NDSU Veterinary Diagnostic Laboratory

Summer 2019, Vol. 3, No. 3

In This Issue

A newsletter about diagnostic trends at the laboratory, animal health topics, interesting cases and new test offerings.

www.vdl.ndsu.edu

We welcome comments, questions and suggestions. Please email us at vetlab.ndsu@ndsu.edu or call the laboratory at (701) 231-8307.

Director's Corner

I hope everyone is enjoying the nice summer weather we have had across most of the state. At the laboratory, summer is generally a time when submission numbers drop slightly from the busy spring season, allowing laboratory staff the opportunity to catch up on other duties and have time to work on projects.

VDL staff recently have been kept busy working on IT projects. We are now on Facebook and LinkedIn, so please visit our pages to keep abreast of interesting things happening at the lab. The VDL's new, streamlined website will be going live in the coming weeks. A lot of time was spent adding additional content and making the site easier to navigate.

Secondly, as indicated in my last message, the process of replacing the laboratory's information system is underway. The Matrix Gemini laboratory information system has been chosen as the VDL's new laboratory information system.

This software will provide significant enhancements, compared with the existing system, and will include a new client portal, similar to the existing results portal, where submitters can access reports and invoices, and check the status of their submissions. Deployment and configuration of this system is anticipated to take a minimum of nine months.

Many staffing changes have occurred at the VDL this year. Long-time serology technician Kathy Fischer has retired and the lab was able to hire two additional staff members: pathologist Laura Rice, DVM, MS, DACVP, and molecular diagnostics technician Lori Scott, LVT, MLS.

Additionally, Brianna Stenger, Ph.D., has taken over as section head for molecular diagnostics. This will be the first time in more than two years that the laboratory has had a full complement of professional staff and I look forward to the positive impact this will have at the laboratory. Have a great rest of the summer.

Sincerely,

Brett T. Webb, DVM, PhD, DACVP
VDL Director and Veterinary Pathologist

Summer/Fall Calendar

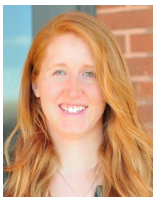
Sept. 2, 2019 — Closed for Labor Day	Nov. 11, 2019 — Closed for Veteran's Day

NDSU VETERINARY DIAGNOSTIC LABORATORY
North Dakota State University

New VDL Staff

Brianna Stenger, Ph.D.

Section Head, Molecular Diagnostics



Dr. Stenger grew in the Hillsboro, N.D., area and completed her B.S. in zoology and Ph.D. in environmental and conservation sciences (with a focus on using molecular tools in disease ecology research) at North Dakota State University. She has worked in the VDL molecular diagnostics section since 2016 and comes to the position with a tremendous amount of experience in molecular assay development and validation.

Lori Scott, LVT, MLS

Technician, Molecular Diagnostics

Scott grew up in Fargo and completed her B.S. in veterinary technology at North Dakota State University. She worked in veterinary practice for a number of years before returning to NDSU to complete her degree in medical laboratory science. Scott joins the molecular diagnostics section with nearly 10 years of diagnostic experience as a medical technologist, with a significant portion of it being in molecular diagnostics.

Laura Rice, DVM, MS, DACVP

Board Certified Anatomic Pathologist

Dr. Rice grew up in California and attended Cornell and the University of Wisconsin for her B.S. She completed her DVM at Kansas State University, interned at the University of Minnesota and was in small animal practice for a year. Dr. Rice completed her anatomic pathology training at Texas A&M University. Most recently, she was clinical instructor in zoo and aquatic animal pathology at Disney Animal Kingdom in conjunction with the University of Florida.

MINI CASE REPORTS

Large animal

Hepatic trematodes, such as *Fasciola hepatica* (common or sheep liver fluke) and *Fascioloides magna* (giant or deer liver fluke), have been reported in beef cattle in the upper Midwest. These liver flukes can be associated with clostridial infections such as redwater disease and black disease in cattle. Liver flukes also may result in monetary loss due to carcass condemnation and the increased time for affected animals to reach slaughter weight.

Since 2016, more than 50 cases of liver fluke have been identified in weaned calves and adult beef cattle at the VDL. Less frequently, signs of fluke infestation have been present in much younger calves, including aborted fetuses.

The gross lesion is similar no matter the age: black linear streaks (parasitic migration tracts) throughout the liver. A 2 to 5 centimeter, trapezoidal, rubbery, flat fluke also may be discovered when cutting through the liver.

The black linear tracts correspond microscopically to necrosis and hemorrhage with intralesional pigment or hematin (Figure 1). If lucky, golden yellow-walled fluke eggs will be mixed into the migration tracts (Figure 2).

The prepatent period of *F. magna* in ruminants is three to seven months, which indicates that the very young (fetal and neonatal) calves diagnosed with this condition were most likely infected during gestation. VDL pathologists are preparing a publication based on these cases.

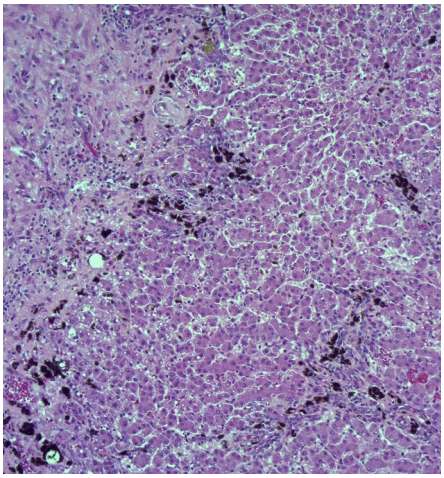


Figure 1: Photomicrograph of parasitic migratory tracts with black pigment in the liver of a 2-day-old beef calf. (Heidi Pecoraro, NDSU)

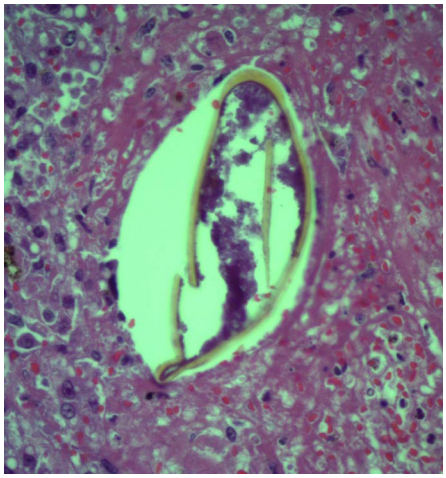


Figure 2: Photomicrograph of golden brown-walled fluke egg within a parasitic migratory tract. (Heidi Pecoraro, NDSU)

Small animal

Canine heart disease has been in the news lately due to the recent FDA update on dilated cardiomyopathy (DCM) linked to certain dog foods. This spring, several cases of canine heart disease were diagnosed on autopsy, with sudden death as the only clinical sign noted. A history of "sudden death" often clues the pathologist in to look closely at the brain, heart and lungs.

DCM was noted in several adult dogs: two Doberman Pinscher dogs, a breed that is genetically predisposed to this condition, and one mixed small breed dog not generally associated with DCM. The small breed dog had a history of being switched off of a grain-free diet one year prior to sudden death.

The lesions looked identical in all three dogs. Grossly, each of the hearts had a globoid appearance with rounding of the apex. In DCM, the right-to-left ventricular free wall ratio often will be reduced from the typical 1:3 to 1:2 or even 1:1, which also was noted in these cases.

Under the microscope, we found myocardiocyte loss and degeneration with replacement fibrosis and fatty infiltration (Figure 3). Trichrome stain nicely highlighted the interstitial fibrosis (Figure 4).

Another cardiac lesion in dogs characterized by myocardiocyte loss and replacement fibrosis is cardiomyopathy associated with canine parvovirus-2 (CPV-2) infection. This is seen mostly in puppies and young dogs under the age of 2 years (Ford et al. Vet Path 2017;54(6):964-971).

An 8-month-old puppy presented this spring for sudden death with no prior illness. On autopsy, the heart had the characteristic globoid appearance noted in DCM, but the right-to-left ventricular free wall ratio was within normal limits (ratio of 1:3). Vague white streaks were noted within the myocardium during sectioning.

Microscopically, we found marked myofiber loss and interstitial fibrosis (Figure 5-6). Because fibrosis is an indication of chronic heart disease, puppy parvoviral myocarditis was suspected. PCR for CPV-2 was positive, confirming viral myocarditis.

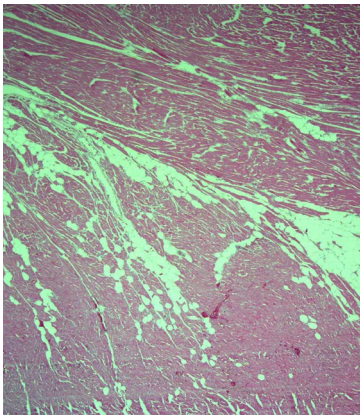


Figure 3: Photomicrograph of fat cells (round clear cells) infiltrating the heart muscle of an adult small breed dog. (Heidi Pecoraro, NDSU)

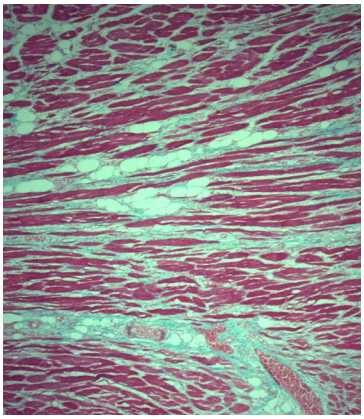


Figure 4: Photomicrograph of trichrome stain to highlight fibrosis (light blue) within the heart muscle of the case in Figure 3. (Heidi Pecoraro, NDSU)

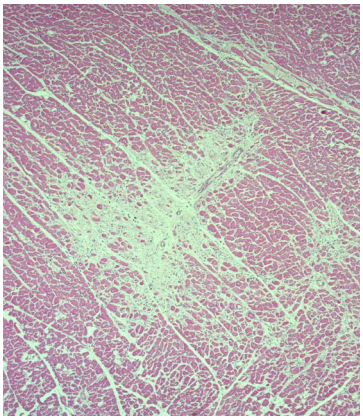


Figure 5: Photomicrograph of variably sized areas of cell loss within the heart of an 8-month-old puppy. (Heidi Pecoraro, NDSU)

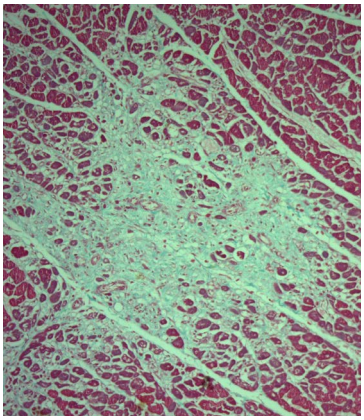


Figure 6: Photomicrograph of trichrome stain to highlight cell loss and early fibrosis in the heart of the case from Figure 5. (Heidi Pecoraro, NDSU)

Bench Notes

Swab sampling tips: Tissues, fluids, aspirates or fecal material are always preferable to swabs. Submit swabs only if no other sample options are available or when sampling mucosal surfaces.

Rayon or dacron swabs with plastic shafts are preferred. Flocked swabs pick up more sample and are designed to release more of the sample during processing. Cotton swabs contain fatty acids that may be toxic to certain bacteria and should be avoided if possible.

Swabs always should be sent in an appropriate transport media. Swabs for viral testing (PCR, FA) should be sent in universal transport media or in sterile redtop tube (no gel) with sufficient sterile saline to maintain moisture (approximately 1 milliliter). Swabs for culture should be submitted in bacterial transport (Amies or Stuart's for aerobic culture, anaerobic StarSwabs for anaerobes).

If bacterial culture and viral testing are requested, please submit two sets of swabs in the appropriate transport media. Refrigerate swabs for viral testing or bacterial culture; if anaerobic culture is desired, maintain the anaerobic transport at room temperature.

Rabies virus testing: Testing for rabies virus infection is performed using the direct fluorescent antibody assay (DFA). The test method is outlined by the Centers for Disease Control and Prevention in the "Protocol for Postmortem Diagnosis of Rabies in Animals by Direct Fluorescent Antibody Testing" (available at www.cdc.gov/rabies/pdf/rabiesdfaspv2.pdf).

The minimum standard for this test requires a cross-section of the brain stem and a cross-section of the cerebellum or hippocampus. Whole brain submission is required for this test to have a conclusive negative result. All positive results, no matter what brain sections are used, are considered positive for rabies virus infection.

The DFA will be performed on partial brain sections submitted; however, if the DFA is negative, the results will be listed as inconclusive. All rabies testing at the VDL comes with additional histopathologic evaluation of brain sections (if available) by a board-certified anatomic pathologist.

Retirement: After 35 years at the Veterinary Diagnostic Laboratory, **Kathleen Fischer** retired in May. Kathy worked with many regional practitioners through the years and was our expert serology technician. She is greatly missed, but our virology technician, Sharon Wilson (another well-seasoned veteran of the VDL), has taken over serology laboratory responsibilities and has provided a seamless transition.

NDSU Veterinary Diagnostic Laboratory
P.O. Box 6050
NDSU Department 7691
Fargo, ND 58108-6050

NON-PROFIT
U.S. POSTAGE
PAID
FARGO, ND
PERMIT NO. 818

Disease Updates

Bovine

The number of **pneumonia** cases has decreased this summer, compared with the winter and spring months. Respiratory viral diseases mostly were due to bovine respiratory coronavirus (5 cases with one additional suspect) and bovine respiratory syncytial virus (4 cases).

Pasteurella multocida (16 cases), *Mannheimia hemolytica* (11 cases), *Trueperella pyogenes* (7 cases) and *Mycoplasma* spp. (10 cases) accounted for the respiratory bacterial infections submitted to the VDL. As typical, several tissues tested positive for more than one bacterium and/or virus.

As cattle are being moved out to pasture, submissions for **scours** screens have dropped. Sixty-five cases of calf scours were submitted to the laboratory, with confirmation of at least one diarrhea-associated pathologic agent.

Only 3 bovine abortion screens were requested, with an etiologic agent identified in 1 of the cases.

Small Ruminants

Pneumonia was associated with *Mannheimia hemolytica* (8 cases) and *Mycoplasma* spp. (1 case) in small ruminants. Ovine progressive pneumonia was positive by small ruminant lentivirus PCR in lung tissues from 1 sheep, with another suspected positive case.

As with bovine abortion cases, only 3 **ruminant abortion** screens were requested. No etiologic agents were identified.

Follow us on our our social media feeds.

www.facebook.com/NDSUVeterinaryDiagnosticLaboratory/

www.linkedin.com/company/ndsu-veterinary-diagnostic-laboratory

Contact Information

NDSU Veterinary Diagnostic Laboratory, P.O. Box 6050, NDSU Department 7691, Fargo, ND 58108-6050, Phone: (701) 231-8307

For more information on this and other topics, see **www.vdl.ndsu.edu**