

# DIAGNOSTIC INSIGHTS

## Lead toxicity in cattle: An ongoing environmental problem

By Dr. Gordon Andrews

I recently received a 6 month old calf for necropsy examination with a history of acute onset of neurological signs including blindness, recumbency, opisthotonus, paddling, and death within 12 hours of the onset of clinical signs. The submitter wanted to rule out rabies, and the rabies test was negative. There were no gross lesions in the brain or any other organ systems. The owner did not wish to pursue any additional diagnostic testing at that time. Within two days, two more calves from this group died with the exact same clinical signs and were submitted to me for complete necropsy examination to establish a definitive diagnosis. I was suspicious of lead toxicity, so collected whole blood from both calves for lead testing. Toxic levels of lead were present in the blood of both calves. I spoke with the owner about the diagnosis. He had also considered lead toxicity and had already searched the premises where the calves were held but had been unable to find any source of lead. Lead toxicity is the most commonly diagnosed toxicity in cattle at the diagnostic laboratory. Lead is found in many home, agricultural, and industrial products, and combined with cattle's curiosity, licking behavior, and indiscriminate eating habits makes lead toxicity common.

In order to protect the other cattle from possible lead poisoning, it is crucial to identify the lead source and remove it. However, finding the

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## NEW Anaplasmosis PCR Available

### **Bovine**

Organisms: *Anaplasma marginale* and *Anaplasma phagocytophilum*

Sample: EDTA (purple top) tube

### **Individual or pooled testing can be requested**

For pooling, each bovine must be collected in a separate blood tube

The lab will pool up to five samples in a single PCR test

Cost: Individual @ \$30

Pooled (up to 5 individuals) @ \$30

Example: pool of 2 @ \$30; pool of 4 @ \$30

Individuals within a positive pool that are then tested individually \$15/ea

### **Canine**

Organism: *Anaplasma phagocytophilum*

Sample: EDTA (purple top) tube

Cost: \$37.50

## Lead toxicity in cattle | *Continued from page 1*

exact source of the lead exposure is not always straight forward. In cattle, common sources of lead are discarded auto / machinery batteries and improperly disposed of used motor oil. Other farm and ranch sources of lead include; grease, lead tire weights, linoleum, pipe fitting compound (pipe dope), shotgun pellets or lead bullets, lead-based painted wood, or those paint chips that have fallen off older barns or outbuildings. (see illustration)

In this case, the owner was unable to find any of the common sources of lead listed above, so he submitted soil samples, collected from the site of an old outbuilding which had burned down, to the KSVDL Toxicology Laboratory. These soil samples contained very high levels of lead. Lead in soil can cause toxicity by direct ingestion of the soil or by inhalation of dust from the soil. Lead poisoning in animals should be considered a sentinel for possible environmental contamination by lead which can result in toxicity for other animals or humans, particularly children.



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## Bovine Tuberculosis Testing

Personnel from the KSVDL accompanied KSU veterinary students to a dairy to complete a routine whole-herd TB test. The testing required two days testing 2,700 cows each day.

The TB testing exercise was a cooperative endeavor between the KSVDL, USDA, and the Kansas Department of Animal Health.



*KSVDL, USDA, KDAH, and students stop for a group picture during a routine TB testing exercise*

# Tularemia

By Dr. Brian Lubbers, Dr. Kelli Almes

Tularemia is a disease most commonly seen in rabbits, cats, and humans caused by *Francisella tularensis*, a gram-negative coccobacillus. The bacterium is known to infect more than 100 species of mammals, 25 species of birds and even fish, amphibians and reptiles<sup>1</sup>. The Centers for Disease Control and Prevention reported that human cases (2003-2012) were clustered in the four state area of Kansas, Missouri, Arkansas and Oklahoma<sup>2</sup>.

Ticks (*Amblyomma americanum*, *Dermacentor andersoni*, *Dermacentor variabilis*) serve as both long term reservoirs and vectors for the disease. However, other blood-feeding insects (mosquitoes, biting flies) can serve as mechanical vectors for the disease. Cats, dogs and humans can become infected through: ingestion of infected rabbits or rodents, bites or scratches from infected animals, or aerosol exposure<sup>3</sup>.

Due to the arthropod vector, tularemia is seen seasonally at KSVDL primarily between April and November (see Chart). The most common species tested is the cat but samples from rabbits, dogs and non-human primates have been submitted. Many of these samples are deceased cats for necropsy and diagnosis. The typical clinical history in these cases is fever, lethargy, lymphadenopathy, icterus and frequently oral ulcerations. These are also the most common presenting clinical signs for cats infected with *Cytauxzoon felis*, a non-zoonotic pathogen which poses no health risk to humans or animals other than cats. Because ticks also serve as the vector for *Cytauxzoon felis*, they share a common seasonality.

Gross lesions for these two diseases differ markedly, with the most common findings at necropsy for tularemia being: multifocal necrosis of the spleen (Fig. 1), marked enlargement of lymph nodes with necrosis and icterus (Fig. 2). Multifocal necrosis may also be seen in the liver and lungs and oral or lingual ulceration is common. The lesions of tularemia and *Cytauxzoon* are also distinctive histologically. At KSVDL, immunohistochemical staining (IHC) can be used on fixed tissues for confirmation of *F. tularensis* (Fig. 3), while bacterial culture is the preferred test on fresh tissues.

Antemortem diagnosis is a bit more challenging and if diagnosed early enough, the disease can be successfully treated with antimicrobial therapy. Serology tests indicate if a cat has been exposed to the disease but are more difficult to interpret than bacterial culture or IHC. There is limited information regarding



Figure 1: Spleen from cat infected with tularemia displaying multifocal to coalescing necrosis.



Figure 2: Enlarged and necrotic submandibular lymph nodes along with generalized icterus.

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## Tularemia | *Continued from page 2*

appropriate specimens in veterinary patients, however the recommended samples for humans are: swabs or skin scrapings for dermal lesions, lymph node aspirates or biopsies for systemic disease and pharyngeal washings and sputum samples for the respiratory form of tularemia. Interestingly, blood cultures in humans are often negative<sup>4</sup>. A recent submission of a lymph node aspirate to KSVDL from a clinically ill cat resulted in a positive culture. Due to the pronounced lymphadenopathy seen with tularemia, aspirates are generally easy to obtain. Practitioners should take precautions to protect both their own and their client's safety, as infected cats pose a large human health concern due to the highly infectious nature of tularemia. For this reason, rapid treatment is crucial to save the cat and decrease human exposure.

1 Songer, Glenn; Post, Karen. *Veterinary Microbiology: Bacterial and Fungal Agents of Animal Disease*. St. Louis: Elsevier Saunders, 2005.

2 "Tularemia: Reported tularemia cases – United States, 2003-2012". [<http://www.cdc.gov/tularemia/statistics/map.html>] Centers for Disease Control and Prevention. Sept 24, 2013. Accessed: June 15, 2014.

3 Greene, Craig. *Infectious Diseases of the Dog and Cat 4th ed.* St. Louis: Elsevier Saunders, 2012.

4 "Tularemia: For Clinicians". [<http://www.cdc.gov/tularemia/clinicians/index.html>] Centers for Disease Control and

Prevention. Jan 11, 2011. Accessed: June 15, 2014.

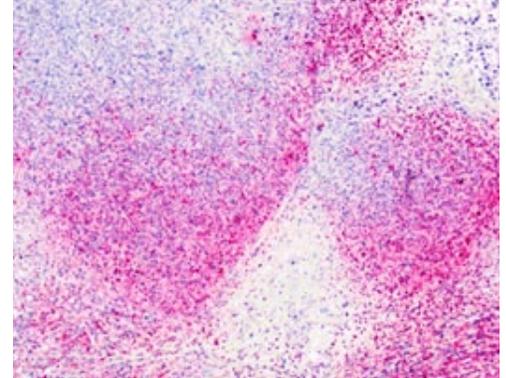


Figure 3: Positive IHC staining for *F. tularensis* in a lymph node.

## The Potential Added Value of the KSVDL Canine Parvovirus (CPV) PCR Compared to the SNAP Test

*While considered a fast and simple screening test, a 2009 study found that the Idexx SNAP™ test detected only 80%, 78%, and 77% of parvovirus 2a, 2b, and 2c clinical infections, respectively.*

The KSVDL PCR test is indicated when a definitive antemortem or postmortem diagnosis is essential and/or when the specific CPV strain is required.

Organism: Canine parvovirus (CPV 2-a, 2-b, and 2-c)

Sample: 5-10 grams of feces in sterile bag or tube

Please ship on ice packs for overnight delivery to KSVDL

Cost: \$30 per sample

Contact Jianfa Bai (785-532-4332; [jbai@vet.ksu.edu](mailto:jbai@vet.ksu.edu)) or Bill Fortney (785-532-4605, [wfortney@vet.k-state.edu](mailto:wfortney@vet.k-state.edu)) for more information.

## Are All BVDV Laboratories the Same?

By Dr. Gregg Hanzlicek

Because of the potential negative impact BVDV can have on bovine herd health, false negative test results can be devastating to cattle populations.

An article in the Journal of Veterinary Diagnostic Investigations evaluated the ability of veterinary laboratories to correctly identify positive samples from BVD PI calves. Samples from two known PI calves were submitted to 23 laboratories. The tests requested included IHC, antigen capture ELISA, virus isolation, and PCR.

Ten laboratories correctly identified all samples as being infected with BVDV. Seven laboratories correctly identified  $\geq 90\%$  of the samples as BVDV positive, and 5 correctly identified the samples as BVDV positive 71% to 79% of the time. One laboratory correctly identified the samples as BVDV positive only 43% of the time.

The study conclusion included the recommendation that some laboratories need to validate testing procedures and assess their quality control programs.

For more information about BVDV testing at KSVDL, please contact Dr. Gregg Hanzlicek at: 785-532-4853 or [gahanz@vet.k-state.edu](mailto:gahanz@vet.k-state.edu).

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Reality or Myth?

Sheraton Crown Center  
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Changes in Veterinary Antibiotic  
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#### **KSVDL hours:**

**Labor Day** Closed Sept. 1

**Thanksgiving** Closed Nov. 27-28, Open Nov. 29

**Christmas** Closed after noon on Dec. 24; Closed  
Dec. 25 and Dec. 26; Open Dec. 27

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