College of Veterinary Medicine
Kansas State University
presents

Phi Zeta Research Day

A.D. 1925

March 7, 2023

Annual Phi Zeta Research Day
March 7, 2023
The Sigma Chapter of Phi Zeta, est. 1969

Schedule of Events

12:00 (noon)	***PLENARY Session[1]***
BI Auditorium	**Welcome and Introduction of Keynote Speaker by Phi Zeta President, Dr. Emily Reppert** ***Keynote Speaker* Dr. Amelia Woolums**, Amelia R. Woolums, DVM MVSc PhD DACVIM DACVM, Mikell and Mary Cheek Hall Davis Endowed Professor, Department of Pathobiology and Population Medicine, Mississippi State University **" The Host Response in Bovine Respiratory Disease: What Do We Know?"**
1:15 – 2:30 pm	***ORAL Research Presentations[2]***
BI Auditorium	**Applied/Clinical Science Research (Small animals/exotics)**
201 Trotter Hall	**Applied/Clinical Science Research (Large animals/exotics)**
301 Trotter Hall	**Basic Science Research & Case Reports (Large animal)**
2:30 – 3:30 pm	***Royal Canin POSTER Session***
BI Atrium	**Basic Science Research / Applied/Clinical Science Research / Case Reports**
3:30 – 4:30 pm	***ORAL Research Presentations[2]***
BI Auditorium	**Applied/Clinical Science Research (Small animals/exotics)**
201 Trotter Hall	**Applied/Clinical Science Research (Large animals/exotics)**
301 Trotter Hall	**Basic Science Research & Case Reports (Large animal)**
4:30-5:30 pm	
BI Atrium	***Reception***
5:30 pm	
BI Auditorium	***AWARDS Ceremony[3]***
	Initiation of New Members to Phi Zeta **Announcement and Presentation of Awards Recognizing Research and Scholarship Accomplishments** **Closing Comments**

[1] The plenary session (welcome and keynote) will be held in the BI Auditorium – Buffet lunch will be available to those who RSVP

[2] Presenters should arrive no later than 1:00 pm to their designated room to upload their presentations. Presentations should be 12-minutes and allow 3 minutes for questions and answers.

[3] We invite all attendees to RSVP join us for the Award ceremony at the BI auditorium.

Applied/Clinical Science ORAL PRESENTATIONS
Phi Zeta Research Day
March 7, 2023, 1:15 – 4:30 pm
BI Auditorium

1:15 – 1:30	McHaney, Anastasia	Multimodal Imaging Evaluation of Emphysematous Osteomyelitis in a Dog
1:30 – 1:45	Calo, Grace	Validation of a Copeptin Assay in Normal Dogs
1:45 – 2:00	Peng, Jingwen	Therapeutic Benefit of Palliative Radiation Therapy Assessed by an Accelerator in Dogs with Nasal Tumor
2:00 – 2:15	Estrada, Jose	Congenital Lobar Emphysema in a Young Dog
2:15 – 2:30	Miller, Kamilyah	Detection of Echinococcus spp. in Coyotes in the Midwest United States
2:30 – 3:30	**Break for Poster Session**[1]	
3:30 – 3:45	Rehiem, Michelle	Pre- and Post-Prandial Plasma Glucagon-like Peptide-2 in Dogs with Chronic Gastrointestinal Disease
3:45 – 4:00	Jackson, Nathan	A Prevalence and Descriptive Study of Rhino Horn Callus in Femoral Fractures in Dogs at an Academic Teaching Hospital (2009-2021)
4:00 – 4:15	Tomlinson, Trey	Evaluation of an Oral Lotilaner Product in Controlling Flea Populations on Naturally Infested Cats in Private Residences in West Central Florida

[1] Poster presentations will be held at the **Atrium of the BI Auditorium**

Applied/Clinical Science ORAL PRESENTATIONS
Phi Zeta Research Day
March 7, 2023, 1:15 – 4:30 pm
201 Trotter Hall

1:15 – 1:30	Weeder, Mikaela	Comparison of Firocoxib and Meloxicam for Pain Mitigation in Goats Undergoing Surgical Castration
1:30 – 1:45	Horton, Lucas	Pooled Analyses of Three Randomized Controlled Trials Comparing Effects of Two Hormonal Implant Programs and Differing Days-On-Feed on Carcass Characteristics and Feedlot Performance of Beef Heifers
1:45 – 2:00	Brown, Rachel	Prevalence of Liver Abscess in Feed Yard Mortalities During the Feeding Period and Association with Demographic Factors
2:00 – 2:15	Bickmeyer, Naemi	Pregnancy Success Among Eastern Kansas Beef Cows Infected with Anaplasma Marginale and/or Bovine Leukemia Virus
2:15 – 2:30	Neyland, Trey	Pilot Study of the Effect of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) on the Persistence of Viral Shedding in Calves
2:30 – 3:30	**Break for Poster Session**[1]	
3:30-3:45	Schmidt, Paige	Determining Frequency of Common Pulmonary Gross and Histopathological Findings in Feedyard Fatalities
3:45 – 4:00	Lou, Maria	Evaluation of Oral Firocoxib, Administered to the Sow and Delivered Transmammary to Piglets, to Alleviate Pain Associated with Tail Docking and Castration
4:00 – 4:15	Deters, Alyssa	Fusobacterium Varium and its Potential Role in Liver Abscess Formation in Feedlot Cattle
4:15 – 4:30	Long, Katie	Association Between Heart Measurements and the Prevalence of Heart Lesions in Feedlot Cattle

[1] Poster presentations will be held at the **Atrium of the BI Auditorium**

Basic Science ORAL PRESENTATIONS
Phi Zeta Research Day
March 7, 2023, 1:15 – 4:30 pm
301 Trotter Hall

1:15 – 1:30	Zabiegla, Alexandria	Spike Protein Mediated Entry of SARS-CoV, SARS-CoV-1 and MERS-CoV to Assess Host Susceptibilities and Infection Efficiencies
1:30 – 1:45	Sutherland, Cameron	Using a Validated SCORFAD Scale to Describe Lesions Associated with FAD by Anatomical Region in Cats
1:45 – 2:00	McDowell, Chester	Experimental Infection of Domestic Pigs with African Swine Fever Virus Isolated in 2019 from Mongolia
2:00 – 2:15	Bold, Dashzeveg	Characterization of SARS-CoV-2- Specific Monoclonal Antibodies in Vitro and in Vivo
2:15 – 2:30	Cool, Konner	Experimental infection of Calves (Bos taurus) with SARS-CoV-2
2:30 – 3:30	**Break for Poster Session**[1]	
3:30 – 3:45	VanDange, Kortnee	Safety of Wild-Caught Musca Domestica for use as Protein Supplement in Animal Feed
3:45 – 4:00	Hall, Madeline	The Impact of Early Life Stress on Brain Development, Immune Function, and Behavior in Swine
4:00 – 4:15	Keck, Sarah	Characterization of a Mouse Model of Aldosterone-Producing Adenomas
4:15 – 4:30	Johnson, William	Gastrointestinal Nematode (GIN) Diversity in North American Bison Assessed by Next Generation Sequencing, a 2023 Update

[1] Poster presentations will be held at the **Atrium of the BI Auditorium**

Applied/Clinical Science POSTERS
Phi Zeta Research Day
March 7, 2023, 2:30 – 3:30
BI Atrium
(Posting from 1:00 – 4:30 pm; Q&A for Judging 2:30 – 3:30 pm)

1	Ardalan, Mehrnaz	Determination of Seroprevalence for SARS-CoV-2 in Farmed and Wild White-Tailed Deer Using Different Antibody Detection Assays
2	Edache, Stephen	Evaluating the Effectiveness of a Postbiotic Product in Reducing Salmonella Prevalence in the Subiliac Lymph Nodes of Culled Dairy Cattle
3	Fritz, Bailey	Tissue Residue Depletion of Cannabinoids in Cattle Fed Industrial Hemp
4	Hamilton, Megan	A Retrospective Evaluation of Oral Clonazepam Premedication on Capture Stress in Captive Zoo Animals
5	Hansen, Chandler	Pre-Lab Videos as a Supplementary Teaching Tool for First-Semester Canine Veterinary Gross Anatomy
6	Heinin, Lilli	Exploration of Hydration Status and Outcome in Feedlot Calves Examined for Respiratory Treatment
7	Kopp, Dannell	The Economic Impact and Factors Influencing the Comparison of Three Metaphylactic Options to Control Bovine Respiratory Disease in Feedlot Cattle
8	Lierse, Skylar	Oral Administration of Firocoxib in Swine and Evaluation of Pain Using Infrared Thermography
9	Lovett, Anne	Investigation of Chronic Anaplasma Marginale Infection and Breeding Soundness in Beef Bulls
10	Mayhue, Erin	Glucagon-Like Peptide-2 and Fecal Score Correlation in Dogs with Chronic Enteropathies
11	McAtee, Taylor	Sustainability and Outcomes Research Approaches to Comprehensively Assess Interventions in Feedlots
12	Neal, Kyndall	Comparing Case Fatality Metrics Associated with First Treatment of Bovine Respiratory Disease
13	Neil, Hannah	Hematologic and Biochemical Changes in Caprine Whole Blood Stored Up to 28 Days
14	Rojas, Catherine	Detection of Antibodies Specific for SARS-CoV-2 Antigens in Animals
15	Schelkopf, Conrad	Electronic Nose Differentiates Pre- and Post-Induced Bovine Respiratory Disease Challenge Samples
16	Toillion, Alyssa	Plasma Pharmacokinetics and Plasma and Urine Residue Characteristics of Multiple Regimens of Chlortetracycline Administered Through the Feed to Beef Cattle
17	Uribe, Olivia	Stop Worrying, We have you Covered! Physical Barriers Significantly Reduce Fly Worry Behavior in Horses
18	Whyte, MacKenzie	Increased Axial Twisting Within an Ending Loop Causes Decreased Maximum Failure Load of Knots in Some Suture Sizes and Types
19	Wilson, Grace	Prevalence of Dipylidium Caninum in Ctenocephalides Felis Collected from Cats, Dogs, and Homes in Tampa, FL

Basic Science POSTERS
Phi Zeta Research Day
March 7, 2023, 2:30 – 3:30 pm
BI Atrium
(Posting from 1:00 – 4:30 pm; Q&A for Judging 2:30 – 3:30 pm)

1	Aparicio, Cesar	Developing Thermosensitive Delivery Systems for Combination Treatment with Microwave Hyperthermia for Pancreatic Cancer
2	Costa Ball, Natalia	Genome Wide CRISPR-Cas9 Screening Identified Four Immune Genes Involved in the Type-I Interferon Response Against JEV
3	Bickmeier, Naemi	Antimicrobial Susceptibilities of E. Coli from Calves Treated with Chlortetracycline for Anaplasmosis Control
4	Cameron-Harp, Kelly	Vesicular Stomatitis Virus-Indiana and Culicoides Sonorensis Biting Midges: Insights into Vector Competency
5	DeVader, Sarah	A Water Extract from Fresh Water Green Alga Up-Regulates Immune Checkpoint Protein in Lung Carcinoma Cells
6	Farleigh, Douglas	In Vitro Effects of Palmitoylethanolamide in Canine Mast Cell Tumor Cell Lines
7	Haas, Sierrah	Extreme Heat, Social Vulnerability, and its Impact on Respiratory Health
8	Robbins, Marliee	The Antihelminthic Drug Niclosamide Inhibits Growth of Acute Lymphoblastic Leukemia Cells
9	Rollerson-Clark, Frachesca	Identification of Canine Cytochrome P450 Enzymes Involved in the Metabolism of Antiepileptic Drug
10	Salih, Harith	Antimicrobial Activities of Bacterial Probiotic Cultures Against Liver Abscess-Causing Pathogens in Beef Cattle
11	Wen, Yi	Ex Vivo Analysis of Extracellular Vesicle Interactions with Immune Cells in Whole Blood of Macaca Nemestrina

ORAL PRESENTATIONS REQUIREMENTS:

- Arrive no later than 1:00 pm to your designated room to upload your presentation.
- No specific format required.
- 12-minute presentation time limit; 3 minutes allowed for questions and answers.
- Please give 24-48 hours advance notice if you are unable to attend/present due to unforeseen circumstances.

POSTER PRESENTATION REQUIREMENTS:

- Poster Size: The supplied poster boards can accommodate posters 48 inches wide by 36 inches deep.
- Poster PDFs need to be sent to Sarah Keatley (keatley@vet.k-state.edu) by **March 1, 2023**.
- Posters can be printed with the Veterinary Medical Library's Print Graphic Services. Contact Susie Larson at 785-532-4025 or larson@vet.k-state.edu. The cost of poster printing is the responsibility of the presenter or presenter's mentor.
- The BI Atrium will be open from 9:00 am on the day for set-up.
- Table tents and thumbtacks will be provided.
- The Poster Session question and answer time for judging will be from **2:30-3:30 pm.**
- Posters must be removed from the BI Atrium by **5:00 pm**
- Please give 24-48 hours advance notice if you are unable to present due to unforeseen circumstances.

PHI ZETA OFFICERS 2022:

On behalf of the Phi Zeta Executive Committee (2022):

Dr. Emily Reppert – President (erepper@vet.k-state.edu)
Ashton O'brien (2023) – Co-Vice President (ashtono@vet.k-state.edu)
Shanice Harris (2023) – Co-Vice President (harrissl@vet.k-state.edu)
Dr. Raghavendra Amachawadi – President-Elect (agraghav@vet.k-state.edu)
Dr. Nicolette Cassel – Secretary/Treasurer (ncassel@vet.k-state.edu)
Sarah Keatley – Alumni and Event Coordinator (keatley@vet.k-state.edu)

2023 Phi Zeta Research Day
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Presenter: [1]Anastasia McHaney, DVM

Multimodal Imaging Evaluation of Emphysematous Osteomyelitis in a Dog

Co-Authors: [1]Nicolette Cassel, BSc, BVSc, MMedVet, Dip ECVDI, [1]Erica Chavez-Peon, DVM, DACVR, [1]Michelle Riehm, DVM, [1]William Whitehouse, DVM, DACVIM (SAIM)

Corresponding Author: [1]Anastasia M McHaney, DVM (anastasp@vet.k-state.edu)

[1] Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University

Keywords: emphysematous; osteomyelitis; pumice-stone sign; canine

Abstract

Emphysematous osteomyelitis (EO), characterized by the presence of intramedullary gas, is a rare phenotype of osteomyelitis in dogs. The objectives of this case report were to describe the imaging findings and clinical outcome of a case of canine EO.

A 1-year-old intact male blue heeler was presented with pyrexia, pelvic limb lameness, and pitting edema. Survey radiographs and CT confirmed the presence of intramedullary gas. Four weeks after initial diagnosis, the patient had developed changes of the femurs consistent with chronic osteomyelitis, with near complete resolution noted at the 3-month recheck.

Emphysematous osteomyelitis is rarely reported. In humans, this condition is often associated with comorbidities, including diabetes mellitus, and carries a guarded prognosis with 24-32% mortality rate. The presence of multiple small foci of gas within the medullary cavity in the absence of penetrating trauma or recent surgery is considered pathognomonic for EO.

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Presenter: Grace Calo, DVM Candidate, College of Veterinary Medicine

Validation of a Copeptin Assay in Normal Dogs

Co-Authors: [1]Thomas Schermerhorn, VMD,DACVIM

Corresponding Author: [1]Thomas Schermerhorn, VMD, DACVIM (Tscherme@vet.k-state.edu)

[1] Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University

Keywords: Copeptin, ADH, ELISA, Canine

Abstract

Copeptin is a pituitary peptide produced through the cleavage of pre-proarginine vasopressin (ADH). Copeptin is co-secreted in equimolar amounts with ADH. In the blood, copeptin is more stable than ADH and serves as a biomarker for ADH secretion. The study objective was to validate a commercial ELISA assay to measure canine copeptin. The ELISA assay was validated using serum obtained from healthy dogs. Standards and canine samples were analyzed in duplicate. Validation parameters determined were intra- and inter-assay coefficient of variation(CV), recovery, parallelism, and dilutional linearity. Serum copeptin was detected in all samples (n=9). Mean serum copeptin concentration was 1.67 ng/mL (range 0.85-4.09 ng/mL). Intra-assay CV was 8.42% and inter-assay CV was 9.6%. The limits of detection were 0.1 -10 ng/ml. The assay displayed dilutional linearity and parallelism. Recovery from spiked samples averaged 147%.The assay displayed acceptable parameters for precision, linearity, and recovery. The results provide an expected range for copeptin in dogs, suggesting that copeptin measurement may be useful for evaluating water balance in dogs.

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Presenter: [1]Jingwen Peng, MS

Therapeutic Benefit of Palliative Radiation Therapy Assessed by an Accelerator in Dogs with Nasal Tumor

Co-Authors: [2]Wei-Wen Hsu, PhD, [1]Chieko Azuma, DVM, PhD, DACVR

Corresponding Author: [1]Jingwen Peng, MS (jingwenp@vet.k-state.edu)

[1] Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University
[2]Environmental and Public Health Sciences, University of Cincinnati

Keywords: Canine; Nasal tumor; Radiation therapy; Fitbark; accelerator

Abstract

Canine nasal tumors are locally aggressive malignancies with clinical signs including epistaxis and respiratory distress. Palliative radiation therapy (PRT) has been the standard treatment for dogs with nasal tumors to improve quality of life (QOL). However, there are no objective measurements to assess changes in QOL in dogs with nasal tumors during and post PRT treatment. We hypothesized that patients receiving PRT will have better sleep efficiency due to the shrinkage of the tumor. Survival data analysis was performed on 135 canine patients with nasal tumors that received either no treatment (n=117) or PRT (n=18). We used Fitbark, a commercially available accelerometer to generate sleep efficiency profiles in 6 PRT-treated dogs. There was a significant difference between the survival curve of the no-treatment group and PRT group, with estimated median survival times of 76 and 615 days, respectively. The sleep efficiency plots show patterns consistent with owner's observation in the survey. Our study indicated a significant survival benefit for dogs who underwent PRT. We conclude FitBark can be a candidate monitor to assess QOL in dogs with nasal tumors.

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Presenter: [1]Jose Estrada, DVM

Congenital Lobar Emphysema in a Young Dog

Co-Authors: [1]Lauren Ryon DVM, [1]Anastasia McHaney DVM, [1]Clay Hallman DVM, DACVR, [1]Thomas Schermerhorn, VMD, DACVIM

[1] Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University

Corresponding Author: Jose Estrada, MVZ, EMCPE, MMVZ (jdem@vet.k-state.edu)

Keywords: Bronchopulmonary dysplasia, Dog, Lung, Congenital emphysema, Bronchial cartilage dysplasia.

Abstract

Congenital lobar emphysema (CLE) is an uncommon disorder characterized by bronchial cartilage dysplasia in 1+ lung lobes causing airflow obstruction, progressive pulmonary hyperinflation, and dyspnea.

A 4-mo old dog was evaluated for increased respiratory effort. Radiographs showed progressive multilobar hyperinflation, and primary consideration was given to a congenital etiology, such as CLE.

The dog was euthanized 48-hr later due to progressive signs. Necropsy revealed atelectasis, pneumonia, and hyperinflation of multiple lobes. Histopathology showed pulmonary fibrosis, bronchial cartilage dysplasia, and emphysema.

Congenital lobar emphysema is rarely reported in dogs. Common clinical signs include cough and dyspnea. Definitive diagnosis requires histopathology, though imaging may be useful for antemortem assessment. As pulmonary changes are progressive and irreversible, treatment options include lung lobectomy or euthanasia.

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Presenter: [1]Kamilyah R. Miller, DVM

Detection of *Echinococcus spp*. in Coyotes in the Midwest United States

Co-Authors: Todd Kollasch, DVM, Elanco Animal Health, William Ryan, DVM, Ryan Mitchell Associates LLC, [1]Brian H. Herrin, DVM, PhD, DACVM (Parasitology)

Corresponding Author: [1]Kamilyah R. Miller, DVM (kamilyah@vet.k-state.edu)

[1]Diagnostic Medicine & Pathobiology, Kansas State University College of Veterinary Medicine,

Keywords: wildlife, parasites, zoonotic, epidemiology

Abstract

Echinococcus spp. are zoonotic tapeworms of wild canids that also infect humans and domestic animals.

Coyote carcasses were collected from Kansas (n=15) and Missouri (n=8). Intestinal tracts were processed by sifting and filtration to identify adult Echinococcus spp. Positive samples were morphologically, and molecularly, identified using PCR targets for nad1 and rrnS genes.

Seven coyote carcasses (KS= 5/15; MO= 2/8) were positive for adult *Echinococcus spp.* All positive samples were morphologically and molecularly identified as *E. multilocularis* with sequences closely matching the Asian-type A1 strain.

This is the first description of Echinococcus sp. in canids in Kansas, and the first systematic description of *Echinococcus sp*. in Missouri. Together this study shows the expanding range of *Echinococcus spp*. in the US and the increasing zoonotic threat infected coyotes serve as sources of infection for domestic dogs and humans.

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Presenter: [1]Michelle Riehm, DVM

Pre- and Post-Prandial Plasma Glucagon-like Peptide-2 in Dogs with Chronic Gastrointestinal Disease

Co-Authors: [1]Erin J Mayhue, BS, [1]Maria C Jugan, DVM, MS, DACVIM

Corresponding Author: [1]Michelle D Riehm, DVM (mriehm@vet.k-state.edu)

[1]Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University

Keywords: canine, chronic enteropathy, enteroendocrine hormone

Abstract

Glucagon-like peptide-2 (GLP2) promotes intestinal (GI) mucosal growth and maintains the GI barrier. In humans with GI disease, mucosal pathology affects GLP2 secretion. GLP2 has not been evaluated in dogs with chronic enteropathies (CE).

Plasma GLP2 was prospectively compared in 18 uncontrolled CE dogs and 17 healthy dogs. Fasted, 1-h, and 3-h post-meal blood samples were mixed with proteinase inhibitors. Plasma GLP2 was analyzed using a canine ELISA. Procedures were repeated in CE dogs after 30 days of GI disease therapy. Fasted and post-meal GLP2 were compared between time-points and groups via mixed effects models.

Fasted and post-meal GLP2 were lower in uncontrolled CE dogs at enrollment (fasted, 424 pg/ml) vs healthy dogs (fasted, 1184 pg/ml; P<0.0001) and recheck (P<0.001). 1-h post-meal GLP2 was higher in CE dogs at recheck vs enrollment (P=0.02).

Chronic enteropathies disrupts normal GLP2 secretion in CE dogs. Treatment for GI disease may normalize GLP2.

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Presenter: Nathan Jackson, DVM Candidate, College of Veterinary Medicine

A Prevalence and Descriptive Study of Rhino Horn Callus in Femoral Fractures in Dogs at an Academic Teaching Hospital (2009-2021)

Co-Authors: [1]Nicky Cassel, BVSc, MMedVet (Diagnostic Imaging), Dip ECVDI, [2]Geoffrey Fosgate, BS, DVM, PhD, Dip ACVPM; [1]Kara Berke, DVM, DipACVS,

Corresponding Author: [1]Nathan Jackson, BS (nathan46jack@vet.k-state.edu)

[1]Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University
[2]Department of Production Animal Studies, University of Pretoria, Pretoria, South Africa

Keywords: Femur fracture, radiology, rhino horn callus, periosteum, orthopedic

Abstract

This retrospective study reports the prevalence of rhino horn callus (RHC) formation in dogs. Potential etiology and significance of this finding is discussed.

Medical records of the VHC at KSU were retrospectively reviewed for patients presenting for femoral fractures with initial and follow-up radiographs. Age, breed, fracture conformation, fixation method and the presence or absence of RHC formation was documented.

375 dogs were included in the study. A total of 31 fractures developed RHC with a dog-level prevalence of 8.3% and a fracture-level prevalence of 7.8%. RHC was more common in younger dogs and Boxers. Young dogs and comminuted fractures in addition to spiral or transverse fracture conformation were significant risk factors for the development of RHC.

The development of RHC is unlikely related to fixation technique and suspected to originate from the facies aspera of the femur due to distractive forces on tendonous insertions occurring at the time of injury.

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Presenter: Trey Tomlinson, DVM Candidate, College of Veterinary Medicine

Evaluation of an Oral Lotilaner Product in Controlling Flea Populations on Naturally Infested Cats in Private Residences in West Central Florida

Co-Authors: [1]Grace Wilson, [1]Amiah Gray, [1]Cameron Sutherland, DVM, [1]Kamilyah Miller, DVM, [3]Yiyao Li, [4]Taylor Gin, DVM, [3]Erin Lashnits, MS, DVM, PhD, DACVIM, Michael Canfield, DVM, DACVD, Animal Dermatology South, [2]Brian Herrin, DVM, PhD, DACVM (Parasitology)

Corresponding Author: [1]Trey Tomlinson, BS (trey40@vet.k-state.edu)

[1] College of Veterinary Medicine, Kansas State University
[2] Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine, Kansas State University
[3] University of Wisconsin-Madison School of Veterinary Medicine
[4] North Carolina State University College of Veterinary Medicine

Keywords: Fleas, Natural Infestations, Isoxazolines

Abstract

The cat flea, Ctenocephalides felis, is an ectoparasite and disease vector that can cause allergic dermatitis in dogs and cats.

For this study, 21 high (≥5 fleas on cats AND in traps) and 24 low flea homes (< 5 fleas on cats AND/OR in traps) were enrolled. All cats and dogs were treated monthly with oral lotilaner. Flea counts on cats and the environment were collected semi-weekly for 3 months using flea combing and two intermittent-light flea traps, respectively.

The geometric means for Day 0 flea counts on cats in HIGH and LOW homes was 12.6 and 4.1, respectively. The geometric means of environmental flea counts on Day 0 was 27.4 and 0.6 for HIGH and LOW homes, respectively. The percent reduction of flea numbers was >98% by Day 7 on cats and >90% in the environment by Day 21. All homes and cats were flea free by Day 80.

Overall, the use of oral lotilaner products was effective at controlling on-animal and environmental flea populations.

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Presenter: Mikaela Weeder, PhD Candidate, College of Veterinary Medicine

Comparison of Firocoxib and Meloxicam for Pain Mitigation in Goats Undergoing Surgical Castration

Co-Authors: [1]Michael Kleinhenz DVM, PhD, [1]Emily Reppert, DVM, MS, DACVIM, [1]Leslie Weaver, DVM, MS, DACVIM, [2]Bailey Fritz, BS, [2]Andrew Curtis, MS, PhD, [2]Alyssa Leslie, [2]Johann Coetzee, BVSc, PhD, DACVCP, DACAW

Corresponding Author: [1]Michael Kleinhenz, DVM, PhD (mkleinhe@vet.k-state.edu)

[1] Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University
[2] Department of Anatomy and Physiology, College of Veterinary Medicine, Kansas State University

Keywords: goat, castration, meloxicam, firocoxib, pain

Abstract

Castration is a common husbandry practice in livestock management. There are currently no approved analgesic drugs for surgical castration in goats. This study sought to examine the effects of firocoxib and meloxicam in goats after surgical castration. Twelve male goats (6-8m) under injectable anesthesia were surgically castrated and administered firocoxib (n=6) or meloxicam (n=6). Treatments were administered at 0, 24 and 48h. Six male goats served as controls (CNTL). Outcome measurements included infrared thermography, visual analog scoring, kinetic gait analysis, and blood plasma. Collection of outcome measures occurred at -24, 4, 8, 24, 48 and 72h. Visual analog scoring for firocoxib and meloxicam were significantly higher at 48hr compared to CNTL (P =0.03). Rear stride length was significantly longer when firocoxib was administered compared to meloxicam and CNTL at 72h (P=0.0006, P=0.0007). Further evaluation of firocoxib and meloxicam is needed after surgical castration in goats.

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Presenter: [3]Lucas Horton, MS

Pooled Analyses of Three Randomized Controlled Trials Comparing Effects of Two Hormonal Implant Programs and Differing Days-on-Feed on Carcass Characteristics and Feedlot Performance of Beef Heifers

Co-Authors: [4]Brandon Depenbusch, MS, PhD, [1]Ben Holland, MS, MBA, PhD, [1]Alyssa Word, MS, PhD, [2]Marshall Streeter, PhD, [2]John Hutcheson, MS, PhD, [3]David Renter, DVM, PhD

Corresponding Author: [3]Lucas Horton, MS (lhorton@vet.k-state.edu)

[1] Cactus Research Ltd.
[2] Merck Animal Health
[3] Department of Diagnostic Medicine & Pathobiology, College of Veterinary Medicine, Kansas State University
[4] Innovative Livestock Services Inc.,

Keywords: days-on-feed, feedlot, heifers, implant

Abstract

Objectives were to evaluate impacts of two growth promotant implant programs (IP) and differing days-on-feed (DOF) on feedlot performance and carcass traits of heifers.

Three commercial trials were pooled using 10,583 crossbred heifers, 144 pens, with a 2×3 factorial randomized block design. The IP were IH+200 – initial implant and a re-implant, or XH – single extended-release implant. Cattle were harvested at a standard endpoint, +21, or +42 additional DOF.

Gain:feed (G:F) and carcass weight (HCW) increased for IH+200 vs XH ($P < 0.01$). There were shifts towards lower numerical yield grades (YG) but lower quality grades (QG) for IH+200 vs XH ($P < 0.01$). Increasing DOF yielded greater final live and HCW ($P < 0.01$), while daily gain and G:F decreased ($P < 0.01$). There were higher numerical YG ($P < 0.01$), and higher QG ($P < 0.01$) as DOF increased.

Carcass composition and performance changes should be considered for IP and market timing decisions.

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Presenter: Rachel Brown, DVM Candidate, College of Veterinary Medicine

Prevalence of Liver Abscess in Feed Yard Mortalities During the Feeding Period and Association with Demographic Factors

Co-Authors: [1]Phillip Lancaster, PhD, [1]Brad White, DVM, MS, [1]Paige Schmidt, [1]Madeline Mancke, [1]Makenna Jensen, [2]Brandon Depenbusch, PhD, MS

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Keywords: Arrival weight, necropsy, days on feed, sex

Abstract

Study objective was to evaluate liver abscess (LA) frequency during the feeding period and associations with demographic factors. An observational study of systematic necropsies of all mortalities at 6 feed yards provided LA data. A generalized linear mixed-effects model was used to evaluate probability of LA among demographic factors. In 396 necropsies, 26 cases had LA. Prevalence of LA in mortalities at <50, 50-100, and >100 days on feed were 3.7%, 5.2%, and 9.3%, in each period, respectively, but was not different ($P > 0.05$). Heavier arrival weights (>363 kg) had 4.2% LA versus 13.6% in lighter weights (<272 kg), but was not different ($P > 0.05$). Sex was associated ($P=0.002$) with the occurrence of LA, with steers having a greater probability than heifers (0.012 vs. 0.003, respectively). This study's sample is biased as only mortalities were included. Findings indicate LA primarily occur after 100 days on feed and are not strongly associated with demographic factors other than sex.

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Presenter: [2]Naemi Bickmeier, MS

Pregnancy Success Among Eastern Kansas Beef Cows Infected with Anaplasma Marginale and/or Bovine Leukemia Virus

Co-Authors: [2]Tippawan Anantatat, MS, [2] Mallory Beltz, [2]Autumn Eggers, [2]Kathryn E. Reif, BA, MS, PH, PhD, [1]Bryan Weaver, DVM, [1]Juan Almaraz, DVM, [1]Shaun M. Huser, DVM, [3]Ching Kang, BSc, PhD, MS, PhD, [3]Xiaoxu Song, PhD

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Keywords: chronic bovine anaplasmosis, bovine leukemia Virus, cow pregnancy success

Abstract

Anaplasma marginale and bovine leukemia virus (BLV) are economically-significant and production-limiting cattle pathogens which establish chronic infections. We hypothesize that maintenance of chronic infections will reduce pregnancy success. Objectives were to evaluate *A. marginale*, BLV, and co-infection prevalence and investigate associations between infection and pregnancy success. Eastern Kansas cows (n=2,857) were sampled during routine pregnancy screening. Infection status was determined using PCR or ELISA. Infection status, pregnancy status, and host variables were analyzed with logistic and linear regression methods. The prevalence of *A. marginale* and BLV were 28% and 55%, with co-infection significantly associated with cow age. The *A. marginale* prevalence was highest in older, pure bred, and lower body condition cows. Cow open rate (8.5%) was highest in *A. marginale* infected cows. Investigating how chronic infections impact pregnancy success is important to optimize production.

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Presenter: [1]Trey Neyland, DVM

Pilot Study of the Effect of Non-Steroidal Anti-Inflammatory drugs (NSAIDs) on the Persistence of Viral Shedding in Calves

Co-Author: [1]Leslie Weaver, DVM, MS, DACVIM, [1]Michael Apley, DVM, PhD, DACVCP, [1]Brian Lubbers, DVM, PhD, ACVCP

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Keywords: Non-steroidal anti-inflammatories, Viral Shedding, Infectious Bovine Rhinotracheitis, Flunixin Meglumine

Abstract

There is insufficient information on the effects of viral shedding load of cattle treated with an NSAID for clinical bovine respiratory disease. The objective was to evaluate the effects on viral shedding of calves treated with flunixin meglumine post inoculation of infectious bovine rhinotracheitis (IBR) compared to control calves. In this randomized-placebo control study, 12 calves were randomly assorted into 2 groups, flunixin group and a control group. The treatment group calves received 2.2-mg/kg flunixin meglumine intravenously 60 hours post IBR inoculation. Twice daily nasal swabs were collected for IBR polymerase chain reaction, for 14 days. The flunixin group had the greatest least squares mean (LSM) for viral shedding over multiple timepoints along with the highest LSM over all the timepoints compared to the control group. The data reveals that there is correlation between flunixin meglumine and viral shedding load in calves with clinical respiratory disease.

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Presenter: Paige Schmidt, DVM Candidate, College of Veterinary Medicine

Determining Frequency of Common Pulmonary Gross and Histopathological Findings in Feedyard Fatalities

Co-Authors: [2]Abigail Finley, DVM, DACVP, [1]Eduarda Bortoluzzi, MV, PhD, MS, [3]Brandon Depenbusch, MS, PhD, [1]Maddie Mancke, BS, [1]Rachel Brown, BS, [1]Makenna Jensen, BS, [1]Phillip Lancaster, MS, PhD, [1]Robert Larson, DVM, PhD, DACT, DACVPM, ACAN.

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Keywords: necropsy, bovine respiratory disease, feedyard, histopathology

Abstract

Bronchopneumonia (BRD), acute interstitial pneumonia (AIP) and bronchopneumonia with an interstitial pattern (BIP) are associated with feedlot cattle mortality. The study objective was to utilize gross necropsy and histopathology to determine the frequency of pulmonary lesions, grossly and histopathologically. Gross systematic necropsies were performed on 417 mortalities, 402 received a gross diagnosis and 189 had a histopathological diagnosis. Frequency of pulmonary diagnosis was described and generalized linear mixed models were used to evaluate the probability of agreement between diagnoses. Using gross diagnosis, BRD represented 36.6% of cases with AIP and BIP representing 10.0% and 35.8%, respectively. Histopathological results were similar and tended (P=0.06) to be associated with gross diagnosis. Improved understanding of pulmonary pathology can be valuable for evaluating and adjusting therapeutic interventions.

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Presenter: [1]Maria E. Lou, MS

Evaluation of Oral Firocoxib, Administered to the Sow and Delivered Transmammary to Piglets, to Alleviate Pain Associated with Tail Docking and Castration

Co-Authors: [1]Skylar Lierse, [1]Jaime Gray, [1]Madeline G. Hall, [2]Michael D. Kleinhenz, DVM, PhD, [1]Johann F. Coetzee, BVSc, PhD, DACVCP, DACAW, [1]Abbie V. Viscardi, PhD

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Keywords: firocoxib, transmammary, swine, animal welfare, pain

Abstract

In the United States, piglets raised on commercial farms undergo tail docking and surgical castration without the provision of analgesia. Practical and effective forms of on-farm analgesia are needed to improve piglet welfare.

The objective of this study was to determine which dose of transmammary-delivered firocoxib was most effective at alleviating surgical castration and tail docking pain in piglets. One of five doses of oral firocoxib (0, 3, 4, 5, or 6 mg/kg) was randomly allocated and administered to each sow (n=40) and delivered transmammary to piglets. Piglets (n=400) were then surgically castrated and tail-docked (male), tail-docked (female), or sham handled (male and female). Piglet body weight, vocalizations, behavior, wound inflammation, facial grimace, gait, and blood cortisol and drug concentrations were assessed.

Piglets receiving 3 mg/kg firocoxib gained more weight than piglets receiving 4, 5, and 6 mg/kg firocoxib ($P \leq 0.05$). Analysis of other outcome measures are ongoing.

Transmammary delivered firocoxib may increase weaning weights. Animal welfare benefits will be verified with further analysis.

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Presenter: Alyssa Deters, DVM Candidate, College of Veterinary Medicine

Fusobacterium Varium and its Potential Role in Liver Abscess Formation in Feedlot Cattle

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Keywords: Fusobacterium, liver abscess, cattle, microbiology

Abstract

Fusobacterium necrophorum, a ruminal bacterium, is the primary causative agent of liver abscesses. Another Fusobacterium species, varium, has also been identified as a rumen inhabitant. *F. varium* shares many similarities with *F. necrophorum* and is a human pathogen. Our objective was to determine prevalence of *F. varium* in liver abscesses in feedlot cattle. Liver abscesses were obtained from 98 feedlot cattle. Samples were homogenized, plated on blood agar and selective agar, incubated anaerobically for 48 hours, then colonies were picked and species confirmed by quantitative PCR assay. Samples were also enriched then plated to blood agar. Direct plating of the liver abscess sample did not yield *F. varium*, but enrichment of the samples resulted in recovery of 3 *F. varium* isolates. Additionally, qPCR analysis of liver abscess samples showed *F. varium* presence in 13 of 98 samples. This study is the first to have obtained isolates and determined prevalence of *F. varium* from bovine liver abscesses. More research is needed to evaluate the potential role of *F. varium* in liver abscess pathogenesis, including it its ability to invade the rumen epithelium as a means to enter the liver.

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Presenter: Katie Long, Current MVBS Student at Kansas State University

Association Between Heart Measurements and the Prevalence of Heart Lesions in Feedlot Cattle

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Keywords: Heart disease, heart measurements, feedlot

Abstract

Heart disease is an animal health and economic concern to feedlot cattle producers. Eccentric hypertrophy is most common in heart disease, and we hypothesized larger heart measurements would be associated with presence of heart lesions in deceased cattle. The study objective was to determine associations between heart measurements and heart lesion cases in feedlot cattle. Software was used to calculate target heart measurements from photos. Correlation coefficients among heart measurement variables were evaluated to eliminate collinearity. Generalized linear mixed models were used to identify associations between heart measurements and the probability of heart lesions while controlling for known confounders. From this model, we determined that greater left and right ventricular lumen area were associated with heart lesion cases. Heart measurements from photos can provide an objective measure to determine heart lesions.

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Presenter: [1]Alexandria Zabiegala, DVM

Spike Protein Mediated Entry of SARS-CoV, SARS-CoV-1 and MERS-CoV to Assess Host Susceptibilities and Infection Efficiencies

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Keywords: Coronaviruses, Spike Protein, Zoonosis, Proteases

Abstract

Coronavirus spike protein (S) mediates entry into host cells by binding to receptor, during which processing S protein into S1 and S2 by host proteases plays an important role. SARS-CoV (SA1) and SARS-CoV-2 (SA2) utilize ACE2, while MERS-CoV (ME) uses DPP4 as a receptor. SA2 and ME possess polybasic amino acids at the S1/S2 junction in S, but SA1 does not have polybasic residues. To compared entry efficiency of these coronavirus S into cells and study the effect of TMPSS2, a membrane-bound trypsin-like protease involved in S1/S2 cleavage, we used pseudoviruses carrying S from three coronaviruses and cells expressing various animal ACE2. We found that SA1 and SA2 entered cells expressing ACE2 from most tested animal. When TMPRSS2 was co-expressed with receptor in cells, entry of SA2 and ME pseudoviruses significantly increased but not SA1. The results suggest that SA and SA2 may share similar host range, and TMPRSS2 enhances the entry of viruses possessing polybasic residues at S1/S2.

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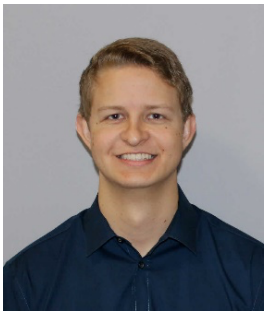

Presenter: [1]Cameron Sutherland, DVM

Using a Validated SCORFAD Scale to Describe Lesions Associated with FAD by Anatomical Region in Cats

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Keywords: Fleas, dermatitis, SCORFAD

Abstract

Flea Allergy Dermatitis (FAD) is a host hypersensitivity reaction in response to allergens injected by cat fleas. The SCORing Feline Allergic Dermatitis scale (SCORFAD) is a system to assess the severity of FAD in cats.

A board-certified veterinary dermatologist assessed dermatologic lesions using the SCORFAD system on 130 owned cats that had >5 fleas by flea combing. The score of each anatomical region was compared using the Kruskal-Wallis ANOVA Test.

The most severe lesions were documented on the ventral abdomen (SCORFAD = 1.62) and cervical (SCORFAD = 1.48) regions. While the ventral abdomen scored highest, the maximum score was 6/16, indicating a more consistent mild lesion in comparison to other regions. After treatment with an isoxazoline, all SCORFAD scores returned to normal limits.

This study is an example of a novel use of SCORFAD score to illustrate lesion localization associated with FAD in cats.

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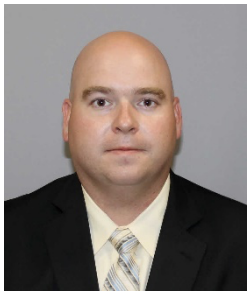

Presenter: [1]Chester D McDowell, DVM, MS

Experimental Infection of Domestic Pigs with African Swine Fever Virus Isolated in 2019 from Mongolia

Co-Authors: [1]Dashzeveg Bold, DVM, MS, [1]Jessie D. Trujillo, DVM, PhD, [1]David A. Meekins, PhD, [1]Cassidy Keating, MS, [1]Konner Cool, MS, [1]Taeyong Kwon, DVM, MS, [1]Daniel W. Madden, DVM, MS, [1]Bianca L. Artiaga, DVM, PhD, [1]Velmurugan Balaraman, DVM, PhD, [2]Ulaankhuu Ankhanbaatar, DVM, [5]Batsukh Zayat, DVM, PhD, [1]Jamie Retallick, DVM, PhD, [3]Kimberly Dodd, DVM, PhD, [4]Chungwon J. Chung, DVM, PhD, [1]Igor Morozov, DVM, PhD, [1]Natasha N. Gaudreault, PhD, [1]Jayme A. Souza-Neto, PhD, [1]Jürgen A. Richt, DVM, PhD

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Keywords: ASFV, Mongolia, Acute disease, Genotype II, Domestic pigs

Abstract

African swine fever virus (ASFV) is a high consequence pathogen of swine (*Sus scrofa*). In 2019, a genotype II ASFV outbreak was reported in Mongolia. Here, we evaluated clinical disease, virulence, and pathology associated with the ASFV Mongolia/2019 field isolate (ASFV-MNG19) by experimental infection of domestic pigs. Six pigs were intramuscularly challenged with ASFV-MNG19. Clinical signs were monitored daily. Blood and oral fluids were collected on odd days post-challenge (DPC) to assess viremia and viral shedding. All pigs were humanely euthanized and necropsied for pathological evaluation. Clinical signs and viremia were observed at 3DPC. All ASF-MNG19-infected pigs were euthanized by 7DPC due to severe clinical disease. The ASFV-MNG19-infected pigs had high viremia and shed virus in oral fluids late in disease. Gross lesions were consistent with acute ASF. ASFV-MNG19 is a virulent genotype II virus with similar clinical disease progression as other circulating genotype II ASFVs.

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Presenter: [1]Dashzeveg Bold, DVM, MS

Characterization of SARS-CoV-2- Specific Monoclonal Antibodies in Vitro and in Vivo

Co-Authors: [2]Ebony N. Gary, PhD, [1]Natasha N. Gaudreault, PhD, [1]Konner Cool, MS, [1]Jessie D. Trujillo, DVM, PhD, [1]Igor Morozov, DVM, PhD, [2]David A. Weiner, PhD, [1]Jürgen A. Richt, DVM, PhD.

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Keywords: SARS-CoV-2, receptor binding domain, neutralizing monoclonal antibody, COVID-19 hamster model.

Abstract

Neutralizing antibodies which target SARS-CoV-2 can be induced via natural infection or immunization. They can also be used as therapeutics when passively transferred as hyperimmune sera or monoclonal antibodies (MAbs).

SARS-CoV-2 receptor binding domain (RBD)-specific MAbs were produced in mice to generate hybridomas. The therapeutic potential of the MAbs against SARS-CoV-2 was evaluated in a hamster model. Hamsters were treated with MAbs intraperitoneally on -1 and +1 day post challenge.

The MAbs 31F4 and 15G1 demostrated high neutralizing activity against several SARS-CoV-2 strains including variants of concern. MAb-treated hamsters maintained body weight following challenge, had only minor lung lesions, and shed significantly less virus compared to the untreated, infected controls.

Our results show that the RBD-specific MAbs 31F4 and 15G1 can effectively neutralize SARS-CoV-2, and protect against clinical signs of infected hamsters, indicating their therapeutic potential.

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Presenter: [1]Konner Cool, DVM Candidate, College of Veterinary Medicine

Experimental Infection of Calves (Bos taurus) with SARS-CoV-2

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Keywords: SARS-CoV-2, COVID-19, Cattle, Experimental Infection

Abstract

Previous research concluded that cattle were not a likely reservoir host for Wuhan-like SARS-CoV-2 isolates. In 2021, SARS-CoV-2 antibodies were detected in clinical samples from cattle, warranting investigation of this species susceptibility to variants of concern (VOC). In our study, eight calves were challenged with SARS-CoV-2 Delta and Omicron BA.2 VOCs, concurrently. Two sentinel calves were introduced 24 hours post challenge to evaluate virus transmission. Blood, swabs, and tissues were collected during the 20 day study. We found that 6/8 challenged calves shed SARS-CoV-2 RNA early in infection. SARS-CoV-2 Delta was isolated from tissues in 2/3 challenged calves at 3 DPC. Neutralizing antibodies were produced for SARS-CoV-2 Delta, but not Omicron BA.2, in 1/3 challenged calves at 20 DPC. Our findings suggest that cattle are permissive to SARS-CoV-2 Delta VOC, which outcompeted the Omicron VOC. However, no virus transmission to sentinels was observed.

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Presenter: Kortnee VanDonge, DVM Candidate, College of Veterinary Medicine

Safety of Wild-Caught Musca Domestica for use as Protein Supplement in Animal Feed

Co-Authors: [1]Sabrina Swistek, BS, [2]Phillip Shults PhD, ABADRU, [3]Robert Ewing, MS, FABADRU

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Keywords: Agriculture, nutrition, pathogen, insect, vector

Abstract

Protein feedstuffs are a necessary, yet expensive, additive to chicken diets. To alleviate the expenses, houseflies (*Musca domestica*), can be utilized as an alternative source of protein. Although wild-caught flies act as vectors for disease, we hypothesis heat treatments will make them safe for consumption. Fly samples collected from both dairy and chicken operations were assigned to a treatment as control, dried, or heated. Treatments were plated to measure microbiological growth. Subsets were also sent to a nutrition laboratory for analysis. Results demonstrated major reductions in bacterial growth from control to dried or heated flies, respectively. Nutritional analysis results indicated no significant reductions in crude protein. The disinfection methods used are a simple way to reduce pathogen load of samples without damaging the nutritional value. Additional pathogen and toxin testing will need to be done to further explore the safety.

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Presenter: Madeline G. Hall, DVM Candidate, College of Veterinary Medicine

The Impact of Early Life Stress on Brain Development, Immune Function, and Behavior in Swine

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Keywords: swine, animal welfare, behavior, socialization, neurodevelopment

Abstract

This study aimed to further understand the role of early life stress on brain development and neural plasticity by evaluating the behavioral, immunological, and neurodevelopmental outcomes of swine from birth to 17 weeks of age. Seven sows were enrolled, and their litters were randomly allocated to one of two treatment groups: socialized (SOC; n=3) or unsocialized (CON; n=4). Ten piglets per litter were enrolled in this study. When piglets were 8 days old, the socialization treatment was applied by allowing SOC to intermingle with unfamiliar conspecifics, while CON were only allowed to interact with littermates. Behavior and immunology data were collected throughout the study period, and a subset of pigs (n=24) were euthanized at 17 weeks for gross and histopathologic assessment of the brain. Preliminary analysis found no brain weight difference between SOC and CON pigs (p=0.47). Pigs deemed "winners" of a behavior contest held at 8 weeks had significantly heavier brains than "loser" pigs (p=0.01). Analyses of other outcome measures are on-going. The results of this pilot study will help to understand the long-term impacts of early life stress on swine welfare.

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Presenter: Sarah Keck, DVM Candidate, College of Veterinary Medicine

Characterization of a Mouse Model of Aldosterone-Producing Adenomas

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Keywords: xenograft, aldosterone-producing adenoma, angiotensin, HAC-15, model development

Abstract

Aldosterone-producing adenoma (APAs) research utilizes xenograft mouse models to increase translational success. This study characterized a mouse model for APAs that included an inoculation procedure, a protocol that determined tumor function, and a correlation of tumor size to aldosterone production. The inoculation experiment utilized three treatment groups of varying HAC-15 cell concentrations with and without matrigel and concluded that injecting 20 million cells with Matrigel provides the most efficient tumor growth. The angiotensin-aldosterone delay study utilized groups of mice assigned to different waiting periods following an angiotensin II injection. Plasma obtained after the waiting interval was used to identify aldosterone production. Aldosterone reached peak concentration at 2 hours post-injection, which can be used in future experiments to assess tumor function. Lastly, the correlation of tumor volume to aldosterone production yielded no significant correlation.

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Presenter: [1]William Johnson, MS

Gastrointestinal Nematode (GIN) Diversity in North American Bison Assessed by Next Generation Sequencing, a 2023 Update.

Co-Authors: [1]Colton Adkins, [1]Guwin Nilaweera, [1]Samantha Reynolds, [2]Hayden Wolfe, BS, [2]Bradly Wehus-Towe, [2]Jameson Brennan, PhD, [2]Catherin Krus, DVM, [3]Danielle Buttke, DVM, PhD, [2]Jeff Martin PhD

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Keywords: parasitology, next generation sequencing, diagnostics

Abstract

Over the past few decades, parasites of US bison herds have been understudied. The species composition and diversity of GIN infections in the US bison herds is not currently known. It is hypothesized that the composition will change based on farm, region and year. A technique using next generation sequencing (NGS) has recently been described to identify GIN.

For this study, fecal samples were collected from 27 herds in 10 different states from August 2021 to December 2022. Samples were cultured. DNA was extracted from L3 stage larvae, amplified, sequenced using NGS, and analyzed using the DADA2 pipeline.

We present the GIN composition of 141 individual samples, the difference of GIN composition found in different herds, and the change of composition year to year. Cooperia spp., Ostertagia spp., and Haemonchus spp. were found to be common.

This study demonstrates how deep amplicon sequencing can be used to identify the GIN composition within a single animal and within herds of animals

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Presenter: [1]Mehrnaz Ardalan, PhD

Determination of Seroprevalence for SARS-CoV-2 in Farmed and Wild White-Tailed Deer Using Different Antibody Detection Assays

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Keywords: SARS-COV-2, Deer, Antibody

Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a single-stranded, enveloped RNA virus belonging to the Coronaviridae family, genus Betacoronavirus. A broad host range has been described for SARS-CoV-2, creating concern for future zoonotic outbreaks and further global economic losses. White-tailed deer (WTD) are known to be highly susceptible to SARS-CoV-2 and are widely distributed across the United States with high population density. The popularity for hunting and farming of white-tailed deer creates opportunities for spillback of SARS-CoV-2 from humans to animals. It is therefore important to monitor the seroprevalence of SARS-CoV-2 antibodies in white tailed deer spatially and temporally. Improved serological detection of antibodies against both, the nucleocapsid (N) and spike (S) proteins of SARS-CoV-2 are important to estimate the prevalence of infection in animal populations and improve capabilities for effective screening of different animal species. Accordingly, in the present study, we used two commercial ELISA assays based on the SARS-CoV-2 receptor binding domain (RBD) and the nucleocapsid protein to detect the presence of SARS-CoV-2 antibodies in wild and farmed WTD serum samples obtained from three U.S. states. Also, a surrogate virus neutralization ELISA kit developed for human sera that detects antibodies to RBD in the serum samples was used. A conventional virus neutralization test (VNT) was used as a reference assay. In the present study, 312 deer serum samples (wild and farmed WTD) were collected between 2018 - 2022 from Ohio, Indiana, and Kansas. Our results indicated that 38.5% and 20.8% of deer tested positive by the RBD and N indirect ELISAs, respectively. The highest seropositivity was observed in farmed animals in the state of Kansas. No antibodies to SARS-CoV-2 were detected by any of the tests in deer serum samples collected in 2018. Further research and assay validation is necessary for accurate serosurveillance for SARS-CoV-2 in different animal species.

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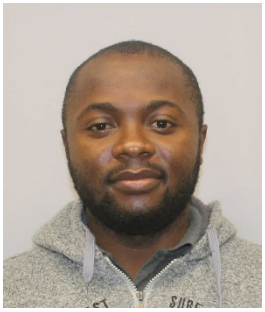

Presenter: [1]Stephen Edache, DVM

Evaluating the Effectiveness of a Postbiotic Product in Reducing *Salmonella* Prevalence in the Subiliac Lymph Nodes of Culled Dairy Cattle

Co-Authors: [1]Diana M. Dewsbury, MS, PhD, [1]Vanessa de Aguiar Veloso, DVM, MS [1]Leigh Ann George, [1]Xiaorong Shi, [1]T.G. Nagaraja, DVM, MS, PhD, Sherri Trujillo, JBS, [2]Tom S. Edrington, [1]David G. Renter, PhD, DVM, [1]Natalia Cernicchiaro, DVM, MS, PhD

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Keywords: Food Safety, Epidemiology, *Salmonella*, Lymph nodes, Postbiotic

Abstract

We evaluated whether a *Saccharomyces cerevisiae* fermentation product (SCFP) is effective in reducing Salmonella prevalence in the subiliac lymph nodes (LN) of culled dairy cattle, among regions and seasons.

In collaboration with two commercial processing plants in the Southwest and Northeast regions of the United States, culled cattle lots processed on the same week from dairy farms that fed SCFP and did not feed the product (no-SCFP) were identified and sampled. A total of 1,773 LN, collected between May 2021, and November 2022, were tested for *Salmonella* using culture-based and quantitative PCR methods.

The overall crude *Salmonella* prevalence was 9.8% (173/1,773). Our preliminary results indicate that no difference was observed between SCFP and no-SCFP farms ($p = 0.73$), and an interaction effect was detected between the seasons and regions ($p = 0.04$).

Identifying effective preharvest strategies to reduce *Salmonella* prevalence is essential in ensuring food safety and protecting public health.

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Presenter: [1]Bailey Fritz, BSc, DVM/PhD Candidate, College of Veterinary Medicine

Tissue Residue Depletion of Cannabinoids in Cattle Fed Industrial Hemp

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Keywords: industrial hemp, cannabinoids, tissue residue, cattle, withdrawal

Abstract

Despite interest in the use of industrial hemp (IH) in cattle feed, there is no safety data on tissues from exposed cattle. The objectives of this study were to describe the cannabinoid tissue residue profile and estimate withdrawal times in cattle fed IH. Twenty male Holsteins received oral IH at a dose of 5.5 mg/kg/d cannabidiol for 14 d. Plasma was collected throughout the study. Liver (L), kidney (K), muscle (M), and adipose (A) tissue were collected at euthanasia on days 15, 16, 17, 19, and 22. Cannabinoid content was quantified with liquid chromatography mass spectrometry. Plasma analysis is incomplete. Withdrawal periods were estimated using the FDA WithdrawalApp in R (10 ng/g tolerance). Δ-9-tetrahydrocannabinol was detected in L, K, and A. Cannabidiol was detected in all tissues. The withdrawal times for L, K, M, and A were 68, 21, 39, and 154 d. Adipose was selected as the target tissue. Our results will inform discussions regarding the inclusion of IH in cattle feed.

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Presenter: [1]Megan Hamilton, DVM Candidate, College of Veterinary Medicine

A Retrospective Evaluation of Oral Clonazepam Premedication on Capture Stress in Captive Zoo Animals

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Keywords: clonazepam, premedication, capture stress, zoo

Abstract

Clonazepam is a benzodiazepine that is commonly used to treat panic disorders, anxiety, and seizures in humans. The objective of this retrospective case control study was to determine if oral premedication with clonazepam resulted in noticeable sedation prior to darting or injection for anesthesia in captive zoo animals. It was hypothesized that a sedation strategy using oral clonazepam would result in improved outcomes in darting and injection by causing sedation via level of calmness noted prior to induction of anesthesia. Oral clonazepam was recorded in 33 different anesthetic events in 11 species with 38 species matched controls. It was concluded that although the results of this study do not demonstrate significance, this is likely due to the limitations of the retrospective study design, not the efficacy of clonazepam. Further prospective studies need to be conducted to properly assess the pharmacodynamics of clonazepam on captive zoological species.

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Presenter: [1]Chandler Hansen, MS

Pre-Lab Videos as a Supplementary Teaching Tool for First-Semester Canine Veterinary Gross Anatomy

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Keywords: videos, anatomy, lab, veterinary, learning

Abstract

To adapt to an interactive generation of learners, video resources can provide information necessary for lab preparation, describe clinical correlations, and maximize dissection time.

Pre-lab videos were viewed by first-year KSU DVM students prior to each dissection lab. The purpose of the videos was to identify and describe structures to be appreciated, resulting in improved student exam grades.

Significant correlations were found between Practical Exam 3 grade and number of Exam 3 pre-lab videos viewed (R = 0.191, P-Value = 0.048), Practical Exam 4 grade and number of Exam 4 pre-lab videos viewed (R = 0.314, P-Value = 0.0009), average Practical Exam score and total number of pre-lab videos viewed throughout the semester (R = 0.246, P-Value = 0.010), and Final Course Grade and total time spent viewing all pre-lab videos (R = 0.243, P-Value = 0.011).

Although a weak correlation, the significance indicates an increase in exam scores.

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Presenter: Lilli Heinen, DVM/PhD Candidate, College of Veterinary Medicine

Exploration of Hydration Status and Outcome in Feedlot Calves Examined for Respiratory Treatment

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Keywords: feedyard, hydration, treatment outcome, mortality risk

Abstract

Feedlot cattle are visually evaluated for signs of illness and to determine treatment. Dehydration is hard to measure and reference ranges are often based on a different population. The study objective was to explore clinical markers for dehydration and association with treatment outcome 90 days after enrollment. Our study consisted of 96 cattle evaluated at treatment for respiratory disease. Measures taken included packed cell volume, total protein, globe recession, capillary refill time, mucous membrane quality, and skin tent time. Results showed 9 dehydrated animals (PCV > 46%). Risk for treatment failure was not different between hydration status groups ($p > 0.05$). Skin tent was significantly ($p < 0.05$) associated with hydration. TP and PCV had poor correlation and neither measure was related to treatment outcome. We conclude that dehydration at respiratory treatment is not a good predictor of outcome.

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Presenter: Dannell J. Kopp, DVM Candidate, College of Veterinary Medicine

The Economic Impact and Factors Influencing the Comparison of Three Metaphylactic Options to Control Bovine Respiratory Disease in Feedlot Cattle

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Keywords: Bovine Respiratory Disease, economics, feeder cattle, metaphylaxis

Abstract

Metaphylactic antibiotic use in feeder cattle is common to control disease. Antimicrobial stewardship ensures continued efficacy. The objective is to identify characteristics of cohorts that benefit from metaphylaxis when economics are used to measure health outcomes. 12,785 cohorts from 13 feedlots were given a standard entry date, prices based on weight categories, and each of three metaphylactic options: none, low cost/efficacy, high cost/efficacy. An economic model compared cohort net returns across the three options. Logistic regression models included covariates for entry weight, sex, average daily gain, cohort size, and days on feed, with feed yard as a random effect to determine model-adjusted probability of benefiting economically from metaphylaxis. Entry weight was important with the lowest weight cohorts having a 59% probability of benefiting from metaphylaxis. Results illustrate that cohort demographics influenced probability of benefiting economically from metaphylaxis.

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Presenter: Skylar Lierse, DVM Candidate, College of Veterinary Medicine

Oral Administration of Firocoxib in Swine and Evaluation of Pain Using Infrared Thermography

Co-Authors: Maria E. Lou, PhD Candidate, Michael D. Kleinhenz, DVM, PhD, Madeline G. Hall, Jamie Gray, Johann F. Coetzee, BVSc, PhD, DACVCP, DACAW, DECAWBM(AWSEL), Abbie V. Viscardi, PhD

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Keywords: firocoxib, swine, infrared thermography, pain evaluation

Abstract

Currently, pigs in commercial production farms are not provided with routine pain management for surgical procedures such as castration and tail docking, which raises significant concerns for animal welfare. This study investigated the oral use of a common NSAID, firocoxib, given to the sow and delivered transmammary to piglets, to alleviate pain and stress associated with these procedures. Infrared thermography (IRT) is a non-invasive method used to assess physiological processes such as inflammation and infection. IRT data analysis was used to determine which dose of transmammary-delivered firocoxib (3.0, 4.0, 5.0, 6.0 mg/kg) was most effective at alleviating pain associated with castration and tail docking procedures in piglets. Fourteen sows nursing ten viable piglets (5 male and 5 female) were either provided an oral dose of firocoxib (at one of the above doses; FIRO) or no analgesic drug (control; CON). IRT images were taken of the surgical sites and surrounding tissue of each piglet 24 hours prior to processing (surgical castration and tail docking), and at 1, 7, 24, 36, and 48h post-processing. Preliminary results showed that piglets in the CON treatment group had significantly higher tail docking site temperatures (i.e., more inflammation) than piglets in the 3.0, 4.0, and 5.0 mg/kg FIRO groups ($p<0.05$), with a trend found in the 6.0mg/kg FIRO group ($p=0.06$). Piglets in the CON treatment group also had significantly higher castration site temperatures than piglets in the 3.0, 4.0, 5.0, and 6.0mg/kg FIRO treatment groups ($p<.0001$). The long-term aim of this study is to improve food animal health and welfare through minimally invasive drug administration and novel pain evaluation techniques.

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Presenter: [1]Anne Lovett, DVM

Investigation of Chronic *Anaplasma Marginale* Infection and Breeding Soundness in Beef Bulls

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Keywords: BSE, anaplasmosis, bulls, chronic carrier

Abstract

While clinical anaplasmosis transiently eliminates bull breeding potential, the impact of chronic Anaplasma marginale carrier status on bull reproduction is unknown. We hypothesize carrier bulls will have lower breeding soundness examination (BSE) metrics compared to uninfected bulls. Study objectives: i) determine prevalence of chronic A. marginale infection in Kansas bulls; and, ii) compare BSE outcomes of infected and uninfected bulls.

Client-owned beef bulls (n=535) undergoing routine BSEs were enrolled. Packed cell volume and *A. marginale* infection status were analyzed. Outcomes were analyzed using logistic and linear regression.

Chronic *A. marginale* prevalence was 46%, with bull age having a significant effect. Of the 12.5% of bulls with unsatisfactory BSEs, 55.2% were infected. Poor semen quality was the greatest reason for BSE failure.

Chronic *A. marginale* infection of tested bulls parallels Kansas cow infection rates. Most carrier bulls retain satisfactory breeding potential.

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Presenter: Erin J Mayhue, DVM Candidate, College of Veterinary Medicine

Glucagon-Like Peptide-2 and Fecal Score Correlation in Dogs with Chronic Enteropathies

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Keywords: Chronic enteropathy, canine, Enteroendocrine hormone

Abstract

Glucagon-like peptide-2 (GLP2), is secreted in response to food and intestinal microbiota by-products. As microbiome dysbiosis is common in canine chronic enteropathies (CE), it was hypothesized that plasma GLP2 would negatively correlate with fecal score.

20 CE dogs were fasted 12 h prior to a standardized meal. Blood samples, fasted, 60, and 180 min post-meal, were mixed with proteinase inhibitors. Plasma GLP2 was measured with a commercial canine ELISA. A single, blinded observer used an established fecal score to grade same-day stool. A mixed repeated measures model compared GLP2 over time. Pearson's correlation compared GLP2 and fecal score.

GLP2 did not differ among timepoints (fasted, 430 ±168 pg/mL; 60 min, 447 ±161 pg/mL; 180 min, 485 ±154 pg/mL; p=0.14). Correlation between GLP2 and fecal score was r^2=0.11 (p=0.16).

Plasma GLP2 was not related to fecal score in CE dogs. Further evaluation of GLP2 with specific microbiota is required.

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Presenter: [1]Taylor McAtee, MS

Sustainability and Outcomes Research Approaches to Comprehensively Assess Interventions in Feedlots

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Keywords: sustainability, feedlot, beef cattle, outcomes research, antimicrobial use

Abstract

There is a heightened focus on sustainability in animal agriculture, including greenhouse gas emissions, land and water resources, animal health and wellness, and profitability. Measuring impacts is crucial for stakeholders using sustainability terms or goals. An outcomes research approach to assessing the impacts of management decisions could include multiple ways of determining value based on stakeholders' perceptions. Our objective was to use a feedlot health trial to demonstrate different approaching to determine value, including a sustainability metric related to greenhouse gas emissions, and outline how this is relevant to researchers working in animal disease. The feedlot trial example has data on health outcomes, the number of antimicrobial doses, live animal and carcass performance, a partial budget, and estimated emissions. This approach allows for a more comprehensive and informative comparison of management decisions to facilitate sustainability in animal agriculture.

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Presenter: Kyndall Neal, DVM Candidate, College of Veterinary Medicine

Comparing Case Fatality Metrics Associated with First Treatment of Bovine Respiratory Disease

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Keywords: bovine respiratory disease, case fatality rate, risk factors

Abstract

Bovine respiratory disease (BRD) is a leading cause of morbidity and mortality in beef feedlots, with antimicrobials serving as the mainstay of BRD therapy. Post-treatment outcome evaluation provides information on characteristics of successful treatments and cases. Knowledge gaps exist in identifying potential relationships between risk factors and post-BRD treatment success. The primary study objective was to identify risk factors associated with case fatality risk with BRD mortalities (CFRBRD) and case fatality risk from all-cause mortality (CFRALL). Similar case fatality rates were observed when evaluating body temperature categories among the two groups. There was a higher CFRALL probability being pulled on Wednesday while the CFRBRD category had no day of week predilection. In both groups heifers were shown to have an overall higher probability of a case fatality rate. Overall, CFR factors are similar whether an animal dies from a BRD related illness or a separate event.

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Presenter: [1]Hannah Neill, DVM

Hematologic and Biochemical Changes in Caprine Whole Blood Stored up to 28 days

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Keywords: caprine, whole blood, storage

Abstract

Parasitic anemia is a common affliction of goats that, in severe cases, requires a blood transfusion. There is currently no published data on hematologic changes in stored caprine blood. Percent hemolysis is used as a marker for viability, with 1% being the acceptable cutoff.

Ten healthy blood donor goats were selected and 250ml whole blood was drawn from each and stored at 37 F. At collection and every 7 days for a total of 28 days samples were taken to determine biochemical and hematologic values of blood. At the end of 28 days blood was submitted for aerobic and anaerobic culture.

Blood values remained within suitable limits for transfusion and below 1% hemolysis for up to 21 days in most samples. Cultures were negative on all blood bags.

Changes over time are similar to that in other species and caprine blood appears biochemically and hematologically stable for up to 21 days in storage.

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Presenter: Catherine Rojas, DVM Candidate, College of Veterinary Medicine

Detection of Antibodies Specific for SARS-CoV-2 Antigens in Animals

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Keywords: SARS-CoV-2, antibodies, exotic animals, serology

Abstract

The novel SARS-CoV-2 reservoir host has not yet been identified and transmission is not well understood. This study was performed to investigate the presence of SARS-CoV-2 antibodies in animals across the US. Sera from 204 bison and 46 exotics were analyzed for the detection of antibodies against the receptor-binding domain (RBD) and the nucleocapsid (N). Results showed that 4% of bison samples tested positive using a commercial ELISA that detects RBD-specific antibodies. 2% of bison and 2% of exotic samples tested positive using a commercial ELISA that detects antibodies against the N protein. Positive samples by these ELISAs were further tested by serum neutralization. Here, 13% of bison samples had a positive titer. Findings of few seropositive bison and other exotics indicate that these animals may occasionally be infected by SARS-CoV-2 or other coronaviruses. Determining antibody status is crucial for detecting previous exposure, transmission and potentially identifying new hosts.

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Presenter: Conrad Schelkopf, DVM/PhD Candidate, College of Veterinary Medicine

Electronic Nose Differentiates Pre- and Post-Challenge Samples in an Induced Bovine Respiratory Disease Model

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Keywords: bovine respiratory disease, cattle, electronic nose, expired air, nasal swabs

Abstract

Bovine respiratory disease (BRD) is the most common disease in post-weaning and feedlot cattle and accurate diagnosis remains a challenge. The objective of this study was to test the effectiveness of an electronic nose (eNose) for the detection of BRD. Intact male Holstein calves (n=12) were challenged with Bovine Herpes Virus-1 and *Mannheimia haemolytica*. Expired air and nasal swabs were collected daily from each calf pre- and post-challenge. Expired air (n=122) and nasal swabs (n=122) were analyzed by the eNose with results reported as the percentage of correctly identified pre- and post-challenge samples. The eNose correctly identified 30/31 (96.8%) expired air and 29/31 (93.5%) nasal swab pre-challenge samples. Correct post-challenge identification for expired air (66/91; 72.5%) was lower than that for the nasal swabs (89/91; 97.8%). The eNose correctly identified pre- and post-challenge BRD samples from both expired air and nasal swabs with a high degree of accuracy.

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Presenter: [2]Alyssa Toillion, MPH

Plasma and Urine Residue Characteristics of Multiple Regimens of Chlortetracycline Administered Through the Feed to Beef Cattle

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Keywords: Cattle, Chlortetracycline, Pharmacokinetics, Plasma, Residues, Urine

Abstract

Chlortetracycline (CTC) is a medically important in-feed antimicrobial. The objectives of this study were to: (1) determine the plasma and urine residue characteristics of three CTC regimens and (2) determine environmental exposure of sentinel animals housed with cattle recently receiving different doses of CTC. Eight heifers received CTC in feed for each of three different regimens (n = 24). Two control heifers were added to each treatment group after CTC administration ended (n = 6). Blood and urine samples were collected throughout the 86-day study and analyzed by UPLC MS/MS. Chlortetracycline was found in the urine of all treatment groups for the entire study, with a mean terminal T½ of 25 ± 7 d for the highest regimen of 10 mg/lb bw for 5 days. Sentinels displayed urine CTC concentrations throughout the entire study. CTC can be detected in the urine of cattle for a prolonged period of time after administration of common regimens.

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Presenter: Olivia Uribe, DVM Candidate, College of Veterinary Medicine

Stop Worrying, We Have You Covered! Physical Barriers Significantly Reduce Fly Worry Behavior in Horses

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Keywords: Stable flies, stomoxys calcitrans, fly worry, physical barriers, horses

Abstract

Stable flies' (*Stomoxys calcitrans*) bites cause fly worry for horses. On-horse fly control utilizes chemical or physical means, but no comparative study has been published. This study evaluated the efficacy of physical barriers (fly sheet, mask, and leg coverings), pyrethroid-based spray, and bio-based spray in pasture-boarded horses.

Horses were evaluated for fly worry behavior (skin twitch, leg stamp, tail swish, and head movement) before and after intervention by filming for 5-minute intervals and counting the number of fly worry events.

Physical barriers were more effective than chemical sprays (t-test, $p=0.0426$) and while bio-based sprays were more effective than pyrethroid sprays (71.71% ± 12.21 vs 54.32% ± 19.86 respectively), it was not significantly different (t-test, $p = 0.1085$). Fly worry reduction was negligible within 4 hours of either spray application.

Physical barriers should be used for all day protection while sprays be used when physical protection cannot be used.

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Presenter: [1]MacKenzie Whyte, DVM

Increased Axial Twisting within an Ending Loop Causes Decreased Maximum Failure Load of Knots in Some Suture Sizes and Types

Co-Authors: [2]Sally Stroda, [1]David Upchurch, DVM, MS, DACVS

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Keywords: Suturing, knot tying, square knots

Abstract

To determine whether axial twisting within an ending loop of a continuous pattern negatively impacts security and maximum load to failure of suture knots.

525 knots (15 samples each of seven different suture types/sizes tested in five knot twist configurations each)

Each suture type and size were used to create a starting square knot and each of the following ending square knot configurations: 0 twists, 1 twist, 4 twists, and 10 twists. Each suture was tested to maximum failure using an Instron Universal Testing Machine with a 100 kg load cell at a speed of 100 mm/min. Each suture and knot was evaluated for mode of failure using gross evaluation of the knots and video footage recorded during testing.

Maximum load to failure was decreased in knots tied within ending loops containing more twists for some types and sizes of suture. With 4-twists, 0-PDO, 1 PDO, and 2-0 Nylon were more likely to fail at the knot than knots with 0 twists. All sutures containing 10 twists, except 3-0 Monoderm, were more likely to fail at the knot than knots with 0 twists.

This study shows that for select suture types and sizes, increasing the number of twists present within the ending loop weakens the knot. Ideally the ending loop should be unraveled prior to tying the knot.

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Presenter: Grace Wilson, DVM Candidate, College of Veterinary Medicine

Prevalence of Dipylidium Caninum in Ctenocephalides Felis Collected from Cats, Dogs, and Homes in Tampa, Florida

Co-Authors: [1]Trey Tomlinson, [1]Amiah Gray, [1]Cameron Sutherland, [1]Kamilyah Miller, [3]Krista Li, [2]Taylor Gin, [3]Erin Lashnits, Michael Canfield, [1]Brian Herrin,

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Keywords: Flea, Tapeworm, *Ctenocephalides felis, Dipylidium caninum*

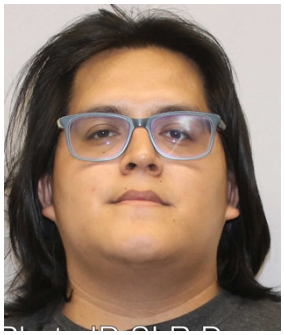
Abstract

The cat flea, *Ctenocephalides felis*, is a common external parasite that can transmit a variety of pathogens, including *Dipylidium caninum*, a zoonotic tapeworm that infects the small intestine of cats and dogs.

Fleas were collected from cats, dogs, and the environment of residential homes in the Tampa, FL area. A total of 1422 fleas were collected; 281 fleas from 47 cats, 99 fleas from 9 dogs, and 1042 fleas from 63 homes. Fleas were pooled into groups of 3, DNA was extracted, and a PCR was run.

A total of 213 pools of fleas were tested. Of those, 74 pools were from cats, 26 pools were from dogs, and 113 pools were from the environment. Of the pools tested, 8/213 (3.8%) were positive for *D. caninum* (2/74 cat pools (2.7%); 0/26 dog pools (0.0%); 6/113 home pools (5.3%)).

There was no significant difference in the prevalence of *D. caninum* between the three groups, indicating that the tapeworm is found at a low level in all tested flea populations.



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Presenter: [1]Cesar Aparicio, PhD Candidate, College of Veterinary Medicine

Developing Thermosensitive Delivery Systems for Combination Treatment with Microwave Hyperthermia for Pancreatic Cancer

Co-Authors: [2]Anna Botiglieri, [1]Sarah Timmerman, [1]Marla Pyle, [1]Tej B. Shrestha, [2]Punit Prakash, [1]Matthew Basel, PhD

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Keywords: Hyperthermia, liposomes, gemcitabine, pancreatic ductal adenocarcinoma

Abstract

Treatment of pancreatic ductal adenocarcinoma with gemcitabine is limited by an increased desmoplasia and poor vascularization, and short plasma half-life. Heat-sensitive PEGylated liposomes can increase plasma stability, reduce clearance, and decrease side effects. Nevertheless, a limitation of such formulation has been the low loading efficiency of gemcitabine. In addition, the production of large batches of liposomes entails low reproducibility of results. To optimize the production of liposomes in a common laboratory setting, we used two encapsulation methods: direct hydration and passive loading with ammonium sulfate. The loading solutions were interchanged with 1X PBS and 0.9 %, 2%, and 3% saline solutions to improve the release of gemcitabine upon heat exposure. Thermosensitive liposomes composed of DPPC: DSPC: PEG2k PE (65:35:5; 25 mg/mL) reach 4-10 weight % loading efficiency, with consistent size and long shelf stability. UV spectroscopy confirmed the presence of gemcitabine

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Presenter: [1]Natalia Costa Ball, PhD, MS

Genome-Wide CRISPR-Cas9 Screening Identified Four Immune Genes Involved in the Type-I Interferon Response Against Japanese Encephalitis Virus

Co-Authors: [1]Natalia Costa Ball, PhD, MS, [1]Joshua Willix PhD, [1]Dana L. Vanlandingham, PhD, MS, FRES

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Keywords: Japanese encephalitis virus, CRISPR-Cas9 knock-out A549 cells, type-I interferon response, live-attenuated vaccines.

Abstract

Host factors crucial for Japanese encephalitis virus (JEV) pathogenesis are poorly understood, precluding the development of candidate live-attenuated vaccines (LAVs). We used the genome-wide CRISPR-Cas9 knock-out screening of human A549 cells (GeCKO-A549) to investigate the host responses following JEV challenge. GeCKO-A549 cells were infected with the JEV SA14-14-2 vaccine strain at a multiplicity of infection of 0.1 and maintained for 18 days. Unique gene were selected based on the viability of GeCKO-A549 cells following the JEV infection. Deletion of four genes associated with type-I interferon response, i.e., tyrosine kinase 2, interferon alpha subunits 1 and 2, and signal transducer and activator of transcription 1 led to the survival of infected GeCKO-A549 cells. In contrast to wild-type JEV infection, the SA14-14-2 vaccine strain is capable of eliciting a spectrum of type-I IFN responses, providing the molecular basis for immunogenicity of the empirically derived JE LAV.

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Presenter: [1]Naemi Bickmeier, MS

Antimicrobial Susceptibilities of E. Coli from Calves Treated with Chlortetracycline for Anaplasmosis Control

Co-Authors: [1]Kathryn E. Reif, BA, MS, PH, PhD, [1]Tippawan Anantatat, MS, [1]Brandt C. Skinner,MS, [2]Alyssa R. Toillion, MPH, [2]Raghavendra G. Amachawadi, BVSc, MS, PhD, [2]Emily J. Reppert, DVM, MS, DACVIM, [3]Johann F. Coetzee, BVSc, PhD, Qing Kang BS, PhD, MS, PhD, Department of Statistics, Kansas State University

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Keywords: Antimicrobial resistance, free choice CTC-medicated feed, National Antimicrobial Re-sistance Monitoring System

Abstract

Chronic bovine anaplasmosis is commonly managed using chlortetracycline (CTC)-medicated (0.5-2 mg/lb/BW/day) feed with no limit on use duration. We hypothesize prolonged antibiotic use for anaplasmosis control may promote antimicrobial resistance in off-target microbes. Objectives were to evaluate changes in antibiotic suscpetibilities of E. coli derived from cattle provided different CTC concentrations for 120 days. Changes in E. coli susceptibilities to 14 antibiotics were determined using Sensititre™ NARMS gram negative plates and CLSI breakpoints. Minimum inhibitory concentration (MIC) data were subjected to linear mixed model analysis. Median MIC for tetracycline did not significantly change, but chloramphenicol, sulfisoxazole, trimethoprim/sulfamethoxazole, ampicillin, and streptomycin MICs significantly increased, sometimes crossing breakpoints. Longterm CTC use may broadly influence microbial antimicrobial susceptibility, highlighting the need for judicious antimicrobial use.

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Presenter: [2]Kelly Cameron-Harp, BS, MSc

Vesicular Stomatitis Virus-Indiana and *Culicoides Sonorensis* Biting Midges: Insights into Vector Competency

Co-Authors: [1]Lindsey M. Reister-Hendricks, MS, [1]Barbara S. Drolet, PhD

Corresponding Author: [2]Kelly Cameron-Harp, BS, MSc (kcameronharp@vet.k-state.edu)

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Keywords: Vesicular stomatitis virus, midges, vector

Abstract

Vesicular stomatitis virus (VSV), a reportable, economically important zoonotic disease of livestock, is transmitted via insect vectors and by direct contact. We hypothesized that *Culicoides sonorensis*, a known vector for VSV-New Jersey, would be a competent vector for VSV-Indiana.

A time-course infection study was conducted in midges using a 2019 Indiana field isolate to determine if virus would disseminate from the midguts into the heads and salivary glands by day 10 post-feeding. Infectious virus was confirmed by cytopathic effects (CPE) on Vero cell monolayers. RNA extraction and RT-qPCR was performed.

By day 3 the virus has disseminated from the midgut to the head.

Cytopathic effects indicated that the virus remains infectious through day 10 and suggests potential vector competence. Future replicate studies with additional time points are needed, as well as a better understanding of virus titers in VSV-IN infected livestock lesions.

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Presenter: [1]Sarah DeVader, MVBS Candidate, College of Veterinary Medicine

A Water Extract from Fresh Water Green Alga Up-Regulates Immune Checkpoint Protein in Lung Carcinoma Cells

Co-Authors: [1]Susumu Ishiguro, [1]Jeffery Comer, [1]Masaaki Tamura

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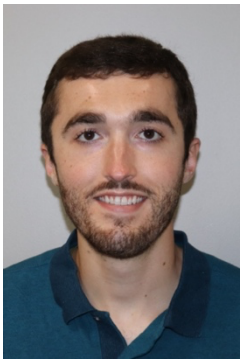
Keywords: Lung cancer, Immune checkpoint proteins, PD-L1

Abstract

Immune checkpoint proteins are important targets in cancer immunotherapy. Expression of immune checkpoint protein ,PD-L1 by human lung cancer is associated with susceptibility to immunotherapy. *Euglena gracilis* is an alga whose water extract (EWE) possesses anti-cancer activity. However, its bioactive components are yet to be known. We hypothesize the bioactive component in EWE attenuates the growth of lung carcinoma by upregulating PD-L1 expression in cancer cells. Lewis Lung Carcinoma (LLC) cells were treated with EWE or PBS and evaluated for expression of PD-L1 mRNA using RT-PCR and PD-L1 protein using flow cytometry. EWE dose-dependently upregulated expression of PD-L1 mRNA and protein. These increases were completely abolished by treating EWE with trypsin. EWE also inhibited LLC cell growth. These results indicate a peptide in EWE can directly upregulate PD-L1 expression in lung carcinoma cells and may be the bioactive substance in EWE that inhibits lung carcinoma growth.



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Presenter: Douglas Farleigh, DVM Candidate, College of Veterinary Medicine

In Vitro Effects of Palmitoylethanolamide in Canine Mast Cell Tumor Cell Lines

Co-Authors: Samuel Hocker, DVM, MS, DACVIM (Oncology)

Corresponding Author: Samuel Hocker, DVM, MS, DACVIM (Oncology) (sam.hocker21@gmail.com)

Keywords: In vitro; palmitoylethanolamide; endocannabinoid; mast cell tumor; canine

Abstract

High grade canine mast cell tumors (MCTs) carry a poor prognosis due to their high metastatic rate and aggressive phenotype. Palmitoylethanolamide (PEA) is an endocannabinoid ligand that has shown the ability to inactivate mast cells in allergic conditions. The objective of this preclinical study was to assess PEA's potential as a therapeutic option for canine MCTs by assessing cannabinoid receptor expression and evaluating PEA's cytotoxicity in the C2 canine MCT cell line. Western blot revealed the presence of TRPV1, but could not confirm the presence of CB1 or CB2 proteins. PEA's IC50 determined by MTT assay and fit by a variable slope Hill's equation was 102.6 □M. When the IC50 was compared to vehicle control, it resulted in a statistically significant ($p < 0.0004$) decrease in cell viability. PEA has demonstrated cytotoxic characteristics; however, further evaluation into its underlying mechanism of cytotoxicity and interaction with standard of care chemotherapy is needed.

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Presenter: Sierrah Haas, MPH Candidate, College of Veterinary Medicine

Extreme Heat, Social Vulnerability, and its Impact on Respiratory Health

Co-Authors: [1]Ellyn R. Mulcahy, PhD, MPH, [2]Steven Corbett

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Keywords: Extreme heat, respiratory illness, social vulnerability

Abstract

Extreme heat is a substantial threat to human health as it both directly and indirectly impacts physical, social, and environmental health. The reduction of extreme heat impacts is a crucial One Health effort. More specifically, research has shown associations between rising global temperatures and increased rates of respiratory illness. Drastic changes in heat without ample time for human acclimation results in certain populations being more highly vulnerable to its effects. This study was conducted with the goal of geographically identifying populations most vulnerable to extreme heat in Kansas. The main purpose of this identification was to propose specified public health resource distribution and suggest best practices for mitigating the negative respiratory health impacts of the warming climate. Readily available Kansas social vulnerability, respiratory illness, and extreme heat data were analyzed and interpreted using geographic information system (GIS) mapping. Census tract-level data were visually explored to identify areas showing potentially associated extreme heat rates and chronic obstructive pulmonary disease. or asthma crude prevalence. Furthermore, using social vulnerability data, populations that are more likely to need related resources were identified. Results indicated visual associations between crude respiratory illness prevalence and high levels of social vulnerability. Kansas census tracts with historically high numbers of extreme heat days tend to be associated with a higher crude prevalence of respiratory illness. Preliminary conclusions indicate potential associations between extreme heat and respiratory illness in Kansas. Results of this mapping indicate a need for future work in the targeted distribution of physical and educational health resources to areas that are considered highly socially vulnerable

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Presenter: Marilee Robbins, DVM Candidate, College of Veterinary Medicine

The Antihelminthic Drug Niclosamide Inhibits Growth of Acute Lymphoblastic Leukemia Cells

Co-Authors: [1]Kathleen Sakamoto, MD, PHD, [1]Kailen Mark, BS

Corresponding Author: [2]Marilee Robbins, BS

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Keywords: Niclosamide, Leukemia, ALL, Lymphoid

Abstract

Acute lymphoid leukemia (ALL) is a cancer of the blood and bone marrow that causes excessive proliferation of lymphocytes. ALL is the most common type of childhood cancer. The 5-year survival rate for children with B-ALL is 90%, however, there are fewer effective and nontoxic therapies for relapsed disease. The cAMP-responsive element binding protein (CREB) is overexpressed in a majority of patients with ALL and acute myeloid leukemia (AML) and plays an important role in leukemia cell proliferation. Niclosamide has previously been shown to be a potent anti-leukemic agent that can inhibit CREB function in AML cells. Therefore, we hypothesized that niclosamide inhibits proliferation of ALL cells and is a potential therapeutic agent to treat ALL. We treated both B-ALL and T-ALL cell lines, including Nalm6, REH, Jurkat, Loucy. Cells (2x10^4) were grown in 96-well plates and treated with either niclosamide at 10, 5, 2.5, 1, 0.5, 0.25, 0.1, 0.05, 0.025 or 0.01µM or with DMSO control. After 72 hours, CellTiter-Glo assays were performed to assess cell viability calculated as a percentage of control with a dose response curve. GraphPad Prism Software was used to calculate the concentration of drug inhibiting cell viability by 50% (IC50). The IC50 value for Nalm6, a B-ALL cell line, was between 0.32µM and 0.58µM (N=3) and for Jurkat, a T-ALL cell line, was between 0.18µM and 0.24µM (N=3) with a 95% confidence interval. Our data demonstrates that both B-ALL and T-ALL cells are sensitive to niclosamide and therefore niclosamide should be considered as a potential therapeutic agent for ALL.

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Presenter: [1]Franchesca Rollerson- Clark, BSc

Identification of Canine Cytochrome P450 Enzymes Involved in the Metabolism of Antiepileptic Drugs

Co-Authors: [1]Stephanie Martinez, PhD

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Keywords: Canine, Cytochrome P450, anti-epileptic

Abstract

Epilepsy affects 1% of dogs and 30% of cases are refractory. Polymorphic cytochrome P450 enzymes (CYP) metabolize many antiepileptic drugs (AEDs) in humans, contributing to variable drug response, but the involvement of CYP enzymes in AED metabolism in dogs is unknown. This study aimed to identify the major CYPs involved in the metabolism of zonisamide, phenytoin, levetiracetam, imepitoin, and primidone in dogs. In vitro metabolism assays were performed with dog liver microsomes, followed by reaction phenotyping with recombinant CYP enzymes. CYP3A12 was identified as the primary isozyme responsible for zonisamide metabolism. Phenytoin was metabolized primarily by CYP2C21, and to a lesser extent by CYP2D15 and CYP2B11. Levetiracetam was too metabolically stable to be accurately measured. Drugs that interact with CYP3A12 may cause interactions with zonisamide, and polymorphisms in CYP3A12, 2D15, and 2B11 in dogs may impact AED response. Further studies are ongoing to complete reaction phenotyping of remaining drugs. These findings may help predict drug interactions and advance precision veterinary medicine but should be confirmed in vivo.

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Presenter: [2]Harith M. Salih, PhD Candidate, College of Veterinary Medicine

Antimicrobial Activities of Bacterial Probiotic Cultures Against Liver Abscess-Causing Pathogens in Beef Cattle

Co-Authors: [2]T. G. Nagaraja, BVSc, MVSc, PhD,

Corresponding Author: [1]R. G. Amachawadi, BVSc, MS, PhD (agraghav@vet.k-state.edu)

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Keywords: Liver abscess, Feedlot cattle, Probiotics, Antibiotic Alternatives

Abstract

Liver abscesses are bacterial pyogenic infections, occur in beef cattle fed high-grain, low-roughage diets. The causative agents include two subspecies of *Fusobacterium necrophorum* (necrophorum and funduliforme), *Trueperella pyogenes*, and *Salmonella enterica.* Testing antimicrobial activities of culture supernatants of certain bacterial probiotic cultures against liver abscess-causing bacterial pathogens. Probiotic bacterial species were cultured in appropriate growth media, centrifuged, filter sterilized, and stored at -20°C. *L. helveticus* reduced the growth of both *Fusobacterium* subspecies, *T. pyogenes* and *S. enterica*. Addition of *L. helveticus* supernatant to *in vitro* fermentations containing ruminal fluid, buffer, and substrates (glucose, lactic acid, or ground cattle feed) exhibited reduction in spiked culture of *F. necrophorum*. Probiotic cultures may have the potential to be used as a feed supplement to control liver abscess.

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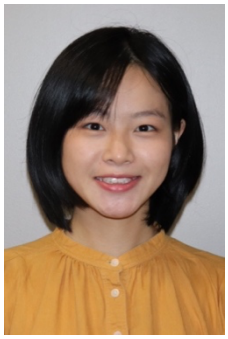

Presenter: Yi Wen, DVM Candidate, College of Veterinary Medicine

Ex Vivo Analysis of Extracellular Vesicle Interactions with Immune Cells in Whole Blood of *Macaca Nemestrina*

Co-Authors: [1]Blanca Rodriguez, [1]Suzanne E. Queen, [1]Erin N. Shirk, [1]Amanda Maxwell, [1]Jessica Plunkard, [1]Natalie Castell, [1]Jessica M. Izzi, [1]Kenneth W. Witwer

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Keywords: extracellular vesicle, peripheral blood mononuclear cells, B cells, Macaca nemestrina

Abstract

Extracellular vesicles (EVs) are nano-sized, lipid bilayer particles produced naturally by cells in multicellular organisms and have great potential as novel carriers for delivery of biomolecules to treat diseases. To better understand how EVs interact with peripheral blood mononuclear cells (PBMCs), we developed an ex vivo model using whole blood collected from Macaca nemestrina to mimic the environment encountered by EVs in hosts. Nanoluciferase assays and flow cytometry were conducted to detect the presence of EVs in association with different immune cell subtypes. Our data shows that EVs come in contact with both PBMCs and red blood cells (RBCs) after 5 minutes of incubation and remained detectable up to 24 hours. Importantly, EVs were found to associate with B cells at significantly higher levels than with any other PBMC subtype tested. Future experiments using confocal microscopy will be performed to determine the specific nature of the interactions between EVs and B cells