

COLORADO STATE UNIVERSITY
Veterinary Diagnostic Laboratories
Fort Collins – Rocky Ford – Western Slope

BACTERIOLOGY

IMPORTANT: Time required for testing, as shown in the test schedule below, is ONLY an estimate. We make very effort to adhere to these schedules, however, unexpected sample volumes, poor sample quality, equipment failure or other factors beyond our control may impact our ability to meet these timelines. Always collect and submit samples well in advance of YOUR deadline to provide us with ample time should problems arise.

TESTS	SUBMISSION	CONTAINER	COOLANT	DEAD-LINE	TIME REQUIRED	SPECIAL COMMENTS
BACTERIOLOGY						
Acid Fast Stain	1) Any sample that can be applied to a slide 2) Smear	1) Sterile container 2) Slide folder	1) Refrigerate* 2) None	Set up daily by 4pm	Same day by 5pm	*Best if received within four hours of collection. Identifies acid fast organisms by special staining.
Aerobic Contact Plate Counts	1) Contact plates after inoculation	1) Contact plate	1) Refrigerate or none	Incubated daily as received.	Next day	The results will only be a count of organisms, not identification.
Aerobic Culture	1) Tissue 2) Swab 3) Fluid	Sterile container	Refrigerate (unless using a port-a-cul for transport media)	Set up daily. Monday-Friday by 4:30 p.m. Saturday & Sunday by noon.	3-5 days. (Depends on growth of organism)	Swabs are not acceptable for urine specimens. Gram stain routinely set up for small intestines only.
Anaerobic Culture	1) Swab 2) Tissue 3) Fluid/aspirate	1) Anaerobic transport media 2) Sterile container 3) Sterile container (RTT)	1) None 2) Refrigerate 3) Refrigerate	Monday-Friday by 4:30 p.m. Saturday & Sunday by noon.	3-10 days. (Depends on growth of organism)	Cultures submitted for anaerobic culture will be cultured aerobically as well. Aspirates should be delivered immediately to the lab. Gram stains are done routinely.
Antibiotic Susceptibility	Aerobic bacterial isolate (isolated by Diagnostic Lab or pre-isolated)	Trypticase Soy Agar Slant May require Blood Agar Slant	None	Monday-Friday by 4:30 p.m.	24 hours after isolation of bacterial growth. Some fastidious organisms do not grow.	Done by request only Contact laboratory for specific antibiotics. Done on significant pathogens only. Anaerobes are not tested because they usually follow a predictable pattern.
Bacterial Identification By Biolog	Isolated bacterial colony (Isolated by Diagnostic Lab or pre isolated)	Bacterial media, Swab, Isolate from culture	Refrigerate	Monday-Friday by 4:00 p.m.	3-5 days later	Done by request only
Blood Culture	1) Large animal: 5-10 ml blood in BHI (70 ml) DO NOT OVERFILL 2) Small animal: 1-3 ml blood in BHI (20 ml)	1) BHI (70 ml) 2) BHI (20 ml)	None. (Room temperature recommended)	Monday-Friday by 4:30 p.m. Saturday & Sunday by noon.	1) 7 days. Preliminary in 48 hours.	Anaerobic and aerobic culture.
<u>Campylobacter fetus ss venerealis</u>	1) Cervical mucous* 2) Preputial scrapings* and wash 3) Fetal tissues	1) Clark's media* 2) Clark's media* 3) Stomach contents, liver, lung	1) None (room temperature) 2) None (room temperature) 3) Refrigerate	Monday-Friday by 4:30 p.m. Saturday & Sunday by noon.	1) 7 days minimum 2) 7 days minimum 3) 3-7 days	*Clark's transport media required. Contact laboratory.
<u>Campylobacter jejuni</u>	Feces 3-5 g , intestine	Sterile container. Transport media for shipping.	Refrigerate	Monday-Friday by 4:30 p.m. Saturday & Sunday by noon	3 days minimum.	Fresh specimen important. Deliver immediately.

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CEM Culture	Dependent upon export requirement of each receiving country. Usually cervical and clitoral from mare, urethral and glans from stallion.	Amies with charcoal (NO EXCEPTIONS). Must be received within 48 hours of collection.	Refrigerate	Monday-Friday by 4:00 p.m.	7 days minimum. If suspect, time is variable.	Isolate and identify <u>Taylorella equigenitalia</u> . Contact lab. We need at least 48 hours advance notice to prepare isolation media. Specimen testing must begin within 48 hours after collection.
Clostridial Fecal Culture	Feces, 3-5 grams	Sterile Container	Refrigerate	Monday-Friday by 4:30 p.m. Saturday & Sunday by noon.	3-10 days. (Depends on growth of organism)	
<i>Clostridium difficile</i> A/B toxin test (ELISA)	Feces, 3-5 g	Sterile container	Refrigerate	Tuesday by 5:00 p.m. Set up Wednesday	2 - 7 days	Samples are batched. We will freeze sample until we have sufficient samples to process.
<i>Clostridium perfringens</i> Enterotoxin (ELISA)	Feces, 3-5 g	Sterile container	Refrigerate	Tuesday by 5:00 p.m. Set up Wednesday	2 - 7 days	Detects enterotoxin that is associated with the spore forming process of <u>Clostridium perfringens</u> . Samples are batched. We will freeze sample until we have sufficient samples to process.
Fecal Culture	1) Feces 2) Intestinal content or segment, fresh	1) Sterile container 2) Sterile container	1) Refrigerate 2) Refrigerate	Monday-Friday by 4:00 p.m.	3-5 days	Normally for Salmonella only. Contact lab for additional requests.
Fungal Culture Also includes yeast culture and ID	1) Hair 2) Scabs 3) Tissue 4) Body fluid	Sterile container	1) None 2) None 3) Refrigerate 4) Refrigerate	Monday-Friday by 4:00 p.m. Saturday & Sunday a.m.	1) 2 weeks minimum 2) 2 weeks minimum 3) 3-6 weeks 4) 3-6 weeks All reviewed weekly.	Identifies fungus or yeast. Submit hair & scabs for dermatophyte culturing. Submit tissue or body fluids for dimorphic fungus or systemic mycoses.
Gram Stain	Sample for bacterial culture	Sterile container	Refrigerate	Monday-Friday by 4:30 p.m.	1 day. Done immediately if requested.	Done routinely on every anaerobic culture except fecal cultures.
Impression Smears	Intestinal segments, fresh	Sterile container	Refrigerate	Monday-Friday by 4:30 p.m.	1 day	For Gram, spore or acid-fast stain.
Milk Culture	Milk	Sterile container	Refrigerate or frozen	Monday-Friday by 12:00 p.m.	3-5 days	Large accessions (>30) require prior notification.
Mycoplasma, PCR	Milk	Sterile container	Refrigerate or frozen.	Monday-Friday by 12:00 p.m.	2-5 Days	Large accessions require prior notification.
Mycobacterium Culture 1) Paratuberculosis 2) Avian species 3) Other species	1) Feces, lymph node, intestine, rectal biopsy 2) Liver, intestine 3) Skin biopsy	Sterile container	Refrigerate	Monday-Friday set up as received.	1) 16 weeks minimum 2) 8 weeks minimum 3) 8 weeks minimum	Checked weekly.

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BACTERIOLOGY/SEROLOGY

<i>TESTS</i>	<i>SUBMISSION</i>	<i>CONTAINER</i>	<i>COOLANT</i>	<i>DEAD-LINE</i>	<i>TIME REQUIRED</i>	<i>SPECIAL COMMENTS</i>
Mycoplasma Culture	1) Swab 2) Fresh tissue 3) Milk	1) Amies with charcoal 2) Sterile Container 3) Sterile Container	1) Refrigerate 2) Refrigerate or freeze 3) Refrigerate or freeze	Monday-Friday by 4:30 p.m.	1) 6-10 days minimum 2) 6-10 days minimum 3) 10 days minimum	Mycoplasma cultured on canine, feline, bovine, equine, ovine species only. Positive milk cultures can be speciated by PCR.
PCR – <i>Bacillus anthracis</i> real-time	1) Gram-positive bacteria 2) Whole blood 3) Serum or plasma 4) Pleural fluid 5) Transtracheal aspirate 6) Sputum 7) Fresh or frozen tissue 8) Environmental samples	1) Liquid medium, agar plate, or agar slant 2) EDTA tube 3) Red-top or separator tube 4) Sterile, leak-proof container 5) Sterile, leak-proof container 6) Sterile, leak-proof container 7) Sterile, leak-proof container/whirl-pak 8) Sterile, leak-proof container	1) – 7) Refrigerate	M-F	48 hours excluding weekends (STAT requests available for an additional charge)	This is a Laboratory Response Network protocol. Samples are reported as DNA detected, no DNA detected or Inconclusive. Samples may be forwarded to the LRN for additional testing at the discrepancy of the CSUVDL. Positive results are also reported to the CDC.
PCR-Bacterial Isolate ID	Isolate	Agar plate, culture tube	Refrigerate	Monday-Friday	3-5 days	Contact lab for additional information.
PCR – <i>Brucella</i> spp. real-time	1) Gram-negative bacteria 2) Whole blood 3) Serum 4) Environmental samples	1) Liquid medium, agar plate, or agar slant 2) EDTA tube 3) Red-top or separator tube 4) Sterile, leak proof container	1) – 4) Refrigerate	M-F	48 hours excluding weekends (STAT requests available for an additional charge)	This is a Laboratory Response Network protocol. Samples are reported as DNA detected, no DNA detected or Inconclusive. Samples may be forwarded to the LRN for additional testing at the discrepancy of the CSUVDL. Positive results are also reported to the CDC.
PCR for <i>Coxiella burnetii</i> (Q Fever)	1) Placenta 2) Fetal feces (meconium) 3) Fetal lung 4) Fetal stomach (abomasal) contents 5) Vaginal swabs	1) Sterile container 2) Sterile container 3) Sterile container 4) Leak proof container 5) 1ml sterile saline	1) Refrigerate 2) Refrigerate 3) Refrigerate 4) Refrigerate 5) Refrigerate	M-F by noon	24 hours later	1) Reported as positive or negative.
PCR <i>E. coli</i> multiplex	Isolate (Isolated by Diagnostic Lab or pre-isolated)	Agar plate, culture tube	Refrigerate	Monday-Friday by 4:00 p.m.	2-5 days	Detects genes common to enterotoxigenic <i>E. coli</i>
PCR – <i>Francisella tularensis</i> real-time	1) Gram-negative bacteria 2) Whole blood 3) Serum 4) Environmental samples	1) Liquid medium, agar plate, or agar slant 2) EDTA tube 3) Red-top or separator tube 4) Sterile, leak proof container	1) – 4) Refrigerate	M-F	48 hours excluding weekends (STAT requests available for an additional charge)	This is a Laboratory Response Network protocol. Samples are reported as DNA detected, no DNA detected or Inconclusive. Samples may be forwarded to the LRN for additional testing at the discrepancy of the CSUVDL. Positive results are also reported to the CDC.

TESTS	SUBMISSION	CONTAINER	COOLANT	DEAD-LINE	TIME REQUIRED	SPECIAL COMMENTS
PCR – Fungal Isolate ID	Isolate	Agar plate, culture tube	Refrigerate	Monday-Friday	3-5 days	Contact lab for additional information.
PCR for Genotype <i>Clostridium perfringens</i>	Isolated clostridial colony	Agar plate, culture tube	Refrigerate	Run weekly	Contact lab.	Isolated colony from tissue cultured, or isolate sent directly.
PCR for Leptospirosis	1) 2 - 5 ml urine 2) .5 – 1 ml blood 3) .5 – 1 ml aqueous fluid 4) 1cm ³ liver, kidney or ocular tissue	1) RTT 2) RTT 3) RTT 4) Sterile saline	1) Refrigerate 2) Refrigerate 3) Refrigerate 4) Refrigerate	Tuesday & Thursday	2-5 days	Samples are batched.
PCR for Mycoplasma	Conjunctival, oral, nasal swabs	PCR media* or 1/2 ml sterile saline	Refrigerate	Upon request	2-5 days later by 5:00 p.m.	*Contact Lab for media
PCR – <i>Yersinia pestis</i> real-time	1) Gram-negative bacteria 2) Whole blood 3) Serum 4) Environmental samples	1) Liquid medium, agar plate, or agar slant 2) EDTA tube 3) Red-top or separator tube 4) Sterile, leak proof container	1) – 4) Refrigerate	M-F	48 hours excluding weekends (STAT requests available for an additional charge)	This is a Laboratory Response Network protocol. Samples are reported as DNA detected, no DNA detected or Inconclusive. Samples may be forwarded to the LRN for additional testing at the discrepancy of the CSUVDL. Positive results are also reported to the CDC.
Spore Stain	Sample for bacterial culture	Sterile container	Refrigerate	Monday-Friday by 4:30 p.m.	1 day. Done immediately if requested.	Done routinely on every small animal fecal culture.
Total Aerobic Plate Count	Various samples	Sterile container	Refrigerate	Contact lab	3-5 days	Must contact lab before submission.
BACTERIOLOGY – SEROLOGY TESTS						
Anti-Nuclear Antibody (ANA)	1/2 ml serum	RTT	Refrigerate	Monday-Friday by 11:00 a.m.	Same day by 5:00 p.m. (3 hr. Test)	Detects anti-nuclear antibody in serum. Titers 1:25 are reported as negative. Positive results will include final titer and type of pattern.

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<u>Brucella abortus</u>	1/2 ml serum	RTT	Refrigerate	1) In by 10:00 a.m. Wednesday 2) By special request	1) Read out Wednesday by 5:00 p.m. 2) Same day by 5:00 p.m.	Test is not official for certification purposes- llama, equine, bovine, caprine (any large animal) available. Set up Wednesday unless special request. Can be set up anytime but must be specifically requested.
<u>Brucella canis</u> RSAT card test.	1/2 ml serum	RTT	Refrigerate	Monday-Friday as received by 4:00 p.m.	Same day by 5pm.	Results reported negative with or without 2ME.
<u>Brucella ovis</u> ELISA						Samples are sent directly to Western Slope Lab for testing. Please do not send to the Fort Collins Lab as it will cause a delay of test results.
C-Titer	1) ½ ml serum	1) RTT	1) Refrigerate	Monday-Friday by 4:00 p.m.	2 – 5 days	Large accessions require prior notification Paired sera advised.
CID – Combined Immunodeficiency Evaluation	1) 2 ml EDTA Blood 2) 2 fresh blood smears 3) 1 ml serum	1) PTT 2) Slides 3) RTT	1) Refrigerate 2) None 3) Refrigerate	Monday-Thursday by 11:00 a.m.	Next day by 11:00 a.m.	1-2) WBC, differential in clinical pathology. 3) IgG quantitation 3) IgM quantitation Arabians only.
Cryptococcus antigen detection	1) 1 ml serum 2) 1/2 ml CSF	1) RTT 2) RTT	1) Refrigerate 2) Refrigerate	Monday-Friday by 11:00 a.m.	Same day by 5:00 p.m.	Latex agglutination results will be reported as positive or negative. If positive, sample will be titered.
Fungal Serology Screen (AGID) 1) Histoplasma 2) Blastomyces 3) Coccidioides 4) Aspergillus	1/2 ml serum minimum. CSF	RTT	Refrigerate	Monday-Thursday by 11:00 a.m.	Histo, Cocci, Aspergillus reported the next day by 11:00 a.m. Blasto reported 48 hours after set up.	Fungal serologies also run individually. Reported as positive or negative.
IgG Estimation 1) Bovine 2) Llama - (sodium sulfite) 3) Equine - (SNAP)	1) 1 ml serum 2) 1 ml serum 3) Equine SNAP can be done on plasma or serum	1) RTT 2) RTT 3) PTT/RTT	Refrigerate	Monday-Friday by 3:00 p.m.	One hour with prior notification.	NOTIFY LAB THAT SAMPLE HAS ARRIVED. Semi-quantitative measurement of IgG. Determined within a range if there has been adequate transfer. Can do STAT with notification. 3) Samples received after 5:00 p.m., weekends and holidays will be run by Clinical Pathology at an increased price.
Immunoelectrophoresis (IEP)	1/2 ml serum 5ml urine	RTT	Refrigerate	Monday-Wednesday by 10:00 a.m.	7 days later	Test requires subjective analysis by section head. Test is done following an abnormal SPE to determine gammopathy.

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Lepto-5 Serology	1/2 ml serum	RTT	Refrigerate	Wednesday by 11:00 a.m.	Read out by 5:00 p.m. Wednesday. If the titer is positive (1:400) will rerun the next week to determine the titer endpoint.	Determines titers of Lepto to serovars Pomona, Canicola, Hardjo, Grippio, Ictero. Large accessions (>20) require prior notification. Paired sera recommended. Other serovars may be available upon request, call lab.
Lepto Bratislava	½ ml serum	RTT	Refrigerate	Wednesday by 11:00	Read out by 5:00 p.m. Wednesday	Determines titer of Lepto serovar Bratislava
Llama Quantitative Radial Immunodiffusion (RID) 1) IgG	½ ml serum	RTT	Refrigerate	Monday-Thursday by 11:00 a.m.	Next day by 11:00 a.m.	Radial immunodiffusion is the procedure for the quantitation of specific proteins in serum and other biological fluids. Plasma in PTT can be used, but serum is preferred.
Mycobacterium Paratuberculosis (AGID)	½ ml serum	RTT	Refrigerate	Monday, Tuesday and Wednesday by 2:00 p.m.	Read out 48 hours later.	The AGID is used for species other than bovine. Large accession must be scheduled ahead of time, >10 samples.
Mycobacterium paratuberculosis (ELISA)	1) ½ ml serum 2) ½ ml plasma	1) RTT 2) PTT	Refrigerate	Tuesday by 2:00.	same or next day	Bovine only. If other species, use AGID.
Quantitative Radial Immunodiffusion (RID) 1) IgG 2) IgM 3) IgA Bovine, Canine, Feline, Equine	1/2 ml serum or 2 ml colostrum (for dilutions)	RTT	Refrigerate	Monday-Thursday by 11:00 a.m.	Next day by 11:00 a.m.	Radial immunodiffusion is the procedure for the quantitation of specific proteins (antibodies) in serum and other biological fluids. Plasma in PTT can be used, but serum is preferred.
Serum Protein Electrophoresis (SPE)	1) 1/2 ml serum 2) 5-10 ml urine	RTT	Refrigerate	Monday-Friday by 11:00 a.m.	Next day by 5:00 p.m.	Quantitates protein components and verifies whether gammopathy exists.