

# Colorado State University Veterinary Diagnostic Laboratory



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## **O Letter from the Director, Barbara E. Powers, DVM/PhD**

**W**elcome to the first issue of "LabLines" from the Colorado State University Diagnostic Laboratory. LabLines is a bi-annual publication updating you on developments in the Laboratory, as well as informing you of disease trends. This edition of LabLines provides information on who we are and what we do.

The Laboratory has gone through many changes. On July 1, I became director of the Laboratory. In the Microbiology section, we appointed new section heads for virology, Dr. Jim Collins, and bacteriology, Dr. Claudia Gentry-Weeks.

Another major change is that the pathology services of the Diagnostic Laboratory and Department of Pathology are now combined. The Diagnostic Laboratory is now responsible for ensuring excellence in service for all users, including the Veterinary Teaching Hospital. This merger allows the workload to be spread over a larger number of pathologists, increasing efficiency of the Laboratory. It also allows for more interaction between a larger number of pathologists, increasing quality of diagnosis. The merger further provides excellent teaching material for professional veterinary medical students and pathology residents who previously did not have access to Diagnostic Laboratory case material. Because of the merger, the Diagnostic Laboratory director now reports to Dr. Tony Frank, head of the Department of Pathology. Dr. Frank is enthusiastic about being a part of the Diagnostic Laboratory. Here, field cases spawn new research projects, classic teaching formats meet "the real world," and research advances and expertise impacts significant disease problems of companion animals and animal agriculture within Colorado, the region, and beyond.

As director, my main goal is to maintain and improve quality and timely service to all of our users. Other goals are to work toward rapid development and incorporation of new technologies into disease diagnosis, and to improve the quality of education of our veterinary students and residents. I appreciate your continued support of the Diagnostic Laboratory and am enthusiastic about facing the challenges of being the director of this Laboratory. We have an excellent professional staff dedicated to high-quality service. I encourage any comments or suggestions from you, our users. We all wish to make the Colorado State University Diagnostic Laboratory a top quality laboratory where excellence in service to our users is our prime mission.

Barbara Powers

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The Diagnostic Laboratory is composed of closely integrated sections, each playing a vital role to provide you with complete and timely results. For any information regarding laboratory results or information concerning the following sections, please call 970-491-1281. For more information, we also have a User's Guide available or visit us on the worldwide web at <http://www.vetmed.colostate.edu/dlab>.

## CLIENT SERVICES SECTION

The client services section of the Diagnostic Laboratory serves as a vital link in the communication between the various sections of the laboratory and you--our client. This section is responsible for accessioning and routing samples, data entry of cases, billing and general reception for clients, both in person and over the phone. We send and track samples referred to other laboratories. The staff of the client services section helps with any and all of the following--prices, sample requirements or appropriateness, reporting of results, shipping options, expected result times, referral tests. The staff also handles requests for any supplies needed such as our User's Guide, forms, histopathology mailers, federal express airbills, media, and others.

Jay Kammerzell is the business manager and Carrie Schmer is the office manager. Nancy Ault, Tina Sund, Sherrie Henderson and Angie Baldivia staff the office. Mary Lindburg, Lisa Monzingo and Elaine Andersen handles transcription of dictated pathology cases.

## PATHOLOGY SERVICES

The pathology section is composed of a necropsy service and a biopsy/histopathology service. Nine pathologists rotate on-duty through the services and frequently consult with each other regarding cases. Information regarding treatment options is available from the clinicians at the VTH. All pathologists are board certified and members of the American College of Veterinary Pathologists. These pathologists are: Drs. Dale Baker, Gary Cockerell, Tony Frank, Dan Gould, Bob Glock, Robert Norrdin, Barb Powers, Patricia Schultheiss, and Terry Spraker.

### Necropsy Service

The necropsy service provides diagnostic pathology support for all users, including the Veterinary Teaching Hospital (VTH), who have animals that die or are euthanized. Another important function is training veterinary students and pathology residents in diagnostic pathology. The section head is Dr. Dan Gould. The necropsy laboratory coordinator is Dennis Madden, assisted by Lee DeBuse.

We perform necropsies daily, including weekends. Non-VTH cases should be submitted through the client services section of the Diagnostic Laboratory or, on weekends/holidays, through the emergency desk of the VTH. The necropsy service for VTH cases is concentrated in the morning in order to provide maximal teaching value.

For all cases, we report the gross findings the day of the necropsy by telephone or VTH mail. For non-VTH cases, we telephone or fax updates as laboratory findings become available. A final report is usually generated within a week. For VTH cases, which involves both the resident-in-training and the supervising pathologist, the final report is available within four weeks.

### Biopsy and Histopathology Service

This section provides diagnostic service for evaluation of biopsy specimens from live animals as well as histopathologic analysis of tissues sent in from field necropsies. This may include submissions for histopathology in conjunction with bacteriology, virology, parasitology and/or toxicology and include interpretation of the results by the coordinating pathologist. The section head is Dr. Barb Powers. Assistants who process samples are Lee DeBuse and Judi Tuffield; and histotechnicians Frank Aquino, Yang Sun Shin, Maryanne Tryjan, and Robert Zink (histology supervisor). A wide variety of special stains, including immunohistochemical staining is available.

A Federal Express courier service is available that will pick-up specimens at your hospital and provide next-day delivery is available. We provide Formalin-filled containers and pre-labeled mailers for your convenience. Tissue specimens arriving at the laboratory by 3:00PM are processed overnight and slides are ready for interpretation by the pathologist on duty the following day. We fax or phone biopsy results usually within 24 to 48 hours. If you need results as soon as possible, please do not hesitate to call, as preliminary results may be available before the cases are dictated or transcribed.

Cases with ancillary testing (microbiology/toxicology, and others) take longer but preliminary histopathologic results are available within 24 to 48 hours. Consultation with the original pathologist is always available as is review of difficult or confusing cases by a second pathologist.

## BACTERIOLOGY SECTION

The bacteriology section is responsible for isolating and identifying bacterial and fungal pathogens from a variety of specimens including tissues, feces, and urine. Specimens may be taken at necropsy or from live animals. We test bacterial pathogens isolated from clinical specimens for susceptibility to a panel of antibiotics, specific for companion

animals or food animals to provide information useful for treating the disease. We also perform immunological assays for measuring immunoglobulin levels and for detecting antibodies in patient serum specific for bacterial and fungal pathogens.

The bacteriology section is composed of a dynamic team of individuals; Dr. Claudia Gentry-Weeks (section head), Dr. Robert L. Jones (assistant section head), Cindy Hirota, Mike Jessen, Barbara McClelland, Jean Muirhead, Gayle Thompson, and Denise Bolte. All work together to identify pathogens and report results, develop new methods, and assure quality results.

We process bacterial and fungal specimens in the afternoon of the day of receipt. Aerobic bacteria usually require 2-4 days for identification and antibiotic susceptibility testing, while anaerobic cultures usually require 4-7 days for completion of identification. Certain bacterial and fungal pathogens may take longer to grow and identify. We phone or fax results of identification and antibiotic susceptibility tests upon completion. Dr. Gentry-Weeks or Dr. Jones are available for consultation on cases that are challenging or confusing.

## VIROLOGY SECTION

The virology section is responsible for analysis of specimens to obtain evidence of viral infection. Specimens from live animals may include nasal or ocular secretions, feces, and blood or tissue(s) from a suspected viral lesion. In addition, we test serum (paired, when possible) for the presence of antibodies to a panel of viruses for a retrospective diagnosis. Success in diagnosis often is better using specimens from live animals. However, we frequently perform tests on samples taken at necropsy. Dr. Jim Collins (section head) and Dr. Gary Cockerell (assistant section head) supervise the virology section. Jane Carman, Anita Schiebel, Kathi Wilson and Tracy Vermedahl comprise the technical staff. The section offers diagnostic testing for the major viruses of cattle, horses, dogs, and cats, and selected testing for viruses of pigs, sheep, wildlife, and llamas. The staff work together to perform the most appropriate diagnostic tests. These may include isolation of virus (VI); detection of viruses using fluorescent antibody (FA), PCR, ELISA, electron microscopy (EM), or immunoperoxidase (IP); and serology. Several of these analyses including FA, EM, ELISA are performed as rapid tests with short turnaround time. We make every attempt to provide reports with useful interpretations relevant to the individual case history. We transmit reports to the submitters by telephone, fax, or email as soon as they are completed. For case consultation, the technical staff and Drs. Collins or Cockerell are available by telephone.

## CHEMISTRY/TOXICOLOGY SECTION

The chemistry/toxicology section is comprised of Dr. Dwayne Hamar (section head) and Cathy L. Bedwell (chemist). This section provides a variety of chemical analyses to aid in the diagnosis of an animal's nutritional status. Trace- and macro-mineral analyses are available from biological tissues such as blood, serum, bone, kidney, and liver, as well as feeds, mineral supplements, water, and forages. We analyze small liver biopsies for most trace- and macro-nutrients. Copper, selenium, and vitamins A and E analyses are the most requested nutritional tests.

Several chemical tests for diagnosing toxicoses are available. Analyses often requested include strychnine, arsenic, nitrate, mercury, lead, and acetylcholinesterase. We perform these tests on biological tissues, vomitus or stomach contents, feeds, and suspected baits. Other available tests include canine serum bromide analysis and qualitative analysis of bladder calculi.

We provide interpretive diagnostic information with every analysis. With cases involving wild or exotic animals where little nutritional research has been published, we give diagnostic information from other species for comparison. Dr. Hamar or Cathy are always available to discuss with you the data and possible interpretations.

## PARASITOLOGY SECTION

The parasitology section is responsible for identifying external and internal parasites from skin scrapings, feces, blood, aspirates, and tissues. Dr. John Cheney (section head), is the parasitologist and Glenda Taton-Allen, MS, is a microbiologist. Together, these two analyze all samples, conduct research, and teach several parasitology classes throughout the year.

A study just being completed by this section is a heartworm survey of 2,500 blood samples from dogs living along the Front Range of Colorado. Another study we are analyzing is examination of the prevalence of *Cryptosporidia* in cats. A study in progress is examining the prevalence of *Giardia* and *Cryptosporidia* in normal horses.

Samples for parasitology may be brought directly to the Diagnostic Laboratory or sent by mail. We phone, fax or mail results. Dr. Cheney or Glenda are available to answer questions or consult with clients about specific parasitologic problems.

## FIELD INVESTIGATION UNIT

The field investigation unit (FIU) is a recently formulated service resulting from need to provide outreach services to investigate unusual or difficult animal health problems. The unit has a special interest in emerging problems or problems of broad concern. This unit is based in the Veterinary Clinical Sciences Food-Animal Medicine Group and the Diagnostic Laboratory. We incorporate expertise from the entire Colorado State University campus when appropriate. The coordinator of this unit is Dr. Bob Glock.

Veterinarians with perplexing or unusual animal health problems may request assistance. The FIU establishes communications and conducts field examinations as deemed appropriate. These will usually involve some reimbursement from affected clientele, but may include investigations that go beyond the scope of what the individual animal owner can afford. Ultimately, the intent is for some of these investigations to develop into more extensive research efforts that may produce adequate funding and resources to provide useful recommendations.

Anyone interested in using the services of the FIU should contact the Diagnostic Laboratory, Dr. Anthony Knight in Clinical Sciences, Dr. Glock, or other faculty at the VTH.

## ENDOCRINOLOGY & SPECIALIZED SEROLOGICAL SECTION

The endocrinology section recently purchased a new chemiluminescent immunoanalyzer (IMMULITE), enabling us to offer a wider variety of tests that are run more frequently. We perform measurements of total T4, free T4, endogenous TSH, cortisol and therapeutic drug monitoring for phenobarbital, digoxin and gentamicin on Monday, Wednesday and Friday. We offer endogenous plasma ACTH on Fridays. Panels of above combinations of tests are also available at a discount price. Future endocrine tests will include serum PTH and insulin. Dr. Deb Greco of the VTH supervises the endocrinology section. She is available for consultation and interpretation of your results. We report results by either fax or phone, followed by a hard copy in the mail.

The specialized serological services section offers serum, aqueous humor, and CSF *Toxoplasma gondii* antibody testing for dogs and cats, as well as serum antibody testing for canine Rocky Mountain Spotted Fever and Lyme disease. Dr. Mike

Lappin of the VTH supervises this section. We perform these tests on Tuesdays and Thursdays with same-day read out of results providing the sample is submitted by 12:00PM on the day before testing. We report results by either a fax or phone call. A hard copy is sent by mail.

## CLINICAL PATHOLOGY

The clinical pathology section is a part of the Department of Pathology that is housed in the VTH. Routine clinical pathology analysis such as CBC, small and large animal chemistry panels, urinalysis, cytology interpretations, and specialized analyses are available. The section head is Dr. Duane Lassen. The Diagnostic Laboratory can route your samples to the clinical pathology section and the clinical pathologist on duty can provide you with assistance in interpretation of your laboratory results.

## ROCKY FORD LABORATORY

The Rocky Ford Branch Laboratory provides services that include pathology, microbiology, serology, and limited chemistries such as nitrate, calcium, phosphorus, BUN, GGT, prussic acid, and others. We refer tests that are not performed here to the Fort Collins Laboratory. The Laboratory has three full-time employees -- Dr. Charles Dickie (director and pathologist), Linda Tomky, and Peggy Schweizer. Part-time personnel are Nancy Butler, Carol Knudsen, Loxi Proctor, Raymond Montanez, Clara Fosdick, and Deborah Elmore.

The Laboratories most compelling interest is the day-to-day challenge of helping solve problems and providing service for the livestock industry. Personnel in the laboratory are available for consulting and provide results as soon as they are available.

## WESTERN SLOPE LABORATORY

The Western Slope Branch Laboratory, located in Grand Junction, provides diagnostic services in anatomic pathology, bacteriology, selected serologies, and limited tests in other disciplines. We refer tests that are not performed here to the Fort Collins Laboratory. Dr. Darrell Schweitzer (director) handles pathology specimens, John Rhodes handles bacterial cultures, and Anna Mathews is the administrative assistant.

Samples submitted via US Post Office, UPS, and Federal

Express are received in the afternoon and we initiate procedures the same day. If these deliveries are in late afternoon, we set-up samples first thing the next day. Samples sent by premium handling methods are delivered in the morning. We are in close communication and any of us can be consulted concerning results on cases.

## DIAGNOSTIC LABORATORY SPECIALTIES

### Pathology

- Toxicologic pathology--Drs. Baker, Frank, and Gould
- Surgical pathology/oncologic pathology--Dr. Powers
- Dermatopathology--Dr. Schultheiss
- Poisonous/toxic plants--Drs. Dickie and Baker
- Food animal diseases--Drs. Glock, Dickie, Schweitzer, and Schultheiss
- Wildlife and exotic pathology--Dr. Spraker
- Neuropathology and ophthalmologic pathology--Dr. Gould
- Nutritional and metabolic pathology--Dr. Norrdin
- Bone and joint pathology--Drs. Norrdin and Powers
- Endometrial pathology--Dr. Powers

### Bacteriology--Dr. Gentry-Weeks and Dr. Jones

- Antimicrobial susceptibility
- Anaerobic bacteria, including Clostridial diseases
- Fungal pathogens
- Campylobacter and Mycobacteria culturing
- Fusobacterium, Salmonella and Actinobacillus-induced diseases
- Rapid identification and PCR assays for bacterial pathogens
- Testing for contagious equine metritis
- Serologic assays for *Brucella ovis* and *B. canis*

### Virology--Dr. Collins and Dr. Cockerell

- Bovine herpes viruses and Bovine viral diarrhea virus
- Malignant catarrhal fever
- Bovine respiratory viruses

- Pathogen detection in bulk milk from dairies
- Feline herpesviruses
- Bovine leukemia virus
- PCR assays for viral pathogens

### Other

- Food animal parasitism--Dr. Cheney
- Trace and macro-mineral analysis--Dr. Hamar
- Diagnostic toxicology--Dr. Hamar
- Endocrine testing and drug level monitoring--Dr. Greco
- Toxoplasmosis testing--Dr. Lappin

### EXTERNAL ADVISORY COMMITTEE

The Diagnostic Laboratory has an external advisory committee to help us in assessing our service and deciding our future directions. In addition to contacting us directly, you may contact these members with suggestions for improvement of our laboratory services. We would like to express our sincere appreciation to these individuals for their assistance in the betterment of our laboratory.

Mr. Mike Dickenson/Dairy Cattle Industry  
Mr. Ed Hansen/Beef Cattle Industry  
Dr. Lenny Jonas/Small Animal Practitioner  
Dr. Tony Knight/Dept Head Clinical Sciences  
Dr. Del Miles/Bovine Practitioner  
Dr. Michael Miller/Colorado Division of Wildlife  
Dr. Wendell Nelson/Director/Veterinary Teaching Hospital  
Dr. Ken Neuens/Equine Practitioner  
Dr. Darrell Tomky/Mixed Animal Practitioner  
Dr. David Turunjan/Poultry Consultant  
Dr. Pete Walker/Colorado Division of Wildlife  
Dr. Steve Wheeler/Small Animal Practitioner

### COMING IN FUTURE ISSUES OF CSU DIAGNOSTIC LABLINES

- New diagnostic tests for BVD
- Feline herpes by PCR
- Malignant catarrhal fever detection by PCR
- New diagnostic tests for BVD
- *Actinobacillus pleuropneumonia* identification by PCR
- Results of canine heartworm survey
- Bulk milk tank screening program
- Testing for PRRS (porcine respiratory reproductive syndrome)
- Updates on rumenal microenvironment/relation to polioencephalomalacia and atypical interstitial pneumonia

- Plant toxicities at Rocky Ford Lab
- Disease statistics
- and more.....
- LabLines is a biannual newsletter. If you have any suggestions for information to be included, or information you would like to see discussed in upcoming issues, please let us know.