University of Colorado Hospital
Clinical Laboratory

Reflex Test Protocols

Test Ordered	Initial Test Performed	Criteria for Reflex	Tests Ordered and Billed by Reflex, as applicable
Blood Bank			
Antibody Titer	N/A	No Type and Screen Ordered	Type and Screen; Antibody Identification and titer if Screen is positive.
Prepare RBCs for Transfusion (aka Crossmatch)	N/A	No Antibody Screen ordered	Antibody Screen
Direct Antiglobulin Test (DAT)	Polyspecific DAT IgG DAT	Positive polyspecific DAT Positive IgG DAT	IgG DAT, C3 DAT Elution
Fetal Cell Screen	Fetal Cell Screen	Positive	Fetal Hemoglobin
Rh Type	Rh Type	Rh-negative mother with Rh - positive or Rh-unknown baby	Type and Screen and/or Rh Immunoglobulin
Type and Screen	ABO, Rh, Antibody Screen	Positive antibody screen No historical ABO type	Antibody identification ABO Group (retype)
Transfusion Reaction Investigation	N/A	Patient temperature increase ≥ 3°C.	Culture and Gram Stain of blood unit
Chemistry/Immunoassay			
Celiac Disease Reflex Panel	IgA	IgA 10 mg/dL or greater IgA less than 10 mg/dL	Tissue Transglutaminase IgA Ab Tissue Transglutaminase IgG Ab and Deamidated Gliadin Peptide IgG Ab
Cortisol	Cortisol	Cortisol > 110 ug/dL	Reflex Cortisol endpoint
Creatinine Kinase-MB Panel	CKMB and CK	CKMB ≥ 6.3 ng/mL	CK-MD Index
Free T4 w/Reflex FT4- Dialysis	Free T4	>12.0 ng/dL or pt < 9 mo. Old	Free T4 by Equilibrium dialysis/ Radioimmunoassay
Lactate Arterial Sepsis	Lactate, Arterial	Result of ≥ 2.0 mmol/L	Lactate, Arterial to be drawn 2 hours post treatment/ monitoring.
Lactate Venous Sepsis	Lactate, Venous	Result of ≥ 2.0 mmol/L	Lactate, Venous to be drawn 2 hours post treatment/ monitoring.
TSH with Reflex to Free T4	TSH	Result is abnormal	Free T4

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Flow Cytometry			
Anti-CD20 Therapy Monitor	CD20 Panel and Complete Blood Count (CBC) with differential (DIFF).	Requires the Absolute Lymphocyte Count from a CBC and differential.	CBC with Diff is automatically ordered and performed. Manual differential is ordered and performed when autodiff fails.
CD4 Helper T Cells	CD4 Panel and Complete Blood Count (CBC) with differential (DIFF).	Requires the Absolute Lymphocyte Count from a CBC and differential.	CBC with Diff is automatically ordered and performed. Manual differential is ordered and performed when autodiff fails.
Immunophenotyping Leukemia and Lymphoma on CSF from non-hematology-oncology patients.	Body Fluid Cell Count reviewed	Nucleated cell count ≥ 5	Immunophenotyping Leukemia Lymphoma performed. If nucleated cell count <5, approval required from pathology to perform.
Lymphocyte Enumeration of TBNK	TBNK Panel and Complete Blood Count (CBC) with differential (DIFF).	Requires the Absolute Lymphocyte Count from a CBC and differential.	CBC with Diff is automatically ordered and performed. Manual differential is ordered and performed when autodiff fails.
Pre-CAR T-Cells	Pre-CAR T-Cell Panel and CBC w/ Diff (Manual if Auto Fails)	Requires WBC from the CBC. Manual review is required if CBC values are flagged.	Manual differential
T Cell Panel	T Cell Panel and Complete Blood Count (CBC) with differential (DIFF).	Requires the Absolute Lymphocyte Count from a CBC and differential.	CBC with Diff is automatically ordered and performed. Manual differential is ordered and performed when autodiff fails.
Transplant CD3	Transplant CD3 and Complete Blood Count (CBC) with differential (DIFF).	Requires the Absolute Lymphocyte Count from a CBC and differential.	CBC with Diff is automatically ordered and performed. Manual differential is ordered and performed when autodiff fails.
Hematology and Coagulation			
APC Resistance w/Reflex to FVL Mutation	APC Resistance	Less than 1.8	Factor V Leiden Mutation
Body Fluid Count and Differential	Body Fluid Count	Requires nucleated cell count greater than zero.	Body fluid count is automatically performed. If the nucleated cell count is zero, the differential will be cancelled and credited.
CBC with Manual Diff if Auto Fails	CBC with Manual Diff if Auto Fails	Autodiff fails	CBC, no autodiff
Heparin Induced Antibody (HIT) Reflex	HIT	Positive	Serotonin Release Assay
Manual Differential	Complete Blood Count (CBC)	Requires white blood cell (WBC) count 0.5 x 10^9/L or greater.	Differential is cancelled and credited when WBC under 0.5 x 10^9/L. The caregiver/provider may contact the lab to request that the differential be performed if still desired.
Physician Directed Path Review	Pathologist Review and Complete Blood Count (CBC)	Pathologist required clinical context for correlation.	CBC is automatically ordered and performed.
Russell Viper Venom Time Test (RVVT)	RVVT	Abnormal RVV Test (screen) or ratio	RVVTCONF

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Immunology			
CMV IgM Reflexive (Prenatal Only)	CMV IgM	Positive	CMV IgG CMV IgG Avidity
Hepatitis B Surface Antigen	Hepatitis B Surface Antigen	Reactive, females 0 - 45 years. (Patients with gender mismatch will default to legal sex to determine confirmation reflex.)	Confirmation by neutralization
RPR (Rapid Plasma Reagin)	Treponema pallidum Ab	Treponema pallidum Ab result is Reactive	Rapid Plasma Reagin (RPR). If RPR is reactive, RPR titer
Treponema pallidum Ab with reflex	Treponema pallidum Ab	Treponema pallidum Ab result is Equivocal or Reactive	Rapid Plasma Reagin (RPR) or Treponema Pallidium AB by TPPA (TP-PA). If RPR is reactive, RPR titer. If RPR is non-reactive, TP-PA is sent out when there is no/unknown history of syphilis.
Microbiology/ Molecular Diagnostics			
AFB Culture	AFB Culture	Positive culture	AFB Smear; Identification, AFB Probe; Identification, aerobe; Identification, anaerobe; Identification, mold; Identification, Mycobacteria/ AFB; Identification, yeast; Sensitivity (per drug); Concentration; Confirmatory stains; Tissue homogenization
Bacterial Culture, Routine (on source other than blood, urine, or stool)	Routine Bacterial Culture	Positive culture	Identification, aerobe; Identification, anaerobe; Identification, enzyme detection; Identification, mold; Identification, Mycobacteria/ AFB; Identification, yeast; Sensitivity; Gram Stain; Anaerobic culture; Tissue homogenization

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Blood Culture	Blood Culture	Positive culture *Gram stain results as Gram-Positive Cocci in Clusters (GPCCL) or as Gram-Psitive Cocci in singles (GPC)	Identification, aerobe; Identification, anaerobe; Identification, enzyme detection; Identification, mold; Identification, Mycobacteria/ AFB; Identification, yeast; Sensitivity Culture typing; per antiserum *MRSA/SA Blood Culture PCR
Candida auris PCR	Candida auris PCR	Detected PCR result	Candida auris screen (culture)
Carbapenemase-Producing Organism PCR	Carbapenemase-Producing Organism PCR	Any Detected PCR result	Screening culture
Cdifficile Toxin PCR	Cdifficile Toxin PCR	Detected PCR Result (Inpatient)	Toxin EIA (CDIF)
Fungus Culture (source other other than skin, hair or nails)	Fungus Culture (source other other than skin, hair or nails)	Positive culture	Identification, aerobe; Identification, anaerobe; Identification, mold; Identification, Mycobacteria/ AFB; Identification, nucleic acid probe Identification, yeast; Sensitivity, yeast; Tissue homogenization
Fungus Culture, Skin/Hair/ Nails	Fungus Culture, Skin/Hair/ Nails	Positive culture	Identification, aerobe; Identification, anaerobe; Identification, mold; Identification, Mycobacteria/ AFB; Identification, yeast; Tissue homogenization
GI PCR PANEL PLUS	GI PCR PANEL GI PCR Supplemental Culture*	Positive Salmonella Positive Shigella/EIEC Positive for Vibrio or Vibrio Cholerae	Salmonella Culture Shigella Culture State Health Confirmation *GI PCR Panel and Supplemental Culture must be ordered together
Hepatitis C Virus Genotype	Review chart for recent Hepatitis C Virus quant PCR	If recent Hepatitis C Virus quant PCR is unavailable	Hepatitis C Virus Quant PCR; Hepatitis C Genotype will be cancelled if Hepatitis C Virus Quant PCR is <2000 IU/mL
HIV 1/2 Antibody-Antigen Screen	HIV 1/2 Antibody-Antigen Screen	Positive screen	Confirmation & HIV-1/2 Differentiation
Meningitis/ Encephalitis PCR Panel	Meningitis/ Encephalitis PCR Panel	N/A	CSF Aerobic/Anaerobic Cultures must be ordered concurrently with MEP Panel

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MTB-RIF PCR	MTB-RIF PCR	N/A	AFB Culture must run concurrently with MTB-RIF PCR
Ova & Parasites Complete	If clinical criteria not met, Giardia Antigen and Cryptosporidium Antigen will be substituted.	Clinical criteria for Complete O & P are not met (refer to Test Catalog).	Giardia antigen; Cryptosporidium antigen; Cryptosporidium Stain; Trichrome Stain; Concentration
Screening Culture	Screening Culture	Non-susceptible to one or more carbapenems	Carba-R PCR
Urine Culture	Urine Culture	Positive culture	Identification, urine organism; Identification, aerobe; Identification, anaerobe; Identification, enzyme detection; Identification, mold; Identification, Mycobacteria/ AFB; Identification, yeast; Sensitivity

Sendouts

Acetylcholine Receptor Antibody Reflexive Panel	ACHR Binding Ab, ACHR Blocking Ab	Acetylcholine Receptor Binding Ab greater than 0.4 nmol/L or Acetylcholine Receptor Blocking Ab greater than 26%	Acetylcholine Receptor Modulating Ab
ADAMTS13 Reflex Panel	ADAMTS13 activity	Activity ≤ 30% Inhibitor < 0.8 BU	ADAMTS13 Inhibitor ADMATS13 Ab
ANA Reflexive	ANA, Anti-Centromere	Positive ANA	Anti-SM/RNP, Anti-SSA/SSB, Anti-DNA
ANCA with reflex to titer	c-ANCA p-ANCA	Positive Positive	c-ANCA titer p-ANCA titer
ANCA Positive with reflex to titer & MPOAB or PR3AB	c-ANCA p-ANCA	Positive Positive	Titer Titer and PR3 Ab or MPO Ab
Anti-dsDNA by Crithidia w/Reflex titer	Anti-dsDNA/Crithidia	Positive >1:10	Titer
Anti-Mitochondrial Antibody	Antimitochondrial Ab	Positive >1:10	AMA titer
Anti-Neutrophil Cyto Ab	c-ANCA, p-ANCA	Positive	Titer
Arsenic Urine or Heavy Metals Urine	Arsenic Urine	35-2000 ug/L	Arsenic Speciation

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Autoimmune Encephalopathy Antibody Panel - CSF or Serum	Immunofluorescence (IFA)	Pattern Suggestive of: CRMP-5-IgG	CRMP-5-IgG Western Blot and (serum only) Ach receptor (muscle) binding antibody
	Immunofluorescence (IFA)	Amphipysin antibody, AGNA-1, ANNA-1, ANNA-2, PCA-1, PCA-Tr	Immunoblot specific to the antibody.
	Immunofluorescence (IFA)	IGLON5	IgLON5 cell-binding assay (CBA)
	IFA (AMPA only) and Cell-binding assay (CBA)	AMPA, and AMPA CBA is positive, or (serum only) CASPR2 CBA is positive	IFA titer and (serum only) CRMP-5-IgG Western Blot and Ach receptor (muscle) binding antibody.
	Immunofluorescence (IFA)	GABA-B, and GABA-B antibody is positive	IFA titer
	IFA and Cell-binding assay (CBA)	NMDA, and NMDA CBA is positive	IFA titer
	Immunofluorescence (IFA)	DPPX, GFAP, mGluR1	CBA and titer
	Immunofluorescence (IFA)	NIF	Alpha internexin CBA, NIF heavy chain CBA, NIF light chain CBA, and NIF titer
Borrelia burgdorgeri VlsE1/pepC10 Ab, Total by ELISA w/Reflox to IgG and IgM by Immunoblot	*Borrelia burgdorferi* VlsE1/pepC10 Antibodies, Total	VlsE1/pepC10 antibodies by ELISA is 0.91 IV or greater	B. burgdorferi IgG and IgM by immunoblot
Cryoglobulins w/Reflex IFE and Ig Quants	Cryoglobulin Screen	Positive	IFE and Cryoprecipitin Quants
Drug panel 9 S/P w/Reflex Confirmations	DOA 9 S/P Screen	Positive	Confirmation for positive drug(s)
F-Actin AB IGG w/Reflex to Smooth Muscle AB IGG Titer	F-Actin AB IGG	Positive >20 units	Smooth Muscle AB IGG Titer
Fragile X Syndrome Testing (w/Reflex to Methylation)	Fragile X Allele 1/2, Methylation Pattern, Interpretation, FRAG X Specimen	CCG repeat of ≥ 100	Methylation analysis
Gamma-Aminobutyric Aced Receptor, Type A (GABA-AR)Ab, IgG by CGA-IFA w/Reflex to Titer	GABA-AR Ab IgG	Positive	GABA-AR Ab IgG Titer
HTLV I/II EIA w/Reflex to WB	HTLV I/II Screen	Positive Screen	HTLV I/II Confirmation
Kratom (Mitragynine) - Screen With Reflex to Confirmation,	Kratom, Screen	Positive Screen	Confirmation
Leucine-Rich, Glioma-Inactivated Protein 1 Antibody, IgG by CBA-IFA w/Reflex to Titer, Serum	LGI1 Ab IgG	Positive	LGI1 Ab IgG Titer
Lyme Screen Ab w/Reflex to Western Blot	Lyme Screen	Positive >1.00 LIV	Lyme IgG WB and Lyme IgM WB

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Muscle-Specific Kinase (MuSK) Ab, IgG by CBA-IFA w/Reflex to Tire, Serum	MuSK SER Ab IgG	Positive	MuSK SER Ab Titer
Myasthenia Gravis Reflexive Panel	ACHR Binding Ab, ACHR Blocking Ab	Acetylcholine Receptor Binding Ab greater than 0.4 nmol/L or Acetylcholine Receptor Blocking Ab greater than 26% Acetylcholine Receptor Binding Ab less than or equal to 0.4 nmol/L	Acetylcholine Receptor Modulating Ab Muscle-Specific Kinase (MuSK) Ab, IgG
Myelin Oligodendrocyte (MOG-IgG1), FACS assay w/Reflex to Titer	MOG-IgG1 cell based flow cytometry (FACS) asay	Positive screen	MOG-IgG1 flow cytometry titer assay
Myeloproliferative Neoplasm, JAK2 V617F, w/Reflex to CALR and MPL	JAK2 V617F	Negative Screen CALR negative screen	CALR MPL
NMDAR CSF IgG w/Reflex	NMDAR CSF IgG	Positive screen	NMDAR CSF IgG Titer
NMDAR IgG w/Reflex	NMDAR IgG	Positive screen	NMDAR IgG Titer
Phencyclidine, Urine Screen w/Reflex to Quantitation	Phencyclidine, Urine	Positive screen	Confirmation/ Quantitation by LC-MS/MS
Phospholipase A2 Receptor (PLA2R) Ab, IgG x/Reflex	Phospholipase A2 Receptor Ab	Positive	Phospholipase Receptor A2 Ab, IgG Titer
Q-Fever IgG/IgM w/ Reflex Titer	Q-Fever Phase I IgG Q-Fever Phase II IgG Q-Fever Phase I IgM Q-Fever Phase II IgM	Positive or indeterminate Positive or indeterminate Positive or indeterminate Positive or indeterminate	Q-Fever I IgG Titer Q-Fever II IgG Titer Q-Fever I IgM Titer Q-Fever II IgM Titer
Restricted Pain Management Urine Drug Screen w/Reflex Confirmations	CUTox Drug Screen	Positive	Quantitation/Confirmation of positives
Striated Muscle AB w/ Reflex	Striated Muscle AB	Positive screen	Striated Muscle Titer
Thyroglobulin, Serum or Plasma w/Reflex to LC-MS/MS or CIA	Thyroglobulin Ab	TgAb Negative TgAb > 4.0 IU/mL	Tg by chemiluminescent immunoassay (CIA) Tg by high-performance liquid chromatography-tandem mass spectrometry (LC-MS/MS)
VDRL CSF	VDRL CSF	Weakly reactive or reactive	VDRL Titer

Special Chemistry

Hemoglobin Electrophoresis	Hemoglobin Electrophoresis	CBC not already performed within 7 days of Hgb Elect order. Patient has no previous testing at UCH Clinical Laboratory.	CBC IEF, Pathology Interpretation
SPEP (Serum Protein Electrophoresis) with Reflex IFE	Protein Total, Serum/Plasma and SPEP	Monoclonal protein is suspected based on the SPEP result or a suggestive clinical scenario.	Immunofixation Electrophoresis, Serum; Pathology Interpretation; IgD/IgE

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UPEP w/Reflex IFE, Timed Urine (LAB438)	Protein timed urine, protein electrophoresis	Monoclonal protein is suspected based on the UPEP result or the patient has had no previous UPEP at UCH Clinical Laboratory.	Immunofixation Electrophoresis, Urine (IFE U); Pathology Interpretation
UPEP w/Relex IFE, Random Urine (LAB837)	Protein urine, protein electrophoresis	Monoclonal protein is suspected based on the UPEP result or the patient has had no previous UPEP at UCH Clinical Laboratory.	Immunofixation Electrophoresis, Urine (IFE U); Pathology Interpretation
Urinalysis			
Eosinophil Smear, Urine	Eosinophil Smear, Urine and Urine WBC quantification	Requires Urine WBC quantification >5 WBC/hpf to perform Eosinophil Smear, Urine.	Urine WBC quantification is automatically performed. If the urine WBC result is within normal limits, the Eosinophil Smear, Urine will be cancelled and credited.
Urinalysis, Reflex to Microscopic Examination	Urinalysis Chemical	Any appearance other than "Clear", and/or Positive Protein, Blood, Nitrite, and/or Leukocyte esterase	Microscopic Examination
Urinalysis, Complete with Culture Reflex (if indicated)	Urinalysis chemical and microscopic	If WBC > 5/HPF *and* Squamous Epithelial ≤ 10/HPF	Urine culture
Urinalysis, Microscopic Reflex to Culture	Urinalysis microscopic	If WBC > 5/HPF *and* Squamous Epithelial ≤ 10/HPF	Urine culture