



Summer 2023, Vol. 7, No. 3

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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



Welcome to the summer issue of the NDSU VDL newsletter. Between camps, national meetings and regional conferences (including NDVMA in August), vacation, and, of course, baseball games, my schedule is already full.

We are deep in preparation for our American Association of Veterinary Laboratory Diagnosticians (AAVLD) accreditation renewal visit this September. AAVLD is a third-party certifying body that provides formal recognition of laboratory competence and quality. In essence, AAVLD ensures that you can trust our results.

Preparing our renewal application has been a reflective exercise in assessing where we have been since our last on-site visit and gives us a chance to identify our strengths and weaknesses. It also helps focus our next steps – where we want to be in five years.

Since the last site visit, the NDSU VDL has made tremendous improvements. The most glaring change is our new state-of-the-art facilities as of 2017. However, the building could not function without the expertise and knowledge of its people, including its nearly two dozen specialty veterinarians and technical, quality, IT, and administrative staff. Also integral to our efforts is the support of our stakeholders, partners, and clients.

We thank you for your continued support and trusting us with your diagnostic needs. Have a great summer and see you at the NDVMA conference this August in Fargo.

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

Calendar: Summer-Fall Closures

July 4 – Independence Day

November 10 – Veteran's Day

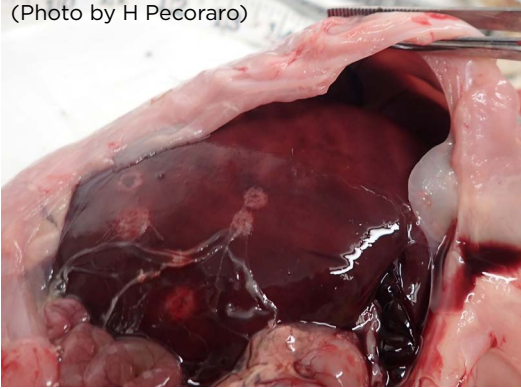
September 4 – Labor Day

November 23 – Thanksgiving

NDSU VETERINARY DIAGNOSTIC
LABORATORY
North Dakota State University

Mystery Photo

(Photo by H Pecoraro)



Liver of an aborted lamb.

The liver of an aborted lamb contains multiple white circular foci along the surface extending into the parenchyma on section. Several of the circular foci have a soft center, creating a targetoid or umbilicated appearance.

What is the cause?

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

New Faculty

In early June, the NDSU VDL welcomed its first ever veterinary diagnostician, **Dr. Heather Mitchell**. Like veterinary pathologists, diagnosticians perform autopsies, coordinate testing for case submissions, and communicate findings and recommendations to clients.

After finishing her B.S. in agriculture at South Dakota State University (SDSU), Dr. Mitchell attended Iowa State University (ISU) for her veterinary medical degree. Her career spans 17 years and includes experience with livestock, horses, small ruminants, companion animals, small rodents, and avian and reptile species. She is also well-known in the region for her leadership in NDVMA, AVMA, and local animal rescue.

Though Dr. Mitchell has spent much of her professional career in private practice, she comes to us with diagnostic experience at both the SDSU VDL microbiology section and ISU swine respiratory disease laboratory.

We are very excited to have Dr. Mitchell on the NDSU VDL team and know her vast clinical experience and interest in pathology will be an asset to us and all our clients.



Dr. Heather Mitchell
(Photo by Kelly Benson, NDSU VDL chemist)

Disease Updates

The NDSU VDL has diagnosed tularemia in multiple species since 2017. This disease occurs throughout temperate regions and has been detected in animals from both eastern and western North Dakota.

The causative agent of tularemia, *Francisella tularensis*, is a gram-negative, non-spore forming, facultative intracellular bacillus. Avian and mammalian species can become infected with tularemia after being bitten by ticks harboring the bacterium. Carnivores may also become infected after eating diseased rodents or rabbits.

Cats are the most diagnosed species from samples submitted to the NDSU VDL. This is not surprising considering the main reservoir is wild rabbits, hares, and rodents, all of which often fall prey to domestic and wild cats.

Clinical signs in infected cats include depression, fever, icterus, oral or lingual ulcers, draining abscesses, panleukopenia, and death.

Antemortem diagnosis is performed via PCR on exudates or tissue specimens. Given the highly infectious nature of the organism and potential to infect people, testing must be conducted in BSL-3 facilities.

Postmortem findings include lymphadenomegaly, splenomegaly, and hepatomegaly with small tan to gray foci throughout the spleen, liver, and lung.

If tularemia is suspected, samples should be submitted per instructions detailed at <https://www.vdl.ndsu.edu/anthrax-plague-tularemia-submission-guide/>. As always, please contact the laboratory with any questions regarding sample submissions.

Tularemia Diagnosed at NDSU VDL

Year	Species	State
2017	Domestic cat	ND
2017	Domestic cat	VA
2019	Wild rabbit	ND
2020	Domestic cat	ND
2020	Exotic felid	ND
2021	Domestic cat	NJ
2022	Wild rabbit	ND
2022	Wild rabbit	ND
2023	Wild rabbit	ND

Spleen from a cat who was found dead. Note the tan nodules protruding from the surface.



Photomicrograph by L Rice

Mini Case Reports

Dr. Quynn Steichen, NDSU VDL veterinary anatomic pathology resident

The VDL autopsy service received a 3.5-year-old, female Dorper sheep found dead with no noted prior clinical signs.

Postmortem examination revealed firm, heavy, and red to dark red lung lobes that failed to collapse when the chest was opened.

Microscopically, the peribronchiolar and perivascular tissues were expanded by mononuclear cells forming variably sized lymphoid follicles with occasional germinal centers, also called bronchus-associated lymphoid tissue (BALT) hyperplasia. The alveolar septa were multifocally thickened by smooth muscle hypertrophy, along with lymphocytes, macrophages, plasma cells, and fewer neutrophils.

These gross and histologic lesions are classic features of ovine progressive pneumonia (OPP), which is caused by a small ruminant lentivirus. PCR detected the transmembrane envelope gene, *env*, to confirm the diagnosis. If PCR is not available, agar gel immunodiffusion (AGID), serology, or immunohistochemistry can be performed. Serology is primarily used as a screening tool for flocks.

Small ruminant lentiviruses can affect both sheep and goats. Ovine progressive pneumonia (OPP) most often infects sheep while caprine arthritis encephalitis virus (CAEV) is associated with goats. However, cross species spread can occur.

Transmission occurs mostly through colostrum or milk; however, the virus can be spread via inhalation of nasal secretions and *in utero* as well. Infection and shedding of the virus are lifelong. Unlike other lentiviruses affecting other species, small ruminant lentiviruses do not lead to immunosuppression.

For both viral strains, clinical findings include progressive interstitial pneumonia, arthritis (mostly in adult goats), mastitis, and encephalitis (inflammation of the brain). Producers may notice loss of body condition score ("thin ewe syndrome"), increased effort to breathe while at rest, or firm udder with reduced milk flow ("hard bag").

In sheep, typical gross lesions include diffuse, heavy lung lobes that have a rubbery texture, are pale gray to tan in color, and do not collapse when the chest is opened. In goats, the lung lobes are similar in appearance; however, additionally, small, white generalized foci that bulge on cut section are present. Microscopically, sheep and goats have interstitial pneumonia with prominent lymphoid nodules. However, type II pneumocyte hyperplasia is a feature only in CAEV.

In 2014, NDSU Extension conducted research that found 66% of North Dakota sheep flocks were infected with OPP, and the overall individual infection rate was 28%. Flocks that are infected with OPP have lower production efficiency due to early culling, decreased milk production and lower weaning weights. Dr. Redden and Dr. Dyer recommend an OPP prevention plan that includes identifying the infection rate, and sourcing and/or testing replacements for genetic markers (*TMEM154*) to determine risk level for OPP infection.

References:

Caswell JL, Williams KJ. Respiratory system. In: Maxie MG, ed. Jubb, Kennedy, Palmer's Pathology of Domestic Animals. Vol. 2. 6th ed. Philadelphia, PA: Elsevier; 2016:558-559.

Redden, R. and Dyer, N. "Protect Sheep Against Ovine Progressive Pneumonia." NDSU Extension and Ag Research News, 3rd Feb. 2014, North Dakota State University, <https://www.ag.ndsu.edu/news/newsreleases/2014/feb-3-2014/protect-sheep-against-ovine-progressive-pneumonia>. Accessed 31st May. 2023.

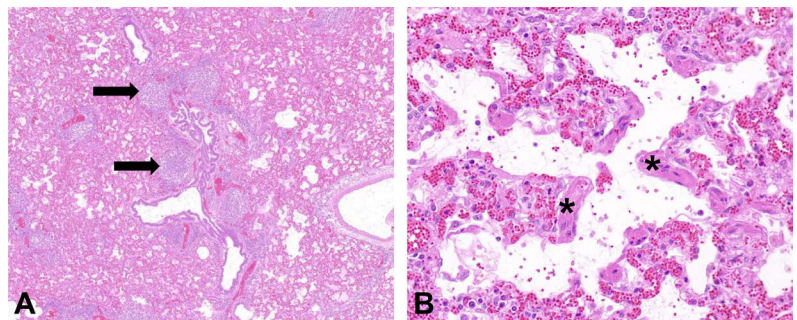
Bench Notes

Fee increases – Due to increasing costs of materials and labor, there will be fee increases on some NDSU VDL services starting July 1, 2023. Be sure to visit the website for the latest prices.

Old reports – The old LIMS (VADDS) portal is being retired. After Sept. 30, 2023, any results reported prior to implementation of the new LIMS in March 2022 will no longer be available online. For results reported before March 2022, please contact the NDSU VDL via email at ndsu.vetlab@ndsu.edu to receive a PDF copy of reports.

Serology summer hours – From June 1 to Sept. 1, there will be no serological testing performed on Fridays. Reminder that samples must be received before 5 p.m. on the business day before testing is scheduled.

Water screening – Recent hot weather conditions coupled with few localized rain events have led to high to potentially toxic concentrations of sulfates and nitrates in some water samples submitted to the NDSU VDL. The total dissolved solids (TDS) have been in the low to middle ranges and acceptable for most livestock. If the predictions for warmer-to-hot summer weather holds, water quality in parts of North Dakota might deteriorate and monitoring water quality may be necessary for livestock health and performance. For water collection guidelines, visit <https://www.vdl.ndsu.edu/water-collection-guide-2/>.



Sheep with OPP. (A) Formation of lymphoid follicles (arrows) representing BALT hyperplasia. (B) Smooth muscle hypertrophy (asterisks) expands the alveolar septa. (Photomicrograph by Q Steichen)

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Staff Spotlight

Lori Scott has been a molecular microbiologist with NDSU VDL since 2019. As a licensed medical laboratory scientist (MLS), she was part of SARS-CoV-2 testing efforts during the pandemic. In addition, she has been integral to North Dakota's response to the recent high pathogenic avian influenza outbreak. Prior to becoming an MLS, Lori worked as veterinary technician. Her vast experience in both animal and human health brings a unique perspective of One Health to the NDSU VDL.



Lori Scott
VDL Molecular Microbiologist
(Photo by Kelly Benson, VDL Chemist)

What is your favorite mythical creature?

Pegasus

If you were a professional baseball player, what would be your introduction song?

"Get The Party Started" by P!NK

Do you prefer funny stories or dramatic ones?

Funny

Who is the most famous person you have met?

Hulk Hogan



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

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