

Late Breaking Posters

1: CHLAMYDIA MURIDARUM INFECTION CAUSES PROLIFERATIVE COLITIS IN IL10^{-/-} MICE

Adan Aguirre¹, Glory Leung¹, Rodolfo J Ricart Arbona^{1,2}, Neil S Lipman^{1,2}, Sebastian E Carrasco¹

¹Center for Comparative Medicine and Pathology, Memorial Sloan Kettering Cancer Center and Weill Cornell Medicine, New York, NY, USA, ²Tri-Institutional Training Program in Laboratory Animal Medicine and Science, Memorial Sloan Kettering Cancer Center, Weill Cornell Medicine, and The Rockefeller University, New York, NY, USA

Chlamydia muridarum (Cm) is a reemerging intracellular bacterial pathogen in academic research mouse colonies. Spontaneous Cm infections in immunodeficient mouse strains can cause clinical disease and significant pathology, whereas infections in immunocompetent strains typically result in asymptomatic, persistent intestinal infections. Recently, our group demonstrated that experimental Cm infection can significantly impact murine models commonly used to study intestinal inflammation and cancer. The objective of this study was to characterize the intestinal pathology associated with experimental Cm infection in Il10^{-/-} mice. Eight 4-week-old female B6.129P2-Il10^{tm1Cgn}/J mice were cohoused for 2 weeks with either Cm-shedding or Cm-free mice and euthanized at 16-weeks of age following Cm co-housing. Mice were confirmed to be *C. muridarum*-free or *C. muridarum*-infected by fecal qPCR. Microscopically, the ceca of Cm-infected mice exhibited mild chronic typhlitis, whereas the colons showed moderate to marked chronic proliferative colitis, with no lesions in Cm-negative mice. In situ hybridization with a Cm-specific probe was positive but showed low organism abundance in the intestine. Immunohistochemical assessment of the colonic lesions showed predominantly CD4⁺ T-cell infiltrates, with fewer scattered CD8⁺ T cells, F4/80⁺ macrophages, and rare FoxP3⁺ regulatory T cells. Spatial multiplex immunofluorescence is being performed to characterize selected pro- and anti-inflammatory mediators induced by Cm infection in the colon. Our findings demonstrate that experimental Cm infection induces significant chronic colonic pathology in Il10^{-/-} mice. These findings suggest that Cm infection may provide a useful experimental model for investigating mechanisms of intestinal inflammation and may have relevance to murine models of inflammatory bowel disease.

Discipline: Anatomic pathology, **Topic:** Comparative pathology, **Species:** Rodents, **Systems:** Gastrointestinal

2: FATAL TOXIN PRODUCING ESCHERICHIA COLI-ASSOCIATED ENTERIC DISEASE IN TWO PUPPIES

Asmaa Al-Mokaddem¹, Heather Wyss², David Drum², Ida Phillips²

¹Tuskegee University, Tuskegee, AL, USA, ²North Carolina Veterinary Diagnostic Laboratory System, Raleigh, NC, USA

Escherichia coli is an important cause of enteric disease in young animals; however, determination of pathogenic significance requires correlation of histologic lesions with bacterial culture and virulence-associated genotyping. Two fatal cases of *E. coli*-associated enteritis in puppies are described. Case 1 involved a 12-day-old male

Australian Shepherd puppy from a litter with multiple neonatal deaths. Necropsy revealed intestinal dilation and red-tinged intestinal contents. Histologically, the small intestine had moderate necrotizing neutrophilic enteritis characterized by crypt necrosis, epithelial hyperplasia, and myriad apically attached bacteria. Moderate multifocal lymphocytolysis was present in the spleen and lymph node. Nonhemolytic *E. coli* was isolated from the small intestine, kidney, and lung, supporting concurrent septicemia. Molecular testing identified the isolate as positive for heat-stable toxin A (STa), supporting enterotoxigenic *E. coli* (ETEC) infection. Case 2 involved an 8-week-old male Yorkshire Terrier with acute anorexia and death. Necropsy demonstrated dehydration and hemorrhagic enteritis. Histologically, the small intestine exhibited multifocal superficial hemorrhagic enteritis with crypt necrosis and apically attached bacteria. Nonhemolytic *E. coli* was isolated from the small intestine and was positive for the *eae* gene, encoding intimin, supporting enteropathogenic *E. coli* (EPEC) infection. These cases demonstrate that pathogenic *E. coli* can cause fatal enteric disease in puppies through distinct virulence mechanisms. Predisposing factors including dystocia, naïve immune system, reduced birth weight, hypothermia and overcrowding of facilities may contribute to disease development. Further studies are required to correlate *E. coli* infection in puppies and development of systemic disease particularly in relation to age-dependent susceptibility.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Canine, **Systems:** Gastrointestinal

3: POORLY GRANULATED VISCERAL MAST CELL TUMOR MIMICKING LYMPHOMA IN A DOG WITH PRESUMPTIVE C-KIT DOWNREGULATION AFTER TREATMENT

Marcela Apuy Martinez¹, Paula Giaretta², Krysten Schmidt¹, Nobuko Wakamatsu¹, Joanne B. Messick¹, Andrea Pires dos Santos¹, Craig Thompson¹, Olivia Geels¹, Camila Benaduce Emanuelli Mello¹

¹Purdue University, West Lafayette, IN, USA, ²Gastrointestinal Laboratory, College Station, TX, USA

A 5-year-old spayed mixed-breed dog was presented with diarrhea, vomiting, and dyspnea. Imaging exams identified pleural effusion, a pulmonary lesion, and an abdominal mass, while CBC revealed eosinophilia. Four months later, the dog returned with dyspnea and melena, and eosinophilia had recurred. Computed tomography revealed hepatic and renal nodules, lymphadenopathy, intestinal mass, and recurrent pleural effusion. Fine-needle aspirates of hepatic nodules revealed marked eosinophilic inflammation and a low number of atypical large round cells with scant, deeply basophilic cytoplasm, round nuclei, finely stippled chromatin, and multiple nucleoli. Based on cytomorphology, the cytology interpretation was most consistent with lymphoma. Although eosinophilia raised consideration of mast cell tumor (MCT), it is also associated with T-cell lymphoma and was therefore considered a nonspecific finding. Flow cytometry identified large CD45+ hematopoietic cells lacking CD18 and other lineage-specific antigens, while PARR revealed polyclonal immunoglobulin and T-cell receptor gene rearrangements. Histopathology demonstrated dense eosinophilic inflammation and 10% large round cells; however, their morphology was not sufficiently distinctive for classification. Immunohistochemistry showed strong c-KIT expression, with 20% positive for tryptase, supporting MCT despite absence of metachromatic granules by cytology,

histopathology, Giemsa, and toluidine blue staining. The dog was diagnosed with visceral MCT and treated with chemotherapy and a tyrosine kinase inhibitor (TKI). Three months later, the patient was euthanized. Postmortem examination revealed widespread neoplastic infiltration, with neoplastic cells now negative for c-KIT and tryptase. This case highlights the diagnostic challenges of poorly granulated visceral MCTs, the importance of ancillary testing, and presumptive c-KIT downregulation following TKI therapy.

Discipline: Clinical pathology, **Topic:** Oncology, **Species:** Canine, **Systems:** Systemic

4: CHOLANGIOHEPATITIS WITH CIRRHOSIS ASSOCIATED WITH PLAGIORCHIOID TREMATODIASIS IN A COMMON WATERSNAKE (NERODIA SIPEDON)

Alexandre Arenales^{1,2}, Eliana DeLuca^{1,2}, Amira Abdu^{1,2}, Laken Russell³, Jeongha Lee^{1,2}

¹Louisiana State University, Baton Rouge, LA, USA, ²Louisiana Animal Diagnostic Disease Laboratory (LADDL), School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA, USA, ³Mississippi Aquarium, Gulfport, MS, USA

Plagiorchioid trematodes infect a wide range of vertebrate hosts, including reptiles, but hepatobiliary lesions associated with biliary trematodiasis are poorly characterized in snakes. We describe a case of severe chronic hepatobiliary disease associated with plagiorchioid trematodiasis in a common watersnake (*Nerodia sipedon*) and molecularly characterize the trematode. A zoo-housed watersnake died following a 5-month history of anorexia. Necropsy, histopathology, fecal flotation, and molecular testing of formalin-fixed, paraffin-embedded liver tissue were performed. The snake had no visible coelomic fat. Histologically, the liver had severe dissecting fibrosis with marked hepatocellular loss and prominent ductular reaction. Bile ducts were ectatic and had concentric peribiliary fibrosis, lymphoplasmacytic inflammation, epithelial erosion, and hyperplasia. Ectatic bile ducts and the gallbladder contained numerous operculated trematode eggs measuring approximately 30 × 15 µm and multiple trematodes measuring up to 3 × 1.5 mm. Trematode ITS-2 and cox1 sequences obtained from hepatic tissue showed greatest similarity to *Telorchis bonnerensis* (~90%) and *Choledocystus hepaticus* (~86%), respectively, supporting placement within Plagiorchioidea but precluding species-level identification. Additional findings included granulocytic and proliferative pneumonia with numerous nematode larvae and intracellular apicomplexan schizonts, as well as gastric and intestinal mural granulomas centered on nematode larvae. No parasites were detected by fecal flotation. The severe hepatic disease was attributed to plagiorchioid trematodiasis. Although biliary trematodes have been reported in snakes, the associated hepatobiliary pathology remains poorly characterized. This case demonstrates that biliary trematodiasis can cause severe chronic hepatobiliary disease in snakes, similar to that recognized in mammalian hosts.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Wildlife/Zoo, **Systems:** Hepatobiliary

5: DIEULAFOY'S LESION ASSOCIATED WITH CARPROFEN USE IN TWO ADULT LABRADOR RETRIEVER DOGS

Caitlyn Bohannon-Ritchie¹, Rosalie Ierardi¹, Yoomin Jo¹, Laura Nafe², Seyedeh Pantea Rahnema², Kate Shumway², Owen Skinner²

¹University of Missouri Veterinary Medical Diagnostic Laboratory, Columbia, MO, USA, ²Department of Veterinary Medicine and Surgery, College of Veterinary Medicine, University of Missouri, Columbia, MO, USA

Dieulafoy's Lesion is a rare condition characterized by a gastrointestinal mucosal ulcer overlying an aberrant submucosal artery that can cause life-threatening hemorrhage. This report discusses two diagnoses of Dieulafoy's lesion in dogs at the University of Missouri College of Veterinary Medicine. Case 1 was a 5-year-old, male castrated Labrador Retriever presented to the MU VHC Emergency Service for a month-long history of melena and ongoing, progressive anemia after a three-week course of carprofen for a soft tissue injury. After 4 days with no improvement despite several blood transfusions, the patient was taken for an exploratory laparotomy. A section of stomach appeared grossly abnormal and was submitted for histopathology. Histopathology revealed a mucosal ulcer over an exposed submucosal artery with a fibrin clot and nascent granulation tissue. Clinical signs resolved after surgery. Case 2 was a 3-year-old, female spayed Labrador Retriever mix that presented to the MU VMDL for necropsy. After a seven-day course of carprofen, the submitting veterinarian reported hematemesis, pale gums, and severe lethargy. Anemia progressed despite supportive care and multiple transfusions, and humane euthanasia was elected. Necropsy revealed a focal gastric ulcer, and histopathology confirmed the presence of an aberrant submucosal artery underlying the defect. Dieulafoy's lesion is an uncommon cause of severe gastrointestinal hemorrhage in humans and has been reported once previously in a dog. It can cause mortality if not identified and treated promptly; therefore, while uncommon, Dieulafoy's lesion should be a differential in dogs with acute gastrointestinal hemorrhage that is nonresponsive to traditional management.

Discipline: Anatomic pathology, **Topic:** General pathology, **Species:** Canine, **Systems:** Gastrointestinal

6: ADVANCING VETERINARY ONCOLOGY THROUGH STANDARDIZED REPORTING: THE VCGP COMMUNITY APPROACH AND CALL TO ACTION

Pompei Bolfa¹, Don Meuten², Chiara Palmieri³, Kristina Meichner⁴, Olivia Patania⁵, Michael Dark⁶

¹Ross University School of Veterinary Medicine, Basseterre, Saint Kitts and Nevis,

²College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA,

³University of Queensland, Brisbane, Australia, ⁴Department of Pathology, College of Veterinary Medicine, University of Georgia, Athens, GA, USA, ⁵Gastrointestinal Laboratory, Texas A&M University College of Veterinary Medicine & Biomedical Sciences, College Station, TX, USA, ⁶University of Florida College of Veterinary Medicine, Gainesville, FL, USA

The Veterinary Cancer Guidelines and Protocols (VCGP; vcgp.org) initiative is a global, community-driven effort to advance veterinary oncology by promoting

standardized tumor evaluation and reporting across species, institutions, and disciplines.

VCGP develops protocols and guidelines. Protocols are tumor- and species-specific tools that define and capture the essential data elements required for the evaluation of individual neoplasms. Guidelines provide expanded best-practice recommendations, including literature reviews, methodological considerations, illustrative images, discussion of areas of controversy, and identification of research priorities aimed at improving diagnostic approaches. Both resources are developed through expert review and consensus, with the goal of enhancing consistency, reproducibility, and comparability of veterinary oncology data.

To facilitate daily use, VCGP also produces Pathology Quick Reference Guides (PQRGs), concise summaries that highlight key diagnostic criteria, essential references, and reporting recommendations.

These guides distinguish core elements, which are associated with clinical outcomes and support prognostication and therapeutic decision-making, from non-core elements, which may be reported at the discretion of the pathologist.

These documents provide the foundation for developing synoptic reports that are tumor and species specific. Examples of each will be presented and discussed.

By providing standardized reporting frameworks, image libraries, and evidence-based diagnostic guidance, VCGP promotes diagnostic consistency, facilitates multicenter research, supports pathologists through clearer definitions of histologic criteria, and improves the comparability of studies. Ultimately, this collaborative initiative aims to strengthen prognostication, enhance clinical decision-making, and improve outcomes for veterinary cancer patients. We invite pathologists, clinicians, researchers, and trainees to participate in and contribute to this growing international community effort.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Canine, **Systems:** Systemic

7: ANALYTICAL AND CLINICAL PERFORMANCE OF A NEW DIGITAL REFRACTOMETER IN CANINE EFFUSIONS

Beau Brown, Meghan Johnson, Sichao Wang, Jeremie Korchia
Michigan State University, East Lansing, MI, USA

Background: Optical refractometers cannot read total protein (TP) concentrations below 2 g/dL, precluding generation of best cutoff values to predict etiologies of transudates.

Objective: Analytical validation of the Refractix (Reichert) digital refractometer (DR) by comparison studies versus optical refractometer (OR; Reichert) and versus reference chemistry analyzer (BC; Beckman-Coulter AU680), imprecision, and QC performance; clinical validation generating useful cutoff values for etiologies of canine pleural and peritoneal transudates.

Methods: Three analytes were considered: TP, specific gravity (SG), and refractive index (RI20). Method comparison between DR and OR & BC was performed by Passing-Bablok regressions and Bland-Altman difference plots, imprecision was characterized in detail, and total error was determined. Significant differences between transudate etiologies were assessed by ANOVA, and associated cutoff values and sensitivity and specificity were generated by ROC curve analysis.

Results: Correlation between methods was excellent. Almost all CVs were <4% (TP) or <0.15% (SG and RI20). QC performance was satisfactory. ANOVA revealed that analyte values were lower in transudates from decreased oncotic pressure (DOP) compared to increased hydrostatic pressure (IHP), with TP values much more significant than SG or RI20 values. The TP cutoff 100% specific for DOP was <0.95 g/dL, with a fair sensitivity (79%), and 100% specific for IHP was >3.3 g/dL, with a low sensitivity (41%).

Conclusion: The Refractix has overall robust analytical performance, with excellent precision and acceptable agreement with compared methods. It measures TP (most useful of 3 analytes) down to minimal concentrations and is clinically useful in differentiating canine transudates (DOP vs. IHP).

Discipline: Clinical pathology, **Topic:** Methods/technology, **Species:** Canine, **Systems:** Systemic

8: EVALUATION OF A CUSTOM AI-POWERED REPORTING TOOL FOR AUTOMATED DIAGNOSIS AND DESCRIPTION OF COMMON VETERINARY SKIN TUMORS

Elliott Chiu¹, Fraser Hill², May Tse¹, Fabian Lean¹, Agzhan Batyrbek¹, Yu Kwan Lau¹, Yan Sin Poon¹, Yat Hei So¹, Hsin Chien Tsai¹, Chun Yin Wong¹, Xianrui Li¹, Antoni Chan¹

¹City University of Hong Kong, Hong Kong, Hong Kong, ²City University of Hong Kong Veterinary Diagnostic Laboratory, Hong Kong, Hong Kong

Background: Artificial intelligence (AI) offers significant potential to enhance veterinary dermatopathology workflows. This preliminary study evaluated a custom-built AI tool designed to analyze whole slide images (WSI) and automatically generate pathology reports for four veterinary skin tumors.

Methods: The AI was trained to diagnose squamous cell carcinoma, hemangioma, feline mast cell tumor, and sebaceous adenoma, and to evaluate margins, lymphovascular invasion (LVI), and mitotic count (MC). Forty retrospective cases were evaluated by the AI program and a panel of four career veterinary pathologists (three ACVP diplomates and one FANZCVS Fellow). Diagnostic agreement and feature extraction metrics were compared between the human panel and the AI.

Results: Inter-observer agreement among pathologists for identifying tumor type was 97.5%, while agreement between the AI and pathologists remained highly concordant at 95%. LVI was identified in 12 cases by at least two reports. In seven cases, LVI was detected by a single reporter; notably, the AI was the sole detector in six of these. The AI significantly overcalled MC (z-score = 32.5; pathologist SD = 7.2) and frequently reported shorter surgical margins (z-score = -3.13; pathologist standard deviation = 1.17).

Conclusion: The custom AI tool demonstrated high accuracy and concordance with board-certified pathologists for primary tumor classification. However, significant discrepancies emerged in prognostic features; the AI showed a propensity to overcall mitoses, measure surgical margins more conservatively, and potentially over-interpret LVI. These findings highlight the promise of AI for primary diagnosis but emphasize the critical need for refining algorithms related to prognostic feature extraction.

Discipline: Anatomic pathology, **Topic:** Methods/technology, **Species:** Canine, **Systems:** Integument

9: AUTOMATED HOTSPOT QUANTIFICATION OF KI-67 IMMUNOPOSITIVE NUCLEI IN CANINE PARATHYROID MASSES

Megan Corbett¹, C. Robert Stiliz¹, Octavia-Peninah Parris², Elizabeth Howerth¹

¹Department of Pathology, College of Veterinary Medicine, University of Georgia, Athens, GA, USA, ²University of Georgia, Athens, GA, USA

Background: Ki-67, a proliferation marker, can help distinguish malignant from benign parathyroid masses by highlighting proliferative hotspots used to calculate a Ki-67 proliferation index. However, hotspot identification is susceptible to observer variability. This study evaluated digital image analysis software for automated hotspot detection and Ki-67 quantification compared to traditional visual inspection.

Methods: Ki-67 immunohistochemistry was performed on formalin-fixed, paraffin embedded parathyroid tissues from 17 dogs retrieved from the University of Georgia Pathology Department archives. Slides were digitized and whole slide images were manually annotated in QuPath (v. 0.6.0). Each mass was visually assessed, and Ki-67 hotspots manually identified. Automated positive cell and hotspot detection algorithms were then applied. Percentages of Ki-67 positive nuclei within hotspots identified by each method were compared using the Wilcoxon matched-pairs signed rank test and Bland-Altman analysis.

Results: The percentage of Ki-67 positive nuclei differed between manual and automated hotspot detection methods ($p = 0.01$). Positive nuclei in manually detected hotspots ranged from 0.30% to 49.94% (mean = 7.64%), and from 0.29% to 43.80% (mean = 9.41%) for automatically detected hotspots. Automated hotspot detection had a bias toward higher measurements (26.80%), with wide limits of agreement (-50.05% to 103.70%).

Conclusions: Automatically detected hotspots had higher % Ki-67 positive nuclei measurements than manual assessment. Limitations included the need for manual tissue annotation and artifact exclusion, a small sample size, biological variability, and a single visual assessor. Further studies are needed to assess the utility of automated hotspot detection for malignancy determination.

Discipline: Anatomic pathology, **Topic:** Methods/technology, **Species:** Canine, **Systems:** Endocrine

10: SPINAL CORD COLLECTION: AN EFFICIENT TECHNIQUE IN SWINE TO ENHANCE DIAGNOSTIC AND RESEARCH PATHOLOGY PRACTICE,

DEMONSTRATED BY A RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA (REBOA) OPTIMIZATION STUDY

Emily Corbin¹, Charles Schwarten², Clifford Morgan³, Erica Molina³

¹US Army Institute of Surgical Research, San Antonio, TX, USA, ²711th Human Performance Wing, Bioeffects Division, San Antonio, TX, USA, ³Naval Medical Research Unit - San Antonio, San Antonio, TX, USA

BACKGROUND: Pathologists often omit spinal cord evaluation in postmortem examinations, partly due to inefficient collection methods. 1) We present a simple, efficient ventral approach to the swine spinal cord to promote routine evaluation. 2) To demonstrate its value, we present a study evaluating therapeutics hypothesized to minimize trauma-induced endotheliopathy and the systemic inflammatory cascade leading to end organ damage associated with resuscitative endovascular balloon occlusion of the aorta (REBOA) use for hemorrhage control.

SPINAL CORD VENTRAL APPROACH: In dorsal recumbency, the ventral vertebral plate is removed using a Stryker saw, exposing the entire thoracolumbar spinal cord to the level of the cauda equina for efficient collection. Key anatomical landmarks are detailed herein.

EXPERIMENT: Swine were randomized into three groups (n=7/group): TIE2 agonist or TNF- α inhibitor treatment, and vehicle control; all procedures were otherwise equivalent. Multiorgan microscopic and biomarker analyses were performed. Using this refined spinal cord approach, we were able to easily collect the spinal cords, and lumbar spinal cords were microscopically evaluated. Ventral horn neuronal necrosis was identified and quantified as a percentage of total ventral horn neurons.

RESULTS AND CONCLUSION: Ventral horn neuronal necrosis was a consistent, clinically significant finding with direct implications for REBOA use in humans. The TIE2 agonist group has a statistically significant reduction in neuronal necrosis compared to the vehicle control group ($p = 0.024$), with no other significant differences. This suggests TIE2 agonists may improve adverse ischemic end-organ effects of lifesaving REBOA devices, and highlights the importance of spinal cord evaluation.

Discipline: Anatomic pathology, **Topic:** Comparative pathology, **Species:** Porcine, **Systems:** Nervous

11: WHAT IS NORMAL AT NHP SUBCUTANEOUS INJECTION SITES? A 10-YEAR HISTORICAL CONTROL EVALUATION OF 519 VEHICLE-TREATED CYNOMOLGUS MONKEYS

Rahul Dange, Rong Xu, Lin Zhu, Jiamin Ni, Tiansheng Zhou, Rongrong Li, Xixing Zhao

WuXi AppTec, Laboratory Testing Division, Cranbury, NJ, USA

Background and Objective: Interpretation of subcutaneous injection-site findings in nonhuman primate (NHP) toxicity studies can be challenging due to limited historical control data describing procedure- and vehicle-related lesions. This retrospective

analysis was conducted to characterize the incidence and severity of microscopic findings at subcutaneous injection sites in vehicle-treated NHPs.

Methods: Microscopic findings from subcutaneous injection sites were compiled from 519 vehicle-treated cynomolgus monkeys enrolled in regulated repeat-dose toxicity studies conducted over a 10-year period. Morphologic diagnoses, incidence, and severity grades were summarized.

Results: Subcutaneous hemorrhage was the most common finding, occurring in 212/519 (40.9%) animals and ranging from minimal to marked severity. Mixed inflammatory infiltrates or mixed-cell inflammation were observed in 70/519 (13.5%) animals, while fibroplasia or fibrosis occurred in 51/519 (9.8%) animals. Mononuclear infiltrates, subcutaneous necrosis, and neutrophilic infiltrates were present in 4.1%, 3.3%, and 3.1% of animals, respectively. Neovascularization was observed in 2.1% of animals. Less frequent findings included myofiber degeneration/regeneration (1.7%), myofiber necrosis (1.5%), epidermal erosion/ulceration (1.2%), granulomatous inflammation (1.0%), edema (0.8%), epidermal hyperplasia/hypertrophy (0.8%), pigmented macrophages (0.8%), pseudocysts (0.4%), multinucleated giant cells (0.2%), eosinophilic material (0.2%), and foamy macrophages (0.2%). Most findings were graded minimal to mild except hemorrhage.

Conclusions:

Hemorrhage, mixed inflammation, and fibroplasia/fibrosis represent the most common microscopic findings at subcutaneous injection sites in vehicle-treated NHPs and likely reflect tissue injury and repair associated with routine dosing procedures. These historical control data provide context for interpreting injection-site pathology and may help distinguish potential test article-related effects from common background/procedure-related changes in nonclinical safety studies.

Discipline: Anatomic pathology, **Topic:** Toxicology, **Species:** NHP, **Systems:** Integument

12: PRIMARY BILATERAL ADRENAL B-CELL LYMPHOMA IN A RED-TAILED HAWK (*BUTEO JAMAICENSIS*)

Eliana De Luca¹, Mark Mitchell^{2,3}, Katie Bakalis³, Jeongha Lee^{1,2}

¹Louisiana Animal Disease Diagnostic Laboratory, SVM, Louisiana State University, Baton Rouge, LA, USA, ²Department of Pathobiological Sciences, SVM, Louisiana State University, Baton Rouge, LA, USA, ³Department of Veterinary Clinical Sciences, SVM, Louisiana State University, Baton Rouge, LA, USA

Rationale: Primary adrenal lymphoma is rare in veterinary species and, to our knowledge, has not been previously reported in birds. Immunophenotypic characterization of avian neoplasms remains challenging because of limited availability of validated antibodies and variable cross-reactivity of mammalian-directed antibodies across avian species.

Objective: The aim of this study was to describe the pathologic and immunohistochemical features of a primary adrenal B-cell lymphoma in a red-tailed hawk (*Buteo jamaicensis*).

Methods: A female red-tailed hawk of unknown age was submitted for postmortem examination following neurologic signs associated with trauma. A necropsy, histopathologic examination, and immunohistochemistry for PAX5, CD3, pancytokeratin AE1/AE3, IBA-1, chromogranin A, and synaptophysin were performed.

Results: Bilateral, pale tan masses were identified adjacent to the cranial poles of the kidneys, in the expected location of the adrenal glands. Histologically, masses were composed of sheets and packets of round to polygonal neoplastic cells, with entrapped clusters of presumptive adrenocortical cells. Similar neoplastic cells infiltrated the kidney and were in pulmonary blood vessels. No neoplastic infiltrates were identified in other examined organs, including bone marrow, spleen, and liver. Approximately 40-80% of neoplastic cells, exhibited weak to moderate nuclear PAX5 immunoreactivity. CD3 immunolabeled inflammatory T-lymphocytes, whereas neoplastic cells were negative for cytokeratin AE1/AE3. IBA-1, chromogranin A, and synaptophysin did not cross-react with control tissues.

Conclusion: The anatomic distribution, morphologic features, and immunophenotype support a diagnosis of primary adrenal B-cell lymphoma with renal involvement and pulmonary tumor emboli. This case expands the spectrum of lymphoma presentations in birds and underscores the diagnostic challenges.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Wildlife/Zoo, **Systems:** Endocrine

13: GROSS, HISTOLOGIC, AND IN SITU HYBRIDIZATION CHARACTERIZATION OF CUTANEOUS FIBROPAPILLOMAS ASSOCIATED WITH ODOCOILEUS VIRGINIANUS PAPILLOMAVIRUS 1 IN A FREE-RANGING WHITE-TAILED DEER

Chrissy Eckstrand

Rowan University, Glassboro, NJ, USA

Background: Papillomaviruses (PVs) cause cutaneous proliferative lesions in a range of mammalian hosts, including cervids. *Odocoileus virginianus* papillomavirus 1 (OvPV-1) is the only fully characterized PV described in white-tailed deer, but the gross, histologic, and cellular tropism of OvPV-1-associated lesions has not been well documented using modern in situ methods.

Objective: To characterize the gross and histologic features of cutaneous fibropapillomas in a free-ranging white-tailed deer and determine the cellular localization of OvPV genome using RNAscope in situ hybridization (ISH).

Methods: A free-ranging white-tailed deer presented with numerous raised, individualized and coalescing, variably ulcerated cutaneous nodules and masses on the head and neck. Tumors were formalin-fixed, routinely processed, and examined by hematoxylin and eosin staining. Serial sections underwent RNAscope ISH using anti-sense probes targeting the OvPV-1 *L1* gene, with paired positive (host *PPIB*) and negative (*DapB*) control probes.

Results: Masses were well-demarcated dermal nodules of densely cellular, disorganized mesenchymal cell proliferation supported by increased collagen, elevating an overlying epithelium that was mildly to markedly hyperplastic with rete

ridge formation and multifocal orthokeratotic hyperkeratosis. ISH demonstrated abundant OvPV genome within nuclei and cytoplasm of hyperplastic epithelial cells and superficial keratin, and within nuclei of dermal mesenchymal cells. Viral genome was absent from adjacent unaffected epithelium and dermis, and control probes confirmed assay validity.

Conclusions: OvPV-1 demonstrates dual tropism for epithelial and dermal mesenchymal cells within cutaneous fibropapillomas, supporting a pathogenesis in which viral replication in both compartments contributes to the fibropapillomatous phenotype, consistent with mechanisms described for fibropapillomas in other species.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Wildlife/Zoo, **Systems:** Integument

14: GANGLIONEUROBLASTOMA IN AN 11 YEAR OLD BOXER

Steven Edmonds^{1,2}, Ryan Oliveira^{1,2}

¹Washington Animal Disease Diagnostic Laboratory, Washington State University, Pullman, WA, USA, ²Washington State University College of Veterinary Medicine, Pullman, WA, USA

Peripheral neuroblastic tumors are uncommonly diagnosed neuroendocrine neoplasms including neuroblastoma, ganglioneuroblastomas, and ganglioneuromas. Ganglioneuroblastomas display intermediate differentiation with both undifferentiated neuroblastic cells, and well-differentiated ganglion cells. While these tumors typically arise from peripheral nerves in the sympathetic nervous system, single case reports in both veterinary and human literature have described ganglioneuroblastomas from other regions not immediately adjacent to large peripheral nerves, including the dermis of a digit and the oral cavity.

This diagnostic case report presents a ganglioneuroblastoma found in an 11 year old Boxer dog. This dog presented to its primary veterinarian for a rapidly growing nodule near the right oral commissure. The dog was anesthetized for an excisional biopsy without complications. The samples were subsequently submitted as two small pieces of soft tissue. Limited follow up with this dog confirms no evidence for regrowth.

Histopathology revealed a neoplastic population with a mixture of more differentiated neuronal-like cells with suspect Nissl substance (toluidine blue and cresyl violet positive) on a morphologic gradient with poorly differentiated neuroblasts. The cells were supported by a fibrous, suspect Schwannian stroma; however, it did not stain with luxol fast blue. A suite of antibodies were used to characterize this tumor with regional positive reactivity to Synaptophysin (+), Chromogranin A (+++), Neuronal Nuclei (NeuN; ++), Neuron-Specific Enolase (NSE; +), S-100 (+++), Glial Fibrillary Acidic Protein (GFAP; ++), Myelin Basic Protein (MBP; +), and Microtubule-Associated Protein 2 (MAP2; +). Cells were negative for Neurofilament 200 (NF200).

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Canine, **Systems:** Nervous

15: PATHOLOGICAL AND MOLECULAR CHARACTERIZATION OF CIRCULATING AVIAN ONCOGENIC VIRUSES IN EGYPTIAN COMMERCIAL LAYER FLOCKS

Abdelhamid Fares^{1,2}, Anis Zaid², Salah El-Ballal²

¹Department of Population Health and Pathobiology, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA, ²Department of Pathology, Faculty of Veterinary Medicine, University of Sadat City, Monofiya, Egypt

Background: In commercial poultry, co-circulating avian oncogenic viruses, specifically Marek's disease virus (MDV), avian leucosis virus (ALV), and reticuloendotheliosis virus (REV), induce complex, overlapping lymphoproliferative neoplastic syndromes.

Objective: This study characterized the pathology and molecular etiology of naturally occurring neoplastic disease in vaccinated commercial layer flocks in Sharkiya, Egypt (2014–2015).

Methods: Necropsies were performed on diseased Hy-Line layer chickens (19–72 weeks old) presenting with progressive emaciation, paresis, and visceral enlargement. Visceral, skeletal, and nervous tissues were formalin-fixed and processed for histopathological evaluation. DNA extracted from spleens and livers was screened via PCR for ALV subgroups (A–E, J), MDV, and REV, followed by amplicon sequencing of representative isolates.

Results: Field outbreaks exhibited 5–15% excess mortality and macroscopic visceral lymphosarcomas across various anatomical sites, with or without sciatic neurolymphomatosis or ocular lymphomatosis. Histopathology revealed diffuse neoplastic sheets composed of lymphoblastic, lymphocytic, myeloblastic, and myelocytic cells with elevated mitotic indices, hydropic degeneration, apoptosis, circulating leukemic cells, and eosinophilic intracytoplasmic inclusion bodies in hepatocytes. PCR screening of 58 tumor-bearing samples revealed high viral co-infection rates: ALV (A–E) infection in 44.82%; ALV/MDV co-infection in 48.27%; ALV/ALV-J/MDV in 3.44%; and quadruple ALV/ALV-J/MDV/REV in 1.72%. Sequenced ALV isolates demonstrated high homology to the Taiwanese TW-3593 strain; MDV isolates were serotype-1, clustering with very virulent Chinese GX0101 strain.

Conclusions: This is the first documentation of multi-viral oncogenic co-infections in Egyptian layer flocks. The high prevalence of ALV-MDV co-infections underscores a severe biosecurity failure and highlights the critical necessity of routine histopathological and PCR surveillance to guide control strategies.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Avian, **Systems:** Systemic

16: DISSEMINATED CHOLANGIOCARCINOMA IN AN ELK (CERVUS CANADENSIS)

Mahala Furman¹, Clare Brown^{1,2}

¹College of Veterinary Medicine, Oklahoma State University, Stillwater, OK, USA,

²Oklahoma Animal Disease and Diagnostic Laboratory, Stillwater, OK, USA

Background: An adult bull elk from a game ranch died naturally following two weeks of progressive weight loss despite antibiotic, anti-parasitic, and anti-inflammatory treatment. The bull was submitted to the Oklahoma Animal Disease Diagnostic Laboratory for postmortem evaluation. On gross examination, the elk was in thin

body condition. Several irregularly shaped, slightly raised to umbilicated, tan, solid, firm masses, measuring up to 8 cm in diameter, expanded the liver. Myriad nodules of similar appearance, ranging from pinpoint to 0.5 cm in diameter, were widely disseminated throughout the omentum and mesentery, concentrated around prominent, tortuous vessels, as well as on serosal surfaces of the intestinal tract, spleen, urinary bladder, parietal peritoneum, diaphragm, and pampiniform plexus and epididymis of the testes. On histologic examination, anaplastic epithelial cells are arranged in irregular tubules, acini, and small nests with abundant eosinophilic cytoplasm and 1-3 central, round nuclei within a robust collagenous stroma.

Results: Immunohistochemistry was performed using CK7, HepPar1, and Synaptophysin; neoplastic cells demonstrate histopathologic features consistent with a cholangiocarcinoma. No liver flukes (*Fascioloides magna*) nor eggs were identified grossly, histopathologically, or via fecal flotation. Cholangiocarcinoma is an uncommon biliary neoplasm in ruminants; to our knowledge, this case represents the first reported case of cholangiocarcinoma in a cervid.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Wildlife/Zoo, **Systems:** Hepatobiliary

17: QUANTITATIVE 3-T MRI AND DIGITAL NEUROPATHOLOGY OF EXCITOTOXIC ENCEPHALOPATHY IN NEONATAL PIGLETS

Taylor Godwin, Lee Martin

Johns Hopkins University School of Medicine, Baltimore, MD, USA

Piglets are increasingly used as translational models of neonatal and pediatric brain injury, but magnetic resonance imaging (MRI) characterization of neonatal porcine encephalopathy is limited. We evaluated whether quantitative clinical 3-T MRI detects subacute unilateral excitotoxic injury induced by the N-methyl-D-aspartate (NMDA) glutamate receptor agonist quinolinic acid (QA) and corresponds with digital neuropathology. Three neonatal piglets (2-3 days old) were studied. Two received stereotaxic injections of 960 nmol QA (16 μ l) into the right putamen and vehicle into the left putamen (survived for 3 or 8 days), and one age-matched sham. MRI included T1- and T2-weighted structural sequences and diffusion tensor imaging. Bilateral regions were segmented to measure lesion and regional volume, fractional anisotropy (FA), and mean, axial, and radial diffusivity. Coronal hematoxylin and eosin-stained sections were analyzed in QuPath using standardized color-deconvolution stain vectors. A pixel classifier quantified area of vacuolar pathology, and StarDist nucleus detection quantified nuclear density. Regional volumes were comparable subacutely after injury. Relative to the sham, QA piglets had lower mean diffusivity in the ipsilateral putamen and lower FA in the ipsilateral internal capsule, consistent with cytotoxic edema and evolving axonopathy. Histopathologic analysis showed greater vacuolar degeneration in the QA lesioned hemisphere, most pronounced in the ipsilateral putamen, caudate nucleus, internal capsule, globus pallidus, and cerebral cortex, reflecting the NMDA receptor-mediated excitotoxicity. Vacuolar area inversely corresponded with nuclear density in gray matter regions. We conclude that quantitative 3-T MRI with digital histopathology faithfully characterizes subacute neonatal excitotoxic brain injury for modeling infant encephalopathy.

Discipline: Anatomic pathology, **Topic:** Methods/technology, **Species:** Porcine, **Systems:** Nervous

18: CONCURRENT MUCOPOLYSACCHARIDOSIS TYPE VI AND MENINGIOMA IN A DOMESTIC CAT

Joshua Hall¹, Jessica Santos-Streuslin¹, Kerry Goldin¹, Kensey Cross², Alexandra Armstrong¹

¹University of Minnesota College of Veterinary Medicine, Saint Paul, MN, USA, ²New Hope Animal Hospital, New Hope, MN, USA

Mucopolysaccharidosis type VI (MPS VI) is a rare lysosomal storage disorder causing accumulation of glycosaminoglycans (dermatan sulfate and chondroitin sulfate) in connective tissues due to a deficiency in arylsulfatase B. Spontaneous MPS VI in domestic cats was first reported in the late 1970s, but subsequent descriptive literature is lacking. A privately owned, 9-year-old, neutered male, Domestic Shorthair cat had historical progressive hindlimb weakness, muscle atrophy, and decreased range of motion. PennGen metabolic testing (urine and blood) was consistent with MPS and suggestive of MPS VI. Due to declining quality of life, the cat was euthanized. On radiographs (ante- and postmortem), there were diffuse vertebral malformations and a multifocal appendicular osteoarthropathy, with misshapen and sclerotic humeral and femoral heads and bilateral femoral neck fractures with femoral head resorption and acetabular flattening. Postmortem examination revealed marked kyphosis with bony ventral fusion of lumbar vertebrae, degenerative joint disease in all major appendicular joints, and mild cardiomegaly with atrioventricular valve thickening. Within the meninges overlying the left temporal lobe, there was a semi-firm, tan mass, with several smaller meningeal thickenings widely distributed across the cerebrum. Histopathologically, the meningeal mass was consistent with a transitional meningioma. Intracytoplasmic, granular accumulations were observed in articular chondrocytes, valvular and arterial fibroblasts, corneal keratocytes, and circulating and perivascular monocytes and macrophages, including within the meningioma. While MPS VI is not known to cause neoplasia in humans or animals, one previous study found a relatively high rate of meningiomas in young cats (<3 years of age) with MPS I.

Discipline: Anatomic pathology, **Topic:** Comparative pathology, **Species:** Feline, **Systems:** Nervous

19: CUTANEOUS PARAGONIMIASIS IN A CANINE SKIN BIOPSY

Emily Hoskins¹, Granit Qupeva², Rafael Ramos², Kendall Langsten², Guilherme Verocai²

¹Texas A&M Veterinary Medical Diagnostic Laboratory, College Station, TX, USA,

²Texas A&M University, College of Veterinary Medicine & Biomedical Sciences, College Station, TX, USA

A canine skin biopsy from a 6-year-old male neutered dog from Missouri with no clinical history and no specified anatomic location was submitted to Texas A&M Veterinary Diagnostic Laboratory. Within the subcutis of the biopsy, there was severe focal pyogranulomatous and lymphoplasmacytic inflammation surrounding a 2.23 × 4.71 mm parasite with histologic features suggestive of a trematode, including spongy parenchyma, vitelline glands, and brown to gold pigment within the gastrointestinal tract. As subcutis is an abnormal location for canine trematodiasis,

aberrant migration of an immature trematode species was favored. Etiologic differentials included *Paragonimus kellicotti*, *Alaria* spp., and *Nanophyetus salmincola*. Histologic features were inconsistent with *Heterobilharzia americana*. Scrolls of formalin-fixed paraffin-embedded tissue were submitted to the Texas A&M College of Veterinary Medicine and Biomedical Sciences Parasitology Diagnostic Laboratory for molecular species-level identification. Genomic DNA was extracted and PCR and sequencing performed targeting a fragment of the cytochrome c subunit 1 gene. The generated sequence (502 base pairs) was 100% identical to a *P. kellicotti* (HQ900670) sequence available on GenBank, also from Missouri, confirming the diagnosis. Cutaneous paragonimiasis has been described in humans, with rare reports in dogs. Pulmonary disease remains the most common manifestation of *P. kellicotti* infection; however, ectopic migration should also be considered in dogs with pyogranulomatous or eosinophilic cutaneous lesions, particularly when there is a history of potential freshwater crayfish exposure in endemic areas.

Discipline: Anatomic pathology, **Topic:** General pathology, **Species:** Canine, **Systems:** Integument

20: IDENTIFICATION AND CHARACTERIZATION OF LACTOCOCCUS GARVIEAE SEQUENCE TYPE 95 ISOLATED FROM MOZAMBIQUE TILAPIA (OREOCHROMIS MOSSAMBICUS) IN THE UNITED STATES

Kim Jacobsen¹, Yoandy Coca¹, Mia Reed¹, Zeinab Yazdi¹, Eileen Henderson², Heather Fritz², Alessandra Rodriguez², Taylor Heckman³, Joshua Bumgarner³, Benjamin LaFrentz⁴, Esteban Soto¹

¹University of California - Davis, Davis, CA, USA, ²California Animal Health & Food Safety Laboratory, Davis, CA, USA, ³Thad Cochran National Warmwater Aquaculture Center, Stoneville, MS, USA, ⁴USDA-ARS, Auburn, AL, USA

Mozambique tilapia (*Oreochromis mossambicus*) from a farm in the Southwestern US were examined due to ongoing morbidity and mortality at the facility. Affected fish exhibited gross and histologic changes consistent with bacterial septicemia and *Lactococcus garvieae* and *Aeromonas hydrophilia* were isolated from internal tissues. Multilocus sequence typing revealed that the representative *L. garvieae* isolate (R26-22) was sequence type (ST) 95. Genome analysis identified two antimicrobial resistance genes, *mdt(A)* and *IsaD*, however no phenotypic resistance to erythromycin or tetracycline was identified on microbroth dilution. Rainbow trout (*Oncorhynchus mykiss*; 22.2 ± 4.6 g), Nile tilapia (*Oreochromis niloticus*; ~20 g), and channel catfish (*Ictalurus punctatus*; ~20 g) were intra-coelomically challenged (shedders) with a high (HD; ~10⁷ CFU/fish) or a low (LD; ~10⁵ CFU/fish) dose of *L. garvieae* R26-22 (n = 5 fish/tank, 2 tanks/treatment) and then added to tanks containing ten unchallenged fish (cohabitants). In this experiment, *L. garvieae* R26-22 was pathogenic to shedder trout and tilapia, with 80% and 10% mortality in the HD and LD trout and 100% and 60% mortality in the HD and LD tilapia, respectively. Histologically, shedder tilapia and trout demonstrated widespread granulomatous inflammation with abundant fibrin and intra- and extracellular gram-positive cocci. No mortality was observed in cohabitant trout or tilapia, or in any catfish, however a single HD cohabitant tilapia developed corneal opacities and melanosis. This study represents the first published report of *L. garvieae* in farmed tilapia in the United States, as well as the first report of *L. garvieae* ST 95 in North America.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Aquatic, **Systems:** Systemic

21: ACANTHOCHEILONEMA FILARIASIS IN A FREE-RANGING BOBCAT

Brooke Kahn¹, Michelle Verant², Granit Qupeva³, Guilherme Verocai³, Ashley McGrew¹, Samantha Gillette⁴, Katy Warner⁴, Tyler Coleman⁴, Karen Fox¹

¹Colorado State University, Fort Collins, CO, USA, ²National Park Service, Biological Resources Division, Fort Collins, CO, USA, ³Texas A&M University, College Station, TX, USA, ⁴Organ Pipe Cactus National Monument, Ajo, AZ, USA

An approximately 5-year-old male bobcat (*Lynx rufus*) was euthanized at Organ Pipe National Monument in Arizona for emaciation and severe wounds. Gross necropsy examination confirmed severe emaciation and wounds consistent with intraspecific aggression. The right kidney was reduced in size measuring approximately 1.0 cm in diameter. Histological findings included chronic infarction of the right kidney with marked replacement fibrosis and mineralization. Microfilariae were present in renal vasculature, bilaterally, and in vessels throughout most other tissues examined. No adult filarioid nematodes were observed grossly or histologically. Cytologic examination of blood revealed numerous microfilariae with blunt anterior extremity and mean dimensions were 232.8 µm X 4 µm. PCR of spleen was negative for *Dirofilaria* species. Microfilariae were isolated from blood for DNA extraction and amplification and sequencing of the filarial COX1 gene. The resulting 674 bp sequence was 89.2-90.3% similar to other *Acanthocheilonema* species. *Dirofilaria immitis* and *Dirofilaria striata* have been reported in bobcats, but this is the first report of *Acanthocheilonema* sp. in bobcats. In the United States, *Acanthocheilonema reconditum* has been reported in domestic canids with adult worms being found within the subcutis. This case describes a potential new host record of microfilariae in the bobcat. We speculate that the microfilariae burden in the renal vessels may have contributed to chronic infarction of the kidney and systemic illness within the bobcat, possibly making the animal more prone to intraspecific attack.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Wildlife/Zoo, **Systems:** Systemic

22: DIAGNOSTIC YIELD OF CANINE HINDLIMB AMPUTATION FOR CLINICALLY SUSPECTED STIFLE NEOPLASIA

Kei Kuroki

University of Missouri Veterinary Medical Diagnostic Laboratory, Columbia, MO, USA

Surgical amputation may serve as both a diagnostic and therapeutic procedure when joint neoplasia is suspected, particularly when the lesion is clinically aggressive, painful, or not amenable to complete local excision. However, clinical examination and imaging may not reliably distinguish neoplasia from other causes of stifle enlargement. Although incisional biopsy may provide a less invasive means of diagnosis, amputation without prior biopsy may be elected based on clinical findings and surgical judgement. However, the diagnostic accuracy of this approach has not been well characterized. A retrospective search of the University of Missouri Veterinary Medical Diagnostic Laboratory database identified eight canine cases with stifle enlargement in which hindlimb amputation was performed without prior incisional biopsy over a 16-year period. Neoplasia was clinically suspected in six

cases. Four were confirmed as neoplastic, including three intra-articular soft tissue sarcomas and one histiocytic sarcoma. The remaining two were diagnosed as fungal granulomatous synovitis and hyperplastic synovitis, respectively, resulting in a positive predictive value of 66.7 % for the clinical suspicion of neoplasia. In one additional case, amputation was elected during planned surgery for cranial cruciate ligament rupture when the stifle was found to be filled with an extensive soft tissue mass, subsequently diagnosed synovial myxoma. Another case underwent amputation because of chronic complications following cranial cruciate ligament surgery. These findings demonstrate that clinical suspicion of stifle neoplasia is not always accurate. When clinically feasible, incisional biopsy may be considered before amputation to better characterize the underlying disease process occurring within the enlarged stifle.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Canine, **Systems:** Bone and joints

23: PRESERVATION OF BASAL PLATELET ACTIVATION STATUS IN CANINE WHOLE BLOOD OVER 72 HOURS: A PILOT FLOW CYTOMETRIC EVALUATION OF A DIRECT-DRAW PLATELET STABILIZATION TUBE

Kelvin Liu¹, Yihan Zheng², Zhaohui Wang³, Yuqian Hua⁴, Honglei Zhou⁵

¹University of North Carolina at Greensboro, Greensboro, NC, USA, ²Hangzhou High School (Gongyuan Campus), Hangzhou, China, ³Intelliflow tech LLC, LEWES, DE, USA, ⁴IntelliFlow (Beijing) Biotechnology Co., Ltd., Beijing, China, ⁵Jiangsu Agri-animal Husbandry Vocational College, Taizhou, China

Background: Flow cytometric CD62P (P-selectin) measurement on CD61+ platelets is established in dogs but pre-analytically constrained: unfixed canine samples have been analyzed within 15 minutes, delayed testing has required dedicated fixation workflows, and the assay remains outside routine veterinary practice.

Objective: To determine whether a direct-draw platelet stabilization tube preserves basal CD62P expression in canine whole blood over 72 hours at ambient and refrigerated storage.

Methods: Paired samples were drawn at one venipuncture from a healthy dog into 3.2% sodium citrate (control) and platelet stabilization tubes, held at 22-28 °C and 2-8 °C, and analyzed at 0, 1, 6, 24, and 72 hours. Platelets were identified with anti-CD61 and CD61+CD62P+ events reported as a percentage.

Results: In citrate, CD61+CD62P+ platelets rose from 8.5% to 38.5% at 1 hour and 43.4% at 6 hours, then 30.3% and 29.3% at 24 and 72 hours (22-28 °C, SD 12.0); refrigerated citrate rose to 37.6% and 44.9% at 1 and 6 hours and 65.0% and 71.1% at 24 and 72 hours (SD 22.2). In stabilization tubes, values remained 0.6-1.9% at 22-28 °C (SD 0.5) and 0.6-1.4% at 2-8 °C (SD 0.3).

Conclusions: Citrated canine whole blood showed a greater than fourfold rise in CD62P+ platelets within one hour at both temperatures, diverging further with refrigeration, while paired stabilized blood stayed below 2%. The 1- and 6-hour points span current canine assay practice; 24 hours corresponds to overnight shipment and 72 hours to multi-day transit. A larger cohort is planned.

Discipline: Clinical pathology, **Topic:** Methods/technology, **Species:** Canine, **Systems:** Hematopoietic

24: PRIMARY INTRANASAL AMELANOTIC MELANOMA IN A YOUNG HUSKY

Yu-Yi Lo¹, Yu-Ting Chou², Hui-Wen Chang¹, Wei-Hsiang Huang¹, Yen-Chen Chang¹, Chih-Cheng Chang¹, Chi-Fei Kao³

¹Graduate Institute of Molecular and Comparative Pathobiology, School of Veterinary Medicine, National Taiwan University, Taipei, Taiwan, ²National Taiwan University Veterinary Hospital, Taipei, Taiwan, ³Department of Veterinary Medicine, School of Veterinary Medicine, National Taiwan University, Taipei, Taiwan

A four-year-old spayed female Husky was presented to National Taiwan University Veterinary Hospital (NTUVH) for evaluation of a progressive left nasal lesion and associated respiratory signs. Series of diagnostic imaging showed gradual dorsorostral expansion of a contrast-enhancing growth, marked conchal lysis, and involvement of the cribriform plate and the left nasopharyngeal meatus. Rhinoscopy with sampling was performed and strong bleeding propensity was observed. Cytology described predominately aggregates of large round cells with moderate to high nuclear-cytoplasmic ratio, frequent cytoplasmic vacuoles, and moderate anisocytosis. Although subsequent histopathology did not confirm a malignancy, an empirical trial of L-asparaginase and prednisolone of anti-inflammatory dose was initiated. While mild clinical improvement was observed, follow-up computed tomography demonstrated persistent lesion progression. Repeat biopsy from both the nasal and oral entries revealed an expansile growth replacing the lamina propria of mucosa and comprising polygonal to spindloid neoplastic cells arranged in sheets, islands or bundles, embedded in a small amount of fibrovascular, to occasionally thick and hyalinizing stroma. No junctional activity was detected. The neoplastic cells showed strong immunoreactivity for vimentin and SOX-10 but were negative for pan-CK, PNL-2, Melan-A, desmin, and SMA. A diagnosis of amelanotic melanoma was favored based on the morphologic and immunohistochemical results. Canine intranasal melanoma is rare, locally destructive and tends to occur at young ages with an unknown metastatic potential. This case again highlights the rarity and high invasiveness of primary intranasal melanoma in young dogs and emphasizes the diagnostic challenges associated with its unusual clinical, anatomical, and histopathological features.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Canine, **Systems:** Respiratory

25: ESOPHAGEAL DERMOID CYST ASSOCIATED WITH MEGAESOPHAGUS AND FATAL ASPIRATION PNEUMONIA IN A MAINE COON CAT

Ariel de Aguiar, Carly Bauer, Rachel Sanford, Carlos Lopez Figueroa
University of Minnesota, Saint Paul, MN, USA

Background: Megaesophagus is an uncommon disorder in cats characterized by impaired esophageal motility and dilation, often resulting in regurgitation and aspiration pneumonia. Reported causes include idiopathic disease, congenital abnormalities, neuromuscular disorders, endocrine and metabolic diseases, inflammatory conditions, mechanical obstruction, trauma, and toxicities. Dermoid cysts are rare developmental lesions and are only exceptionally reported within the esophagus.

Case Description and Results: A 2-year-old neutered male Maine Coon was evaluated for a 6-week history of regurgitation, vomiting, and progressive weight loss, progressing from intolerance of solid food to liquids only. Thoracic radiographs and computed tomography identified a large fluid-filled intrathoracic mass associated with esophageal dilation and pulmonary consolidation. Fine-needle aspiration yielded mature keratinized squamous cells suggestive of a keratin-containing cyst. Following acute respiratory deterioration, the cat was euthanized and submitted for necropsy. Postmortem examination revealed marked dilation of the cervical and cranial intrathoracic esophagus and a 12 × 2.5 × 3 cm encapsulated intramural esophageal mass containing abundant opaque, yellow material. Histologically, the lesion consisted of a well-demarcated cyst extending from the submucosa to muscularis, lined by stratified squamous epithelium and filled with abundant lamellated keratin and keratinaceous debris, consistent with a dermoid cyst. The lungs exhibited severe necrosuppurative bronchopneumonia with intra-alveolar foreign material and abundant bacterial aggregates, consistent with aspiration pneumonia.

Conclusions:

This case identifies an esophageal dermoid cyst as a rare cause of mechanical esophageal dysfunction resulting in marked megaesophagus and fatal aspiration pneumonia. Developmental esophageal cysts should be considered among differential diagnoses for regurgitation and megaesophagus in young cats.

Discipline: Anatomic pathology, **Topic:** General pathology, **Species:** Feline, **Systems:** Gastrointestinal

26: MYCOBACTERIUM GENAVENSE INFECTION IN 23-YEAR-OLD A SULFUR CRESTED COCKATOO

Mohamed Mousa¹, James Trybus², Hannah Sather², Ida Phillips²

¹Tuskegee University, Tuskegee, AL, USA, ²North Carolina Veterinary Diagnostic Laboratory System, Raleigh, NC, USA

Mycobacterium genavense is a slow-growing, nontuberculous mycobacterium and one of the most common causes of mycobacteriosis in pet birds that can cause disease in mammals. It has been isolated from tap water and the gastrointestinal tract of humans. A 23-year-old female sulfur-crested cockatoo was presented for necropsy following a history of weight loss, inability to gain weight, loose stools, and multiple masses. Gross examination revealed prominent keel bone and generalized muscle atrophy, and multiple firm, tan masses involving the left submandibular, left cervical, base of the heart, and the omentum. On cut section, there was abundant necrotic debris, and approximately 10 mL of serosanguineous coelomic fluid was present. Histologically, the masses consisted of dense, coalescing sheets of macrophages with formation of multiple granulomas characterized by central necrotic debris surrounded by multinucleated giant cells. Numerous acid-fast organisms were identified within macrophages and giant cells. Molecular testing of granulomatous nodules was positive for *Mycobacterium*, and sequencing identified *Mycobacterium genavense* confirming the etiologic diagnosis. These findings support a diagnosis of disseminated granulomatous disease caused by *M. genavense*. This case highlights *M. genavense* as an important differential diagnosis for multisystemic granulomatous disease and mass-forming lesions in companion psittacine birds. Because *M. genavense* has been reported as a rare opportunistic pathogen in

immunocompromised patients, identification in pet birds warrants consideration of potential zoonotic exposure.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Avian, **Systems:** Systemic

27: COMPARATIVE EVALUATION OF CANINE RED BLOOD CELL MORPHOLOGY IN CYTOLOGY SLIDES AND PERIPHERAL BLOOD SMEARS

Craig Thompson^{1,2}, Azure Patterson¹

¹Purdue University College of Veterinary Medicine, West Lafayette, IN, USA, ²The Department of Comparative Pathobiology, College of Veterinary Medicine, Purdue University

Background: Evaluation of red blood cell (RBC) morphologic abnormalities on peripheral blood smears is a routine component of hematologic assessment and can provide valuable diagnostic information. Although erythrocytes are commonly present in cytology preparations, RBC morphologic abnormalities are not routinely evaluated during cytologic interpretation because their diagnostic significance in these specimens remains uncertain.

Objective: To determine the agreement between red blood cell morphologic abnormalities observed on cytology preparations and those identified on corresponding peripheral blood smears.

Material and Methods: A total of 43 paired peripheral blood smears and corresponding cytology slides were collected from the same patients within 24 hours of sample collection, resulting in 86 slides for evaluation. All slides were randomly assigned identification numbers, and both reviewers were blinded to slide pairings throughout the evaluation. A highly trained veterinary student and a board-certified veterinary clinical pathologist independently evaluated each slide. Following independent evaluation, findings from cytology preparations were compared with those from the corresponding peripheral blood smears.

Hypothesis: We hypothesized that RBC morphologic abnormalities observed on cytology preparations would differ from those observed on corresponding peripheral blood smears.

Results: Agreement, McNemar and paired-t tests we performed to compare findings in the peripheral blood and cytology for each observer. P values ranged from 0.146 to <0.001 for different morphologies for each observer.

Conclusion: Additional studies with more cases and specific tissues are warranted to further characterize the findings and draw more specific conclusions.

Discipline: Clinical pathology, **Topic:** General pathology, **Species:** Canine, **Systems:** Hematopoietic

28: LXR ALPHA EXPRESSION IS INCREASED IN CANINE MAMMARY TUMORS INDEPENDENTLY OF TUMOR CELL PROLIFERATION

Promptorn Raksaseri, Punnarat Viboonchan, Wuthichai Klomkleaw, Dilaka Chumthong, Damri Darawiroj, Sayamon Srisuwattanasagul, Saritvich Panyaboriban

Faculty of Veterinary Science, Chulalongkorn University, Pathumwan, Bangkok, Thailand

Background: Canine mammary tumors (CMTs) are the most common neoplasms in female dogs, with approximately 50% being malignant. Although liver X receptors (LXRs) regulate cholesterol and lipid homeostasis, are implicated in human breast cancer, their expressions in CMTs remain poorly characterized.

Objective: To examine LXR alpha and LXR beta expression and cellular localization in CMTs and evaluated their association with tumor cell proliferation.

Methods: Mammary tissues from 22 female dogs (5–15 years old) underwent unilateral mastectomy were classified as benign (n = 11) or malignant (n = 11). Neoplastic and adjacent non-neoplastic tissues were assessed for LXR alpha and LXR beta by Western blotting (WB) and immunohistochemistry (IHC), with H-score correlated with proliferating cell nuclear antigen (PCNA) and mitotic indices.

Results: Both LXR subtypes were detected in neoplastic and adjacent non-neoplastic mammary tissues. WB detected immunoreactive bands for LXR alpha at 68 and 50 kDa and for LXR beta at 50 kDa. IHC staining revealed that both LXR subtypes were predominantly localized to the cytoplasm of the glandular and ductal epithelial cells, and myoepithelial cells, with occasional nuclear staining. H-score analysis revealed significantly higher LXR alpha expression in both benign and malignant tumors than in adjacent non-neoplastic tissues, whereas LXR beta expression was unchanged. Notably, neither LXR alpha nor LXR beta H-scores correlated with PCNA expression or mitotic index.

Conclusion: These findings identify increased LXR alpha expression in CMTs independent of cell proliferation, highlighting LXR alpha as a potential therapeutic target through modulation of lipid metabolism and/or cell survival.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Canine, **Systems:** Mammary

29: MEMBRANE MATTERS: IMPACT OF CANINE DYSLIPIDEMIA ON RED BLOOD CELL PHOSPHATIDYLSERINE EXTERNALIZATION AND RHEOLOGICAL PROPERTIES

Elizabeth Rexroat, Sean Jenkins, Jacob Layton, Jordan Peeler, Nooshin Zandi, Ashley Brown, Erica Behling-Kelly, Sydney Hastain
College of Veterinary Medicine, North Carolina State University

Background: Dogs with primary and endocrine-associated lipid imbalance (dyslipidemia) are at increased risk for red blood cell (RBC)-rich venous thromboembolisms. The mechanisms underpinning the association are not well understood. Because RBC phosphatidylserine (PS) externalization and deformability influence coagulation and clot formation and breakdown, respectively, dyslipidemia may increase thrombotic risk by altering RBC membrane composition and rheology.

Objectives: 1) Quantify PS externalization on RBCs from healthy dogs and dyslipidemic dogs, and 2) characterize their rheological properties.

Methods: EDTA-anticoagulated blood was collected from healthy dogs when fasted and non-fasted as well as dogs with primary or secondary conditions associated with dyslipidemia. RBC PS externalization was quantified by FITC-Annexin V labeling and flow cytometry. Rheological parameters were obtained using the ALCOR Scientific Mizar®.

Results: The mean proportion of Annexin V-positive RBCs was slightly higher in healthy dogs when non-fasted (0.63%) compared to fasted (0.16%, n=5), and was highest in dyslipidemic dogs (0.65%, n=6). The mean RBC distribution index and peak provided by the Mizar® were highest in healthy fasted dogs (28.9, 58) compared to their non-fasted samples (13.45, 39) and dyslipidemic dogs (15.71, 50).

Conclusion: Preliminary data shows that healthy non-fasted dogs and dogs with dyslipidemia have slightly higher proportions of Annexin V-positive RBCs as well as less deformable RBCs than healthy fasted dogs. Findings may suggest that increased or altered circulating lipids influence RBC membrane composition and rheology. Sample collection is ongoing.

Discipline: Clinical pathology, **Topic:** General pathology, **Species:** Canine, **Systems:** Cardiovascular

30: TOXICOPATHOLOGICAL STUDY OF POLYSTYRENE MICROPLASTIC INGESTION IN THE YELLOW MEALWORM (TENEBRIO MOLITOR)

Chloé Rosa-Teijeiro, Fanny Renois, Marie-Odile Benoit-Biancamano
Université de Montréal, Saint-Hyacinthe, QC, Canada

Microplastics (MPs) are persistent environmental contaminants that threaten terrestrial ecosystems, driving interest in biological approaches to plastic degradation, including insects capable of ingesting polystyrene (PS). The yellow mealworm (*Tenebrio molitor*) has demonstrated the ability to consume PS and has therefore been proposed as a potential bioremediation organism. However, the toxicological and biological effects of chronic MP exposure including immune and antioxidant responses, as well as the fate of ingested MPs within and outside the insect remain poorly characterized.

This study aims to investigate the toxicodynamics and toxicokinetics of prolonged exposure to four commonly used PS formulations, each containing different additives.: general-purpose PS, expanded PS, extruded PS, and high-impact PS. Adult mealworms will be exposed for 14 days, followed by assessment of tissue-level effects through histopathology and evaluation of immune and antioxidant responses through gene expression analyses. The absorption and tissue distribution of MPs and their additives will be investigated using quantitative autoradiography and gas chromatography–mass spectrometry. MP elimination will be assessed through characterization of digestive residues using μ FTIR spectroscopy analysis.

Preliminary observations in mealworms exposed to 5- μ m red PS microspheres for seven days revealed dehydration, digestive obstruction by dried red frass and abundant microspheres with apparently unchanged morphology in fecal smears. PS microspheres were also visualized histologically within the digestive tract.

This project will improve understanding of the toxicological and immunotoxicity effects and biological fate of MPs in terrestrial invertebrates and help assess the potential of *T. molitor* as a model for environmental contaminant research and plastic bioremediation.

Discipline: Anatomic pathology, **Topic:** Toxicology, **Species:** Invertebrates, **Systems:** Gastrointestinal

31: FIBRINOUS PERICARDITIS IN A HORSE: INDICATIVE OF A POTENTIAL FUTURE OUTBREAK?

Rachael Surowiec, Linden Craig, Sam Wicker

University of Tennessee College of Veterinary Medicine, Knoxville, TN, USA

A 17-year-old, castrated male, thoroughbred was euthanized for lethargy, coughing, nasal discharge, tracheal effusion and muffled heart sounds. Cytologic evaluation of pericardial fluid obtained at the time of euthanasia revealed numerous degenerate neutrophils containing intracellular bacteria. At postmortem examination, there was severe tracheal effusion and hepatic congestion, indicative of right-sided heart failure. The pericardial sac had a thick carpet of tan fibrin covering the epicardium and inner surface of the pericardial sac. Microscopically, the epicardium was expanded by granulation tissue and edema interspersed with neutrophils, macrophages, and fewer lymphocytes and plasma cells, with overlying layers of fibrin. Gross and histologic findings were consistent with fibrinous pericarditis. Aerobic and anaerobic bacterial cultures of the epicardium yielded scant growth of *Actinobacillus equuli*. In spring of 2017, an outbreak of forest tent caterpillar ingestion was associated with septic fibrinous pericarditis in horses. Cases associated with caterpillar exposure most commonly yielded *Actinobacillus* spp. The similarity in culture results, in conjunction with the seasonality of this case (late spring), raises concern that this case may represent part of a larger outbreak or indicate the potential for future cases of septic pericarditis associated with forest tent caterpillar exposure.

Discipline: Anatomic pathology, **Topic:** Other (Diagnostic Pathology), **Species:** Equine, **Systems:** Cardiovascular

32: COMPARISON OF MULTIPLE AUTOMATED AND MANUAL MEASUREMENT METHODS FOR COUNTING PERIPHERAL BLOOD MONONUCLEAR CELLS IN RHESUS, DOG, MOUSE, AND RAT SAMPLES FOLLOWING ISOLATION FROM WHOLE BLOOD

Peter Szczerba, Gopalkrushna Patel, Payal Patel, Michelle Raffaele, Dana Billy, Elizabeth Besteman
Merck

Peripheral Blood Mononuclear Cells (PBMCs) are used in wide variety of research-based applications including Toxicology and Pre-clinical Drug Development, Vaccine Development, Immunomonitoring, Immunotherapy, and Autoimmune Research. Different researchers use a variety of methods to count PBMCs. This study compared popular PBMC counting methods across Rhesus monkey, Dog, Mouse, and Rat following Ficoll-Paque isolation from whole blood. Methods included manual hemacytometer microscopy, Nexelcon Cellometer Auto T4 bright-field imaging, Siemens ADVIA 2120i (Baso and Perox modes) flow cytometry, and Sysmex XN-

2000V (Whole Blood and Body Fluid modes) flow cytometry. Method agreement varied widely with only the ADVIA Baso and Sysmex Whole Blood (WB) showing agreement across all species. The Sysmex Body Fluid (BF) demonstrated agreement with the Sysmex WB and ADVIA Baso for Rat and Mouse PBMCs only. The Sysmex and ADVIA also provided WBC differentiation, platelet, and RBC measurement capabilities which can be used to assess isolation technique and PBMC sample quality. However, agreement for these three parameters across all species was limited to platelets between the Sysmex WB and ADVIA Baso methods. The Cellometer and manual hemacytometer counts failed to show agreement with any of the other methods. Each method offers varying advantages from simplicity of use, cost, and availability, to more advanced cell measurement capabilities. The Cellometer and manual hemacytometer counts are accessible to most laboratories with limited investment. However, the Sysmex WB and ADVIA Baso methods offer the most reproducible and accurate counts due to flow cytometry and increased number of cells counted per sample.

Discipline: Clinical pathology, **Topic:** Methods/technology, **Species:** NHP, **Systems:** Hematopoietic

33: THE BONE LESS TRAVELED: AN UNUSUAL CASE OF MYCOBACTERIOSIS IN A MOLUCCAN COCKATOO (*CACATUA MOLUCCENSIS*)

Payton VanDusseldorp, Deb Miller, Madison Callicott

University of Tennessee College of Veterinary Medicine, Knoxville, TN, USA

An approximately 10-year-old female intact Moluccan cockatoo (*Cacatua moluccensis*) was presented to the University of Tennessee Avian and Exotic Department for acute non-weight bearing lameness on the left pelvic limb. Radiographs revealed fractures of the left femur, right distal ulna, multifocal lytic long bone lesions, and a caudal coelomic mass. Due to severity of lesions, humane euthanasia was elected. Gross examination identified a chronic healing fracture of the right distal ulna, an acute complete oblique fracture of the left proximal femur, and a 3x1.5x1cm, round, soft, smooth, pink to tan, cavitated mass firmly adhered to the left body wall and extending into the pelvis and cloaca. Histologically, the coelomic mass consisted of a necrotizing granuloma containing abundant acid-fast, gram-negative, filamentous bacilli. Similar organisms were identified within macrophages and multinucleated giant cells in the bone marrow of multiple long bones and in the lungs. The long bones exhibited granulomatous osteomyelitis with cortical destruction, explaining the pathologic fractures and lytic lesions. *Mycobacterium* was detected by PCR and sequencing using shavings from the tissue block of the coelomic mass. Sequence analysis demonstrated greatest identity with *Mycobacterium avium* subspecies *avium*, supporting this organism as the most likely etiologic agent. This case demonstrates an unusual presentation of disseminated avian mycobacteriosis characterized by extensive granulomatous osteomyelitis and pathologic fractures. The distribution of lesions, including a prominent granuloma adjacent to the cloaca, raises the possibility of localized inoculation associated with self-trauma in addition to the more typical gastrointestinal route of infection.

Discipline: Anatomic pathology, **Topic:** Infectious disease, **Species:** Avian, **Systems:** Systemic

34: A RETROSPECTIVE ANALYSIS OF NON-CHYLOUS LYMPHOCYTE-RICH PERITONEAL EFFUSIONS IN CATS

Jeremy Wang, Jeremy Bessett

University of Wisconsin School of Veterinary Medicine, Madison, WI, USA

Non-chylous lymphocyte-rich effusions form due to leakage of chylomicron-poor lymph from lymphatic vessels. In cats, this type of effusion in the pleural space is typically associated with a cardiomyopathy or intra-thoracic neoplasm, possibly due to increased lymphatic pressure. There is a paucity of information regarding non-chylous lymphocyte-rich peritoneal effusions in cats; the objective of this study was to investigate the diseases associated with these rare effusions. Medical records from the authors' institution were retrospectively reviewed, and 14 cases were identified between March 2015 and June 2026. All included patients were domestic or mixed breed cats, and the median age was 10.5 years (range 7-17). The median total protein concentration was 2.9 g/dL (range <2.5-5.5), the median total nucleated cell count was 880 cells/ μ L (range 320-27,020), and the median lymphocyte percentage was 62.5% (range 42-96). 6/14 cats (42.9%) had pancreatitis, 6/14 had a confirmed or suspected lymphoproliferative disorder, 3/14 (21.4%) had a confirmed or suspected non-hematopoietic intra-abdominal neoplasm, and 2/14 (14.3%) had mild hypertrophic cardiomyopathy. In some cases, the small lymphocytes present in the effusion could not be definitively distinguished from neoplastic lymphocytes. Cardiac disease was not as overtly associated with these effusions as compared to those in the pleural space. However, major limitations of this study include the small number of cases and the lack of a full cardiac workup in most cases.

Discipline: Clinical pathology, **Topic:** Other (Effusions), **Species:** Feline, **Systems:** Systemic

35: A RENAL SURPRISE: BILATERAL RENAL CARCINOMA IN A HAMSTER AND RETROSPECTIVE STUDY

Amy Webb, Linden Craig

University of Tennessee College of Veterinary Medicine, Knoxville, TN, USA

A 2-year-old male hamster presented for a 1-month history of anorexia and weight loss that had rapidly progressed over the previous week to lethargy, and he died on the way to the hospital. At autopsy, this hamster was emaciated and had a cecal torsion involving 6.5cm of the cecal base. Additional gross findings included dorsal lumbar alopecia, bilateral tan-pink soft nodules in the kidneys, and variably sized clear to dark green cysts in the liver. Histologically, the bilateral renal nodules were composed of neoplastic epithelial cells forming cords and tubules that multifocally invaded into the adjacent parenchyma. Neoplastic epithelial cells were cuboidal to columnar with eosinophilic cytoplasm, indistinct cell borders, and round nuclei with usually indistinct nucleoli; anisocytosis and anisokaryosis were marked with frequent karyomegaly, rare binucleation, and no mitotic figures. These findings were consistent with bilateral renal carcinomas. A search of hamsters submitted for autopsy to the University of Tennessee College of Veterinary Medicine between 2006 and 2026 revealed 34 hamster submissions. Of these, 2 (6%) were diagnosed with renal carcinoma, and only 1 of those (this case) was bilateral. Alopecia and biliary cysts were present in two hamsters, one with adrenocortical carcinoma and one with bilateral renal carcinoma (this case). Bilateral renal carcinomas have been rarely reported in hamsters with both spontaneous occurrence and associated with

estrogen administration. It is unclear if these represent multicentric origin or metastatic spread.

Discipline: Anatomic pathology, **Topic:** Oncology, **Species:** Rodents, **Systems:** Urinary

36: HISTOLOGIC AND MOLECULAR SIGNATURES OF CLOSTRIDIODES DIFFICILE INFECTION-INDUCED ACUTE KIDNEY INJURY IN A MURINE MODEL

Farnaz Yousefi, Yoonsung Hu, Shaan Mooyottu

Auburn University College of Veterinary Medicine, Auburn, AL, USA

Background: In human *Clostridioides difficile* infection (CDI), acute kidney injury (AKI) complicates 17-22% of hospitalizations, roughly doubles inpatient mortality, and predicts renal decline. Evidence is clinical and creatinine-based, with injury attributed to dehydration and inflammation. However, direct renal tissue injury has not been characterized pathologically.

Methods: C57BL/6 mice received an oral antibiotic cocktail and intraperitoneal clindamycin to disrupt colonization resistance, then were gavaged with *C. difficile* spores (CDI, n=9) or PBS; antibiotic-treated and untreated mice served as controls. Kidneys collected 48 hours post-challenge underwent histopathology; immunohistochemistry (IHC) and western blotting for kidney injury molecule-1 (KIM-1), a tubular injury marker; western blotting for phosphorylated STAT3 (pSTAT3), an inflammatory signaling readout; and renal RNA-seq with qPCR.

Results: Histologically evident tubular injury was observed in 3/9 CDI mice but not in controls. Lesions involved proximal convoluted tubules, with degeneration (swelling, vacuolation, brush border loss) and necrosis (hypereosinophilic cytoplasm, pyknotic nuclei). Renal Kim1 and Stat3 transcripts and KIM-1 and pSTAT3 proteins were increased, with KIM-1 immunolabeling localized to proximal tubules by IHC. RNA-seq identified ~2,500 differentially expressed genes in CDI kidneys versus controls ($Q < 0.05$; n=6). Key driver analysis of RNA-seq data with qPCR validation resolved two distinct pathways: an upregulated inflammatory pathway and a downregulated mitochondrial oxidative phosphorylation (OXPHOS) pathway.

Conclusions: CDI produces proximal tubular degeneration and necrosis with KIM-1 induction and STAT3 activation and involves two distinct but interrelated inflammatory and OXPHOS pathways. To our knowledge, this is the first histologic and molecular characterization of CDI-associated AKI, indicating tubular injury beyond prerenal azotemia.

Discipline: Anatomic pathology, **Topic:** Comparative pathology, **Species:** Rodents, **Systems:** Urinary