

**Clinical and Applied Science Research Presentations**  
**(Companion Animal and Other)**  
**Phi Zeta Research Day**  
**March 10, 2015, 1:15-2:45pm**  
**Mosier E-107**

- 1:15 – 1:30 **Heather Vaske** – Assessment Of Renal Function In Hyperthyroid Cats Managed With Hill's® Prescription Diet® Y/D® Feline.
- 1:30 – 1:45 **Nicole San Jose** – The effect of cranial electrotherapy stimulation on cribbing behavior in horses
- 1:45 – 2:00 **Ellen Heinrich** – Effect of Sucralfate on the Relative Bioavailability of Fluoroquinolones and Tetracyclines in Greyhound Dogs
- 2:00 – 2:15 **Eric B. Garcia** – CARDIAC ASSESSMENT OF ZOO-KEPT BLACK-TAILED PRAIRIE DOGS (CYNOMYS LUDOVICIANUS)
- 2:15 – 2:30 **Katie Delph** – Comparison of immunologic responses following intranasal and oral vaccination with a USDA approved, live-attenuated *Streptococcus equi* vaccine
- 2:30 – 2:45 **Keith D DeDonder** – Pharmacokinetics and pharmacodynamics of gamithromycin in pulmonary epithelial lining fluid in naturally occurring bovine respiratory disease in multi-source commingled feedlot cattle

5:00 – 6:00 pm **Reception and Awards Ceremony** Frick Auditorium and Foyer, 2<sup>nd</sup> Floor, Mosier Hall

- Initiation of New Members to Phi Zeta
- Announcement & Presentation of Awards Recognizing Research & Scholarship Accomplishments
- Closing Comments

## **Assessment Of Renal Function In Hyperthyroid Cats Managed With Hill's® Prescription Diet® Y/D® Feline.**

**Heather Vaske**

Author(s): Heather H. Vaske, Laura Armbrust, Steven C. Zicker, Dennis E. Jewell, Gregory F. Grauer

Studies have demonstrated that glomerular filtration rate (GFR) declines with treatment of hyperthyroidism independent of treatment modality. Hill's® Prescription Diet® y/d® Feline is a controlled iodine food used to control feline hyperthyroidism, however, its effects on renal function have not been evaluated. The objective of this study was to assess the effects of y/d® Feline on renal function in hyperthyroid cats.

Hyperthyroidism was diagnosed in 15 client owned cats based on total thyroid hormone concentration (TT4) and compatible clinical signs. Baseline excretory renal function was assessed via plasma clearance of technetium diethylene-triamine-pentaacetate (GFR), serum creatinine (sCr), and serum symmetrical dimethyl arginine (SDMA) concentrations. Ultrasound was utilized to measure muscle mass (epaxial muscle diameter [EMD]). After a transition period to y/d® Feline, it was then fed exclusively for 6 months and baseline parameters were re-assessed. A t-test was used to evaluate changes over time; a *P*-value <0.05 was considered significant.

Feeding y/d® Feline for 6 months resulted in a significant decrease in mean TT4 (185.5 vs. 60.5 nmol/l) and sCr (1.11 vs. 0.93 mg/dl). No change was observed in GFR (2.31 vs. 2.26 ml/min/kg), SDMA (12.47 vs. 12.26 µg/dl), or EMD (left 1.56 vs. 1.62 cm and right 1.55 vs. 1.56 cm). SDMA correlated better with GFR than sCr ( $r^2$  0.50 vs. 0.30).

Although not all cats became/remained euthyroid throughout the study period, management with y/d® Feline decreased TT4 without decreasing GFR or EMD. Compared with sCr, SDMA may be a better marker of renal excretory function in cats with hyperthyroidism.

## **The effect of cranial electrotherapy stimulation on cribbing behavior in horses**

**Nicole San Jose**

Author(s): Jeanine Berger DVM, DACVB, Nicole San Jose, Kathryn Holcomb MA, Balazs Toth DVM, Sharon Spier DVM, PhD, DACVIM

Crib-biting, also known as cribbing, is a stereotypic behavior seen in some horses that is believed to be a result of stress involved with domestication and management. When engaging in crib-biting behavior, a horse grasps a solid object such as a fence with its teeth and sucks in air. Horse owners consider this a detrimental habit for both animal health and property preservation. In response, owners have frequently resorted to methods that can cause pain in horses in order to reduce this unwanted behavior with variable success. Cranial electrotherapy stimulation is an FDA approved method for treating anxiety, depression, and stress in humans. The purpose of this study is to analyze the effects of a cranial electrotherapy stimulation device designed for use in horses and whether or not the device reduces crib-biting behavior. The overall objective is to improve equine health and welfare by testing a method that focuses on managing the underlying cause of crib-biting behavior rather than using disciplinary methods. The design of this study includes two components. The experimental component quantified crib-biting behavior in a group of horses specifically used for research. Horses in a treatment group showed a statistically significant decrease in rate of crib-biting compared to horses in a control group. In addition, crib-biting behavior appeared to have decreased as treatments progressed and relapsed as treatments ended. The clinical component of this study is on-going and uses privately-owned horses to demonstrate the effects of the device in real-life situations.

## **Effect of Sucralfate on the Relative Bioavailability of Fluoroquinolones and Tetracyclines in Greyhound Dogs**

**Ellen Heinrich**

Author(s): Kate KuKanich, Sarah Guess, Autumn Harris, Ellen Heinrich, Butch KuKanich

Pharmacokinetic studies in animals are needed to support current drug recommendations. Sequential studies examined the interaction of sucralfate, a gastroprotectant, with first minocycline (a tetracycline) and then enrofloxacin and ciprofloxacin (fluoroquinolones). The objectives were to determine whether a) concurrent administration or b) 2 hr delayed administration of sucralfate reduced the oral bioavailability of an antibiotic, using a randomized crossover design with five Greyhound dogs. Each antibiotic (minocycline 10mg/kg, enrofloxacin 5mg/kg, or ciprofloxacin 25mg/kg) was administered orally alone (M, E, C), concurrently with oral sucralfate (1g of a 200mg/ml suspension) (MS, ES, CS), or 2hrs prior to oral sucralfate (1g of a 200mg/ml suspension) (M2S, E2S, C2S). Plasma antibiotic concentrations were evaluated using liquid chromatography and mass spectrometry, and a repeated measures ANOVA was used to compare pharmacokinetic parameters across groups. Maximum concentration (C<sub>MAX</sub>) and area under the curve (AUC) of MS were significantly lower than M, and relative bioavailability (%F) of MS was 35% compared to M, whereas a 2hr delay resulted in no differences in C<sub>MAX</sub> or AUC from M and %F of 140%. There was variability in ciprofloxacin absorption, with no significant differences among groups; however %F of CS was 48% and %F of C2S was 87%, suggesting a clinically relevant interaction with benefit from sucralfate delay. Enrofloxacin absorption was less variable, and no interaction was documented with concurrent sucralfate administration. These results have important clinical implications concluding that it is important to stagger drug administration of sucralfate with minocycline or ciprofloxacin but not necessary with enrofloxacin.

## **CARDIAC ASSESSMENT OF ZOO-KEPT BLACK-TAILED PRAIRIE DOGS (CYNOMYS LUDOVICIANUS)**

**Eric B. Garcia**

Author(s): Eric B. Garcia, David Eshar, Justin D. Thomason, Kenneth R. Harkin, and David Biller.

Cardiomyopathy is reported to be a relatively common disease condition in prairie dogs; however, there are no reports of normal cardiac physiology and clinical assessment in the prairie dog. The objective of this study was to report the ultrasonographic and radiographic measurements of the heart and plasma troponin concentration in captive black-tailed prairie dogs (Cynomys ludovicianus). Zoo-kept prairie dogs with no clinical signs of disease (n=17) were evaluated. Each animal was anesthetized with isoflurane via facemask and a complete clinical assessment was performed including, complete blood count (CBC) and plasma biochemistry, urinalysis, blood gasses, plasma troponin concentration, three-view whole body radiography and echocardiogram. Standard measurements were taken and the descriptive statistics performed. The data presented here can serve as a reference for objectively evaluating prairie dogs with possible cardiac disease, potentially resulting in earlier diagnosis and, hopefully, more successful treatment.

**Comparison of immunologic responses following intranasal and oral vaccination with a USDA approved, live-attenuated *Streptococcus equi* vaccine**

**Katie Delph**

Author(s): Delph K, Davis EG, Bello N, Hankins K, Wilkerson MJ, Ewen CL

The purpose of this pilot study was to compare both systemic and local immune responses following intranasal or oral vaccination for *Streptococcus equi* var *equi*. Eight healthy horses with *Streptococcus equi* M protein (SeM) titers less than 1:1600 were vaccinated with a live-attenuated vaccine, intranasally or orally, in a two-vaccine series. Serum and nasal secretions were collected for baseline and 2- and 4-week post-booster vaccination detection of immunoglobulins G (IgG) and A (IgA) to SeM protein. Antibody assessment was performed using a commercially available ELISA for SeM titers and a novel magnetic microsphere assay that utilizes fluorescent imaging for IgA quantitation. Horses vaccinated intranasally had a substantial increase in both serum IgG and IgA SeM antibody levels post vaccination ( $P=0.0006$  and  $P=0.007$ , respectively). Horses vaccinated orally had an increase in the serum IgG SeM antibody levels post vaccination ( $P=0.0150$ ), though the increase was approximately one-third the magnitude of intranasal vaccinates. There was no change in SeM IgA antibody post vaccination in orally-vaccinated horses ( $P=0.15$ ). Results indicate that administration of the live-attenuated Pinnacle® *Streptococcus equi* var *equi* vaccine through intranasal or oral routes resulted in an increase in serum IgG SeM antibody, though the response magnitude differed between administration routes.

## **Pharmacokinetics and pharmacodynamics of gamithromycin in pulmonary epithelial lining fluid in naturally occurring bovine respiratory disease in multi-source commingled feedlot cattle**

**Keith D DeDonder**

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The objectives of this study were to determine if 1) a correlation exists between individual pharmacokinetic parameters and treatment outcome when feeder cattle were diagnosed with bovine respiratory disease (BRD) and treated with gamithromycin and 2) if there was a stronger correlation between treatment outcome and gamithromycin concentration in plasma or in the pulmonary epithelial lining fluid (PELF) effect compartment. The study design was a prospective, blinded, randomized clinical trial utilizing three groups of 60 steers/bulls randomly allocated sham injection or gamithromycin mass medication.

Gamithromycin susceptibility of *M haemolytica* (n=300) and *P multocida* (n=238) were determined using broth microdilution. A two compartment pharmacokinetic model with a compartment for gamithromycin in plasma and PELF was developed using rich datasets from unpublished studies. The sparse data from our study were then fit to this model using nonlinear mixed effects modeling to estimate individual parameter values which were used to simulate full time-concentration profiles for each animal, which were analyzed using non-compartmental methods so that classical PK/PD indices could be calculated for plasma and PELF.

Marginally significant positive correlations were found between treatment success and both plasma ( $P = 0.06$ ) and PELF ( $P = 0.08$ )  $AUC_{0-t}$ . An increased gamithromycin mean residence time (MRT) in the PELF was associated with a successful case outcome ( $P = 0.03$ ). Calculated PK/PD indices are indicative that for both *M haemolytica* and *P multocida* a larger drug exposure in terms of concentration, and time of exposure, was favorable to a successful case outcome, although no statistical differences were observed.