NORTH CAROLINA VETERINARY DIAGNOSTIC LABORATORY SYSTEM

User Guide
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North Carolina Department of Agriculture and Consumer Services

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Table of Contents

I. Introduction…… 3
II. Submitting Specimens, Submission Forms, Shipping Regulations and Sample Retention…… 5
III. Test Results, Fees, and Billing …….. 8
IV. Rollins Laboratory Sections
A. Pathology…….. 9
Necropsy……... 9
Biopsy & Cytology……... 12
Immunohistochemistry……. 12
B. Bacteriology…….. 12
Specimen Submission Guidelines Chart……... 13
C. Bacterial Serology……. 19
D. Molecular Diagnostics…….. 19
E. Parasitology……... 23
F. Virology…… 24
G. Toxicology/Chemistry…..…… 26
H. Outsource/Referrals…….. 26
V. Test Schedule…….. 26
VI. Reportable Diseases…… 53

NCVDLS Website Link:
https://www.ncagr.gov/divisions/veterinary/ncvdl

I. Introduction

The North Carolina Veterinary Diagnostic Laboratory System (NCVDLS) was established in 1947 by the North Carolina Department of Agriculture. Our mission is to provide veterinarians, the animal industries, and the citizens of North Carolina with accurate and timely laboratory support services to diagnose, conduct surveillance, and assist in responding to and preventing animal disease. Protection of both public health and the food supply are important components of this mission. The laboratory is fully accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and offers services in bacteriology, molecular diagnostics, mycology, parasitology, pathology, serology, and virology and limited services in toxicology. Most Chemistry/Toxicology services are outsourced to the Pennsylvania Animal Diagnostic Laboratory System.

Rollins Laboratory in Raleigh is the full-service central laboratory, with branch laboratory locations in Fletcher (Western), Elkin (Northwestern), and Monroe (Griffin). The laboratories are open Monday through Friday, 8am to 5pm. Emergency after-hours, weekend, and holiday submissions must be arranged by contacting the individual laboratory.

Contacting the Laboratory

Many answers to your questions may be found in this guide. Please feel free to call with any additional questions. When calling for preliminary results, please be prepared to provide the following information so we can assist you more quickly:

- Case accession number (if known)
- Name/address/phone number of submitter
- Owner's name
- Animal identification
- Date of submission

NCVDLS Facilities

Rollins Animal Disease Diagnostic Laboratory

Director of Laboratories – Dr. James Trybus
Assistant Director of Laboratories – Dr. Lalitha Peddireddi
Client Services Coordinator – Dr. Jennifer Haugland
Pathology Services Coordinator – Dr. James Trybus
Avian Pathologist – Vacant
Bacteriology Section Head – Dr. Anil Thachil
Histopathology Section Head – Dr. James Trybus
Molecular Diagnostics Section Head – Dr. Adam Beard
Toxicology Section Head – Dr. Cat Barr
Virology/Serology Section Head – Vacant

FedEx/UPS: 4400 Reedy Creek Road, Raleigh, NC 27607
US Mail: 1031 Mail Services Center, Raleigh, NC 27699-1031
Phone: (919) 733-3986 Fax: (919) 733-0454

Western Animal Disease Diagnostic Laboratory
Resident Director – Dr. David Drum
785 Airport Road, Fletcher, NC 28732
Phone: (828) 684-8188 Fax: (828) 687-3574

Northwestern Animal Disease Diagnostic Laboratory
Resident Director – Dr. Kimberly K Hagans
1689 N. Bridge Street, Elkin, NC 28621
Phone: (336) 526-2499 Fax: (336) 526-2603

Hoyle C. Griffin Animal Disease Diagnostic Laboratory
Resident Director – Dr. Heather Wyss
401 Quarry Road, Monroe, NC 28112
Phone: (704) 289-6448 Fax: (704) 283-9660

Referrals

When clients request tests that are not performed at an NCVDLS facility, we inform them of the situation. When such tests are sent to another laboratory, submission information is shared with the subcontracted laboratory, and the requested tests are tracked in our system. The client account will be billed $20 for shipping & handling, and the client is responsible for fees associated with testing whether they are billed by us or by the outsourced laboratory.

Note: Caseous lymphadenitis (CL) testing is not available at NCVDLS. When serum samples are submitted for multiple tests including CL, please indicate in the submission form that we are permitted to outsource CL testing.

National Animal Health Laboratory Network and Other 'Official' Testing

The Rollins facility is a Tier 1 laboratory and core member of the National Animal Health Laboratory Network (NAHLN) which is a cooperative effort between two USDA agencies, the Animal and Plant Health Inspection Service (APHIS) and the National Institute of Food and Agriculture (NIFA), and the American Association of Veterinary Laboratory Diagnosticians (AAVLD).

Participating laboratories perform routine diagnostic tests for endemic animal diseases, as well as targeted surveillance and response testing for foreign animal diseases. Consequently, samples may be tested for surveillance purposes (see Fee Schedule).

Official regulatory tests may be required by state, federal and/or international agencies for the movement or certification of animals. NCVDLS facilities are approved by the National Veterinary Services Laboratory to perform a variety of official tests. For these types of tests, please ensure that your submission meets any official requirements including being accompanied by an official test chart signed by an accredited veterinarian. Please refer to our Test Schedule (part V) to determine the need for this.

Current import/export requirements are available at https://www.fsis.usda.gov/inspection/import-export by contacting the USDA office (919) 855-7700.

II. Submitting Specimens, Submission Forms, Shipping Regulations, and Sample Retention

Submitting Specimens

Specimens can be delivered in person, by commercial courier service (e.g., FedEx, UPS), or by US Postal Service. **We strongly discourage the shipment of perishable specimens by USPS because slower delivery may compromise specimen quality.** NCVDLS has contracted discounted rates with FedEx for packages weighing 5 lb or less. A flat fee of $10.00 per shipment can ensure overnight delivery. The fee is applied to client accounts each time the service is used. Contact the Rollins Laboratory Business Office at (919) 733-3986 for more information.

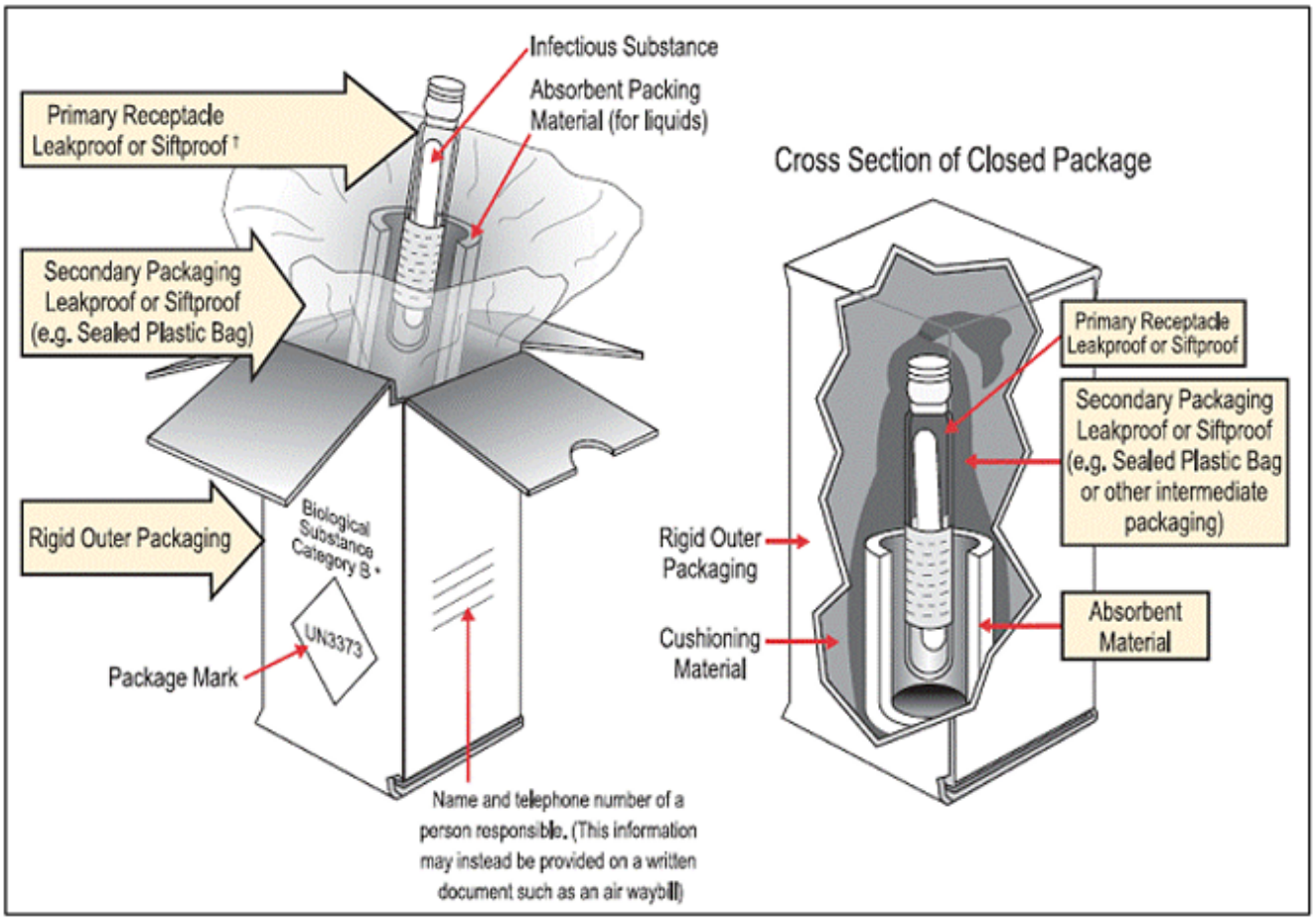
Shipping Regulations

Federal regulations define diagnostic specimens and determine how they are classified, packaged, and transported. These rules apply to the shipment of veterinary specimens to diagnostic laboratories via commercial carriers such as FedEx or UPS. Veterinarians are subject to these rules, and non-compliance can result in very stiff fines. More stringent requirements are in effect for known infectious agents.

Formalin-fixed tissues are exempt but should still be packaged in leak-proof containers with adequate absorbent material.

It is vital that clients who package diagnostic samples for shipment to the laboratory have the required documented training and ensure that each shipment meets the current packaging standards mandated by IATA and USDOT.

Potentially hazardous biological materials must be packaged to withstand content leakage, shocks, temperature changes, pressure changes, and other conditions that can occur during transport. All biological materials must be tripled packaged as diagrammed below.



Please choose a carrier that will deliver specimens within 24-48 hrs of sample collection. Please avoid weekend and holiday deliveries, if possible. Please contact the Rollins Laboratory Business Office for more information (919) 733-3986.

Submission Forms

A completed submission form must accompany specimens submitted to NCVDLS facilities. Forms may be downloaded from the NCVDLS website: https://www.ncagr.gov/divisions/veterinary/ncvdl/Submissions.

- Avian/Poultry Submission Form**:** Use for all avian diagnostic specimens including tissues, live/dead birds, biopsy, and cytology samples.
- Poultry Regulatory Submission Form: Use for serum specimens submitted for avian influenza*, Mycoplasma gallisepticum, M. synoviae, M. meleagridis,* and *Salmonella* testing in association with the National Poultry Improvement Plan.
- Surgical Biopsy and Cytology Submission Form: Use for all cytology specimens (fluid or slides) and biopsy samples obtained from live animals.
- General Submission Form: Use for all other types of specimens, including serum, tissues, swabs, necropsy specimens.
- Swine Test Chart: Use for PRV and/or brucellosis testing. Contact Rollins to request forms.

Fill out the forms completely including owner information and animal identification. Please list specimens being submitted and list test requests for each specimen in the appropriate blanks. The User Guide will help to identify test offerings. **If submission forms are incomplete or if specific tests are not requested, specimen processing/testing will be delayed until the necessary information is provided.**

At the time of receipt, specimens are assigned an accession number which is used to track the specimen throughout the laboratory. Generally, a case coordinator is also assigned to the accession, and they are responsible for the specimens and for reporting test results.

Sample Retention

Specimens submitted to the laboratory become the property of the NCVDLS and may be subject to additional diagnostic testing for state and federal disease surveillance programs.
Sample retention policies are listed below by testing section. Please notify the laboratory *at the time of submission* if longer retention is required.

Necropsy	Carcasses are disposed of following examination unless private cremation is requested. Based on diagnostic necessity and carcass conditions, tissue samples may not be retained. When retained, fresh tissue samples may be stored for 1 month from the date the animal is received. Formalin fixed and frozen tissue samples may be stored for up to 2 months.
Histopathology, Biopsies, and Cytology	Formalin-fixed tissue is retained for 2 weeks. Paraffin embedded tissue blocks are retained for 7 years. Cytology samples are retained for 1 month.
Bacteriology/Parasitology	Samples are generally retained for 2 weeks from the date received unless there is insufficient sample or if sample is forwarded to another department. Milk samples may be frozen and retained for 1 month.
Serology	Chicken and turkey samples for Mg/Ms/Mm are saved for 2 weeks. All Mammalian ELISA samples are saved for 2 weeks. Samples for Brucellosis testing are saved for 1 week unless forwarded to another department. Samples for Leptospirosis testing and saved for 4 weeks.
Virology	Samples are retained for 1 month if space allows.
Molecular Diagnostics	Samples are retained for 1 month if space allows.
Toxicology	Samples are retained for 2 weeks unless there is insufficient sample or it was forwarded to another laboratory for testing.

III. Test Results, Fees, and Billing

Test Results

NCVDLS reports of test results can be distributed by

- Fax
- US Mail
- Web Portal – Clients having an account with username and password can log in to the web portal. Once results are complete and the report is distributed by the case coordinator/ section head, an email is sent to the client notifying them the report is ready to be viewed and/or downloaded from the website https://lims.ncvdl.com/NCVDLSOnline/Login.aspx.
- Email – Reports sent by email are attached as a PDF document and thus are not secure. Since the laboratory has a responsibility to protect client confidentiality, we require a signed waiver of acknowledgment that this method is not secure.

Please contact the Rollins Laboratory Business Office (919) 733-3986 to request a waiver and to set up email as the method of report distribution or with other questions about report distribution.

Turnaround times for our test services appear in the NCVDLS Test Schedule section of this User Guide. Estimated turnaround times are counted in business days from the day the test is assigned (usually at specimen receipt) until the day that results are reported, assuming there are no complications with testing. Note that when laboratory tests are included in necropsy cases, this extends the turnaround time by 2-4 weeks depending on the tests required, occasionally up to 6 or 8 weeks.

NCVDLS recognizes the importance of test results to our clients. If you have questions about a test result, please call us, referring to the laboratory accession number.

Fees

A current Fee Schedule is available on our website at
https://www.ncagr.gov/veterinary/ncvdlfeebrochure
and fees are subject to change without notice.

Billing

Clients are assigned an account number which should be referenced for all billing inquiries to the Rollins Laboratory Business Office. Clients are responsible for payment of all billable services. Please check the Bill To box for the appropriate client on the submission form. If a third party is to be billed, please indicate that on the submission form. Invoices are generated at the end of each month and transmitted to the client for payment. The State of North Carolina requires that all debts be paid within 90 days. Late fees are mandated on accounts that are 30 days past-due at an interest rate of 5 %. Accounts with balances over 90 days past-due are placed on hold and no services can be rendered until bills are paid.

IV. Rollins Laboratory Sections

A. Pathology

Pathology services include performing diagnostic necropsies, histopathological evaluations of tissue samples, immunohistochemistry, and cytology services. All laboratories within the NCVDLS offer diagnostic necropsies. Histopathology, immunohistochemistry, and cytology services are performed exclusively at the Rollins Laboratory. Telephone consultation with a pathologist or diagnostician prior to submissions is particularly encouraged if a case is complex or if the diagnostic investigation involves an ongoing series of submissions.

Necropsy Services

Necropsies are performed at each laboratory from 8 am to 5 pm, Monday through Friday, except for state holidays. Animals received late in the day may not be examined until the following working day.

Non-human primates and their samples are not accepted by NCVDLS except for formalin fixed tissues.

The necropsy fee includes the necropsy examination and when needed, additional testing available in the NCVDLS to help make a diagnosis. The Assigned Veterinarian for the case will decide which in-house tests to run based on clinical history, necropsy findings, and the availability of in-house tests. The low necropsy fee does not permit testing that is not relevant to the presented case. If further in-house laboratory testing is requested, additional charges may apply. Testing done outside of NCVDLS can be requested at the client's expense.

For the best outcome, submit animals for necropsy as soon as possible after death. Submitting a frozen body does not prevent a necropsy, but it does cause delay, additional decomposition, freezing artifacts, and may prevent the isolation of pathogens. Live animals are preferred only in cases of porcine neonatal diarrhea and in diseases of poultry and fish. Refusal of an animal for necropsy is at the discretion of the assigned veterinarian based upon the following: (a) an animal is deemed too decomposed for further diagnostic testing, (b) a recent laboratory submission generated a laboratory diagnosis for a similar problem/issue for a client, therefore another necropsy is unwarranted, and/or (c) a diagnosis has already been obtained and confirmed, therefore a necropsy is unwarranted (e.g., fractured leg, uterine prolapse, chronic laminitis). **Animals refused for necropsy will not be accepted by the laboratory for disposal only.**

Euthanasia: The laboratories do not euthanize companion animals or horses. Euthanasia of cattle, sheep, goats, pigs, and camelids is only performed when the animal is unable to stand and does not struggle. Transporting down cattle is often not humane, so euthanasia prior to transportation is strongly encouraged. There is an additional fee for euthanasia at the laboratories.

Animal Remains: **NC statute (02NCAC52C.0302) prohibits the return of animal remains to the owner or veterinarian. Disposal of the remains is done by mass cremation at the laboratories.** An exemption has been made for private cremation by commercial crematory

services. Whole-body cremation of pet livestock is limited to animals weighing less than 150 lbs. For those weighing more than 150 lbs, the head and heart can be sent to the crematory. Saving the body for private cremation **must be requested by notation on the submission form at the time of submission**. The laboratory's disposal fee is waived only for whole-body private cremation, but the client is responsible for the crematory service charges. Clients are responsible for making their own crematory arrangements and are required to use one of the lab-approved crematories (a list is available). Note that if an animal is tested for rabies virus (or a horse for encephalitis), the body/head and heart will not be released to a crematory until negative tests are received. **If any animal is positive for rabies (or encephalitis in a horse), the body will be mass cremated at the laboratory and will not be released for private cremation due to safety concerns for the crematory personnel.**

Submission Form: Use the Poultry/Avian Submission Form to submit birds for necropsy. Use the General Submission Form to submit all other animals for necropsy. Complete the veterinarian contact information, owner contact information, the animal identification section, and write a thorough history. History should include symptoms, duration, therapy, management practices, ration, and previous history of disease. Clinical history is most helpful when written by the attending veterinarian.

After-Hours Policies: Necropsies are not performed on weekends or on State holidays at any NCVDLS facility unless the situation qualifies as an emergency. Emergency situations are limited to (a) cases of multiple deaths within a flock/herd over a short period of time (24-48 hrs), (b) cases of suspected foreign animal diseases (Foot and Mouth, Virulent Newcastle Disease, etc.), (c) zoonotic diseases. A veterinarian at the Rollins lab facility is on-call after-hours by telephone for consultation purposes. Smaller dead animals can be dropped off after-hours at only the Rollins and Western Laboratories by leaving the animals in an accessible cooler.

- Rollins Lab After-Hours Cooler can accommodate animals weighing less than 300 lbs.
- Western Lab After-hours Cooler can accommodate animals weighing less than 150 lbs.

We encourage clients with non-emergency cases to have animals necropsied by their own veterinarian to prevent decomposition that may preclude the ability to make a diagnosis.

Results

Preliminary gross findings of the necropsy examination are generally reported to the client verbally or by email within 24-36 hrs of completion. A final written report is distributed to the client upon completion of all tests and conclusion of the investigation. Usually, additional laboratory procedures are required to arrive at a diagnosis. **Note that when additional laboratory testing is done in necropsy cases, this extends the turnaround time by as much as 2-4 weeks depending on which tests are required, occasionally up to 6 or 8 weeks**

Legal/Cruelty Cases

Animal cruelty/legal cases are handled in the same manner as routine necropsy submissions. Additional forensic testing such as determining the time of death, forensic entomology, or determining types of accelerants used in burning cases is not performed. Please notify the laboratory at the time of submission if there is a potential cruelty allegation or a legal issue. Any

pictures of the animal must be taken prior to laboratory submission. When poisoning is suspected, please notify the laboratory at the time of submission. Samples may be outsourced for toxicology testing at the client's request and expense. If bullet retrieval is desired in suspected gunshot cases, radiographs should be taken and submitted to the laboratory with the animal.

CWD (Chronic Wasting Disease) Testing
Cervids are tested for CWD at the Rollins laboratory as part of the surveillance program regulated by NCDA and NCWRC. Samples submitted may include heads or tissues obtained by approved collectors. Testing is performed by immunohistochemistry (IHC) using the USDA/ NVSL-approved protocol. When entire heads are submitted, a $6 organ pluck fee is added. Any suspect result is sent to NVSL for confirmation.

Rabies Testing
Testing is performed on fresh brain tissue by the North Carolina State Laboratory of Public Health located in Raleigh. The NCVDLS is not to be used for the transshipping to the Public Health Lab. Questions regarding animal or human exposure should be addressed to the patient's veterinarian or physician, county animal control agency, county health department, or the NC Public Health Veterinarian/Epidemiology team. **If only rabies testing is desired**, veterinarians or owners should contact their county Animal Control or Health Department. More information about rabies can be found at https://epi.dph.ncdhhs.gov/cd/lhds/manuals/rabies/testing.html or by calling the Public Health Laboratory at (919) 733-7544 during regular hours of operation (7:30 am-4:30 pm weekdays).

Field Necropsy Guidelines
When collecting tissues in the field, patient history, clinical signs, and gross lesions should determine which tissues to collect. Proper selection and preservation of samples is critical. **Please call the appropriate laboratory and speak to a veterinary pathologist or diagnostician at any time if you have questions concerning specimen selection, collection, or transport.**

1) Specimens for histopathology should include multiple slices of appropriate organs, including lesions, transitional zones, and adjacent grossly normal tissue. When in doubt, collect specimens from multiple organs, including brain. For feline cardiomyopathy cases, submit the entire opened heart. Specimens should be less than ¼" thick (formalin penetrates only ⅛ " in the critical first 24hrs of fixation) and placed in leak-proof, wide-mouthed solid containers with a formalin-to-tissue ratio of 10 to 1. **NOTE**: DO NOT refrigerate specimens during the fixation process, as this will delay penetration of formalin into the tissues.
2) Fresh specimens should be large enough to demonstrate the lesion yet small enough to allow for rapid chilling. Fresh samples should be packaged individually to prevent cross-contamination in properly labeled, leak proof containers. Tied off loops of intestine or containers of intestinal contents are preferred over swabs. Tied off loops of intestine must be packaged separately from other tissues.
3) See Test Schedule for additional information about preferred samples and preservation.

The three conditions that most frequently interfere with a diagnosis are

- Advanced postmortem autolysis

- Sample collection too late in the course of disease
- Inappropriate sample selection.

With each submission, include signalment, clinical history, and differential diagnoses, and provide a list of specimens.

Biopsy and Cytology Services

Submission of surgical biopsies, aspirated fluids, and slides made from aspirates should be accompanied by a completed Surgical Biopsy and Cytology submission form. Include the following crucial information for in-depth and accurate interpretation of the samples:

- Animal name and signalment (age, breed, and sex)
- Method used to obtain the sample (e.g., excisional biopsy, incisional biopsy)
- Information pertaining to the location, size, duration of the lesion and response to treatment, if any.

For smaller tissue samples, fixation is complete within 24 hrs and a decreased volume of formalin may be used for shipping. Surgical biopsies should be submitted in one piece for margin evaluation. Larger samples can be partially incised through the skin (not the surgical margins) to enhance fixation.

The preferred sample for cytologic evaluation is a smear of the aspirate on glass microscope slides. Samples such as transtracheal washes and effusions can be submitted in an EDTA tube. Note that EDTA samples are not suitable for bacterial culture. DO NOT submit cytology slides in the same package with samples in formalin! Formalin fumes cause artifacts that preclude accurate slide evaluation. Turnaround time for cytology and biopsy submissions is usually 8 days or less.

Immunohistochemistry (IHC) Services

Additional diagnostic tests for infectious agents and cell markers are available by IHC and may be recommended by the case pathologist. IHC is performed on formalin-fixed tissue samples from diagnostic necropsies, mail-in biopsies, and bovine ear notches (for bovine viral diarrhea virus).

B. Bacteriology

The Rollins Bacteriology Section provides isolation and identification of a wide variety of aerobic and anaerobic bacteria, fungi, and mycoplasmas. The Bacteriology Section also performs parasitology services at Rollins, see Parasitology section for details.

Bacteriology Submission Guidelines

The value of bacterial culture is directly dependent upon the quality of the specimen. Improperly collected or transported specimens may lead to erroneous culture results. The following general guidelines should be considered:

1. Collect specimens aseptically from an appropriate site, during the acute stage of disease, and prior to antimicrobial therapy.

2. Submit generous volumes, if possible.
3. Submit a separate sample for each discipline/department requested (bacteriology, cytology, etc.)
4. Avoid swab specimens, if possible. Swabs are easily contaminated and most often do not provide a sufficient volume of specimen for culture.
5. Place specimens in an appropriate transport media to maintain a buffered and non-nutritive environment and to prevent desiccation. Make sure the transport media has not passed the manufacturer's expiration date.
6. Place multiple tissue specimens in separate containers to prevent cross-contamination.
7. Use an indelible marker to label specimens with the location (tissue) and animal species of origin.
8. Generally, refrigerate specimens immediately after collection and ship to the laboratory with cold packs.
9. Package specimens carefully to ensure there will be no leakage or breakage in transit.
10. Always indicate the test request on the submission form.
11. Antimicrobial susceptibility testing (AST) is available for aerobic bacteria only. It can be performed either by Kirby-Bauer disk diffusion (default) or Microbroth dilution MIC method. **If a specific AST is preferred, note this on the submission form.**
12. Susceptibility tests are conducted in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines and are performed on isolates deemed to be clinically significant. Susceptibilities may not be performed on isolates that represent normal flora or common contaminants, as it will not provide useful information and may lead to inappropriate antimicrobial therapy. We are unable to perform susceptibilities on fastidious organisms for which there are no recommended guidelines or interpretive criteria.
13. Different microbiologic culture procedures require different times for completion depending on organism growth rate. Refer to Test Schedule for further details.

BACTERIOLOGY SPECIMEN SELECTION & TRANSPORT GUIDELINES

CONDITION	POSSIBLE ETIOLOGIC AGENTS	SPECIMEN(S)	COLLECTION/ TRANSPORT
Abortion	*Brucella* species (spp.) *Campylobacter* spp. *Leptospira* spp. *Listeria monocytogenes* Many others	Fetus: fresh, intact fetus or fetal lung, liver, brain, kidney, stomach contents. Fetal thoracic fluid. Dam: Placenta with cotyledons, vaginal discharge or swab, cervical mucus.	Refrigerated.
Abortion, mycotic	*Aspergillus* spp. zygomycetes	Placenta with cotyledons. Fetal stomach contents and/ or skin lesions.	Refrigerated.

CONDITION	POSSIBLE ETIOLOGIC AGENTS	SPECIMEN(S)	COLLECTION/ TRANSPORT
Abscess	*Actinomyces* spp. Anaerobes *Trueperella pyogenes* *Pasteurella multocida* Staphylococci Streptococci	Exudate or swab in transport medium. Biopsy in sterile saline.	Refrigerated with exception of anaerobes, which need to be at room temperature.
Actinomycosis or actinobacillosis	*Actinomyces bovis* *Actinobacillus lignieresii*	Exudate with granules or lesion. Swab of abscess material in transport medium or collected in syringe w/o needle.	Refrigerated.
Anaerobic infections	Clostridia *Bacteroides* spp. *Fusobacterium* spp. *Prevotella* spp. *Porphyromonas* spp.	Large piece of affected tissue. Exudates/ swabs need to be in anaerobic transport medium. Ligated segments of affected intestine.	Room temperature.
Arthritis	Streptococci *Trueperella pyogenes* *Haemophilus* spp. *Erysipelothrix rhusiopathiae* *Mycoplasma* spp. *Staphylococcus aureus*	Entire affected joint from smaller animals. Synovial tissue in sterile saline. Joint swab in transport medium. Joint fluid collected in blood culture medium or in sterile syringe w/o needle.	Refrigerated. Blood culture medium needs to be at room temperature.
Atrophic rhinitis of swine	*Bordetella bronchiseptica* and/or *Pasteurella multocida*	Ante-mortem: Deep swab of nasal cavity, placed in sterile saline. Tonsil swab or biopsy in sterile saline. Post-mortem: Send entire snout or turbinate swabs in an aerobic transport medium such as Stuart's.	Refrigerated.
Bartonellosis	*Bartonella* spp.	Blood in blood transport medium. Heart valves, lymph node aspirates in a sterile container.	Blood culture medium at room temperature. Tissues refrigerated or frozen.
Black leg, gangrene	*Clostridium chauvoei,* *C. novyi,* *C. perfringens,* *C. septicum,* *C. sordellii*	Fresh piece of muscle with lesion. Impression smear slides from affected tissue for fluorescent antibody test.	Room temperature.
Botulism	*Clostridium botulinum*	Food suspected of containing toxin. Ligated sections of fresh intestine. Large section of liver. Serum. Samples may be forwarded to a reference lab.	Refrigerated tissues. Frozen serum.

CONDITION	POSSIBLE ETIOLOGIC AGENTS	SPECIMEN(S)	COLLECTION/ TRANSPORT
Bovine respiratory disease	*Histophilus somni* *Pasteurella multocida* *Mannheimia haemolytica* *Mycoplasma* spp.	Ante-mortem: Transtracheal aspirate in sterile container, or deep nasal swab. Post-mortem: Lung at demarcation between normal and affected tissue.	Refrigerated.
Brucellosis reactor	*Brucella* spp.	Ante-mortem: Milk, vaginal secretions, semen, blood cultures, hygroma (fluid from a swollen joint). Post-mortem: Head, mammary and genital lymph nodes, spleen, reproductive organs.	Refrigerated. Must be received with animal identification tag.
Campylobacteriosis – reproductive / abortion *Vibrio* culture (ruminant)	*Campylobacter fetus* ss. *venerealis* (Vibrio abortion), or ss. *fetus*	Aborted fetus, or fetal lung, liver, stomach contents; placenta. Male: Preputial mucus or secretions, semen. Female: Cervical or vaginal mucus.	Refrigerated. Must be received within 24-48 hrs of collection. Frozen tissue specimens are also acceptable. For vaginal/cervical mucus, preputial smegma, or semen: Contact lab prior to submittal for special sample collection and transport instructions.
Campylobacteriosis – abortion/ stillbirth (ruminant)	*Campylobacter jejuni*	Fresh aborted fetal tissues and/or placenta.	Refrigerated. Must be received within 24-48 hrs of collection. Frozen tissue specimens are also acceptable.
Campylobacteriosis – gastrointestinal disease	*Campylobacter jejuni*	Fresh diarrheic feces, rectal/fecal swabs collected in bacterial transport media for maintaining *Campylobacterium* viability.	Refrigerated. Delivered within 24-48 hrs of collection. Frozen specimens also acceptable.
Campylobacteriosis – poultry/ ratites	*Campylobacter jejuni*	Liver, bile, or gall bladder.	Refrigerated. Delivered within 24-48 hrs of collection. Frozen specimens also acceptable.
Caseous lymphadenitis	*Corynebacterium pseudotuberculosis*	Affected lymph node; abscesses, exudates in sterile container; swabs in aerobic transport medium.	Refrigerated.

CONDITION	POSSIBLE ETIOLOGIC AGENTS	SPECIMEN(S)	COLLECTION/ TRANSPORT
Colibacillosis	*Escherichia coli*	Affected portions of intestines, fresh feces, or fecal swabs in aerobic transport medium.	Refrigerated.
Cystitis	*Escherichia coli* *Proteus* spp. *Enterococcus* spp. *Staphylococcus aureus*	5-10 mL fresh urine in urine culture tubes or a sterile container. Bladder swabs in aerobic transport medium.	Refrigerated. Ice packs preferable. Deliver within 24 hrs of collection.
Dermatophytosis (ringworm)	*Microsporum* spp. and *Trichophyton* spp.	Skin scrapings or hairs. Swabs NOT suitable.	Room temperature.
Dermatophilosis ("rain rot")	*Dermatophilus congolensis*	Scabs and crusts in sterile container. Skin biopsy in sterile saline.	Room temperature.
Enterotoxemia	*Clostridium perfringens*	Several ounces of fresh intestinal content in sterile container.	Refrigerated. Frozen specimen preferred.
Enteritis (diarrhea)	*Escherichia coli* *Salmonella enterica* Others	Fresh, diarrheic feces in sterile container. Tied-off loops of affected intestine.	Refrigerated.
Erysipelas	*Erysipelothrix rhusiopathiae*	Acute form: Heart blood, kidney, spleen, liver. Arthritic and cardiac form: joints and heart valves (swabs in aerobic transport medium).	Refrigerated.
Greasy pig disease, exudative epidermitis	*Staphylococcus hyicus* *Streptococcus* spp.	Skin scrapings in a sterile container. Skin swabs in aerobic transport medium.	Refrigerated.
Glässers disease ("Hps")	*Haemophilus parasuis*	Brain, heart, lung, and intact, swollen joints or other organs with fibrinous coating. Swabs are not acceptable.	Refrigerated.
Keratoconjunctivitis, bovine	*Moraxella* spp.	Conjunctival swabs in aerobic transport medium.	Refrigerated. Must arrive at lab within 24 hrs of collection.
Interdigital dermatitis ("Footrot")	*Dichelobacter nodosus* *Fusobacterium necrophorum*	Surgical biopsy of affected tissue in anaerobic transport medium.	Room temperature
Listeriosis	*Listeria monocytogenes*	Neural form: Brain stem. Visceral form: Liver. Abortion form: Placenta and fetus or fetal stomach contents. Feed samples.	Refrigerated.
Mastitis	*Staphylococcus* spp. *Streptococcus* spp. *Mycoplasma* spp. Coliforms, many more	5-10 mL milk collected in a sterile, leakproof container.	Refrigerated or frozen. Samples may be frozen for up to 2 weeks.

CONDITION	POSSIBLE ETIOLOGIC AGENTS	SPECIMEN(S)	COLLECTION/ TRANSPORT
Meningitis	*Streptococcus* spp. *Streptococcus suis* *Histophilus somni* *Cryptococcus neoformans*	Ante-mortem: Aseptically collected cerebrospinal fluid in blood culture medium. Post-mortem: Brain, meningeal swabs in aerobic transport medium	Blood culture medium at room temperature. Refrigerated tissues.
Mycobacteriosis (other than Johne's disease or tuberculosis)	Rapidly growing *Mycobacterium* spp.	Skin lesions, draining tract swabs, biopsies, body fluids, tissues with granulomatous lesions, feces.	Refrigerated.
Mycoplasmosis	*Mycoplasma* spp.	Ante-mortem: Tracheal exudates and aspirates, milk, choanal or conjunctival swabs, joint fluid. Swabs must be in appropriate transport medium. Post-mortem: Lung tissue with bronchi, trachea, sinuses, air sacs, intact affected joint.	Refrigerated and delivered within 48 hrs of collection. Frozen tissue specimens are suitable.
Nocardiosis	*Nocardia asteroides* and other spp.	Biopsy in sterile container. Aspirates, exudates (to include granules). Transtracheal wash in sterile container.	Room temperature.
Otitis externa	*Proteus* spp. *Pseudomonas* spp. *Staphylococcus* spp. *Streptococcus* spp. Many other bacteria Yeasts (*Malessezia*)	Ear swab placed in aerobic transport medium.	Refrigerated.
		Impression smear slide.	Room temperature.
Pleuropneumonia of swine ("APP")	*Actinobacillus pleuropneumoniae*	Portion of affected lung, or other tissues with lesions.	Refrigerated.
Pseudomembranous colitis	*Clostridium difficile*	Affected portion of colon, colon contents in anaerobic transport medium.	Refrigerated/frozen.
Pyelonephritis, bovine	*Corynebacterium renale*	Ante-mortem: Midstream sample of urine in a sterile container. Post-mortem: Portion of affected kidney, ureter, bladder and urethra.	Refrigerated.
Rhodococcal pneumonia of foals	*Rhodococcus* spp.	Ante-mortem: Transtracheal wash in sterile container. Post-mortem: Fresh lung with lesions and respiratory lymph nodes.	Refrigerated.

CONDITION	POSSIBLE ETIOLOGIC AGENTS	SPECIMEN(S)	COLLECTION/ TRANSPORT
Salmonellosis	*Salmonella enterica*	Ante-mortem: Fecal swabs or 1-5g feces from diarrheic animals. Collect 3-5 specimens at 12-24hr intervals. Post-mortem: Intestines, liver, gall bladder, spleen, lung, lymph nodes, bone marrow, feces, intestinal contents.	Refrigerated.
Septicemia	Staphylococci Streptococci Enteric bacteria Others	Ante-mortem: Blood collected aseptically during a febrile spike in a blood culture system.	Room temperature.
		Post-mortem: Heart blood, bone marrow, spleen, liver, lungs.	Refrigerated.
Sporotrichosis	*Sporothrix schenckii*	Biopsy material from unopened skin nodules or scrapings from skin ulcers, placed in sterile containers with saline.	Refrigerated.
Strangles, equine	*Streptococcus equi* ss. *equi*	Abscess material on swab in aerobic transport medium or in syringe w/o needle.	Refrigerated.
Swine dysentery/ spirochetal colitis	*Brachyspira hyodysenteriae* *Brachyspira pilosicoli* or other spp.	Ante-mortem: Fecal or rectal swabs in anaerobic transport medium. Post-mortem: Spiral colon, colonic scrapings, feces.	Refrigerated.
Systemic fungal infections (blastomycosis, histoplasmosis, coccidioidomycosis, cryptococcosis)	*Blastomyces dermatitidis* *Coccidioides immitis* and C. *posadasii* *Histoplasma capsulatum* Cryptococci	Exudates from draining tracts/ lesions; transtracheal washes; CSF; ocular fluid; prostatic fluid; urine; lymph node aspirates/ biopsies; bone; other tissues with lesions. Place in sterile container with saline.	Refrigerated except CSF, which should be room temperature.
Tuberculosis	*Mycobacterium* spp.	Affected portions of lung, liver, spleen, lymph nodes (mediastinal, cranial, bronchial, portal). Bone marrow. Other tissues/organs with granulomatous lesions.	Refrigerated. Testing not performed by NCVDLS. Tissues forwarded to NVSL for culture.
Tularemia	*Francisella tularensis*	Heart blood, liver, spleen, bone marrow, or other organs with white necrotic foci.	Refrigerated. Must state on submission form "tularemia suspect".

C. Bacterial Serology

Serum samples from various animal species are tested for antibodies to infectious agents. NCVDLS also performs regulatory testing for brucellosis, avian mycoplasmosis, and anaplasmosis.

Blood samples deteriorate quickly and should be packaged to stay cool during transit. Whenever possible, serum samples should be poured off the clot and shipped cold or frozen. If paired samples are to be tested, the acute serum should be held frozen and sent to the laboratory along with the convalescent serum sample for parallel testing.

Instructions for collecting poultry blood samples:

1. Collect at least 500 µl (0.5 mL) blood, but do not overfill the blood tube. The tube should be about half full of blood.
2. Place the blood tubes in the cardboard tube box and tilt the box approximately 30 degrees. After collection, the samples should be transferred to a room temperature environment (≈70° F) as soon as possible.
3. Keeping the box tilted, samples should be allowed to clot at room temperature for approximately 1 hr. Do not refrigerate the samples before they have had time to clot.
4. Once the samples have clotted, refrigerate them until they can be brought to the lab.
5. Samples should be submitted to the lab within 24 hrs of collection. If this is not possible, keep the samples refrigerated until they can be delivered to the lab.
6. Do not hold refrigerated samples for more than 4 days prior to delivery to the lab. If long-term storage is required, the serum should be removed from clots and frozen.
7. If you wish to freeze the sample, remove the serum from the clot and transfer it to a clean tube with a cap. Do not freeze the serum while still on the clot.

D. Molecular Diagnostics

Nucleic acids (DNA/RNA) present in all living things are specific to each organism. Molecular diagnostics use **polymerase chain reaction (PCR),** a highly sensitive and specific amplification method, to detect organism-specific DNA/RNA. Detection of a target DNA/RNA sequence provides direct evidence of the organism's presence in the specimen. Maintaining nucleic acid integrity through proper specimen collection, handling, and transport is essential for reliable results.

<u>General Requirements for Molecular Diagnostics</u>

- Use clean, leak-proof, indelibly labeled containers (animal ID, collection date).
- Avoid overfilling; ensure exterior is free from contamination.
- **Swabs**: Only sterile synthetic tips (Dacron, rayon, nylon) with plastic shafts are only acceptable swab types for PCR. **Note**: Wooden shafts with cotton tips or calcium alginate swabs are not acceptable for PCR.
- Indicate number/type of swabs per tube on the submittal form.
- Follow validated storage/transport guidelines to prevent degradation or contamination.

Avian Influenza

Avian influenza is an acute and highly contagious viral disease of birds that is often characterized by high mortality in all age groups. Submit tracheal or oropharyngeal swabs in Brain Heart Infusion (BHI) broth or a commercial transport medium (Remel MicroTest M4 Transport Medium; up to 5 swabs may be pooled in 3 mL medium or up to 11 swabs in 5.5 mL tube of medium (5 mL BHI is acceptable when 5.5 mL BHI is not available). Plastic swabs/ polyester tips are required. Wooden swabs/ cotton tips will be rejected. **Dry swabs are not suitable and will be rejected.** Incomplete forms or missing information may result in testing delays. Samples should be shipped with cold packs for next-day delivery.

To test for Influenza A Virus infection in other mammals, NCVDLS is required to contact the NAHLN regarding species and acceptable sample types. Please contact the laboratory prior to submitting samples from mammalian species other than bovine (milk), feline, or swine.

*Avian Metapneumovirus

Avian metapneumovirus (aMPV) is a highly contagious upper respiratory viral disease of poultry including turkeys, layers, broilers, and breeders. Severity and symptoms depend on the bird species and virus type (A, B, C or D). Accurate and early detection of aMPV is critical to controlling its spread, differentiate from other respiratory infections (including avian influenza and infectious laryngotracheitis), manage secondary infections, incorporate appropriate management practices, and prevent significant economic losses associated with it. Rollins Lab offers the following tests for aMPV: virus isolation, ELISA **(antibodies to Type A, B and C)**, and a multiplex real-time RT-PCR (which simultaneously detects and differentiates **Type A and B).** For ELISA testing, submit serum samples. For PCR, submit individual tracheal swabs in closed tubes or pooled in **groups of three** in 3 mL BHI, or freshly excised tracheas in sealed bags. Keep refrigerated until shipping with cold packs for overnight delivery.

* ***Note:***

The abbreviation used for Avian Metapneumovirus (**aMPV**) can be confused with **APMV-1** (Avian Paramyxovirus). To avoid confusion and ensure accurate test ordering, we have changed **Avian Paramyxovirus abbreviation to NDV**. Please select NDV or spell out the test name when ordering the tests.

Avian Reovirus

Avian reovirus is widespread in domestic and wild birds, especially broilers, breeders, and turkeys, causing viral arthritis and tenosynovitis with significant economic impact. Testing is performed via real-time RT-PCR on tendon tissue, tendon swabs, or confirmed virus isolates. Samples should be shipped chilled with cold packs. Results are usually available in 2-7 business days following sample receipt.

Bovine Viral Diarrhea Virus

Bovine viral diarrhea virus (BVDV) is an economically important disease of ruminants that causes respiratory and reproductive problems. The laboratory offers multiple methods to detect BVD virus: Virus isolation, IHC, PCR and antigen-capture ELISA, chosen based on clinical scenario and herd testing goals. For test selection assistance call the lab to consult with a diagnostician. For PCR, **serum** from cattle (and camelids) is preferred; pools of up to five serum samples allowed in pooled testing.

Clostridium perfringens genotyping

Genotyping is performed on pure bacterial isolates obtained from intestinal tissue of affected animals. Purity and species identity are confirmed prior to genotyping. Isolates/ cultures should be shipped chilled with cold packs.

E. coli genotyping

Pathogenic *E. coli* are differentiated by virulence genes, enterotoxins (associated with diarrhea) and adhesins (aid in attachment to and colonization of intestinal cells). The multiplex PCR screens for enterotoxin genes (LT, STa, STb), cytotoxin necrotizing factor genes (CNF1, CNF2), adhesins (K88, K99, 987P, F41, F18, eae) and Shiga-like toxins (Stx1, Stx2 and Stx2e) in bovine, ovine, caprine, equine, porcine, canine, and feline pathogens.

Equine Herpes Virus

Two closely related equine herpes viruses, EHV-1 and EHV-4, cause equine rhinopneumonitis; A neurological form of EHV-1 (mutated form) also causes equine herpesvirus myeloencephalopathy (EHM). EHV-1 (and occasionally EHV-4) can also cause abortion and neonatal deaths and sometimes referred to as equine abortion virus. Virus remains latent throughout life in almost all horses exposed to EHV. After the primary respiratory infection, reinfection or recrudescence may occur with few clinical signs. Rollins performs three real-time PCR assays: one specific to EHV-1, one to EHV-4 (both targeting gB gene), and a third targeting an SNP in ORF30 of EHV-1 to identify neuropathogenic strains. These PCRs detect viral nucleic acid but do **not distinguish presence of infectious virus**.

Infectious Bronchitis

Infectious bronchitis is a highly infectious upper-respiratory disease of chickens, which can also affect kidneys (nephrogenic strain) and reproductive system resulting in huge economic losses. Submit individual tracheal swabs in closed tubes or pooled in groups of three in 3 mL BHI, or freshly excised tracheas in sealed bags. Keep refrigerated until shipping with cold packs for overnight delivery.

Infectious Laryngotracheitis

Infectious Laryngotracheitis is highly contagious upper-respiratory disease of poultry caused by an alphaherpesvirus. Submit individual tracheal swabs in closed tubes or freshly excised tracheas in sealed bags. Keep refrigerated until shipping with cold packs for overnight delivery.

Lawsonia intracellularis

Lawsonia intracellularis causes proliferative enteropathy (PE) or ileitis in swine and other domestic animals resulting in serious economic losses. This bacterium causes proliferation of intestinal cells, resulting in enteric disease or even death. Submit fresh, affected intestinal segments or fecal samples from animals suspected of having PE. These should be stored in the freezer and shipped to the laboratory with cold packs or dry ice.

Note: *Lawsonia* organisms are shed intermittently in the feces. Tests on multiple samples may be necessary to detect the presence of this agent.

Mycoplasma gallisepticum and *Mycoplasma synoviae*

Mycoplasma gallisepticum is one of the etiological agents of chronic respiratory disease in hens and infectious sinusitis in turkeys. *Mycoplasma synoviae* is responsible for a subclinical infection

of the respiratory tract and causes synovitis. Submit tracheal swabs (up to 5 per pool) placed in 3 mL BHI broth or freshly excised tracheas in sealed bags. Samples should be shipped with cold packs for next-day delivery.

*Newcastle Disease Virus – ***Please contact laboratory prior to submission***.
Newcastle Disease Virus (**NDV**; also avian paramyxovirus-1, APMV-1), previously known as exotic or velogenic viscerotropic Newcastle Disease Virus, causes a highly contagious and fatal viral disease affecting all avian species. Rollins offers National Animal Health Network (NAHLN) PCR test that detects both lentigenic and velogenic/virulent forms of the virus. All samples will be first screened for NDV-matrix gene sequences, after which any matrix positive samples will then be tested by vNDV PCR assay. Submit tracheal or oropharyngeal swabs in Brain Heart Infusion (BHI) broth or a commercial transport medium (Remel MicroTest M4 Transport Medium; up to 5 swabs may be pooled in 3 mL medium or up to 11 swabs in 5.5 mL tube of medium (5 mL BHI is acceptable when 5.5 mL BHI is not available). Plastic swabs/ polyester tips are required. Wooden swabs/ cotton tips will be rejected. **Dry swabs are not suitable and will be rejected.** Incomplete forms or missing information may result in testing delays. Samples should be shipped with cold packs for next-day delivery.

* ***Note:***
The abbreviation used for Avian Metapneumovirus (**aMPV**) can be confused with APMV-1 (Avian Paramyxovirus, also **Newcastle Disease Virus**). To avoid confusion and ensure accurate test ordering, we have changed **Avian Paramyxovirus abbreviation to NDV**. Please select NDV or spell out the test name when ordering the tests.

Porcine Circovirus 2/3 (PCV 2/3) real-time PCR
PCV2 is associated with post weaning multi-systemic wasting syndrome (PMWS), also known as porcine circovirus type 2 systemic disease (PCV2-SD) and porcine circovirus type 2 subclinical infection (PCV2-SI); PCV3 has been associated with signs similar to PCV2, however, many infections seem to be subclinical. PCV3 has been associated with neurological disease, reproductive failure, respiratory disease, enteric disease, and porcine dermatitis and nephropathy syndrome (PDNS). Acceptable samples for PCR are: Serum, blood, body cavity fluid, swabs, urine, feces, and tissue homogenates.

Porcine Reproductive and Respiratory Syndrome
PRRS virus causes abortions, infertility, and pneumonia in swine. The multiplex PCR distinguishes US and European strains. Submit fresh lung tissue, fetal thymus, fetal thoracic fluid, serum, or lung lavage fluid. Ship samples with cold packs for next-day delivery.

Swine Enteric Coronavirus Disease
Swine Enteric Coronavirus Disease is a highly contagious disease caused by a group of emerging porcine coronaviruses, including porcine epidemic diarrhea virus (PEDV) and porcine delta coronavirus (PDCoV) which can cause high morbidity and variable mortality. This infection may resemble other viral diseases such as Transmissible gastroenteritis (TGE). PCR tests offered at Rollins can detect and differentiate PEDV, PDCOV and TGE. Submit fresh lung tissue, fetal thymus, fetal thoracic fluid, serum, or lung lavage fluid, with cold packs for next-day delivery.

Swine Influenza

Swine influenza virus is an acute, highly contagious respiratory disease. Lung tissue or bronchial or nasal swabs should be submitted for testing. Keep samples refrigerated and ship with cold packs for next day delivery.

Turkey Coronavirus

Turkey coronaviruses cause diarrhea in young turkey poults, with most severe clinical signs and highest mortality in poults under 1 month of age. For PCR testing, submit intestinal tissue or intestinal swabs (pool up to 5 specimens), with cold packs for next-day delivery.

West Nile

WNV is a mosquito-transmitted virus that causes inflammation or swelling of the brain and spinal cord in horses and humans. Submit brain stem, cerebellum, and cerebrum from clinically affected animals for testing. These sections should be placed in individual bags, labeled, and stored in the refrigerator until they can be shipped to the lab with cold packs for overnight delivery.

E. Parasitology

Limited parasitology services are available at NCVDLS and include fecal flotation, centrifugation-sucrose, modified McMaster's, *Tritrichomonas foetus* culture, and fluorescent antibody testing for *Cryptosporidium* and *Giardia* (performed as duplex testing). Please refer to the Test Schedule to see which location performs which tests.

These services are NOT available: heartworm check, Baermann floatation.

Fecal Examination

Fecal samples must be fresh for accurate results. If specimens have been in the environment for several hours or days, many fragile protozoan parasites may have died or disintegrated. Nematode eggs often hatch rendering them more difficult to identify. Also, free-living soil nematodes, fly larvae, or mites may invade the specimen on the ground and cause difficulty in the differentiation of hatched parasite larvae from non-pathogenic species.

Submit specimens in individual sealed containers; plastic specimen cups, zip top, or Whirl-pack® bags are recommended. Label the container with the animal identification and date of collection using an indelible marker. **DO NOT send feces in OB sleeves or exam gloves.** A minimum of 5 g feces is necessary for accurate results. If samples are greater than 2 hrs old, they should be held refrigerated and shipped to the laboratory packed in ice or other coolant. Results are usually available within 48 hrs of receipt.

Fecal Floatation

Zinc sulfate solution is used. Results for this qualitative test are reported as few, moderate or many.

Quantitative Floatations (EPG)

- Modified McMaster's: Zinc sulfate solution is used. For ruminant and equine samples, only trichostrongyle/strongyle–type ova are counted. For camelid samples, all ovum types are counted.

- Centrifugation Sucrose: Sheather's sugar solution is used. This is the recommended test for camelids when looking for *Eimeria macusaniensis.* All ovum types are counted.

Cryptosporidium and *Giardia*
The Rollins and Western Laboratories offer a direct immunofluorescence assay for the detection of *Cryptosporidium* oocysts and *Giardia* cysts from stool specimens. Specimens should be submitted in 10% formalin (1:1 ratio) or SAF fixative (sodium acetate formalin). Specimens should **not** be preserved in polyvinyl alcohol.

Parasite Identification
Parasite identification is performed at NCSU/CVM through a cooperative agreement. Specimens should be sent to the Rollins Laboratory. Helminths and external arthropod parasites should be submitted in leak-proof vials or small jars containing 70% ethanol or 10% formalin and labeled appropriately. When mites are suspected, skin scrapings should be placed in glycerin in a tightly sealed vial. Results generally take 7 days.

Tritrichomonas species
Clinical studies have demonstrated the superiority of the In-Pouch® proprietary system for the collection, transport, and cultivation of *T. foetus* in cattle, *T. gallinae* in birds, and intestinal trichomonads in felines. Media are available from the Rollins Laboratory on a limited basis or may be purchased directly from the manufacturer (Bio-Med Diagnostics, Inc., 800-964-6466 or https://biomeddiagnostics.com/prepared-culture-media/inpouch-tf-bovine). Specimens should be collected per the manufacturer's instructions, held at 15-37° C and shipped to the laboratory as soon as possible. Allow a minimum of 7 days for test completion.

F. Virology

The Virology Laboratory Section provides virus isolation and identification testing for mammalian and avian viruses. The laboratory uses cell culture and embryonating eggs to isolate virus. Specific viruses are identified by fluorescent antibody (FA), virus neutralization (VN, SN), agar gel immunodiffusion (AGID), hemagglutination (HA), hemagglutination-inhibition (HI) and/or polymerase chain reaction (PCR) tests. The laboratory utilizes antigen-capture to assist in identifying viruses by direct examination.

The Virology Section also conducts tests for antibodies to specific viruses by virus neutralization (VN/SN), enzyme-linked immunosorbent assay (ELISA), agar gel immunodiffusion (AGID), hemagglutination-inhibition (HI) for economically important mammalian and avian viruses.
As we are continuously adapting our testing capabilities to best fit our clients' needs, feel free to contact the laboratory directly if you have questions about the availability of testing.

General Requirements for Virology Submissions
The quality of the sample submitted for testing directly impacts the reliability of test results. Samples should be collected and kept cold prior to and during shipping. When possible, samples should be sent to the lab within 24 hrs of collection. Overnight shipment through FedEx or UPS is recommended.

Equine Infectious Anemia (EIA)/Coggins Test

1. All testing is done in accordance with USDA rules and regulations (9CFR75.4, VS Memo 555.7 and 555.16).
2. Only a licensed and accredited Veterinarian may submit samples for testing.
3. Samples must be accompanied by an appropriate submission form.
   - The Rollins laboratory participates in electronic submission through Global Vet Link (GVL) and USDA Veterinary Services Process Streamlining (VSPS).
   - If not submitted electronically, samples must be sent with a completed VS10-11 form. VS10-11 forms are available from the USDA.
4. Samples should be clearly labeled to match paperwork. Incomplete paperwork or mismatched samples will result in delayed testing.
5. The Veterinarian accreditation code or license number must be listed on all submission forms. Failure to include a valid accreditation or license number may delay reporting of results.
6. Routine testing is done by AGID. Samples are typically set up once per day, usually in the afternoon. The AGID test requires a 24 hr incubation period. Samples received before 3 pm will be processed and results will be available by 5 pm the next business day. **Samples received after 3 pm will be set up the next business day.**
7. Rush testing is available for an additional fee ($15.00 per sample, plus cost of testing). Rush testing covers all testing where clients require results within a 24 hr period. Contact the lab for availability.
8. Clients wishing to test for import/export purposes are encouraged to contact the National Veterinary Service Laboratory (NVSL) in Ames, IA.

Viral Serology

1. To ensure sufficient serum for mammalian testing, collect at least one red-top tube (≈3-5 mL) per sample and allow the blood to clot for 1 hour or so and then refrigerate until shipped. Clients with access to a centrifuge can spin blood, collect the serum or and ship it in a fresh tube, or use serum separator tubes for best results.
2. For avian serology, submit at least 1-2 mL whole blood (0.2 to 0.5 mL serum) when possible. If requesting AIV ELISA, at least 0.5 mL serum is required. If requesting multiple tests, ensure a sufficient volume of sample (e.g., 0.5 mL serum for AI and 0.5 mL for titers) is submitted.
3. All samples should be clearly labeled and match submission paperwork. Clearly indicate which tests are needed. When samples from two farms are in one box, note this information in the paperwork as well as on the top and sides of the box.
4. Sample testing turnaround times vary with each test and are dependent upon number of samples received. See the Test Schedule for additional details about individual tests.

Virus Isolation

1. Collect tissue samples aseptically from appropriate sites. Clearly mark all paperwork and samples with animal ID and sample site. Samples collected during acute phases of illness are best. Contact the laboratory with questions about appropriate samples and collection.

2. Samples sent to the lab within 24-48 hrs can be refrigerated and sent with ice packs. If shipping is delayed longer than 48 hrs, samples should be frozen and shipped on dry ice. Keep samples cold at all times.
3. Swabs should be submitted in viral transport media when possible. Contact the laboratory for additional information.
4. For liquid samples, submit at least 10 mL when possible.
5. Virus isolation may require several passages and follow-up testing for positive identification. This process may take several weeks.

G. Toxicology/Chemistry

This service was closed at NCVDLS in 2007 but is being partially re-established as of 2022. Three tests are currently offered at Rollins. Calculi Identification by FTIR determines percent composition of biologically generated stones to assist with prevention of recurrence. Toxicology Evaluation (visual/microscopic) can be applied to rumen content, stomach content, forage, or hay for possible toxic plant material or visually identifiable foreign object contamination to help direct further testing. Toxicology Evaluation can also be used to check for blister beetle fragments in equine stomach content or cecal content, or for the beetles in hay; for lead fragments in reticulum content; or for cyanobacteria (blue-green algae) in water samples. Toxic Plant Identification (visual/microscopic) is also available.

Most Analytical Toxicology testing is outsourced to the Pennsylvania Animal Diagnostic Laboratory System (PADLS) through a Memorandum of Understanding. Clients will be charged a shipping & handling fee of $20 by NCVDLS. PADLS will bill them directly for services rendered. Test services available may be found at: http://padls.agriculture.pa.gov/PADLSSearch.aspx.

H. Outsource/Referrals

NCVDLS outsources work if it does not have the capability to perform an analysis. Outsourced requests are only submitted to laboratories that demonstrate competency for the work performed unless the client specifically requests that a particular laboratory be used. In these cases, submission information for the patient and client are shared with the subcontracting laboratory. Samples outsourced to other laboratories for analysis are charged at the rate of the subcontracting laboratory or are billed directly to the client. A shipping & handling fee of $20 is applied.

V. Test Schedule

NCVDLS realizes that our clients expect test results in a timely manner. To meet these expectations, we have developed turnaround time goals which are the average amount of time it takes to perform a test and generate a result. Although we will make every effort to adhere to these schedules, the availability of test results will be impacted by laboratory workload, holidays, test reagent/supply availability, specimen quality, specimen arrival time, inclement weather, or staffing issues.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Acid fast stain	Rollins/Bacti	Fresh affected tissue, feces	Ice pack	M-F	1-2 days	Detects acid-fast bacilli
Aerobic culture/ susceptibility	Rollins/Bacti	Affected tissues, fluids, swabs	Ice pack	M-F	3-5 days	Leak-proof sterile containers for tissues and fluids. Aerobic transport medium for swabs. Specify whether Kirby-Bauer or Microbroth AST is preferred for susceptibility.
Anaerobic culture	Rollins/Bacti	Affected tissues, fluids, swabs	None	M-F	7-14 days	Leak-proof sterile containers for tissues. Anaerobic transport medium for fluids and swabs. Ship unrefrigerated by express delivery.
Anaplasmosis (cELISA)	Rollins/Sero	Serum (bovine)	Ice pack	M-F	1-3 days	Bovine only
Avian Encephalomyelitis Virus (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 day	IDEXX kit
Avian Influenza (AGID)	Rollins/Viro Griffin Northwestern	Serum or egg	Ice pack	M-Thur	1-2 days	For NPIP testing, refer to current auxiliary provisions. NVSL test antigen
Avian Influenza (ELISA)	Rollins/Viro Griffin	Serum, at least 0.5 mL (chicken)	Ice pack	M-W-F	1-2 days	For NPIP testing, refer to current auxiliary provisions. Zoetis kit, IDEXX kit

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Avian Influenza Matrix (RRT-PCR)	Rollins/Mol	Tracheal or oropharyngeal swabs, see comments	Ice pack	M-F	1-3 days * Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day Non-negative samples are tested using Avian Influenza H5 (RRT-PCR) and/or Avian Influenza H7 (RRT-PCR)	Collect swabs in either Brain Heart Infusion (BHI) broth or a commercial transport medium, such as Remel M4. Up to 5 swabs per 3 mL tube; up to 11 swabs per 5.5 mL tube of medium. Plastic swabs/ polyester tips are required. Not suitable/ rejected: wooden shafts, cotton tips, dry swabs. Incomplete forms or missing information may result in testing delays.
Avian Influenza Matrix, Bovine (RRT-PCR)	Rollins/Mol	Milk, at least 3-10 mL per animal – leak-proof or screw-top container critical	Ice pack	M-F as needed	1-7 days	Refrigerate or freeze samples and ship on ice. Once received, the National Animal Health Laboratory Network (NAHLN) laboratories can pool samples from up to 5 cows. Label tubes with official ID or corresponding number(s) on the submission form. Purpose of test and federal premise ID are required for testing. Submission without all pertinent information may delay results.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Avian Influenza Matrix, Feline (RRT-PCR)	Rollins/Mol	Brain, brain swab, or oropharyngeal (preferred) or nasal swab from both nares, see comments	Ice pack	M-F as needed	1-7 days ***** Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in either Brain Heart Infusion (BHI) broth or a commercial transport medium, such as Remel M4. Plastic swabs/ polyester tips are required. Not suitable/ rejected: wooden shafts, cotton tips, dry swabs. Incomplete forms or missing information may result in testing delays.
Avian Influenza-multiple species (ELISA)	Rollins/Viro	Serum, at least 0.5 mL (chicken, turkey, duck, ostrich, goose)	Ice pack	M, W, F	1-2 days	For NPIP testing, refer to current auxiliary provisions. IDEXX kit
Avian Influenza (Antigen Capture ELISA)	Rollins/Viro Griffin Northwestern Western	Tracheal or oropharyngeal swabs	Ice pack	M-F	1 day	Collect up to 5 swabs in 3 mL tube of BHI broth Zoetis FluDetect
Avian Metapneumovirus (aMPV) (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	Detects A, B, and/or C serotype; IDEXX Kit
Avian Metapneumovirus (aMPV) (RT-PCR)	Rollins/Mol	Tracheal or oropharyngeal swabs, up to three per pool	Ice pack	M-F as needed	1-3 days ***** Same day if received by 10:30 am, AND with prior notification or a note on the submittal form that results are needed same day	Collect swabs in BHI transport medium. Detects A and B types.
Avian Paramyxovirus-1 (NDV) (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	IDEXX kit
Avian Paramyxovirus-1 (NDV) (ELISA), Turkey	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	IDEXX kit

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Avian Paramyxovirus-1 (NDV) (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	1-2 days	avsbio test antigen
Avian Paramyxovirus-1 (NDV) (Matrix RRT-PCR)	Rollins/Mol	Tracheal or oropharyngeal swabs, see comments	Ice pack	M-F as needed	1-3 days ***** Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in either Brain Heart Infusion broth or a commercial transport medium, such as Remel M4. Up to 5 swabs per 3 mL tube; up to 11 swabs per 5.5 mL tube of medium.
Avian Reovirus (AGID) (Viral Arthritis)	Rollins/Viro	Serum	Ice pack	Volume dependent	1-2 days	avsbio test antigen
Avian Reovirus (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	IDEXX kit
Avian Reovirus (PCR)	Rollins/Mol	Tendons, or tendon swabs	Ice pack	M	1-7 days	None
Bartonella culture	Rollins/Bacti	Ante mortem: Blood in EDTA tube, lymph node or bone marrow aspirates Post mortem: heart valves, lymph nodes	Ice pack	M-F	30-35 days	None
Blood culture	Rollins/Bacti	Blood collected in blood culture medium	None	M-F	7-10 days	Ship unrefrigerated by express service. Clotted blood or blood collected in EDTA are NOT suitable for culture.
Bluetongue Virus (cELISA)	Rollins/Viro	Serum	Ice pack	As needed	2-3 day	VMRD kit
Bovine Coronavirus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Bovine Diarrhea Panel (rota, corona, cryptosporidium) (PCR)	Rollins/Mol	Feces (5-10 g), Intestinal contents (1-2 mL) or intestinal tissues (1-5 g)	Ice pack	M-F as needed	1-5 days	Prefer samples submitted from calves less than 60 days of age
Bovine Leukosis Virus (ELISA)	Rollins/Viro	Serum	Ice pack	F	1-7 days	VMRD kit
Bovine Respiratory Syncytial Virus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Bovine Viral Diarrhea Virus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	3 days	Submit fixed ear notch samples from multiple animals in separate containers with the animal's identification clearly marked on the container.
Bovine Viral Diarrhea Virus (Antigen Capture ELISA)	Rollins/Viro	Serum, fresh ear notch	Ice pack	M, W	2-7 days	Ear notch samples in individual labeled tubes without fixative. Serum samples from precolostral newborn calves or calves older than 3 months of age. IDEXX kit
Bovine Viral Diarrhea Virus (PCR)	Rollins/Mol	EDTA whole blood, serum, nasopharyngeal swab, tissues, or ear notch	Ice pack	M-F as needed	1-5 days	None
Bovine Viral Diarrhea Virus Type 2 (VN)	Rollins/Viro	Serum	Ice pack	F	4-10 days	NVSL strain 125 genotype 2

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Brachyspira spp. culture	Rollins/Bacti	Ante mortem: fecal or rectal swabs in anaerobic transport medium. Post mortem: affected colon with contents, feces	Ice pack	M-F	10-14 days	None
Brucella abortus (BAPA; in-house FPA retesting of suspects included)	Rollins/Sero Western	Serum (bovine, camelid, cervid, equine, porcine)	Ice pack	M-F	1-2 days	Completed USDA-APHIS VS Form 4-33 (Brucellosis Test Record) must accompany bovine and swine samples if testing is for regulatory purposes.
Brucella spp. (Card)	Rollins/Sero	Serum (caprine, ovine)	Ice pack	M-F	1-2 days	Caprine, ovine; detects *B. abortus*, *B. suis*, and *B. melitensis*
Brucella spp. culture	Rollins/Bacti	Ante mortem: milk, vaginal discharges, semen, blood cultures, lymph node aspirates Post mortem: lymph nodes, reproductive organs, mammary tissue, spleen, aborted fetus with membranes, placenta	Ice pack (except blood cultures)	M-F	14-16 days	For brucellosis "reactor" animals, specimens must be received with identification tag.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Bulk Tank Milk culture	Rollins/Bacti	5-10 ml milk collected in a sterile, leakproof container	Ice pack or frozen	M-F	3-5 days for Aerobic culture 14-21 days for Mycoplasma	Provides detailed information on the specific types of bacteria in the bulk tank sample and is used to screen herds for the presence/ absence of contagious mastitis pathogens, including Mycoplasma. Please notify lab if sending more than 10 samples at one time.
C-Kit	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for mast cells and gastrointestinal stromal tumors can provide prognostic information in canine mast cell tumors.
Calculi Identification (FTIR)	Rollins/Tox	Stones, clean and dry	Ice pack	M-F	3-5 days	Compositional analysis (%) of biologically generated stones.
Campylobacter fetus culture – reproductive/ abortion *Vibrio* (ruminant)	Rollins/Bacti	Aborted fetus, or fetal lung, liver, stomach contents; placenta Male: Preputial mucus or secretions, semen Female: Cervical or vaginal mucus	Ice pack	M-F	5-10 days	Refrigerated. Must be received within 24-48 hrs of collection. Frozen tissue specimens are also acceptable. For vaginal/cervical mucus, preputial smegma, or semen: Contact lab prior to submittal for special sample collection and transport instructions.
Campylobacter jejuni culture – abortion/ stillbirth (ruminant)	Rollins/Bacti	Fresh aborted fetal tissues and/or placenta	Ice Pack	M-F	3–7 days	Refrigerated. Must be received within 24-48 hrs of collection. Frozen tissue specimens are also acceptable.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Campylobacter jejuni culture – gastro-intestinal disease	Rollins/Bacti	Rectal/fecal swabs; fresh diarrheic feces., tied-off loops of intestine	Ice pack	M-F	3-7 days	Swabs should be collected in Cary-Blair or other transport medium suitable for maintaining Camplyobacters. Must be received within 24-48 hrs of collection.
Campylobacter jejuni culture– poultry/ ratites	Rollins/Bacti	Liver, bile, or gall bladder	Ice pack	M-F	3-7 days	Refrigerated. Delivered within 24-48 hrs of collection. Frozen specimens also acceptable.
Canine Coronavirus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Canine Distemper (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Canine Parvovirus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Caprine Arthritis Encephalitis/ Ovine Progressive Pneumonia (cELISA)	Rollins/Viro	Serum	Ice pack	Tue, Thur	3-7 days	VMRD kit

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
CD3 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for identification of T-cells
CD20 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for identification of B-cells
CD31 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for identification of vascular endothelial cells
CD204 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for identification of macrophages associated with canine histiocytic sarcoma
Chicken Anemia Virus 1:10 (CAV) (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	IDEXX kit
Chronic Wasting Disease (CWD) (IHC)	Rollins/ Necropsy and/or IHC	Cervid heads; or tissues obtained by approved collectors	Ice pack	Tue, Fri	10-14 days	NCDA- or NCWRC-regulated surveillance testing program; any suspect is sent to NVSL for confirmation testing
Clostridium chauvoei (FAT)	Rollins/Bacti	Affected tissues	Ice pack	Thur	1-7 days; batched & performed once a week	Detects Blackleg

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Clostridium difficile toxin assay	Rollins/Bacti	Fresh diarrheic feces or colon contents, 3-5 g	Ice pack or frozen	F	1-7 days; same day if received before noon	Detects toxins A and B Validated for swine and equine samples
Clostridium novyi (FAT)	Rollins/Bacti	Affected tissues	Ice pack	Thur	1-7 days; batched & performed once a week	None
Clostridium perfringens culture	Rollins/Bacti	Affected sections of intestinal tract	Ice pack	M-F	3-5 days	None
Clostridium perfringens genotyping (PCR)	Rollins/Mol	Bacterial isolate	Ice pack	Thur	1-7 days following receipt of isolate	None
Clostridium septicum (FAT)	Rollins/Bacti	Affected tissues	Ice pack	Thur	1-7 days; batched & performed once a week	None
Clostridium sordellii (FAT)	Rollins/Bacti	Affected tissues	Ice pack	Thur	1-7 days; batched & performed once a week	None
Coccidia (AO)	Rollins/Viro	Feces	None	Volume dependent	1-2 days	None
Coxiella burnetii - Q Fever (ELISA)	Rollins/Sero	Serum	Ice pack	As needed	1-3 days	None
Cryptosporidium (AO)	Rollins/Viro	Feces	None	Volume dependent	1-2 days	None
Cryptosporidium FA	Rollins/Bacti Western	Feces or reptilian stomach contents, fresh or preserved in 10% formalin or SAF	Ice pack	M (Rollins) M-F (Western)	1-7 days; batched & run once a week 1-2 days	Fresh feces and reptilian stomach content must be received within 24 hrs of collection. Immunofluorescence assay that detects oocysts.
Cytology	Rollins/Cyto	Aspirated samples on microscope slides or effusions/fluids in EDTA tube	Ice pack for fluids	M-F	1-8 days	Protect from formalin, formalin fumes, or formalin fixed tissue
Darkfield exam	Rollins/Bacti	Tissues, body fluids, feces	Ice pack	M-F	1 -2 days	Detects presence of spirochetes
Diff-Quick stain (hematologic)	Rollins/Bacti	Smears on microscope slides, tissues, body fluids	Ice pack	M-F	1-2 days	Detects presence of fungal hyphae or *Dermatophilus congolensis* in cytologic specimens.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
DOG1 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor cell marker used for canine gastrointestinal stromal tumors
E-cadherin (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor cell marker often used to assess the tumor aggressiveness and evaluate metastases
E. coli genotyping (PCR)	Rollins/Mol	Bacterial isolate	Ice pack	W	1-7 days following receipt of isolate	See Molecular Diagnostics above for virulence factors that are available.
Eastern Equine Encephalitis Virus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Equine Herpes Virus 1 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Equine Herpes Virus (Types 1 & 4) (PCR)	Rollins/Mol	Whole blood (EDTA), tissues, nasopharyngeal swabs	Ice pack	Volume dependent	2-5 days	Differentiates between neuropathogenic and nonneuropathogenic/ respiratory strains of EHV-1.
Equine Herpes Virus 1 (VN)	Rollins/Viro	Serum	Ice pack	Tues	4-10 days	None

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Equine Infectious Anemia (AGID)	Rollins/Viro Western	Serum	Ice pack	M-F	1-2 days	3 days for Friday testing-report Monday. There is an additional charge for priority/rush testing, call the Laboratory for availability. Samples received after 3 pm will be tested the next day. VMRD kit.
Equine Infectious Anemia (ELISA)	Rollins/Viro	Serum	Ice pack	M-F	1 day	Same day service VMRD kit. There is an additional charge for priority/rush testing, call the Laboratory for availability.
Fecal Examination - centrifugation/ sucrose	Rollins/Bacti Northwestern	At least 5 g fresh feces	Ice pack	M-Thur	1-2 days minimum	Quantitative analysis Fresh feces must be received within 24 hrs of collection. Recommended for detecting camelid infections with *Eimeria macusaniensis*. Result turnaround times may be delayed due to high volume.
Fecal flotation	Rollins/Bacti Griffin Northwestern Western	At least 5 g fresh feces	Ice pack	M-F	1-2 days minimum	Qualitative analysis Fresh feces must be received within 24 hrs of collection. Recommended for routine parasite screening. Result turnaround times may be delayed due to high volume.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Fecal Examination-Modified McMaster's	Rollins/Bacti Griffin Northwestern Western	At least 5 g fresh feces (cattle, sheep, goats, camelids, horses)	Ice pack	M-F	1-2 days	Quantitative analysis. Fresh feces must be received within 24 hrs of collection. Please notify lab if sending more than 10 samples at one time. Result turnaround times may be delayed due to high volume.
Feline Coronavirus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Feline Herpes Virus I (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Feline Panleukopenia (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Ferret Coronavirus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Fungal Culture	Rollins/Bacti	Affected tissues, hairs, skin scrapings, scabs	Ice pack (exceptions: zygomycosis and pythiosis suspects)	M-F	14-30 days	Swab specimens are not recommended. Submit specimens for dermatophyte culture in a clean, paper envelope.
Giardia FA	Rollins/Bacti Western	Feces or reptilian stomach contents, fresh or preserved in 10% formalin or SAF	Ice pack	M (Rollins) M-F (Western)	1-7 days; batched & run once a week 1-2 days	Fresh feces and reptilian stomach content must be received within 24 hrs of collection. Immunofluorescence assay that detects oocysts.
Gram stain	Rollins/Bacti	Tissues, aspirates, exudates, or impression smears	Ice pack	M-F	1-2 days	Used in the direct examination of specimens for the presence/ absence of bacteria, especially in normal sterile body fluids, abscess fluids and specimens from soft-tissue infections.
Gross Exam (Necropsy)	Rollins/Path Griffin Northwestern Western	Freshly dead animal		M-F (weekend or holiday: call 'on call vet' phone for your lab)	Preliminary verbal or email report, 1-2 days. Final report, 7-14 days if no added testing is needed. If additional testing, up to 6-8 weeks.	Necropsy examination and fee include additional testing such as histopathology, bacteriology, and virology as necessary to make a diagnosis.
Hemagglutination Test	Rollins/Viro	Viral Isolate	Ice pack	As needed	1 day	Typically used for hemagglutinating viral isolates obtained by chicken embryo isolation
Histopathology	Rollins/Histo	Formalin-fixed tissue	None	M-F	2 days	Samples requiring special stains, additional fixation or decalcification may have an increased turnaround time

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Histopathology Recuts	Rollins/Histo	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Includes H & E sections, unstained sections on + slides and thick cut fixed tissue curls for PCR
Infectious Bovine Rhinotracheitis Virus (VN)	Rollins/Viro	Serum	Ice pack	Tues	4-10 days	NVSL viral strain CO
Infectious Bronchitis Virus (PCR)	Rollins/Mol	Tracheal or oropharyngeal swabs, up to five per pool	Ice pack	M-F as needed	1-3 days ***** Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	None
Infectious Bronchitis Virus - Ark (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	avsbio test antigen
Infectious Bronchitis Virus - Conn (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	avsbio test antigen
Infectious Bronchitis Virus - Delaware (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	avsbio test antigen
Infectious Bronchitis Virus - Mass (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	avsbio test antigen
Infectious Bronchitis Virus (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	IDEXX kit
Infectious Bronchitis Virus JMK (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	avsbio test antigen
Infectious Bursal Disease (AGID)	Rollins/Viro	Serum	Ice pack	M-Thur	1-2 days	avsbio test antigen
Infectious Bursal Disease (ELISA)	Rollins/Viro	Serum	Ice pack	Volume dependent	3-7 days	IDEXX kit

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Infectious Laryngotracheitis Virus (PCR)	Rollins/Mol	Tracheal or oropharyngeal swabs, up to three per pool	Ice pack	M-F as needed	1-3 days * Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in Remel M4 transport medium
Influenza Virus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Type A influenza strains including H7N7, H7N3, H7N2, H3N8, H3N2, H1N1, and H1N2
Influenza A Virus, Bovine (ELISA)	Rollins/Viro	Serum or milk	Ice pack	As needed	1-3 days	Milk is tested by ELISA if it has tested negative by Avian Influenza Matrix, Bovine RRT PCR. IDEXX kit
Influenza A Virus Matrix (RRT-PCR)	Rollins/Mol	*Mammals – please contact the lab for other than bovine (milk), feline, or swine*	Ice pack	M-F as needed	1-3 days * Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in either Brain Heart Infusion (BHI) broth or a commercial transport medium, such as Remel M4. Up to 5 swabs per 3 mL tube; up to 11 swabs per 5.5 mL tube of medium. Plastic swabs/ polyester tips are required. Not suitable/ rejected: wooden shafts, cotton tips, dry swabs. Incomplete forms or missing information may result in testing delays.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Influenza A Virus Matrix, Swine (RRT-PCR)	Rollins/Mol	Lung, nasal swabs, see comments	Ice pack	M-F as needed	1-3 days * Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in either Brain Heart Infusion (BHI) broth or a commercial transport medium, such as Remel M4. Up to 5 swabs per 3 mL tube; up to 11 swabs per 5.5 mL tube of medium. Plastic swabs/ polyester tips are required. Not suitable/ rejected: wooden shafts, cotton tips, dry swabs. Incomplete forms or missing information may result in testing delays.
Johne's disease (ELISA)	Rollins/Ser	Serum/plasma	Ice pack	As needed	1-3 days	IDEXX kit
Ki67 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker used for identifying actively dividing cells. A high Ki67 index suggests aggressive tumor growth, while a lower one may have a better prognosis.
Lawsonia intracellularis (PCR)	Rollins/Mol	Fresh, affected intestinal segments or feces	Ice pack	M	1-7 days	Because the organism is shed intermittently in the feces, multiple samples may be necessary to detect its presence.
Leptospira autumnalis (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None
Leptospira bratislava (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None
Leptospira canicola (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Leptospira grippotyphosa (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None
Leptospira hardjo (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None
Leptospira icterohaemorrhagiae (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None
Leptospira pomona (MAT)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	None
Leptospira MAT (5 serovars)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	Includes serovars *pomona*, *canicola*, *icterohaemorrhagiae*, *grippotyphosa*, and *hardjo*
Leptospira MAT (6 serovars)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	Includes serovars *pomona*, *canicola*, *icterohaemorrhagiae*, *grippotyphosa*, *hardjo* and *bratislava*
Leptospira MAT (7 serovars)	Rollins/Sero	Serum, fetal thoracic fluid	Ice pack	Thurs	1-7 days	Includes serovars *pomona*, *canicola*, *icterohaemorrhagiae*, *grippotyphosa*, *hardjo* *bratislava*, and *autumnalis*
Listeria spp. cold enrichment culture	Rollins/Bacti	Ante mortem: Uterine discharges, mastitic milk, cerebrospinal fluid Post mortem: brain stem (neural form), liver (visceral form), placenta, fetus (abortion) Silage	Ice pack	M-F	3-4 days for initial report; entire culture takes 12 weeks	None

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Listeria monocytogenes (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Melan A (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker expressed in melanocytes. Used for identification of poorly differentiated melanomas.
MUM-1	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for identification of plasma cells
Mycobacterium spp. culture	Rollins/Bacti	Skin lesions, draining tract swabs, biopsies, tissues with granulomatous lesions, feces, body fluids.	Ice pack	M-F	Up to 21 days	Detects rapidly growing species. This method will not detect *Mycobacterium avium* subsp. *paratuberculosis* (Johne's) or *M. bovis*.
Mycoplasma gallisepticum (ELISA)	Rollins/Sero Griffin Northwestern	Serum	Ice pack	Volume dependent	3-5 days	Zoetis kit
Mycoplasma gallisepticum (HI)	Rollins/Sero	Serum	Ice pack	M-F	3-5 days	Confirmatory test for ELISA positive samples

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Mycoplasma gallisepticum (PCR)	Rollins/Mol	Tracheal swabs, up to three per pool	Ice pack	M-F	1-3 days ***** Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in a mycoplasma transport medium.
Mycoplasma hyopneumoniae (ELISA)	Rollins/Sero	Serum	Ice pack	As needed	1-3 days	IDEXX kit
Mycoplasma meleagridis (ELISA)	Rollins/Sero Griffin	Serum	Ice pack	Volume dependent	3-5 days	Zoetis kit
Mycoplasma meleagridis (HI)	Rollins/Sero	Serum	Ice pack	M-F	3-5 days	Confirmatory test for ELISA positive samples
Mycoplasma spp. culture	Rollins/Bacti	Ante mortem: Tracheal exudates and aspirates, eggs, milk, joint fluid or choanal, conjunctival, inner ear, or vaginal swabs Post mortem: lung tissue with bronchi, trachea, sinuses, air sacs; intact affected joint	Ice pack	M-F	Up to 21 days	Swabs in suitable transport medium, such as Amie's. Delivered within 48 hrs of collection. Frozen tissue specimens are suitable. In-house speciation of isolates for which there is an additional cost is limited to *Mycoplasma gallisepticum* and *M. synoviae*. Unable to culture *M. hyopneumoniae*
Mycoplasma synoviae (ELISA)	Rollins/Sero Griffin Northwestern	Serum	Ice pack	M-F	3-5 days	Zoetis kit
Mycoplasma synoviae (HI)	Rollins/Sero	Serum	Ice pack	M-F	3-5 days	Confirmatory test for ELISA positive samples

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Mycoplasma synoviae (PCR)	Rollins/Mol	Tracheal swabs, up to three per pool	Ice pack	M-F	1-3 days ***** Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Collect swabs in a mycoplasma transport medium.
Neospora caninum (ELISA)	Rollins/Sero	Serum	Ice pack	As needed	2-3 days	Used to detect antibodies in serum of cattle only. IDEXX kit
NPIP *Salmonella* culture (conventional)	Rollins/Bacti Griffin	Drag swabs, chick papers, foot covers, litter, fluff, cloacal swabs placed in double -strength skim milk Live reactor birds	Ice pack	M-Thur	7-10 days	Serogrouping is included. For serotyping, isolates are forwarded to the National Veterinary Services Laboratory (NVSL).
Ovine Progressive Pneumonia/Caprine Arthritis Encephalitis (cELISA)	Rollins/Viro	Serum	Ice pack	Tue, Thur	3-5 days	VMRD kit
Pancytokeratin AE1/AE3 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	AE1/AE3—Tumor/cell marker used for identification of epithelial cells
Parainfluenza 3 (VN)	Rollins/Viro	Serum	Ice pack	Tues	4-10 days	NVSL viral strain SF-4
PAX-5 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for identification of B-cells

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
PNL2 (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker expressed in melanocytes. Used for identification of poorly differentiated melanomas.
Porcine Circovirus (Types 2 & 3) (Multiplex PCR)	Rollins/Mol	Serum, blood, body cavity fluid, urine, fecal suspensions, and tissue homogenates	Ice pack	M-F	2-5 days	None
Porcine Coronavirus - TGE (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Porcine delta-Corona Virus (PCR)	Rollins/Mol	Intestinal swab, fresh diarrheic feces, fresh intestine, environmental swabs	Ice pack	M-F as needed	1-3 days * Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Call lab for submission of large numbers of samples or expedited testing.
Porcine Epidemic Diarrhea Virus (PCR)	Rollins/Mol	Intestinal swab, fresh diarrheic feces, fresh intestine, environmental swabs	Ice pack	M-F as needed	1-3 days * Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	Call lab for submission of large numbers of samples or expedited testing.
Porcine Reproductive & Respiratory Syndrome Virus (ELISA)	Rollins/Viro	Serum	Ice pack	As needed	1-2 days	IDEXX kit

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Porcine Reproductive & Respiratory Syndrome Virus Multiplex (PCR)	Rollins/Mol	Fresh lung tissue, fetal thymus, fetal thoracic fluid, tonsil, serum, or lung lavage fluid	Ice pack	M-F as needed	1-5 days	Includes US & European strains
Porcine Reproductive & Respiratory Syndrome Virus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Porcine Transmissible Gastroenteritis Virus (TGE) (PCR)	Rollins/Mol	Intestinal swab or fresh diarrheic feces	Ice pack	M-F as needed	1-3 days ***** Same day if received by 10:30 am, **AND** with prior notification or a note on the submittal form that results are needed same day	For same day results, notify lab and submit specimens by 10 am.
Pseudorabies Virus g1 (ELISA)	Rollins/Viro	Serum	Ice pack	M, W, F	3-7 day	Submit sera with NC Swine Test Chart IDEXX kit
Pseudorabies Virus gB (ELISA)	Rollins/Viro	Serum	Ice pack	M, W, F	3-7 day	Submit sera with NC Swine Test Chart IDEXX kit

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Rabies Testing (not performed by NCVDLS)	Rollins/Nec Griffin Northwestern Western	Freshly dead animal, head		M-F	1 day	The NCVDLS is not to be utilized for shipping, case management, and client notification of companion animal and wildlife/feral rabies suspects involving human exposure. Local and county animal control or Public Health agencies and private veterinarians are advised to directly submit specimens for testing to the State Lab of Public Health in Raleigh. NCVDLS will process and submit livestock and equine samples where local personnel do not have the expertise or equipment to safely procure a sample. An organ pluck fee will be charged for brain removal if necropsy is not performed.
Ruminant Mastitis culture/ susceptibility	Rollins/Bacti	5-10 mL milk collected in a sterile, leak-proof container	Ice pack or frozen	M-F	3-5 days	Please notify lab if sending more than 10 samples at one time.
Salmonella pullorum (tube)	Griffin	Serum	Ice pack	M, Tues	3 days	Requirement for NPIP

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Salmonella spp. enrichment culture	Rollins/Bacti	Ante mortem: Fecal swabs or 10-15 g feces from diarrheic animals. A minimum of 3 specimens collected on consecutive days is preferred. Post mortem: Intestines, liver, gall bladder, spleen, lung, lymph nodes, bone marrow, feces, and intestinal contents	Ice pack	M-F	3-5 days	Animal must have a minimum of five consecutive *Salmonella* negative cultures before being considered not to have salmonellosis. **Note: Group D *Salmonella* spp. isolates from poultry will be serotyped.**
SMA (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker used to distinguish smooth muscle tissue in tumors and identify fibroblasts in soft tissue tumors.
Swine Influenza Virus H1N1 (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	A/SW/Iowa/73 strain
Swine Influenza Virus H3N2 (HI)	Rollins/Viro	Serum	Ice pack	Volume dependent	2-3 days	A/SW/NC/35922/98 strain
Toxicology Evaluation (Vis/ Microscopic)	Rollins/Tox	Rumen/ reticulum content, stomach content (EQ, SA), suspect bait, hay, forage, water	Ice pack	M-F	3-5 days	May detect toxic plant, blue-green algae, blister beetle, battery plate, pesticide bait forms; may indicate further testing
Toxic Plant Identification (Vis)	Rollins/Tox	Suspected plant	Ice pack, insulated from plant specimen	M-F	3-5 days	Entire plant, if possible (flowers and fruits help). Non-toxic plants may not be identified.

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
Toxoplasma gondii (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
Tritrichomonas foetus exam	Rollins/Bacti	Feline feces/intestinal contents; bovine cervical mucus or preputial scrapings	None	M-F	6-12 days	Contact lab prior to submission for special sample collection and transport instructions. Samples must be submitted in InPouch medium.
Turkey coronavirus (PCR)	Rollins/Mol	Fresh intestine cloacal swab	Ice pack	Volume dependent	2-5 days	None
Vimentin (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	Tumor/cell marker for mesenchymal cells
Viral Arthritis/Reovirus (AGID)	Rollins/Viro	Serum	Ice pack	Volume dependent	1-2 days	avsbio test antigen
Virus Isolation (cell culture)	Rollins/Viro	Fresh affected tissue	Ice pack	Tues, Thur	2-4 weeks	Turnaround time is from day of specimen inoculation . Bacterial contamination will require longer passage period for results.
Virus isolation (egg inoculation)	Rollins/Viro	Fresh affected tissue	Ice pack	Tues, F	2-3 weeks	Infectious Bronchitis Virus requires 6 passages with 3-week turnaround time

AGENT/ PROCEDURE	LAB/ SECTION	SPECIMEN(S)	COOLANT	TEST DAYS	TURNAROUND TIME (WORKING DAYS)	COMMENTS
West Nile Virus (IHC)	Rollins/IHC	Formalin-fixed tissue or paraffin-embedded tissue on charged microscope slides	None	M-F	2-3 days	None
West Nile Virus (PCR)	Rollins/Mol	Brain stem, cerebellum, and cerebrum	Ice pack	Volume dependent	2-5 days	None
Yersinia spp. cold enrichment culture	Rollins/Bacti	Diarrheic feces, visceral organs, or lymph nodes with lesions	Ice pack	M-F	3-21 days	None

VI. Reportable Diseases

In the state of North Carolina, veterinarians are required by law (02 NCAC 52C .0603) to report the following diseases to the State Veterinarian's Office at (919)707-3250.

- Anthrax
- Avian Chlamydiosis (Psittacosis, Ornithosis)
- Avian Encephalomyelitis
- Avian Influenza (High Pathogenic)
- Avian Influenza (Low Pathogenic)
- Brucellosis (livestock only)
- Classical Swine Fever (Hog Cholera)
- Contagious Equine Metritis
- Echinococcosis
- Equine Encephalitis
    - Eastern Equine Encephalitis
    - Venezuelan Equine Encephalitis
    - Western Equine Encephalitis
    - St. Louis Encephalitis
- Equine Infectious Anemia
- Foreign Animal Diseases (including, in addition to those listed in this Rule, any disease believed to be absent from the United States and its territories)
- Fowl Typhoid (*Salmonella gallinarum*)
- Infectious Laryngotracheitis (other than vaccine induced)
- Leishmaniasis

- *Mycoplasma gallisepticum/Mycoplasma synoviae*
- Paramyxovirus (other than Newcastle; includes menangle virus)
- Plague (*Yersinia pestis*)
- Pseudorabies
- Pullorum (*Salmonella pullorum*)
- Q fever (*Coxiella burnetii*)
- Rabies (equine and livestock only)
- Scabies (cattle and sheep only)
- Screw Worm (Exotic myiasis)
- Transmissible Spongiform Encephalopathies (including Bovine Spongiform Encephalopathy, Chronic Wasting Disease, and Scrapie)
- Tuberculosis
- Tularemia (*Francisella tularensis*)
- Vesicular Disease
    - Foot and Mouth
    - Vesicular Stomatitis
    - Vesicular Exanthema
    - Swine Vesicular Disease
- Virulent (Exotic) Newcastle Disease
- West Nile (domestic animals only)

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