

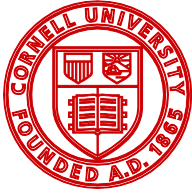
**Cornell University**  
College of Veterinary Medicine



# Clinical Investigators' Day



**October 16, 2015**



## Cornell University College of Veterinary Medicine

**W**elcome to the 2015 Clinical Investigators' Day, sponsored by the Cornell University College of Veterinary Medicine. The primary goal of this forum is to provide an opportunity for residents and interns to showcase ongoing investigations carried out at Cornell University College of Veterinary Medicine. It is our hope that greater insights will be gained in the breadth and depth of clinical investigations conducted at the College and will serve as a catalyst to promote greater interactions among colleagues with clinical and basic science research interests.

### **Organizing Committee**

Dr. Elizabeth Buckles, Co-Chair  
Dr. Jonathan Cheetham  
Mr. Kim Eaton  
Mr. Doug Fink  
Ms. Kathleen Hall  
Dr. Ursula Krotscheck  
Dr. Mary Martin, Co-Chair  
Dr. Santiago Peralta  
Dr. Tracy Stokol, Co-Chair  
Dr. Rory Todhunter

The organizing committee thanks the following individuals who contributed to the success of the Day:

Dr. Rodney Dietert  
Mr. Dave Frank  
Ms. Nancy Grossman  
Mr. Drew Kirby  
Ms. Nancy Rice  
Dr. Meg Thompson  
Mr. Chad Westmiller

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## CURRENT CVM CLINICAL TRIALS



### **Dogs**

- Prognosis in trauma and sepsis
- Platelet-rich plasma in osteoarthritis
- Lymphoma tissue banking
- Phase II: doxycycline and B-cell lymphoma
- Longevity pathways
- Immunoprofiling ITP for individualized therapy
- Complement in IMHA
- Innate immunity in allergic disease
- Vitamin D status in immune-mediated disease
- Heat and heartworm in shelters
- Palladia™ and hypothyroidism
- Genomic approaches in mixed-breeds
- Lipids and thrombosis

### **Dogs**

- Cerenia™ as an adjunct analgesic
- Cranial cruciate rupture and surgical technique
- Best abdominal wound closure

### **Cats**

- Carboplatin in injection site sarcomas
- DNA damage and injection site sarcomas
- Genetic mapping and genomic resources Non-thyroidal illness and thyroid testing
- Sequencing studies of coronaviruses

### **Cats and Dogs**

- Biomarkers in critically ill patients

**PROGRAM SCHEDULE**  
**Friday October 16, 2015**  
**Lecture Hall II, Veterinary Education Center**

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|                               |  |              |
|-------------------------------|--|--------------|
| <b>8:30am-9:15am</b>          | Continental Breakfast (VEC Atrium)   |              |
| <b>9:15am-9:30am</b>          | Welcome & Introductions – Dr. Elizabeth Buckles / Dr. Rory Todhunter   |              |
| <b><u>9:30am-10:00am</u></b>  | <b><u>Presentation</u></b><br>“PUMP UP YOUR CAREER”<br><b>Denni Day</b> , President, VetPharm  |              |
| <b><u>10:00am-11:00am</u></b> | <b><u>Resident Presentations</u></b> – Moderated by <b>Dr. Rolfe Radcliffe</b><br>CANINE LIPOPROTEINS ENHANCE FIBRINOLYSIS AND ALTER FIBRIN CLOT STRUCTURE<br><b>Midori G. Asakawa</b> – Clinical Pathology Resident   | <b>Pg. 1</b> |
|                               | THE EFFECTS OF HIGH-DOSE, LONG-CHAIN, OMEGA-3 FATTY ACIDS ON COAGULATION AND FIBRINOLYSIS IN DOGS; A RANDOMIZED CROSS-OVER TRIAL<br><b>April E. Blong</b> – Small Animal Nutrition Resident  | <b>Pg. 2</b> |
|                               | AUTOLOGOUS PLATELET RICH PLASMA TREATMENT FOR CANINE INDOLENT CORNEAL ULCERS<br><b>Michele L. Edelmann</b> – Comparative Ophthalmology Resident  | <b>Pg. 3</b> |
|                               | EFFECT OF VARIOUS ANTI-PLATELET DRUGS ON <i>EX VIVO</i> EQUID HERPESVIRUS TYPE 1-INDUCED PLATELET ACTIVATION<br><b>Daniela Hernandez Muguero</b> – Clinical Pathology Resident   | <b>Pg. 4</b> |
| <b><u>11:00am-11:30am</u></b> | <b><u>Break</u></b>  |              |
| <b><u>11:30am-12:15am</u></b> | <b><u>Resident Presentations</u></b> – Moderated by <b>Dr. Kyla Ortved</b><br>IN VIVO THREE-PHOTON FLUORESCENT MICROSCOPY ENABLES NOVEL STRUCTURAL AND FUNCTIONAL IMAGING OF THE SPINAL CORD<br><b>SallyAnne L. Ness</b> –Staff Internist, PhD candidate in Biomedical Engineering | <b>Pg. 5</b> |
|                               | DYNAMICS OF MSC IMMUNEPRIVILEGED STATUS IN AN INFLAMED ENVIRONMENT<br><b>Jacqueline A. Hill</b> – Large Animal Surgery Resident  | <b>Pg. 6</b> |
|                               | EVALUATION OF NSAIDS IN RODENTS USING A PLANTAR INCISION PAIN MODEL<br><b>Terese E. Noe</b> – Laboratory Animal Medicine Resident  | <b>Pg. 7</b> |
| <b><u>12:15pm-1:45pm</u></b>  | <b><u>Lunch &amp; Presentations</u></b>  |              |
| 12:15-1:00                    | Lunch  |              |
| 1:00-1:30                     | “PANEL DISCUSSION: OPPORTUNITIES BEYOND YOUR RESIDENCY”<br>Drs. Susan Hackner, Galina Hayes, Nora Springer, and Bettina Wagner   |              |
| 1:30-1:45                     | Break  |              |

(Schedule Continued)

**1:45pm-2:45pm**

**Keynote Address**

**“INTEGRATING COMPARATIVE ONCOLOGY TO IMPROVE  
DEVELOPMENTAL THERAPEUTICS: A NEW PATH FORWARD”**

**Dr. Kristy Richards, PhD, MD, Associate Professor  
Department of Biomedical Sciences, Cornell University**

**2:45pm-3:45pm**

**Resident Presentations – Moderated by Dr. Scott Palmer**

**IMPACT OF DIETARY PLANE OF ENERGY DURING THE DRY PERIOD ON  
LIPOPROTEIN PARAMETERS IN THE TRANSITION PERIOD IN DIARY CATTLE**

**Ashleigh W. Newman – Clinical Pathology Resident**

**Pg. 8**

**COMPARISON BETWEEN INTRAORAL RADIOGRAPHIC AND COMPUTED  
TOMOGRAPHIC FINDINGS FOR DIAGNOSING PERIODONTITIS AND  
ENDODONTIC DISEASE IN DOGS**

**Robert Campbell – Dentistry and Oral Surgery Resident**

**Pg. 9**

***STREPTOCOCCUS EQUI* SUBSPECIES *ZOOEPIDEMICUS* IN A POPULATION OF  
SHELTER CATS: A CASE SERIES**

**Tiva Hoshizaki – Shelter Medicine Resident**

**Pg. 10**

**HISTOPATHOLOGICAL FEATURES OF NATURALLY-OCCURRING SALMONELLA  
DUBLIN INFECTION IN NORTHEASTERN HOLSTEIN DAIRY CATTLE**

**Heidi Lee Pecoraro – Anatomic Pathology Resident**

**Pg. 11**

**3:45pm-4:00pm**

**Break**

**4:00pm-4:45pm**

**Resident Presentations – Moderated by Dr. Brian VanderVen**

**DOES HEAD AND NECK POSITION ALTER VERTIBROBASILAR ARTERIAL  
BLOOD FLOW IN DOGS?**

**Justin Cardwell – Diagnostic Imaging Resident**

**Pg. 12**

**DOGS WITH SEPSIS AND TRAUMA HAVE SIGNIFICANTLY INCREASED PLASMA  
CELL-FREE DNA CONCENTRATIONS**

**Jo-Annie Letendre – Small Animal Emergency & Critical Care Resident**

**Pg. 13**

**IDENTIFICATION OF GENE EXPRESSION PROFILES LINKED TO DEGENERATIVE  
MITRAL VALVE DISEASE IN THE SMALL BREED DOG**

**Eva M. Oxford – Cardiology Resident**

**Pg. 14**

**5:00pm**

**Award Presentations and Reception**

**Dr. Lorin Warnick, Interim Dean, Cornell College of Veterinary Medicine**



## Keynote Speaker



***Kristy Richards, PhD, MD, Associate Professor, Department of Biomedical Sciences, Cornell University and Department of Medicine, Division of Hematology/Medical Oncology, Weill Cornell Medical College***

Dr. Richards is a medical oncologist who specializes in treating lymphoma patients, and her laboratory focuses on finding new and better ways to treat lymphoma. Dr. Richards earned her undergraduate degree from Cornell University, followed by a Ph.D. in genetics and an M.D., both from Stanford University. She did her residency in internal medicine at Brigham and Women's Hospital, and completed a hematology/oncology fellowship at the MD Anderson

Cancer Center.

Dr. Richards co-directs the Cross-Campus Experimental Therapeutics Program at Cornell. Her research interests include genetic and genomic approaches to understanding lymphoma biology. Her lab is using genomic strategies to characterize a canine model of lymphoma in pet dogs that could provide a more representative animal parallel for therapeutic trials. She is also involved in clinical trials that focus on improved therapeutic strategies for lymphoma patients.

## Speakers



***Denni O. Day, RN, MSPH***

Denni has more than 25 years of healthcare experience, spanning the fields of clinical nursing, hospital and long-term care administration, management consulting, information systems design and implementation, teaching, and research. She received an undergraduate degree in biology from American University, a nursing degree from Alfred University, and a master of science degree in public health from the University of North Carolina (Chapel Hill).

Before starting VetPharm, Denni was the chief financial officer of the Clinical Research Institute at the University of Rochester. She also created and directed the Community Research Network, an academic consortium that grew to include more than 1,400 private-practice physicians who participated in industry-sponsored clinical trials. Prior to that, Denni served on the faculty of the University's School of Medicine and Dentistry and also was the Associate Director for Administration and Finance of the Clinical Trials Coordination Center.



***Galina Hayes, BVSc, PhD, Assistant Professor of Small Animal Surgery, Department of Clinical Sciences, Cornell University***

Dr. Hayes graduated from Bristol University in 1998. She followed this with several years of mixed and small animal private practice before obtaining her Royal College of Veterinary Surgeons certificate. She has completed a private practice internship in Calgary followed by an Emergency Critical Care residency at the University of Guelph in combination with a PhD in epidemiology.

Dr. Hayes then completed a surgery residency fellowship at Guelph in combination with a post-doc fellowship and a DVSc in pharmacokinetic modeling. Dr. Hayes is double-boarded in ECC and surgery.

## (Speakers Continued)



***Susan Hackner, BVSc, MRCVS, Chief Medical Officer, Cornell University Veterinary Specialists (CUVS)***

Dr. Hackner completed her veterinary degree in South Africa and immigrated to the US to pursue a residency in Internal Medicine at the University of Pennsylvania School of Veterinary Medicine. She also completed a fellowship there in Emergency & Critical Care. She is board certified in both Internal Medicine (1992) and Emergency & Critical Care (1994). Prior to starting CUVS, she was Chair of the Department of Critical Care & Emergency Medicine at the Animal Medical Center, NY.

Dr. Hackner's primary area of interest is hematology, thromboembolism and bleeding disorders. She has published more than 15 chapters in major veterinary textbooks and has presented over a hundred lectures in the US and internationally. She has been actively involved in the initiation and development of Emergency-Critical Care as a specialty, establishing standards in the field, and educating and mentoring all levels of trainees.



***Nora L. Springer, DVM, PhD, Clinical Pathology, Cornell University***

Dr. Springer has been a Post-Doctoral Graduate Fellow in the Fischbach Laboratory in the Department of Biomedical Engineering at Cornell since 2013. She received her DVM in 2008 from Kansas State University. Subsequently, she completed a companion animal medicine and surgery internship at Louisiana State University prior to coming to Cornell in 2009 to partake in a clinical pathology residency. Dr. Springer holds memberships in several professional associations including the Biomedical Engineering Society, the American Society for Investigative Pathology, and diplomate status in the American College of Veterinary Pathologists. Her research explores the link between obesity and cancer with particular focus on the biophysical similarities between the obese and tumor microenvironment. Additionally, Dr. Springer has an avid interest in science communication and outreach and actively participates in a collaborative effort with the Cancer Resource Center of the Finger Lakes to connect cancer researchers and individuals personally affected by cancer.



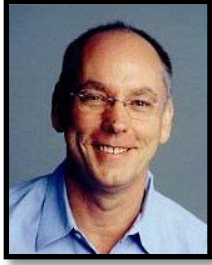
***Bettina Wagner, DVM, Dr. vet. med. Habil., Associate Professor in Immunology, Department of Population Medicine and Diagnostic Sciences; Associate Dean for Research and Graduate Education, Cornell University***

Dr. Wagner was awarded her DVM in 1990 and Dr. vet. med. in Veterinary Immunology in 1993 from the School of Veterinary Medicine, Hannover, Germany. She was a visiting professor and Senior Research Associate at the Baker Institute for Animal Health prior to joining the Population Medicine and Diagnostic Sciences faculty in 2006.

Dr. Wagner's laboratory focuses on research in equine immunology. She is particularly interested in immune responses and protective mechanisms in neonates and young foals. Major pathways that are investigated by her group are adaptive T-cell immunity, antibody isotype responses and cytokine regulation. Dr. Wagner has been awarded several international patents and is the Director of the Serology/Immunology section at Cornell's Animal Health Diagnostic Center.



## Judges



***Philippe Baneux, DVM, Diplomat ECLAM, Professor (Adjunct) Departments of Biomedical Sciences and of Clinical Sciences, College of Veterinary Medicine, and Department of Animal Science, College of Agriculture and Life Sciences. Faculty member, Field of Comparative Biomedical Sciences, Graduate School, Cornell University***

Dr. Philippe Baneux (DVM from University of Ghent, Belgium) has directed laboratory animal care and use programs in academic institutes including the University of Southern California, Harbor-UCLA Medical Center, and UC Irvine.

In 2005 he assumed the position of Executive Director at the Center for Comparative Medicine, Office of the V.P. for Research, Northwestern University. He has been an ad-hoc site visitor for AAALAC International since 1983 and a member of the Council on Accreditation since 2004. Dr. Baneux is the founding president of the European Society of Laboratory Animal Veterinarians and a Diplomat of the European College of Laboratory Animal Medicine (ECLAM). He represents ECLAM on the International Association of Colleges of L.A.M.



***James W. Casey, PhD, Associate Professor of Virology, Department of Microbiology and Immunology, Cornell University***

Dr. Casey received the BS degree in Biology from Wayne State University in 1966 and his PhD from the University of Chicago in 1973 studying Biology. Dr. Casey was a postdoctoral fellow at Cal Tech from 1974-1980 where he studied molecular virology in the laboratory of Norman Davidson.

Dr. Casey's research focuses in two lines of investigation. Oncogenesis in wild populations, primarily in fish and marine turtles, which is an understudied field that has provided new insights into viral agents responsible for this disease. More recently, Dr. Casey has turned his attention to the recent outbreak of viral hemorrhagic septicemia (VHSV) in the Great Lakes, an agent that is having a major impact on numerous species that inhabit these waters.



***Susan Hackner, BVSc, MRCVS, Chief Medical Officer, Cornell University Veterinary Specialists (CUVS)***

*see Speakers above*



***Drew Noden, PhD, Professor Emeritus of Embryology and Animal Development, Department of Biomedical Sciences, Cornell University***

Professor emeritus Drew Noden joined the Cornell Veterinary Medicine Faculty in 1979. His NIH-supported research defined the embryonic origins and generated maps showing the morphogenetic movements of craniofacial peripheral neurons, connective tissues, skeletal muscles and blood vessels. In addition, experimental analyses revealed the mechanisms controlling these processes, and produced over 80 papers. Dr. Noden taught animal development to veterinary, graduate and undergraduate students and tutored in the Animal Body course.

## (Judges Continued)



***Janet Scarlett, DVM, MPH, PhD, Professor Emeritus of Epidemiology, Department of Population Medicine and Diagnostic Sciences***

Dr. Scarlett received her DVM from Michigan State University and her MPH and PhD from University of Minnesota. She has been an Associate Dean of Students and has served as a board member for the Association of Shelter Veterinarians.

Dr. Scarlett is interested in the epidemiologic study of preventive factors for pet surplus in the United States including spay/neuter programs, pet trafficking, veterinary activities impacting relinquishment to animal shelters, and valid epidemiologic uses of shelter software programs.

Dr. Scarlett is the founder and director of Maddie's® Shelter Program, one of only a handful of comprehensive shelter medical programs at veterinary colleges in the United States, designed to elevate the profile of shelter medicine and emphasize the critical need for medical and behavioral programs in all animal shelters. Dr. Scarlett received the SUNY Chancellor's Award for Faculty Service in 2013.

## Moderators



***Kyla Ortved, DVM, PhD, Clinical Assistant Professor, Department of Clinical Sciences, Cornell University; Equine Surgeon and Emergency Clinician, Cornell Ruffian Equine Specialists***

Dr. Kyla Ortved received her DVM degree from the University of Guelph in 2006 and completed her large animal surgical residency training at Cornell University in 2010. Kyla became boarded with the American College of Veterinary Surgeons in 2011. Following her residency, Kyla went on to obtain a PhD in equine cartilage repair at Cornell.

She received her PhD in June 2014 and joined the faculty at Cornell Ruffian in July 2015 where she has been an active equine surgeon. She continues to pursue research in gene and cell therapies for improving cartilage repair and preventing osteoarthritis.



***Scott Palmer, VMD, Adjunct Professor, Department of Population Medicine & Diagnostic Sciences, Cornell University; New York State Equine Medical Director***

Dr. Palmer is a renowned veterinarian who, as the New York State Equine Medical Director, oversees the health and safety of horses at all New York State Thoroughbred and Standardbred racetracks. Since graduating from the University of Pennsylvania, School of Veterinary Medicine in 1976, Dr. Palmer has worked as a staff clinician at the New Jersey Equine Clinic, serving as the Hospital Director from 1997 through 2013.

He is a two-time recipient of the New Jersey Equine Practitioners Veterinarian of the Year award, as well as a recipient of the AAEP President's Award in 2009 and the AAEP Distinguished Service Award in 2010. Dr. Palmer is board certified in equine practice by the American Board of Veterinary Practitioners and has authored dozens of peer-reviewed publications and is a featured speaker at veterinary conferences world-wide.

## (Moderators Continued)

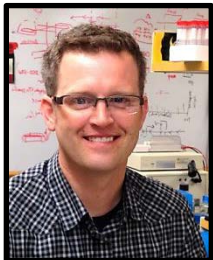


***Rolfe M. Radcliffe, DVM, Diplomate ACVS, Instructor, Large Animal Surgery and Emergency Critical Care, Department of Clinical Sciences, Cornell University***

Dr. Rolfe Radcliffe completed veterinary school and residency training in large animal surgery at the University of Minnesota, and became board-certified as a large animal surgeon by the American College of Veterinary Surgeons in 2001. While working at Cornell University under the mentorship of Dr. Thomas Divers, Rolfe completed fellowship training in large animal emergency critical care and became board-certified by the American College of Emergency Critical Care in

2012.

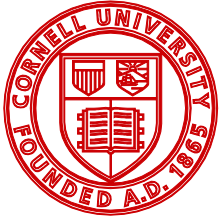
Dr. Radcliffe leads the Large Animal Emergency and Critical Care Service at Cornell, and his interests include large animal emergency critical care, colic surgery, orthopedics, and laparoscopy. Rolfe is involved with several research projects at Cornell University, including the use of biomarkers in critical care horses, applications of human advances in the veterinary field, and innovations in teaching, such as the use of laparoscopy for guiding student learning of rectal palpation in horses.



***Brian VanderVen, PhD, Assistant Professor, Department of Microbiology and Immunology, Cornell University.***

Dr. VanderVen was appointed as Assistant Professor in the Department of Microbiology and Immunology in the College of Veterinary Medicine in 2014. He received his Ph.D. in Microbiology at Colorado State University and completed his postdoctoral training at Cornell University in the College of Veterinary Medicine.

*M. tuberculosis* is causative agent of tuberculosis and is responsible for approximately one-million deaths each year. Partly why *M. tuberculosis* is such a successful pathogen is that the bacterium survives inside macrophages and can persist in humans for decades. Currently the VanderVen lab is focused on understanding how *M. tuberculosis* acquires and utilizes host-derived nutrients during acute and chronic phases of disease. The lab is also actively working to discover new anti-TB drugs to ultimately improve tuberculosis treatment.



**Midori Asakawa, BVSc**

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**Institution and Location**

Azabu University, Sagamihara, Japan  
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**Degree**

BVSc  
Internship  
Residency  
Pathologist  
Residency

**Year**

2006  
2007  
2010  
2012  
2013-present

**Current Position:** Resident in Clinical Pathology, 3<sup>rd</sup> year

**Abstract Title:** CANINE LIPOPROTEINS ENHANCE FIBRINOLYSIS AND ALTER FIBRIN CLOT STRUCTURE

**Authors Names:**

M.G. Asakawa<sup>1</sup>, D.J. Fletcher<sup>2</sup>, C.J. Wong<sup>1</sup>, E. Behling-Kelly<sup>1</sup>

<sup>1</sup>Department of Population Medicine and Diagnostic Sciences, Cornell University, Ithaca, New York

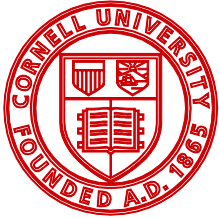
<sup>2</sup>Department of Clinical Sciences, Cornell University, Ithaca, New York

**Project Mentor:**

Erica Behling-Kelly, DVM, PhD, Department of Population Medicine and Diagnostic Sciences

**Abstract:**

In people, dyslipidemia, characterized by increased oxidized low density lipoprotein (ox-LDL) and decreased high density lipoprotein (HDL), is a recognized risk factor for thrombosis. Similar lipoprotein changes are observed in dogs with diseases predisposing for thrombosis, such as hyperadrenocorticism. We hypothesized that native and oxidized LDL would reduce fibrinolysis and that HDL would enhance fibrinolysis in canine plasma. The aim of this study is to evaluate the effects of the major classes of lipoproteins on fibrinolysis in canine plasma. LDL and HDL were isolated from normal canine plasma by density-gradient ultracentrifugation and were oxidized by copper-sulfate treatment. The effect of native and oxidized lipoproteins on fibrinolysis was evaluated using thromboelastography modified by addition of tissue-type plasminogen activator (M-TEG). Purified lipoproteins were also tested for presence of profibrinolytic mediators, using colorimetric enzymatic assays. The ultrastructure of lipoprotein-treated and buffer-treated fibrin clots was examined by scanning electron microscopy (SEM). M-TEG revealed a statistically significant enhancement of fibrinolysis in all lipoprotein-treated samples compared to buffer control. Clot strength and time to clot formation was not different between groups. There was no detectable plasminogen activator or plasmin activity in the isolated canine lipoproteins. On SEM, clots with added lipoproteins showed looser, disorganized fibrin networks with numerous blunt-ended fibrils, compared to native clots. Canine native and oxidized LDL and HDL alter fibrin clot structure in vitro, and this likely underlies their ability to enhance fibrinolysis. Additional studies are required to discern how lipoproteins alter clot formation.



**April E. Blong, DVM, DACVECC**

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Iowa State University, Ames, IA  
North Carolina State University, Raleigh, NC  
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**Degree**

DVM  
Internship  
Internship  
Residency  
Residency

**Year**

2009  
2009-2010  
2010-2011  
2011-2014  
2014-present

**Current Position:** Resident in Small Animal Nutrition, 2<sup>nd</sup> year  
Postdoctoral Associate, Cornell Clinical Fellow, Biomedical Sciences, 3<sup>rd</sup> year

**Abstract Title:** THE EFFECTS OF HIGH-DOSE, LONG-CHAIN, OMEGA-3 FATTY ACIDS ON COAGULATION AND FIBRINOLYSIS IN DOGS; A RANDOMIZED CROSS-OVER TRIAL

**Authors Names:**

Blong, AE; Fletcher, DJ; Wakshlag J, Department of Clinical Sciences, Cornell University, Ithaca, NY

**Project Mentor:**

Daniel J. Fletcher, PhD, DVM, Department of Clinical Sciences

**Abstract:**

Introduction:

Long-chain omega-3 fatty acids (n-3 FA) are added to diets for a variety of reasons including possible anti-thrombotic effects. Using n-3 FAs to prevent thrombosis may provide a new treatment for pro-thrombotic disease states in dogs. This study sought to assess the effects of high-doses of n-3 FAs on coagulation as well as the overall safety.

Methods:

Eight, healthy, client-owned dogs were included in a randomized cross-over trial evaluating two doses of n-3 FAs (250 and 375 mg/kg/day) fed for 12 weeks each. *In vitro* coagulation was assessed every 3 weeks using both whole blood and plasma tissue factor activated thromboelastography with and without added tissue plasminogen activator to better assess fibrinolysis. At weeks 0 and 12, prothrombin time, partial thromboplastin time, platelet count, PFA-100, plasminogen and anti-plasmin were also assessed.

Results:

All dogs tolerated n-3 FA supplementation without apparent complications and readily accepted the liquid supplement fed over an adult maintenance kibble. Dogs receiving 375 mg/kg/d of fish oil after 12 weeks had mildly increased platelet counts (233 vs 266 x10<sup>3</sup>/uL), p=0.011) and plasminogen levels (72.1 vs 81.5%, p=0.016). No other significant changes in coagulation parameters, including thromboelastography, were observed.





**Michele L. Edelmann, VMD**

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**Institution and location**

University of Pennsylvania, Philadelphia, PA  
North Carolina State University, Raleigh, NC  
Cornell University, Ithaca, NY

**Degree**

VMD  
Internship  
Residency

**Year**

2012  
2012-2013  
2013-present

**Current Position:** Resident in Ophthalmology, 3<sup>rd</sup> year

**Abstract Title:** AUTOLOGOUS PLATELET RICH PLASMA TREATMENT FOR CANINE INDOLENT CORNEAL ULCERS

**Authors Names:**

Michele L. Edelmann<sup>1</sup>, Joseph J. Wakshlag<sup>1</sup>, Hussni O. Mohammed<sup>2</sup>, Eric C. Ledbetter<sup>1</sup>

<sup>1</sup>Department of Clinical Sciences, Cornell University, Ithaca, New York

<sup>2</sup>Department of Population Medicine & Diagnostic Sciences, Cornell University, Ithaca, New York

**Project Mentor:**

Eric C. Ledbetter, DVM, Department of Clinical Sciences

**Abstract:**

Purpose: To evaluate effects of adjunctive treatment with platelet rich plasma (PRP) on corneal re-epithelialization, vascularization, and fibrosis in dogs with indolent corneal ulcers.

Methods: Client-owned dogs with uncomplicated indolent ulcers were enrolled in a randomized, placebo-controlled, double-blinded clinical trial. All dogs were treated with diamond burr epithelial debridement, topical tobramycin solution QID, topical atropine sulfate ointment SID, and Elizabethan collar placement for 4 weeks. Dogs were randomly assigned to receive autologous PRP solution QID (treatment group) or artificial tear solution QID (control group). Recheck examinations were performed at 2 and 4 weeks after initiating treatment. Chi-Square and T-tests were utilized to compare categorical and continuous variables, respectively, between groups.

Results: Forty dogs completed the study including 20 dogs that received PRP and 20 dogs that received artificial tears. Eleven of 20 control dogs (55%) and 12 of 20 treatment dogs (60%) were healed by 2-week recheck ( $P=0.75$ ). Fifteen of 20 control dogs (75%) and 18 of 20 treatment dogs (90%) were healed by 4-week recheck ( $P=0.21$ ). Mean difference in corneal vascularization scores between the initial and 4-week recheck was 0.05 in the control group and -0.15 in the treatment group ( $P=0.53$ ). Mean difference in corneal fibrosis scores between the initial and 4-week recheck was 0.45 in both the control and treatment group ( $P=1.00$ ).

Conclusions: In this preliminary study of indolent corneal ulcers, PRP did not improve outcomes, but was well-tolerated. Further research is required to determine if other applications for PRP exist in canine ophthalmology.

*Supported by the Cornell University Resident Research Grants Program and PRP kits donated by Terumo BCT.*



**Daniela Hernandez Muguero, BVSc**

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**Institution and location**

University of Guadalajara, Jalisco, Mexico  
National Autonomous University of Mexico  
National Autonomous University of Mexico  
Cornell University, Ithaca NY

**Degree**

BVSc  
Externship  
MS  
Residency

**Year**

2008  
2011  
2013  
2015-present

**Current Position:** Resident in Clinical Pathology, 1<sup>st</sup> year

**Abstract Title:** EFFECT OF VARIOUS ANTI-PLATELET DRUGS ON *EX VIVO* EQUID HERPESVIRUS TYPE 1-INDUCED PLATELET ACTIVATION

**Authors Names:**

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**Project Mentor:**

Tracy Stokol, BVSc, PhD, Department of Population Medicine and Diagnostic Sciences

**Abstract:**

**Introduction:** Equid herpesvirus type 1 (EHV-1) disease syndromes, such as abortion and equine herpesvirus myeloencephalopathy, are associated with thrombosis in placental and spinal vessels. We have found that EHV-1 activates platelets *in vitro*, inducing alpha-granule release and microvesiculation, possibly contributing to the thrombosis observed in infected horses. Identifying a drug that inhibits these procoagulant effects may help prevent thrombosis in infected horses.

**Objective:** To evaluate standard anti-platelet drugs for inhibition of EHV-1-induced platelet activation *ex vivo*. **Methods:** In a double-blinded study, 12 healthy horses were treated for 5 days with 4 platelet inhibitors (aspirin, clopidogrel, pentoxifylline and theophylline) or placebo followed by a 3-week washout period between treatments. Platelet-rich plasma (PRP) was prepared from citrated blood obtained before treatment and 4 hours after the final drug dose. Platelets were exposed to 2 EHV-1 strains (at 1 plaque forming units/cell) or controls for 10 minutes then platelet activation was assessed by quantifying the percentage of platelets expressing P-selectin and the percentage of platelet-derived microparticles (PDMP, small events positive for Annexin V) with flow cytometry.

**Results:** Mean percentages of P-selectin-positive platelets and PDMPs did not differ significantly between time points (pre- and post-treatment) for each drug, except for platelets exposed to positive control. Similarly, no significance differences in P-selectin-positive platelet or PDMP percentages were observed between drugs at either time point. **Conclusion:** Dosing of horses with standard platelet inhibitors does not affect EHV-1-induced platelet activation *ex vivo*, suggesting these drugs will not be optimal for thromboprophylaxis in EHV-1 infected horses.



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**Abstract Title:** IN VIVO THREE-PHOTON FLUORESCENT MICROSCOPY ENABLES NOVEL  
STRUCTURAL AND FUNCTIONAL IMAGING OF THE SPINAL CORD

**Project Mentor:** Chris Schaffer, PhD, Department of Biomedical Engineering, Cornell University

**Abstract:** Abstract not available



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**Abstract Title:** DYNAMICS OF MSC IMMUNOPRIVILEGED STATUS IN AN INFLAMED ENVIRONMENT

**Authors Names:**

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**Project Mentor:**

Lisa Fortier, DVM, PhD, Department of Clinical Sciences

**Abstract:**

Major histocompatibility complex (MHC) genes code for antigen presenting molecules and are important for immune responses. In horses, bone marrow derived mesenchymal stromal cells (MSCs) were traditionally classified as MHC class II negative, making them immunoprivileged. Contemporary studies demonstrate that environmental factors influence MHC class II expression in MSCs suggesting acquisition of antigenicity. The purpose of this study was to determine how an inflammatory environment alters MHC class II expression of equine MSCs. We hypothesized that MHC class II expression in MSCs originating from horses of varying breeds would increase upon exposure to inflammatory cytokines present in acute joint disease. To validate the use of qPCR to measure MHC expression, MHC class II negative MSCs from four horses were exposed to IFN- $\gamma$  and cells collected at 24, 48 and 96 hours. To determine how MHC class II expression changes in MSCs exposed to inflammatory mediators, MSCs from various breeds were exposed to 6 different treatments: 1) standard MSC media (negative control); 2) TNF- $\alpha$ ; 3) IL-1 $\beta$ ; 4) no treatment conditioned media; 5) IL-1 $\beta$  – stimulated conditioned media; 6) IFN- $\gamma$  (positive control). Cells were collected and MHC class II levels analyzed using both flow cytometry and qPCR. All cells exposed to IFN- $\gamma$  showed upregulation of MHC class II expression on qPCR. MHC class II gene copy numbers were significantly greater compared to baseline as early as 24 hours after exposure to IFN- $\gamma$  (p=0.03) and peaked at 48 hours. Phase two of the experiment is currently in progress.



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**Abstract Title:** EVALUATION OF NSAIDS IN RODENTS USING A PLANTAR INCISION PAIN MODEL

**Authors Names:**

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**Project Mentors:**

Todd J. Pavek, DVM, DACLAM, Center for Animal Resources and Education (Co-mentor)

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**Abstract:**

For rodent analgesia, NSAIDs are preferable over opioids due to reduced frequency of required dosing and ease of availability. We hypothesized that self-administered oral medication provides analgesia equivalent to meloxicam delivered via subcutaneous injection in a plantar incisional model of pain. Mice were divided into 4 groups: sham (anesthesia, no surgery), control (no analgesia), meloxicam injection (2 mg/kg, SC q24hr), and meloxicam medicated diet (2 mg/kg/day PO). An incision was made into the plantar aspect of the right hind foot, the plantaris muscle was elevated, and the incision was closed. Nociceptive assays were performed using von Frey and Hargreaves methodology to test allodynia and hyperalgesia, respectively. Unexpectedly, mice experienced increased hyperalgesia compared to the sham group after both meloxicam diet and injection. Additionally, there was no statistically significant difference in allodynia between sham and control groups at time points other than 12 hr. These findings suggest that the commonly used meloxicam dosage of 2 mg/kg q24hr does not provide sufficient postoperative analgesia in mice. We also sought to evaluate the efficacy of firocoxib versus buprenorphine for reducing allodynia and hyperalgesia in rats. Rats were divided into 6 groups: sham (anesthesia, no surgery), control (no analgesia), buprenorphine (0.05 mg/kg SC q8hr), meloxicam (2 mg/kg SC q24hr), firocoxib 10 (10 mg/kg SC q24hr), and firocoxib 20 (20 mg/kg, SC q24hr), and underwent plantar incision surgery as described above. As with the mice, rats were tested with mechanical von Frey and thermal Hargreaves equipment perioperatively. Finalized data for this study is pending completion.





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**Current Position:** Senior Resident in Clinical Pathology

**Abstract Title:** IMPACT OF DIETARY PLANE OF ENERGY DURING THE DRY PERIOD ON LIPOPROTEIN PARAMETERS IN THE TRANSITION PERIOD IN DIARY CATTLE.

**Authors Names:**

Ashleigh W. Newman<sup>1</sup>, Sabine Mann<sup>1</sup>, Daryl Van Nydam<sup>1</sup>, Thomas R. Overton<sup>2</sup>, Erica Behling-Kelly<sup>1</sup>

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**Project Mentor:**

Erica Behling-Kelly, DVM, PhD, Department of Population Medicine and Diagnostic Sciences

**Abstract:**

The high energy demands of dairy cows during the transition period from late gestation into early lactation places them at an increased risk for the development of metabolic and infectious diseases. Modification of dry period diet, focused on markers of lipolysis and ketogenesis, has been investigated as a means to minimize this risk. In this study, we hypothesized that the provision of a dry period diet with adequate, but not excessive, total metabolizable energy would better allow cows to maintain total serum cholesterol and their natural high density lipoprotein (HDL)-rich status throughout the transition period. Cows were allocated to one of three dry period dietary treatment groups following a randomized block design. Lipoprotein fractions, serum cholesterol, and triglycerides were measured weekly from approximately seven weeks pre-calving to six weeks post-calving. All cows displayed a consistent electrophoretic pattern of a prominent alpha-migrating lipoprotein (HDL) and a smaller beta-migrating lipoprotein (LDL), and stayed HDL-rich throughout the study. All treatment groups demonstrated a decline in cholesterol and triglycerides just prior to parturition, followed by a climb in cholesterol and HDL after parturition. Cows fed the high-energy diet were able to maintain slightly higher, statistically significant, serum cholesterol throughout the study period. Rare individual cows from all treatment groups showed evidence of oxidative modification of lipoproteins, indicated by a more electronegative mobility to both their LDL and HDL fractions. The impact of these modest alterations on the overall health of the cow is unknown, but warrants further investigation.



**Robert Campbell, DVM**

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**Current Position:** Resident in Dentistry and Oral Surgery, 3<sup>rd</sup> year

**Abstract Title:** COMPARISON BETWEEN INTRAORAL RADIOGRAPHIC AND COMPUTED TOMOGRAPHIC FINDINGS FOR DIAGNOSING PERIODONTITIS AND ENDODONTIC DISEASE IN DOGS.

**Authors Names:**

Robert Campbell, Santiago Peralta, Nadine Fiani, Peter Scrivani, Department of Clinical Sciences, Cornell University, Ithaca, New York

**Project Mentor:**

Santiago Peralta, DVM, Department of Clinical Sciences

**Abstract:**

Intraoral radiography traditionally has been the imaging technique used in veterinary dentistry to diagnose dental disease. Computed tomography (CT) also has been used to diagnose periodontitis and endodontic disease. However, objective comparison between the two techniques has not been performed in dogs. The aim of this randomized, blinded, retrospective, cross-sectional study was to compare intraoral radiography and CT in 49 dogs that were admitted for evaluation of oral, maxillofacial, or dental disease at our hospital between January 1, 2000 and May 1, 2015. We hypothesized that (1) CT and intraoral radiography of the mandible would detect the same number of teeth with periodontitis; (2) CT of the maxilla would detect more teeth with periodontitis than intraoral radiography; (3) and CT of the whole mouth detects more teeth with endodontic disease than intraoral radiography. Individual teeth were scored for the presence or absence of periodontitis and/or endodontic disease for each imaging modality. The results were compared and assessed for agreement using a Kappa statistic. The results of this study may aid clinicians in selecting specific imaging techniques in dogs undergoing treatment of periodontitis or endodontic disease.

Key references available upon request.



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**Current Position:** Resident in Shelter Medicine, 2<sup>nd</sup> year

**Abstract Title:** *STREPTOCOCCUS EQUI* SUBSPECIES *ZOOEPIDEMICUS* IN A POPULATION OF SHELTER CATS: A CASE SERIES

**Authors Names:**

Tiva Hoshizaki, Elizabeth A. Berliner, Janet M. Scarlett, Department of Population Medicine and Diagnostic Sciences, Cornell University, Ithaca, New York

**Project Mentor:**

Elizabeth Berliner, DVM, MA, Department of Population Medicine and Diagnostic Sciences (Mentor)  
Janet M. Scarlett, DVM, MPH, PhD, Department of Population Medicine and Diagnostic Sciences (Co-mentor)

**Abstract:**

Introduction:

*Streptococcus equi* subspecies *zooepidemicus* (SEZ) has been previously reported as causing severe upper respiratory tract infection (URI) and occasionally neurologic signs in cats, as well as fatal hemorrhagic pneumonia in dogs. This report describes SEZ in a shelter which experienced increased mortality in their cats. Necropsy of the index case revealed SEZ otitis media, prompting further investigation of SEZ in the population.

Methods:

Approximately 180 out of 220 free-roaming cats were examined. Cats were tested for FeLV/FIV, microchipped, vaccinated, and examined for illness. Nasal or aural exudates from cats which displayed signs of URI, otitis externa or neurologic signs were swabbed for aerobic bacterial culture and molecular identification. Cats which died or were euthanized were submitted for necropsy and further diagnostics.

Results:

Of the 30 cats selected for testing, 12 were culture positive for SEZ. The most commonly associated clinical signs were nasal or aural discharge. Mild and ceruminous SEZ otitis externa was diagnosed in 4 cats and in two additional cats with SEZ otitis media/interna and neurologic signs. Notably, no dogs became clinically ill with SEZ during the investigation.

Conclusions:

This is the first report of SEZ otitis externa in cats, which was primarily mild to subclinical. Practitioners should be aware that SEZ can present as either URI, otitis externa, or otitis media/interna in cats from situations involving prolonged, dense cohousing. The unremarkable presentation suggests that SEZ may be underdiagnosed in these at-risk populations and that a carrier state may exist.



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**Current Position:** Resident in Anatomic Pathology, 2<sup>nd</sup> year

**Abstract Title:** HISTOPATHOLOGICAL FEATURES OF NATURALLY-OCCURRING SALMONELLA DUBLIN INFECTION IN NORTHEASTERN HOLSTEIN DAIRY CATTLE

**Authors Names:**

Pecoraro HL<sup>1,2</sup>, Thompson B<sup>1,3</sup>, and Duhamel GE<sup>1,2,3</sup>

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**Project Mentor:**

Gerald E. Duhamel, DVM, PhD, Department of Biomedical Sciences

**Abstract:**

*Salmonella enterica* subsp. *enterica* serovar Dublin (*Salmonella* Dublin) is a host-adapted bacterium that causes high morbidity in dairy cows worldwide. Clinical signs range from asymptomatic to diarrhea to systemic infection. Previous experimental infection studies have elucidated the pathogenesis and outlined some of the histologic changes during *Salmonella* Dublin infection; however, there is limited information in naturally-acquired disease. The objective of the current study was to characterize histopathologic lesions in cows naturally-infected with *Salmonella* Dublin. A retrospective search of archives at the New York Animal Health Diagnostic Center revealed 57 culture-confirmed *Salmonella* Dublin cases from NY and PA in which detailed tissue histology was performed. Of the 57 cases, all were from Holstein cows, 53 were female, and 53 were under 6-month-old. There were 37 bacterial, 9 viral, and 3 parasitic co-infections. Mild to severe myocarditis was found in over 40% (11/25) of heart tissues examined. Ninety-one percent (52/57) of lungs had moderate to severe pneumonia. In addition, moderate to severe inflammation was present in 77% (27/35) of livers, 58% (14/24) of spleens and 57% (19/33) of lymph nodes examined. Inflammation was primarily composed of neutrophils, with fewer lymphocytes and histiocytes, and was often accompanied by necrosis. We propose a histopathological case definition of *Salmonella* Dublin in Holstein cattle less than 6-month-old that includes a combination of neutrophilic pneumonia with or without necrosuppurative and histiocytic hepatitis, splenitis and lymphadenitis. These findings will assist in the development of improved protocols for the diagnosis of infectious diseases of dairy cattle.



## Justin Cardwell, BSc BVMS

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**Current Position:** Resident in Diagnostic Imaging, 3<sup>rd</sup> year

**Abstract Title:** DOES HEAD AND NECK POSITION ALTER VERTIBROBASILAR ARTERIAL BLOOD FLOW IN DOGS?

### **Authors Names:**

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### **Project Mentors:**

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Amy E. Yeager, DVM, DACVR, Cornell University Hospital for Animals (Co-mentor)

### **Abstract:**

#### Introduction/Purpose:

Permanent hearing loss following general anesthesia is reported in dogs. One possible cause is ischemic injury to the inner ear because of reduced labyrinthine perfusion. We hypothesize that flexion of the head and neck would compress the vertebral arteries between the paracondylar processes and the wings of the atlas reducing vertebral, basilar, and labyrinthine blood flow (and hence reduced flow to both inner ears). The study aims are to use non-invasive imaging techniques in healthy dogs to document the anatomic relationships and to look for evidence of altered blood flow in those arteries in different head and neck positions.

#### Methods:

A pilot study was performed using 3-D time-of-flight magnetic resonance angiography (MRA), ultrasonography, and computed tomography angiography (CTA) in two healthy anesthetized dogs to determine which imaging technique/s and which patient positions were best to evaluate the anatomic relationships and blood flow within the vertebral and basilar arteries. A cross-sectional study is currently underway evaluating 6 healthy anesthetized dogs using the selected patient positioning and imaging techniques based on the results of the pilot study.

#### Results:

The pilot study is completed. CTA and MRA depicted excellent morphology, showing reduced distance between the paracondylar processes and the wings of the atlas during flexion, with possible compression of the vertebral arteries. Pulsed wave Doppler analysis provided the best assessment of blood flow.

#### Discussion/Conclusion:

The results of the pilot study provided morphologic evidence for our hypothesis. The results of the pilot and cross-sectional studies will be presented.





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2013  
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**Current Position:** Resident, Small Animal and Emergency & Critical Care, 2<sup>nd</sup> year

**Abstract Title:** DOGS WITH SEPSIS AND TRAUMA HAVE SIGNIFICANTLY INCREASED PLASMA CELL-FREE DNA CONCENTRATIONS

**Authors Names:**

Jo-Annie Letendre, Robert Goggs; Department of Clinical Sciences, Cornell University, Ithaca, New York

**Project Mentor:**

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**Abstract:**

Introduction:

Cell-free DNA (cfDNA) is a useful diagnostic and prognostic biomarker in people with sepsis and trauma, but its measurement in dogs with these conditions has not been reported. We aimed to determine if cfDNA was identifiable in canine plasma and to evaluate two techniques for the measurement of plasma cfDNA concentrations in dogs presenting to an emergency room.

Methods:

Assay linearity, repeatability and reproducibility were evaluated. Plasma cfDNA was measured on residual plasma samples from 60 dogs including those with sepsis (n=15), severe trauma (n=15), neoplasia (n=15), and from healthy dogs (n=15). Quantification of cfDNA was performed in duplicate on diluted citrated plasma and following DNA purification using two fluorescence assays (SYBR-Gold; Quant-iT). Fluorescence intensities (FI) were converted to cfDNA concentrations using standard curves. Median FI values and cfDNA concentrations were compared to healthy controls using the Kruskal-Wallis test, with adjustment for multiple comparisons. Alpha was set at P<0.05.

Results:

Both assays had excellent linearity, and acceptable repeatability and reproducibility. Compared to controls, plasma cfDNA concentrations were significantly increased in dogs with sepsis and with severe trauma using both assays. Dogs with neoplasia had significantly increased cfDNA concentrations when measured with the Quant-iT assay only. When measurements were performed on purified DNA, only dogs with severe trauma had significantly increased cfDNA concentrations.

Conclusion:

Cell-free DNA can be readily identified in canine plasma using fluorescence assays. DNA extraction offers no advantage over direct measurement. Compared to healthy controls, dogs with sepsis and severe trauma have significantly increased plasma cfDNA concentrations.



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**Current Position:** Resident in Cardiology, 3<sup>rd</sup> year

**Abstract Title:** IDENTIFICATION OF GENE EXPRESSION PROFILES LINKED TO DEGENERATIVE MITRAL VALVE DISEASE IN THE SMALL BREED DOG

**Authors Names:**

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**Project Mentors:**

N. Sidney Moïse, DVM, Department of Clinical Sciences (Mentor)

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**Abstract:**

**Background:** Degenerative mitral valve disease (DMVD) is a common cause of morbidity/mortality in the small breed dog, and accounts for an estimated 75% of treated cardiac diseases. Mechanisms are poorly understood, but disease progression is likely dependent on a combination of genetic mutations, age, breed, strain on the valve leaflets, and dysfunction in essential cellular pathways.

**Hypothesis:** Small breed dogs share one or more common genetic mutations that contribute to the development and progression of DMVD. These mutations can be identified using a custom single nucleotide polymorphism (SNP) array developed by one of us (ARB). Studying these mutations can be used to elucidate patterns of inheritance, gene expression and disease pathogenesis.

**Methods/Results:** Blood samples were obtained with consent from 249 (95 control, 154 affected) client-owned dogs (<20kg). Genomic DNA was analyzed using a custom (SNP) sequencing array containing 185,850 SNPs. Results were analyzed by calculating the odds ratio and P value for each SNP. The strongest association signal was detected on Chromosome 17 ( $P=7.7 \times 10^{-6}$ ). Here, an important candidate gene, *CTNNA2*, codes for a-catenin, an integral adherens junctions protein. Fine mapping of *CTNNA2* did not definitively detect a mutation in the coding regions of the gene.

**Future Directions:** Further studies will evaluate expression of a-catenin using Western blot and immunofluorescence microscopy to evaluate protein trafficking and regulation. Fine mapping of additional identified association signals is ongoing.

**Conclusions:** DMVD is an important cause of morbidity and mortality in small breed dogs. Ongoing studies may find a genetic link to the disease.

# NOTES