

545 Mathematical modeling and analysis of use of space. M. C. Christman^{*1}, C. P. Miller¹, and I. Estevez², ¹University of Florida, Gainesville, ²University of Maryland, College Park.

Spatial confinement imposes behavioral restrictions on animals because of limitations in movement and use of space. Such limitations are particularly exacerbated in farm animals that are maintained in intensive commercial production systems. Despite the important consequences of space availability/quality on the health and welfare of farm animals, many existing studies do not include study of patterns of movements because of the lack of adequate statistical methods for descriptors for movement and behavior in confined space. We describe a complex computer simulation of individual-based movement in confined space and its application. Our objective is to obtain a process model simulating animal movement and behavior that can be used to study statistical methodology as it relates to testing hypotheses about the effects of varying density and available area for confined animals. Our animal model is the domestic fowl *Gallus gallus domesticus* although the model can be used with other species that are found in limited or confined habitat. We simulate movement as a correlated random walk with additional controls to allow for the ability to manipulate the reaction of the animal to boundaries, the tortuosity of its steps, and the degree to which it avoids areas already visited. In addition, the model can be modified to allow for behavior that changes through time such as might occur with age and to incorporate behavior in response to new resources or to other animals within its space. Using this model, we have developed new descriptors of movement and use of space in confined regions. For example, we have developed new measures of tortuosity and core areas that are useful for distinguishing among the effects of varying environments. The model can also be used to do power analyses in order to determine adequate sample sizes and sampling regimes such as the interval between observations of a focal animal. We demonstrate use of these new methods using data from an experiment on domesticated fowl in which density and pen size was varied and show that our new methods are better than those originally developed for animal studies in unconfined space.

Key Words: Correlated Random Walk, Behavior, Domestic Fowl

546 Major pitfalls in animal welfare research. J. J. McGlone^{*1}, L. E. Hulbert¹, N. Krebs¹, M. A. Sutherland¹, and J. W. Dailey², ¹Texas Tech University, Lubbock, ²USDA Livestock Issues Research Unit, Lubbock, TX.

Animal welfare researchers are obligated to provide the best quality of research possible to meet scientific standards and society concerns. The conclusions derived from studies can have major consequences on animals and the animal industries. However, major pitfalls are far too common in animal welfare research. The following potential problems (not in priority order) associated with these specialized types of investigations include: 1) Lack of statistical replication/duplication within studies, lack of simultaneous inter-institution replication and related ethical considerations of inappropriate sample sizes, 2) Lack of a defined biological or applicable control, 3) Lack of including both physiology and behavior data collected in a study, which then requires an entire new study to gather the missing information, 4) Lack of collaboration between research competitors, some of which have special skills, 5) Ambiguity, inaccuracy, lack of precisions and insufficient depth of behavioral and physiological measures, 6) A reliance solely on incomplete electronic data bases and inattention to early, valuable work that is relevant or directly answers the question at hand, 7) Inconsistent behavioral definitions, setting up a difficulty in comparing and interpreting research. 8) An inability to understand the meaning of changes in behavior or physiology (sometimes simply due to this neonatal science), 9) Lack of agreement on appropriate measures/standards of animal welfare, 10) Inappropriate anthropomorphism. While it is important that scientists have empathy and show compassion for animals, the necessary leap from human perception to animal perception should be executed with caution and discretion. All of these tribulations could result in flawed conclusions, which could have detrimental effects on regulations and actual animal welfare.

Key Words: Animal Welfare, Methods, Behavior

Animal Health - Livestock and Poultry: Bovine II

547 New frontier in monitoring, early diagnostics and prevention of ketosis in dairy cows. K. L. Ingvarstsen^{*}, N. C. Friggens, and T. Larsen, *University of Aarhus, Faculty of Agricultural Sciences, Tjele, Denmark.*

The objective of this presentation is to give a status on the opportunities for prevention of e.g. ketosis in dairy cows using future monitoring systems. Although the incidence of clinical ketosis is generally low, sub-clinical ketosis is important as it occurs more frequently. It may increase the risk of other diseases, involuntary culling and impair production and reproduction. The large between-cow variation in e.g. β -hydroxybutyrate (BHBA), calls for proactive prevention of ketosis by identifying and changing e.g. nutrients to 'high risk cows'. Such cows may be in imbalance - situations where the regulatory mechanisms are insufficient for the animals to function optimally leading to a high risk of disease. We have developed a model for the prediction of the risk of ketosis in dairy cows using in-line measurements of BHBA in milk (Nielsen et al., JDS 88, 2441-2453). The model is designed to function solely on the basis of milk BHBA

but other data can be included as additional risk factors for ketosis. Outputs of the model are the risk of ketosis (value between 0 and 1, where 0 = no risk and 1 = full blown ketosis) and how many days until the next milk sample should be taken and analyzed for BHBA. Prototype sampling systems for in-line measurement of e.g. BHBA in milk that utilize the above model have been developed. Such systems open up for 'Status oriented strategies based on risk management' that allow, on farm and at individual cow level, adjustment of feeding and management based on automatically registered indicators to reduce the risk of diseases but at the same time improve production and reproduction (Ingvarstsen 2006, Anim. Feed Sci. Tech. 126: 175-213). A challenge in building such strategies is to better understand the biological basis of the imbalance measured and thus to be able to predict individual animal responses to changes in e.g. nutrient supply or management to overcome the imbalance. Progress towards a better understanding will come through a combination of classical physiology, metabolic network mapping (e.g. proteomics) and quantitative modeling.

Key Words: In-line Monitoring, Ketosis, Disease Prevention

548 *Neotyphodium coenophialum* alters blood metabolites involved in nitrogen, energy, and mineral metabolism in growing steers. K. R. Brown^{*1}, L. R. Harrison², J. L. Klotz³, J. R. Strickland³, J. A. Boling¹, and J. C. Matthews¹, ¹*Department of Animal and Food Sciences, Lexington, KY*, ²*Livestock Disease Diagnostic Center, Lexington, KY*, ³*Forage-Animal Production Research Unit, USDA-ARS, University of Kentucky, Lexington, KY*.

Blood metabolite changes in steers during summer-long grazing of toxic endophyte-infected pastures were investigated as a part of a larger study for determination of physiological genomic and metabolic pathways for alkaloid metabolism. Blood cell counts, differentials, and serum metabolites of growing steers grazing fescue infected either with high (HE) or low (LE) amounts of toxic endophyte for 85 d were determined. Experimental treatments consisted of steers grazing either a LE (6.8% infection) mixed grass-tall fescue pasture (n = 9; BW = 266 ± 10.9 kg; 5.7 ha) or a HE (62.8% infection) tall fescue pasture (n = 10; BW = 267 ± 14.5 kg; 5.7 ha). Blood samples were collected by jugular venipuncture on d 0, 36, 57, and 85 of the study. Values presented are those for which no treatment × day of trial interaction was observed. Steers grazing HE pastures had decreased serum alanine transferase ($P < 0.02$, 10.2%), aspartate aminotransferase ($P < 0.04$, 9.9%), albumin ($P < 0.01$, 4.3%), and albumin:globulin ($P < 0.05$, 6.4%). No changes were observed for γ -glutamyl transferase, blood urea nitrogen, creatinine, total protein, globulin, or total bilirubin compared to the LE steers. Lactate dehydrogenase ($P < 0.01$, 13.4%) and glucose ($P < 0.05$, 6.3%) were lower in the HE steers. Serum concentrations of magnesium, sodium, and chloride did not differ, but phosphorus was lower ($P < 0.02$, 5.9%) in steers grazing the HE pasture compared to LE. No differences were observed in packed cell volume, red blood cells, hemoglobin, white blood cells, segments, lymphocytes, monocytes, and eosinophils between the two treatments. This study suggests chronic exposure to toxic endophyte-infected tall fescue selectively decreased blood components that are important indices for growth and metabolic function.

Key Words: Endophyte, Fescue, Metabolite

549 Changes in lying behavior of lactating dairy cows associated with body condition score and milk yield. J. M. Bewley^{*1}, R. E. Boyce², L. Munksgaard³, C. Drummond⁴, J. Hockin⁴, B. Scott⁴, and M. M. Schutz¹, ¹*Purdue University, West Lafayette, IN*, ²*IceRobotics, Ltd., Roslin, Scotland, UK*, ³*Danish Institute of Agricultural Sciences, Research Centre Foulum, Denmark*, ⁴*Barony College, Dumfries, Scotland, UK*.

The lying time (LT) of lactating Holstein-Friesian cows of varying body condition scores (BCS) and milk yield were measured using IceTag™ animal activity monitors in the Barony College dairy herd. A three-week average BCS was calculated for each cow and in total 84 cows were divided equally between 3 BCS categories (BCAT) [Thin(T): BCS <2.75; Moderate(M): 2.75 ≥ BCS <3.25; Heavy(H): BCS ≥ 3.25] and 2 stage of lactation categories (LCAT, < or > 150 days in milk). The cows were kept in two management systems (MS, parlor (n=24) or AMS, (n=60)). Behavior was recorded for 5-7 days for each cow. An average of October and November test day fat and protein corrected milk was calculated for each cow (FPCM). Cows that exhibited clinical lameness before or during the observation period

were excluded. For cows exhibiting estrus, the day of and the day prior to breeding were removed. When LT, hours standing, or number of steps taken within an individual day differed from an individual cow's weekly average by 2 or more standard deviations, these observations were removed. The final analysis included 79 cows (433 observations). The effects of FPCM, BCAT, week, and day within week were included in a mixed model ($p=0.0074$, 0.1223, 0.0007, and 0.0070, respectively). Effects LCAT, MS, FPCM/BCAT interaction, and pregnancy status were not significant and not included in the model. Lying time decreased with increasing milk yield. The LSMeans for LT within BCS category were 10.96(±0.293), 10.43(±0.286), 10.10 (±0.288) for H, M, and T, respectively, with H and T significantly different ($P=0.0412$). Both BCS and milk yield affected the lying behavior of the cows. Thin cows may be challenged to meet generally recommended lying times of 10 hours per day, though specific lying times for different body conditions remain to be determined.

Key Words: Lying Behavior, Activity Monitor, Automatic Monitoring

550 Rectal versus peripheral temperature measurement using radio-frequency implants in steers challenged with lipopolysaccharide during periods of heat stress. E. D. Reid^{*1}, J. M. Velasco¹, and G. E. Dahl², ¹*University of Illinois, Urbana*, ²*University of Florida, Gainesville*.

Heat stress in cattle reduces production and profit for livestock owners. Heat stress causes an increase in body temperature, which makes it difficult to identify sick animals in systems using rectal temperature as a tool to assess animal health. Injectable radio frequency implants (RFI) that can monitor temperature at the site of implantation are available and readings are positively correlated with rectal temperature (RT) during periods of heat stress. These RFI also exhibit a negative correlation with RT when cattle are challenged with lipopolysaccharide (LPS). We hypothesized that the RFIs, implanted under the scutiform cartilage of the ear of steers would be positively correlated to RT during controlled heat stress, and would exhibit a negative correlation to RT during a challenge with LPS during heat stress. To test this hypothesis, four steers (127 ± 7 kg) were moved into controlled environment chambers with individual stalls (2 steers per chamber), implanted with RFI, and allowed 2 wk to acclimate. One chamber remained at 20 C, the other was increased to 35 C starting at 0800 for a period of 48 hours. LPS was administered to all steers at 1000 on day 2. The steers were then given a 2 wk adjustment period at 20 C, and the temperature was increased in the opposite chamber, resulting in a crossover statistical design with each steer as its own ambient control. Rectal and RFI temperatures were logged at 5 min intervals. Ambient temperature was also recorded every 5 min and was included as a covariate in the statistical model. Pearson correlation coefficients for RFI and RT were 0.08 ($P=0.44$) during heat stress, 0.20 ($P=0.05$) during heat stress with LPS challenge, 0.41 ($P<0.01$) during the ambient period, and -0.42 ($P<0.01$) during the ambient period with LPS challenge. Individual response varied; some exhibited negative correlation while others exhibited positive correlation. These data do not support the hypothesis and suggest that individual response be considered when identifying models for use of RFI in temperature monitoring.

Key Words: RFID, Temperature, LPS

551 Hemodynamics in the caudal artery of yearling steers following removal from toxic tall fescue and placement on non-toxic diets. G. E. Aiken*¹ and L. K. McClanahan², ¹USDA-ARS-FAPRU, Lexington, KY, ²University of Kentucky, Lexington.

Doppler ultrasonography was used to monitor changes in blood flow characteristics of the caudal artery in yearling steers after being removed from toxic 'Kentucky 31' fescue pastures and placed on non-toxic diets. Ergot alkaloids, produced by the *Neotyphodium* endophyte that infects tall fescue, bind α -adrenergic receptor sites that constrict peripheral vascular tissues and reduce the animal's ability to dissipate body heat. Forty steers were stratified by BW for assignment to five, 3.0-ha pastures. The steers were grazed for 112 d starting on 2 June, 2005. Upon termination of grazing on 12 September, thirty-six of the steers were randomized into groups of three for placed into small pens and fed a wet corn silage-concentrate mixture ad libitum. Ultrasound scans of the caudal artery at the 4th coccygeal vertebrae were taken using an Aloka 3500 Ultrasound Unit (Aloka, Inc., Wallingford, CT). Three cross-sectional scans were taken to determine mean artery lumen area, and three Doppler spectra with a longitudinal transducer orientation were collected to estimate mean velocity, heart rate, stroke volume, and flow rate. Ultrasound measures were collected at 0 (initial measures), 1, 7, and 71 days on non-toxic diets (DNTD). Temporal changes in ultrasound measures were analyzed with mixed models. Initial caudal artery area (5.4 mm²) had increased ($P < 0.001$) by 7 DNTD (6.6 mm²) and further increased ($P < 0.001$) by 71 DNTD (7.2 mm²). Heart rate was initially low (111 beats/min), but increased ($P < 0.01$) to 124 beats/min by 7 DNTD. Heart rates were similar ($P > 0.10$) between 7 and 71 DNTD. Stroke volume tended ($P < 0.10$) to increase between 0 (0.40 mL) and 7 (0.5 mL) DNTD, but had substantially increased ($P < 0.001$) from the initial volume by 71 DNTD (0.58 mL). Initial flow rate (38.3 mL/min) increased ($P < 0.05$) by 7 DNTD (47.5 mL/min) and further increased ($P < 0.001$) by 71 DNTD (61.8 mL/min). Results indicated that vasoconstriction can be reduced, but not eliminated, in 7 d after cattle are removed from toxic fescue and placed on non-toxic diets.

Key Words: Tall Fescue, Ergot Alkaloids, Vasoconstriction

552 Response of digital dermatitis to treatment with topical lincomycin or oxytetracycline: comparison of gross visual and histopathological observations one month after treatment. B. Nuccitelli¹, S. L. Berry*¹, D. H. Read², R. L. Walker², and T. R. Famula¹, ¹University of California, Davis, ²California Animal Health and Food Safety Laboratory, Davis, CA.

Cows were enrolled in the study if they had active digital dermatitis (DD) on one or both rear feet. Twenty-five cows were allotted to 3 groups: 1) treated with 10 g lincomycin HCl (n=11), 2) treated with oxytetracycline HCl (n=11), or 3) no treatment (n=3). Cows were restrained on a tilt-table; lesions were photographed and 6 mm punch biopsies were taken and placed in formalin to be examined for histopathology. For treated cows, lincomycin HCl or oxytetracycline HCl was mixed with sufficient deionized water to make a paste, applied to a 4X4 gauze, placed on the lesion, and held in place with a light bandage. Control cows were bandaged after biopsy but received no topical antimicrobial. Lesions were re-photographed at approximately days 14 and 30. At the d 30 examination, biopsies were taken adjacent to the site of the first biopsy and submitted for histopathology. The pathologist (DHR) had no knowledge of treatment groups when he

examined the samples submitted. Based on gross examination at d 14, 20/22 of the treated lesions appeared to be healed (improved lesion score, no pain, and no visible activity). Based on gross examination at d 30, 18/22 treated lesions appeared to be healed and 4/22 lesions appeared to be active. Two of the 3 lesions on control cows appeared active and were painful; the 3rd lesion appeared to be healing. Of the 18 lesions that appeared to be healed, 10/18 (55%) were classified histologically as active or incipient. Histologic evaluation of activity of DD lesions was based on the degree to which there was: 1) loss of the epidermal barrier, 2) invasion of the stratum spinosum and 3) invasion of the papillary dermis by profuse numbers of slender, spiral organisms. Histological examination agreed with gross visual examination prior to treatment with antimicrobials but did not agree 1 month after the lesions were treated. We could not distinguish between recurrent lesions or new infections.

Key Words: Digital Dermatitis, Footwarts, Lameness

553 Mechanical properties of the solear hoof horn of heifers before and during the first lactation as a prediction of lameness susceptibility. B. Winkler¹, J. K. Margerison*², and C. S. Brennan², ¹University of Plymouth, Plymouth, UK, ²Massey University, Palmerston North, New Zealand.

Mechanical tests were completed on samples of sole hoof horn taken from 20 heifers at 2 months before parturition (p1) and 100 days postpartum (p2). Simultaneously, all claws were assessed for the lesions score (LS) in the sole horn. Heifers were kept at pasture prepartum and housed loose in a straw bedded yard postpartum. Hoof samples were collected from all claws and analysed for elastic modulus (ELM) and puncture resistance (PR), each measurement was replicated five times on the same area of each claw. Data was analysed by ANOVA GLM using period and claw as fixed effects. PR force of the sole horn was significantly greater in front claws (FC) when compared to hind claws (HC) ($P < 0.05$) (p1- FC 8.2, HC 7.4N, p2- FC 11.1, HC 10.3N). The PR force and ELM significantly increased postpartum compared with prepartum ($P < 0.01$) (p1- 7.8, p2- 10.7N and p1- 86.9, p2- 118.0N/mm²), while the LS of the claw horn increased between periods ($P < 0.001$) (p1- 73.1, p2- 186.5). No significant difference in LS was found between FC and HC in the prepartum period, however LS was significantly greater in the HC compared with the FC in the postpartum period ($P < 0.001$) (HC 223.7, FC 149.3). Prepartum ELM and PR force were not correlated with lesion score either pre or postpartum. However, postpartum ELM and PR force were significantly negatively correlated ($P < 0.01$) to the increase in lesion score between periods ($R = 0.65$). Mechanical tests reflected the changes in housing and in haemorrhage levels that occurred between p1 and p2.

Key Words: Lameness, Dairy, Hoof Tissue

554 Effect of sample thickness, tissue moisture content and storage methods on the punch resistance and elastic modulus of the bovine hoof horn. B. Winkler¹ and J. K. Margerison*², ¹University of Plymouth, Plymouth, UK, ²Massey University, Palmerston North, New Zealand.

Tissue sample treatment and storage was assessed using hooves of six beef cattle (24 and 28 months) from an abattoir. Tissue samples from the sole and white line of each claw (5 and 2 of International Foot Map) and kept in sealed plastic bags at room temperature until conditioning from physiological moisture content (0) and relative humidity (RH) 11, 33, 58, 75 and 97%; sample thickness (0.05 and 0.3 mm); storage duration in plastic bags 2°C for 0, 48, 96, 144 and 192 hours and freezing (-20°C) for 7, 14 and 28 days. After treatment tissue samples were tested 12 times for punch resistance (PR) and elastic modulus (EM) using a Texture Analyser. Samples were tested for DM content. Increase in DM resulted in a significant ($P < 0.01$) linear increase in the PR (N) of the sole (PR = 0.490; DM: 24.39, Rsq. = 0.54) and the white line horn (PR = 0.430; DM: 24.87, Rsq. = 0.64). The

EM (N/mm²) of the sole horn was significantly ($P < 0.01$) positively exponentially related to the DM (EM = 0.0602e^{0.1012x}, Rsq. = 0.81). DM varied from 63.7 to 89.1%, PR of the sole horn from 6.24 to 24.66N, PR of the white line horn from 2.17 to 18.60N and EM from 85.5 to 751.9N/mm². The days (1 to 8) taken to analyse the samples and freezing for up to 28 days had no significant effect on the DM and PR of the sole and white line horn. There was a significant ($P < 0.01$) increase in the EM of the sole horn when samples were frozen for 28 days. PR increased in a positive significant ($P < 0.001$) linear in relation to the thickness (mm) of the area tested (PR = 6.679 + 34.531 thickness, Rsq. = 0.66).

Key Words: Hoof, Beef Cattle, New Methods

Breeding and Genetics - Livestock and Poultry: Dairy Cattle II

555 Performance and physical conformation of first parity backcross Holstein x Jersey cattle and their Holstein contemporaries. K. A. Weigel*, T. J. Halbach, C. Maltecca, and P. C. Hoffman, *University of Wisconsin, Madison*.

The experimental population for the present study consisted of 194 backcross females, which were the offspring of 7 young Jersey x Holstein sires and 167 lactating Holstein dams, as well as 90 pure Holstein females, which were the offspring of 57 young Holstein sires and 83 lactating Holstein dams. These animals were born from November 2003 to January 2007 at the University of Wisconsin - Madison Integrated Dairy Facility. All first parity crossbred cows (N=40) and Holstein cows (N=23) were classified for linear type traits by a trained evaluator between 50 and 200 d postpartum. A linear model, which included fixed effects of classifier, days in milk, and pen, indicated that crossbred cows had shorter stature ($P < 0.0001$), more strength ($P < 0.05$), lower dairy form score ($P < 0.10$), more slope from hooks to pins ($P < 0.01$), narrower rump ($P < 0.0001$), steeper foot angle ($P < 0.01$), closer front teat placement ($P < 0.10$), and straighter rear legs when viewed from the rear ($P < 0.05$). Mean differences in body depth, rear legs when viewed from the side, fore udder, rear udder height, rear udder width, udder cleft, udder depth, teat length, and udder tilt were not significant. Crossbred cows were 35 kg lighter ($P < 0.10$) at first calving, however, mean birth weight of their calves did not differ. Likewise, mean body condition score at first calving did not differ, nor did mean body condition score at breeding. Peak milk yield of crossbred cows was 4 kg lower ($P < 0.05$), although fat and protein percentage did not differ. Based on these data, it appears that crossbreeding may improve mobility traits and reduce maintenance feed costs (through decreased body size), albeit at the expense of milk production.

Key Words: Dairy, Crossbreeding, Type

556 Crossbreds of Jersey/Holstein compared to pure Holsteins for production, fertility, and udder traits during first lactation. B. J. Heins, L. B. Hansen, A. J. Seykora, A. R. Hazel*, J. G. Linn, and D. G. Johnson, *University of Minnesota, St. Paul*.

Jersey/Holstein crossbreds (n = 76) were compared to pure Holsteins (n = 73) for 305-d milk, fat, and protein production, days open, number

calving a second time, and udder traits during first lactation. Cows were housed at two University of Minnesota research facilities and calved from September 2003 to May 2005. Jersey/Holstein crossbreds were bred to Montbeliarde sires, and Holstein cows were bred to Holstein sires. Best Prediction was used to calculate actual production (milk, fat, and protein) for 305-d lactations. Adjustment was made for age at calving and herd-year and records less than 305 d were projected to 305 d. Jersey/Holstein crossbreds (249 kg) and pure Holsteins (251 kg) were not significantly different for fat production, but pure Holsteins had significantly higher milk (7179 kg vs. 6600 kg) and protein (224 kg vs. 209 kg) production than Jersey/Holstein crossbreds. Least squares means for days open were 136 for Jersey/Holstein crossbreds and 159 for pure Holsteins. Jersey/Holstein crossbreds had a higher percentage of cows that calved a second time than pure Holsteins, (87% vs. 77%) respectively. Udder clearance, front teat placement, and teat length were measured during first lactation. Udder clearance was measured from the ground to the bottom of the udder and front teat placement was the distance between the front teats. Age at calving, herd-year, stage of lactation, breed, and random effect of sire within breed were included in the statistical model. Jersey/Holstein crossbreds had significantly less udder clearance than pure Holsteins, (47.2 cm vs. 54.6 cm) respectively. Jersey/Holstein crossbreds and pure Holsteins were not significantly different for front teat placement (15.3 cm vs. 13.7 cm) and teat length (4.5 cm vs. 4.4 cm), respectively.

Key Words: Crossbreeding, Heterosis, Production

557 SNPs in the 3'UTR of Stearoyl-CoA desaturase gene in Canadian Holsteins and Jerseys. P. M. Kgwatalala, E. M. Ibeagha-Awemu*, J. F. Hayes, and X. Xhao, *McGill University, Ste Anne De Bellevue, Quebec, Canada*.

Stearoyl-CoA desaturase (SCD) catalyzes the synthesis of conjugated linoleic acid (CLA) and monounsaturated fatty acids (MUFA) in the mammary gland. A two to three-fold variation in CLA and desaturase index have been reported among animals on the same diet. We hypothesized that SNPs in the 3'UTR of the SCD gene result in different 3'UTR regulatory variants which influence the production of SCD enzyme and consequently its activity in the mammary gland, which may explain some observed variations in CLA and MUFA