

# Wyoming State Veterinary Laboratory Newsletter – October 2008

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#### **MESSAGE FROM THE DIRECTOR**

As 2008 is drawing to a close, it is appropriate to reflect on this past year and to plan and look forward to the future. We are very fortunate to have been able to hire two new faculty members, Jonathan Fox and Chaoqun Yao, pathologist and parasitologist, respectively. Jonathan has an excellent background in diagnostic pathology and has been able to make an immediate contribution to the diagnostic case load. Chaoqun, on the other hand, comes from a different background. He is working hard to become involved in the case load on a day-to-day basis and is making excellent progress in transitioning to diagnostic parasitology from a strictly research career. I am certain Chaoqun would appreciate your phone calls and inquiries; these will help focus and facilitate the transition. For the first time in the five years I have been at WSVL, the Laboratory has a full complement of pathologists. I have been able to participate as a pathologist in the diagnostic case load on only a few occasions, something that I sorely miss and hope to remedy in the future. I've said this on more than one occasion: "the clientele of WSVL are the best I've had the pleasure to work with in over 20 years of diagnostic pathology service." Two additional searches for faculty positions are near completion, one for a virologist and one an epidemiologist. The search committees headed by Gerry Andrews and Merl Raisbeck have done an excellent job and we certainly have a good list of applicants for these positions. Hopefully these two positions will be filled during 2009.

The United States economy has taken a turn for the worse during late 2008 but Wyoming is faring better than other states. Still, most of us will feel some impact, some more than others. Considering the increase in the fee cap this past July, WSVL hopes to be frugal with your diagnostic testing dollars. We often have to make important decisions between which tests would provide the most relevant results but run some risk of missing a diagnosis and more comprehensive testing that would rule out other possibilities. Inclusion of in-house toxicology and molecular diagnostic tests under the fee cap has been valuable but we have not seen a dramatic increase in requests for these tests to date. You can help us provide the most efficient and cost-conscious service in two important ways. First is to be as specific as possible in requesting the tests you feel would be most productive. We can limit testing solely to those you

request but we need to know ‘up front’ if that is your desire. Second, a good history is always a sound idea. We are here to make recommendations concerning additional testing that might be warranted but need a good history rather than shooting-in-the-dark. Please, let’s both strive to improve our communications.

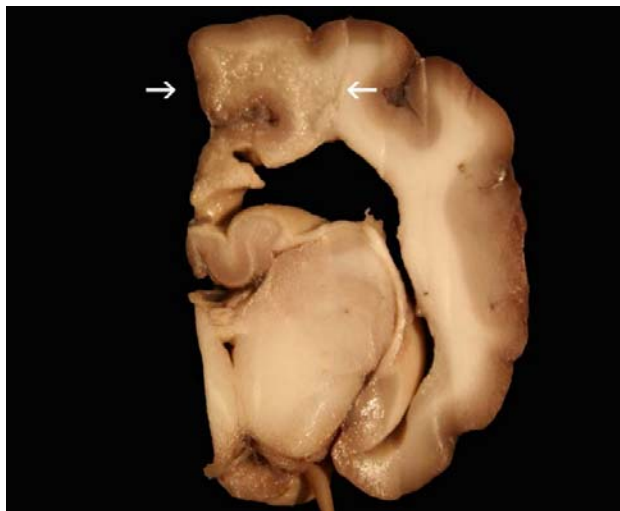
Don Montgomery

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## INTERESTING CASES FROM WSVL AND OTHER TIDBITS

### Pug dog encephalopathy

The carcass of a two year old pug dog from Laramie WY was submitted for necropsy with a tentative diagnosis of pug encephalopathy. The dog had a 3-month history of convulsions, and was euthanized. Grossly there was multifocal discoloration in gray and white matter, particularly in cerebral cortex and subcortical white matter. This corresponded histologically to cribiform change progressing to cavitation, and non-suppurative encephalitis. The presumptive diagnosis is pug dog encephalitis.



*Slice of brain of 2-year old male Pug with 3-month history of convulsions. There is a discreet area of malacia and discoloration in parietal cortex (between arrows). These areas can be detected by MRI.*

This is the fourth time we have seen this disease at post-mortem in a Pug since 2000. Pugs are not a common breed in Wyoming, suggesting this may be a surprisingly common disease. There have been several recent studies that attempted to get a better understanding of the

syndrome. A similar disease occurs in several other small breeds, such as Maltese and Yorkshire terriers. In Pugs the disease is primarily in younger dogs, most commonly female, and there is a tendency for it to occur in lighter weight dogs. The study from which this information was gleaned identified 60 affected pugs – that’s a lot of affected animals. No virus has been identified, although we are attempting virus isolation as in previous cases. As far as I know no genetic or familial pattern has been incriminated. The veterinarian who submitted the case wanted to know whether there is an effective way to make a diagnosis ante-mortem. CSF samples in some dogs show lymphocytic pleocytosis, but I don’t know what proportion of dogs will exhibit this. MRI has been used in research settings to follow the lesions in affected dogs.

#### Citations:

Levine JM et al: 2008, Epidemiology of necrotizing meningoencephalitis in Pug dogs. J Vet Intern Med. 22(4):961-968

Kitagawa M et al: 2007, A canine case of necrotizing meningoencephalitis for long-term observation: clinical and MRI findings. J Vet Med Sci. 69(11):1195-8

Cordy DR, Holliday TA: 1989, A necrotizing meningoencephalitis of pug dogs. Vet Pathol. 26(3):191-4

Donal O’Toole  
Pathologist, WSVL

### Osteopetrosis in Red Angus Cattle

Osteopetrosis is a rare, heterogeneous group of diseases due to defective osteoclast function resulting in inadequate resorption of bone and modeling of primary trabeculae. Its morphological hallmark is endochondral new bone in medullary cavities. Most forms of the disease are genetic in animals and people, but an osteopetrosis-like disease occurs sporadically in cattle as a result of congenital infection with bovine viral diarrhoea virus (BVDV). Inherited osteopetrosis was relatively common in American Angus cattle in the 1970s, but has largely disappeared. We report the emergence of congenital osteopetrosis in Red Angus cattle with laboratory confirmation of 10 cases in three states (KS; MO; WY) since 2006. We encourage diagnosticians to submit DNA from affected and carrier Red Angus cattle to one author (TS) to facilitate the development of a diagnostic genetic test.

Three widely-used related sires were identified as presumptive carriers and of the ten affected Red Angus calves, five were the result of embryo-transfer from one superovulated presumed carrier dam following sire-daughter breeding. Calves were small and either premature or stillborn. The following gross changes were present: brachygnathia inferior, impacted molars, short long bones and/or vertebrae, medullary cavities filled with bone; thick calvarium; malformed and focally

compressed cerebral hemispheres; posterior herniation of cerebellum. The primary histologic lesions were medullary cavities filled with primary spongiosa, and reduced numbers of osteoclasts. The 10 affected calves were negative for bovine viral diarrhea virus by viral isolation, immunohistochemical staining and/or fetal serology.



*Craniofacial malformations and abnormal bones in a red Angus calf with osteopetrosis.*

The trait responsible for osteopetrosis in Red Angus cattle has not been identified. DNA from affected calves is being used for gene discovery and assay development. The purpose of this article is to remind diagnosticians of the characteristic appearance of osteopetrosis in Angus cattle. Until the putative osteopetrosis gene is characterized, we propose the following diagnostic criteria for the disease in Red Angus cattle: 1. Defective osteoclast function manifested as marrow cavities filled

with endochondral bone. 2. Prematurity or stillbirth. 3. Brachygnathia inferior. 4. Genetic relationship to defined carriers (<http://redangus.org/genetic-defects/carriers/>). 5. Negative for BVDV.

Shannon Swist  
Pathologist, WSVL

### Canine mycoplasma cystitis

On a recent accession consisting of a canine urine sample collected via cystocentesis we noted what appeared to be *Mycoplasma* on our standard culture plate. *Mycoplasmas* don't always grow on this media but do on occasion. The animal had been on various antibiotics but the urinary problem had continued to be chronic. We were able to take a sample of the presumptive *Mycoplasma* and do a PCR which was positive. We then were able to go back to the urine itself and after centrifugation a PCR on the pellet material was also positive for *Mycoplasma*. Although *Mycoplasma* and *Ureaplasma* can be considered part of the normal mucosal flora of dogs, these microorganisms have also been associated with urogenital disease. *Mycoplasma* has been associated with urinary tract disease. Because this was a cystocentesis sample we felt the presence of *Mycoplasma* was significant. The bottom line is that *Mycoplasma* should be considered in cases of canine urinary tract infections and we can do a PCR directly on a pellet from the urine sample.

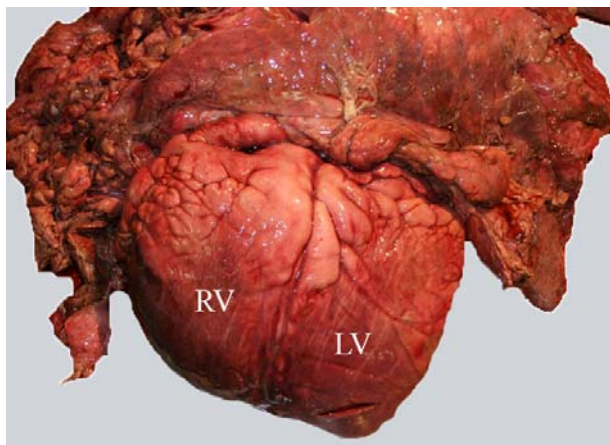
Ken Mills, PhD  
Microbiologist, WSVL

### Brisket disease in cattle feedlots at 5,000 feet or less

Brisket disease, due to abnormally high pulmonary vascular resistance, is most commonly seen at high altitudes. The lowest cut off for the disease is 1,000 m (3,280 feet). Most cases occur in cattle grazing at 2,500 – 3,500 m (8,202 – 11,482 ft). The higher the altitude at which cattle graze, the more likely it is that they will develop the disease. Classically the disease is seen in Angus and Angus-cross cattle, particularly when trailed or otherwise forced to undergo exercise. Brisket disease is also recognized in feedlots, particularly in fall and early winter within 45 – 90 days of going on feed. I assume that rapid weight gain in cattle with incipient brisket disease pushes them into decompensated right sided cardiac failure.

Recently there was a discussion among feedlot veterinarians in the upper Midwest of the occurrence of brisket disease in operations at or below 5,000 feet (1,524 m). The question was: is this really brisket, or

could it be something else? As a result, the laboratory was submitted heart and lungs of an affected heifer. It was brisket disease.



*Pluck from a feedlot heifer with brisket disease. The right ventricular myocardium (RV) is hypertrophied. The left ventricular myocardium (LV) is unaffected. The best way to document this is to measure each part of the ventricles separately.*

The diagnosis of terminal brisket disease post-mortem is straightforward. In addition to ascites, hepatomegaly and subcutaneous edema, affected cattle have a marked hypertrophy of the right ventricular myocardium. The best way to corroborate this at the practitioner's end is to cut off right and left ventricular free walls, and measure each separately. When the ratio of right ventricular free wall weight to right + left ventricular free wall is  $>0.4$ , this is objective evidence of hypertrophy of the right wall. To confirm it at the diagnostician's end, send us whole heart unfixed (so that we can do RVFW and LVFW measurements) plus fixed pieces of lung and liver, *or* send us representative formalin-fixed samples of right and left ventricular myocardium, as well as fixed pieces of liver and lung. Be sure to take samples of grossly normal lung, such as the posterior lobes, which are unaffected by terminal antero-ventral bacterial bronchopneumonia. Lesions of pneumonia can confound the histological interpretation of changes in pulmonary arteries. These changes can be surprisingly subtle. It helps the pathologist to have fixed samples of liver to document the extent and severity of chronic passive congestion.

Jensen R, Mackey DR: Diseases of feedlot cattle, pp. 257 – 261. Lea and Febiger, Philadelphia.

Donal O'Toole  
Pathologist, WSVL

## Potomac Horse Fever Serology

A recent case of profuse diarrhea in an equine has caused us to reevaluate referring samples to other laboratories for PHF serology. A single serum sample from an unvaccinated horse was submitted to the WSVL with a request for PHF serology. The sample was shipped to a laboratory performing this assay and was called positive. In a conversation with the veterinarian about the significance of the serology result the discussion came around to PCR being the preferred method of diagnosing PHF and it turned out intestinal content had been saved. When a PCR was done on the intestinal content sample it was clearly negative. This prompted a search of the literature and some web sites which caused us to seriously question serology, especially on a single sample. One individual had sent a number of serum samples to different laboratories. Some were known and some were unknowns. The results they got back were all over the board and the same sample ranged from a very high titer at one lab to negative at another. In our opinion questionable results are worse than none so the WSVL will not send off single serum samples for PHF serology. Useful results may still be obtained from acute and convalescent samples run at the same time.

Ken Mills, PhD  
Microbiologist, WSVL

## Antibiotic Susceptibility Reports

You may have noticed a change in our antibiotic susceptibility reports recently. As part of maintaining accreditation by the American Association of Veterinary Laboratory Diagnosticians we are required to use standardized methods that are validated. The antibiotic susceptibility method we use is defined in a document "Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals; Approved Standard—Third Edition". [This document provides the currently recommended techniques for antimicrobial agent disk and dilution susceptibility testing, criteria for quality control testing, and interpretive criteria for veterinary use.](#) The document is very specific on which antibiotics can be tested on which organisms and the zone sizes for those specific organisms. What you will see is a different set of antibiotic results for gram negative, gram positive and Streptococcus isolates. These will also be appropriate for the animal species from which we got the isolate. We hope this does not impact your practice and is not meant to dictate your choice of antibiotics but as a

testing entity we are required to follow standards.

Ken Mills, PhD  
Microbiologist, WSVL

## **DEPARTMENT OF VETERINARY SCIENCES HOSTS SCIENTIFIC EXCHANGE ON CATTLE DISEASES**

The Department of Veterinary Sciences organized and hosted a daylong scientific exchange in August 2008 on diseases of cattle. "This was one of several meetings around the region to encourage networking among veterinary researchers, clinicians and diagnosticians," said Dr. Donal O'Toole of the Department of Veterinary Sciences. These meetings are sponsored by Pfizer Animal Health.

Among the topics covered were right-sided heart failure in dairy cattle, which recently emerged as a disease in cattle along the Colorado Front Range, new technologies to characterize genetic mutations responsible for disease in food animals, and bovine viral diarrhea, which is a perennial source of loss on Wyoming ranches. Dr. Dannele Peck, an assistant professor in the Department of Agricultural and Applied Economics, addressed the issue of how to quantify losses in livestock due to various diseases, such as brucellosis and bovine viral diarrhea. Dr. Tara McDaneld, a research geneticist with the U.S. Department of Agriculture's Roman L. Hruska U.S. Meat Animal Research Center in Clay Center, NE., explained the way in which specific mutations involved in disease can now be identified in her laboratory. Dr. Greg Goodell, a dairy cattle veterinarian from Greeley, Colo., described a distinctive form of cardiac disease in young dairy cattle. The disease has features of brisket disease (pulmonary hypertension), which is widely recognized in beef cattle, particularly the Angus breed. Dr. O'Toole showed that histological features of the disease are distinct in several ways from classical brisket, primarily the severity of changes in pulmonary arteries.

The afternoon was devoted to a discussion of bovine viral diarrhea (BVD), including presentations on how to recognize and control the disease. Jackie Cavender, chief virology technician at the WSVL, took the audience through various methods her unit uses to diagnose BVD in laboratory samples. Dr. O'Toole and Jackie Cavender described a phenomenon that the laboratory recently recognized: that some cattle persistently infected with BVD are difficult to diagnose using standard commercial assays. Dr. Colleen Duncan, a pathologist from Colorado State University, reviewed BVD and related pestiviruses as they occur in wildlife. Her main conclusion was that wildlife is rarely a source

of BVD outbreaks in cattle operations; persistently infected cattle remain the major way in which infection enters and persists in herds. Dr. Rob Callan, a large animal veterinarian with Colorado State University's veterinary teaching hospital, discussed how producers can control the disease through vaccination and biosecurity. The use of naturally infected cattle in transmission and protection studies was reviewed by Dr. Jerry Stokka, formerly with Kansas State University and now with Pfizer Animal Health. Dr. Dale Grotelueschen, also with Pfizer, summarized national efforts to control BVD in beef herds and how this has been approached in northern European countries.

"It is unusual to be able to get veterinarians and basic researchers together in a relaxed forum like this to discuss new and emerging problems in the cattle industry and to develop networking contacts," Dr. O'Toole said. "Pfizer plans to facilitate further meetings in the future, specifically one involving veterinarians from UW and CSU."

Reprinted from *Agademics* (Sept 2008), with minor amendments.

[http://uwadmnweb.uwyo.edu/uwexpstn/Agademics/Agademics\\_main.htm](http://uwadmnweb.uwyo.edu/uwexpstn/Agademics/Agademics_main.htm)

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## **FROM THE WYOMING DEPARTMENT OF HEALTH**

### **Clarification of Rabies Related Quarantine of Animals**

The quarantine times (45 days vs. 180 days vs. 10 days) for management of animals that could have been exposed to rabies and for animals that bite humans can be confusing. For vaccinated animals that have been exposed to rabies the quarantine period is 45 days. The management of unvaccinated animals that have been exposed to rabies can involve either euthanasia and testing or a quarantine of 180 days. Note that home quarantines are not acceptable for nonvaccinates with potential exposure to a rabid animal.

For vaccinated animals that bite a human, the quarantine period is 10 days. In instances where an unvaccinated animal bites a human, the management can involve either euthanasia and testing or 10 day quarantine. More detailed information on this issue can be found in the Wyoming State Veterinarian's Rabies Management and Post Exposure Management Rules at <http://soswy.state.wy.us/Rules/RULES/6379.pdf>. Free Consultation on management of animals for rabies related issues can be obtained by calling the State Public Health Veterinarian Office at 307-777-5825 or by calling

the Public Health 24/7 All Hazards Response Line at 1-888-996-9104.

Karl Musgrave, DVM, MPH  
Wyoming Department of Health

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## **FROM THE WYOMING LIVESTOCK BOARD**

### **Wyoming Veterinary loan repayment program**

Wyoming is facing a shortage of large animal and food animal veterinarians as is the rest of the nation. As veterinarians age or change the focus of practice to more lucrative small animal practice, the ranching and farming communities across the nation find food animal services more difficult to obtain. Many states have addressed this shortage by providing incentives for food animal veterinarians to come to their states to practice. With average debt load for a new graduate of \$120-\$170,000.00 there has to be a mechanism to ease the burden of loan repayment. The starting salary for new graduates in Wyoming is \$30-\$40,000.00 per year. This does not allow a decent standard of living as well as repay loans at the rate of \$12,000.00-\$15,000.00 per year.

The Wyoming legislature provided in the 2008 session a means of recruiting new food animal veterinarians and keeping existing food animal veterinarians within the State.

Rep. Dan Zwonitzer sponsored a bill (HB 74) that provides \$270,000.00 for 2 years to aid in the repayment of educational loans to veterinarians who practice food animal medicine in underserved areas of the State. The law states that the Wyoming Livestock Board in consultation with the Wyoming Veterinary Medical Associations and Wyoming Veterinary Licensing Board provide monies for educational loan repayment.

The statute provides loan repayment to Wyoming licensed veterinarians who have practiced food animal medicine in the State for 6 months. These veterinarians who have applied and are selected by the Wyoming Livestock Board are eligible for up to \$30,000.00 per year for 3 years. "Food animals" are defined as cattle, swine, sheep or goats. The veterinarians must be U.S. citizens and have graduated from an accredited veterinary college.

No state money shall be expended for repayment of any loan unless 25% of the money is matched with other funds in any combination from any county, city,

veterinary clinic, animal care facility, state agency, university, laboratory or veterinary clinic.

The Board shall select recipients based on the following criteria: the area in the state being served, percentage of food animal practice, the amount of educational expense and whether the recipient has a committed sponsor to provide 25% of the grants matching funds.

The American Veterinary Medical Association has provided guidelines as to percentages of food animal practice in Wyoming, as well as defining underserved areas in the State. This map may be accessed at [www.avma.org/fsvm/maps/wy.asp](http://www.avma.org/fsvm/maps/wy.asp).

The loans will probably be granted on a 25%, 50%, 75% and 100% of food animal medicine. For example; if veterinarians spend 50% of their time practicing food animal medicine, they would be eligible for a loan repayment grant of \$15,000.00 per year. This amount would be \$11,250.00 State funds and \$3750.00 sponsor funds per year. This amount could change through the life of a 3 year contract, if other factors occur, such as the percent of food animal practice changes or a new sponsor is obtained.

State funding is in the amount of \$270,000.00, the sponsor matching fund would amount to \$90,000. The total amount available for the biennium would be \$360,000.00. To assure that the program will be adequately funded for the biennium, probably \$120,000 will be spent the first year, with the remainder spent the second year to cover existing grants and hopefully a second crop of new veterinarians in 2010. With this formula, it is expected that the board and sponsors could fund 4-6 positions a year for 2 years. A request for funding has been included in the exception biennial budget for 2011-2012.

The grant amount would be paid to the selected recipient as a yearly one time payment. The selected recipient may be asked to provide proof that the payment actually was made to the institution listed on the loan application.

This program is brand new in Wyoming. The Wyoming Livestock Board and staff are working diligently to make this a program that will attract new food animal veterinarians and keep existing food animal veterinarians in the state. If the Board can place or keep 4-6 veterinarians a year for the next 2 years there is hope the shortage of food animal service can be addressed in Wyoming.

Fred Emerich DVM  
Field Veterinarian  
Wyoming Livestock Board