

## ULAM-IVAC Animal Diagnostic Laboratory Testing

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Click the link for each test name for additional details regarding test parameters, sample collection, storage, and volume. All samples must be consistent with [ULAM-IVAC Clinical Pathology Sample Collection Guidelines](#). For additional questions, contact [ulam-ivac@umich.edu](mailto:ulam-ivac@umich.edu).

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### Blood smear (prep only)

#### Hematology

<b>Test Parameters</b>	Manual differential
<b>Sample Collection</b>	WHOLE BLOOD samples can only be drawn into EDTA (lavender) tubes. ADL recommends Sarstedt Microvette 100 REF :20.1278. or Becton EDTA microtainers REF:365973. Immediately flick tubes with your finger and place on rocker to ensure anticoagulant is adequately mixed.
<b>Storage</b>	Sample can be stored at 2-5C for up to 24 hours
<b>Volume</b>	Minimum of 50ul to 100ul WHOLE BLOOD in Sarstedt tubes, >100ul in EDTA microtainers
<b>Species</b>	All mammalian species
<b>Test Performed</b>	In house
<b>Comments</b>	Advance notice of sample submission will ensure timely processing. Samples submitted on Fridays may be sent out at an additional cost, or may not be performed depending on the overtime availability of technicians.

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### CBC, with automated differential

#### Hematology

<b>Test Parameters</b>	Total WBC, 5-part differential, RBC, Hb, HCT, MCV, MCH, MCHC, PLT
<b>Sample Collection</b>	WHOLE BLOOD samples can only be drawn into EDTA (lavender) tubes. ADL recommends Sarstedt Microvette 100 REF :20.1278. or Becton EDTA microtainers REF:365973. Immediately flick tubes with your finger and place on rocker to ensure anticoagulant is adequately mixed.
<b>Storage</b>	Sample can be stored at 2-5C for up to 24 hours
<b>Volume</b>	Minimum of 50ul to 100ul WHOLE BLOOD in Sarstedt tubes, >100ul in EDTA microtainers
<b>Species</b>	All mammalian species
<b>Test Performed</b>	In house
<b>Comments</b>	Advance notice of sample submission will ensure timely processing. Samples submitted on Fridays may be sent out at an additional cost, or may not be performed depending on the overtime availability of technicians.

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### Hemocrit, spun

#### Hematology

<b>Test Parameters</b>	Relative volume of erythrocytes (reported in %)
<b>Sample Collection</b>	WHOLE BLOOD samples can only be drawn into EDTA (lavender) tubes. ADL recommends Sarstedt Microvette 100 REF :20.1278. or Becton EDTA microtainers REF:365973. Immediately flick tubes with your finger and place on rocker to ensure anticoagulant is adequately mixed.
<b>Storage</b>	Sample can be stored at 2-5C for up to 24 hours
<b>Volume</b>	Minimum of 50ul to 100ul WHOLE BLOOD in Sarstedt tubes, >100ul in EDTA microtainers
<b>Species</b>	Mouse, Rat, Guinea Pig, Rabbit, Sheep, Pig, Dog, Cat, NHP
<b>Test Performed</b>	In house

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### Manual Differential

#### Hematology

<b>Test Parameters</b>	% of bands and segmented neutrophils, lymphocytes, monocytes, eosinophils, and basophils
<b>Sample Collection</b>	WHOLE BLOOD samples can only be drawn into EDTA (lavender) tubes. ADL recommends Sarstedt Microvette 100 REF :20.1278. or Becton EDTA microtainers REF:365973. Immediately flick tubes with your finger and place on rocker to ensure anticoagulant is adequately mixed.
<b>Storage</b>	Sample can be stored at 2-5C for up to 24 hours
<b>Volume</b>	Minimum of 50ul to 100ul WHOLE BLOOD in Sarstedt tubes, >100ul in EDTA microtainers
<b>Species</b>	Mouse, Rat, Guinea Pig, Rabbit, Sheep, Pig, Dog, Cat, NHP
<b>Test Performed</b>	In house

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### Reticulocyte Count

#### Hematology

<b>Test Parameters</b>	% of reticulocytes in red blood cell population
<b>Sample Collection</b>	WHOLE BLOOD samples can only be drawn into EDTA (lavender) tubes. ADL recommends Sarstedt Microvette 100 REF :20.1278. or Becton EDTA microtainers REF:365973. Immediately flick tubes with your finger and place on rocker to ensure anticoagulant is adequately mixed.
<b>Storage</b>	Sample can be stored at 2-5C for up to 24 hours
<b>Volume</b>	Minimum of 50ul to 100ul WHOLE BLOOD in Sarstedt tubes, >100ul in EDTA microtainers
<b>Species</b>	Mouse, Rat, Guinea Pig, Rabbit, Sheep, Pig, Dog, Cat, NHP
<b>Test Performed</b>	In house

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### Electrolytes (ISE Na, K, Cl) \*\*150 uL

#### Chemistry

<b>Test Parameters</b>	Na, K, Cl
<b>Sample Collection</b>	Whole blood in gel separator tubes is preferred. No additive tubes are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes (red tops) must be spun and serum removed before freezing.
<b>Volume</b>	150ul SERUM
<b>Test Performed</b>	In house

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### Liver Panel (ALT, AST, ALP, TBili, ALB) \*\*100 uL

#### Chemistry

<b>Test Parameters</b>	ALT, AST, ALP, TBili, ALB
<b>Sample Collection</b>	Whole blood in gel separator (yellow and tiger top) tubes is preferred. No additive tubes are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes must be spun and serum removed before freezing.
<b>Volume</b>	100ul SERUM
<b>Test Performed</b>	In house

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### Mini Liver Panel (ALT, AST) \*\*50 uL

#### Chemistry

<b>Test Parameters</b>	ALT, AST
<b>Sample Collection</b>	Whole blood in gel separator (yellow and tiger top) tubes is preferred. No additive tubes (red tops) are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes must be spun and serum removed before freezing.
<b>Volume</b>	50ul SERUM
<b>Test Performed</b>	In house

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### Mini Chem Panel (ALB, ALP, ALT, Ca, BUN, Creat, T Prot, Gluc, TBili)

#### Chemistry

<b>Test Parameters</b>	ALB, ALP, ALT, Ca, BUN, Creat, T.Pro, Gluc, Tbili
<b>Sample Collection</b>	Whole blood in gel separator (yellow and tiger top) tubes is preferred. No additive tubes (red tops) are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes must be spun and serum removed before freezing.
<b>Volume</b>	120ul SERUM
<b>Test Performed</b>	In house

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### Pig Full Chemistry Panel (ALB, ALP, AST, BUN, Ca, Chol, CK, Creat, Gluc, T.Bili, T.Prot, Trig, Electrolytes)

#### Chemistry

<b>Test Parameters</b>	ALB, ALP, AST, BUN, Ca, Chol, CK, Creat, Gluc, T.Bili, T.Prot, Trig, Electrolytes (Na, K, Cl)
<b>Sample Collection</b>	Whole blood in gel separator (yellow and tiger top) tubes is preferred. No additive tubes (red tops) are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes must be spun and serum removed before freezing.

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### Full Chemistry Panel (ALB, ALP, AST, BUN, Ca, Chol, CK, Creat, Gluc, TBili, T Prot., Trig, Electrolytes) \*\*270uL

#### Chemistry

<b>Test Parameters</b>	ALB, ALP, ALT, AST, BUN, Ca, Chol, CK, Creat, Gluc, T.Bili, T.Prot, Trig, Electrolytes (Na, K, Cl)
<b>Sample Collection</b>	Whole blood in gel separator (yellow and tiger top) tubes is preferred. No additive tubes (red tops) are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes must be spun and serum removed before freezing.
<b>Volume</b>	270ul SERUM
<b>Test Performed</b>	In house

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# ULAM-IVAC Animal Diagnostic Laboratory Testing

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## 1 Chemistry only/animal

### Chemistry

<b>Test Parameters</b>	Choose: ALB, ALP, ALT, AST, BUN, Ca, Chol, CK, Creat, Gluc, T,Bili, Mg, Phos, T. Prot, Trig
<b>Sample Collection</b>	Whole blood in gel separator (yellow and tiger top) tubes is preferred. No additive tubes (red tops) are permitted but reduce serum recovery volumes.
<b>Storage</b>	Gel separator (yellow and tiger tops) tubes may be frozen once centrifuged. No additive tubes must be spun and serum removed before freezing.
<b>Volume</b>	50uL SERUM
<b>Test Performed</b>	In house

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## General Culture and Susceptibility (95017)

### Microbiology Service

<b>Test Parameters</b>	Identification of bacteria and susceptibility table
<b>Sample Collection</b>	Sterile swab collection technique, use Amiesmedia without charcoal
<b>Storage</b>	Refrigerate for up to 2 days only
<b>Volume</b>	Areas can be pooled on one swab if necessary
<b>Test Performed</b>	Send Out

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## ADS - Fecal Culture

### Microbiology Service

<b>Test Parameters</b>	Only Salmonella unless otherwise requested
<b>Sample Collection</b>	Fecal sample in sterile container or swab. Anaerobes (i.e., Clostridium) must be collected in Star transport media.
<b>Storage</b>	Refrigerate Volume 1 g minimum is necessary for Salmonella recovery
<b>Test Performed</b>	In house
<b>Comments</b>	Unless the DCPAH form lists a history of severe diarrhea, toxigenic E. Coli will not be included. Campylobacter needs Cary-Blair media for recovery

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## Anaerobic Culture (95004) \*Starplex transport media REQUIRED, see Vet Tech Staff\*

### Microbiology Service

<b>Test Parameters</b>	Identification of bacteria and susceptibility table
<b>Sample Collection</b>	Specific collection vials MUST be used (Star transport swabs). Sterile technique.
<b>Storage</b>	Room temperature –DO NOT REFRIGERATE. Sample viability for only 48 hours once swabbed
<b>Volume</b>	Areas can be pooled on one swab if necessary
<b>Test Performed</b>	Send Out
<b>Comments</b>	Ship at room temperature

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### Blood Culture and Susceptibility (95005) \*Blood collection bottles REQUIRED, see ADL staff\* Microbiology Service

<b>Test Parameters</b>	Identification of bacteria and susceptibility table
<b>Sample Collection</b>	Specific collection vials MUST be used. For clinical cases vet techs will supply, for research cases ADL will supply once requested. Sterile technique MUST be used.
<b>Storage</b>	Room temperature –DO NOT REFRIGERATE
<b>Volume</b>	<ul style="list-style-type: none"><li>• If you cannot obtain 10 mL of blood, divide the blood as follows:</li><li>• If &gt;1mL divide equally between both the REDOX (Purple/Aerobic) and REDOX 2 (Red/Anaerobic)</li><li>• If &lt;1mL but &gt;0.5mL then place 0.5mL in purple/aerobic and remainder in red/anaerobic</li><li>• If 0.5 mL put the entire specimen in purple/aerobic bottle</li></ul>
<b>Test Performed</b>	Send Out
<b>Comments</b>	Ship at room temperature

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### Herpes B Cell Culture Virology

#### Primate Virology Service

<b>Test Parameters</b>	Identification of bacteria and susceptibility table
<b>Sample Collection</b>	Polyester tipped swabs snapped off into Remel M4 media tubes
<b>Storage</b>	Swabs must be stored and shipped frozen
<b>Volume</b>	SOP for exposure dictates swab sites
<b>Test Performed</b>	Send Out
<b>Comments</b>	Must be shipped on ice packs as category B unless animal is known to be positive

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### Herpes B Serology Antibody (HB-02)

#### Primate Virology Service

<b>Test Parameters</b>	Titre values
<b>Sample Collection</b>	Whole blood drawn into serum separator (yellow tops) tubes. Centrifuge and remove serum.
<b>Storage</b>	Separated serum must be stored and shipped froze
<b>Volume</b>	1-2mL SERUM
<b>Test Performed</b>	Send Out
<b>Comments</b>	Must be shipped on ice packs as category B unless animal is known to be positive

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### PT/PTT (415)

#### Clinical Pathology Service

<b>Test Parameters</b>	Seconds
<b>Sample Collection</b>	MUST fully fill a blue top tube (citrate) for collection. Submit immediately to ADL.
<b>Storage</b>	Samples that will not be processed in 24 hours can be stored as frozen plasma
<b>Volume</b>	Full blue top tube to ensure correct anticoagulant to blood ratio
<b>Test Performed</b>	Send Out

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### Urinalysis, Complete (Routine Urinalysis, Casts per LPF, Bacteria, Mucous, Epithelial Cells, Crystals)

#### Urinalysis

<b>Test Parameters</b>	Routine analysis, casts per LPF, bacteria, mucous, epithelial cells, crystals
<b>Sample Collection</b>	Ideally, urine is collected by a sterile method into a sterile container. Non-sterile samples cannot be submitted for microbiology.
<b>Storage</b>	Urine should be examined as soon as possible after collection, because artifacts will occur in the urine over time (cells lyse, crystals form in vitro). If a delay is anticipated before analysis, the urine should be refrigerated. Refrigerated urine should always be brought to room temperature before testing. If analysis cannot be performed promptly (< 30 minutes), refrigeration will slow microbial growth and tends to stabilize most urine components for up to 12 hours (rewarm to room temperature before analysis).
<b>Volume</b>	1mL urine minimum
<b>Test Performed</b>	In House

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### Urinalysis, Routine (Color/Clarity, Specific Gravity by refractometer, pH, Protein, Glucose, Ketones, Urobiligen, Bilirubin, Blood, RBC per HPF, WBC per HPF)

#### Urinalysis

<b>Test Parameters</b>	(Color/Clarity, Specific Gravity by refractometer, pH, Protein, Glucose, Ketones, Urobiligen, Bilirubin, Blood, RBC per HPF, WBC per HPF)
<b>Sample Collection</b>	Ideally, urine is collected by a sterile method into a sterile container. Non-sterile samples cannot be submitted for microbiology.
<b>Storage</b>	Urine should be examined as soon as possible after collection, because artifacts will occur in the urine over time (cells lyse, crystals form in vitro). If a delay is anticipated before analysis, the urine should be refrigerated. Refrigerated urine should always be brought to room temperature before testing. If analysis cannot be performed promptly (< 30 minutes), refrigeration will slow microbial growth and tends to stabilize most urine components for up to 12 hours (rewarm to room temperature before analysis).
<b>Volume</b>	1mL urine minimum
<b>Test Performed</b>	In House

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## ULAM-IVAC Animal Diagnostic Laboratory Testing

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### Direct Smear for Parasites

#### Parasitology

<b>Test Parameters</b>	Routine analysis, casts per LPF, bacteria, mucous, epithelial cells, crystals
<b>Sample Collection</b>	Ideally, urine is collected by a sterile method into a sterile container. Non-sterile samples cannot be submitted for microbiology.
<b>Storage</b>	Urine should be examined as soon as possible after collection, because artifacts will occur in the urine over time (cells lyse, crystals form in vitro). If a delay is anticipated before analysis, the urine should be refrigerated. Refrigerated urine should always be brought to room temperature before testing. If analysis cannot be performed promptly (< 30 minutes), refrigeration will slow microbial growth and tends to stabilize most urine components for up to 12 hours (rewarm to room temperature before analysis).
<b>Volume</b>	1mL urine minimum
<b>Test Performed</b>	In House

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### Ectoparasite Exam (Tape, Pelt, or Slide)

#### Parasitology

<b>Test Parameters</b>	Identify parasites present in sample
<b>Sample Collection</b>	Slide preps must use Shandon's mount with toluene base. Tape and pelt preps must use translucent tape.
<b>Storage</b>	Slides can be stored at room temperature. Pelts must be read the same day.
<b>Test Performed</b>	In House

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### Fecal Flotation

#### Parasitology

<b>Test Parameters</b>	Identify parasites present in sample
<b>Sample Collection</b>	Fresh feces free of bedding or feed in an airtight container. Note: Fresh samples will yield more accurate results since eggs may hatch within hours.
<b>Storage</b>	Fresh feces can be refrigerated for up to 1 week
<b>Volume</b>	5-10 grams
<b>Test Performed</b>	In House

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### McMasters Fecal Exam

#### Parasitology

<b>Test Parameters</b>	Eggs per gram of feces
<b>Sample Collection</b>	Fresh feces free of bedding or feed in an airtight container. <i>Note: Fresh samples will yield more accurate results since eggs may hatch within hours.</i>
<b>Storage</b>	Fresh feces can be refrigerated for up to 1 week
<b>Volume</b>	5-10 grams
<b>Test Performed</b>	In House

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