was included in the model as a covariate. Estimates were obtained for the additive and dominance effect of the putative QTL at that location. Chromosome-wide significance thresholds for each trait were determined empirically by permuting the marker data. Five chromosomes were identified to harbor putative QTL for necropsy score. The recent completion of the canine genome sequencing has facilitated the comparison of the dog genome with the human genome, allowing the further investigative analysis of canine QTL. The region on CFA18 flanked by markers AHT130 and FH2429 and identified in our study to harbor putative QTL is syntenic with 11q12.2-q12.3 region on the human chromosome 11, where a primary hip OA susceptibility locus was fine-mapped. Similarly, the region on CFA19 between markers FH2279 -Ren91I14 is syntenic to human 2q14.2-2q21.1, region identified as linked to an OA locus segregating in different human populations. This indicates that the genetic mechanism underlying hip OA in dogs may have similarities to human OA and the dog model would greatly improve our ability to identify candidate genes for further investigation.

Key Words: OA, Dogs, QTL