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September 5 & 6, 2024





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# Program Schedule



## Thursday, September 5

Foothills Campus (HRIC Atrium & Theatre 3)

- 11:30 a.m. **Arrival, Registration and lunch (Foothills Campus, HRIC Atrium)**
- 12:35 p.m. Introduction to Symposium and Keynote Speaker by UCVM Dean Renate Weller - Theatre 3
- 12:40 p.m. **Keynote Speaker** | Lisa Fortier | Presentation Title: *Intra-articular Approaches to Osteoarthritis*
- 1:45 p.m. **Podium #1** | Jennifer Burns | Title: *Prevalence of Exercise-Induced Pulmonary Hemorrhage, Tracheal Mucus and Recurrent Laryngeal Neuropathy in Competitive Draft Pulling Horses* | [Click for details](#)
- 2:15 p.m. **Podium #2** | Zoe Chan | Title: *Association between Hoof Asymmetry and Movement Asymmetry in Racing Thoroughbreds* | [Click for details](#)
- 2:45 p.m. **Break**
- 3:00 p.m. **Keynote Speaker** | Lisa Fortier | Presentation Title: *How to Get Your Work Published and Noticed - Through the Lens of an Editor in Chief*
- 3:45 p.m. **News Reviews/Talk** - Thilo Pfau
- 4:05 p.m. **News Reviews/Talk** - Brielle Rosa
- 4:25 p.m. **News Reviews/Talk** - Michael Davis
- 4:50 p.m. **Poster Presentations & Wine and Cheese Reception** - Foothills Campus, HRIC Atrium
- 7:00 p.m. **Travel back to hotel**

Posters will be available for viewing throughout both days of the symposium



# Program Schedule



## Friday, September 6

Spy Hill Campus & Spruce Meadows

- **7:50 a.m.** Bus from hotel to CSB
- **8:45 a.m.** Keynote Speaker #2 is introduced
- **8:50 a.m.** **Keynote Speaker #2** – Maria Camilla Ceballos Betancourt
- **9:50 a.m.** **Podium #3** | Bethanie Cooper | Title: *Oral DHA supplement (algae-derived) increases alveolar macrophage metabolism and alters protein expression of the lower airway in healthy horses* | [Click for details](#)
- **10:20 a.m.** **BREAK**
- **10:40 a.m.** **Podium #4** | Katie Sheats | Title: *Investigation of peritoneal fluid cell-free dna as a biomarker in equine colic patients* | [Click for details](#)
- **11:10 a.m.** **Podium #5** | Lindsay Korac | Title: *Effect of a dietary nutraceutical "STRUCTURE-Joint" on response of horses to intra-articular challenge with IL-1: implications for tissue adaptation to stress* | [Click for details](#)
- **11:40 a.m.** **Podium #6** | Denise Mc Sweeney | Title: *Using Accelerometer-based Inertial Measurement Unit Sensors To Identify Racing Thoroughbreds At High Risk of Catastrophic Musculoskeletal Injury* | [Click for details](#)
- **12:10 p.m.** **LUNCH**
- **1:15 p.m.** Tour of CSB
- **2:00 p.m.** **Podium #7** | Nadia Golestani | Title: *Systemic safety, oxidative and inflammatory effects of dietary Spirulina in horses following high-intensity exercise* | [Click for details](#)
- **2:30 p.m.** **Podium #8** | Yuji Takahashi | Title: *Comparison of muscle activity in hindlimb between treadmill and sand surface* | [Click for details](#)
- **3:00 p.m.** **Podium #9** | Babak Faramarzi | Title: *The Distal Sesamoidean Impar Ligament: A histologic review* | [Click for details](#)
- **3:30 p.m.** Program concludes
- **4:00 p.m.** **Bus to Spruce Meadows**
- **5:00 p.m.** **Spruce Meadows reception & awards presentation**
- **9:40 p.m.** **Bus to hotel**

Posters will be available for viewing throughout both days of the symposium



# Keynote Speakers



## Lisa Fortier

Editor In Chief and Chief Publications Officer at AVMA (American Veterinary Medical Association)



## Maria Camila Ceballos Betancourt

Assistant Professor (Beef Cattle Welfare), Faculty of Veterinary Medicine, University of Calgary

Dr. Lisa A. Fortier is the Editor-in-Chief of The Journal of the American Veterinary Medical Association (JAVMA) and The American Journal of Veterinary Research (AJVR) and Publications Division Director at the American Veterinary Medical Association. She is also the James Law Professor of Surgery at Cornell University in Ithaca, NY. She received her DVM from Colorado State University and completed her PhD and surgical residency training at Cornell University. She is boarded with the American College of Veterinary Surgeons and practices equine orthopedic surgery at Cornell University in Ithaca, New York and at the Cornell Ruffian Equine Specialists in Elmont, New York. Her laboratory has a particular interest in translational research including the prevention of post-traumatic osteoarthritis. In addition, Dr. Fortier's research program investigates the clinical application of stem cells and biologics such as platelet rich plasma and bone marrow concentrate for cartilage repair and tendinosis. She has received the Jaques Lemans Award from the International Cartilage Repair Society, the New Investigator Research Award from the Orthopaedic Research Society, the Pfizer Research Award for Research Excellence from Cornell University, and the SUNY Chancellors Award for Scholarship and Creative Activities, the Kappa Delta Award, and the American Association of Veterinary Clinicians Faculty Achievement Award. Dr. Fortier has served as the Vice President of the International Veterinary Regenerative Medicine Society, and President of the International Cartilage Repair Society.

Dr. Maria Camila Ceballos graduated in Animal Science in Colombia, at The National University of Colombia (2010). Following the completion of her undergraduate studies, she has worked in the field of animal welfare and behavior, first as a researcher in the CIPAV Foundation (Center for Research in Sustainable Systems of Agricultural Production), in Colombia, focusing on the evaluation of dairy and beef cattle welfare and behavior in sustainable production systems. Then, she started a Masters at the São Paulo State University (UNESP) in Brazil, addressing the effects of handling frequency of cattle kept under rotational and alternative grazing systems, with a focus on how cattle handling impacted their temperament. Afterward, she completed her Ph.D. at the same University (UNESP), focused on human-cattle relationships and its effects on cattle welfare, as reflected in temperament, behavior, physiology, and performance measures. By the end of her Ph.D. program, Maria Camila secured an internship at the Animal Welfare Science Centre (University of Melbourne - Australia), where she participated in a project focused on the human-animal relationship and dairy cattle welfare. In 2018, she started working at the University of Pennsylvania, the USA, as a post-doctoral researcher, mainly focusing on assessing the welfare and behavior of breeding sows housed in different housing systems. Dr. Ceballos is currently an Assistant Professor in Beef Cattle Welfare and Behavior, W.A. Ranches at the University of Calgary, Faculty of Veterinary Medicine.

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# News hour Speakers



## Thilo Pfau

**Professor, Faculty of Veterinary Medicine & Kinesiology, University of Calgary**

Dr. Thilo Pfau's career path took a fascinating turn. He started with a PhD in speech recognition at the Technical University of Munich, focusing on the technical side of communication. However, his interests shifted towards the biomechanics of movement, leading him to the Royal Veterinary College in London. There, he delved into animal locomotion, researching gait patterns in quadrupeds like horses and camels, and even applying his knowledge to lameness detection in cows and horses. This passion for animal movement analysis continued when Thilo joined the University of Calgary in 2021. Now, with a joint appointment in Faculty of Kinesiology and Faculty of Veterinary Medicine, he's utilizing both traditional and emerging technologies to further understand how animals move.



## Brielle Rosa

**Assistant Professor of Veterinary Pharmacology, Faculty of Veterinary Medicine, University of Calgary**

Dr. Brielle Rosa obtained her DVM from Cornell University (New York, USA) in 2004 and then completed an internship in Ambulatory and Production Medicine. She went on to work in New Zealand at the Massey University Equine Clinic and then obtained her PhD from Massey University in 2014. Her current work in veterinary pharmacology began with sessional instructing and progressed to completing a postdoc in pharmacology before accepting a position as Assistant Professor of Veterinary Pharmacology. As part of her academic appointment, Dr. Rosa also continues to practice part-time as an equine-focused general practice veterinarian in rural Alberta.



## Michael Davis

**Professor, Oklahoma State University**

Dr. Michael S. Davis is a veterinary physiologist and board-certified specialist in veterinary internal medicine and veterinary sports medicine at Oklahoma State University where he conducts research on animal exercise physiology and performance. His studies in horses have demonstrated the induction of asthma-like airway disease by strenuous exercise performed in cold environments. Canine studies have included the development and validation of preventative methods for exercise-induced gastric disease as well as helping to identify novel metabolic pathways used by elite canine athletes to support fatigue-resistant endurance exercise. These studies have provided the United States Armed Forces with valuable information on the physiological capabilities of working dogs, as well as the methods for producing maximal performance and sustainability of these dogs. His current research focus is the mechanisms by which mitochondria maintain (or fail to maintain) adequate supply of ATP during physiochemical extremes typical of strenuous exercise such as high temperature and low pH. As a professional educator for 20 years and with numerous national and international speaking events, Dr. Davis has extensive training and experience in educating a variety of different audiences.







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Schedule (Sept 5)

Schedule (Sept 6)

Keynote Speakers

News hour Speakers

Podium Abstracts

Poster Abstracts

# Podium Abstracts







# Podium #1

## Jennifer Burns

Atlantic Veterinary College, University of Prince Edward Island

### Prevalence of Exercise-Induced Pulmonary Hemorrhage, Tracheal Mucus and Recurrent Laryngeal Neuropathy in Competitive Draft Pulling Horses

#### AUTHOR NAME / AFFILIATION

- Jennifer Burns DVM, MSc, DABVP, Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island
- Emily John DVM, PhD, DACVIM, Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island
- Kathleen MacMillan DVM, MSc, DABVP, Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island

#### ABSTRACT

##### Introduction

Respiratory disease is common in the horse population and often associated with poor performance. Despite their outstanding strength and aerobic capacity, little regard is given to draft horses and the disorders they may encounter during athletic activity. Objectives of this study were: (1) determine the prevalence of exercise-induced pulmonary hemorrhage (EIPH), tracheal mucus (TM) and recurrent laryngeal hemiplegia (RLH) in a population of competitive draft pulling horses, and (2) determine if there was an association between horse weight, height, age, amount pulled, or competition placing with EIPH, TM or RLH.

##### Methods

A total of 34 horses participated in the study and each had an airway endoscopic examination performed 60 minutes following the completion of their last pull. Structural or functional abnormalities were noted and each horse was given an EIPH score (1-4), RHL score (0-4) and TM score (0-4).

##### Results

Twenty-eight horses had evidence of TM (15 with TM score 1, 11 with TM score 2, 2 with TM score 3). Twenty-five horses had no evidence of EIPH and 9 horses had EIPH grade 1. Twenty-three horses had no evidence of RLH while 3 had grade 2 RLH, 2 had grade 3 RLH, 3 had grade 4 RLH and 3 horses had evidence of prior RLH surgery. The presence of TM, RLH or EIPH was not correlated with any of the variables investigated in this study.

##### Conclusions

Our results indicate that while these disorders do occur in draft pullers, they do not appear to interfere with their athletic performance.





## Podium #2

### Zoe Chan

Faculty of Kinesiology, University of Calgary, Calgary

#### Association between Hoof Asymmetry and Movement Asymmetry in Racing Thoroughbreds

##### AUTHOR NAME / AFFILIATION

- Zoe Chan, Faculty of Kinesiology, University of Calgary, Calgary, Canada
- Winnie Ho, Hong Kong Jockey Club, Hong Kong AND Department of Veterinary Clinical Sciences, City University of Hong Kong, Hong Kong
- Bronte Forbes, Hong Kong Jockey Club, Hong Kong
- Thilo Pfau, Faculty of Kinesiology & Faculty of Veterinary Medicine, University of Calgary, Calgary, Canada

##### ABSTRACT

Racehorses training and racing predominantly in one direction (clockwise or counterclockwise) may experience uneven loading between their inside and outside limb, potentially influencing the hoof shape. Asymmetrical hooves may be associated with different movement patterns. This study aimed to understand the relationship between hoof shape and movement patterns. 186 Thoroughbreds trained predominantly to race clockwise were assessed trotting in a straight line. Motion sensors were placed at the midline on the poll. HW was digitally measured at the widest part of the hoof through photographs of the solear surface. The difference between the outside (left) and inside (right) HW was calculated for both the fore- and hind-limbs. The median of the absolute differences in the fore- and hind-limbs were used to identify horses with asymmetrical hooves. Those with asymmetrical hooves were then segregated into subgroups: Wider Outside (WO) and Wider Inside (WI). The difference in upward movement amplitudes of the poll (UpDiff) between the two halves of a stride cycle was calculated and compared between subgroups. HW was significantly different between the outside and inside hooves in both fore- and hind-limbs ( $p < 0.01$ ). Movement analysis showed fore-WI ( $n=65$ ) and fore-WO ( $n=27$ ) have significantly different UpDiff ( $p < 0.01$ ), and similarly ( $p=0.01$ ) between hind-WI ( $n=63$ ) and hind-WO ( $n=28$ ). In conclusion, Thoroughbreds trained clockwise were found to have wider inside hooves in both their fore and hind pairs. Those that showed hoof asymmetry were found to have reduced upward movement of the poll during stance phase of the wider limb, regardless of the side.



## Podium #3

### Bethanie Cooper

College of Veterinary Medicine, North Carolina State University

Oral DHA supplement (algae-derived) increases alveolar macrophage metabolism and alters protein expression of the lower airway in healthy horses

#### AUTHOR NAME / AFFILIATION

- Bethanie Cooper, DVM/Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC
- Kallie Hobbs, DVM, DACVIM/Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC
- Rosemary Bayless, DVM, PhD, DACVIM/Department of Molecular Biomedical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC
- Kerry O'Donnell, DVM/College of Veterinary Medicine, North Carolina State University, Raleigh, NC
- M. Katie Sheats, DVM, PhD, DACVIM, FHEA/Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC

#### ABSTRACT

**Introduction:** Docosahexaenoic acid (DHA) supplementation decreases inflammation in asthmatic horses. In humans, omega-3 fatty acids promote a shift in macrophages from M1 (pro-inflammatory) to M2 (anti-inflammatory) phenotype. The mechanism(s) underlying the anti-inflammatory effects of DHA on the airway are not fully understood. The goal of this study was to investigate the impact of a DHA supplement on equine alveolar macrophage metabolism and the protein profile of bronchoalveolar lavage (BAL) supernatant.

**Hypothesis:** Oral administration of a DHA supplement in healthy adult horses will significantly alter alveolar macrophage metabolism and protein profiles of BAL supernatant.

**Methods:** Ten healthy, adult university-owned horses. A prospective, sequential, placebo-controlled study. BALF was collected at baseline, following 45 days placebo treatment, and following 45 days oral administration of a commercially available DHA supplement (14 day washout.) Whole blood was collected following placebo and respiratory supplement treatment. Alveolar macrophage oxygen consumption rate (OCR), BAL cytology, and proteomics were analyzed.

**Results:** Seven horses completed the study. Compared to placebo, supplementation significantly decreased the whole blood ratio of Omega 6: Omega 3 and significantly increased the ratio of DHA: Arachidonic acid. Additionally, after supplementation, mean alveolar macrophage OCR increased. Comparison of BAL supernatant protein profiles in DHA supplementation vs. placebo identified 67 (10 low- and 57 high-abundance) differentially expressed proteins.

**Conclusions:** Oral supplementation of an algae-derived DHA supplement increases alveolar macrophage metabolism which could indicate a greater population of M2 (anti-inflammatory) alveolar macrophages. Proteins associated with cellular respiration such as NAD(P)H dehydrogenase and diphosphotransferase have high abundance following DHA supplementation.





## Podium #4

### Katie Sheats

Faculty of Veterinary Medicine, University of Calgary

#### Investigation of peritoneal fluid cell-free dna as a biomarker in equine colic patients

##### AUTHOR NAME / AFFILIATION

- Rosemary L. Bayless, North Carolina State University College of Veterinary Medicine, Comparative Medicine Institute, North Carolina State University, Raleigh, NC
- Emily G.M. Martin, North Carolina State University College of Veterinary Medicine, Comparative Medicine Institute, North Carolina State University, Raleigh, NC
- Kate E. Sarkan, University of Georgia College of Veterinary Medicine
- Bethanie L. Cooper, North Carolina State University College of Veterinary Medicine
- Kira L. Epstein, University of Georgia College of Veterinary Medicine
- M. Katie Sheats, North Carolina State University College of Veterinary Medicine, Comparative Medicine Institute, North Carolina State University, Raleigh, NC

##### ABSTRACT

The role of the equine back in modulating locomotion emphasizes the need to develop a system that aids with early recognition of locomotor abnormalities in this region, contributing to preventing injuries and improving welfare. Objective measurement of the normal movement of the equine Thoraco-Lumbo-Sacral (T-L-S) region across different surfaces and movement patterns remains limited. In this study, we used an inertial measurement unit system (EquiGait©) to quantify differential rotational and translational T-L-S range of motion (ROM) during overground locomotion and assessed the influence of the surface type on back ROM. Twenty-five recently retired race Thoroughbred geldings, aged between 3 and 8 years, were trotted in a straight line and lunged on both sand and turf surfaces. Back ROM was analyzed using general linear regression models to assess associations between surface type and T-L-S ROM. Based on preliminary data collected, we hypothesized that T-L-S ROM will be higher on sand than on turf. Pilot data shows a consistent increase in neck and back ROM in sand over turf in different anatomical locations; Axial rotation at Poll-withers: Turf 13.1(7.5,) Sand: 22.7(9.8). Lumb-Sacral: Turf 8.2 (6.6) Sand 11.9 (2.4). Flexion-Extension, Poll-withers: Turf 8.1 (7.4), Sand: 10.4 (10.4), Lumb-Sacral: Turf 4.7 (1.5), Sand 3.1 (1.3). Lateral Bending Poll-withers: Turf 3.8 (7.8), Sand: 13.9 (5.6), Lumb-Sacral: turf 0.9 (0.7), Sand 2.3 (0.7), confirming our hypothesis. This study will aid in creating a comprehensive performance assessment protocol for evaluating the movement of the thoracolumbar region.



## Podium #5

### Lindsay Korac

University of Guelph

Effect of a dietary nutraceutical “STRUCTURE-Joint” on response of horses to intra-articular challenge with IL-1: implications for tissue adaptation to stress

#### AUTHOR NAME / AFFILIATION

- Korac., L
- Golestani., N
- MacNicole., J.L
- Souccar-Young., J
- Witherspoon., S
- Topher., S
- Wildish., A
- Pearson., W \*

#### ABSTRACT

The purpose of this study was to determine local (articular) and systemic effects of intra-articular IL-1 in horses supplemented with a dietary PUFA supplement [STRUCTURE-Joint (ST-J)]. Sixteen (16) healthy, mature, light breed horses were randomly assigned to diets containing 0 or 120 cc (n=8 per group) of ST-J for 30 days. On Days 0 (prior to beginning supplementation) and days 27, 75ng of reIL-1 $\beta$  was injected into the left or right intercarpal joint to induce mild, transient synovitis. Synovial fluid was obtained by aseptic arthrocentesis at post-injection hour (PIH) 0 (immediately prior to IL-1 injection), 6, 12 and 72. ST-J supplementation for 30 days significantly reduced joint circumference, increased synovial fluid PGE2, NO, and RvD1 compared with the unsupplemented control group. There was also a significant increase in plasma hemoglobin, and free and total bilirubin, and decrease in plasma glucose. These data provide evidence for the usefulness of ST-J to modulate physiological variables with importance in exercise performance and tissue adaptation to exercise stress and further research on this product is warranted.





## Podium #6

### Denise Mc Sweeney

College of Veterinary Medicine, Washington State University

#### Using Accelerometer-based Inertial Measurement Unit Sensors To Identify Racing Thoroughbreds At High Risk Of Catastrophic Musculoskeletal Injury

##### AUTHOR NAME / AFFILIATION

- Denise Mc Sweeney
- Mikael Holmström
- Kevin Donohue
- David Lambert
- Warwick Bayly

##### ABSTRACT

**Introduction:** > 90% of catastrophic musculoskeletal injuries in racing thoroughbreds occur at sites of pre-existing pathology which evade clinical detection during pre-race veterinary examinations. A means of using technology to identify high-risk horses before they suffer a catastrophic injury is needed.

**Methods:** An accelerometer-based inertial measurement unit (IMU) sensor system that continuously recorded the locomotory movements of horses in the longitudinal, dorsoventral and mediolateral planes at 800Hz each while racing, was developed and worn in  $\approx$ 28,000 starts. An AI-based algorithm was developed to analyze the recorded limb and torso movements of each horse and categorize its risk of suffering a catastrophic injury if it continued to train and race (Cat1 =lowest risk; Cat6 =highest). Efforts were made to obtain diagnostic follow-ups on Cat $\geq$ 5 horses.

**Results:** Incidence of Cat1 =65% of starts, Cat2 =17%, Cat3 =10%, Cat4 =5%, Cat5 =2%, Cat6 =0.4%. 85 runs from 60 horses that suffered a fatal injury were recorded; 80% were Cat3 - Cat6 horses. The relationship between the Category level and the risk of catastrophic injury was exponential: if Cat1 risk factor =1; Cat2 was 3X higher; Cat3 =12X; Cat4 =25X; Cat5 =55X; Cat6 =185X. Most horses were lost to follow-up, but data was obtained for 93/135 Cat $\geq$ 5 horses from one track. 6 suffered fatal injuries, 6 had positive PET scans for potential catastrophic lesions, and 38 had not returned to racing 11 months later.

**Conclusion:** The IMU-based sensor system offers great potential for identifying thoroughbreds at highest risk of suffering catastrophic musculoskeletal racing injuries.



# Podium #7

## Nadia Golestani

University of Guelph

### Systemic safety, oxidative and inflammatory effects of dietary Spirulina in horses following high-intensity exercise

#### AUTHOR NAME / AFFILIATION

- Nadia Golestani
- Sarah White-Springer
- Carey Williams
- MacKenzie Paton
- Brodie Ross
- Lindsay Korac
- Wendy Pearson

#### ABSTRACT

Exercise-induced changes in hematological, biochemical, inflammatory, and oxidative stress markers significantly impact equine health and metabolic efficiency. Spirulina, a nutrient-rich blue-green microalga, shows potential in modulating these exercise responses and aiding tissue adaptation. This study examined the effects of Spirulina supplementation on sedentary horses exposed to acute exercise stress. Sixteen healthy horses underwent a 30-minute standardized exercise test (SET) before and after 30 days of supplementation with either a control diet (CON; n=8) or a Spirulina-supplemented diet (SPI; n=8). Blood and synovial fluid samples were collected pre- and post-exercise to evaluate complete blood count (CBC), biochemical parameters, and markers such as nitric oxide (NO), prostaglandin E2 (PGE2), and Resolvin D1. Spirulina supplementation increased hematocrit levels at rest on day 30 and maintained hemoglobin and hematocrit levels post-exercise, indicating enhanced oxygen-carrying capacity. Additionally, glucose levels were higher 8 hours post-exercise in the Spirulina group, suggesting improved energy availability. Inflammatory markers revealed that synovial fluid NO levels increased significantly 24 hours post-exercise, with Spirulina enhancing NO levels throughout the trial. PGE2 levels also increased consistently in the Spirulina group, while Resolvin D1 levels in both synovial fluid and blood were elevated post-exercise, indicating accelerated inflammation resolution. In conclusion, Spirulina supplementation not only moderated oxidative stress but also improved exercise performance and recovery by maintaining higher hemoglobin levels, reducing muscle damage, and enhancing energy availability. These findings highlight Spirulina's potential to optimize recovery and metabolic processes in exercised horses.





# Podium #8

## Yuji Takahashi

Japan Racing Association

### Comparison of muscle activity in hindlimb between treadmill and sand surface

#### AUTHOR NAME / AFFILIATION

- Yuji Takahashi
- Kenji Otsuka
- Toshinobu Yoshida
- Yusaku Ebisuda
- Kazutaka Mukai

#### ABSTRACT

**Introduction:** Equine neuromuscular responses on the treadmill and overground during canter remain unknown. This study compared muscle activation and running form at moderate speed.

**Methods:** Six Thoroughbreds (mean  $\pm$  SD; 530  $\pm$  30 kg) ran on the treadmill (TM) without riders and sand surface (SS) with riders (75  $\pm$  30 kg) randomly at 7 m/s. Stride frequency and step lengths (hind, diagonal, fore and airborne) were measured by a high-speed camera. Surface electromyography data of five muscles for the left and right hindlimbs were recorded. Normalized peak averaged rectified values (ARV) in each muscle, stride frequency and each step length were compared using a paired t-test.

**Results:** Stride frequency was significantly higher on TM (1.87  $\pm$  0.06 strides/s) than SS (1.80  $\pm$  0.06 strides/s). Further, shorter stride length (3.74  $\pm$  0.13 m) due to shorter airborne step length (0.60  $\pm$  0.10 m) was observed on TM compared to SS (3.93  $\pm$  0.10 m and 0.87  $\pm$  0.11 m, respectively). Significant greater ARV in Musculus tensor fasciae latae was observed in trailing limb (+18%) on TM, while significant greater ARV in M. flexor digitorum longus was observed in trailing limb (+17%) on SS. No significant differences were found in M. gluteus medius, M. biceps femoris, and M. extensor digitorum longus.

**Conclusion:** Canter on SS may increase hindlimb deep digital flexor tendon load than TM, while canter on TM may increase stifle joint load than SS. These results may be useful for selecting rehabilitation and/or training surface.



# Podium #9

## Babak Faramarzi

Western University of Health Sciences

### The Distal Sesamoidean Impar Ligament: A histologic review

#### AUTHOR NAME / AFFILIATION

- Dr. Babak Faramarzi | College of Veterinary Medicine, Western University of Health Sciences, USA.
- Dr. Wael Khamas | College of Veterinary Medicine, Western University of Health Sciences, USA.
- Jeselle -Ann Laxa | College of Veterinary Medicine, Western University of Health Sciences, USA.
- Dr. Dongbin Lee | Institute of Animal Medicine, College of Veterinary Medicine, Gyeongsang National University, Rep. of Korea.
- Dr. Fanglong Dong | College of Podiatric Medicine, Western University of Health Sciences, USA.

#### ABSTRACT

The distal sesamoidean impar ligament (DSIL) is part of the podotrochlear apparatus and connects the navicular bone (NB) to the distal phalanx (P3) of the horse foot. It is unknown how the DSIL functions in the pathophysiology of caudal heel pain, such as navicular syndrome, despite its association with the vascular and neural supply to the NB. Because the DSIL is a broad, short ligament that is difficult to detect with standard imaging techniques, a histological examination is necessary. Our goal is to shed light on the DSIL's typical makeup so that anomalies or diseases can be contrasted with it. The objectives of this study were: 1) To determine the normal histological composition of the DSIL and 2) To investigate the impact of the breed and age. The cadaveric DSIL samples (n=42) were obtained from young Thoroughbred (TB), young Quarter (QH), and old Quarter horses' feet, sectioned, processed, and stained with Trichrome and H&E stains. Measurements including the size of vessels, number of vessels and nerve fascicles, and relative density of collagen and adipose tissue were taken within 3x3 mm areas of interest on each slide. We found that the number of vessels was significantly higher in young TB and QH than in older QH, and the number of vessels was significantly higher in TB than in QH (P<0.0001). Our results imply that there is a difference in histological properties of the DSIL between age and breed.





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Schedule (Sept 5)

Schedule (Sept 6)

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Podium Abstracts

Poster Abstracts

# Poster Abstracts







# Poster

## Jennifer Burns

Atlantic Veterinary College

### Racing performance of Standardbred horses following surgical treatment of apical proximal sesamoid bone fractures

#### AUTHOR NAME / AFFILIATION

- Jennifer Burns DVM, MSc, DABVP (Equine) | Assistant Professor | Department of Health Management | Atlantic Veterinary College, University of Prince Edward Island, PEI
- Emily John DVM, PhD, DACVIM | Assistant Professor | Department of Health Management | Atlantic Veterinary College, University of Prince Edward Island, PEI
- Kathleen MacMillan DVM, MSc, DABVP (Equine) | Associate Professor | Department of Health Management | Atlantic Veterinary College, University of Prince Edward Island, PEI
- Aimie Doyle DVM, MSc, DACVS | Professor | Department of Health Management | Atlantic Veterinary College, University of Prince Edward Island, PEI

#### ABSTRACT

##### Introduction

Apical proximal sesamoid bone (PSB) fractures are a common occurrence in Standardbred racehorses due to the high-intensity nature of their work. Studies have evaluated the racing performance after surgical removal of apical fracture fragments in Thoroughbreds, however information pertaining to Standardbred racehorses is limited. Consequently, the objectives of this study were: (i) describe the distribution of apical PSB fractures in a population of Standardbred racehorses; and (ii) measure return to athletic ability in these horses following surgical removal of apical PSB fracture fragments.

##### Methods

Medical records of Standardbred racehorses presenting to the Atlantic Veterinary College for surgical treatment of an apical PSB fracture were reviewed. Lifetime racing records were obtained and the five race starts before injury and the five race starts following surgical treatment were analyzed for total earnings and number of top-3 placings for each horse.

##### Results

Thirty-three horses raced following surgery; 22 of which were racing prior to injury. No significant differences were found in top-3 placings or monetary earnings for the 22 horses which had raced prior to and after surgery. There was no significant difference in limb or sesamoid affected and return to racing. No associations were found between type of surgery performed or degree of suspensory desmitis and whether the horse returned to racing.

##### Conclusion

88% of horses that were racing prior to injury also raced following surgical treatment of an apical PSB fracture. Surgical removal of apical PSB fractures in Standardbred racehorses does not appear to affect their future athletic ability.



# Poster

## Brittany Davis

University of Calgary

### Nutritional Trace Mineral Deficiencies in Thoroughbred Racehorses – a preliminary investigation

#### AUTHOR NAME / AFFILIATION

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#### ABSTRACT

Thoroughbred racehorses require careful nutritional management to perform and train at the demanding near-maximal speeds required in racing. In a preliminary investigation, hay samples were collected from 4 trainers and daily feed quantities were weighted for 2 randomly selected horses per trainer (n=8). Complete nutritional forage and concentrate results were analyzed.

Dietary copper intake averaged 88.55 mg per horse fulfilling only 41.6% of their daily required intake (RDI). Dietary zinc intake averaged 385.1 mg per horse meeting only 65.8% of the RDI. Dietary Manganese intake averaged 532 mg per horse fulfilling 90.6% RDI. While calcium and phosphorus content were usually sufficient, 75% of the horses did have a calcium deficiency, with half the horses exhibiting a Ca:P that was either below or above the optimal limits for growing horses. Similarly, forage was consistently below recommended minimal consumption at 83% of RDI.

Copper, zinc, and manganese play essential roles in the body, especially in bone and soft tissue development, maintenance, and function. Chronic deficiencies in these trace minerals may contribute to injury risk and injury development through reduced musculoskeletal tissue properties and repair abilities. Imbalances in the Ca:P can affect bone and joint development and quality, contributing to orthopedic issues. Forage consumption below recommended daily minimums increases the risk of colic and contributes to poor gastrointestinal health. Trainers feed all their racehorses similarly, so this deficiency will exist in the 43 total horses belonging to these trainers. Dietary imbalances are of significant concern for racehorse health, safety, and welfare.



# Poster

## Daniela Espinosa

University of Guelph

### Susceptibility patterns and MDR rates for bacterial isolates recovered from sick neonatal foals.

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#### ABSTRACT

**Background:** Blood culture and antimicrobial susceptibility testing direct treatment in sick foals. Preemptive therapy requires clinicians to hypothesize possible causative agents and antibiotic resistance patterns.

**Rationale:** Antibiotic susceptibility trends of bacterial isolates recovered from sick neonatal foals in Ontario are scarce.

**Hypothesis:** Multidrug resistance (MDR) rates are unknown.

**Objectives:** To describe the antibiotic susceptibility and MDR rates from bacterial species recovered from sick neonatal foals.

**Study design:** Descriptive, retrospective study.

**Methods:** Records of foals < 1 mo, admitted to OVC (2011-2023), with a positive bacterial culture and susceptibility testing, were included. Bacterial species isolated, antibiotic susceptibility (amikacin, ampicillin, ceftiofur, chloramphenicol, enrofloxacin, erythromycin, gentamicin, kanamycin, penicillin, rifampin, tetracycline, trimethoprim sulfonamide[TMS]) and MDR were recorded.

**Results:** 80 samples from blood (33), umbilicus (35), synovial fluid (11), tracheal aspirate (18), biopsy (4), incision sites (4), abscess (3) and IV catheters (1) of 77 foals, yielded 109 bacterial isolates. *Actinobacillus* spp. had 88% MDR, resistance to erythromycin and susceptibility to ceftiofur. *Escherichia coli* had 87% MDR, resistance to erythromycin and rifampin, and susceptibility to amikacin, chloramphenicol and enrofloxacin. *Enterococcus* spp. had 83% MDR, resistance to aminoglycosides, rifampin and erythromycin, and susceptibility to ampicillin. *Klebsiella* spp. had a 57% MDR, including resistance to erythromycin and rifampin, but was more susceptible to amikacin and enrofloxacin. The most susceptible isolates were *Streptococcus* spp.

**Conclusions:** *S. zooepidemicus* is an important cause of neonatal infections that remains susceptible to common antibiotics. MDR is commonly observed in *Actinobacillus* spp., *E. coli*, *Enterococcus* spp. and *Klebsiella* spp.





# Poster

## Karelhia Garcia-Alamo

University of Calgary

### Effect of footing and movement pattern on the thoracolumbar Range of motion of Thoroughbred horses

#### AUTHOR NAME / AFFILIATION

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#### ABSTRACT

The role of the equine back in modulating locomotion emphasizes the need to develop a system that aids with early recognition of locomotor abnormalities in this region, contributing to preventing injuries and improving welfare. Objective measurement of the normal movement of the equine Thoraco-Lumbo-Sacral (T-L-S) region across different surfaces and movement patterns remains limited. In this study, we used an inertial measurement unit system (EquiGait©) to quantify differential rotational and translational T-L-S range of motion (ROM) during overground locomotion and assessed the influence of the surface type on back ROM. Twenty-five recently retired race Thoroughbred geldings, aged between 3 and 8 years, were trotted in a straight line and lunged on both sand and turf surfaces. Back ROM was analyzed using general linear regression models to assess associations between surface type and T-L-S ROM. Based on preliminary data collected, we hypothesized that T-L-S ROM will be higher on sand than on turf. Pilot data shows a consistent increase in neck and back ROM in sand over turf in different anatomical locations; Axial rotation at Poll-withers: Turf 13.1(7.5), Sand: 22.7(9.8). Lumb-Sacral: Turf 8.2 (6.6) Sand 11.9 (2.4). Flexion-Extension, Poll-withers: Turf 8.1 (7.4), Sand: 10.4 (10.4), Lumb-Sacral: Turf 4.7 (1.5), Sand 3.1 (1.3). Lateral Bending Poll-withers: Turf 3.8 (7.8), Sand: 13.9 (5.6), Lumb-Sacral: turf 0.9 (0.7), Sand 2.3 (0.7), confirming our hypothesis. This study will aid in creating a comprehensive performance assessment protocol for evaluating the movement of the thoracolumbar region.



# Poster

## Kallie Hobbs

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### Effect of footing and movement pattern on the thoracolumbar Range of motion of Thoroughbred horses

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#### ABSTRACT

**Introduction:** Endothelial glycocalyx (EG) degradation results in vascular hyperpermeability, inappropriate leukocyte adhesion and intravascular coagulation. Small intestinal (SI) EG shedding during inflammatory and ischemic states has been shown to be predictive of morbidity and mortality in human ICU settings. The shedding of EG components such as syndecan-1, heparin sulfate (HS), and hyaluronan shedding both intravascularly and peritoneally in horses has not been evaluated. Greater understanding of EG dysregulation may contribute to improved diagnostic utility in horses with SI disease. Therefore, the main objective of this study was to determine if blood and peritoneal fluid (PF) levels of syndecan-1, HS and hyaluronan are elevated in horses with small intestinal disease compared to their healthy counterparts.

**Methods:** Twelve horses, grouped as healthy (H; 22), small intestinal inflammation (SII; 12), or small intestinal strangulating (SIS; 34). Using equine validated ELISAs, syndecan-1, hyaluronan, and heparan sulfate levels were evaluated in blood and PF and compared between groups using a one-way ANOVA ( $P < 0.05$ ).

**Results:** Hyaluronan was significantly increased in the blood ( $p=0.0193$ ) and PF ( $p=0.0192$ ) of SIS disease compared to H horses. Hyaluronan and HS were significantly increased in the blood of SII compared to SIS horses ( $p=0.0449$ ,  $p=0.0188$ ). Elevated blood levels of hyaluronan were associated with non-survival ( $p=0.014$ ). Heparan sulfate was significantly increased in the blood ( $p=0.0039$ ) and PF ( $p=0.0151$ ) of SIS disease compared to H horses.

**Conclusions:** Based on preliminary findings, EG components are elevated in horses with SI disease and may have utility in differentiating horses with SII and SIS disease.



# Poster

## Olivia Kenny

University of Calgary

### Comparison of Three Objective Gait Analysis Systems in Horses with Multi-Limb Lameness

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#### ABSTRACT

Evaluation of horses with multi-limb lameness can be challenging in a clinical setting. While a veterinarian's subjective examination of lameness provides vital clinical assessment of the horse's gait, objective gait analysis systems can be beneficial in detecting asymmetric movements not visible to the human eye. These systems can aid clinical diagnostics and potentially provide methods of monitoring locomotion changes throughout rehabilitation. This study evaluates the effectiveness of three commercially available gait analysis systems in detecting asymmetrical movements across a diverse population of horses with multi-limb lameness. The systems evaluated were: an IMUS (inertial measurement unit system), an AIA (artificial intelligence app) and PSB (pressure sensor boots). Analysis of data from thirty-one horses trotted straight on a hard surface was completed. Twenty-three were equipped with all 3 systems, with the remaining subjects not evaluated in PSB. When determining the limb causing the most asymmetric movement, the AIA and IMUS agreed in 80.6% of cases, while the PSB agreed with the AIA and IMUS system for 34.8% and 26.1% of cases respectively. Using a Bland and Altman analysis, the AIA and IMUS comparison produced absolute bias and precision values of 1-5% and 8-16%, respectively. These reported values are below the 25% threshold required for reliable human visual observations; thus, this study concludes that two of the investigated systems can consistently detect gait asymmetries in cases of complex multi-limb lameness. These findings are valuable for veterinarians and researchers in selecting appropriate monitoring using objective measurements for lameness evaluation in horses.





# Poster

## Mary Margiotta

University of Guelph

### Assessment Tool for the Evaluation and Promotion of Good Racehorse Welfare

#### **AUTHOR NAME / AFFILIATION**

- Mary Margiotta

#### **ABSTRACT**

Currently, Ontario, CA, does not have established welfare protocols for horses on track property during race days. Despite the Ontario racing sector's significant economic contribution, its operation relies heavily on maintaining a social license to operate. With increasing public concern about racehorse welfare, implementing a thorough welfare assessment protocol would highlight the standards of care and conditions for horses at the racetrack. The data gathered through this protocol can inform recommendations for optimal care, allowing racetracks to adjust both short-term and long-term goals to elevate welfare standards based on accurate information. With the use of this assessment protocol, racetracks can demonstrate their commitment to promoting the highest standards of equine welfare within the racing industry. This can help to enhance the reputation of the racing industry, build public trust, and ultimately contribute to the long-term sustainability and success of horse racing in Ontario. This protocol was developed based on the NFAACC Code of Practice for Equines, along with the rules and guidelines provided by the Alcohol and Gaming Commission of Ontario (AGCO) for the management and care of racehorses. It is intended for use by racetracks and their governing bodies to oversee racehorse welfare on their premises. While this protocol was developed for Ontario, it is easily adaptable for racing in any region. Implementing this protocol within the racing industry will continue to promote transparency between governing bodies, jockeys, horse owners and the public regarding the welfare of racehorses while at the racetrack.



# Poster

## Shannon Massie

University of Calgary

### Oxygen consumption, locomotory-respiratory coupling and EIPH in horses during the Paso Fino gait

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#### ABSTRACT

**Introduction:** Colombian Paso Fino horses are known for their smooth gait and high stride frequencies; however, the associated workload has not been evaluated. The objective was to describe oxygen consumption (VO<sub>2</sub>), heart rate (HR), locomotory-respiratory coupling, and haematology of the Paso Fino gait, including whether exercise-induced pulmonary hemorrhage (EIPH) was present.

**Methods:** Eleven Paso Fino horses performed a standardized Paso Fino gait test across two wooden sounding boards ("In" and "Out"). VO<sub>2</sub> and ventilatory parameters (tidal volume (VT); peak inspiratory and expiratory airflows (PkVI, PkVE); respiratory rate (RR); minute ventilation (VE)) were measured using a portable ergospirometry facemask. Heart rate (HR) was measured using electrocardiograms. Post-exercise lactate, hematocrit and electrolytes were measured. EIPH was assessed via tracheobronchoscopy. Four horses completed a secondary high-intensity gallop test to elicit peak VO<sub>2</sub>, used as a workload reference.

**Results:** Median [IQR] strides/second was 2.8 [2.7, 2.9]. HR were significantly higher across the "Out" boards (189 [186, 191] bpm) than "In" (182 [177, 186] bpm). Relative VO<sub>2</sub> measured 49.8 [48.4, 59.5] ml/(kg.min) (VT=8.6 [8.0, 10.7] L; RR=87.1 [75.4, 99.5] bpm; VE=869 [740, 902] L/min; PkVI=33.4 [32.7, 37.2] L/s; PkVE=44.2 [40.3, 46.0] L/s). Locomotory-respiratory coupling was 2:1. Post-exercise blood lactate (2.7 mmol/L) and hematocrit (50%) were moderately increased. Three horses showed endoscopic evidence of Grade-1 EIPH. The Paso Fino gait equaled 79 [68, 80]% VO<sub>2</sub>pk and 90% maximal HR, compared to high-intensity gallop.

**Conclusions:** Despite high-energy demands requiring full collection and rapid footfalls, the Paso Fino gait represents submaximal efforts based on VO<sub>2</sub><VO<sub>2</sub>pk and blood lactate.



# Poster

## Grace Ochigbo

University of Calgary

### Researching select Alberta plants towards isolation and identification of novel anthelmintic compounds

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#### ABSTRACT

Antiparasitic resistance to available drugs and the slow discovery of new agents necessitates the urgent search for new medications to effectively combat parasitic infections in animals. Indigenous people traditionally utilize plants as parasiticides. Working with a Traditional Knowledge Keeper, we identified local Alberta plants they consider antiparasitic and may be utilized in self-medication by wild animals as starting research materials.

Fresh plant tissues were extracted in 60% isopropanol for 2 weeks, filtered, and stored in the dark at room temperature. Aliquots of the whole plant extracts were homogenized, air-dried and reconstituted with 2% DMSO and exposed to a mixed population of equine strongyle larvae for 48 hours. Motility reductions were observed and recorded. Whole extracts that produced great larval motility inhibitions underwent serial fractionation by HPLC. Resulting fractions were tested using motility assay and active fractions then sub-fractionated using a different column chemistry. Chemometric analysis of the resultant LC/QTOF data was done. This process was repeated until the chemical complexity was reduced sufficiently for putative compound identifications.

Whole plant extracts significantly reduced larval motility (69-97%) compared to extraction blank and untreated nematode controls (6-15%) after a 48-hour exposure period though comparable to those by ivermectin (71-76%). Initial and sub-fractionation on phenylhexyl column produced 2 active fractions each with motility inhibitions (62-81%) while sub-fractionation on C-18 column yielded 3 active fractions (62-97%). Extract complexity has been reduced from 660 to 93 compounds.

Indigenous knowledge of apparent animal self-medication behavior may lead to rapid discovery of novel veterinary compounds from plants.





# Poster

## Nicole Osinchuk

University of Calgary

### A Proteomic Perspective on the Morphogenesis and Degeneration of the Equine Superficial Digital Flexor Tendon

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#### ABSTRACT

Injury of the superficial digital flexor tendon (SDFT) is one of the most common injuries affecting performance horses, often accompanied by poor healing and a high risk of re-injury, loss of athletic performance, and chronic pain. The risk of significant SDFT injury increases in aged athletes, indicating an innate loss of inherent capability to repair microdamage sustained during exercise with increasing age. The purpose of this study is to improve our knowledge of the changes within both the cells and extracellular matrix of the SDFT over time in response to both advancing age as well as in the face of athletic performance. We obtained SDFT samples from ten horses grouped into six categories: mid-gestation, late gestation, young non-racing, young racing, old non-racing, and old racing. Our fetal samples represent timepoints at which regeneration is capable in response to injury (mid-gestation) compared with a fetal timepoint at which this capability is lost (late-gestation). Likewise, amongst horses challenged by athletic performance and presumably incurring chronic microdamage, young patients clinically demonstrated improved capacity to not only repair microdamage but remodel tendon tissue to function better in the face of continued performance when compared to aged samples. Using an unbiased proteomics approach, data was analyzed using Maxquant and subjected to pathway enrichment analysis using the STRING database (STRING-db) and Metascape. Increasing our understanding of the proteomic changes and proteome-wide activity relative to the regenerative or reparative capacity of the SDFT will be imperative to improving prevention, treatment plans and care for all horses.



# Poster

## Thilo Pfau

University of Calgary

### Monthly variation of gait asymmetry in Thoroughbred racehorse in training

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#### ABSTRACT

**Introduction:** Racehorses regularly perform highspeed exercise with peak limb forces of up to 2.5 times bodyweight. Repetitive loading and accumulation of microdamage contributes to failure of anatomical limb structures. Movement symmetry is associated with force imbalances between limbs. Differences in movement symmetry between days indicate a continual shift in forces between limbs. We hypothesize that longitudinal assessments at monthly intervals exceed daily differences?

**Methods:** 286 Thoroughbreds in training (November 2014 - May 2016) at Singapore Turf Club were randomly assessed at monthly intervals during straight-line, in-hand trot. Vertical head and pelvic movement symmetry was quantified with inertial sensors. Horses with >1 gait assessments were included. Absolute differences were calculated between repeats and compared to published values for daily differences in Thoroughbreds.

**Results:** In total 1663 gait assessments were conducted. 257 horses were assessed >1 time contributing 1633 data sets. The median between repeats was 35 days (25th percentile: 29 days, 75th percentile: 42 days). 95% of repeat differences were within 32 mm and 23 mm for absolute differences between minima and maxima for head movement and within 17 mm and 19 mm for pelvic movement. This corresponds to between 115 and 200 % of daily differences for head movement and between 155 and 173 % for pelvic movement.

**Conclusion:** Head and pelvic movement symmetry differences between monthly repeats clearly exceed daily differences. Further studies should aim to investigate possible association between the increased monthly variation and potential underlying causes, such as impending injuries.



# Poster

## Joy Stock

University of Minnesota, College of Veterinary Medicine

### Case-control analysis for identification of putative exercise associated sudden death causing variants in racehorses

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- Dr. Molly McCue
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#### ABSTRACT

Exercise-associated sudden deaths (EASD) are an important cause of death in racehorses and are likely caused by fatal arrhythmias when necropsy reports are inconclusive. Roughly 30% of EASD necropsies report negative findings (autopsy negative, AN-EASD). Variants in ion channel genes cause at least 30% of human AN-EASDs. Unlike catastrophic musculoskeletal breakdown, the genetic bases of AN-EASDs in horses have been largely unexplored. Whole genome sequences (WGS) of cases and controls were used to identify candidate AN-EASD-causing variants in thoroughbred racehorses. Younger horses with AN-EASD were selected as cases. Older horses with no history of poor performance or cardiac problems were selected as controls. WGS were mapped to the reference equine genome (EquCab3.0). Variants were identified and annotated using a GATK best practices-based pipeline, and SnpEff. Putative AN-EASD-causing variants were identified using SnpSift case-control analysis, which generated five models of association. Variants whose significance in any one of the models met a Bonferroni corrected significance level were chosen for further analysis, yielding 97 variants in 77 different genes. Three predicted high impact frameshift variants that resulted in a loss of function were found in the MARCKS(1) and ENSECAG00000006098(2) genes. Three predicted moderate impact missense variants were found in the NHSL1, MMRN2, and KANK3 genes. The remaining 91 variants were modifier variants. Prioritized variants will be genotyped in a future independent cohort of racehorses with and without AN-EASD to validate candidate variants identified.





# Poster

## Paul Wallace

Oklahoma State University

### Plasma and synovial fluid amikacin concentrations following concurrent systemic and IVRLP amikacin administration in healthy neonatal foals

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#### ABSTRACT

Concurrent systemic administration and intravenous regional limb perfusion (IVRLP) of antimicrobials is commonly performed in equine neonates with sepsis and septic synovitis. Studies evaluating the pharmacokinetics of amikacin administered via IVRLP to neonatal foals are lacking. Our objectives were to compare amikacin concentrations in plasma and synovial fluid following a dosing protocol of 25 mg/kg amikacin divided 16.7 mg/kg IV and 8.3 mg/kg via either cephalic or saphenous IVRLP. We hypothesized that both protocols would result in similar pharmacokinetics, that plasma amikacin concentrations observed at 30 minutes post-systemic administration would exceed a therapeutic target of 53 µg/mL, and that synovial fluid concentrations would exceed a therapeutic target of 160 µg/mL. Eight healthy neonatal foals were administered each protocol at least 48-hours apart. Synovial fluid was obtained at 15 and 30 minutes after IVRLP. The systemic amikacin dose was administered at the time of tourniquet release (30 minutes), and plasma samples were obtained over a 24-hour period. Plasma and synovial fluid amikacin concentrations observed were not different between protocols ( $p=0.6$  &  $0.08$ ), so a single least square means estimate was predicted for each sample type, at each time point. The amikacin concentration estimate [95% confidence interval] for plasma was 66.3 µg/mL [57.5, 75.1] 30 minutes after administration of the systemic dose and was 238.5 µg/mL [146.1, 330.9] in synovial fluid 30 minutes after IVRLP. These results support our hypotheses and suggest that administering amikacin systemically and via IVRLP as described can achieve therapeutic plasma and synovial fluid concentrations in neonatal foals.



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