

UTCVM VETERINARY MEDICAL CENTER

Diagnostic Laboratory Service

Laboratory Manual

The UTCVM Veterinary Medical Center is home to eight diagnostic laboratories: bacteriology/mycology, endocrinology, immunology, parasitology, pharmacology, virology, clinical pathology, and anatomic pathology. The faculty and technical staff in these laboratories provide vital medical diagnostic and supporting services for animals, along with cutting-edge research for the improvement of animal, human, and public health. UTCVM offers referring veterinarians accurate and timely laboratory results, phone consultations, courier pickup of samples, and special rates for FedEx shipping. Our full-service laboratories provide diagnostic services for most animal species.

The goal of the UTCVM Diagnostic Laboratory Service is to provide laboratory results with the precision and accuracy you should expect from a professional diagnostic laboratory. This manual provides general guidelines for specimen collection and submission to our specialty laboratories.

Test Results

Test results are automatically faxed to the veterinary practice. If your practice prefers to receive results by email, please call **865-974-5771** or email rdvminfo@utk.edu.

Ownership of Specimens

Submission of specimens to the UTCVM Veterinary Medical Center Diagnostic Laboratory Service signifies acceptance of a contract for test results and interpretation of results. Specimens submitted to the Service and isolates derived from them become the property of the University of Tennessee. The Service maintains the right to refer a portion of the specimen to an appropriate laboratory for additional testing. The University of Tennessee maintains the right to use the specimens for any lawful purpose, including but not limited to performing applied research and test development at the University or other collaborating institutes. Return of specimens to the submitter is determined on a case by case basis and will incur charges related to shipping, handling, and materials cost.

Hours of Operation

Monday – Friday, 8:00am – 5:00pm, Eastern Time Zone

Saturday Morning – Clinical Pathology and Bacteriology/Mycology operates with limited staff.

Holiday Closures

UTCVM Diagnostic Laboratory will be closed on the following days:

New Year's Day
Martin Luther King, Jr.
Spring Holiday (Good Friday)
Memorial Day
Juneteenth
Independence Day
Labor Day
Thanksgiving - Thursday & Friday
Christmas Day

Laboratory Phone Numbers

Bacteriology/Mycology	(865) 974-5639	Parasitology	(865) 974-5645
Anatomical Pathology (Biopsy/Necropsy)	(865) 974-5673	Pharmacology	(865) 974-5646
Clinical Pathology (Chemistry, Cytology, Hematology & Urinalysis)	(865) 974-5605	Toxicology	(865) 974-5638
Endocrinology	(865) 974-5638	Virology/Immunology	(865) 974-5880
Histopathology	(865) 974-5874	Diagnostic Laboratory Service Director - Dr. Bente Flatland	(865) 974-5576

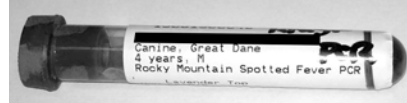
Laboratory Manual

PACKAGING & SHIPPING GUIDELINES

Label Specimen Container

The specimen should be contained in a plastic, spill-proof container or tube. Syringes and hypodermic needles should not be used as sample containers. Each primary container should be labeled with:

- Patient name
- Owner first & last name
- Specimen type
- Test
- Collection date/time



Place in Biohazard Bag

Place the primary container into a biohazard bag (or other watertight secondary container) with enough absorbent material to soak up the entire contents. If multiple samples are being included in one package, wrap or separate the samples so they do not come into contact with each other.

Complete Submission Form

A fully completed laboratory submission form should be included with the specimen. It is important that the form be kept separate from the specimen (placed in outer pouch of biohazard bag or in a separate sealed bag) to protect the form from becoming wet or otherwise contaminated. Download individual lab submission forms: vetmed.tennessee.edu/vmc/dls

Prepare Package for Shipping

Specimens that require refrigeration, including fresh blood, serum, and tissues should be sent with ice packs*. Biopsy tissues should be in 10% BNF fixative. Unfixed, air-dried slides should be packaged in a slide holder with bubble wrap. Refrigerated and room temperature samples can be shipped in the same package as long as adequate packing material is used to separate the samples. **DO NOT SHIP CYTOLOGY (OR BLOOD) SMEARS AND BIOPSY SAMPLES IN THE SAME BOX due to risk of exposing cytology/blood smears to formalin fumes. Use the smallest box possible that will adequately fit the sample.** Fill the shipping package with additional packing material to minimize movement of the secondary container during transportation.

*Dry ice cannot be used with UTCVM FedEx labels. Samples that must remain frozen during transit, i.e. Equine Endogenous ACTH, must be shipped using another courier, or with your own FedEx account.


For further instructions, please consult the FedEx "How to Pack" guidelines. https://www.fedex.com/content/dam/fedex/us-united-states/shipping/images/2020/Q3/Step_by_step_packing_instructions_1983015854.pdf

HazMat / IATA Regulations

Diagnostic specimens must be packaged and shipped in compliance with regulatory standards governing biohazardous materials for routine specimens**. See the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations <https://www.iata.org/publications/dgr/Pages/index.aspx> and US DOT 49 CFR Parts 171-180 - <https://www.fmcsa.dot.gov/safety/carrier-safety/classification-and-package-selection-hazardous-materials>. The U.S. Department of Transportation (DOT) Hazardous Materials (HazMat) Regulations, require all persons who offer or transport diagnostic specimens to comply with applicable regulations. Please do not hesitate to call the laboratories for further shipping instructions.

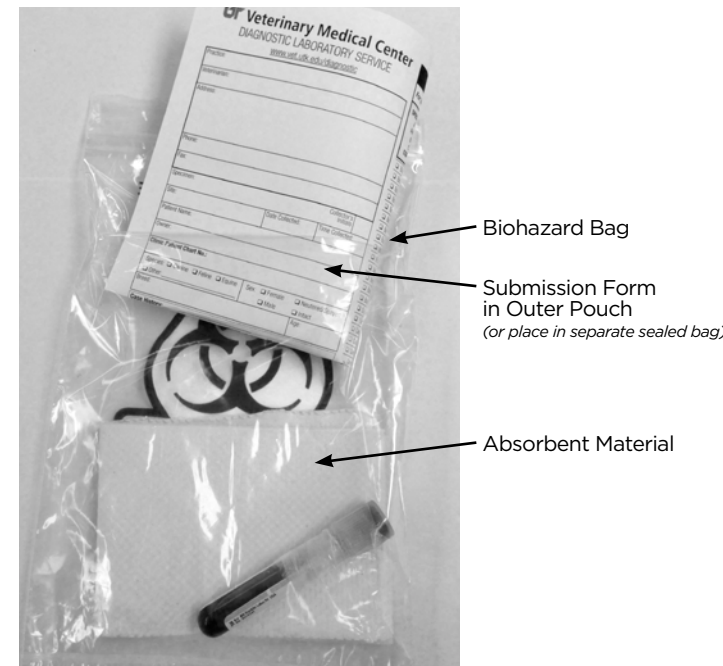
**If specimen is suspected to contain infectious agents, it is the shipper's responsibility to comply with international/US domestic shipping regulations: (https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/Transporting_Infectious_Substances_brochure.pdf)

PRIMATE SAMPLES:
Due to the potential health risk to UTCVM personnel, **primate samples are only accepted with prior approval and instruction***. Without prior approval or proper packaging, samples will be destroyed.



Call the specific lab prior to submitting. The only labs currently accepting primate samples are Anatomic Pathology (Biopsy & Necropsy), and Clinical Pathology.

**Primate samples and necropsies are NOT accepted from outside the United States.*



FedEx Discount Rate Program

Take advantage of UTCVM's discounted FedEx rates today! If you're shipping from within the Continental US, your packages can reach our lab by the next business morning. Rates vary by location, with a maximum shipping cost of \$30.00 for farther areas and less for those nearby. To find your clinic's specific discounted rate, log into the VOLVet Portal, click on FedEx labels where it's displayed at the top of the page.

865-974-5771

vetmed.tennessee.edu/vmc/dls

General Shipping Instructions

- Login to your VOLVet Portal account: tiny.utk.edu/VOLVetPortal
- Refer to our packaging and shipping guidelines before sending samples.
 - » A package with UTCVM's FedEx priority overnight label must weigh less than 3 pounds and be in a small box (recommended box size: 8"x 8" x 8" or smaller).
 - » For each package, FedEx calculates a "rated weight" based on the actual box weight and dimensions. If the "rated weight" exceeds 3 pounds, additional shipping charges will be assessed. Any shipping charges more than your clinic's discounted FedEx rate will be added to your monthly invoice.
 - » To avoid additional shipping charges, we strongly recommend:
 - Using only one small refrigerant pack
 - Ensuring the box size is 8"x 8" x 8" or smaller
 - Splitting the shipment into two or more packages
 - » Dry ice cannot be used in packages sent with the UTCVM FedEx labels
 - » Multiple specimens from multiple patients and destined for different labs can be included in a single box (< 3 pounds and in a box < 8"x8"x8")
 - **DO NOT SHIP CYTOLOGY (OR BLOOD) SMEARS AND BIOPSY SAMPLES IN THE SAME BOX due to risk of exposing cytology/blood smears to formalin fumes.**

- Each label is billed at the time of purchase. No credits will be given for unused labels. Shipping charges will be on your next monthly UTCVM invoice.
- FedEx labels are for Monday through Thursday shipments only. **Do not send samples on a Friday.** UTCVM Diagnostic Laboratory Service will not be available to receive samples on Saturdays.
- Call FedEx at 1-800-463-3339 for a pick-up or deliver your package to the nearest FedEx drop-off location. For specific FedEx collection times and local drop-off locations visit: <http://www.fedex.com/locate>

Additional Instructions for International Shipments (discounted rates vary)

The UTCVM Diagnostic Laboratory Service will accept companion animal specimens provided the material has not been inoculated with or exposed to any livestock* or poultry** foreign animal disease agent. A permit for these specimens is not required at the U.S. port of arrival. **Primate samples and necropsies are NOT accepted from outside the United States.**

Required documentation:

1. Two copies of the written statement must be submitted on producer/shipper letterhead, with one copy placed in the plastic pouch on the outside of the package and one copy between the secondary and tertiary packaging layer. For information required

Benefits of a VOLVet Portal account

- Gain immediate access to medical records of referred patients
- Look up results of diagnostic lab samples submitted by your clinic
- Receive FedEx overnight shipping labels for lab submissions at a deep discounted rate
- Request a courier service pick-up for clinics within a 45-mile radius of UTCVM
- Find detailed guidelines for patient referrals and estimates for many common procedures in the Referral Guide



in the statement refer to: <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-and-animal-product-import-information/import-live-animals/no-import-permit-reg> (Guideline 1102: Feline and Canine Material).

2. Three copies of the commercial invoice must be placed in the shipping pouch on the outside of the package to be reviewed at the U.S. port of arrival and one copy between the secondary and tertiary packaging layer. A commercial invoice will be provided with your UTCVM FedEx shipping labels.
3. For all endocrinology specimens, complete and place the USDA Biological Specimen Shipment Form (<https://vetmed.tennessee.edu/vmc/dls/Endocrinology/Documents/USDA-PortEntryInspec.pdf>) in the plastic pouch on the outside of the package.

* Livestock is defined by USDA as both beef and dairy cattle, pigs, sheep, goats, horses, mules, asses, buffalo, and camels.
** Poultry is defined by USDA as domestic fowls, including chickens, turkeys, geese and ducks, raised for the production of meat or eggs.

UTCVM Courier Service

UTCVM offers a daily courier service for diagnostic submissions to Knoxville, TN and the surrounding areas within a 45-mile radius. In addition to lab samples, veterinary practices may submit MRI scans, ultrasounds, radiographs and necropsies (up to 25 lbs) to UTCVM through our courier service. For necropsies, tertiary packaging is required: inner bag, secondary bag or container with ice, outer container (cardboard or styrofoam box). Pharmacy medication orders can also be delivered to your facility by the courier service.

Request or Cancel Courier Pick-up

Submit your request through the online VOLVet Portal.

- Requests must be made by the end of business day to guarantee a next-day pickup.
- Specimens must be prepared and ready for collection prior to the courier's arrival.
- If samples are not available at the time of pick-up, a service charge will still apply.

Collection Times

Monday through Friday, daily collections begin at 8:00am and samples will be delivered to the UTCVM Diagnostic Laboratory Service by 3:00pm. Turnaround times for test results vary; please consult the specific laboratory's test directory in this manual for details.

Refer to our packaging and shipping guidelines in the Laboratory Manual before sending samples.

Courier Service Fee

Fees for the UTCVM Courier Service vary depending on the location of your clinic. When you sign in to the VOLVet Portal to submit a request the fee will be noted by your clinic name. If you are interested in signing up for the courier service, please call 865-974-5771 for more information. Charges for this service will be included on your monthly UTCVM statement.

To get started

- Register for a portal account at tiny.utk.edu/VOLVetPortal
 - A UTCVM representative will call you within 2 business days to verify your identity, clinic association, and send you an email to set up your password
 - Sign in to the VOLVet Portal using your email address and password
- Please note that multiple portal accounts can be established for veterinarians and staff within the veterinary practice but each user must have a unique email address.

If you need immediate access to the VOLVet Portal, please register first then call **865-974-5771**, Monday - Friday, 8pm - 5pm (EST).



SUBMISSION GUIDELINES

Submitting Tissues

- Containers must be labeled with the patient's name, sealed securely, and have an opening no smaller than the diameter of the jar.
- Use separate containers for separate lesions. For example, if there is a lesion on the leg and on the face, submit these in separate containers so they can be appropriately distinguished.
- There is a \$27.00 additional site charge for 4+ samples: This \$27.00 charge will not apply to submissions with multiple gastrointestinal biopsies or multiple skin samples of dermatologic conditions.
 - » Use a 10:1 formalin to tissue ratio.
 - » **DO NOT SHIP CYTOLOGY (OR BLOOD) SMEARS AND BIOPSY SAMPLES IN THE SAME BOX due to risk of exposing cytology/blood smears to formalin fumes.**
- Glass containers are not recommended as breakage can occur in transport.

Tissue Handling

- Minimize the use of electrocautery or laser surgery, as it causes artifacts that make cell identification and surgical margin evaluation extremely difficult, if not impossible.
- Handle specimens gently. Excessive squeezing of tissues (with forceps, or otherwise) also creates artifacts that make cell identification and surgical margin evaluation extremely difficult, if not impossible.

Surgical Margins

- Surgical margins can be evaluated **ONLY** in samples submitted whole without any incisions into the surgical margins. If the sample is too large to fix whole,
 - » You may cut into the surface of the skin (but the incision should not extend to the edge/margin of the sample)
 - » or you may paint the surgical margins, fix a few hours in formalin, then send the pieces you want evaluated.
- Surgical margins should not be requested on diffuse lesions (e.g. dermatitis, inflammatory bowel disease, etc.).



The specimen was too large for this container, causing the lid to not properly secure. There is no absorbent material (paper towels) inside the bag to absorb some of the leak. This specimen leaked through the bag and the box it was shipped in, causing unnecessary biohazard exposure.

Large Tissue Samples

Please do not try to formalin-fix large organ samples (spleens, limbs). These samples should be submitted **whole**, refrigerated, and delivered promptly on ice (ice packs) and without formalin.

For large skin masses:

- If you are not concerned about surgical margins, please take several representative pieces of the mass, especially at its periphery and interface with surrounding normal tissue, and submit those in formalin. **DO NOT cut into the surgical margin before inking or fixation.**
- If you are concerned about surgical margins and cannot send the entire specimen, you should paint the surgical margins, fix a few hours in formalin, then similarly select several representative pieces of the mass which include surgical margins, and submit those in formalin. **DO NOT cut into the surgical margin prior to inking or fixation.**
 - » Store any unsubmitted sample remains in house (either in formalin or refrigerated) until pathology assessment is complete.

Submitting Large Specimens

- Large soft tissue masses are often too large to fix whole.
 - » If you are not concerned about surgical margins, please take several representative pieces of the mass and submit those in formalin (discard the remaining mass).
 - » If you are concerned about surgical margins, you may paint the surgical margins, fix a few hours in formalin, then send the pieces you want evaluated. **DO NOT cut into the surgical margin prior to fixation.**
 - » Large organ excisions (spleens, limbs) should be submitted whole, refrigerated and delivered promptly without formalin.
- For limb amputations, please submit the entire limb on ice. Please try to plan ahead so that these arrive on a weekday within 24 hours of the surgery.



This specimen may have fit into the jar unfixed, but formalin will make tissue "rubbery" and difficult to remove. The container below had to be sawed open. This made it difficult for the pathologist to orient and trim.

Small & Medium-sized Tissue Samples

- Label the container with the patient's name (First and Last) and biopsy site. If there are multiple sites, ensure each site is written on the corresponding container.
- Tissue samples should be placed in 10% neutral buffered formalin with a 10:1 formalin to tissue ratio; however, there should be at least a 1cm gap between the formalin and the lid.
- Only use screw-top lids to avoid leaks. **Never send formalin in glass, food containers, zip-lock bags, prescription pill bottles, test tubes, etc. (These are prone to leaking).**

NOTE: Tissue SWELLS in formalin. Narrow-neck containers (e.g. pill bottles, and food containers) cause the tissue to get stuck. Forcing tissue removal or using machinery to cut open the bottle can damage the tissue and be a safety hazard for staff.

- Make sure the lid is tight.
- Double bag samples.
- Put absorbent material (paper towels, absorbent packs, etc.) in the primary bag in case of a leak.
- Never seal the submission form in with the sample. If using a biohazard "zip-lock" bag, place the form in the designated pocket on the outside of the bag or bag separately.
- Never forcefully fit samples into a container.
- To help ensure samples will not leak in transit, invert them. If it leaks, please re-secure the lid or use Parafilm.

Submitting Bone

Specimens containing bone (digits, mandibles etc) will require decalcification after formalin fixation. This can result in a delay in processing the tissues and finalizing the report.

Surgical Marking Ink

This can be accomplished with fixed tissues after receipt, but applying ink before fixation often gives superior results.

- Hints for applying the surgical ink:
 - » Blot the surface to be inked so that it is dry.
 - » Apply the ink with a cotton swab and let it air dry for 3-5 minutes prior to placing the specimen in formalin.

Submitting Field Necropsies (Bottle Necropsies)

- Occasionally due to transportation or shipping limitations, a field necropsy may need to be performed by a licensed veterinarian.
- Gross description of necropsy findings, relevant clinical history, and post-mortem interval (time between death and necropsy) are desired.
- Representative sections (no larger than 1cm in thickness) should be obtained from all organs of interest for formalin fixation.
 - » Use a 10:1 formalin to tissue ratio.
- Fresh tissues can also be submitted for ancillary testing

(bacteriology, virology, parasitology, etc.). If specific tests are desired, please indicate on the form. Otherwise, ancillary testing will be performed at pathologist discretion.

- » Specimens should be submitted fresh on ice (preferred) or frozen.
- All organs sectioned should be written on the submission form.
- Non-State Contract Cases: There is a \$27.00 additional site charge for 4+ samples.



Proper shipping materials include a biopsy container, secondary container, biohazard bag, absorbent tissue, ice pack, foam insert to protect sample in transit, and a properly sized box.

Shipping Samples

- Only use screw-top lids to avoid leaks. Never send formalin in glass, food containers, zip lock bags, prescription pill bottles, or test tubes etc.-these are prone to leak.
- Double bagging samples is preferable.
- Put absorbent material (paper towels, absorbent packs, etc.) in the primary bag in case of a leak.
- Fill the space in the box with a packaging material (bubble wrap, paper towel, packing peanuts, etc.) to protect the sample during transit.
- Never seal the submission form in the same bag as the sample. If using a biohazard "zip-lock" bag, place the form in the designated pocket on the outside of the bag or bag separately.
- Formalin is a toxic chemical and should be handled with care.**
- Large organ/limb submissions should be triple-bagged, placed in a Styrofoam container with ice packs, sealed, placed in another box (fill space with packaging material if needed), and shipped overnight M-Thur. Do not add formalin. Saline-soaked gauze is fine.



STATE CONTRACT NECROPSY DISPOSAL FEES

All necropsy charges for cattle, buffalo, sheep, goats, and production poultry that are located in Tennessee are covered by the State of Tennessee contract. Fetuses and placentas also fall under this contract. Production poultry are defined as chickens and domesticated geese, ducks, guinea fowl, peafowl, pheasant, ostrich, emu, and rhea. Native wildlife, including migratory waterfowl, and those housed at zoos, rescues, and sanctuaries are not included in this contract.

The State Contract Submission Form (<https://tiny.utk.edu/StateNecropsyForm>) should be completed and signed by the referring veterinarian. The state contract does not cover biopsies.

Effective November 1, 2018, owners are required to pay a disposal charge at the time of presentation of their animal for state contracted necropsy. Disposal charges are based on the age of the animal at the time of necropsy registration at the Large Animal Receiving Desk. Necropsy examination (gross/microscopic) and routine ancillary tests deemed necessary by the duty pathologist will continue to be free under the state contract. Fetuses and placentas also fall under the state contract but will incur a disposal charge.

NOTE TO REFERRING VETERINARIANS: For you to maintain your client interaction in the State supported program you, as the referring veterinarian, will need to provide a State Contract Submission Form. In addition, the individual submitting the deceased animal (owner, agent, veterinarian, etc.) will be required to pay for the estimated disposal charges at the time of presentation. These charges are based on the age of the animal supplied at the time of presentation.

ANIMAL TYPE	AGE	PRICE
CATTLE	< 1 month	\$26.00
	1 - 12 Months	\$73.00
	Over 1 Year - cow/steer	\$240.00
	Over 1 Year - bull	\$360.00
GOATS	Up to 12 months	\$21.00
	Over 1 Year	\$42.00
GOATS - PYGMY/DWARF	Fetus - adult	\$11.00
SHEEP	< 1 Month	\$16.00
	1 - 12 Month	\$37.00
	Over 1 Year	\$48.00
PRODUCTION POULTRY	Any age	\$16.00

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
Biopsy	No additional charge for up to 3 sample sites from the same patient regardless of size. Includes bone decalcification, large specimens, large bones, and comprehensive surgical margin evaluation.	10% BNF (Buffered Neutral Formalin) Formalin to tissue ratio is 10:1. Container needs to be labeled with patient ID and specimen type.	3-5 business days for routine assessment, add an additional 1-3 business days for special stains. Decalcification, large specimens, unfixed tissue, and bones may take longer.	\$130.00
Biopsy - Additional STAT fee	Same as Biopsy except results have a 24 hour + faster turn-around than routine biopsies.	Must have "STAT" written on top of the biopsy request form in big letters. 10% BNF (Buffered Neutral Formalin) Formalin to tissue ratio is 10:1. Container needs to be labeled with patient ID and specimen type.	24-30 hours for verbal report of H&E stained slide	\$36.00
Additional charge for 4+ samples	Additional sample charge does not apply to gastrointestinal biopsies & dermatologic skin samples. Each additional sample is considered 1 site.	10% BNF (Buffered Neutral Formalin) Formalin to tissue ratio is 10:1. Container needs to be labeled with patient ID and specimen type.	3-5 business days for routine assessment, add an additional 1-3 business days for special stains. Decalcification, large specimens, unfixed tissue, and bones may take longer.	\$27.00 per site
Field Necropsy (Bottle Necropsy)	Necropsies performed by the referring veterinarian can be submitted. Formalin fixed tissues will be used for histopathology. Fresh/frozen tissues will be utilized for ancillary testing. A final necropsy report (histopathologic findings only) will be available within 7-10 business days for routine assessment. Special stains will add an additional 1-3 business days.	Complete and sign Field Necropsy Request form. For histopathology: 10% BNF (Buffered Neutral Formalin). Formalin to tissue ratio is 10:1. Container needs to be labeled with patient ID and specimen type. • For ancillary testing (bacteriology, virology, etc.), please submit fresh tissues kept on ice (preferred) or frozen. • Toxicologic testing is not included under the state contract.	7-10 business days for routine assessment, add an additional 1-3 business days for special stains	Non-State Contract Histopathology (up to 3 tissues): \$130 for 4+ samples: add \$27 Ancillary Testing: Varies (see other sections of manual)
Necropsy	Necropsies can be performed on the patients from referring veterinarians with the final necropsy report in 4-6 weeks. Gross necropsy findings will be phoned or e-mailed to the referring veterinarian within 48 hours.	Complete and sign necropsy request and body disposal release forms.	Verbal gross necropsy findings within 48 hours; final necropsy report within 4-6 weeks	Call Lab

*Primate samples and necropsies are NOT accepted from outside the continental United States.

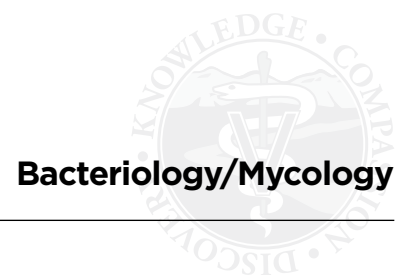
Bacteriology/Mycology



865-974-5639 FAX 865-946-1788

bacteriology@utk.edu

vetmed.tennessee.edu/vmc/dls/bacteriology



SUBMISSION GUIDELINES

- Select sample from a site that is expected to be most representative of the infection.
- Aseptically prepare cutaneous collection sites with a quick acting and tissue penetrating antiseptic (e.g. povidone-iodine) followed by a 70% alcohol swab/wipe. Avoid use of chlorhexidine or benzalkonium chloride for this purpose, especially from multiuse containers, as they may become contaminated.
- Transport samples to the laboratory, with appropriate containment and packaging, as soon as possible.
- Inform the lab if the animal is being treated with antimicrobial drugs and if patient is immuno-compromised.
- Inform the lab of the animal's age, production type and species. This may affect culture interpretation and selective reporting of antimicrobial susceptibility results.
- All specimen containers must be labeled with the patient name, clinic # or owner, body collection site, and date on container. Include history and patient demographic information on referral form.
- Results of Gram stains or other microscopic exams can often be made available the same day the specimen is received, if requested. Microscopic exams may be requested as separate tests and are performed routinely on most culture requests.
- Short-term refrigeration is acceptable (and preferred) for most specimens. Organisms that may not survive freezing or refrigeration include some anaerobes, fastidious respiratory pathogens, zygomycetous fungi, and Pythium insidiosum.

SPECIMEN TYPE & COLLECTION INFORMATION

SPECIMEN SOURCE	COLLECTION DEVICE	SPECIMEN PREPARATION AND COLLECTION	TYPICAL TESTS THAT MAY BE APPLICABLE
Abscess or Wound, Skin biopsy	Culture swab plus gel or sterile tube	Aspirate fluid, pus, or punch biopsy. No saline needed.	Aerobic Culture, Anaerobic Culture, Fungal Culture Dermatophytes only, Mycobacterium Culture, Mycoplasma Culture, Wound Panel
Blood	Blood culture bottles or green top tubes	Wash venipuncture site with antiseptic soap; rinse with sterile water. Apply povidone-iodine; let dry. Remove iodine with 70% alcohol (use same procedure to sterilize stopper on collection tube); draw blood into sterile syringe. Change needle to inoculate collection tube.	Blood Culture (includes aerobic and anaerobic)
Cerebrospinal Fluid	Sterile tube	Aseptically prepare site. Avoid blood contaminated specimen.	Aerobic Culture, Fungus Culture, Mycobacterium Culture, Fungal Antigen Tests (specify which)
Synovial Fluid	Sterile tube, blood culture bottle, or tube containing SPS or heparin anticoagulant	Aseptically prepare site. May collect in syringe rinsed with heparin or if in sufficient volume, place in blood culture tube or tube containing SPS or heparin.	Aerobic Culture, Mycoplasma Culture, Fungus Culture
Ears	Culture swab plus gel	Remove superficial debris; collect swab from deep within external canal	Aerobic Culture, Anaerobic Culture
Eyes	Culture swab plus gel	Suppurative material from conjunctival sites or material from corneal scrapings	Aerobic Culture, Anaerobic Culture Mycoplasma Culture, Fungal Culture
Feces	Sterile tube or container	Avoid contamination with urine or soil.	Specify individual agent or combinations desired: (Salmonella, Clostridium, Campylobacter, GI Panel)
Nail, Skin Scraping, Hair	Sterile tube or container	Clean to remove superficial debris. Use sterile blade to scrape active border of lesion. Hairs should include follicular end.	Fungal Culture, Fungal Culture Dermatophytes only
Nasal or Sinus	Culture swab plus gel or sterile tube	Clean to remove superficial debris. Collect representative aspirate or swab.	Aerobic Culture, Anaerobic Culture, Fungus Culture, Mycoplasma Culture, Respiratory Panel
Tissue (from normally sterile body sites)	Sterile tube or container	Aseptically prepare collection site. Tissue or aspirate preferred (culture swab plus gel acceptable for exudates).	Aerobic Culture, Anaerobic Culture, Mycobacterium Culture, Mycoplasma Culture, Campylobacter Culture, Fungal Culture
Urine	Sterile tube	Cystocentesis recommended; transfer from syringe to sterile tube. Refrigerate urine sample. Specify collection method.	Leptospira tests, Urine Culture Fungal Antigen Tests (Send-out tests, specify agent (Aspergillus, Histoplasma, Blastomyces, Coccidioides))
Milk	Sterile tube or container		Milk Culture
Serum	Sterile tube	Separate serum from clotted blood. Avoid hemolysis.	Brucella canis Antibody, Cryptococcus Antigen ELISA, Fungal Antigen Tests (send-out tests, specify agent- Aspergillus, Blastomyces, Histoplasma, Coccidioides), Leptospira tests

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
MICROSCOPY/STAINS				
Acid Fast Stain		May submit tissue sample or dried impression smear on glass slide	1 Bus. Day	\$25.00
Fungal Microscopy	KOH, Calcofluor, or India ink		1 Bus. Day	\$29.00
Gram Stain		May submit tissue sample or dried impression smear on glass slide	1 Bus. Day	\$24.00
INDIVIDUAL CULTURE AND ANTIMICROBIAL SUSCEPTIBILITY TESTING				
Aerobic & Anaerobic Culture	Includes Gram stain and MIC (when appropriate)	See general specimen collection and submission guidelines	Cultures with no growth held for 5 days; longer incubation required for specified organisms	\$99.00
Aerobic Culture	Includes Gram stain and MIC (when appropriate)	See general specimen collection and submission guidelines	Average 3-5 Bus. Days	\$71.00
Blood Culture (single)	Includes aerobic and anaerobic culture and susceptibilities on aerobes (when appropriate) Refer to Bacteriology Submission Guidelines. Call Lab	Blood culture bottles or green top tubes. Must be submitted within 24 hours. Inquire for special case alternatives	Cultures with no growth held for 7 days; longer incubation required for specified organisms	\$93.50
Blood Culture (set of two)	Each sample collected from different sites with 30-60 minutes apart. Includes aerobic and anaerobic culture and susceptibilities on aerobes (when appropriate) Refer to Bacteriology Submission Guidelines. Call Lab	Blood culture bottles or green top tubes. Must be submitted within 24 hours. Inquire for special case alternatives	Cultures with no growth held for 7 days; longer incubation required for specified organisms	\$121.75
Blood Culture (set of three)	Each sample collected from different sites with 30-60 minutes apart. Includes aerobic and anaerobic culture and susceptibilities on aerobes (when appropriate) Refer to Bacteriology Submission Guidelines. Call Lab	Blood culture bottles or green top tubes. Must be submitted within 24 hours. Inquire for special case alternatives	Cultures with no growth held for 7 days; longer incubation required for specified organisms	\$150.75
Brucella Culture	Hepranized blood for detection of Brucella canis. Call Lab	Green top tube	3-5 Bus. Days	\$58.25
Campylobacter Culture	Fecal screen for C. jejuni or abortion/venereal screen for C. fetus/C. jejuni and related organisms	Fresh feces or tissue, must keep sample refrigerated	3-5 Bus. Days	\$40.50
Fecal Clostridium Culture	Selective screening primarily for C. perfringens/ C. difficile	Fresh feces, may be refrigerated or frozen	3-5 Bus. Days	\$32.25
Fecal Culture, Avian and Exotic	Screen for other misc. pathogens such as Rhodococcus, Shigella, K99 E. coli, Yersinia and Citrobacter rodentium. Must specify which. Includes Salmonella screen.	Fresh feces, may be refrigerated	3-5 Bus. Days	\$60.25
Fecal Salmonella Culture	Salmonella screen only	Fresh feces, may be refrigerated	3-5 Bus. Days	\$35.25
Fungal Culture	Includes fungal microscopy when appropriate	Various tissues and body fluids, culture swab not recommended, see general specimen collection and submission guidelines	Fungal cultures with no growth held for 5 weeks	\$59.00
Fungal Culture Dermatophytes only	Screen for common dermatophytes	Hair or skin scraping	Dermatophyte cultures with no growth held for 3 weeks	\$39.50
Fungal Susceptibility	Contact lab for information regarding this test		Prior Authorization Required	
Listeria Culture	For detection of Listeria	Recommended liver, uterine, or brain stem tissue	3-5 Bus. Days	\$58.25
Milk Culture	Includes susceptibilities (when appropriate)	1.0 mL	3-5 Bus. Days	\$24.00
Mycobacterium Culture	Includes acid fast stain	Various tissues, culture swab not recommended see general specimen collection and submission guidelines	Cultures with no growth held for 6 weeks	\$59.25

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
Mycobacterium Susceptibility for Rapidly Growing AFB and Aerobic Actinomycetes	Contact lab for information regarding this test	Prior Authorization Required		
Mycoplasma Culture	Various tissues and body fluids	Cultures with no growth held for 10 days	Cultures with no growth held for 10 days	\$58.25
Urine Culture	Includes Gram stain and MIC (when appropriate)		Cultures with no growth held for 3 days	\$54.00
CULTURE PANELS AND ANTIMICROBIAL SUSCEPTIBILITY TESTING				
Aerobic/Anaerobic/Fungal Culture	Combination test including stains and bacterial MIC (when appropriate)	See individual tests	3-7 days for bacterial culture, up to 6 weeks for fungal culture	\$139.25
Aerobic/Anaerobic/Mycoplasma Culture	Combination test including stains and bacterial MIC (when appropriate)	See individual tests	3-7 days for bacterial culture, up to 10 days for mycoplasma culture	\$135.25
GI Panel	Includes Aerobic, Anaerobic, Listeria, and Campylobacter	Fresh feces or tissue, must keep sample refrigerated	3 - 5 Bus. Days	\$125.75
Respiratory Panel	Includes Aerobic, Anaerobic, Mycoplasma, and Fungal cultures, stains and two MICs	See individual tests	See individual tests	\$185.00
Wound Panel	Includes Aerobic, Anaerobic, Mycoplasma, Fungal, and Mycobacterium cultures, stains and two MICs	Aspirate or tissue	See individual tests	\$229.75
SEROLOGY/MOLECULAR/MISCELLANEOUS				
Aspergillus Antigen EIA	For Aspergillus Galactomannan Antigen EIA Price includes shipping. Send-out test	1.0 ml serum, plasma, CSF, urine, BAL	3 bus. days	\$110.25
Blastomyces Antigen EIA	For Blastomyces dermatiditis antigen Price includes shipping. Send-out test.	1.0 ml serum, plasma, CSF, urine, BAL	3 bus. days	\$110.25
Brucella canis Serology	Brucella canis antibodies. Includes agglutination and AGID. Send-out test.	1.0 mL serum	3-4 Bus. Days	\$84.25
Cryptococcus Antigen	ELISA for capsular antigen	0.5 ml serum or CSF	1-2 Bus. Days	\$63.50
Histoplasma Antigen EIA	Histoplasma Antigen EIA Price includes shipping. Send-out test.	1.0 ml serum, plasma, CSF, urine, BAL	3 bus. days	\$110.25
Leptospira Direct Immunofluorescence	This test is suitable for cattle herd screening. Will perform fluorescent antibody test using polyclonal antibodies. Sensitivity- Moderate	0.5 mL blood, 1 mL urine, or 1-2 inch necropsy sample from liver and kidney tissue	1 - 3 Bus. Days	\$16.75
Leptospira Panel (PCR only)	Lip L32 gene-based Real-Time PCR to detect DNA from pathogenic Leptospira	0.5 mL blood and 1 mL urine	1 - 3 Bus. Days	\$70.75
Leptospira Panel (Serology & PCR)	Leptospira by Real-time PCR & Leptospira Serology [any species]	0.5 mL blood and 1 mL urine for PCR PLUS 1 - 2 mL serum or plasma for Serology	Up to 7 Bus. Days	\$109.25
Leptospira PCR	Lip L32 gene-based Real-Time PCR to detect DNA from pathogenic Leptospira	0.5 mL blood, 1 mL urine, or 1-2 inch necropsy sample from liver and kidney tissue	1 - 3 Bus. Days	\$55.00
Leptospira Serology	Microscopic agglutination [any species]	1 - 2 mL serum or plasma	Up to 7 Bus. Days	\$50.00
Leptospira Large/Farm Animal Herd Screening by IFA	IFA, includes up to 15 samples	2-5 mL urine	1 - 3 Bus. Days	\$92.50
Leptospira Large/Farm Animal Herd Screening by MAT	MAT, includes up to 15 samples	1 - 2 mL serum	Up to 7 Bus. Days	\$114.50
Leptospira Large/Farm Animal Herd Screening by PCR	PCR, includes up to 15 samples	1 mL urine	1 - 3 Bus. Days	\$343.25
Organism ID PCR With Sequencing	Contact lab for information regarding this test			\$104.00



Clinical Pathology (Chemistry, Cytology, Hematology, & Urinalysis)

SUBMISSION GUIDELINES

Most tests have a one day turnaround unless we have a particularly heavy in-house workload. We do not offer STAT testing for referral specimens. All specimens must be received by NOON in order to be reported on the same day.

CBC

- Complete blood counts must be performed within 24 hours of sample collection.
- Submit a whole blood specimen in a properly filled (to the fill line) **EDTA (lavender-top)** collection tube.
- Additionally make one to two blood smears at the time of collection. We recommend using glass slides with a frosted label area. Let the smear air-dry and place in a cardboard or plastic slide holder.
- Label each specimen (including any slide holder) with TWO unique patient identifiers (e.g., pet name and owner last name, or pet name and medical record number). For blood smears, use a PENCIL to label the glass slide's frosted edge.
- Refrigerate the lavender top collection tube until drop off, courier pick-up, or shipping. **DO NOT REFRIGERATE BLOOD SMEARS.**

Coagulation Profile

- Submit specimen in a properly filled (to the fill-line) **citrate (blue-top)** collection tube
- Label each specimen with TWO unique patient identifiers (e.g., pet name and owner last name, or pet name and medical record number).
- If delivering the sample to UTCVM yourself, please call the laboratory to notify us of the specimen arrival.
- If you cannot get the specimen to our lab within 15 minutes of sampling, you must harvest the plasma: Centrifuge the specimen tube, gently remove the plasma using a PLASTIC transfer pipette (without disrupting the cell button), and place the plasma in a plain PLASTIC tube. Store plasma in FREEZER until drop off, courier pick-up, or shipping.

Chemistry

- Submit specimen in a properly filled (to the fill line) **heparin (green-top)** collection tube. This is the preferred sample type.
- Clot tubes (red-top)** are also accepted, but be aware that our laboratory's reference intervals are for heparinized plasma.
- Label each specimen with TWO unique patient identifiers (e.g., pet name and owner last name, or pet name and medical record number).
- For blood chemistries: If you cannot get the specimen to our lab within 30 minutes of collection, you must harvest the **plasma (green-top)** or **serum (red-top)**. If using a red-top tube, make sure the sample is COMPLETELY CLOTTED before harvesting serum. To harvest plasma/serum: Centrifuge the specimen tube, gently remove the plasma/serum using a PLASTIC transfer pipette (without disrupting the cell button), and place the plasma/serum in a plain PLASTIC tube. Store plasma/serum in refrigerator until drop off, courier pick-up, or shipping.

Common Interferents

Hemolysis (excess free hemoglobin) and lipemia (excess fat, especially triglycerides) both interfere with many laboratory tests and are best avoided if possible.

- Hemolysis can be endogenous to the patient (e.g., intravascular hemolytic anemia) or an artifact due to difficult blood collection or sample handling errors such as: forcing blood through a needle into the blood collection tube, prolonged sample storage, improper sample storage temperature (extreme heat or cold), and poor centrifugation technique (e.g., centrifuging a red-top or tiger-top tube of whole blood that has not fully clotted). When harvesting plasma or serum, if the plasma or serum is visibly red and iatrogenic sample hemolysis is suspected, a new sample should be collected whenever possible. If a patient has severe intravascular hemolysis due to disease, be aware that some laboratory values may not be reported due to interference with testing.
- Lipemia is most commonly post-prandial but can also occur with endocrine disease and disorders of lipid metabolism. When harvesting plasma or serum, if the plasma is visibly lipemic and post-prandial lipemia is suspected, wait and collect another sample after an 8-12 hour fast. If you must submit a grossly lipemic sample, we can reduce the impact of lipemia on chemistry measurements by ultracentrifuging the specimen prior to analysis.

Proper sample handling helps to ensure accurate test results. Please consult test directory for specific tests and panels. Be sure to use appropriate sample tubes and fill these correctly. Avoid prolonged sample storage and extreme temperatures. Do not freeze samples unless specifically indicated for the test. Do not place specimens in direct contact with ice packs.

Urine

- Submit specimen in a **urinalysis tube (preferred)** or a **No-Additive tube (white top)** blood collection tube. A minimum volume of 5 mL urine is required.
- Label each specimen with TWO unique patient identifiers (e.g., pet name and owner last name, or pet name and medical record number).
- Store urine in refrigerator until drop off, courier pick-up, or shipping.

Cytology Smear

- Submission of 2 to 3 highly cellular smears per site is optimal. Smears should be thin (e.g., using "blood smear technique") and contain a monolayer of intact cells.
- We recommend using glass slides with a frosted label area.
- All slides must be clearly labeled with a PENCIL using patient's first and last name and anatomic location. Without proper labeling, samples will be rejected by the laboratory.
- Allow smears to air dry. Place dry slides in a cardboard or plastic slide holder. Label slide holder with TWO unique patient identifiers.
- Leave smears UNFIXED and UNSTAINED. (We do accept previously stained smears, but these are not preferred.)
- Complete one Cytology Submission Form per anatomical location (even if all specimens are from the same patient)**, with these exceptions:
 - » Smears from up to 3 lymph nodes from the same patient may be submitted using one form.
 - » Smears from up to 3 synovial fluids from the same patient (cytology only) may be submitted using one form.
- Anatomic site of the aspirate is required information. A concise clinical history and lesion description will facilitate the pathologist's interpretation and help maximize diagnostic yield.
- DO NOT REFRIGERATE** cytology smears. Protect smears from moisture and keep them away from formalin fumes and other fixatives.

*Primate samples and necropsies are NOT accepted from outside the continental United States.

Centesis Fluid Analysis

- Submit specimen in a properly filled (to the fill line) **EDTA (lavender-top)** collection tube. **DO NOT SUBMIT SPECIMENS IN SYRINGES.**
- If you are submitting fluid for **culture**, place specimen in a **clot (red-top)** collection tube; please follow instructions for submission of culture specimens (see page 4-5).
- If you are submitting fluid for **chemistry analysis**, e.g., creatinine, potassium, or bilirubin measurement, please follow instructions under the “Chemistry” section on the previous page.
- **Complete one Cytology Submission Form per anatomic location (even if all specimens are from the same patient),** and check “Centesis Fluid Exam and Report”.
- Each specimen must be clearly labeled using patient’s first and last name and anatomic location. Without proper labeling, samples will be rejected by the laboratory.
- Refrigerate the lavender top collection tube until drop off, courier pick-up, or shipping.
- Additionally make one to two direct smears of the fluid at the time of collection using a “blood smear” technique. Allow smear(s) to air dry. Place dry slide(s) in a cardboard or plastic slide holder. Label slide holder with TWO unique patient identifiers. Leave smear(s) UNFIXED and UNSTAINED. (We do accept previously stained smears, but these are not preferred.)
- **DO NOT REFRIGERATE** smears. Protect smears from moisture and keep them away from formalin fumes and other fixatives.

Sample Drop-off

- Local veterinarians or their staff are welcome to drop off laboratory specimens. The sample drop-off areas are located at the small animal clinic lobby entrance and outside the pharmacy window on the large animal side.
- Specimens in **EDTA (lavender-top)** (e.g., CBCs, fluids), **heparin (green-top)**, and **clot (red-top)** tubes, plasma/serum in plain plastic tubes, and urine specimens should be placed in individual plastic sample bags together with the appropriate submission form and left in the REFRIGERATOR.
- Cytology smears (in an appropriate slide holder) should be placed in a plastic sample bag together with the appropriate submission form and left in the CYTOLOGY DROP-OFF BOX.
- Lab personnel collect samples from the drop-off area multiple times throughout the day.

Sample Shipping

- Specimens in EDTA (e.g., CBCs, fluids), heparin, and clot (red-top) tubes, plasma/serum in plain plastic tubes, and urine specimens should be placed in individual plastic sample bags together with the appropriate submission form and shipped **OVERNIGHT** with an ice pack. Blood smears accompanying CBC specimens and smears accompanying fluid specimens may be shipped in the same box as the EDTA tube; however, take care to protect the smears from moisture and keep them separated from the ice pack.
- Smears (tissue aspirate smears, smears of fluids, and blood smears for cytologic evaluation) may be shipped via regular mail (do NOT use ice packs), although if there is risk of exposure to high ambient temperatures (e.g., middle of summer), consider expedited shipping (no ice pack needed). **DO NOT SHIP CYTOLOGY (OR BLOOD) SMEARS AND BIOPSY SAMPLES IN THE SAME BOX due to risk of exposing cytology/blood smears to formalin fumes.**

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
CHEMISTRY				
ALB	Albumin	Green top, 1 mL	Next Bus. Day	\$21.00
ALK Phos	Alkaline phosphatase	Green top, 1 mL	Next Bus. Day	\$26.25
Alk Phosphatase, Heat Stable	Corticosteroid-induced isoform of Alk Phos	Green top, 1 mL	Next Bus. Day	\$26.25
ALT	Alanine aminotransferase	Green top, 1 mL	Next Bus. Day	\$21.00
Ammonia	Special and immediate handling required, please call lab.	Lavender top, 1 mL - Immediately spin and separate from cells, MUST be frozen if not submitted within 30 minutes of collection.	Next Bus. Day	\$23.25
AST	Aspartate Aminotransferase	Green top, 1 mL	Next Bus. Day	\$21.00
Avian/Herp Chem Panel, Major	AST, creatine kinase, urea nitrogen, phosphorus, calcium, glucose, total protein, alb, globulin, albumin/globulin ratio, cholesterol, uric acid, bile acid post prand.	Green top, 1 mL	Next Bus. Day	\$40.25
Avian/Herp Chem Panel, Minor	AST, CK, calcium, glucose, total protein, uric acid	Green top, 1 mL	Next Bus. Day	\$24.25
Bile Acids Fasting	Fasting bile acids	Red top, 1 mL	Next Bus. Day	\$40.00
Bile Acids Fast & 2 Hr Pp	Paired samples (fasting & post-prandial)	Red top, 1 mL	Next Bus. Day	\$66.75
Bile Acid Postpran	2 hours after meal	Red top, 1 mL	Next Bus. Day	\$41.50
Bilirubin, Total		Green top, 1 mL	Next Bus. Day	\$21.00
C-Reactive Protein (CRP)	Canine only	Green top, 1 mL	Next Bus. Day	\$25.00
Calcium	Total calcium	Green top, 1 mL	Next Bus. Day	\$21.00
Cholesterol		Green top, 1 mL	Next Bus. Day	\$21.00

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
CK	Creatine Kinase	Green top, 1 mL	Next Bus. Day	\$21.00
cPL SNAP™ Test	Canine pancreatic-specific lipase	Red top, 1 mL	Next Bus. Day	\$30.25
Creatinine		Green top, 1 mL	Next Bus. Day	\$21.00
Electrolyte Panel	Na, K, Cl, TCO2	Green top, 1 mL	Next Bus. Day	\$22.50
Fecal Occult Blood		Feces	Next Bus. Day	\$16.75
Fructosamine		Green top, 1 mL	1-4 Bus. Days Batch run on Tuesdays & Fridays	\$55.75
GGT	Gamma-glutamyl transferase	Green top, 1 mL	Next Bus. Day	\$21.00
Glucose		Green top, 1 mL	Next Bus. Day	\$21.00
Ionized Calcium Panel - Whole Blood	Ionized calcium, Na, K Special and immediate handling required, please call lab.	Green top, 1 mL	Next Bus. Day	\$63.75
Iron Panel	Total Iron, TIBC, % Sat	Green top, 2 mL	Next Bus. Day	\$23.25
Ketones, Serum		Red top, 1 mL	Next Bus. Day	\$12.50
Large Animal General Chemistry Panel	GGT, AST, creatine kinase, urea nitrogen, creatinine, phosphorus, calcium, glucose, total protein, alb, globulin, albumin/globulin ratio, total bilirubin, magnesium, SDH, total iron	Green top, 2 mL	Next Bus. Day	\$51.50
Large Animal Panel and Electrolytes	LA general chemistry panel, plus electrolytes (Na, K, Cl, TCO2)	Green top, 2 mL	Next Bus. Day	\$59.25
LDH	Lactate dehydrogenase	Green top, 1 mL	Next Bus. Day	\$21.00
Lipase		Green top, 1 mL	Next Bus. Day	\$33.75
Lipid Panel	Cholesterol and triglycerides	Green top, 1 mL	Next Bus. Day	\$40.25
Mg	Magnesium	Green top, 1 mL	Next Bus. Day	\$30.75
Phenobarbital		Green top, 1 mL	5-7 Bus. Days Batch run on Thursdays	\$55.75
Phosphorus		Green top, 1 mL	Next Bus. Day	\$21.00
Pre-Op Panel, Large Animal	Na, K, Cl, TCO2, glucose, creatinine, AST	Green top, 1 mL	Next Bus. Day	\$30.25
Pre-Op Panel, Small Animal	Na, K, Cl, TCO2, glucose, creatinine, ALT	Green top, 1 mL	Next Bus. Day	\$30.25
Refeeding Panel	Na, K, Cl, TCO2, calcium, phosphorus, magnesium, ALB	Green top, 1 mL	Next Bus. Day	\$41.50
Renal Panel	Electolytes, BUN, creatinine, phosphorus, calcium, albumin	Green top, 2 mL	Next Bus. Day	\$43.25
Serial Glucoses	Up to 5 timed Collections	Green top, 1 mL	Next Bus. Day	\$90.25
Small Animal General Chemistry Panel	Alkaline phosphatase, ALT, AST, creatine kinase, urea nitrogen, creatinine, phosphorus, calcium, glucose, total protein, alb, globulin, albumin/globulin ratio, cholesterol, total bilirubin, magnesium, total iron, (and CRP if sample is for canine)	Green top, 2 mL	Next Bus. Day	\$47.50
Small Animal Panel and Electrolytes	SA general chemistry panel, plus electrolytes (and CRP if sample is for canine)	Green top, 2 mL	Next Bus. Day	\$64.00
Sorbitol Dehydrogenase-SDH	Serum should be harvested and frozen prior to pickup.	Red top, 1 mL	Next Bus. Day	\$25.25
Total Protein	Biuret method	Green top, 1 mL	Next Bus. Day	\$21.00
Triglycerides		Green top, 1 mL	Next Bus. Day	\$21.00
Urea Nitrogen - BUN		Green top, 1 mL	Next Bus. Day	\$21.00
Uric Acid		Green top, 1 mL	Next Bus. Day	\$21.00
Urine Creatinine		Urine, 1 mL	Next Bus. Day	\$21.00
Urine Electrolyte Panel	Na, K, Cl	Urine, 1 mL	Next Bus. Day	\$22.50
Urine Panel	Na, K, Cl, creatinine, phosphorus	Urine, 1 mL	Next Bus. Day	\$30.25
Urine Protein Quant		Urine, 1 mL	Next Bus. Day	\$33.00
Urine Protein/Creatinine Ratio	UPC	Urine, 1 mL	Next Bus. Day	\$52.00

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
CYTOLOGY				
Blood Smear Exam		1 mL EDTA whole blood	Next Bus. Day	\$54.25
Bone Marrow Cytology and Report		Slides prepared from bone marrow. A concurrent blood sample (lavender top) for CBC and a freshly made blood smear should also be submitted.	Next Bus. Day	\$87.25
Buffy Coat Exam		EDTA blood, 1mL	Next Bus. Day	\$51.25
Centesis Fluid Exam and Report	Cell counts, total solids and smear exams. One cytology submission form per anatomical location (even if all the samples are from one patient). See Cytology submission form for more details.	Lavender & red top. 1 mL aspirate of abdominal, thoracic or pericardial fluid.	Next Bus. Day	\$108.25
Centesis Fluid Exam with Rivalta test	TP, TNCC, RBC, Rivalta test, and cytologic examination	Lavender & red top. 1 mL aspirate of abdominal, thoracic or pericardial fluid.	Next Bus. Day	\$125.00
CSF Analysis w/Cytology and Report	Cerebral spinal fluid; cell counts, protein and concentrated smear exam	CSF, 1mL in sterile tube no additive.	Next Bus. Day	\$108.25
Cytology Smear Evaluation and Report	One cytology submission form per anatomical location (even if all the samples are from one patient). See Cytology submission form for more details.	Slides prepared from FNA or impression	Next Bus. Day	\$88.25
Synovial Fluid Exam and Report	Cell counts, total solids and smear exams. One cytology submission form per anatomical location (even if all the samples are from one patient). See Cytology submission form for more details.	Synovial fluid, 1mL in EDTA tube (Lavender top)	Next Bus. Day	\$108.25
HEMATOLOGY				
Avian / Herp CBC	WBC, spun PCV, absolute white cell counts, cell morphology	Heparinized whole blood (green top tube), 0.5 mL minimum	Next Bus. Day	\$43.25
Blood Typing - Canine	DEA1.1 Pos. or Neg, [Canine]	0.5 mL EDTA blood	1-2 Bus. Days	\$52.50
Blood Typing - Feline	Card test, [Feline]	0.5 mL EDTA blood	1-2 Bus. Days	\$52.50
CBC	Complete blood count with examination of blood smears	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$39.75
CBC & Reticulocytes	Complete blood count and absolute retic count	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$57.00
CBC With Fibrinogen	Complete blood count and fibrinogen by heat precipitation	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$48.50
Coagulation Profile & Platelet Count	CALL LAB before submitting. PT, PTT and platelet count	Blue top tube filled to required level plus EDTA tube for platelet count.	Next Bus. Day	\$66.00
Differential Count (Blood)	WBC differential read from EDTA blood smear	Lav. top tube (EDTA) minimum at least half of required volume for tube size or smears made from tube.	Next Bus. Day	\$20.00
Fibrinogen, Heat Precipitation	Semi-quantitative assay of fibrinogen for large animals	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$16.50
PCV & TPP	Spun packed cell volume and refractometer plasma protein	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$16.00
Platelet Count	Instrument count confirmed with examination of blood smears	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$18.25
PT (Prothrombin Time)	Prothrombin time. CALL LAB before submitting.	Blue top tube filled to required level	Next Bus. Day	\$41.50
PTT (Activated Partial Thromboplastin Time, aPTT)	Partial Thromboplastin Time. CALL LAB before submitting.	Blue top tube filled to required level	Next Bus. Day	\$43.25
Reticulocyte Count	Absolute retic count	Lav. top tube (EDTA) minimum at least half of required volume for tube size	Next Bus. Day	\$23.75
URINALYSIS				
Urinalysis	Urine dipstick and microscopic sediment exam Refrigerate sample	Urine, minimum 5 mL	Next Bus. Day	\$26.75
Urine Hb - Mb Diff	To differentiate urine hemoglobin/myoglobin First morning void is best	Fresh urine, minimum 5 mL	Next Bus. Day	\$29.50

Endocrinology

SUBMISSION GUIDELINES

Proper sample collection and handling are essential to accurate test results.

- Do not send whole blood for any test procedure.
- Please do not send samples in serum-separator tubes (polymer-gel tubes). This causes hemolysis of samples.

Serum is required for all endocrinology tests except Endogenous ACTH (plasma-EDTA).

Label sample containers adequately

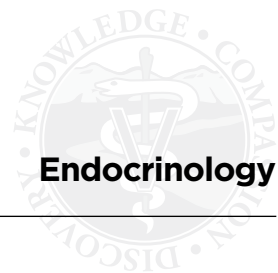
- Owner's name
- Animal's name
- Test desired
- Time of collection (baseline, post-stim., etc.)

Serum samples

- Clot at room temperature. Centrifuge within 1 hour, remove serum and freeze.
- Alternatively, store blood samples in the refrigerator for 2 to 4 hours to clot. Centrifuge, remove serum and freeze. For plasma samples: use EDTA tubes. Centrifuge and remove plasma within 15 minutes and freeze.

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
ENDOCRINOLOGY				
17-Hydroxyprogesterone, Baseline	Canine and Ferret [Feline-castrated/spayed only]	0.5 mL of serum	7-10 Bus. Days	\$25.00
17-Hydroxyprogesterone, Pre & Post (ACTH Stim)	Canine, [Feline-castrated/spayed only]	0.5 mL of serum each	7-10 Bus. Days	\$48.00
Adrenal Panel - ACTH Stim Canine	Baseline and post-ACTH cortisol, progesterone, 17-hydroxyprogesterone, estradiol, androstenedione, testosterone, [Canine]	2.0 mL of serum each	7-10 Bus. Days	\$225.00
Adrenal Panel - ACTH Stim Feline, castrated/spayed only	Baseline and post-ACTH cortisol, progesterone, 17-hydroxyprogesterone, estradiol, androstenedione, testosterone, aldosterone [Feline-castrated/spayed only]	2.0 mL of serum each	7-10 Bus. Days	\$225.00
Adrenal Panel - Ferret	Baseline estradiol, androstenedione, 17-hydroxyprogesterone, [Ferret]	0.5 mL of serum	7-10 Bus. Days	\$90.00
Adrenal Panel - Rabbit, castrated/spayed only	Baseline cortisol, progesterone, 17-hydroxyprogesterone, androstenedione, testosterone [Rabbit-castrated/spayed only]	2.0 mL of serum	7-10 Bus. Days	\$80.00
Adrenal Panel Combined Dex Supp/ACTH Stim	Analyze cortisol, androstenedione, estradiol, progesterone, 17-hydroxyprogesterone and testosterone in baseline, post-dexamethasone, and post-ACTH samples, [Canine]	2.0 mL of serum each	7-10 Bus. Days	\$285.00
Adrenal Panel Additional tube	Canine and Feline - castrated/spayed only	2.0 mL of serum each	7-10 Bus. Days	\$112.00
Aldosterone, Baseline	Canine and Feline - castrated/spayed only	0.5 mL of serum	Samples run once weekly	\$32.00
Aldosterone, Pre & Post (ACTH Stim)	Canine and Feline - castrated/spayed only	0.5 mL of serum each	Samples run once weekly	\$55.00
Androstenedione, Baseline	Canine, Ferret [Feline - castrated/spayed only]	0.5 mL of serum	7-10 Bus. Days	\$42.00
Androstenedione, Pre & Post (ACTH Stim)	Canine [Feline - castrated/spayed only]	0.5 mL of serum	7-10 Bus. Days	\$81.00
Cortisol, Baseline	Alpaca, Canine, Equine [Feline - castrated/spayed only]	0.5 mL of serum	Daily	\$22.00
Cortisol, Pre & Post (ACTH Stim)	Canine [Feline - castrated/spayed only]	0.5 mL of serum each	Daily	\$40.00
Cortisol, Pre & Post Trilostane	Trilostane monitoring [Canine]	0.5 mL of serum each	Daily	\$40.00
Cortisol, Post Trilostane	Trilostane monitoring [Canine]	1.0 mL of serum	Daily	\$22.00



DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
Cortisol, Combined Dex Supp/ACTH Stim	Analyze cortisol in baseline, post-dexamethasone, and post-ACTH samples, [Canine]	0.5 mL of serum each	Daily	\$48.00
Cortisol, High Dose Dexamethasone Suppression	Analyze cortisol in baseline sample and post-dexamethasone samples (4 and 8 hours), [Canine]	0.5 mL of serum each	Daily	\$45.00
Cortisol, Low Dose Dexamethasone Suppression	Analyze cortisol in baseline sample and post-dexamethasone samples (4 and 8 hours), [Canine]	0.5 mL of serum each	Daily	\$45.00
Estradiol, Baseline	Canine, Ferret, [Feline - castrated/spayed only]	0.5 mL of serum	7-10 Bus. Days	\$30.00
hCG Stim Test (Progesterone)	Baseline and post-hCG stimulated progesterone [Canine, Feline, Rabbit]	0.5 mL of serum each	7-10 Bus. Days	\$48.00
hCG Stim Test (Testosterone)	Baseline and post-hCG stimulated testosterone [Canine, Equine, Feline, Rabbit]	0.5 mL of serum each	7-10 Bus. Days	\$48.00
Insulin	Baseline sample [Equine]	1.0 mL of serum. Collect in a red top, allow to clot, then spin and separate. Store sample frozen and send on an ice pack standard overnight.	Samples run once weekly	\$31.00
Progesterone, Baseline	For canine breeding progesterone, sample must be submitted by 3:00pm for same day results. Canine, Equine, [Feline - castrated/spayed only]	0.5 mL of serum	7-10 Bus. Days	\$32.00
Reproductive Hormones (E, P, T)	Baseline estradiol, progesterone, testosterone, Alpaca, Canine, [Feline - castrated/spayed only]	1.0 mL of serum	7-10 Bus. Days	\$87.00
Spay/Neuter Check	Also known as Anti-Mullerian Hormone. [Canine, Feline]	0.5 mL of serum Freeze serum and keep frozen during shipment	Samples run once weekly	\$50.00
T3	[Canine, Feline]	0.5 mL of serum	Samples run on Mon. & Thur.	\$20.00
T3, T4	[Canine, Feline, Equine]	0.5 mL of serum	Samples run on Mon. & Thur. (must be received by 3pm on those days for same day results)	\$36.00
T3, T4/TSH	[Canine]	1.0 mL of serum	Samples run on Mon. & Thur.	\$52.00
T4	[Alpaca, Canine, Feline, Rabbit]	0.5 mL of serum	Samples run on Mon. & Thur.	\$22.00
T4/TSH	[Canine]	0.5 mL of serum	Samples run on Mon. & Thur.	\$39.00
Testosterone, Baseline	Canine, [Feline - castrated/spayed only]	0.5 mL of serum	7-10 Bus. Days	\$28.00
TSH	[Canine]	0.5 mL of serum	Samples run on Mon. & Thur.	\$23.00

Parasitology

SUBMISSION GUIDELINES

Fecal Samples

Routine fecal procedures require a golf ball size refrigerated sample, collected the same day for each test request.

Never pool samples together for parasitic examinations. This practice dilutes the parasite stages in the feces, decreases test sensitivity and increases false negatives.

CHOOSING FECAL PANELS

TEST NAME	COMPONENTS	PROS	CONS
Routine Fecal Panel (Sugar and Zinc) Routine <i>FOR SMALL ANIMALS</i>	Centrifugal* Sucrose	• Increased sensitivity for Roundworm & Tapeworm eggs, <i>Cryptosporidium</i> & Coccidian oocysts	Specific gravity of solution (1.275) distorts <i>Giardia</i> cysts & Fluke eggs
	Centrifugal* Zinc	• Increased sensitivity for <i>Giardia</i> cysts, Fluke eggs & lungworm larvae	Poor sensitivity for whipworm eggs and <i>Cryptosporidium</i> oocysts
<i>Giardia</i> Panel & Sugar Float <i>FOR SMALL ANIMALS</i>	<i>Giardia</i> ELISA	• <i>Giardia</i> ANTIGEN in symptomatic cats & dogs • Increased sensitivity when paired with centrifugal zinc float	Increased false positives in asymptomatic dogs
	Centrifugal* Zinc & Sucrose	• The most comprehensive fecal exams for animals with diarrhea • Optimized for <i>Giardia</i> cysts, <i>Cryptosporidium</i> & Coccidian oocysts	Specific gravity of solution (1.275 vs. 1.19) require both sugar & zinc for comprehensive detection
Fecal float/egg count panel <i>FOR LARGE ANIMALS</i>	McMaster chamber for strongylate eggs	• Assess environmental contamination • Evaluate deworming efficacy • Identify high and low egg shedders • Establish deworming strategies using pre- and post-counts • Provide a basis for eliminating animals contributing to excel pasture contamination	Does not provide a comprehensive fecal exam; low sensitivity for <i>Anoplocephala</i> , <i>Oxyuris</i> , and <i>Parascaris</i> eggs. Does NOT indicate worm burden.
	Centrifugal* Sucrose	• The most comprehensive fecal exams for large animals	Specific gravity of solution (1.275) distorts Fluke eggs



Give us the **whole pile**. There's no such thing as too much poop. Call us to ask about minimum amounts needed.

*Parasite detection significantly increases with centrifugation

Comprehensive review by Companion Animal Parasite Council capcvet.org

CHOOSING HEARTWORM TESTS

ROUTINE TEST COMPONENTS	PROS	CONS
• Dirochek™ ANTIGEN • Knott's Exam	• Gold Standard for heartworm screening/detection. Highest sensitivity for as few as 1-2 adult females	• Poor sensitivity for male only infection or immature female worms
• Idexx 4DxPlus™ Heartworm ANTIGEN & <i>Borrelia burgdorferi</i>, <i>Anaplasma</i> species & <i>Ehrlichia</i> species ANTIBODIES • Knott's Exam	• Sensitivity increased when more than 2 adult females present • Detects <i>Borrelia</i> antibodies from natural infection; not detected from specific vaccines	• Poor sensitivity <2 female worms, male only infection, or immature female worms • Tick-borne pathogen antibodies presence/absence only (NO numerical titer) • No differentiation between <i>Anaplasma</i> species or <i>Ehrlichia</i> species antibodies
• Dirochek™ ANTIGEN	• Highest antigen sensitivity for as few as 1-2 adult females	• Poor sensitivity for male only infection or immature females*
SPECIALTY TESTS & COMPONENTS	PROS	CONS
Verification Panel • Dirochek™ ANTIGEN • Idexx SNAP™ or SNAP 4DxPlus™ • Knott's Exam	• Confirmation of POSITIVE result using multiple tests • Aid in diagnosis for complex cases *** Exclusive to UTCVM Parasitology Lab! ***	
Knott's Exam (Post-treatment)	• Evaluate 3 months after last immiticide injection • Kills and stains microfilariae • Differentiate <i>D. immitis</i> from <i>Acanthocheilonema reconditum</i>	• No microfilariae present in male only infections, or immature female worms • Microfilariae can survive for up to 2 years

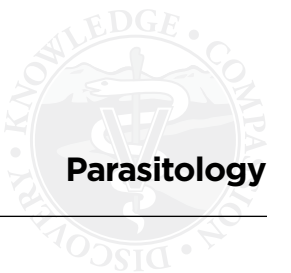
*Male only and immature infections are more common in cats.

Comprehensive review by American Heartworm Society Guidelines heartwormsociety.org

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
FECAL EXAMINATIONS				
SMALL ANIMAL				
Giardia Panel & Sugar Flotation (Zinc & Sugar Flotation, ELISA)	Motile protozoa and select nematode larvae, Centrifugal zinc sulfate flotation (cysts), and ELISA-antigen, Centrifugal sucrose flotation for eggs, cysts, oocysts detection, including <i>Cryptosporidium</i> and whipworms [Canine, Feline (litter-free)]	8 g fresh/refrigerated fecal golf ball sized	2-3 Bus. Days	\$78.00
Lungworm Panel (Zinc & Sugar Flotation, Baermann)	Respiratory parasite larval and egg stages, excluding heartworms, [Canine, Feline]	8 g fresh fecal golf ball sized	Submit Mon. through Thurs. ONLY. Overnight incubation. 3-5 Bus. Days	\$72.75
Routine Fecal Panel (Sugar & Zinc Flotation), Small Animal	Centrifugal sucrose flotation for eggs, cysts, oocysts detection, including <i>Cryptosporidium</i> and whipworms. Centrifugal zinc sulfate flotation for <i>Giardia</i> (cysts), lungworm (larvae), and fluke (eggs).	8 g fresh/refrigerated fecal golf ball sized	2-3 Bus. Days	\$46.75
LARGE ANIMAL				
Fecal Egg Count	Useful for egg count reduction test (evaluate deworming efficacy), [Bovine, Camelid, Caprine, Equine, Ovine]	8 g fresh/refrigerated fecal DO NOT POOL SAMPLES	2-3 Bus. Days	\$21.00
Fecal Egg Count (Herd)	Useful for egg count reduction test (evaluate deworming efficacy), [Bovine, Camelid, Caprine, Equine, Ovine] Submit 3+ individual samples from Herd	8 g fresh/refrigerated fecal: DO NOT POOL SAMPLES	2-3 Bus. Days, depending on number of samples in herd	\$18.75
Fecal Float/Egg Count Panel	Fecal centrifugal flotation sugar and Fecal Egg Count [Bovine, Caprine, Equine, Ovine, other large animal]	8 g fresh/refrigerated fecal DO NOT POOL SAMPLES	2-3 Bus. Days	\$44.00
Large Animal Lungworm Panel	Fecal centrifugal flotation zinc sulfate and fecal Baermann	8 g fresh fecal DO NOT POOL SAMPLES	Submit Mon. through Thurs. ONLY. Overnight incubation. 3-5 Bus. Days	\$45.75
ANY SPECIES				
Heterobilharzia/Schistosoma	Ethyl acetate sedimentation for fluke eggs, [Canine, Feline (litter-free)]	8 g fresh/refrigerated fecal golf ball sized	2-3 Bus. Days	\$67.50
SEROLOGY				
CANINE				
Heartworm Dirocheck™ & Knott's	ROUTINE AND WELL-CHECK <i>Dirofilaria immitis</i> antigen, Knott's test for <i>Dirofilaria immitis</i> and <i>Acanthocheilonema reconditum</i> microfilariae identification	2 sample types required: 2 mL EDTA whole blood AND 1 mL serum or EDTA plasma NO GREEN TOP	2-3 Bus. Days	\$53.00
Heartworm 4DX Plus SNAP™ & Knott's	ROUTINE AND WELL-CHECK SNAP™ Lyme/Anaplasma/Ehrlichia Antibodies-Heartworm Antigen, Knott's test for <i>Dirofilaria immitis</i> and <i>Acanthocheilonema reconditum</i> microfilariae identification	2 sample types required: 2 mL EDTA whole blood AND 1 mL serum or EDTA plasma	2-3 Bus. Days	\$65.00
Heartworm Verification Panel (Knott's + Dirocheck™ + SNAP™)	FOR CONFIRMATION OF POSITIVE RESULT *Please indicate date of last immiticide injection on submission form Knott's test for microfilaria and antigen test for previous Positive result, [Canine]	2 sample types required: 2 mL EDTA whole blood AND 1 mL serum NO GREEN TOP	2-3 Bus. Days	\$89.50
Heartworm Microfilaria Knott's Post-treatment Evaluation	PREVIOUS TREATED CANINE ONLY Knott's test for <i>Dirofilaria immitis</i> and <i>Acanthocheilonema reconditum</i> microfilariae identification	2 mL EDTA whole blood	2-3 Bus. Days	\$27.75
FELINE				
Heartworm Antigen	Feline	1 mL serum	2-3 Bus. Days	\$49.00
OTHER SPECIES				
Toxoplasma ELISA	Enzyme-linked immunosorbent assay for the detection of anti- <i>Toxoplasma</i> IgG antibodies	0.5 mL serum	Test runs weekly on Thursdays	\$74.25

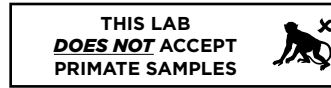
*Primate samples and necropsies are NOT accepted from outside the continental United States.



DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
MISCELLANEOUS				
Parasite External ID	Whole organism (Do not preserve in formalin) Ticks, lice and fleas etc., [All]	Specimens should be stored in saline (refrigerated) or isopropyl alcohol. Do not store in formalin or on scotch tape.	7-14 Bus. Days	\$45.25
Parasite Internal ID	Whole organism (Do not preserve in formalin) Worms, [All]	Specimens should be stored in saline (refrigerated) or isopropyl alcohol. Do not submit in formalin	7-14 Bus. Days	\$45.25
Parelaphostrongylus tenuis (Meningeal/Brain Worm) PCR	P. tenuis PCR on preserved CNS tissue of ruminant/camelid species [NO Primates]	CALL LAB	7-10 Bus. Days	\$208.00

Virology/Immunology



865-974-5880 FAX 865-974-5644

virologyimmunology@utk.edu

https://vetmed.tennessee.edu/vmc/dls/virology-immunology/



SUBMISSION GUIDELINES

- Surface antibody testing, including tests for Neutrophil, platelet, and red blood cell immunological are best performed on EDTA blood samples.
- Patients should not have a recent history of steroid medication
- 2-3 ml of EDTA blood is REQUIRED for antibody testing
- Samples for virus isolation or PCR **MUST BE KEPT COLD.**
- Tissue imprints and conjunctival scrapes should be air-dried. **DO NOT FIX.**
- Conjunctival scrapes should be made **BEFORE** application of fluorescein.
- Ship via FedEx or UPS overnight, Monday through Thursday
- Ship in an insulated package with ice packs
- Results will be faxed or emailed as requested on submission form
- Tests may be ordered STAT at an additional cost and must be submitted by 2pm. Call for details.
- Recommended swabs for PCR should have plastic stems, dacron or rayon tips. Break off into sterile tube. **DO NOT IMMERSER IN GEL.**
- Any tissue aspirate (e.g., lymph node) submitted for flow cytometry immunophenotyping should be suspended in sterile

CHOOSING VIROLOGY TESTS

TEST TYPE	USE	SAMPLE	PROS	CONS
Serology	Detects antibody response	Serum	Shows exposure	Acute testing may be negative. Vaccination can interfere with interpretation.
Isolation	Detects the virus	Tissue, swab in sterile saline, blood (depends on the virus)	Highly sensitive	Requires fresh, refrigerated sample: virus must be viable
IFA (Immunofluorescent Antibody)	Detects viral antibody	Serum	Inexpensive to perform	Poor sensitivity
PCR (Polymerase Chain Reaction)	Detects the nucleic acid in DNA viruses	Tissue, swab, blood, fluid (depends on the virus)	Highly sensitive: virus does not have to be viable	Expensive test to perform
RT-PCR (Reverse-transcriptase Polymerase Chain Reaction)	Detects the mRNA in RNA viruses	Tissue, swab, blood, fluid (depends on the virus)	Highly sensitive: virus does not have to be viable	Expensive test to perform

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
AVIAN AND POULTRY				
Avian Metapneumovirus (aMPV) -A, B, and C	ELISA, [Turkeys and Chickens]	1mL serum	2-5 Bus. Days	\$6.75
Avian Sexing, Psittacine Blood	PCR, [Avian]	0.2mL EDTA blood	3-5 Bus. Days	\$53.50
Avian Leukosis Virus (ALV) p27 Antigen ELISA	ELISA [Chickens]	2mL serum or clotted blood	3 Bus. Days	\$6.75
Infectious Laryngotracheitis (ILT) Antibody	ELISA [Chickens]. Can differentiate TCO or vector vaccinated from field infected chickens	2mL serum or clotted blood	3 Bus. Days	\$6.75
Lymphoproliferative disease virus (LPDV)	Conventional PCR, [Turkeys]	Serum, whole blood, tissue (bone marrow, spleen, thymus, pancreas, liver - ship on ice)	2-5 Bus. Days	\$35.25/pool (up to 5)
Mycoplasma gallisepticum*	ELISA, [Chickens and Turkeys]	2mL serum or clotted blood	3 Bus. Days	\$4.25
Mycoplasma meleagridis*	ELISA, [Turkeys]	2mL serum or clotted blood	3 Bus. Days	\$4.25
Mycoplasma MG/MS*	qPCR, [Chickens and Turkeys]. Must pre-pool (otherwise pooling fee applies)	Environmental Swab, Cloacal/choanal Swab, Nasal Swab or Oropharyngeal Swab	2 Bus. Days	\$31.25/pool (up to 5)
Mycoplasma synoviae*	ELISA, [Chickens and Turkeys]	2mL serum or clotted blood	3 Bus. Days	\$4.25
Salmonella multispecies spp.*	qPCR [Chickens and Turkeys]. Must pre-pool (otherwise pooling fee applies)	Feces, Cloacal/choanal Swab or Environmental Swab	2-3 Bus. Days	\$40.00/pool (up to 5)
Salmonella Pullorum Plate Agglutination test*	Serum plate antigen testing (SPA), [Chickens]	1mL serum	2-5 Bus. Days	\$4.25/sample

*Denotes a diagnostic test ran with National Poultry Improvement Plan approved parameters or platforms

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
CANINE				
Canine Distemper IgG Titer	IFA [Canine]	0.2 mL serum	3 Bus. Days	\$56.75
Canine Distemper RT-PCR	Reverse-transcriptase Polymerase Chain Reaction, [Canine]	Whole blood, CSF, tissue or 4-5 mL urine	3 Bus. Days	\$73.00
Canine Herpesvirus by IFAT	IFAT Direct	Slide prepared from corneal or oropharyngeal or conjunctival swab	3 Bus. Days	\$56.75
Canine Herpesvirus IFA Titer	IFA Titer (Indirect)	0.2mL Serum	3 Bus. Days	\$60.00
Canine Herpesvirus by qPCR	qPCR, [Canine]	swab or tissue	3 Bus. Days	\$57.75
Canine MDRI Gene Mutation Test	qPCR	0.5mL Whole blood	3 Bus. Days	\$58.00
Canine Parvovirus Titer by IFAT	IFA Titer (Indirect)	0.2mL Serum	3 Bus. Days	\$63.50
Canine Parvovirus by qPCR	qPCR, [Canine]	feces or tissue	3 Bus. Days	\$60.00
Canine Parvovirus Vaccine Screen Titer by IFAT	Screening only, no endpoint, by IFA	0.2 mL serum	2 Bus. Days	\$54.50
Canine Rocky Mtn Spotted Fever (RMSF) Titer by IFAT	IFA	0.2 mL serum	3 Bus. Days	\$63.50
Canine Tick Titer Panel by IFAT	RMSF, LYME, E.canis titers	0.2 mL serum	3 Bus. Days	\$168.25
Canine Lyme Disease (Borreliosis) Titer by IFAT	IFA	0.2 mL serum	3 Bus. Days	\$63.50
FELINE				
Feline Chlamydia by qPCR	Chlamydia by Real-time PCR, [Feline] Refrigerate sample	Fecal, swab (avian cloacal/choanal swab), or tissue	3 Bus. Days	\$60.00
Feline Coronavirus (FCoV) by Real-Time qPCR	Quantitative Reverse-transcriptase Polymerase Chain Reaction, Refrigerate sample	1mL fluid, feces, or tissue	3 Bus. Days	\$71.00
Feline Calicivirus Real-time PCR	Reverse-transcriptase Polymerase Chain Reaction, [Feline]	Oropharyngeal or corneal swab in sterile tube	3 Bus. Days	\$71.00
Feline Calicivirus Titer by IFAT	IFA, [Feline]	0.2 mL serum	3 Bus. Days	\$56.75
Feline Demodex gatoi Real-Time PCR	PCR [Feline]	Skin Scraping or Hair Pluck	3 Bus. Days	\$36.75
Feline Herpes & Calici Real-time PCR Panel	Real-time PCR and RT-PCR, [Feline]	Corneal or oropharyngeal swab	3 Bus. Days	\$115.50
Feline Herpesvirus by IFA (Titer)	IFA Titer (Indirect)	0.2 mL serum	3 Bus. Days	\$58.00
Feline Herpesvirus by IFAT	IFAT (Direct)	Slide prepared from corneal or oropharyngeal or conjunctival swab	3 Bus. Days	\$56.75
Feline Herpesvirus by Real-time PCR	Real-time PCR, [Feline]	Corneal or oropharyngeal swab	3 Bus. Days	\$60.00
Feline Infectious Peritonitis (FIP) by IFAT	IFA (Titer), [Feline]	0.2 mL serum	3 Bus. Days	\$63.50
Feline Leukemia Virus (FeLV) by PCR	Polymerase Chain Reaction	0.5mL EDTA blood	3 Bus. Days	\$60.25
Feline Mycoplasma haemofelis PCR	Real-time PCR (Hemobartenella), [Feline]	0.5 mL EDTA blood	3 Bus. Days	\$66.50
Feline Panleukopenia by Real-time PCR	Real-time PCR, [Feline]	Fresh tissue in sterile container, minimum 0.5g	3 Bus. Days	\$60.00
Feline Upper Respiratory Panel	qPCR of Feline Herpesvirus (FVR), RT-PCR of Feline Calicivirus (FCV) and Chlamydia PCR	Conjunctival or oropharyngeal swab	3 Bus. Days	\$180.25

DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
EQUINE				
Equine Adult Diarrhea qPCR Panel	C Diff Tox A/B, Lawsonia, C Perf Enterotoxin, Coronavirus, Salmonella sp	Feces	Up to 7 Bus. Days	Call Lab
Equine Foal Diarrhea qPCR Panel	Salmonella sp., Rotavirus, Rotavirus, C Diff Tox A/B, C Perf Enterotoxin, C Perf AG, C perf netF, ECV, Crypto sp., PHF Feces, Lawsonia, R equi (send-out test)	Feces, minimum 1g (in sterile container) Calcium alginate and gel bacterial swabs are not accepted.	Up to 7 Bus. Days	Call Lab
EIA (Equine Infectious Anemia) Routine AGID	Coggins test, [Equine] USDA electronic submission form available	1.0 mL serum	3 Bus. Days	\$21.75
EIA (Equine Infectious Anemia) Routine AGID - Digital	Coggins test, [Equine] Electronic submissions to Global Vet Link	1.0 mL serum	3 Bus. Days	\$27.25
EIA (Equine Infectious Anemia) STAT by ELISA	Coggins test by ELISA, [Equine] USDA electronic submission form available	1.0 mL serum	2 hours with prior notice	\$41.00
EIA (Equine Infectious Anemia) STAT by ELISA - Digital	Coggins test by ELISA, [Equine], electronic submissions to Global Vet Link	1.0 mL serum	2 hours with prior notice	\$43.75
Equine Herpesvirus 1 and 4 by qPCR	qPCR, [Equine]	Swab, tissue or EDTA blood	3 Bus. Days	\$120.00
Equine Influenza (Serology)	Hemagglutination inhibition (HI), Send-out test. [Equine]	0.5 mL serum	Up to 10 Bus. Days	Call Lab
Equine Respiratory RT-PCR Panel by Real-time PCR	Equine herpesvirus 1, neurotropic strain, Equine herpesvirus 4, Equine streptococcus equi Real-time PCR, and Equine influenza RT-PCR [Equine]	Swab or wash	3 Bus. Days	\$254.50
Equine Streptococcus equi by Real-time PCR	Real-time PCR, [Equine]	Swab or wash	3 Bus. Days	\$63.50
RUMINANT				
Bovine Abortion Real-time PCR and RT-PCR Panel	BVD RT-PCR, IBR PCR, [Bovine] Refrigerate sample (send-out test)	Tissue	Up to 7 Bus. Days	Call Lab
Bovine Coronavirus (BCoV) by RT-PCR	Reverse-transcriptase Polymerase Chain Reaction, [Bovine]	feces or 1 mL EDTA blood	3 Bus. Days	\$73.00
Bovine Diarrhea Panel - BVDV, BCoV, and Rotavirus	Reverse-transcriptase Polymerase Chain Reaction (RT-PCR) for BVD and BCoV and qRT-PCR for Bovine Rotavirus	feces or 1 mL EDTA blood	3 Bus. Days	\$195.00
Infectious Bovine Rhinotracheitis (IBR) by qPCR	Real-Time Polymerase Chain Reaction	Swab or Tissue	3 Bus. Days	\$60.00
Bovine Respiratory Syncytial Virus (BRSV) by qRT-PCR	[Bovine, Caprine, Ovine]	Conjunctival, nasal, oropharyngeal swab	3 Bus. Days	\$71.00
Bovine Respiratory Panel - BVDV, IBR, RSV	BVD PCR, IBR, qPCR, B-RSV, qRT-PCR	Respiratory swab, Lung swab or tissue	3 Bus. Days	\$191.00
Bovine Viral Diarrhea Virus by RT-PCR	Reverse-transcriptase Polymerase Chain Reaction, [Bovine]	2.0 mL whole blood, purple top or tissue	3 Bus. Days	\$71.00
Bovine Pregnancy ELISA	ELISA, [Bovine] Test is run on Thursdays	1mL serum	5 Bus. Days	\$7.00
EXOTIC AND OTHER				
Bartonella Genera PCR	PCR [Canine, Feline]	0.5 mL EDTA blood	3 Bus. Days	\$64.50
Bartonella henselae by IFA	IFA [Canine, Feline]	0.2 mL serum	3 Bus. Days	\$63.50
IgG Level (RID) Camelid, Equine	RID, [Camelid, Equine]	0.5 mL serum	2 Bus. Days	\$53.50
Mycoplasma haemolama PCR	Eperythrozoonosis, [Camelid]	0.5 mL EDTA blood	3 Bus. Days	\$66.50
Sexing, Psittacine Blood PCR	PCR, [Avian]	0.2 mL EDTA blood	5 Bus. Days	\$53.50
Turtle Respiratory Panel	Turtle Respiratory Panel (includes: Ranavirus Real-Time PCR, Mycoplasma and Herpesvirus by PCR w/Sequencing), [Turtles only]	Swab	Up to 5 Bus. Days	\$185.75
MISCELLANEOUS				
Antinuclear Antibody (ANA) by IFA	IFA, [Canine, Equine, Feline]	0.2 mL serum	3 Bus. Days	\$78.00
Electrophoresis, Protein	Electrophoresis No hemolysis present in serum	0.5 mL serum, thoracic or abdominal fluid	3-5 Bus. Days	\$86.25
Electrophoresis, Urine	Electrophoresis w/Path Interp, [Canine, Equine, Feline]	0.5 mL urine	3-5 Bus. Days	\$93.75
Immunophenotyping Flow - Lymphocyte	Panel includes CD4, CD5, CD8, CD21, CD34,CD45, MHC Class II. Flow cytometry. Special handling required. Please call.	2.0 mL EDTA blood or aspirate	2 Bus. Days	\$162.75
Platelet Bound Antibody Flow	Flow cytometry, No steroid use	3 mL EDTA blood required Ship sample in styrofoam box with ice pack, Monday-Thursday only, NOT Friday	2 Bus. Days	\$74.25



DIRECTORY OF TESTS

TEST NAME	TEST DESCRIPTION, [ACCEPTABLE SPECIES], COMMENTS	SAMPLE SUBMISSION	TURNAROUND TIME	PRICE
Red Blood Cell Surface Antibody Flow	Flow cytometry/Coombs by flow, No steroid	0.5 mL EDTA blood Ship sample in styrofoam box with ice pack, Monday-Thursday only, NOT Friday	2 Bus. Days	\$74.25
Sequencing				Call Lab
Virus Isolation				Call Lab
FEES				
Virology & Immunology STAT fee			by noon the following business day	\$32.00
Virology & Immunology Pooling fee (up to 5 samples)	applies to all PCR tests requesting pooling of 2-5 samples	fee is per 2-5 samples		\$15.00/ per pooling



THE UNIVERSITY OF TENNESSEE COLLEGE OF VETERINARY MEDICINE
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