



Spring 2023, Vol. 7, No. 2

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

www.vdl.ndsu.edu

Feedback is always welcome. Please feel free to send your comments or suggestions to ndsu.vetlab@ndsu.edu and specify "newsletter" in the subject line.

NDSU Veterinary Diagnostic Laboratory

Director's Corner



As I write this issue, there is two feet of snow outside my office window. It's the light, fluffy snow that signifies the deep freeze is nearly over and spring is right around the corner. With spring comes new life, warmer weather, and the welcome change from months of darkness to blissful sunlight that bathes the prairie, croplands, and river valleys – making this region one of the prettiest and most abundant in the world.

This spring will also bring change to the NDSU VDL with the resignation of Dr. Deborah Chong. We wish Dr. Chong well and hope the very best for her future. However, her departure does leave the NDSU VDL down two veterinary pathologists.

Thus, to meet the pathology needs of North Dakota producers, veterinarians, animal owners, and public health, we are redirecting one of the veterinary pathologist positions to a veterinary diagnostician position. This is a great opportunity for a licensed (or license-eligible) veterinarian interested in pathology, nutrition, toxicology, or epidemiology to work in diagnostic medicine outside of arduous residency training and board preparation.

The other open veterinary pathologist position will have the option to be remote. This is in accordance with the recent shift from on-site pathologists reading slides under a microscope to remote pathologists evaluating slides digitally. We hope to hire someone with a special interest in toxicology.

Both positions are highlighted on the NDSU VDL website. I encourage any qualified veterinarians to apply. I also welcome any suggestions on how to better meet the needs of the people of the state of North Dakota.

Best wishes for a healthy spring!

Heidi Pecoraro, DVM, Ph.D., Diplomate, ACVP
NDSU VDL Director and Veterinary Anatomic Pathologist

Calendar: Spring-Summer Closures

April 7 – Good Friday

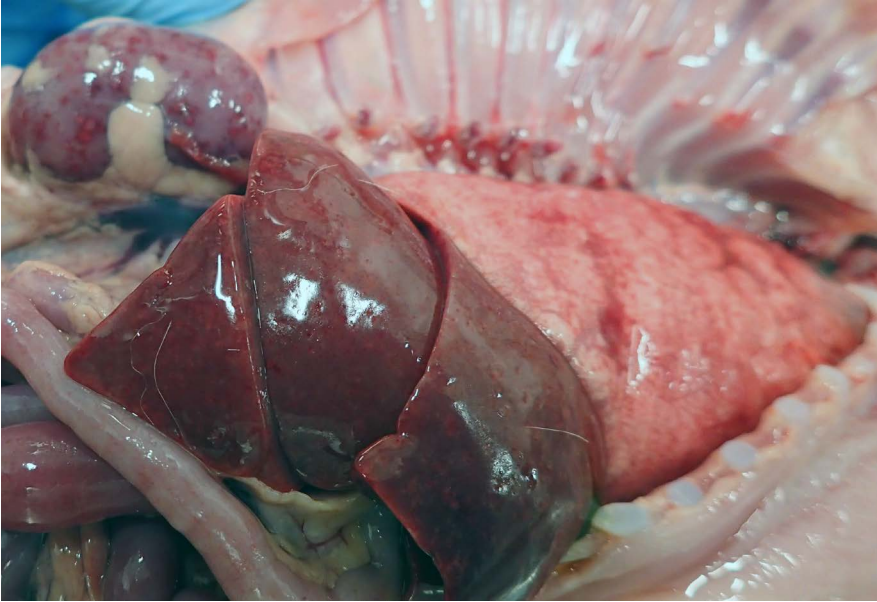
July 4 – Independence Day

May 29 – Memorial Day

September 4 – Labor Day

NDSU VETERINARY DIAGNOSTIC
LABORATORY
North Dakota State University

Mystery Photo



Lung, liver, and kidney of a 10-day-old, puppy from a litter with multiple deaths.

Multiple foci of hemorrhage and necrosis in the lung, liver, and kidney of a 10-day-old puppy. One of six dead puppies from a litter of eleven.

What is the cause?

Visit the NDSU VDL Website (www.vdl.ndsu.edu) to see the answers and read more about the case.

(Photo by Q Steichen)

Disease Updates

Johne's disease is caused by the bacterial agent *Mycobacterium avium paratuberculosis*. This is a chronic and contagious disease that affects ruminants, including bovines, goats, sheep, and cervids. Infection is often acquired when the animal is young by ingestion of infected fecal material. However, clinical signs of diarrhea, especially in cattle, and chronic weight loss typically do not manifest until the animal is older. Because the bacterium can live in the soil for over a year, identification and culling of diseased animals, along with good sanitation and management practices, are keys to preventing infection. The NDSU VDL currently employs two methods for Johne's disease detection.

An ELISA test is used for bovine milk and bovine, caprine, ovine, and cervid serum samples. This test determines presence of antibodies to the bacterium. A positive ELISA result means an animal has been exposed to the pathogen, although the animal may not appear sick. Antibodies can take several weeks to be detected. Thus, animals recently exposed may not be positive, and repeat ELISA or PCR assay may be indicated. The ELISA is a relatively cheap method (only \$6 at the NDSU VDL). However, unlike PCR, the samples cannot be pooled and ELISA does not determine if the animal is currently shedding the bacterium.

The PCR assay can be performed on feces, intestinal contents, and intestine. Fecal samples can be pooled (up to five), which costs \$43 at the NDSU VDL. If the fecal pool is positive, each sample within the pool will be tested individually at \$35

per sample. Individual testing is also available for \$35. The advantage of PCR testing is that it determines presence of the organism within the sample. Therefore, unlike ELISA that tests for exposure to the pathogen, PCR confirms shedding of living and dead bacteria, indicating likely disease.

These two tests can work together to eliminate Johne's disease from a herd under the guidance of a clinical veterinarian. ELISA can be performed first. Any negative animals should then be tested via PCR. If both assays are negative, retesting can be conducted within a few weeks. Repeat negative results give a high probability that the animal has not been exposed and/or sick with the disease.

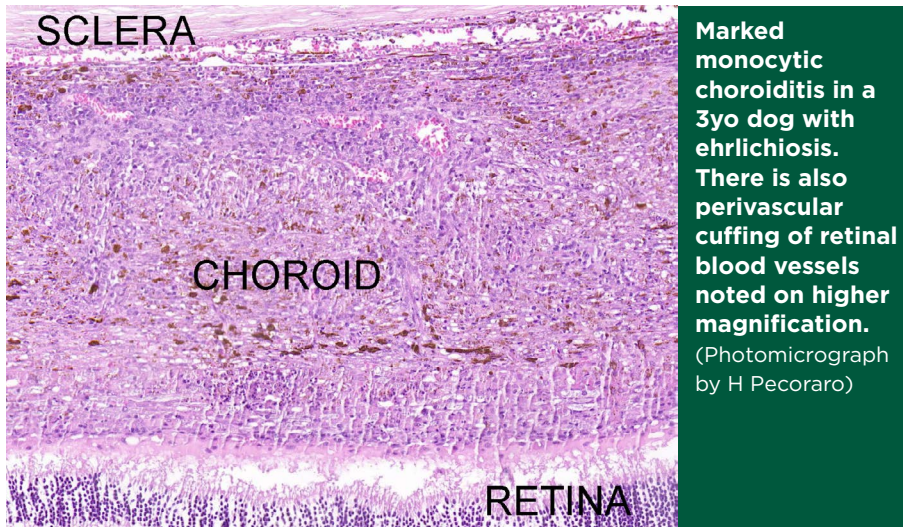
Johne's disease remains a problem for our region's ruminant herds, leading to death and financial loss. Over the last 12 months, in cattle, there have been 313 positive ELISA results out of 8,018 samples (4%) and 476 positive PCR results out of 16,883 tests (3%). For goats, the percentage of positive animals has been even higher at 21% on ELISA (36/170) and 7.5% on PCR (7/93) testing. Naturally, there is bias in these numbers because herds demonstrating illness are more likely to test. Nevertheless, Johne's disease affects North Dakota and Minnesota herds, and testing remains one of the strongest defenses in protecting herds.

For more information on submitting fecal samples for Johne's, check out our submission guide at www.vdl.ndsu.edu/wp-content/uploads/2022/10/Johnes-2022-2023-Edit.pdf.

Mini Case Reports

The VDL biopsy received both eyes from a young adult cattle dog who had bilaterally increased intraocular pressure (IOP). On section, there was about 5 mL of white, clear, viscous fluid around the lenses and the sclera were thickened.

Microscopically, all regions of the eyes, including the choroid, contained dense aggregates of macrophages, lymphocytes, plasma cells, granulocytes, and melanocytes. Wispy eosinophilic material was present in the vitreous chamber. Retinal pigmented epithelium was rounded (aka tombstoning, which is indicative of retinal detachment). There were also aggregates of neutrophils within the corneal layers in one of the eyes and a full-thickness corneal ulcer in the other eye. No etiologic organisms were noted on H&E or special stain for fungus.



Marked monocytic choroiditis in a 3yo dog with ehrlichiosis. There is also perivascular cuffing of retinal blood vessels noted on higher magnification.
(Photomicrograph by H Pecoraro)

The diagnosis was bilateral chronic panuveitis with choroiditis, retinitis, sclerosis, keratitis, corneal ulceration, and retinal detachment, consistent with an infectious etiology. Additional history provided noted the dog was from the southeastern U.S. and positive for *Ehrlichia*. Thus, ehrlichiosis was the likely cause.

The tick-borne rickettsia *Ehrlichia canis* is the causative agent of canine ocular ehrlichiosis. There are three phases of *E. canis* infection – acute, subclinical, and chronic. The acute phase lasts two to four weeks after initial infection. Clinical signs include fever and lethargy, while bloodwork may show thrombocytopenia, leukopenia, and non-regenerative anemia. Enlarged lymph nodes and spleen may be detected on physical examination. After the acute phase, infection enters a subclinical phase that can last months to years, wherein the animal is in a carrier state. Severe ehrlichiosis occurs in the chronic phase. Hallmarks of severe ehrlichiosis include bone marrow hypoplasia with anorexia, depression, severe bleeding disorders, hypoalbuminemia, and elevated serum alanine aminotransferase activity. Uveitis typically manifests in the acute and subclinical phases.

Ehrlichiosis is most prominent in the southern U.S., but distribution of the pathogen is throughout North and South America, Asia, and Africa. Thus, ehrlichiosis should be on the differential list for cases of uveitis and/or increased IOP.

References:

- Kommenou et al. Ocular manifestations of natural canine monocytic ehrlichiosis (*Ehrlichia canis*): a retrospective study of 90 cases. *Vet Ophthalmology*. 2007;10(3):137-142.
- Mylonakis et al. Chronic canine ehrlichiosis (*Ehrlichia canis*): a retrospective study of 19 natural cases. *JAAHA*. 2004;40(3):174-184.
- Pancierera et al. Ocular histopathology of ehrlichial infections in the dog. *Vet Pathol*. 2001;38(1):43-46.

Bench Notes

Calf scours submissions – Calving season in the field means scouring season in the lab. There are several options for diarrhea diagnostics. The Bovine Diarrhea Study includes an enteric culture and PCR for coronavirus, rotavirus, and *Cryptosporidium*. The Neonatal Diarrhea Panel is the same but also includes PCR for *E. coli* virulence genes for calves less than two weeks of age. General investigation (with or without necropsy) typically includes these tests plus fecal flotation or direct smear analysis.

Equine infectious anemia – EIA ELISA testing (i.e., Coggins) will be performed daily March 1 through September 30. Twice weekly testing will resume October 1. For the USDA regulations on EIA sample submission and testing, see www.vdl.ndsu.edu/wp-content/uploads/2020/01/EIA-test-changes-1-15-20.pdf.

Brucella canis testing updates – *Brucella canis* testing remains a referral test due to discontinuation of the testing kit used at the NDSU VDL. Because of the challenges in confidently detecting *B. canis* antibodies in serum samples, we are working with other laboratories across the U.S. to find the best available method. Twelve labs have partnered for an interlaboratory comparison to validate the performance of three commercially available *B. canis* test kits. We hope to provide this method to our clients by the end of the year.

Phytoestrogen analysis – The NDSU VDL toxicology lab has updated the phytoestrogen analysis in forages (alfalfa, white and yellow clovers, red clover, and mixtures of these grasses) and added soybean analysis by LC/MS/MS. The method includes testing for coumestrol and the isoflavones formononetin, daidzein, genistein, biochanin A, and glycitein. The lab requests at least 100 grams of sample, and preferably about 2 quarts of representative forages. The turnaround time is 3 to 14 days, and the cost of the test is \$125.

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Staff Spotlight

Christie Erickson may be one of the newest members of the VDL staff, but her “can do” attitude and hard work have made getting through the challenges of the last year easier. She is tasked with receiving and accessioning all samples that come into the VDL and helping the pathologists on the necropsy floor. We are lucky to have her!

If you could be an animal for a day, which would you choose? *A baby goat, because they are cute and everyone loves them, even if they cause trouble.*

What’s one hobby you’ve always wanted to try?
Cheesemaking

Would you rather be always slightly hot or slightly cold? *I don’t like to be either one, but I definitely get crabby in the cold.*

Favorite ice cream flavor? *Mint Chocolate Chip with a waffle cone*



Christie Erickson

VDL Receiving and
Necropsy Technician
(Photo by Kelly Benson,
VDL Chemist)



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