

NOVEMBER 2022: VOLUME 3, ISSUE 4

# VIRGINIA ANIMAL DIAGNOSTIC NEWSLETTER

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

## EDITORIAL

### It's just a blood smear...

Your friendly neighborhood clinical pathologist here with a public service announcement that might be of help to you and certainly will be to your patients. In a recent informal poll of veterinary students who have work experience in a private veterinary hospital, I asked how many of you see the attending veterinarian or technician reviewing the blood smears from their patients when a CBC is done. A vast majority indicate they that were not aware of any review. I take that information with a grain of salt in that much goes on in a busy clinic that the visiting student may not appreciate. With that in mind, I have an interesting recent case to share. Below is the raw output CBC data from our laboratory analyzer. Now we have a variety of blood analyzers at our disposal in our clinical pathology laboratory, and they are commercial quality units costing north of 100,000 dollars. So, these are not blue light special benchtop machines as are more commonly found in most practice situations. Take a minute and look at these data.

WBC	41.64	[10 <sup>3</sup> /uL]		
RBC	9.94	[10 <sup>6</sup> /uL]		
HGB	11.6	[g/dL]		
HCT	36.5	[%]		
MCV	36.7	[fL]		
MCH	11.7	[pg]		
MCHC	31.8	[g/dL]		
PLT &F	212	[10 <sup>3</sup> /uL]		
RDW-SD	34.4	[fL]		
RDW-CV	24.5	[%]		
PDW	---	[fL]		
MPV	9.4 *	[fL]		
P-LCR	21.4 *	[%]		
PCT	0.09 *	[%]		
NRBC	0.16	[10 <sup>3</sup> /uL]	0.4	[%]
NEUT	7.79 *	[10 <sup>3</sup> /uL]	18.8 *	[%]
LYMPH	31.69 *	[10 <sup>3</sup> /uL]	76.1 *	[%]
MONO	1.56 *	[10 <sup>3</sup> /uL]	3.7 *	[%]
EO	0.39 *	[10 <sup>3</sup> /uL]	0.9 *	[%]
BASO	0.21	[10 <sup>3</sup> /uL]	0.5	[%]

The analyzer WBC data indicates a marked leukocytosis and lymphocytosis with mild neutrophilia and monocytosis. The analyzer did not flag any leukocyte findings as possibly erroneous. When I initially reviewed these results, I expected to find chronic lymphocytic leukemia in our patient or possibly some acute hemic neoplasm, given the magnitude of the lymphocytosis. Now, look at these representative 50 and 100x objective images from the monolayer of the slide.

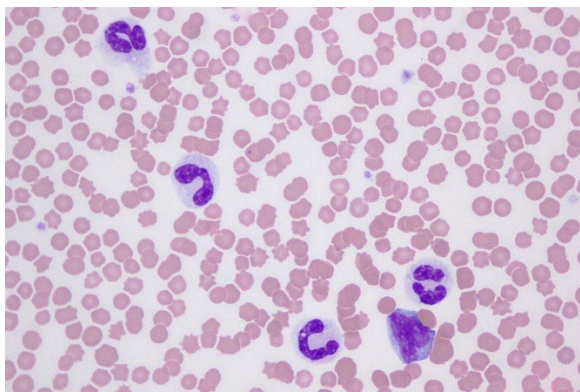
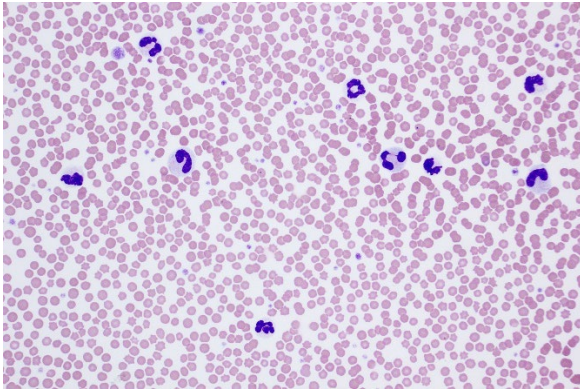
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As you can see, most leukocytes are neutrophils with a few noticeable bands and some toxicity depicted by the cytoplasmic basophilia and some Döhle bodies. The absolute number of lymphocytes was low, as determined by a manual differential count. Combined, these findings were compatible with acute inflammation and superimposed stress, not some ominous neoplastic process. So, where are the lymphocytes? Who knows, lost in the electronic algorithmic brain of our costly blood analyzer. I'm not sharing this to argue that blood analyzers are unreliable. I'm sharing this to say that blood analyzers can be unreliable regardless of their cost or sales brochure literature; trust but verify. The moral of this story is that if you don't look at the blood smear and take the numbers at face value, you will never really know how much you are missing, but your patients might. Take an extra three minutes to take a peek at those smears.

Kurt Zimmerman, DVM, PhD, DACVP-CP/AP  
Professor, Pathology & Clinical Informatics  
Clinical Pathology Section Chief & Residency Coordinator  
Virginia-Maryland College of Veterinary Medicine

## HORSES



### Clostridial myositis in a horse

An eight-year-old Thoroughbred mare was sedated for clipping via an intramuscular injection. Within 24 hours the mare developed swelling in the neck in the region of the injection, which progressively worsened and the mare died suddenly the following day. At necropsy there was an extensive region of subcutaneous hemorrhage and edema throughout the lateral and ventral neck extending to the thoracic inlet, and a focally extensive region of intramuscular hemorrhage and necrosis within the lateral neck. *Clostridium septicum* was isolated from the affected muscle, confirming the diagnosis of Clostridial myositis as the cause of death. In horses this disease is most often the result of intramuscular injection, as in this case, and is associated with the introduction of bacterial spores into the muscle. Tissue necrosis and systemic illness result from the elaboration of Clostridial exotoxins. Surprisingly clinical disease can appear as early as 6 hours post-injection.

Thomas Cecere DVM, PhD, DACVP,  
Virginia Tech.

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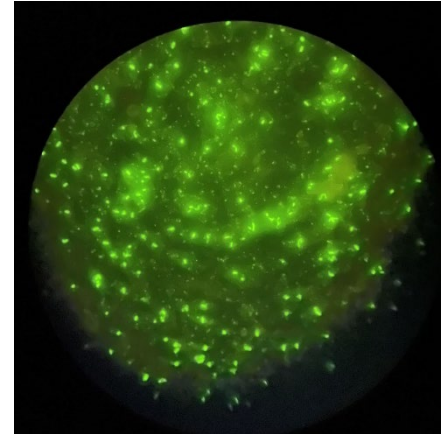
## Disseminated Equine Herpes Virus-1 infection in a pony

A 16-year-old pony mare with a short history of fever, pulmonary interstitial pattern and anemia was euthanized and submitted for necropsy. Small amounts of yellow transparent fluid were collected from all body cavities and multifocal petechiae were present along the mucosa of the trachea, lung, heart and serosa of the intestine.

Histologically, lymphoplasmacytic vasculitis and perivasculitis was identified in the brain, pituitary gland, lung, liver, kidney, heart, stomach, intestine and lymph node. Before euthanasia, a nasal swab was collected for Equine Herpesvirus-1 PCR, which was positive. Gross and histopathologic findings are compatible with a disseminated viral infection that targets blood vessels. Among the most important etiologies for this finding, equine herpesvirus-1 and equine infectious anemia should be considered as differential diagnoses. Based on all described findings, equine herpesvirus-1 disseminated infection was the likely scenario in this case.

Francisco R Carvalho DVM, DSc, DACVP, Virginia Tech.

caused by *C. chauvoei*, is mainly known to cause necrosis in the skeletal muscles of the extremities. However, there are numerous examples in the literature showing necrotic myocarditis also stemming from this pathogen. The disease is not contagious, as cattle become infected by ingesting spores while grazing. The spores will penetrate the intestine and are distributed by the bloodstream to muscle tissue where they will eventually germinate, multiply and produce the toxin that induces necrosis. The eventual cause of death is often acute toxemia.



Anna Steadman, Bacteriologist, Warrenton RAHL

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## RUMINANTS



### Cardiac “Blackleg” in a heifer

A bovine heart collected in a field necropsy from a heifer calf was submitted to the Warrenton regional animal health lab for fluorescent antibody testing to look for histotoxic Clostridia, namely *C. novyi*, *C. sordellii*, *C. septicum* or *C. chauvoei*. Visually, the heart had several spots which were black in appearance. Upon performing the tests, only the *C. chauvoei* test was positive (see attached photo). Blackleg, the disease

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### Eosinophilic colitis in a heifer

Over a period of a few months, two post-weaning Angus heifers were presented for necropsy from a herd with poor growth and eventual wasting. Routine diagnostics had failed to provide a diagnosis. Necropsy was unremarkable except for the poor body condition with minimal stores of body fat as well as diminished skeletal muscle. Histopathology revealed abundant eosinophils in the mucosa of the colon and distal small intestine. A diagnosis of eosinophilic enterocolitis was made, unassociated with parasitism. An immune mechanism was suspected for the case, and a herd mate was treated with immunosuppressive doses of glucocorticoids. This treated heifer made slow but steady improvement and eventually recovered fully from the initial episode of wasting.

Phillip Sponenberg DVM, PhD, Virginia Tech.

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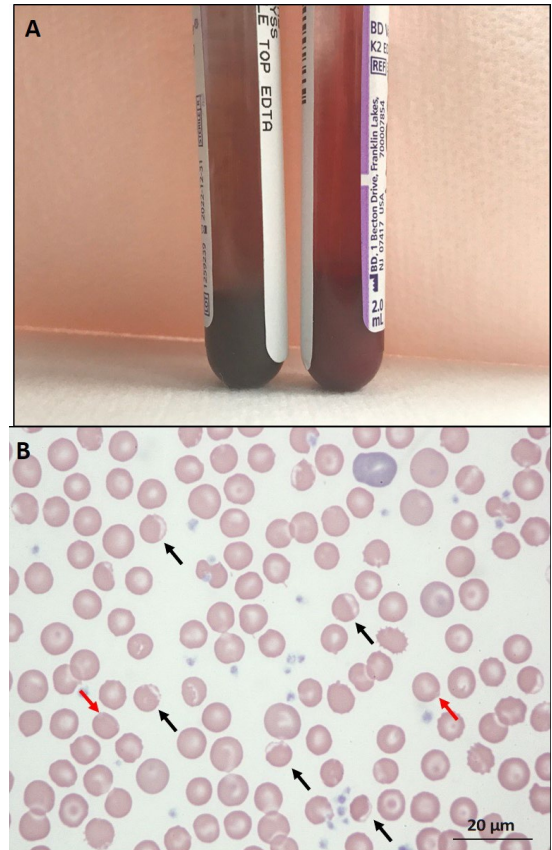


## COMPANION ANIMALS



### Methemoglobinemia in a dog

A 4-year-old, intact male, Labrador Retriever presented to the rDVM due to acute onset of vomiting, diarrhea, hypersalivation, ataxia, lethargy, and episodes of collapse. The rDVM noted a chocolate-brown color of the blood and referred the patient to VMRCVM Teaching Hospital emergency service for further work up. On physical examination, the patient was QAR, panting with a heart rate of 156 bpm, and blue-tinged to grey gums and tongue. Venous blood was submitted to the Virginia Tech Animal Laboratory Diagnostic Services (ViTALS) and its brown color was again noted (Figure A: patient's blood on the left; normally tinged venous blood from another dog on the right). The dog had mild macrocytic normochromic regenerative anemia, moderate neutrophilia, and mild lymphocytosis. On blood smear evaluation, markedly increased numbers of eccentrocytes and low numbers of Heinz bodies were noted (Figure B: a few eccentrocytes indicated by black arrows and Heinz bodies by red arrows). Eccentrocytosis and Heinz bodies are observed when there is oxidative damage to cell membranes and hemoglobin, respectively. The patient was administered IV fluids, N-acetylcysteine, and sodium ascorbate (the latter two for antioxidant properties) and improved over 24-hours, when he was discharged with a presumptive diagnosis of erythrocyte oxidative injury and methemoglobinemia secondary to toxin ingestion. A toxic agent or endogenous process was not identified in this dog. A hereditary cause—such as deficiency of cytochrome b5 reductase—was unlikely given the patient's age and response to therapy. However, Heinz bodies and eccentrocytes can also form due to exposure to acetaminophen, propylene glycol, mothballs containing naphthalene, zinc pennies, garlic, onion, propofol, and secondary to metabolic diseases (e.g., ketoacidotic diabetes and hyperthyroidism) and neoplasia.



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

### Osteosarcoma and Secondary Otitis in a Rat

A 1-year-old pet rat was evaluated for a swollen ear canal. *Rodentibacter pneumotropicus* was isolated from a swab of the affected ear canal. The patient was treated with topical and systemic antimicrobials, but clinical signs did not resolve. Radiographs showed unilateral calcification of the ear canal and bulla, and a mass in the ear canal was observed during a recheck exam. The tissue in the ear canal was removed with traction, submitted for histopathology, and determined to be an osteosarcoma. Most osteosarcomas in rats occur in the appendicular skeleton, but more rarely tumors can occur at non-bony sites. It is probable that the osteosarcoma in the ear canal predisposed this patient to have a secondary ear infection caused by *Rodentibacter pneumotropicus*. This organism was formerly known as *Pasteurella pneumotropica* and can cause opportunistic infections in rats and mice, including otitis and pneumonia.

Tessa LeCuyer DVM, PhD, DACVM

## AVIAN



### Avian Influenza in an emu

A 17-year-old, male Emu was noticed by his caretakers to become anorexic, lethargic and ataxic and passed after about 4 days of these signs. There had been three Emus within this pen, and he was the last one to die and all had similar symptoms. Other avian species were on the property kept in separate pens with biosecurity practices in place. In addition, the facility had many wild waterfowl that ranged around the pens. On necropsy, the trachea appeared reddened, and the brain had multiple hemorrhages on the surface. The ventriculus appeared thickened and was mostly empty. The small and large intestines contained some ingesta with mucous but showed a moderate degree of autolysis. The kidneys and liver were friable. On histopathology, there was a vasculitis with transmural inflammation and fibrinoid necrosis (Brain, intestine, liver), multifocal necrotizing hepatitis, neuronal necrosis, myocardial degeneration/necrosis with inflammatory infiltrates, muscular degeneration, and visceral neuritis. This emu had cloacal and tracheal swabs taken and returned positive for highly pathogenic avian influenza H5N1 (goose/Guangdong H5), and this strain is responsible for the current outbreak occurring within the USA. This is a highly contagious, deadly disease of birds that with strict biosecurity you can reduce the risk of in your birds.

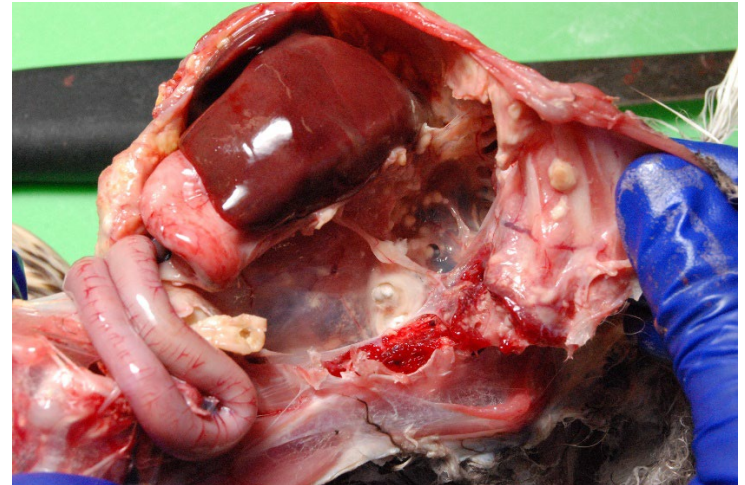
Jamie Horstmann, DVM, Harrisonburg RAHL

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### Aspergillosis in a red-tailed hawk

A juvenile female red-tailed hawk was trapped by a falconer and noted to be thin at the time of trapping, with progressive weight loss over the next three weeks. The bird died and was presented for necropsy. Numerous coalescing gray/tan plaques to nodules were disseminated throughout the anterior thoracic and caudal air sacs, lungs, and peritoneum. Microscopically

these were heterophilic granulomas containing numerous septate fungal hyphae with parallel walls and dichotomous angle branching, supporting a diagnosis of disseminated aspergillosis. Exposure to environmental *Aspergillus* spp. can result in aspergillosis in raptors associated with a variety of risk factors, including host (debilitation, immunosuppression, etc.) and environmental factors.



Thomas Cecere DVM, PhD, DACVP, Virginia Tech.

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## LABORATORY NEWS



### ViTALS

ViTALS was audited by AAVLD in June. The AAVLD accreditation committee reviews that quality system of the entire lab to assess the quality of testing. We're happy to announce that ViTALS received full AAVLD accreditation through 2027.

Dr. Kevin Lahmers, anatomic pathologist, was awarded the 2022 Zoetis Award for Veterinary Research Excellence. This award recognizes veterinary researchers whose studies advance the



## Continued from page 5

standing of veterinary research. We are grateful for this recognition of his contribution to improving the lives of Virginia cattle with his work on *Theileria orientalis*. Dr. Briana Trusiano, clinical pathology resident, passed her ACVP board certifying exam and was awarded Senior Resident status by the ViTALS faculty. She is now able to sign out cases without the oversight of a senior clinician. Dr. Valentina Stevenson, anatomic pathology resident, was awarded the C.L. Davis Foundation resident award for her work ethic, initiative, and passion for teaching veterinary students. Congratulations to all!!

Tanya LeRoith DVM, PhD, DACVP, ViTALS Director.

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## VDACS

The VDACS Laboratory System has had a busy few months of audits, where the main goal was to bring the RAHLs into a “System” on all platforms as opposed to individually functioning laboratories. The FDA came on-site to officially move our “Central Dairy Lab” to the Harrisonburg Laboratory from Wytheville. Both of our Laboratory Evaluation Officers who assist with certifying private dairy testing laboratories are located in the Harrisonburg RAHL. Visits to all of the labs in the VDACS system by the American Association of Laboratory Accreditation (A2LA) occurred in September. Each of our labs has a variety of tests under the A2LA “Scope” which were audited. This audit occurs every two years. The National Animal Health Laboratory Network came on site to visit the Wytheville, Lynchburg and Warrenton Laboratories. The purpose of this visit was to bring all three of these laboratories into the NAHLN as branch laboratories of Harrisonburg. A thorough evaluation of the fee schedule is underway and will be updated for January 2023.

Staff Updates: A new bacteriologist, Amanda Hamilton, started working at the Lynchburg RAHL in August. Our new molecular biologist, our very own Leah Wright, started in October. We are very excited to have new staff on board and to continue to evaluate new tests for our clients. Regretfully, we had to say goodbye to our long time Wytheville diagnostician, Dr. Chris Halsey due to health reasons. We wish him the best in retirement.

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

## LABORATORY LOCATIONS

### RAHLS: Regional Animal Health Laboratory System

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