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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

We made it to summer! As animals are moved to pasture this time of year, our caseload typically decreases. Rest assured, however, the NDSU Veterinary Diagnostic Laboratory (VDL) is still hard at work to meet the diagnostic needs of North Dakota and the region.

As part of the National Animal Health Laboratory Network (NAHLN), a partnership of federal, state and university-associated animal health laboratories, the NDSU VDL is qualified to test for certain foreign animal diseases, such as highly pathogenic avian influenza (HPAI). Be sure to read the bench notes on HPAI testing in milk samples and the disease update section on HPAI in livestock. The NDSU VDL website will be updated whenever there is new HPAI information to share.

This July is the last month with Dr. Quynn Steichen as the veterinary pathology resident. Dr. Steichen has been integral to meeting the pathology demands of the lab these last three years. We are excited that she will continue at the NDSU VDL as a staff pathologist and necropsy section head.

Finally, cheers to Dr. Michelle Mostrom, the NDSU VDL toxicologist, for receiving an NDSU Ag Core Value Award. See more in this issue's Staff Spotlight.

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

Mystery Photo

An unvaccinated, 4-month-old, red, male, crossbred pig was presented for autopsy. The pig was nonresponsive and was euthanized.

What is the underlying cause?

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



Abdominal cavity of a pig.
(Photo by H. Mitchell, VDL Diagnostician)

NDSU VETERINARY DIAGNOSTIC LABORATORY
North Dakota State University

Bench Notes

EIA (Coggins) testing – From June 1 to Sept. 30, Equine Infectious Anemia (Coggins) ELISA testing will be performed Monday through Thursday.

HPAI milk testing – Visit www.vdl.ndsu.edu/hpai-in-cattle for guidance on HPAI testing in cattle. Please include the Federal Premise ID number on the submission form. **[Note:** The NDSU VDL does not perform testing to determine fit for human consumption on any samples. Milk testing is for mastitis and HPAI investigations only.]

Dry fecal swabs for parasitology testing – Dried fecal samples (including swabs) will be rejected by the laboratory due to high likelihood of false negative results. Submit at least a teaspoon of freshly collected feces in a clean widemouth container for the best results.

Rush fees – Effective July 1, rush requests must be approved by the section prior to submission. Not all rush requests can be accommodated, and same-day or next-day result is not guaranteed. The rush fee for all tests except toxicology assays will be an additional 100% of the test fee. For example, a rush request approved on a test that normally costs \$50 will be billed \$100. Please call the NDSU VDL if you have any questions.

Submission forms – Our sample submission forms have been updated. Please replace your old (printed and electronic) versions with the current version on the NDSU VDL website.

Fee schedule – A new fee schedule is effective July 1 and is available on the NDSU VDL website.

Calendar: Spring-Summer Closures

July 4 – Independence Day

September 2 – Labor Day

November 11 – Veteran's Day

November 28 – Thanksgiving

Disease Updates

HPAI in Livestock

Dr. Heidi Pecoraro, NDSU VDL Director and Veterinary Pathologist

Since the onset of the highly pathogenic avian influenza (HPAI) outbreak in the winter of 2022, there have been millions of wild bird and domestic poultry deaths due to the virus. Later that spring, HPAI was detected in wild foxes and skunks and has since spread to nearly 20 other species, including bears, seals, domestic and wild cats, and, more recently, livestock such as goats in Minnesota, alpaca in Idaho and dairy cattle across the U.S.

Influenza A viruses, the group that encompasses HPAI viruses, typically have affinity for certain bird and mammal species (including humans). For example, influenza viruses that circulate among people every winter do not routinely infect horses, cattle, dogs or cats. Similarly, equine influenza and most avian influenza viruses do not usually infect humans. Spillover into other species is certainly possible, and there are scattered reports each year of human influenza virus infecting a cat or dog or pig. However, the viral infection does not usually then spread among members of the spillover species.

HPAI and pandemic human influenza viruses like the H1N1 virus still circulating 15 years later can break through the species barrier due to various mutations in the virus. There are many determinants on how influenza A viruses can jump into a new species. Indeed, entire dissertations (including my own) have been written about the numerous host, viral and environmental factors that contribute to an influenza A virus becoming established within a previously unaffected species. However, details are beyond the scope of this disease update.

In cattle, there have been spillover events documented since the late 1800s, especially in concert with human pandemics. These spillover events have burst themselves out with no evidence of sustained transmission of influenza A viruses among bovine species. However, the emergence of HPAI in dairy herds suggests the virus is being maintained within bovine populations. An underlying viral mutation or bovine host factor may be at play, and I'm sure this is the focus of many studies underway. For now, much is still unknown.

That said, being aware of clinical signs and heightened biosecurity practices are essential to curbing further spread of HPAI among cattle. Clinical signs are nonspecific and numerous but may include abnormal milk that appears more like colostrum, decreased milk production, tacky dry manure, increased respiratory rate, dehydration, lethargy and abortion. As for biosecurity, cleaning and disinfecting vehicles, clothing and equipment is necessary.

Finally, HPAI can infect people. Proper personal protective equipment (PPE) is critical to protecting both cattle and, due to zoonotic potential, humans. Recommended PPE includes Tyvek or disposable gowns, disposable gloves, disposable booties, hair protection, fitted respirators, and goggles or shields.

Mini Case Reports

Dehorning Injury in Kids

Dr. Quynn Steichen, NDSU VDL Veterinary Anatomic Pathology Resident

The VDL received two juvenile Saanen-cross doelings with a limited history of either scouring or bronchopneumonia.

On postmortem examination, both animals had bilaterally symmetrical, 2.5 cm in diameter, full thickness burn wounds on the frontal bones of the head. These areas correlated to areas within the cerebrum that were yellow to tan to red and soft with multiple small areas of mineralization (top figure; yellow circles). In addition, both animals had cranioventral lung lobe consolidation.

On histopathology, the meninges over the cerebrum were infiltrated with large numbers of lymphocytes and macrophages, and fewer neutrophils (bottom figure; red arrows). A similar population of inflammatory cells were observed in multiple areas of the cerebral white matter. In addition to the inflammation, there were areas of hemorrhage and small fibrin thrombi occluding blood vessels.

Within the lungs, the alveoli were moderately distended with neutrophils, some with streaming nuclei ("oat cells") and macrophages admixed with fibrin deposition and necrosis. There was moderate bronchiolar-associated lymphoid tissue (BALT) hyperplasia.

Both animals were diagnosed with chronic meningoencephalitis and fibrinosuppurative bronchopneumonia.

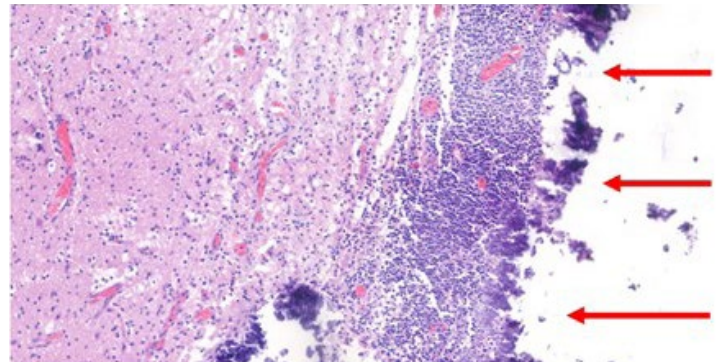
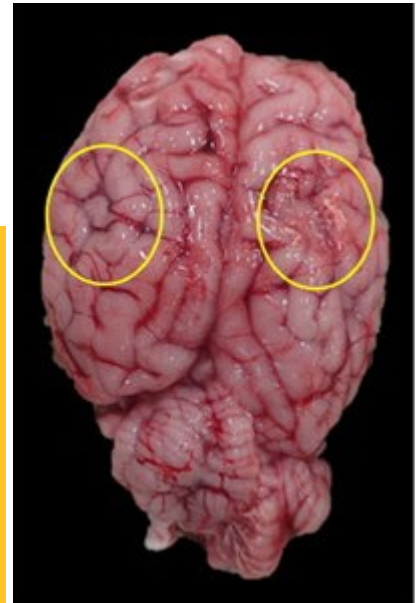
The cause of death is most likely multifactorial. The meningoencephalitis, along with the burn wounds from dehorning, suggest a thermal injury. In addition, these animals had polymicrobial bronchopneumonia.

Cautery disbudding is common in the small ruminant industry to destroy horn buds and prevent horn growth. This procedure should be done under the direction of a veterinarian because pain medication, and sometimes sedation, is necessary. In addition, cautery disbudding can cause thermal damage to the underlying cerebrum due to thinner frontal bones compared to large ruminants (i.e., calves). In Hempstead et al., goat kids that experienced a longer period of cautery iron placement on the horn bud (15 to 20 seconds) experienced more severe brain injury. Effects of thermal injury can manifest within a few days up to 2 months after the procedure. Alternatives to cautery disbudding include caustic paste and cryosurgical disbudding; however, there is a higher chance of scurs or horn regrowth with these techniques.

References

Hempstead MN, Shearer JK, Sutherland MA, Fowler JL, Smith JS, Smith JD, Lindquist TM, Plummer PJ. Cautery Disbudding Iron Application Time and Brain Injury in Goat Kids: A Pilot Study. *Front Vet Sci.* 2021 Jan 18;7:568750.

Juvenile kid with bilaterally symmetrical areas of softening with mineralization (top image; yellow circles). Meninges are infiltrated predominately with lymphocytes and macrophages (bottom image; red arrows). Images by Q. Steichen.



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Staff Spotlight



Dr. Michelle Mostrom, NDSU VDL Veterinary Toxicologist, (left) and Rachel Wald, McHenry County Extension Agent

(Photo by H. Pecoraro)

Dr. Michelle Mostrom

Rachel Wald, McHenry County Extension agent, presented the NDSU Agriculture Core Values Award to Dr. Michelle Mostrom, DVM, Ph.D., DABVT, DABT (1995-2020), NDSU VDL veterinary toxicologist, to recognize her dedicated service and her positive impact to the VDL, NDSU and North Dakota.

The NDSU Agriculture Core Values Award is a peer-to-peer traveling award, allowing Ag faculty and staff from across the state to recognize each other for efforts that reflect our core values – community driven, student focused, stakeholder driven, integrity, impact and innovation.



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