SESSION A

Grace A. Pawsat, Michael M. Fry, Liesel Schneider, Deanna M.W. Schaefer	**"Comparison of Iron Staining & Scoring Methods on Canine Bone Marrow Aspirates"**
	Different pathological conditions cause insufficient iron for erythropoiesis, including absolute iron deficiency caused by chronic external hemorrhage in dogs. Distinguishing absolute iron deficiency from other iron restrictive etiologies allows appropriate intervention. There are no standard scales for scoring iron stores in Prussian blue stained canine bone marrow samples. We investigated the technical performance of two human marrow iron scoring systems, including effects of destaining Wright stained marrow slides before restaining with Prussian blue. Two Prussian blue stained marrow smears were included from each of twelve clinically ill canines. One slide was directly stained with Prussian blue and the other was first stained with Wright stain then destained. Three blinded observers scored each of the 24 randomized slides twice using the Gale method and sideroblast method. Interobserver and intraobserver agreement was acceptable for the Gale method, but the sideroblast method should be used cautiously. A destaining procedure may decrease marrow iron scores.

Beth Wilson, Michael B. Zemel	**"The Effect of Calcium and Dairy on Weight Loss and Body Composition in Overweight and Obese Adults"**
	Research on the relationship between calcium (Ca) and weight has shown mixed results in many small randomized clinical trials (RCTs). A planned systematic review and meta-analysis will use source-level, individual participant data (IPD) from qualifying RCTs to identify the effect of a Ca intervention on total body weight in overweight and obese subjects consuming an energy-restricted diet. IPD from six RCTs of similar design, published from 2000-2007, were combined to evaluate three treatments: diet only; diet plus high calcium; and diet plus high dairy. Preliminary results showed that high dairy diet resulted in a significant increase of weight loss. This analysis will be augmented by including IPD from additional RCTs conducted after 2007. Narrowing the scope of studies to those of similar design, along with analyzing the source data in a single statistical model, will allow any effect of the calcium intervention to be identified with statistical certainty.

Allison N. Renwick, Christina M. Merkley, KaLynn Harlow, Jeffrey R. Sommer, and Casey C. Nestor	**"Undernutrition suppresses kisspeptin and neurokinin B protein expression in wethers"**
	Chronic feed restriction suppresses secretion of gonadotropin releasing hormone (GnRH), and subsequently luteinizing hormone (LH), however, the central mechanism(s) remains unknown. Kisspeptin (KP) and neurokinin B (NKB) co-expressed in the hypothalamus stimulate GnRH/LH pulses. We hypothesized that undernutrition would reduce expression of KP and NKB in the hypothalamus of young, castrated male sheep (wethers). Fourteen wethers were divided into groups: fed to maintain (FM) or feed restricted (FR) to lose 15-20% of pre-study weight by Week 13. Body weights and serial blood samples were collected each week and the hypothalamus was harvested for immunohistochemical analysis following collection of the final blood samples. At Week 13, mean plasma LH concentration and pulse frequency were reduced in FR wethers. Hypothalamic KP and NKB expressions were less in FR wethers. Therefore, this data supports that undernutrition regulates GnRH/LH secretion through suppression of KP and NKB in male castrated sheep.

Natalie Chow, Reza Seddighi, Heather Knych, Xiaocun Sun, Thomas Doherty	**"Sedative effects and pharmacokinetics of detomidine when administered intravenously and intravaginally as a gel to alpacas"**
	Objectives: To evaluate the sedative effects and pharmacokinetics of detomidine gel administered intravaginally to alpacas compared with intravenously administered detomidine. **Methods**: Six healthy adult female alpacas studied on two occasions using a randomized, crossover experiment. Treatments were detomidine (70 µg kg-1) intravenously (IV) or detomidine gel (200 µg kg-1) intravaginally (IVG). Sedation was evaluated for 240 minutes. Venous samples were collected for 360 minutes and were analyzed for plasma detomidine and metabolites. Variables were compared using mixed model analysis. Data are presented as mean ± standard error of mean. **Results**: Onset of sedation was faster in treatment IV than IVG. Time to maximum sedation was shorter in treatment IV than IVG. Duration of sedation was not different between treatments. There was a significant linear relationship between sedation score and plasma detomidine concentration. **Conclusion**: Detomidine administration at the doses studied resulted in moderate sedation when administered IV or IVG to alpacas.

Karen Shaw, Tena Ursini, Steve Adair, David Levine	**"Equine Electromyographic Activity During Therapeutic Exercise with the Elastic Resistance Bands"**
	Equine rehabilitation programs often incorporate therapeutic exercises, to activate specific muscle groups and stabilize areas of injury. To better characterize muscle activation with specific therapeutic exercises, electromyographic activity can be measured. Our objectives were to assess the degree of activation of specific core and locomotor muscles using elastic resistance bands during dynamic exercises in horses. We hypothesized that the use of elastic resistance bands would significantly increase the amount muscle activity as compared to exercise without elastic resistance bands. Fine wire electrodes were placed into the multifidus muscle bilaterally at spinal levels T18, and L5. Additionally, surface electrodes were secured bilaterally over the superficial muscles being examined (longissimus dorsi, rectus abdominus, middle gluteal). Horses performed five different dynamic exercises at both a walk and trot. Processed data supports increases in activation of certain evaluated muscles with utilization of the elastic resistance bands. Further statistical analysis is required for full interpretation.

Austin Bow, Madhu Dhar	**"A Streamlined Approach for Processing RNA-Seq Data"**
	With the increased availability and relatively low cost of modern RNA sequencing, the restrictive factors associated with such an assessment tool have shifted from financial budgeting to data processing time. This is due to the sheer quantity of data generated by the comparison of even a single experimental sample against its respective control, which is only further compounded when examining multiple experimental sample groups. To address some of the concerns associated with these types of bioinformatic data, a simplified method implementing freely available databases and software is described. A recently obtained data set from samples submitted to Novogene was utilized to illustrate this process through examples that highlight critical steps. The described approach represents a mechanism for rapidly processing transcriptomic data to generate relevant and meaningful tables and graphics for use in presentations and publications.

SESSION B

Jennifer Lord, Shamarial Roberson, Agricola Odoi	**"Geographic disparities of pre-diabetes and diabetes in Florida"**
	Background: Identifying geographic disparities in pre-diabetes and diabetes burden is critical for guiding control programs. This study identified geographic clusters/hotspots and predictors of pre-diabetes and diabetes in Florida. **Methods:** Behavioral Risk Factor Surveillance System data for 2013 were obtained from the Florida Department of Health. Spatial scan statistics were used to identify high-prevalence spatial clusters/hotspots. Significant predictors of the conditions inside and outside the identified hotspots were identified using logistic regression. **Results:** High-prevalence clusters were identified for both pre-diabetes and diabetes. There were differences in the predictors of the conditions based on residence inside or outside hotspots. Predictors of the conditions, regardless of location, were obesity, hypertension, and hypercholesterolemia. Additionally, income and physical activity were predictors of diabetes. **Conclusions:** Geographic disparities of pre-diabetes and diabetes exist in Florida. These findings can inform resource allocation and intervention programs focusing on the identified hotspots and modifiable predictors to reduce health disparities.

Tamara Chavez-Lindell, Agricola Odoi	**"Human and animal health concerns in rural communities of Ecuador"**
	Objective: This study investigated health status and concerns, human interactions with livestock, and predictors of pediatric and livestock diarrhea on smallholder farms in Ecuador. **Methods**: A cross-sectional survey of 58 households addressed smallholding characteristics, human-animal interactions, and 30-day history of human and animal diarrhea. Summary statistics were computed and logistic models used to investigate predictors of pediatric and animal diarrhea. **Results**: Forty-one percent of the households had indoor running water. While 65.5% had toilets, the remainder had latrines (27.6%) or no sanitation facilities (6.9%). Although 98.3% of households kept cattle, only 15.5% had waste management plans, which significantly predicted animal diarrhea. Animal stress was the foremost health concern, reported by 60.3% of respondents. Diarrhea was reported by 12.1% of respondents; diarrhea also occurred among children in 15.2% and animals in 55.2% of households. **Conclusion**: Improving sanitation infrastructure and waste management strategies is recommended to mitigate the impact of waste exposure.

Tamara Chavez-Lindell, Agricola Odoi	**"Geographic Disparities and Predictors of Diabetes Mortality Risks in South Africa, 2002-2016"**
	Background: Diabetes mellitus (DM)-associated mortality risk is thought to vary by geographic location in South Africa, yet few studies have investigated these disparities or their predictors. This study investigated district-level geographic disparities and temporal changes in DM-associated mortality risks in South Africa over a 15-year period and identified predictors of identified disparities. **Methods**: Sex-stratified, age-adjusted, district-specific mortality risks were calculated for each year and assessed for clustering using Moran's I. High mortality risk clusters were identified using Tango's flexible spatial scan statistics. Ordinary least squares models were used to investigate predictors of DM mortality risk at the district level. **Results**: Significant high-risk spatial clusters of DM-associated mortalities were identified for both sexes. Race and employment were significant predictors of DM-associated annual mortality risks. **Conclusions**: Population-based Geographic disparities in DM-associated mortalities exist and are influenced by socioeconomic factors in South Africa. Study findings are useful for guiding control programs.

Md. Marufuzzaman Khan, Agricola Odoi	**"Geographic disparities and temporal changes of diabetes prevalence and diabetes self-management education (DSME) program participation in Florida"**
	Objectives. The objectives of this study were to investigate geographic disparities of diabetes prevalence and Diabetes Self-management Education (DSME) participation rates and identify predictors of the observed disparities in DSME participation rates. **Methods.** Clusters of high diabetes prevalence and DSME participation rates were identified using flexible spatial scan statistics. Determinants of DSME participation rate disparities were identified using ordinary least squares and logistic regression models. **Results.** High prevalence clusters of diabetes were identified in northern and central Florida, while clusters of high DSME participation rates were identified in central Florida. Rural counties and those with high proportion of Hispanics tended to have low DSME participation rates. The odds of a county being in a DSME high participation rate cluster was significantly lower for counties with higher percentages of rural residents. **Conclusions.** Addressing these disparities will require specific focus to areas that have high diabetes prevalence but low DSME participation rates.

Allison Andrews, Brian Whitlock, Lew Strickland, Justin Reinhart, Jon Beever, Becky Trout-Fryxell, Kathryn Reif, Chika Okafor	**"Epidemiology of Bovine Anaplasmosis in TN Cattle"**
	Bovine anaplasmosis (BA) is an economically significant disease caused by Anaplasma marginale. There are no recent prevalence estimates or known associated factors for BA in Tennessee (TN), making it difficult to account for production losses. The aim of this study was to determine the seroprevalence and associated factors of BA within TN cattle. In an active surveillance, 247 blood samples were collected from beef cows at a slaughterhouse during May of 2013. In a passive surveillance, data associated with BA testing (20,004 lab submissions) of cattle in TN from 2012 to 2020 was analyzed. In both methods, serum samples were analyzed with cELISA. In the active surveillance, the apparent and the estimated true seroprevalence of BA in TN was 10.53% and 9.17%, respectively. Whereas in the passive surveillance, the apparent and the estimated true seroprevalence of BA in TN was 12.22% and 10.99%, respectively. Age and breed of animals as well as year of sample submission were associated with positive BA test results. Records from the TN Animal Health Diagnostic Laboratory appear to accurately estimate the seroprevalence of BA in TN and show the counties with the highest seroprevalence are in the western region of TN. With this data, future measures can reduce the spread of BA by addressing the associated factors in high risk areas.

Emily Kent, Chika Okafor, Brian Whitlock, Marc Caldwell, Andrea Lear	**"Control of Salmonella Dublin in a Dairy Herd"**
	Salmonellosis caused by Salmonella enterica serovar Dublin (S. Dublin) has increasingly been reported in cattle across the United States, but studies surrounding its control are lacking. The objective of this study was to describe control methods implemented on a dairy farm that were successful in eradicating an S. Dublin outbreak, as measured by changes in herd prevalence. Five groups of Holstein cattle divided by origin and arrival date were tested for S. Dublin using an ELISA. Prevalence estimates were calculated and compared to control measures implemented on the dairy during the outbreak. Two-hundred and eighty three cows were sampled for a total of 700 observations. The group of cows originating from Iowa in 2015 had the greatest seroprevalence (76.53%), but seroprevalence for all groups decreased throughout the study, coinciding with testing and management changes. In conclusion, eradication of S. Dublin is feasible with implemented control measures.

SESSION C

Laura Horton, Richard Gerhold, Sawsan Ammar, Megan Bruce	**"Investigation of blackhead (Histomonas meleagridis) outbreak in domestic turkeys on a private farm in eastern Tennessee"**
	The College of Veterinary Medicine Molecular Parasitology laboratory responded to a suspected blackhead outbreak on a private farm in eastern Tennessee. The farm consisted of adjacently housed chickens, turkeys, and ducks that were allowed to forage together. Initially, one juvenile turkey was reported being lethargic with sulfur-colored feces and died within 2 weeks of developing the clinical signs. Subsequently three additional turkeys displayed similar clinical signs and died soon afterwards. Necropsies performed on each of the turkey carcasses revealed liver target lesions and cecal cores consistent with blackhead due to Histomonas meleagridis. Confirmation of blackhead was performed via parasite culture of feces and histopathology and PCR and DNA sequencing of affected tissues. In addition, multiple farm litter or soil samples were collected to screen for Heterakis gallinarum eggs. Collectively, the results were consistent with classical transmission of H. meleagridis between chickens and turkeys.

Tania Dawant, Richard Gerhold	**"Determining the Prevalence of Toxoplasma gondii in a population of waterfowl"**
	Toxoplasma gondii is the one of the most common food-borne disease in the world. It is a coccidian parasite that infects most warm-blooded vertebrates, including humans, causing disease in a wide variety of animals. This study was an extension of a previous study conducted by Sawasan Amar which showed a higher than expected prevalence in waterfowl and Ring-billed gulls in Tennessee and Pennsylvania respectively. As a result, we decided to extend our sample pool and looked at 329 additional samples from six different states consisting of ten different species of waterfowl. We used a modified agglutination test to test serum samples for antibody presence. Our results showed a high prevalence of 45.9% which suggests a spread through different wildlife species and waterways. This result is particularly important to better understand the spread of T. gondii between terrestrial and aquatic habitats.

Wesley C. Siniard, Carolyn Cray, E. Davis Carter, Matthew J. Gray, Debra L. Miller	**"Clinical pathology of Bsal chytridiomycosis: Electrolyte and serum protein analyses of infected Taricha granulosa"**
	Batrachochytrium salamandrivorans (Bsal) is a recently discovered fungal pathogen that is of global concern because of its potential to cause high mortality in amphibians, especially salamander species. Little has been reported on the pathophysiological effects of Bsal; however, studies of a similar fungus, B. dendrobatidis (Bd), have shown that electrolyte losses occur in amphibians infected with Bd from loss of osmoregulation through extensive skin pathology. In our study, we hypothesize that species susceptible to Bsal chytridiomycosis would have similar losses in electrolytes. Blood was collected from 49 Taricha granulosa at necropsy, and chemistry analyses and serum protein electrophoresis were performed. Results indicate that electrolyte imbalances do indeed occur in Bsal-infected animals, and these imbalances likely lead to dehydration, lethargy, and ultimately death. By understanding the pathogenesis of Bsal, we aim to gain insight in developing treatment options and opportunities to mitigate and prevent spread of disease.

Anastasia Towe, E. Davis Carter, Wesley Siniard, Adrianna Tompros, Kurt Ash, Markese Bohanon, Debra L. Miller, Matthew J. Gray	**"Batrachochytrium salamandrivorans lesions in larval Northern two-lined salamanders (Eurycea bislineata)"**
	Batrachocytrium salamandrivorans (Bsal) is a chytrid fungus that infects amphibians, often causing devastating skin lesions and eventually death. As part of a larger study involving multiple species, two Eurycea bislineata larvae were exposed to a dose of Bsal known to infect adult salamanders (5x106). Larvae do not typically develop lesions despite testing positive for Bsal on PCR, so we hypothesized that these two animals would not develop lesions. They were swabbed for PCR every sixth day of the experiment starting on day 4 and were both positive for Bsal on the first swab and continued to be positive throughout the 60-day experiment. Interestingly, these larvae did develop lesions on the feet. Both survived the duration of the experiment. These findings highlight the potential for Bsal to negatively impact a greater portion of amphibian populations, dealing an even harsher blow to biodiversity.

Ashley Reeves, Debra Miller, William Swanson, Clayton D. Hilton, Tyler A. Campbell, Jason V. Lombardi, Michael E. Tewes	**"Assisted Reproductive Techniques in Free-Ranging Ocelot and Bobcat Populations of South Texas"**
	Recent studies concerning genetic variation in wild felid populations have shown that despite captive management, these small populations tend to lose genetic variation over time. Assisted reproductive techniques (ART) have been used in many species and have the advantage of addressing behavioral or physical incompatibilities between genetically suitable pairs, connecting regional populations, preserving genetic diversity, and linking wild and zoo populations without bringing more animals into captivity. The goals of this study are to 1. compare the effectiveness of urethral catheterization using ultra rapid freezing (Cath-URF) with the traditional straw freezing method in wild ocelots and bobcats in South Texas, which are genetically similar populations, and 2. to compare the effectiveness of ART in wild felids to that of zoo housed felids, which are genetically variable populations. Using the Cath-URF approach, field veterinarians could opportunistically collect felids in other areas of the world for broader application of ART for felid population management.

Ashley M. Reeves, Debra L. Miller, Clayton R. Hilton, Michael E. Tewes, Jason V. Lombardi, John P. Leonard, Maksim Sergeyev, Kelsey Carrier, Melissa Kennedy, Tyler A. Campbell	**"Wild Felid Health and Disease Assessment on East Foundation's El Sauz Ranch"**
	Feral cat colonies have shown increased susceptibility to viral, bacterial, parasitic and tick-borne pathogens that may have negative effects on nondomestic felids that inhabit nearby wildlands. This information paired with documentation of decreased genetic variation is particularly concerning for threatened and endangered species, such as the ocelot population in South Texas. An outbreak within this small ocelot population could negatively impact its long-term survival. To assess the prevalence of these pathogens in ocelot and bobcat populations, blood samples collected from ocelots and bobcats spanning 1985-2020 are being used to assess overall health and pathogen prevalence. Out of 35 tested individuals thus far, 5 were FIV-positive using antibody snap tests. Further health monitoring of 2 of the 5 individuals did not show signs of systemic disease. The findings are expected to assist wildlife managers in planning strategies that reduce or prevent transmission of infectious disease agents among wild and feral cat populations.

SESSION D

Amber F. MacDonald, Ruby Trotter, Austin Bow, Tom Masi, Shawn Bourdo, Madhu Dhar	**"Osteoblast Gene Expression in Human Mesenchymal Stem Cells"**
	Human mesenchymal stem cells (hMSCs) are an attractive model to study bone regeneration due to their ability to proliferate and differentiate into osteoblasts. Adipose tissue is a rich source of MSCs, which can be used for generating new bone cells in either autograft or allograft procedures. Recent bone tissue engineering strategies involve the combination of MSCs and carbon-based nanoparticles. With the development of these constructs, it is important to establish a transcriptomic profile of genes regulating stem cell behavior in presence of nanoparticles. Therefore, the purpose of this study was to use commercial Human Osteogenesis Arrays and Qiagen Gene Globe software to determine the relative fold change during in vitro osteogenesis in presence of graphene. Statistically significant upregulation of osteogenic and angiogenic – specific genes, RUNX2, alkaline phosphatase, bone morphogenetic protein 4, osteocalcin, vascular endothelial growth factors A and B was observed. Data indicates that graphene spontaneously stimulates expression of genes necessary for osteoblast development without chemical induction.

Alisha Pedersen, Kassandra Downing, Karrer M. Alghazali, Austin Bow, Steven Newby, Madhu Dhar, Alexandru S. Biris, David Anderson	**"Osteoinductive potential of degradable polyester urethanes impregnated with nano-hydroxyapatite, with and without decellularized bone particles: rat subcutaneous implant model"**
	Biocompatible and degradable bone substitutes offer promising benefits as alternatives to bone grafts and, in an ideal circumstance, display the capacitation for osseointegration, osteoconductivity, and osteoinductivity. The osteoinductive capacity of a degradable polyester urethane/nano-hydroxyapatite composite scaffold, with and without the inclusion of decellularized bone particles, was evaluated utilizing a non-orthotopic subcutaneous pouch in vivo rat model. Thirty days post-implantation, scaffolds were harvested and histology slides prepared for assessment of osteogenic cells and mineralized extracellular matrix. von Kossa stain was used for quantification of calcium/phosphorus ECM deposition. Immunohistochemical stains for osteopontin, alkaline phosphatase, and osterix, were also evaluated in order to elucidate the presence of osteogenic cells and ECM. All scaffolds were osteoinductive based on von Kossa and IHC results, and those incorporating DBPs had significantly greater osteoinductive response compared to those without DBPs. The combination of nHA and DBPs may provide a useful addition to bone substitutes.

Alisha Pedersen, Pierre-Yves Mulon, David Anderson	**"Ex Vivo Assessment of a Novel Prototype Large Animal Skin Stapler"**
	The purpose of this study was to assess the utility of a novel prototype large animal skin stapler (LASS) developed by a private practitioner. The integrity of ex vivo laceration repairs performed with the LASS was compared with traditional suturing methods and a commercial reloadable skin stapler. Hide segments were uniformly transected and repaired utilizing one of the aforementioned methods. Repairs were distracted at 50-mm per minute employing the Instron 5900 unit. Values for load (N) and extension (mm) at 10% and 40% failure were analyzed, with 10% being considered loss of integrity of the repair. The strongest repair technique was deemed to be the cruciate suture pattern (652.0 N), followed by the Ford interlocking suture pattern (448.4 N), the LASS (133.2 N), and the reloadable skin stapler (103.4 N). While the LASS may present technical and time-efficiency advantages to field veterinarians, integrity of repairs is reduced compared to traditional suture methods.

Caroline Billings, David Anderson	**"In vitro evaluation of cell proliferation and viability when exposed to a collagen matrix with or without impregnation with gentamicin"**
	Many challenges are posed to surgeons faced with complicated procedures, whether those procedures involve expansive bony defects, destruction of large amounts of tissue, or contaminated surgical sites. In particular, challenges include the ability to successfully regenerate tissues of interest and restore form and function to the patient without risk of infection. To date, local delivery of antimicrobial drugs has been done using devices, often non-degradable, that only serve that purpose. Recently, the use of degradable local drug delivery devices that also support tissue regeneration is of great interest. Local delivery of drugs has the potential to adversely affect the integration of the device. We chose to explore, in vitro, the effects of a collagen matrix, with and without antibiotics. We hypothesized that 3T3E1 cells would be able to proliferate on the collagen scaffold and remain viable while exposed to varying concentrations of gentamicin. We found that 3T3E1 cells were able to proliferate on the collagen matrix, and that there were no significant differences in their proliferation or viability when exposed to gentamicin at concentrations of 20µg/mL and 200µg/mL. These results support our hypothesis, indicating that further exploration of this device for use in local drug delivery and tissue regeneration is warranted.

Kassandra Downing, David Anderson	**"Effects of local gentamicin delivery on tissue-implant interfaces"**
	Surgical site infections are a common complication in surgery and are associated with development of biofilms. Bacteria in biofilms are difficult to eliminate, leading to chronic infections requiring large doses of antibiotics. Recently, products have been used to serve a dual purpose: tissue regeneration and local antibiotic delivery. The goal is to increase local drug concentrations, while reducing the risk of systemic toxicity. These scaffolds release antibiotics with an initial burst followed by a prolonged low-level release. Concerns include 1) concentrated doses of antibiotics may cause an adverse effect at the tissue-scaffold interface, and 2) that sub-therapeutic systemic concentrations may drive emergence of antibiotic resistance. This study aimed to examine the effects of local delivery of gentamicin via a collagen scaffold on the tissue-scaffold interface; and determine if prolonged release of sub-therapeutic concentrations drives emergence of resistance genes in gastrointestinal flora, using a rat mandibular defect model.

Rebecca Rifkin, Remiguisz Grzeskowiak, Mohammed Abouelkhair, Robert Murdoch, Stephen Kania, David Anderson	**"Genomic Analysis of S. Aureus Induced Osteomyelitis"**
	The majority of clinical cases of osteomyelitis are caused by Staphylococcus aureus (SA). Phenotypic tests and whole genome sequencing were used to characterize a collection of SA isolates from research goats that developed hypertrophic osteomyelitis subsequent to an orthopedic procedure. Our hypothesis was that phenotypic effects of proliferative bone were the result of unique genes present within this population of SA. All isolates were noted to be sequence type (ST) 398. Comparative genetics indicated that goat osteomyelitic strains harbored over 100 protein-coding genes with few homologs. Putative functions of these unique genes include a modified oligopeptide transfer operon, a large transposon-like cassette harboring a gene encoding tetracycline resistance protein (TetM), and several genes encoding putative lipoproteins and staphylocoagulase-like proteins. Limited reference strains may have led to an inflated number of "unique" genes. ST 398 is a clinically relevant zoonotic strain of SA that shows marked hypertrophic mineralization associated with osteomyelitis.

SESSION E

Erin Duble, Liza Köster	**"Usefulness of pulmonary arterial end-diastolic forward flow (EDFF) in predicting right ventricular remodeling in precapillary pulmonary hypertension and pulmonic stenosis in dogs"**
	Main pulmonary artery end-diastolic forward flow (EDFF) has been studied in humans with repaired tetralogy of Fallot as a potential indicator of restrictive right ventricular physiology (r-RVP). We sought to evaluate EDFF in dogs with two other conditions characterized by r-RVP – pulmonic stenosis (PS) and precapillary pulmonary hypertension (PH). We hypothesized that increasing EDFF maximum velocity in these patients is associated with more severe right ventricular (RV) hypertrophy. Retrospective analysis of echocardiographic studies of 50 PS and 50 PH patients seen by the UTVMC Cardiology service between 2007-2020 revealed that maximum EDFF velocity was significantly positively correlated with end-diastolic RV free wall thickness indexed to body weight (correlation coefficient = 0.297, $p < 0.05$) and with pulmonic valve peak pressure gradient (correlation coefficient = 0.406, $p < 0.005$) in PS patients. Our findings support an association between EDFF and RV hypertrophy in PS patients, but not in PH patients.

Blake J. Andrews, Andrew C. Cushing, Mee-Ja M. Sula	**"Symmetric dimethylarginine (SDMA) in captive tigers (Panthera tigris)"**
	Chronic kidney disease (CKD) is a highly prevalent cause of morbidity and mortality in many felids, including tigers (Panthera tigris). Diagnostic techniques such as palpation and imaging have not been shown to be as sensitive nor specific in the diagnosis of CKD in tigers as in domestic cats. Symmetric dimethylarginine (SDMA) is a renal biomarker that has been shown to increase in domestic felids with CKD earlier than other renal biomarkers, such as creatinine and blood urea nitrogen. Correlating SDMA and other renal biomarkers with histopathologic changes to the kidneys would be of value in the diagnosis of tigers with CKD. We propose a semi-quantitative histologic scoring system incorporating fibrosis, tubular atrophy, and inflammation grading to approach evaluation of CKD in tigers. SDMA significantly correlated ($r = 0.667$) with histologic score using this method and may be better utilized in the future to evaluate severity of CKD in tigers.

Elizabeth V. Anglin, Cassie N. Lux, Xiaocun Sun, Christian Folk, Connie Fazio	**"Clinical characteristics, prognostic factors, and outcome in dogs diagnosed with multiple acquired portosystemic shunts (MAPSS)"**
	Objective: Determine outcome and risk factors for dogs with MAPSS. **Study Design:** Retrospective study. **Animals:** 72 dogs with MAPSS. **Methods:** Medical records of dogs with MAPSS were reviewed for various factors. A Kaplan Meier curve was used to assess survival related to cause of death. Logistic regression analysis was performed to evaluate the association between factors and death related to MAPSS. **Results:** MST of dogs that died due to MAPSS was 580 days. No statistical significance was found between MST of dogs with deaths related and unrelated to MAPSS. Factors associated with death related to MAPSS included increased weight, hypoalbuminemia on recheck, hypocholesterolemia, hypoproteinemia, and hypoglycemia on recheck. **Conclusions:** Dogs that died secondary to MAPSS did not have a reduced MST compared to those with other causes of death. Dogs with evidence of progressive liver dysfunction and mild neurologic signs had an increased odds of death.

Luca Giori, Alex Esteller-Vico, Jillene Sennon-Greene, Hugo Eiler, Kellie Fecteau	**"Iatrogenic Effect of Trilostane (VETORYL®) on Adrenal Steroids Synthesis in Dogs"**
	VETORYL® is one of the medical treatments of choice for dogs with hyperadrenocorticism. Hypotheses: It induces an iatrogenic elevation of specific steroid concentrations; the evaluation of additional steroid concentrations could be an effective tool for monitoring those dogs, in which VETORYL® potentially contributes to persistent clinical signs. Retrospectively, 529 serum samples from gonadectomized dogs were evaluated with an UT adrenal panel. Samples were divided into 3 groups: 0) dogs with HAC, no reported treatment (n = 109). 1) dogs with HAC and receiving trilostane at the time of ACTH stimulation (n = 319). 2) dogs with HAC with discontinued therapy after poor response for at least 30 days (n = 101). An iatrogenic increase on sex steroids such as androstenedione and 17OHP is seen in baseline and post-ACTH concentrations. When treating HAC with VETORYL®, the evaluation of only cortisol concentrations is inadequate in some dogs with overt uncontrolled clinical signs.

Silke Hecht, Kimberly M. Anderson, Aude Castel, John F. Griffin IV, Adrien-Maxence Hespel, Nathan Nelson, Xiaocun Sun	**"Agreement between MRI and CT in the identification of skull fractures in a canine and feline cadaver model"**
	The objectives of this study were to evaluate the agreement of MRI with CT in the identification of skull fractures in a cadaver model, and to determine the accuracy of different MRI sequences and observers. Using CT as the gold standard, accuracy of MRI in fracture identification was determined for individual osseous structures and anatomic regions in 20 cadaver heads. There was 93.5% agreement between MRI and CT in fracture identification, with a significant difference between pre and post trauma studies (99.4% vs. 87.6%; p<0.0001; OR 0.042; 95% CI 0.034-0.052). The agreement for different MRI sequences with CT ranged from 92.6% to 94.6%. Fractures were significantly more accurately detected in the face than other regions. Reader accuracy ranged from 92.6% to 94.7%. MRI has a high agreement with CT in the detection of skull fractures in a cadaver model.

SESSION F

Michelle Dennis, Louis-Pierre Rich, Charlie Arnot	**"Growth anomalies in Caribbean faviid corals - it's not a tumor!"**
	Growth anomalies (GAs) are mass lesions involving the skeleton and soft tissues of hard corals. They are morphologically diverse and their pathogenesis is poorly understood. We investigated the prevalence and pathology of GAs affecting Caribbean faviid corals, including Diploria labyrinthiformes, Pseudodiploria strigosa, Psudodiploria clivosa, and Colpophyillia natans. Exophytic, nodular, and arborized forms of GAs were equally prevalent, together affecting ~8% of surveyed faviids. Prevalence tended to increase with colony size. Histopathological examination of exophytic GAs revealed corallite gigantism, where polyps were enlarged but retained microanatomical structures such as tentacles, mesenteries, gonad, and actinopharynx. In contrast, histopathological examination of nodular GAs demonstrated nodular regeneration, with predominant hyperplasia of basal body wall and absence of other polyp structures. Necrosis was common in GAs, and endolithic fungi and algae were present in most GAs and control biopsies. We could not confirm a neoplastic basis for any morphological form of GA affecting Caribbean Faviidea.

Amanda James, Annie Page-Karjian, Sonia Cheetham, Brian Butler, David Marancik	**"Prevalence of chelonid alphaherpesvirus 5 and associated disease in sea turtles in Grenada, West Indies"**
	Fibropapillomatosis is a debilitating disease of sea turtles that is strongly associated with chelonid alphaherpesvirus 5 (ChHV5) infection. The virus is distributed worldwide and has been detected in all sea turtle species. There is currently no surveillance data describing the prevalence of fibropapillomatosis and ChHV5 in sea turtles in Grenada, West Indies. A total of 167 leatherback (Dermochelys coriacea), hawksbill (Eretmochelys imbricata), and green turtles (Chelonia mydas) were examined from 2017-2018. No external fibropapilloma-like lesions were observed and whole blood and skin tested by ChHV5-specific qPCR and with a generic-herpesvirus nested PCR demonstrated no viral DNA amplification. Serology for ChHV5-specific IgY demonstrated no detectable antibodies. However, in 2020, Grenada's first case of fibropapillomatosis was confirmed. These results suggest that the current impact of ChHV5 on the health of the local population is likely minimal but dynamic. Further examination of host and environmental factors that may influence this low viral prevalence are warranted.

Peter Sojka, Sayge Smith, Cheryl B. Greenacre, Kim Newkirk, Deidra J.H. Mountain	**"Using FISH to Investigate Mu- and Kappa-Opioid Receptor Distribution in the Budgerigar Brain"**
	This study investigated the use of fluorescent in situ hybridization (FISH) to perform a qualitative analysis of μ- and κ-opioid receptor distribution. Eight male budgerigar (Melopsittacus undulatus) brains were collected and frozen rapidly following an acute mortality event related to carbon monoxide toxicity. Brains were kept frozen at -80° C, cut into coronal sections with a cryostat, and placed onto slides (Superfrost® Plus) for FISH analysis. Using custom-designed mRNA probes (RNAscope®) based on the published budgerigar genome, μ- and κ-opioid receptor mRNA was tagged and identified with fluorescent microscopy in various areas of the forebrain and midbrain. Overall, a relative predominance of κ-opioid receptors was noted in the areas of the forebrain and midbrain assessed but cannot be confirmed without quantitative analysis. FISH can facilitate further opioid receptor distribution research by being safer, faster, and technically easier to perform than autoradiography.

Engin Berber, Deepak Sumbria, Barry T. Rouse	**"The role of glucose metabolism on HSV-1 pathogenesis and regulation of blood-brain barrier (BBB) permeability"**
	HSV-1 can result in stromal keratitis (SK) and angiogenesis which are inflammatory events orchestrated mainly by proinflammatory T cells. HSV-1 can also cause encephalitis when virus reaches the brain likely by crossing the BBB. Inflammatory cells enhance glycolysis to rapidly resolve the infection and inhibition of glycolysis with the glucose analog-2DG efficiently inhibited the development of proinflammatory cells and diminished SK and angiogenesis in-vivo. However, alteration of glucose metabolism enhanced the development of encephalitis in Balb/C mice. The cause of encephalitis was hypothesized to be an increase in permeability of the BBB caused by the metabolic inhibitory therapy. BBB leakage was confirmed by measuring the escape from the blood vasculature of injected Evans blue dye. BBB permeability significantly increased in the 2DG received group when compared to HSV-1 infected animals. Damaged BBB led to immune cells and virus to cross the endothelial barrier. To evaluate the effects of 2DG on T cell development we did in-vitro CD4+ T cell culture in the presence or absence of 2DG after single cell splenocyte isolation from transgenic DO11.RAG-2−/− mice. 2DG highly reduced the expression of IFN-γ and Th1 development, but stimulated the expression of IL-17A in a dose dependent manner. In conclusion alteration of glucose metabolism with 2DG heightened the magnitude of pathogenic Th17 cell development in brain and cause BBB leakage during the acute HSV-1 infection.

Deepak Sumbria, Engin Berber, Barry T. Rouse	**"Supplementing the diet with Sodium Propionate suppresses the severity of viral immuno-inflammatory lesions"**
	This report evaluates a dietary manipulation approach to suppress the severity of ocular infections caused by herpes simplex virus infection. The virus causes chronic damage to the cornea that results from a T cell orchestrated inflammatory reaction to the infection. Lesion severity can be limited if cells with regulatory activity predominate over pro-inflammatory T cells and non-lymphoid inflammatory cells. In this report we show that this outcome can be achieved by including the short chain fatty acid salt Sodium Propionate (SP) in the drinking water. Animals given the SP supplement developed significantly reduced ocular lesions than those receiving no supplement. Lymphoid organs contained fewer CD4 Th1 and Th17 T cells, neutrophils and macrophages than controls, but a higher frequency of regulatory T cells was present. By in-vitro assay it was again re-confirmed that SP treatment decrease Th1, Th17 and on other hand it increases Treg cell differentiation form naïve cells. Diet manipulation was an effective approach to limit the severity of viral immuno-inflammatory lesions and may be worth exploring as a means to reduce the impact of herpetic lesions in humans.

Jane S. Woodrow, Melissa Hines, Carla Sommardahl, Bente Flatland, Kaori U. Davis, Yancy Lo, Zhiping Wang, M. Katie Sheats, Elizabeth M. Lennon	**"Analysis of Bronchoalveolar Lavage Reveals Mast Cell Chymase Dysregulation and IFN-gamma as Possible Indicators of Equine Asthma Categories"**
	Equine asthma is a chronic inflammatory lung disease. The cytokine profiles that distinguish asthma groups have not been systematically classified, and mast cell phenotypes have not been well-described in horses. The purpose of this study was to: (1) compare mast cell protease mRNA expression between healthy and asthmatic, (2) analyze the cytokine profile present in BALF of currently defined asthma groups, and (3) use these data to evaluate potential biomarkers. Mast cell protease gene expression and multiplex cytokine assays were performed. Expression of chymase mRNA, a mast cell-specific protease, was significantly decreased in horses with mastocytic asthma; supporting mastocytic asthma as its own asthma type. Multidimensional analysis demonstrated that IFNγ differentiates severe from moderate asthma, and that TNFα and CXCL8 are potential biomarkers of equine asthma. These results will help further define asthma immunopathology, which could improve understanding and definitions of asthma groups, while also potentially identify novel therapeutic strategies.