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VIRGINIA ANIMAL DIAGNOSTIC NEWSLETTER

A joint publication between Virginia Department of Agriculture and Consumer Services and the Virginia Tech Animal Laboratory Services

EDITORIAL

Diagnostic Support for Virginia

The last few years have seen more interaction of the diagnostic efforts of VDACS and ViTALS, which sets the stage for enhancing the important service that all of us provide to Virginians. I have a longer view than most, having been here at Virginia Tech for over 42 years. The close collaboration between these two entities has emerged as a real strength, and needs to be fostered and encouraged as we all move forward to serve our Commonwealth. The Commonwealth is served much better by this collaboration than it ever could be by either one of these acting on their own to the exclusion of the other. Each diagnostic animal service brings unique strengths to the relationship, and these need to be broadly appreciated and further developed to achieve the real strength that is more possible now than any time previously.

A few basic phenomena form the foundation for a successful diagnostic endeavor, especially as it relates to serving the veterinary and agricultural communities. Among these are

1. cost
2. accuracy
3. timeliness

The interaction, communication and influence of both VDACS and ViTALS is essential to the success of all three.

Cost is an interesting aspect. Veterinary diagnostics are inherently expensive. This is due to the need for highly proficient personnel as well as the facilities, equipment, and reagents that underpin many of the procedures and tests. Although veterinary diagnostics are indeed expensive, they are an incredibly good bargain for society. In the absence of accurate veterinary diagnostics, losses can pile up and agricultural production suffers, food safety becomes problematic, and zoonotic surveillance becomes weak or nonexistent. These consequences will rarely or never be assigned back to the root cause that comes from a lack of veterinary diagnostics, but the fact is that these losses can all be avoided by a system of good and efficient veterinary diagnostics.

Accuracy is another important aspect of veterinary diagnostics. Quality assurance can be arduous, but it is essential. Inaccurate results

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are much more damaging than no results at all! My own view is skewed towards anatomic pathology. From this viewpoint, accuracy within both ViTALS and VDACS is now at a very high level. The value of having an array of diagnosticians and pathologists available for consultation is a real strength. This provides for a level of consultation and discussion that strengthens the final outcome in significant ways. Good, targeted recruitment and development have led to a group of veterinarians that is quite strong and now leads in veterinary pathology not only regionally, but also nationally and internationally. This is an accomplishment to celebrate, and is a real strength to the animal diagnostic services in Virginia.

Turn-around time is an important component for truly useful veterinary diagnostics. Long delays can make even the most accurate final results meaningless and some times more expensive than dealing with a problem comprehensively from the very beginning. Organizational strategies have a large influence on the turn-around time for diagnostic testing, and each of the diagnostic services do their best to keep these times at a minimum, providing efficient and reliable diagnostic tests and interpretations.

An ideal system pays close attention to cost, accuracy, and timeliness. Each of those dimensions is currently strong, and that message needs to be loud and clear to our constituents. This is especially true because the relationship is a collaboration between two different entities, both of which serve Virginia. "Collaboration" is the important element, because "competition" will only serve Virginians poorly.

Phillip Sponenberg DVM, PhD

Department of Biomedical Sciences and Pathobiology
Virginia Maryland College of Veterinary Medicine



Dr. D. Phillip Sponenberg will be retiring on June 30th after a 42-year career at the Virginia-Maryland College of Veterinary Medicine. Dr. Sponenberg's career is distinguished by sustained excellence in the fields of rare breed conservation, reproductive pathology, and service to the veterinary profession. He is internationally recognized for his innovative work in applying genetics towards the conservation and management of a wide array of domestic animal species. Dr. Sponenberg has extensively published his innovative methods and work in textbooks, peer reviewed journals, and lay journals and his leadership and work with multiple organizations, including the American Livestock Breeds Conservancy and the Red Iberoamericana Conbiand, exemplify his global impact. He has the distinction of having taught every graduate of the Virginia-Maryland College of Veterinary Medicine. Dr. Sponenberg's service has been recognized by the VMCVM (Faculty Distinguished Service Award, Veterinary Teaching Hospital Lifetime

Service Award, Excellence in Outreach Award, Outstanding Faculty Award), the VVMA (VVMA Service Award, Distinguished Virginia Veterinarian), and the American College of Theriogenologists (Honorary Diplomate 2017). His charisma and honesty have placed him among the most influential faculty for veterinary students, graduate students and residents, not only in this college but in several countries. He will be missed!!!

HORSES

Placental hyperplasia in a mare

A placental sample from a fourteen-year-old Gypsy Vanner mare was collected at a post-foaling checkup and submitted for biopsy examination. The allantoic surface of the sample contained a 4cm diameter slightly raised fluctuant red/brown cystic lesion. Microscopically this lesion consisted of a focally extensive proliferation of cystic glandular structures on the allantoic surface that communicated with a hematoma surrounded by granulation tissue and mineralized matrix. These features were diagnostic for cystic adenomatous hyperplasia of the allantois. The etiopathogenesis of this lesion is incompletely understood, but it is often associated with chronic placentitis, and in some cases, primary fungal or bacterial placentitis. Late-term abortions, stillbirths, and premature birth have been associated with this condition.

Thomas Cecere DVM, PhD, DACVP, Virginia Tech.

RUMINANTS



Update: Bovine Theileriosis

Theileria orientalis Ikeda genotype is a parasite that infects red blood cells of cattle and is transmitted by the Asian Longhorned tick. Ikeda has been found in Virginia, West Virginia, North Carolina, Kentucky, Tennessee, Maryland, Pennsylvania, New York, Ohio and Kansas. Currently, greater than 50% of adult cattle sampled in regional sale barns are positive for this lifelong infection. After the acute infection, the cattle are resistant to additional clinical disease. Common signs include anemia and icterus, and outcomes can include death, late term abortions or temporary decreased breeding efficiency in bulls. A PCR assay for *Theileria orientalis* and *Anaplasma marginale* has been developed and is run at Virginia Tech Animal Laboratory Services. The preferred sample is EDTA blood which can be submitted to ViTALS or to VDACS which will forward it to ViTALS. Spleen is an alternate matrix in a deceased animal. One important consideration with this assay is that it does not differentiate acute vs persistent infection. Work by a veterinary student, Mishana Smith, showed that a threshold cycle or 'Ct' of 25 or lower was more likely to be acute infection. However, the results should correlate with clinical signs or anemia or a positive may indicate persistent infection rather than the cause of clinical syndrome. Bonus fact: sheep have recently been shown to be experimentally infected and serve as a source of the parasite for tick transmission to cattle. If you have questions or comments, please feel free to contact the laboratories.

Kevin Lahmers DVM, PhD, DACVP, Virginia Tech.

Multicentric lymphoma and leukemia with splenic rupture in a cow

A 7-year-old, third lactation female Holstein was submitted for necropsy in good condition. She had a history of being starting to act off approximately 24 hrs. prior to her death and had a significant drop in ruminations. She was given dextrose CMPK, B12 was alive and standing at 6 AM the next day but not willing to move and was dead an hour later. When the abdomen was opened there was a significant amount of blood present and the entire left side of the abdominal subcutis was a red gelatinous mass. The

spleen was significantly enlarged, approximately 39 inches in length with a 12-inch clot present. Every lymph node was enlarged with some as big as 4 inches. On histopathology, neoplastic cells were found within the spleen, lymph node, heart, liver, kidney, and brain. Findings are consistent with multicentric lymphoma. Adult bovine lymphoma is frequently associated with bovine leukosis virus (BLV). This is an infectious retrovirus that transmits to naïve animals via contact with infected blood. A small percentage of animals infected with BLV develop lymphoma which commonly affects lymph nodes, abomasum, spinal cord, uterus, and heart. While it has been described, the spleen is not a common location for this neoplasia.



Significantly enlarged spleen with a focal rupture of the splenic capsule

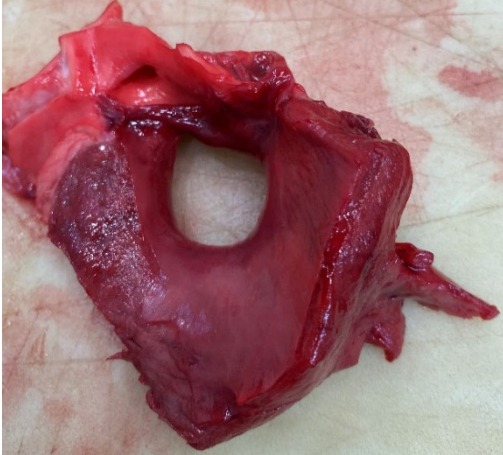
Jamie Horstmann, DVM, Harrisonburg RAHL

Ventricular Septal Defect in a Bull Calf

A 2-month-old bull calf was submitted in good condition after being found dead. He had been treated with Baytril and Resflor prior to his death with minimal improvement. When opening the abdomen, the liver was significantly enlarged with rounded edges and a nutmeg appearance to the liver parenchyma. The kidneys were bilaterally enlarged, and there was a trichobezoar present within the abomasum. When opening the thorax, the heart was significantly enlarged with 200+ mL of red serosanguinous fluid within the pericardial sac. There was a 1-1.5-inch circular communication between the right and left ventricle. Cause of death was a ventricular septal defect and heart failure. Ventricular septal defect (VSD) is the most common congenital defect in cattle, many that are born with this defect have clinical signs of poor growth, dyspnea, or both. Diagnosis of this disease is made via auscultation or necropsy. These animals are at an increased risk of developing respiratory disease. There is no treatment for this disease, and the

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lifespan of the animal depends on the severity of the defect.



Interventricular septum of the heart with a prominent rounded perforation.



Liver with prominent "nutmeg" appearance, indicative of chronic right heart failure.

Jamie Horstmann, DVM, Harrisonburg RAHL

Avian

Update: Avian Influenza

While the threat of Highly Pathogenic Avian Influenza certainly still exists, especially in wild waterfowl and during migratory seasons, Virginia currently has no active cases of the disease. The last confirmed positive case was detected in Rockingham County, in a mixed species "non-poultry" (WOAH Regulatory Definition) flock, on March 6th, 2023. There were ten cases in Virginia, including seven defined as "non-poultry" by the World Organization of Animal Health, one live-bird market, and two "poultry" commercial turkey flocks. The most common epidemiological links associated with introduction continued to be wild waterfowl or access to them.

Jessica Walters DVM, PhD, DACPV, Program Manager,
Office of Laboratory Services

Chicken Adenocarcinoma

An adult female sex link chicken was submitted for necropsy in poor condition. Body condition was 1/9 with no adipose tissue present, a prominent keel bone and diarrhea evident. When opening the abdomen, there was a large fluid-filled structure with yellow serosanguineous fluid (approximately 50 mL). Within this fluid-filled mass was a hard caseous egg yolk with eggshell. The intestines were fused together and filled with hard contents, with multiple nodules present on the surface of the intestines. On histopathology, there was evidence of neoplastic cells within the lung tissue, cecum, ovary, and oviduct as well as desmoplasia and coelomic carcinomatosis all consistent with a malignant epithelial tumor originating from the oviduct/ovary. Adenocarcinomas are common reproductive tumors in chickens over 2 years old.

Jamie Horstmann, DVM, Harrisonburg RAHL

COMPANION AND LABORATORY ANIMALS



Generalized neoplastic disease in a dog

A 9-year-old, intact female, German Shepherd presented to the referral DVM due to labored breathing and anorexia when marked leukocytosis, harsh lung sounds, and severe lung military pattern was identified. Antifungal and anti-bacterial drug treatment was started, and the animal was referred to the Virginia Tech Veterinary Teaching Hospital. On physical exam, she was moderately dehydrated and had the same findings previously reported. Laboratory data indicated a marked inflammatory leukogram, mild hypoalbuminemia and hyperglobulinemia, and increased ALT and ALP. Ultrasound revealed several approximately 4 cm irregular cavitated masses within the liver, three <1 cm nodules in the

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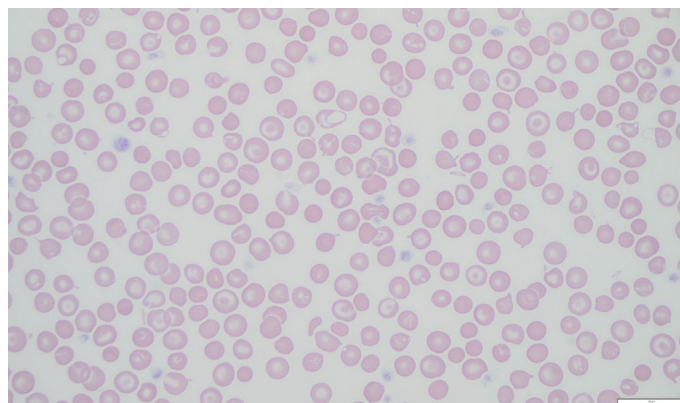
kidneys, and uncountable small nodules on the spleen and lungs. Fine-needle aspiration of the spleen showed lymphoid hyperplasia and extramedullary hematopoiesis, while the cytology of the liver aspirate revealed hyperplastic hepatocytes, neutrophilic inflammation, and a large population of markedly atypical spindle cells. Differential diagnoses included hemangiosarcoma, histiocytic sarcoma, and other undifferentiated soft tissue sarcomas. The dog was humanely euthanized, given the poor prognosis and uncontrolled bleeding into the abdomen after the aspirates, which increased the suspicion of a hemangiosarcoma. Necropsy and histopathology confirmed hemangiosarcoma primary to the heart, with metastasis to the liver, lungs, kidneys, and spleen. Classically, sarcomas tend to produce multifocal, well-circumscribed nodules, although reports describe that lesions can be more variable and also occur as poorly-defined, generalized to diffuse, nodular and linear interstitial lung opacities. Therefore, hemangiosarcoma should be added to the other most common causes of miliary pulmonary pattern, such as fungal diseases and carcinomas.

Priscila B. S. Serpa, DVM, MSc, DSc, DACVP (Clinical), Virginia Tech

Portosystemic shunt mimicking iron deficiency in an adult dog

An 8-year-old, neutered male shih tzu presented to the veterinary teaching hospital for a year-long history of intermittent episodes of collapse/possible seizure activity. A CBC and serum biochemistry were performed. The CBC revealed microcytosis (MCV: 42.6 fL, RI: 61.6-73.5 fL) and hypochromasia (MCHC: 24.9 g/dL, RI: 32.0-37.9 g/dL), though there was no anemia (PCV: 38.8%, RI: 37.0-62.0%). A review of the blood smear confirmed the microcytosis and hypochromasia, but also showed moderate to marked poikilocytosis due to target cells, keratocytes, and schistocytes (see photo). Based on these findings, an interpretation of suspected iron deficiency was made.

The serum biochemistry revealed multiple decreased indirect liver function markers (BUN: 5 mg/dL, RI: 9-30 mg/dL; Albumin: 2.4 g/dL, RI: 2.8-3.7 g/dL; total bilirubin 0.1 mg/dL, RI: 0.2-0.4 mg/dL; and cholesterol: 100 mg/dL, RI: 129-332 mg/dL) and a mildly elevated ALT (ALT: 80 U/L, RI: 16-75 U/L). Upon evaluation of the serum biochemistry and discussion with the clinician, a portosystemic shunt was suspected rather than true iron deficiency.



Peripheral blood smear, Modified Wright stain, 100x magnification: Many of the erythrocytes are microcytic and/or hypochromic. There are also numerous target cells, keratocytes, and schistocytes, which are common findings in iron-deficiency anemia.

Fasting and postprandial bile acids were elevated (fasting BA: 128.5, RI 0.0-14.9; postprandial BA: 60.3, RI: 0.0-29.9) were consistent with decreased hepatic function. An abdominal ultrasound revealed a liver which was mildly reduced in size, but assessment of the portal blood flow was not possible due to the patient's conformation. A presumptive diagnosis of portosystemic shunt was made, and the patient was discharged with a treatment of lactulose, Denamarin and Kepra.

This case serves as an important reminder to consider liver disease/portosystemic shunt as a differential for microcytic and hypochromic anemia. The exact mechanism of the anemia is not known but is suspected to be due to decreased production of proteins needed for iron transport to erythrocyte precursors rather than a true iron deficiency. In addition to iron deficiency and liver disease/portosystemic shunt, other considerations for microcytic hypochromic anemias include copper deficiency and vitamin B6 deficiency.

Natalia Strandberg, DVM, MS, DACVP (Clinical), Virginia Tech

Discospondylitis in a dog

A 7-year-old male neutered German Shepherd presented for reluctance to walk. The dog was painful on mid-thoracic palpation and had thoracic epaxial muscle atrophy and minor hindlimb neurologic deficits. An MRI showed discospondylitis in two thoracic disc spaces. Two blood cultures were submitted to ViTALS: one from the jugular vein that grew *Streptococcus canis*, and one from the saphenous vein that had no bacterial growth. A urine culture grew *Streptococcus canis*. The culture results confirmed the diagnosis of bacterial discospondylitis caused by *Strep. canis*. Blood cultures are positive in

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only 50-75% of discospondylitis cases; multiple blood cultures increase the likelihood of detecting a pathogen, as demonstrated in this case. Urine cultures can be helpful as well, but have limited sensitivity as only 25-50% of discospondylitis cases have positive urine cultures. *Staphylococcus pseudintermedius* is the most common cause of discospondylitis in dogs, but *Streptococcus canis* is relatively common as well. *Brucella canis* and *Aspergillus* spp. should also be considered as differential diagnoses for discospondylitis cases and may require specialized diagnostic tests beyond blood and urine cultures. This patient was treated with cephalexin and responded well to therapy, but long-term treatment and monitoring is required to ensure that the patient does not regress.

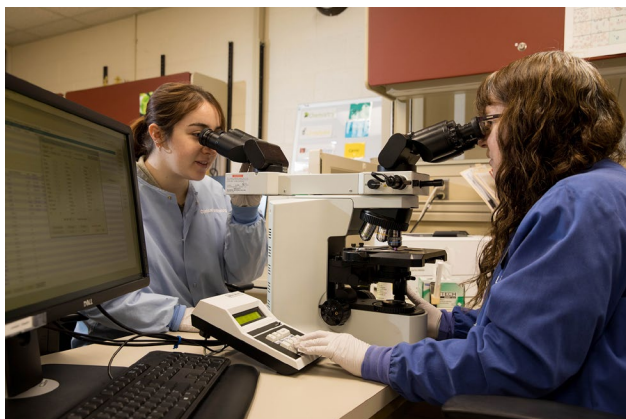
Tessa LeCuyer DVM, PhD, DACVM

Primary cardiac lymphoma in a dog

An eight-year-old male Rhodesian Ridgeback dog collapsed suddenly at home and died on the way to a veterinary clinic. The dog was presented for postmortem examination, and a focal gray mass was identified in the right ventricular myocardium, extending transmurally from the epicardium to the endocardium. Microscopically, this mass consisted of sheets of neoplastic lymphocytes. No gross or microscopic evidence of lymphoma was present in lymph nodes or other visceral organs, confirming primary intracardiac lymphoma in this patient. Primary cardiac lymphoma is uncommon in dogs, but several cases have been reported (JVIM 2003;17:923-927; Aust Vet J 2015 Mar;93(3):67-71; J Vet Med Sci. 2018 Nov 23;801(11):1716-1719).

Thomas Cecere DVM, PhD, DACVP, Virginia Tech.

LABORATORY NEWS



ViTALS

Dr. Valentina Stevenson will be leaving the lab in May to take a faculty position at the University of Florida. While we will miss her tremendously, this is an outstanding opportunity for her, and we are excited to see her career develop.

Dr. Thomas Cecere was awarded with the Dean's innovation award and the class of 2026 outstanding instructor award. Dr. Teresa Southard was awarded with the Dean's innovation award. Dr. Francisco Carvalho was awarded with the CVM outreach award. Congratulations to all!

Roger Ramirez-Barrios, our clinical parasitologist, was named the VVMA Mentor of the Year for 2023. This well-deserved award recognizes excellence in mentorship, and we can't think of anyone more deserving. Congratulations, Roger!

The Chronic Wasting Disease lab is up and running, and has been performing IHC and ELISA tests for the Virginia Department of Wildlife Resources. Many thanks to Daren Lewis, Tessa LeCuyer, and Francisco Carvalho for all of their hard work in standing up the tests!

As the current AAVLD Vice President, I was honored to be able to meet with the AAVLD Government Relations Committee and USAHA partners in Washington, DC in March. We had productive meetings with federal and other agencies to discuss issues and challenges facing agriculture in the US, and plans for the next Farm Bill. It is both encouraging and humbling to see the work that is being done to promote agriculture, and the well-being of producers and citizens.

ViTALS recently increased its NAHLN designation to a Level 2 Laboratory! ViTALS is now one of 23 laboratories with the Level 2 designation and is approved to test for 7 diseases of high consequence to US agriculture. I couldn't be prouder of our team!

Tanya LeRoith DVM, PhD, DACVP, ViTALS Director.

VDACS

The VDACS Laboratory System is super excited to move into the status of a Level 1 Laboratory Designation through the National Animal Health Laboratory Network (NAHLN). This designation change also includes bringing both our Wytheville and Lynchburg Laboratories under the NAHLN scope as Level 1 Branch Labs. Not only does this increase our funding, but it allows us to expand Foreign Animal

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Disease testing capabilities in three of our four laboratories, and we are hopeful of bringing on the fourth laboratory this fall. This designation is currently reserved for laboratories with heavy surveillance volumes, extensive surge capacity, and participation in NAHLN activities.

Regarding testing, we have onboarded both the Bovine Respiratory Panel and Ruminant Abortion Panel, available for testing on both postmortem and antemortem samples. We are also working on adding both BVD PCR and IBR PCR into these panels. Trichomonas PCR will be moved to Lynchburg to run with the other cattle PCRs, and Neospora will be performed in Wytheville. Staff are working hard to streamline testing to improve services and turnaround times.

We have developed both a safety and outreach committee, designed to work with the strengths of our employees to improve the system as a whole. The safety committee is working hard to update and establish new training programs. The outreach committee is busy identifying areas for outreach and visiting with other agencies and businesses. We will be attending four county fairs this summer/fall and are excited to share our new promotional items and outreach displays.

The Lab System also has some new faces- including a new Diagnostician/Laboratory Director in the Wytheville Regional Animal Health Laboratory- Dr. Tom Lavelle, a new Microbiologist Supervisor in Warrenton - DeDe Bache-Shumate, and a new Laboratory Assistant in Harrisonburg- Rosemary Life. We are excited to have them both on board and will be filling vacant positions in both Warrenton and Harrisonburg.

Jessica Walters DVM, PhD, DACPV, Program Manager, Office of Laboratory Services

