

LAB LINES

Diagnostic news and trends from the Colorado State University Veterinary Diagnostic Laboratories
Volume 14, Number 2
Fall/Winter 2009

Terrestrial rabies returns to Colorado

Wake-Up Call!

On Sept. 14, a diagnosis of rabies in a Colorado horse was made—the first in over 30 years. The El Paso County horse initially appeared to be lame on the left



PUBLIC HEALTH

foreleg and resisted having the foot examined by its owner. By the time it was presented to the veterinarian two days later, the left forelimb signs had progressed to severe ataxia, then recumbency with the inability to rise. The horse was euthanized and the brain submitted to CSU VDL in Fort Collins. Direct fluorescent antibody staining revealed rabies viral inclusions within neurons on impression smears of the brainstem and a smaller number of inclusions in the cerebellum. Nonsuppurative encephalitis was found on histopathologic examination and Negri bodies were not evident. The brain was submitted to the CDC, which identified the rabies virus as a skunk strain.

The owner reported a skunk eating the contents of a birdfeeder and fol-

lowing her around the yard during daylight hours two months earlier. As of Oct. 14, eight skunks, one cow, one horse and one mountain lion have been diagnosed with rabies in El Paso County. Statewide, 32 rabid skunks and one fox, in Prowers County, have been found this year. Rabies in terrestrial animals has been a rarity in Colorado in the last three decades. However, since 2007 surveillance by the Colorado Department of Public Health and the Environment detected an increased number of rabid skunks in eastern Colorado. Skunk rabies is now considered endemic east of Interstate 25.

The case of rabies in a horse and cow serves as a wake-up call to veterinarians. Remember to:

- Check your titers every two years for pre-exposure prophylaxis.
- Ensure that staff who decapitate neurologic animals are vaccinated for rabies.
- Wear barrier personal protective equipment when handling neurologic animals. Add a face shield to protect the mucous membranes during necropsy and head or brain removal. ▲

—Hana Van Campen, DVM, PhD, DACVM,
CSU VDL Virology Section Head

RABIES IN COLORADO JAN. 1 TO OCT. 14, 2009

County	Bat	Skunk	Other	Total
Adams	1			1
Arapahoe	1	4		5
Boulder	31			31
Chaffee	1			1
Denver	12			12
El Paso	2	8	3*	13
Elbert		3		3
Gilpin	1			1
Jefferson	2			2
Kiowa		1		1
Kit Carson		1		1
Larimer	6			6
Lincoln		1		1
Mesa	2			2
Montezuma	1			1
Morgan	1	7		8
Otero		2		2
Prowers		1	1**	2
Weld	1			1
Yuma	0	4		4
Total	62	32	4	98

* Horse: 1; Cow: 1; Mountain Lion: 1. ** Fox
Source: Colorado Department of Public Health and Environment.

FOR MORE INFO

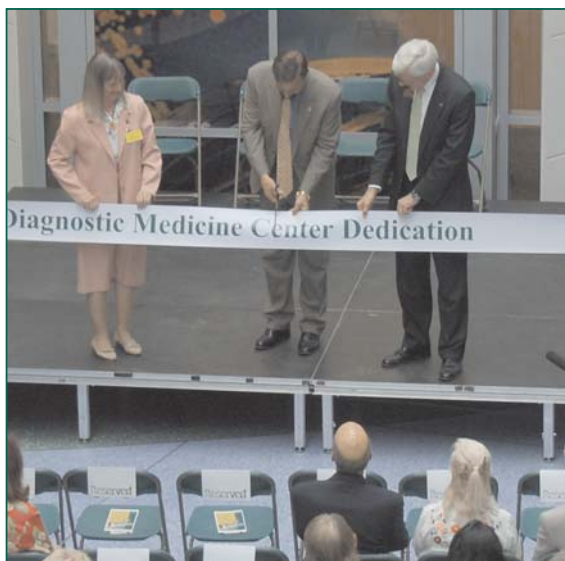
Get updated information on rabies case distribution by species and details on preventive measures for this zoonotic disease from the Colorado Department of Public Health and Environment. Call them at (303) 692-2700 or visit www.cdphe.state.co.us/dc/zoonosis/rabies.

Livestock at risk should be vaccinated annually. Find information on vaccines and protocols from the National Association of State Public Health Veterinarians, at www.nasphv.org/documents/Compendia.html, or *J Am Vet Med Assoc.* 2008 May 15;232(10):1478-86.





Clockwise from top: Attendees included representatives of academia, industry, government and agriculture; about 350 guests toured the new facility, including the stunning three-story atrium; CSU Mascot Cam the Ram greets guests; VDL Director Barb Powers, CSU President Tony Frank and CVMBBS Dean Lance Perryman officially open the new facility; posters and displays detailed the history and progress of the facility's construction; CSU President Frank greets Professor Emeritus Charles Hibler.



Welcome to CSU VDL

Up and Running with a Great Start

An estimated 350 honored guests helped the Veterinary Diagnostic Lab christen its new Diagnostic Medicine Center at our open house and dedication ceremony on Sept. 11. Guests included veterinary



clients; external advisory committee members; producers and producer group representatives, including the Colorado Cattlemen's Association and the Colorado Livestock Association;

representatives of the Colorado Veterinary Medical Association; members of the CSU System Board of Governors; and representatives of USDA, the Colorado Department of Agriculture, the governor's office and state legislators.

"I think this realization of over a decade's worth of hard work — now a centerpiece for our campus — demonstrates the value people see in what we do here every day at the VDL," said Director Barb Powers. ▲

Lab Updates

Where to Deliver Drop-off Samples

Have you seen the new home for the Veterinary Diagnostic Laboratory at CSU which opened in June? Why not take the ideal opportunity to visit by dropping off samples at our new 88,000-square-foot Diagnostic Medicine Center? We are conveniently located immediately north of the James L. Voss Veterinary Teaching Hospital, linked to the hospital by an enclosed corridor. Drops can be made 24 hours a day at the loading dock behind the facility. We look forward to seeing you.

LAB SERVICES



Here's how to find us:

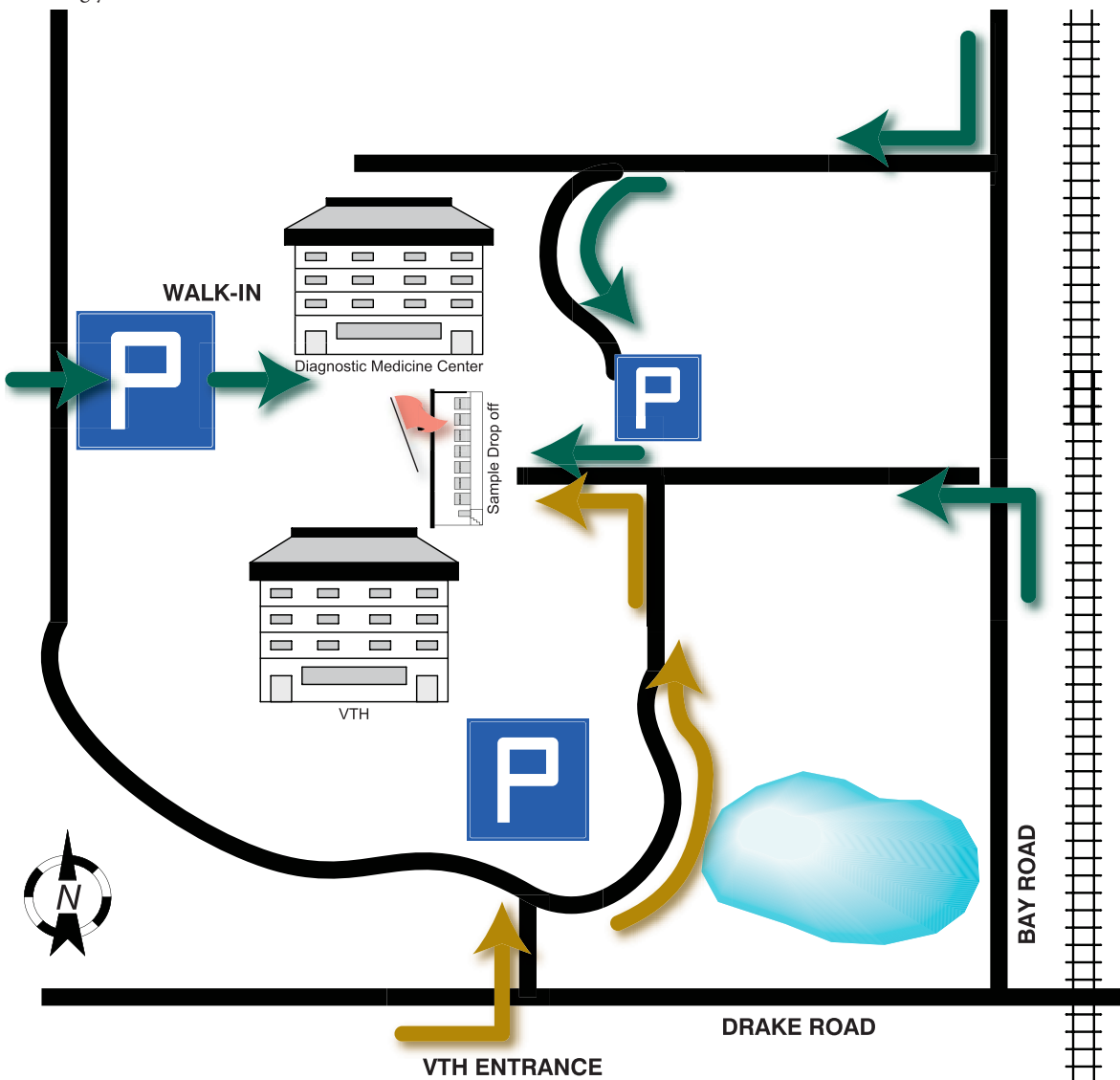
- Take Bay Road north from Drake at the Redwing intersection.

Cross the bridge, take the first left and follow all the way to the Diagnostic Medicine Center dock.

- Enter the teaching hospital entrance off Drake; turn right at the T.

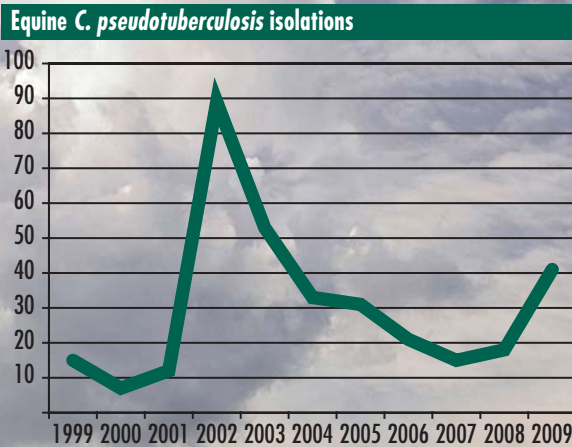
Follow around the parking lot, through the gated area between corral and hospital, and left after the riding area to the dock. If a gate is closing this road off, please wait a few moments; animals are being moved in the area.

After-hours drop-off areas with refrigerators are also available.



HOW ELSE TO GET SAMPLES TO US?

- FedEx courier service. Fee depends on package weight and location. We have a FedEx discount; contact us for information.
- Direct Ship/Overnight Mail. Fee depends on package weight and location.
- Regular Mail/UPS Service. Fee depends on package weight. For biopsy samples, we can send you pre-filled mailers free with a \$2 return fee. FedEx also offers a two-day service on 1-pound mailers for \$6.50.



Diagnostic Summary Update

Corynebacterium pseudotuberculosis in Colorado

—Doreene Hyatt, PhD, CSU VDL Bacteriology Section Head

Corynebacterium pseudotuberculosis infections cause a disease in equids commonly referred to as “pigeon fever,” “pigeon breast,” or “dryland distemper” and are the most common cause of ulcerative lymphangitis in equids. As mentioned in our 2000, 2001, and 2002 *LabLines*, before 1999 the CSU Veterinary Diagnostic Laboratory annually reported approximately one isolation of *C. pseudotuberculosis* from horses statewide. That changed in 2002 when we had a high of 89 isolations in the calendar year.

Whether that increase was because of an increased prevalence or because of an increased awareness of the disease is unknown, but the number of isolations has steadily decreased since 2002. Again, whether the decrease is because of an actual decrease in disease or a decrease in the number of cultures performed is unknown. Recently, there have been media reports of increased numbers of cases in Colorado. As such, updated statistics of the number of isolations of *C. pseudotuberculosis* from horses in the past 11 years are given in the graph at left. ▲

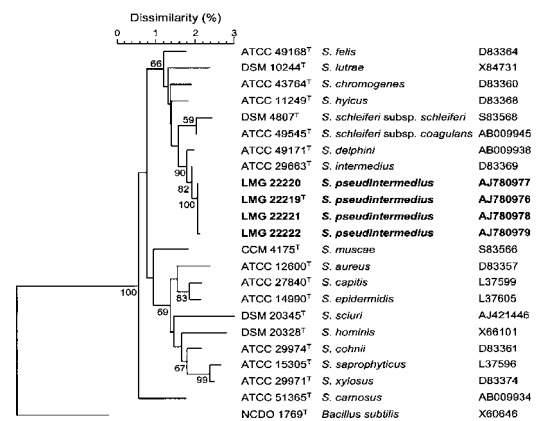
Systematic and Evolutionary Microbiology

Staph. intermedius or *pseudintermedius*?

—Doreene Hyatt, PhD, CSU VDL Bacteriology Section Head

How is one to keep up with the world of changing bacterial names, especially when a change doesn't affect treatment decisions or doesn't apply to all isolates? Such is the case of *Staphylococcus intermedius* and *pseudintermedius*.

In 2005, Belgian scientists looked genetically at *S. intermedius* isolates from a dog, cat, horse and parrot and found that there should be a new novel species, *S. pseudintermedius* (Devriese et al., 2005). Since then, it has been reported by the same authors (Devriese, 2009) that further genetic testing is necessary to differentiate the two species and that strains from dogs that are identified by traditional culture as *S. intermedius* should be reported as *S. pseudintermedius* (but those from other hosts would need more thorough investigation). So, don't be surprised if you start seeing the new name on our reports for canine isolates. ▲



Score: Devriese LA, et al. *Staphylococcus pseudintermedius* sp. nov., a coagulase-positive species from animals. *Int J Syst Evol Microbiol*. 2005 Jul;55(Pt 4):1569-73.



HOW OFTEN DO YOU HEAR ABOUT PRICES DROPPING?

It isn't often in today's economy that you hear about a price dropping for testing of diagnostic samples. Here at Colorado State University's Veterinary Diagnostic Laboratory, we have added a new pricing scale for *Mycobacterium avium* ssp. paratuberculosis serology (ELISA). If you send us at least 100 serum samples, the new price will be only \$4 per sample!

CSU VDL has passed the individual 2009 fecal proficiency panel using ESP liquid media that allows us to conduct official testing for the National Johne's Program using this method until Dec. 31, 2010. The liquid based system allows *M. paratuberculosis* detection in an average of only 36 days, compared to 12 to 16 weeks using solid media. Using this method we can grow the organism faster and use PCR to determine if it is *M. avium* spp. paratuberculosis and not another *Mycobacterium*.

Cost for liquid culture is \$25 per sample. Submit feces or tissues. Pools of up to five samples are accepted. Typical turnaround time is 30-42 days.

Diagnostic Summary Update

Leptospirosis Serology Update

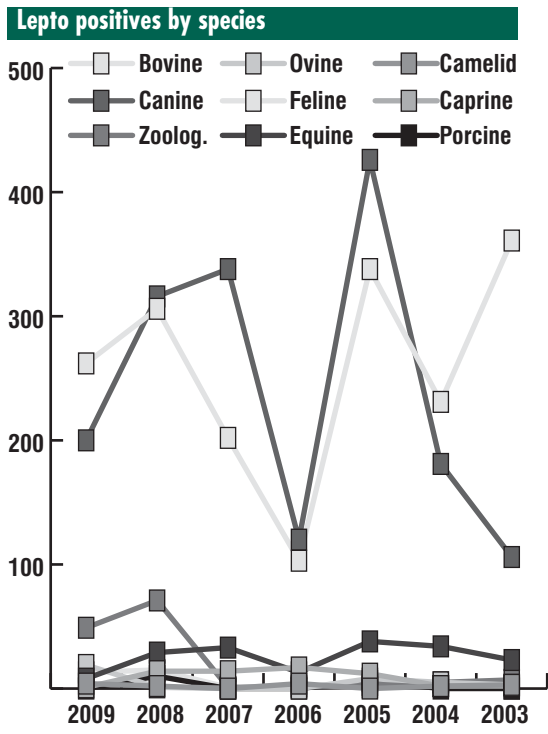
—Doreene Hyatt, PhD, CSU VDL Bacteriology Section Head

As an update of information given for the past few years, the table at right and chart below total the serum samples tested for titers to *Leptospira interrogans* from 2003 through Aug. 15, 2009.

From Jan. 1 to Aug. 15, 2009, CSU VDL performed a total of 82 tests for *L. bratastava*, with seven positives with a high of 1:1600. Additionally, we conducted 107 tests for *L. bratastava* in 2008, of which 16 were positive, with the highest titer being 1:6400. A total of 97 tests for *L. bratastava* were conducted in 2007; 16 were positive, with the highest titer being 1:3200.

Serology results for samples submitted during the past five years and year-to-date through Aug. 15 for all species are broken down. We report the total number of samples tested (N), the number of positive results (P)—defined as a titer greater than or equal to 1:100—and the highest titer reported during the year (High). ▲

	<i>L. canicola</i>			<i>L. grippo</i>		<i>L. hardjo</i>		<i>L. ictero</i>		<i>L. pomona</i>	
	N	P	High	P	High	P	High	P	High	P	High
2004	467	49	800	76	819,200	33	800	102	3200	87	102,400
2005	858	152	1600	135	51,200	117	1600	165	3200	123	12,800
2006	264	51	800	34	6400	21	1600	26	800	38	6400
2007	597	90	1600	105	6400	42	3200	89	3200	98	6400
2008	766	107	6400	157	6400	116	3200	149	6400	128	6400
2009	557	35	1600	80	6400	91	3200	157	3200	106	6400



Advances in Parasitology

Which assay to detect *Tritrichomonas*?

Multiple assays exist to detect *Tritrichomonas foetus* in cattle, and significant differences in sensitivity and specificity have been reported. Here we provide data for the comparison of three different methods of detection for *T. foetus* in bovine preputial scrapings. Veterinarians collected 99 samples under field conditions for diagnostic testing in this study. Culture using the commercially available InPouch TF® (Biomed Diagnostics, San Jose, Calif.) was compared to conventional polymerase chain reaction (cPCR) and real-time polymerase chain reaction (rtPCR). Upon receipt, the InPouch TF® samples were incubated at 36.5° C for 72 hours and then evaluated by microscopy. For cPCR, genomic DNA was extracted from the In Pouch TF® samples using the ZR Fecal DNA kit (Zymo Research, Orange, Calif.) for cPCR. For rtPCR, the Ambion Mag-MAX™-96 Viral RNA Isolation kit (Applied Biosystems, Foster City, Calif.) was used according to manufacturer's modifications for InPouch samples. The PCR reaction was carried out as previously described for cPCR.^{1,2} For rtPCR, the newly developed VetMAX™ *T. foetus* test kit (Applied Biosystems, Foster City, Calif.) was used. This kit includes a Xeno™ DNA internal control which provides an evaluation of DNA degradation during the assay.

The kappa statistics of correlation between culture and cPCR, culture and rtPCR, and cPCR and rtPCR were 0.845, 0.863 and 0.846, respectively (>0.845 very good correlation).

It appears the three testing methods are similar in their ability to detect *T. foetus* in bovine preputial samples. We also conducted a separate pilot study, designed to begin evaluation of the effect of InPouch® shipping conditions on cPCR results. The number of organisms from a stock culture was determined and dilutions made in Diamond's media. These were then inoculated into InPouch TF® samples, collected by veterinarians under field conditions for diagnostic testing, to yield 12.5 and 25 organisms per mL (less than the 50 organisms per mL reported sensitivity² for this cPCR). Pouches were stored vertically for approximately 48 hours, at either room temperature (21° to 23° C), refrigerated (4° C) or frozen (-20° C). Genomic DNA was extracted and cPCR conducted, as above. Six replicates of 12.5 organisms per mL and three replicates of 25 organisms per mL were evaluated.² For dilutions of 12.5 organisms per mL, cPCR detected *T. foetus* in five of six pouches held at each of the three temperatures. For dilutions of 25 organisms per mL, cPCR detected *T. foetus* in two of three, one of three and three of three pouches held at room temperature, 4° C and -20° C, respectively. These early results indicate freezing may be the preferred shipment method for *T. foetus* when using cPCR, however additional data is needed. Similar studies to determine proper shipping techniques would be useful for rtPCR. ▲

— Laurie A. Baeten, Kristy Pabilonia, Christina Weller, Jeanette V. Bishop, Kristin Spencer, Lora R. Ballweber



REFERENCES

1. Felleisen RS, Lamelet N, Bachmann P, Nicolet J, Müller N, Gottstein B. Detection of *Tritrichomonas foetus* by PCR and DNA enzyme immunoassay based on rRNA gene unit sequences. *J Clin Microbiol.* 1998 Feb;36(2):513-9.
2. Felleisen RS. Comparative sequence analysis of 5.8s rRNA genes and internal transcribed spacer (ITS) regions of trichomonadid protozoa. *Parasitology.* 1997 Aug;115 (Pt 2):111-9.

Advances in Parasitology

Arctic foxes a definitive *N. caninum* host?

Little is known about the sylvatic cycle of *Neospora caninum* in arctic and subarctic ecosystems. Serosurveys have shown exposure to the organism in caribou (*Rangifer tarandus*), musk-ox (*Ovibos moschatus*), gray wolves (*Canis lupus*) and others, but the definitive hosts in these ecosystems have not yet been identified. Domestic dogs and coyotes (*Canis latrans*) are the only confirmed definitive hosts for *N. caninum*, although there is reason to speculate that red foxes (*Vulpes vulpes*) and gray wolves may also be. Given this, coupled with the close taxonomic relationship between red and arctic foxes, it is possible arctic foxes could serve as definitive *N. caninum* hosts.

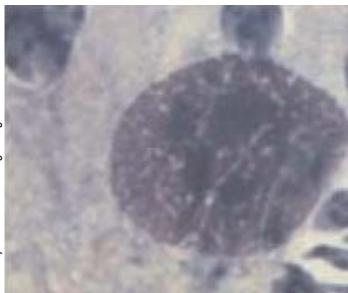
In this study, we opportunistically collected gastrointestinal tracts from 120 arctic foxes and froze them at -80° C

— Stacey A. Elmore,¹ Todd M. O'Hara,² and Lora R. Ballweber¹

¹Colorado State University, Veterinary Diagnostic Laboratory;

²Department of Biology and Wildlife and Institute of Arctic Biology, University of Alaska Fairbanks

until processing. Feces were recovered and analyzed using a nested polymerase chain reaction (PCR) protocol with the previously described primers Np6+/Np21+ and Np6/Np7, which targets the Nc5 region. PCR analysis was followed by the sequencing of amplicons. Identity was confirmed through comparisons with known isolates on GenBank. We detected *N. caninum* DNA in the feces, suggesting the foxes are exposed through hunting, scavenging or, possibly, coprophagy. Further research will address the intermediate host status of arctic canid prey species and continue arctic fox fecal surveys for evidence of natural infections. ▲



CSU VDL in the Field: Disease Updates

BVD and *T. foetus* Testing

BOVINE VIRAL DIARRHEA VIRUS UPDATE

BVD continues to be a hot topic in the beef and dairy industries. During the last fiscal year, the Colorado State University Diagnostic Laboratory system conducted 76,751 BVD tests using AC-ELISA or PCR. Test results were positive on 402 samples, or 0.5 percent. Approximately one-third of the tests were confirming previous positive results, so an estimated prevalence of BVD Persistent Infections (PI) in tested cattle for last year was 0.35 percent, a decrease over 2007. A breakdown of testing by laboratory is shown in the table below, with the previous year's data in parenthesis.

The majority of BVD PI testing is done through the use of a pooled testing strategy. Rocky Ford is the only CSU laboratory offering pooled testing. Last year, Rocky Ford performed 1,758 pooled tests for BVD (average pool size 39 samples) and found 105 positive pools. Follow-up testing of the 105 positive pools identified 287 AC-ELISA positive samples, with a calculated individual prevalence of 0.38 percent.

Once initial herd testing is accomplished and positives removed, it is extremely important to continue to monitor the herd status each year, and *always* test newly purchased animals before they are introduced into the herd.

— Jim Kennedy, DVM, MS, Director, CSU VDL Rocky Ford Branch.

T. FOETUS TESTING UPDATE

In the past year an increasing number of states have begun or implemented a statewide *T. foetus* testing program. All states west of a line through the eastern border of Kansas—except Kansas—now mandate some form of testing. Arkansas, Louisiana and Iowa have also either instituted mandatory testing or are in the process of developing it.



Colorado began a voluntary program in 2002 which was later replaced by a mandatory program. CSU VDL is the leader in *T. foetus* testing for the state of Colorado and provides testing for neighboring states. The table below reflects the testing performed by the CSU Laboratories—a lot of bull! If each bull we tested were assigned the duty of covering 50 cows, CSU's *T. foetus* testing was responsible for the reproductive performance of over a million cattle, or one-32nd of the entire U.S. beef-cow population. ▲

BVD TESTING 2008

Lab	Test Method	Number Tested	Number Positive
Fort Collins	AC-ELISA	1369 (2345)	37 (47)
Grand Junction	*	172 (131)	3 (3)
Rocky Ford	Pooled PCR and AC-ELISA	75,215 (72,305)	362 (436)
Total		76,751 (74,781)	402 (516)

* Grand Junction samples forwarded to Rocky Ford for testing. Numbers in parentheses represent prior year numbers.

TRICH TESTING 2008

Lab	Test Method	Number Tested	Number Positive
Fort Collins	Culture PCR	1254 1188	1 104
Grand Junction	Culture	2902	18
Rocky Ford	Culture PCR Pooled PCR*	1902 3706 2710	44 373 89
Total		21617	540

* Represents 10,665 animals.





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Lab Updates

Mission-Critical Equipment

The CSU VDL has some special equipment needs. If you are considering a gift, your support of equipment would be particularly effective in helping the VDL achieve its mission. Any of the items listed here can be sponsored in honor of someone special and will remain so named for the life of the equipment. A representative of the VDL would be pleased to discuss and explain the need for and the uses of the equipment. Or for additional information, contact:

Dr. Debra Kamstock
(970) 297-1281

Debra.kamstock@colostate.edu

1. SPECTRAFUGE 24D \$1,495, non-refrigerated microfuges (2 needed).

2. TISSUE-TEK VIP 6, \$100,000, vacuum infiltration processor.

3. BIRO 3334 BANDSAW, \$6,750, precision pathology bonesaw.

4. Z400K CENTRIFUGE, \$9,500, refrigerated tabletop.

5. DAKO AUTOSTAINER, \$100,000, automated horizontal IHC slide-processing system.

6. AVANTI JHC, \$25,000, high-capacity, high-throughput centrifuge system.

7. ABI 7900, \$80,000, fast, real-time PCR thermocycler.

8. GELDOC-IT 310, \$11,000, self-contained gel imaging system.



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CSU VDL Establishes Endowment Fund

Your Support Matters

Join the new CSU VDL Endowment Fund and help make a significant impact on the future growth of our mission of service, teaching, research and outreach. Currently, most revenues to operate and support the CSU VDL are generated via fees for service. This limits scientific progression, expansion and education. Increased financial support through the VDL Endowment Fund will remove those limits and provide increased opportunities to pursue research, aid field investigations, support the development of new technologies for disease diagnosis and aid in the expansion of current services offered to our clients. It will provide an avenue for upgrading outdated equipment and allow for continued educational

advancement for both our clients and future diagnosticians. It will further our mission of promoting and protecting animal and human health.

We invite you to join us on this mission. Please assist us in reaching our initial goal of \$25,000 to establish and grow the Endowment Fund. You may contribute by completing the form below or by visiting us online at www.dlab.colostate.edu and clicking "Support the DLAB online."

We would like to extend our sincere gratitude to an inaugural donor, who has requested anonymity, for the initial contribution that has allowed us to launch this endeavor. Thank you for supporting the VDL and our mission.

YES! I want to make my support matter...today and for the future

I would like to help the CSU Veterinary Diagnostic Lab continue and strengthen its mission of promoting and protecting animal and human health.

— Detach and Mail —

Please accept my check for a gift of \$ _____
 (Payable to Colorado State University Foundation Veterinary Diagnostic Laboratory)

Name _____

This gift is from Me My spouse and me My partner and me

Spouse's/Partner's Full Name _____

I would like to make this gift in honor of:

Please feel free to make your gift in honor of a friend, family member, other individual, pet or organization who has inspired you to support us.

Your Name _____

Address* _____

City, State, ZIP* _____

Phone (with area code) _____ E-mail _____

Charge this gift of \$ _____ to my/our
 VISA Mastercard American Express

Card Number _____ Expires ____/____
 (mm / yy)

Name on Card _____

Signature _____

Use this gift for: General purpose, to include education, training, equipment, operations
 No specific designation Diagnostic investigations/research only
 Other _____

*Please return this form with your gift to:
 Colorado State University Foundation, P.O. Box 1870, Fort Collins, CO 80522
 Or go to www.dlab.colostate.edu and click "Support the DLAB online"*

* Necessary information so we can confirm receipt of your contribution and thank you for your support. By contributing to the CSU VDL you become a member of our family and a supporter of our cause. As such, you will automatically receive our biannual newsletter *LabLines* so we can keep you updated on the lab's activities, from investigations to interesting diagnostic cases to test development to comings and goings of residents, post-docs, graduate students and faculty.
 If you prefer not to receive this mailing please check here. All donations are charitable.

CSU VDL In Press

A Roundup of VDL Faculty Research

Van Campen H. Epidemiology and control of BVD in the U.S. *Vet Microbiol.* 2009 In Press.

Virology Section Head Hana Van Campen reviews the incidence of Bovine Viral Diarrhea Virus in the United States, and examines the management practices that put dairy and beef herds at risk of contracting BVD disease. In general, producers appreciate little or any felt need for regional or national eradication programs, preferring to rely heavily on commercial vaccines. "The lack of a clear danger is compounded by the 'Gambler's' mentality among individual cattle producers," she writes. "The low herd prevalence validates the general belief that the application of BVDV vaccines is a 'cure-all' rather than an aid in prevention of BVDV infections."

U'ren L, Guth A, Kamstock D, Dow S. Type I interferons inhibit the generation of tumor-associated macrophages. *Cancer Immunol Immunother.* 2009 Oct 14. In Press.

Debra Kamstock, VDL Pathologist, collaborates with CSU Department of Microbiology, Immunology and Pathology members to use mouse tumor models in an investigation of effects of endogenously produced type I interferons on the generation of tumor-associated macrophages (TAM). Using immunohistochemistry and flow cytometry, the team found TAM density was significantly increased in tumors lacking the type I IFN receptor, and that increased TAM density was associated with a significant increase in tumor growth rate and angiogenesis. Their findings indicate that endogenously produced type I IFNs suppress the generation of TAM, which may in turn account for inhibition of tumor growth and angiogenesis.

Ballweber LR. Ecto- and endoparasites of new world camelids. *Vet Clin North Am Food Anim Pract.* 2009 Jul;25(2):295-310.

Although great strides have been made in understanding the biology, treatment and control of internal and external parasites of llamas, alpacas, guanacos and vicunas, new challenges have arisen, says CSU Parasitology Section Head Lora Ballweber in her review. Parasites that were unknown 15 years

ago have now been described, and researchers are only beginning to figure out their implications for camelid health. New issues, including anthelmintic resistance, will require changes in approach to parasite control. Continued surveillance is critical, not only in our fight against these parasites, but to recognize the next parasitic threat for the new world camelids.

Hall JS, et al. Influenza infection in wild raccoons. *Emerg Infect Dis.* 2008 Dec;14(12):1842-8.

Raccoons can become infected, transport and potentially transmit both avian and human influenza viruses, according to a study involving Kristy Pabilonia, VDL Avian Diagnostics and BSL3 Operations Section Head. Dr. Pabilonia collaborated with USDA on its experi-



ment which infected two raccoon cohorts with both H4N8 and H3N2 flu subtypes. Half the avian-flu group and all the human-flu group subsequently shed the virus.

Devitt JJ, Maranon DG, Ehrhart EJ, Bachand AM, Lana SE, LaRue SM. Correlations between numerical chromosomal aberrations in the tumor and peripheral blood in canine lymphoma. *Cytogenet Genome Res.* 2009;124(1):12-8.

VDL Pathologist EJ Ehrhart joins a study with CSU's Animal Cancer Center showing an alternative, less invasive method for evaluating canine lymphoma compared to the current standard tumor cell evaluation may be possible. By excising one lymph node of dogs known to have lymphoma for immunophenotyping and cytogenetic analysis, sampling and culturing a peripheral blood sample for cytogenetic analysis and using a bone marrow aspirate for staging purposes, the team showed significant correspondence between numerical aberrations in the tumor and the peripheral blood. When tumor analysis is impossible, peripheral blood offers a viable option for cytogenetic assessment. ▲



CSU VDL now offers Laboratory Response Network real-time PCR testing for *Bacillus anthracis*, *Brucella* spp., *Coxiella burnetii* (Q fever), *Francisella tularensis* (tularemia) and *Yersinia pestis* (plague). LRN is an integrated national and international network of laboratories fully equipped to respond quickly to acts of terrorism, emerging infectious diseases, and other public health threats. Cost for the real-time PCR is \$60 per sample.

Guardians of Public Health

Imag(in)e This: Educational Virtual Microscopy System

Refocusing the world's attention on the critical public health issues of vector-borne diseases, such as malaria, heartworm and Lyme diseases, to name a few, has also refocused attention on the role of veterinary parasitologists in animal and human health.

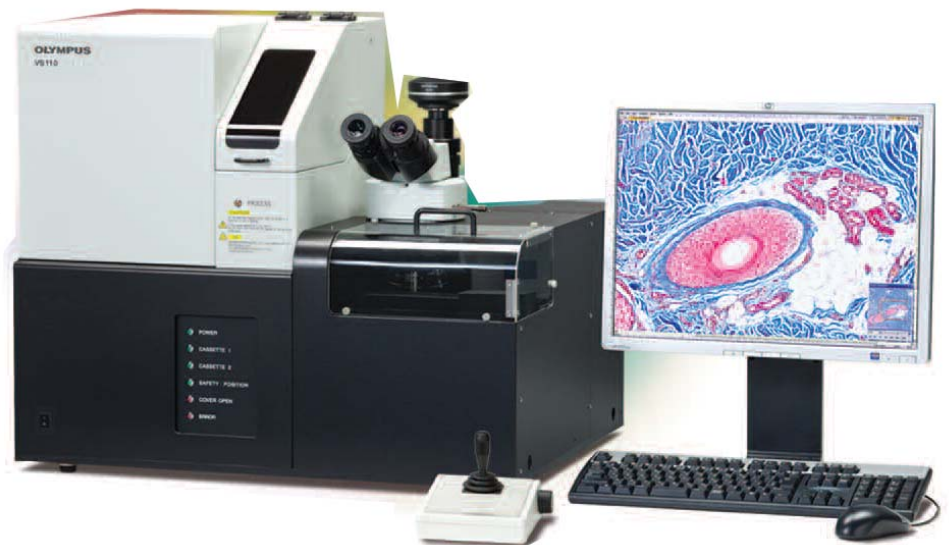
Although we will meet the current and future demands of vector-borne disease control through a variety of means, education is a key step. This education takes various forms—education of veterinary students, continuing education of practicing veterinarians, and education of both DVM and non-DVM graduate students on the latest breakthroughs to detect, treat and prevent parasitic diseases.

To help us meet the needs of that continuing education, both for practitioners and for veterinary students, CSU VDL is actively soliciting donations for the purchase of a virtual microscopy system. Acquisition of this system will allow us to create parasitology modules that will be web-based, thus allowing for distance education. The practitioner or veterinary technician can polish their skills by completing the modules in their clinic rather than traveling to distant sites. Acquisition of the system will also allow us to incorpo-

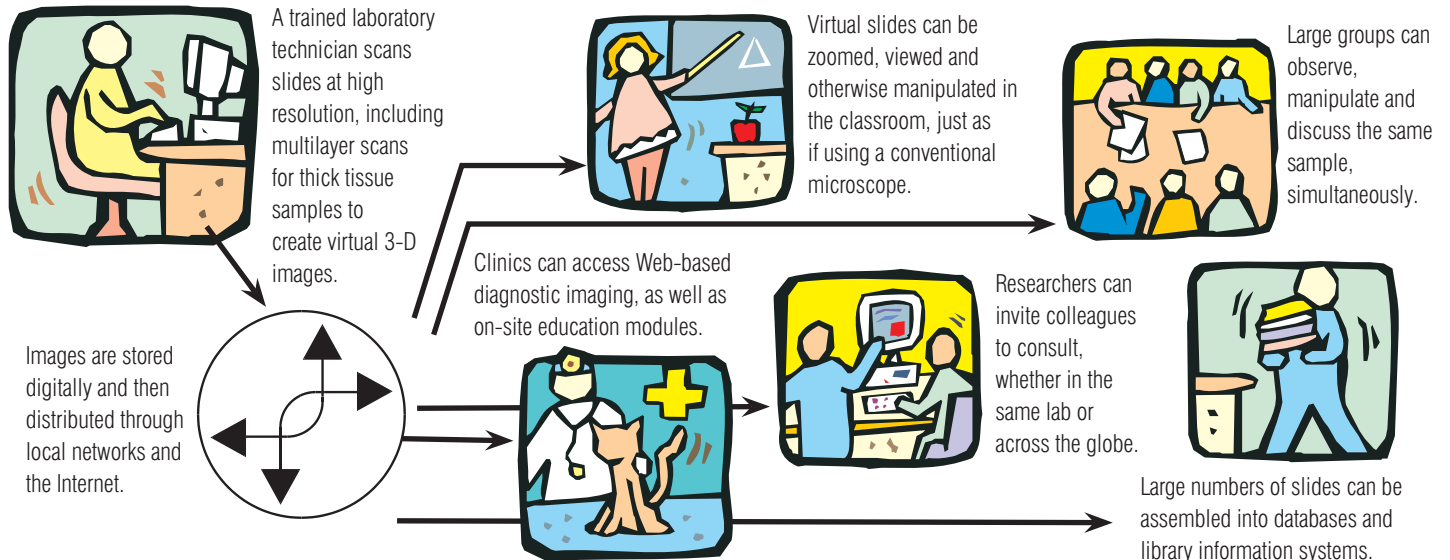
— By Lora Ballweber, DVM, MS, Parasitology Section Head

rate computer-based learning styles into the veterinary curriculum, a style that today's generation of students is very comfortable with.

If we can count on your support in this mission through a charitable contribution, please see page 9 for a giving form to join our CSU VDL Endowment Fund. ▲



How education through virtual microscopy works



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Where to drop off samples.
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Research on a novel *N. caninum* host.
- LAB UPDATE p. 8
Some mission-critical equipment we have identified.

WAKE-UP CALL! p. 1
CSU VDL participates in diagnostics confirming terrestrial rabies has returned.



MISS THE GRAND OPEN? p. 3
See highlights of the Diagnostic Medicine Center open house and dedication Sept 11.



WHICH TRICH ASSAY? . . . p. 6
VDL personnel research *T. foetus* assays.

BOVINE REPRO UPDATE . p. 7
Rocky Ford Director Jim Kennedy updates BVD PI and Trich testing results.



VDL IN PRESS p. 8
Review the best of our team's published research results.

IMAG(IN)E THIS! p. 11
Computer-based virtual microscopy opens up new horizons for education, research.



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Update from the Director

Welcome to this issue of *Lab Lines*. The most exciting news since the last edition is the grand opening of our new facilities. Thanks to the support of our clients, our external advisory committee, producer groups, the Colorado Veterinary Medical Association, the CSU system board of governors and the state legislators, we are looking forward to great accomplishments to come in our new facilities. Here's why:

- It permits us to maintain our accreditation from the American Association of Veterinary Laboratory Diagnosticians, which allows us to continue as one of 12 USDA National Animal Health Laboratory Network core labs with expanded BSL3 laboratory space. We can do surveillance testing to protect agriculture from BSE, Vesicular Stomatitis, Avian and Swine Influenza, Chronic Wasting Disease and others. We can now fulfill our role in CDC's Laboratory Response Network and test for zoonotic diseases, including bioterrorist agents.

- With the new flexible space, we can expand services covering a multitude of disciplines and species to meet the needs of all our clients. We now have room for more modern equipment and increased personnel to conduct



**BARBARA POWERS,
DVM/PHD/DACVP
DIRECTOR**

testing for bacteria, viruses, parasites, toxins, cancer, nutritional deficiencies, trauma, developmental abnormalities and more.

- This facility gives us room to expand our teaching mission. We now have room to offer hands-on educational experience to address the critical shortage of veterinarians, professionals and qualified technical staff in diagnostic laboratory medicine. We can now adequately educate post-graduate veterinarians and veterinary students, as well as undergraduates. Plus, we now have room to perform research, develop and validate new

diagnostic tests, investigate new and emerging diseases, and assist others in their research.

Even though we have this wonderful and beautiful new facility, the hard work, dedication and expertise of its inhabitants—our faculty, staff and students—remains key in providing quality and timely service with a smile. ▲

**LAB
NEWS**



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Watch for great
accomplishments ahead
from CSU VDL's
expanded,
state-of-the-art
facilities.

Barbara E. Powers