



MMPC Comparative Pathology Laboratory Services

Version: 2

Modified from: Version 1 by Dr. Rutledge, UC Davis

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Summary: The mission of the Comparative Pathology Laboratory (CPL) is to provide laboratory animal biologists and basic discovery researchers the highest quality analytical data related to the health of their colony subjects, and projects requiring pre-clinical analysis. If you are in the business of managing research lab animal colonies, especially rodent species, we have a team that can address your questions regarding health monitoring, environment & equipment monitoring, phenotyping of custom bred strains, pathology services, clinical chemistry & hematology analysis related to compound discovery and efficacy.

The Comparative Pathology Laboratory provides gross necropsy and histopathology services tailored for the diagnosis of spontaneous or infectious diseases in laboratory animals. We offer consultation on management and control strategies, and we field questions regarding the use of animal models in the study of human diseases. Consultation on experimental pathology procedures, such as post-mortem sample harvest or organ fixation can also be provided.

CPL also serves the UC Davis campus as the research animal diagnostic laboratory. We regularly perform clinical chemistry, hematology, microbiology cultures and parasitology monitoring related to the health and well-being of veterinary research species.

We take pride in our personal involvement with your projects, and with our deep levels of experience in vivarium management and pre-clinical research analysis. We are a resource for many types of organizations: We serve not only many of the University of California (UC) campuses, but also nationwide academic organizations and commercial biotechnology. We often engage in analysis related to compound exposure, toxicity, vehicle effectiveness, medical device development, stem cell culture management and characterizations of novel rodent strains.

Reagents and Materials:

The reagents and materials are variable, depending upon assays required. Please contact UC Davis MMPC for more information. See below, for listing of all assays available

Protocol:

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Assays Available:

<i>Test Code</i>	<i>Test Name</i>	<i>Description of Services</i>	<i>Specimen Requirement Notes</i>
CLINICAL PATHOLOGY			
C010	CBC (Complete Blood Count)	Total RBC, Hemoglobin, Hematocrit, MCV, MCH, MCHC, RDW. Total WBC, instrument-derived WBC differential count included, expressed as percentages and absolute numbers. Total platelet count with MPV.	Unclotted EDTA or lithium heparin whole blood. 50 uL minimum sample volume. Analysis is optimal within 24 hours of blood collection. Store samples at 2-8 degrees centigrade. Do not freeze or centrifuge.
C015	Manual WBC differential exam	Peripheral blood slide preparation, Wright-Giemsa staining with manual microscopic 100-cell WBC differential cell count and RBC morphology comment	This may be added to a CBC at additional cost, if manual microscopic review of abnormal morphology is indicated.
C070	Reticulocyte count	Microscopic examination of New Methylene Blue supravital-stained blood smear, to determine % reticulocyte count.	Manual microscopic counting using a Miller Ocular.
C080	Fluid analysis (cytological examination by pathologist)	Microscopic examination of impression smear or fluid	Comments on cellular morphology, presence of bacteria or crystals only, no cell counts can be determined.
C085	Fluid analysis (cytological examination by clinical laboratory technologist)	Microscopic examination of impression smear or fluid	Comments on cellular morphology, presence of bacteria or crystals only, no cell counts can be determined.
C090	Tier 1 “Phenotyping” comprehensive chemistry panel	Albumin, Alkaline Phosphatase, ALT, Amylase, AST, Bilirubin (Total), BUN, Calcium, Chloride, Creatinine, Glucose, Phosphorus, Potassium, Protein (Total), Sodium	Chemistries are routinely performed on cleanly separated serum or lithium heparin plasma. Minimum volume for undiluted assay is 120 uL
C120	Liver/Kidney function chemistry panel	Albumin, Alkaline Phosphatase, ALT, AST, Bilirubin (Total), BUN, Creatinine, Protein (Total)	Chemistries are routinely performed on cleanly separated serum or lithium heparin plasma. Minimum volume for undiluted assay is 80 uL
C130	“Small” animal chemistry panel (a general metabolic panel)	Albumin, Alkaline Phosphatase, ALT, AST, Bilirubin (Total), BUN, Calcium, Creatinine, Glucose, Phosphorus, Protein (Total)	Chemistries are routinely performed on cleanly separated serum or lithium heparin plasma. Minimum volume for undiluted assay is 90 uL

C140	Chemistry individual tests	Albumin, Alkaline Phosphatase, ALT, Amylase, AST, Bicarbonate* (CO2), Bilirubin (Total), BUN, Calcium, Chloride, Cholesterol (Total), Creatine Kinase (Total), Creatinine (enzymatic), GGT, Glucose, Iron* (Total), LDH, Lactate* (Lactic Acid), Magnesium*, Phosphorus, Potassium, Protein (Total), Sodium, Triglycerides* (glycerol-blanked), Unsaturated Iron Binding Capacity* (UIBC), Uric Acid*	Chemistries are routinely performed on cleanly separated serum or lithium heparin plasma. Certain tests may be assayed on EDTA plasma – please confirm specimen requirements with us. *Analysis is by prior arrangement only, and may require minimum number of samples to be submitted.
C170	Custom chemistry panel, up to 5 tests	Up to 5 tests from following list: Albumin, Alkaline Phosphatase, ALT, Amylase, AST, Bicarbonate* (CO2), Bilirubin (Total), BUN, Calcium, Chloride, Cholesterol (Total), Creatine Kinase (Total), Creatinine (enzymatic), GGT, Glucose, Iron* (Total), LDH, Lactate* (Lactic Acid), Magnesium*, Phosphorus, Potassium, Protein (Total), Sodium, Triglycerides* (glycerol-blanked), Unsaturated Iron Binding Capacity* (UIBC), Uric Acid*	Minimum volume of at least 70 uL of serum or lithium heparinized plasma. Actual minimum volume is dependent of the specific tests requested. Please inquire. *Analysis is by prior arrangement only, and may require minimum number of samples to be submitted.
C180	Custom chemistry panel, up to 10 tests	Up to 10 tests from following list: Albumin, Alkaline Phosphatase, ALT, Amylase, AST, Bicarbonate* (CO2), Bilirubin (Total), BUN, Calcium, Chloride, Cholesterol (Total), Creatine Kinase (Total), Creatinine (enzymatic), GGT, Glucose, Iron* (Total), LDH, Lactate* (Lactic Acid), Magnesium*, Phosphorus, Potassium, Protein (Total), Sodium, Triglycerides* (glycerol-blanked), Unsaturated Iron Binding Capacity* (UIBC), Uric Acid*	Minimum volume of at least 100 uL of serum or lithium heparinized plasma. Actual minimum volume is dependent of the specific tests requested. Please inquire. *Analysis is by prior arrangement only, and may require minimum number of samples to be submitted.
C190	Urinalysis (not Urine Chemistry)	Dipstick chemistry, specific gravity and microscopic sediment examination for crystals, bacteria and cellular elements.	At least 2 mL of sterile-collected urine is preferred.
C200	Hemoglobin A1c	Total Hemoglobin, A1c Fraction, % A1c Fraction	60 uL EDTA whole blood minimum volume. Do not centrifuge & separate! *Analysis is by prior arrangement only, and requires minimum number of 20 samples to be submitted.
C210	HDL	HDL Cholesterol only	Direct HDL determination
C220	LDL	LDL Cholesterol only	Direct LDL determination
C230	Non-Esterified Fatty Acid (NEFA or Free Fatty Acids)	Non-Esterified Fatty Acid (Free Fatty Acids) only	
C240	Cholesterol, Triglycerides, HDL	“Lipid 3-Panel”: Total Cholesterol, Total glycerol-blanked Triglycerides, HDL Cholesterol	
C250	Cholesterol, Triglycerides, HDL, LDL	“Lipid 4-Panel”: Total Cholesterol, Total glycerol-blanked Triglycerides, HDL Cholesterol, LDL Cholesterol	
C260	Cholesterol, Triglycerides, HDL, LDL, NEFA	“Lipid 5-Panel”: Total Cholesterol, Total glycerol-blanked Triglycerides, HDL Cholesterol, LDL Cholesterol, Non-Esterified Fatty Acid	Minimum sample volume is 65 uL of serum or lithium heparinized plasma. 80 uL is preferred, as dilutions often have to be made, due to high lipid concentrations.
Inquire	Urine chemistry panels	Please inquire for custom panels: Urine Micro albumin, Urine Total Protein, Urine Creatinine, Urine Calcium, Urine Phosphorus, Urine Sodium, Urine Potassium, Urine Urea Nitrogen, Urine Glucose	Urine chemistries may require extensive manual dilutions. Additional tech time charges may apply.
0055	Miscellaneous clinical pathology procedures	Custom clinical pathology services. Charges are based on pre-existing rates	
<u>MICROBIOLOGY</u>		Isolation and identification of bacterial organisms using selective microbiology media	

and biochemical panels. Autoclave, environmental & water monitoring in vivarium facilities			
M010	Aerobic Bacterial culture	Aerobic bacterial culture from an individual site or sample. Microorganism identification	
M040	Bacterial stains (acid fast, gram stain)	Slide preparation and staining to review for presence of bacteria	
M050	Autoclave, steam sterilizer function. Spore ampule test	Spore ampule biological indicator is provided. Testing and interpretation.	
M060	RODAC plate testing (tryptic soy agar with lecithin & tween plates)	Environmental monitoring of surfaces includes incubation and grid counting, with a report on each site tested.	Charged in increments of 10 plates only (each package contains 10 monitoring plates)
M070	Water sample culture and pH	Aerobic bacterial culture of water, and pH reading of bottled water, if acidified. HydroPacs are not checked for pH routinely.	At least 100 mL of water should be submitted for culture. HydroPacs and cage water bottles are acceptable.
M080	Environmental swab culture	Sterile swab of environmental surfaces or transport vehicles, in liquid media for aerobic bacterial culture	
	VHP disc indicator culture	Incubation and interpretation of indicator discs from treatment with <i>vaporized hydrogen peroxide</i> (VHP) exposure.	Each disc charge is equivalent to a single environmental swab specimen.
0055	Miscellaneous microbiology procedures	Custom microbiology services based on pre existing rates	
<u>MOLECULAR DIAGNOSTICS</u> Detection of viral & bacterial pathogens and also parasites, using specific DNA & RNA amplification assays (PCR)			
B010	Helicobacter PCR (1 sample)	Helicobacter PCR on an individual sample. Determine genus and speciation of rodent isolates, if positive.	
B020	Helicobacter PCR (pooled from up to 5 samples)	Helicobacter PCR on a pooled sample. Determine genus and speciation of rodent isolates, if positive.	
B040	Pneumocystis carinii PCR (1 sample)	Pneumocystis carinii PCR submitted as an individual sample	
B050	Q-fever PCR (1 sample)	Q-fever PCR submitted as an individual sample	
B060	Mycoplasma PCR (1 sample)	Mycoplasma PCR submitted as an individual sample	Screens for Mycoplasma species
		Miscellaneous PCR for etiological agents not routinely screened. These would include, but not be limited to: <i>Rodent pinworm species</i> <i>Bordetella bronchiseptica</i> <i>Clostridium piliforme</i> <i>Corynebacterium bovis</i> <i>Klebsiella pneumoniae</i> <i>Pseudomonas aeruginosa</i> <i>Salmonella species</i> <i>Staphylococcus aureus</i>	List of rodent pinworm species detected by PCR: Syphacia obvelata, Syphacia muris, Aspicularis tetraptera. Please inquire about analysis for etiological agents not listed to the left. New organism assays are developed periodically.
B070	Miscellaneous PCR (1 sample)		
		Miscellaneous reverse-transcriptase PCR for etiological agents not routinely screened (qPCR of RNA expression). These would include, but not be limited to: <i>Mouse Hepatitis Virus (MHV)</i> <i>Mouse NoroVirus (MNV)</i>	Routinely used to screen cell culture media and stem-cell lines for MHV. Please inquire about analysis for etiological agents not listed to the left. New organism assays are developed periodically.
B080	Miscellaneous RT-PCR (1 sample)		
0055	Miscellaneous molecular diagnostics	Custom molecular diagnostic services based on pre existing rates	
<u>PARASITOLOGY</u> Microscopic surveys of feces, anal & pelage tape impressions, to detect endo and ectoparasites			
D010	Fecal flotation	Preparation of fecal sample and microscopic examination for ova and parasites	Recommended sample for mice: 2-10 pellets per vial or tube.

			Recommended sample for rats: 1-5 pellets per vial or tube.
D060	Fecal collection and pinworm check	Fecal and intestinal content collection during necropsy , and direct examination for pinworms and protozoa under the dissecting microscope	
D070	Pelage collection and fur mite check	Pelage collection during necropsy , and direct examination for fur mites and nits under the dissecting microscope	
D080	Direct fecal exam/smear	Fecal or intestinal content examination under microscope	
D090	Tape impression <i>collection and exam</i> for pinworm ova	Anal tape impression collection and microscopic examination for pinworm ova	
D100	Tape impression, exam only for pinworm ova	Microscopic examination of a collected anal tape impression for pinworm ova	Charged per tape affixed to a slide. Apply clear tape to only 1 side of the slide (do not wrap over the edge of slide)
D105	Tape impression, exam only for fur mites & nits	Microscopic examination of a collected pelage tape impression for fur mites and nits	Charged per tape affixed to a slide. Apply clear tape to only 1 side of the slide (do not wrap over the edge of slide)
	<u>PATHOLOGY</u>	Comprehensive physical examinations, which may be bundled with serological assays, microbiology cultures, parasitology examinations, and histopathology interpretations of abnormal tissue findings. Suitable for sick animal investigations or novel strain phenotyping.	
P010	Tier 1 Phenotyping Necropsy with Histopathology	Includes: Rodent gross necropsy and examinations, organ weights recorded, tissue collections with processing, slide preparations, staining (14 slides, approximately 50 tissues) and pathologist interpretation of slides and findings.	
P920	LumX UCD Adult Clinical Health Screen	Includes: Rodent gross necropsy and examination, blood collection for serology , direct pelage and cecal parasite exams, nasopharynx and cecal microbiology cultures. LumX UCD Level 2 Serology Panel is performed on the collected blood. Histological tissue collections and preparations will be performed on any lesions, and where clinical signs indicate. Pathologist interpretations of generated slides and lab findings will be reported.	This is a comprehensive clinical health screen, which may be appropriate for sick animal investigations. See the Serology section for the itemized list of etiologies being assayed in the LumX UCD Level 2 serology panel.
P030	CPL Weanling Clinical Health Screen	Includes: Rodent gross necropsy and examination, pelage and cecal parasite exam, nasopharynx and cecal cultures. If notable clinical signs or lesions are present, histological tissue collections and preparations will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	No serological assays are performed in this profile.
P940	LumX JAX Adult Clinical Health Screen	Includes: Rodent necropsy and examination, blood collection for serology , pelage, intestinal and cecal parasite exam, nasopharynx and cecal cultures. LumX JRHS Quarterly Serology Panel is performed on collected blood , and if notable clinical signs or lesions are present, histological tissue collections and preparations will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	See the Serology section for the itemized list of etiologies being assayed in the LumX JRHS Quarterly serology panel.
P050	JAX Weanling Clinical Health Screen	Includes: Rodent necropsy and examination, pelage intestinal, and cecal parasite exam, nasopharynx and cecal culture, and if notable clinical signs or lesions are present, histological tissue collections and preparations	No serological assays are performed in this profile.

		will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	
P070	Small animal gross necropsy	Dog, cat or rabbit gross necropsy with examination and interpretation	
P080	Small animal gross necropsy with histology	Dog, cat or rabbit gross necropsy and examination, with histological tissue collections and processing, slide preparation, staining and interpretation	
P090	Large animal gross necropsy	Sheep, goat, pig, or calf gross necropsy and examination with interpretation	
P100	Large animal gross necropsy with histology	Sheep, goat, pig, or calf necropsy and examination with histological tissue preparation, slide preparation, staining and interpretation	
P110	Rodent gross necropsy	Rodent gross necropsy and examination with interpretation only (without histology tissue collections, processing or interpretations)	
P120	Rodent gross necropsy with histology	Rodent gross necropsy and examinations with histological tissue collections, processing, slide preparation, staining and interpretation	
P121	Fish or other small lab animal gross necropsy	Fish or other small lab animal (non-rodent) gross necropsy and examination (without histology tissue collections, processing or interpretations)	
P122	Fish or other small lab animal gross necropsy with histology	Fish or other small lab animal (non-rodent) gross necropsy and examination with histological tissue preparation, slide preparation, staining and interpretation	
P130	Tissue collection per sample	Collection of tissue sample in formalin, snap frozen, or for further processing (per sample)	Includes all containers, 10% formalin, liquid nitrogen.
P140	Blood collection with serum or plasma processing	Rodent blood collection, with serum or plasma processing. This activity may be added to gross necropsy activities, if blood samples are needed for further research analysis.	Includes all appropriate blood collection tubes, tube labeling, appropriate centrifugation, aliquoting and temporary storage if needed.
P150	Biopsy initial site	Biopsy taken at an initial site. Includes tissue trimming, processing, slide preparation and histological interpretation	
P160	Biopsy (each additional site)	Biopsy, with additional site processing and histological interpretation (per additional site)	
P170	Special stain slide processing with interpretation	Histological special stain slide processing with interpretation	
P180	Tissue processing with H&E Slide	Tissue submitted for trimming, processing, slide preparation, hematoxylin & eosin staining, coverslipping.	
P190	Necropsy room use by an investigator (1-4 hours)	Miscellaneous supplies included, and limited cleaning after necropsy use. Facilities usage fee	
P200	Necropsy room use by investigator (5-8 hours)	Miscellaneous supplies included and limited cleaning after necropsy use. Facilities usage fee.	
0055	Miscellaneous Pathology diagnostics	Custom pathology services based on pre existing rates	
E001	Slide interpretation (1-2 tissues), as part of a project	Histological interpretation of up to two tissues per slide added-on, as part of a submitted project	
E002	Slide interpretation (greater than 2 tissues) as part of study	Histological interpretation of greater than two tissues per slide added-on, as part of submitted project.	
E003	Additional research services by CPL pathologist, per hour rate	Additional rate for consultation, photographic documentation, and image analysis, in the support of a project's specific requirements.	
E004	Additional research services by CPL technician, per hour rate	Additional rate for consultation or technical activities, in the support of a project's specific requirements.	
0055	Surcharges for supplies/drugs ordered	Surcharges for supplies/drugs ordered	

<u>RODENT HEALTH SURVEILLANCE</u>		Laboratory animal routine health monitoring & certification. A recommended part of a comprehensive colony sentinel health program, performed on a periodic basis.	
R902	LumX Mouse UCD RHS Level 1 (whole animal)	Includes: Rodent gross necropsy and examination, blood collection for serology , pelage and cecal parasite exams, nasopharynx and cecal cultures. LumX UCD Level 1 Serology Panel is performed on collected blood , and if notable clinical signs or lesions are present, histological tissue collections and preparations will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	
R903	LumX Mouse UCD RHS Level 2 (whole animal)	Includes: Rodent gross necropsy and examination, blood collection for serology , pelage and cecal parasite exams, nasopharynx and cecal cultures. LumX UCD Level 2 Serology Panel is performed on collected blood , and if notable clinical signs or lesions are present, histological tissue collections and preparations will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	This is a comprehensive health screen. See the Serology section for the itemized list of etiologies being assayed in the LumX UCD Level 2 serology panel.
R004	Rat UCD RHS Level 1 (whole animal)	Includes: Rodent gross necropsy and examination, blood collection for serology , pelage and cecal parasite exams, nasopharynx and cecal cultures. UCD Rat Level 1 Serology Panel is performed on collected blood , and if notable clinical signs or lesions are present, histological tissue collections and preparations will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	
R005	Rat UCD RHS Level 2 (whole animal)	Includes: Rodent gross necropsy and examination, blood collection for serology , pelage and cecal parasite exams, nasopharynx and cecal cultures. UCD Rat Level 2 Serology Panel is performed on collected blood , and if notable clinical signs or lesions are present, histological tissue collections and preparations will be performed. Pathologist interpretations of generated slides and lab findings will be reported.	This is a comprehensive health screen. See the Serology section for the itemized list of etiologies being assayed in the UCD Rat Level 2 serology panel.
R006	Guinea pig/Hamster UCD RHS Level 1 (whole animal)	Includes: Guinea Pig/Hamster gross necropsy, blood collection for adult serology panel, direct pelage and cecal parasite exam, UCD Guinea Pig/Hamster adult serology panel. Histology performed if needed, based on the presence of lesions or clinical signs.	
R007	Guinea pig/Hamster UCD RHS Level 2 (whole animal)	Includes: Guinea Pig/Hamster gross necropsy, blood collection for adult serology testing, direct pelage and cecal parasite exam, nasopharynx and cecal microbiology culture , UCD Guinea Pig/Hamster adult serology panel. Histology performed if needed, based on the presence of lesions or clinical signs.	This is a comprehensive health screen. See the Serology section for the itemized list of etiologies being assayed in the UCD Guinea Pig or Hamster specific serology panels.
R910	JRHS Mouse Quarter Screen (whole animal)	Includes: Rodent gross necropsy, blood collection for serology testing, direct pelage, intestinal, and cecal parasite exams. Nasopharynx and cecal microbiology cultures, LumX JRHS quarter serology panel . Histology performed if needed, based on the presence of lesions or clinical signs.	
R920	JRHS Mouse Bi-annual Screen (whole animal)	Includes: Rodent gross necropsy, blood collection for serology panel, direct pelage, intestinal, and cecal parasite exam, nasopharynx and cecal microbiology culture, LumX JRHS bi-annual serology panel .	

		Histology performed if needed, based on the presence of lesions or clinical signs.	
R930	JRHS Mouse Annual Screen (whole animal)	Includes: Rodent gross necropsy, blood collection for serology panel, direct pelage, intestinal, and cecal parasite exam, nasopharynx and cecal microbiology culture, LumX JRHS annual serology panel + LDH chemistry . Histology performed if needed, based on the presence of lesions or clinical signs.	
R040	JRHS Weanling Screen with Microbiology (whole animal)	Includes: Rodent gross necropsy, direct pelage, intestinal, and cecal parasite exam, nasopharynx and cecal microbiology cultures. Histology performed if needed, based on the presence of lesions or clinical signs.	No serological assays are performed in this profile.
<u>SEROLOGY</u>			
Testing for exposure to viral & bacterial pathogens, detected using multiplexed bead-based immunoassays and ELISA techniques			
	Etiology Key for Mouse Pathogens Tested at CPL	<p>CARB – Cilia Associated Respiratory Bacillus Ectro – Ectromelia Virus E.cun – Encephalitozoon cuniculi EDIM – Epidemic Diarrhea of Infant Mice Virus Han – Hanta Virus K – Mouse Pneumonitis K Virus LCM – Lymphocytic ChorioMeningitis Virus LDV – Lactate Dehydrogenase Elevating Virus MAD 1 – Mouse Adeno DNA Virus 1 MAD 2 = Mouse Adeno DNA Virus 2 MCMV – Mouse CytoMegalovirus MHV- Mouse Hepatitis Virus MNV – Mouse Noro Virus MPV – Mouse Parvo Virus MVM – Minute Virus of Mice (parvovirus type) NS-1 – Non-Structural 1 (parvovirus type) M.pul – Mycobacterium pulmonis M.arth – Mycobacterium arthritidis Poly – Polyomavirus PVM – Pneumonia Virus of Mice Reo-3 – Reovirus 3 Sendai – Sendai Virus SV5 – Simian Virus 5 TMEV – Theiler’s Muine Encephalomyelitis Virus part of GDVII strain Trep – Treponema species infections Tyzzer – Tyzzer’s Disease caused by Clostridium piliforme bacteria</p>	
L041	LumX UCD Mouse Level 1 serology panel	MHV, MPV, MVM, M.pul and arth, TMEV (GDVII), Ectro, EDIM, Sendai, PVM	
L042	LumX UCD Mouse Level 2 serology panel	MHV, Sendai, PVM, MPV, MVM, M.pul and arth, TMEV (GDVII), Reo-3, LCM, Ectro, EDIM, MAD 1 and 2, MNV	
S061	UCD Rat Level 1 serology panel	RCV and SDAV, Sendai, PVM, KRV and H1 and RPV, M.pul and arth	
S062	UCD Rat Level 2 serology panel	RCV and SDAV, Sendai, PVM, KRV and H1 and RPV, M.pul and arth, Reo-3, LCM, TMEV (GDVII), CARB, Han	
L080	LumX UCSF Mouse Level 2 Serology Panel	MHV, Sendai, PVM, MPV, MVM, M.pul, EDIM, TMEV (GDVII), Ectro	
S090	UCSF Rat Serology Panel	RCV and SDAV, Sendai, PVM, Parvo (NS-1), M.pul, TMEV (GDVII)	
S155	UCD Guinea Pig or Hamster serology panels (same Rate Code)	Guinea Pig Serology includes: Sendai, PVM, LCM, Tyzzer’s, SV5, Reo-3, Ecun, PIV-3, GAV, M.pul.	

	is used: Please specify species type of submission)	Hamster Serology includes: Sendai, PVM, LCM, Tyzzer's, SV5, Reo-3, Ecu	
L180	LumX JRHS Mouse Quarterly Serology Panel	MHV, Sendai, PVM, MPV, MVM, M.pul and arth, Tyzzer's, TMEV (GDVII), Ectro, EDIM, MNV	
L190	LumX JRHS Mouse Bi-annual Serology Panel	MHV, Sendai, PVM, MPV, MVM, M.pul and arth, Tyzzer's, TMEV (GDVII), Ectro, EDIM, MNV, MAD 1 and 2, LCM, E.cun, CARB, Han, Reo-3, MCMV, MTV	
L200	LumX JRHS Mouse Annual Serology Panel	MHV, Sendai, PVM, MPV, MVM, M.pul and arth, Tyzzer's, TMEV (GDVII), Ectro, EDIM, MNV, MAD 1 and 2, LCM, E.cun, CARB, Han, Reo-3, MCMV, MTV, Polyoma, K virus, LDV (LDH level measured by serum chemistry analysis)	The most comprehensive grouping of serological screening tests.
L210	LumX JRHS Mouse Importation Serology Panel	MHV, Sendai, PVM, MPV, MVM, M.pul and arth, Tyzzer's, TMEV (GDVII), Ectro, EDIM, MNV, LCM, Han	
L900	LumX Mouse I Panel	Ectro, EDIM, TMEV (GDVII), MHV, M. pulmonis, Sendai, PVM	
S220	CPL Individual serology test (part of panel)	Individual rodent or rabbit serology tests (added to a panel with greater than 3 tests)	
S230	CPL individual serology test	Individual rodent or rabbit serology test	
S240	CPL 2-serology test panel	2 serology tests requested	
S250	CPL individual IFA (immunofluorescent antibody) test	Individual rodent or rabbit IFA test	
	<u>POLYCLONAL ANTIBODY PRODUCTION</u>	An antigen injection service, to produce custom serum antibodies for research. Call for arrangements: 530-752-2832	
A040	Additional antigen boost	Additional antigen injection above the monthly program	
A050	Additional blood collection	Additional blood collection above the monthly program	
A060	Monthly antibody program-rabbit (CPL protocol)	Rabbit antibody program activities: Maintenance of rabbit subject, two antigen administrations, two blood collections and exsanguinations	
A080	Monthly antibody program-mouse (CPL protocol)	Mouse antibody program activities: Maintenance of mouse subject, two antigen administrations and two blood collections	
A100	Monthly antibody program-guinea pig (CPL protocol)	Guinea pig antibody program activities: Maintenance of guinea pig subject, two antigen administrations and two blood collections	