

New Procedures

Several new procedures have been made available since the last issue of *LabHorizons* was published. Several are included here, but for a complete list of published assays please consult the electronic *Directory of Services and Interpretive Guide (e-DoS)* at www.LabCorp.com.

Lupus Anticoagulant With Reflex 117892

CPT 85613; 85732

Synonyms Lupus Anticoagulant; Lupus Anticoagulant Screen

Test Includes Activated Partial Thromboplastin Time-Lupus Anticoagulant (aPTT-LA) and Dilute Russell Viper Venom Time (dRVVT); If either is extended reflex testing is performed and additional charges/CPT code(s) may apply.

Specimen Plasma, frozen

Volume 2 mL

Container Blue-stopper (sodium citrate plasma) tube

Collection Citrated plasma samples should be collected by double centrifugation. Blood should be collected in a blue-stopper tube containing 3.2% buffered sodium citrate.¹ Evacuated collection tubes must be filled to completion to ensure a proper blood to anticoagulant ratio.^{2,3} The sample should be mixed immediately by gentle inversion at least six times to ensure adequate mixing of the anticoagulant with the blood. A discard tube is not required prior to collection of coagulation samples.^{4,5} When noncitrate tubes are collected for other tests, collect sterile and nonadditive (red-stopper) tubes prior to citrate (blue-stopper) tubes. Any tube containing an alternate anticoagulant should be collected after the blue-stopper tube. Serum separator tubes and serum tubes with clot initiators should also be collected after the citrate tubes. Centrifuge for 10 minutes and carefully remove two thirds of the plasma without disturbing the cells, using a plastic transfer pipette. Deliver to a plastic transfer tube, cap, and recentrifuge for 10 minutes. Use a second plastic pipette to remove the plasma, staying clear of the platelets at the bottom of the tube. Transfer the plasma into a LabCorp plastic lavender-stopper tube with cap (LabCorp ID N° 9566589372). The specimen should be frozen immediately and maintained frozen until tested. To avoid delays in turnaround time when requesting multiple tests on frozen samples, please submit separate frozen specimens for each test requested.

Storage Instructions Freeze

Patient Preparation Avoid warfarin (Coumadin®) therapy for two weeks and heparin therapy for two days prior to the test.

Causes for Rejection Hemolysis; clotted specimen; specimen contaminated with heparin (ie, drawn with blood gases)

Use The qualitative detection of lupus anticoagulants in plasma.⁶

Methodology PTT-LA (lupus-sensitive APTT) and dRVVT screen; mixing study if screening tests are prolonged; confirmation if the mixing studies do not correct.

Additional Information Lupus anticoagulants are nonspecific antibodies that extend the clotting time of phospholipid-dependent clotting assays such as the aPTT.^{7,8} Unlike specific factor antibodies, LA are usually associated with venous thrombosis, pulmonary embolism, arterial thrombosis, and recurrent fetal loss.^{9,10} LA do not specifically inhibit individual coagulation factors; rather they neutralize anion-

ic phospholipid-protein complexes that are involved in the coagulation process. Prolongation of clot-based assays is highly dependent on the sensitivity of the reagent employed. Reagents with reduced amounts of phospholipid, such as the aPTT-LA and dilute Russell viper venom time (dRVVT), have enhanced sensitivity for LA. Due to the heterogeneity of LA antibodies, no single assay will identify all cases.⁹ The International Society on Thrombosis and Haemostasis (ISTH) has established criteria for the diagnosis of lupus anticoagulants.⁷⁻⁹

Footnotes

1. Adcock DM, Kressin DC, Marlar RA. Effect of 3.2% vs 3.8% sodium citrate concentration on routine coagulation testing. *Am J Clin Pathol.* 1997; 107(1):105-110.

2. Reneke J, Etzell J, Leslie S, et al. Prolonged prothrombin time and activated partial thromboplastin time due to underfilled specimen tubes with 109 mmol/L (3.2%) citrate anticoagulant. *Am J Clin Pathol.* 1998; 109(6):754-757.

3. National Committee for Clinical Laboratory Standards. *Collection, Transport, and Processing of Blood Specimens for Coagulation Testing and General Performance of Coagulation Assays; Approved Guideline.* 3rd ed. Villanova, Pa: NCCLS;1999. Document H21-A3:11(23).

4. Gottfried EL, Adachi MM. Prothrombin time and activated partial thromboplastin time can be performed on the first tube. *Am J Clin Pathol.* 1997; 107(6):681-683.

5. McGlasson DL, More L, Best HA, et al. Drawing specimens for coagulation testing: Is a second tube necessary? *Clin Lab Sci.* 1999; 12(3):137-139.

6. Brandt JT, Triplett DA, Alving B, et al. Criteria for the diagnosis of lupus anticoagulants: An update. On behalf of the Subcommittee on Lupus Anticoagulant/Antiphospholipid Antibody of the Scientific and Standardisation Committee of the ISTH. *Thromb Haemost.* 1995; 74(4):1185-1190.

7. Brandt JT, Barna LK, Triplett DA. Laboratory identification of lupus anticoagulants: Results of the Second International Workshop for Identification of Lupus Anticoagulants. On behalf of the Subcommittee on Lupus Anticoagulants/ Antiphospholipid Antibodies of the ISTH. *Thromb Haemost.* 1995; 74(6):1597-1603.

8. Brandt JT, Triplett DA, Alving B, et al. Criteria for the diagnosis of lupus anticoagulants: An update. On behalf of the Subcommittee on Lupus Anticoagulant/ Antiphospholipid Antibody of the Scientific and Standardization Committee of the ISTH. *Thromb Haemost.* 1995; 74(4):1185-1190.

9. Alving BM. The antiphospholipid syndrome: Clinical presentation, diagnosis and patient management. In: Kitchens CS, Alving BM, Kessler CM, eds. *Consultative Hemostasis and Thrombosis.* Philadelphia, Pa: WB Saunders; 2002:181-196.

10. Levine JS, Branch DW, Rauch J. The antiphospholipid syndrome. *N Engl J Med.* 2002; 346(10):752-763.

Lupus Anticoagulant (Comprehensive) 117054

CPT 85705; 85670; 85732; 85613

Synonyms Lupus Anticoagulant; Lupus Anticoagulant Screen

Specimen Plasma, frozen

Volume 2 mL

Container Blue-stopper (sodium citrate plasma) tube

Collection Blue-stopper (3.2% sodium-citrate plasma) tube. Citrated plasma samples should be collected by double centrifugation. Blood should be collected in a blue-stopper tube containing 3.2% buffered sodium citrate.¹ Evacuated collection tubes must be filled to completion to ensure a proper blood to anticoagulant ratio.^{2,3} The sample should be mixed immediately by gentle inversion at least six times to ensure adequate mixing of the anticoagulant with the blood. A discard tube is not required prior to collection of coagulation samples.^{4,5} When noncitrate tubes are collected for other tests, collect sterile and nonadditive (red-stopper) tubes prior to citrate (blue-stopper) tubes. Any tube containing an alternate anticoagulant should be collected after the blue-stopper tubes. Serum gel separator tubes and serum tubes with clot initiators should also be collected after the citrate tubes. Centrifuge for ten minutes and carefully remove two-thirds of the plasma without disturbing the cells, using a

plastic transfer pipette. Deliver to a plastic transfer tube, cap, and centrifuge for ten minutes. Use a second plastic pipette to remove the plasma, staying clear of the platelets at the bottom of the tube. Transfer the plasma into a LabCorp plastic lavender-stopper tube with cap (LabCorp ID N° 9566589372). The specimen should be **frozen** immediately and maintained frozen until tested. To avoid delays in turnaround time when requesting multiple tests on frozen samples, please submit separate frozen specimens for each test requested.

Storage Instructions Freeze

Patient Preparation Avoid warfarin (Coumadin®) therapy for two weeks and heparin therapy for two days prior to the test.

Causes for Rejection Hemolysis; clotted specimen; specimen contaminated with heparin (ie, drawn with blood gases)

Use The qualitative detection of lupus anticoagulants in plasma.⁶

Methodology PTT-LA (lupus-sensitive APTT), and dPT screening tests; mixing study if screening test are prolonged; confirmation if the mixing studies do not correct.

Additional Information Lupus anticoagulants re antibodies which inhibit one or more of the in vitro phospholipid dependent tests of coagulation.⁶⁻¹⁰ Recently, the SCC Subcommittee for the Standardization of Lupus Anticoagulants has provided guidelines for the laboratory diagnosis of LA.⁶ No single screening test can detect all LA-positive patients. The ISTH recommends that any sample suspected of having LA be tested using two or more LA screening tests.^{6,7} The screening tests commonly used to detect LA assess inhibitors of the intrinsic pathway (aPTT-LA) and the common pathways (dRVVT). The dPT assay screens for phospholipid dependent inhibitors of a different part of the coagulation cascade, the extrinsic pathway.¹¹ The thrombin time is included to rule out heparin and other thrombin inhibitors.

Footnotes

1. Adcock DM, Kressin DC, Marlar RA. Effect of 3.2% vs 3.8% sodium citrate concentration on routine coagulation testing. *Am J Clin Pathol.* 1997; 107(1):105-110.

2. Reneke J, Etzell J, Leslie S, et al. Prolonged prothrombin time and activated partial thromboplastin time due to underfilled specimen tubes with 109 mmol/L (3.2%) citrate anticoagulant. *Am J Clin Pathol.* 1998; 109(6):754-757.

3. National Committee for Clinical Laboratory Standards. *Collection, Transport, and Processing of Blood Specimens for Coagulation Testing and General Performance of Coagulation Assays; Approved Guideline.* 3rd ed. Villanova, Pa: NCCLS;1999. Document H21-A3:11(23).

4. Gottfried EL, Adachi MM. Prothrombin time and activated partial thromboplastin time can be performed on the first tube. *Am J Clin Pathol.* 1997; 107(6):681-683.

5. McGlasson DL, More L, Best HA, et al. Drawing specimens for coagulation testing: Is a second tube necessary? *Clin Lab Sci.* 1999; 12(3):137-139.

6. Brandt JT, Triplett DA, Alving B, et al. Criteria for the Diagnosis of Lupus Anticoagulants: An Update. On behalf of the Subcommittee on Lupus Anticoagulant/ Antiphospholipid Antibody of the Scientific and Standardisation Committee of the ISTH. *Thromb Haemost.* 1995; 74(4):1185-1190.

7. Brandt JT, Barna LK, Triplett DA. Laboratory identification of lupus anticoagulants: Results of the Second International Workshop for Identification of Lupus Anticoagulants. On behalf of the Subcommittee on Lupus Anticoagulants/ Antiphospholipid Antibodies of the ISTH. *Thromb Haemost.* 1995; 74(6):1597-1603.

8. Alving BM. The antiphospholipid syndrome: Clinical presentation, diagnosis and patient management. In: Kitchens CS, Alving BM, Kessler CM, eds. *Consultative Hemostasis and Thrombosis.* Philadelphia, Pa: WB Saunders; 2002:181-196.

9. Levine JS, Branch DW, Rauch J. The antiphospholipid syndrome. *N Engl J Med.* 2002; 346(10):752-763.

10. Greaves M, Cohen H, MacHin SJ, et al. Guidelines on the investigation and management of the antiphospholipid syndrome. *Br J Haematol.* 2000 Jun;109(4):704-715.

11. Arnout J, Vanrusselt M, Huybrechts E, et al. Optimization of the dilute prothrombin time for the detection of the lupus anticoagulant by use of a recombinant tissue thromboplastin. *Br J Haematol.* 1994 May;87(1):94-99.

Reptilase Time 117180

CPT 85635

Related Information Thrombin Time (015230)

Specimen Plasma, frozen

Volume 2 mL

Minimum Volume 1 mL

Container Blue-stopper (sodium citrate plasma) tube

Collection Blood should be collected in a blue-stopper tube containing 3.2% buffered sodium citrate.¹ Evacuated collection tubes must be filled to completion to ensure a proper blood-to-anticoagulant ratio.^{2,3} The sample should be mixed immediately by gentle inversion at least six times to insure adequate mixing of the anticoagulant with the blood. A discard tube is not required prior to collection of coagulation samples.^{4,5} When noncitrate tubes are collected for other tests, collect sterile and nonadditive (red-stopper) tubes prior to citrate (blue-stopper) tubes. Any tube containing an alternate anticoagulant should be collected after the blue-stopper tube. Gel-barrier

tubes and serum tubes with clot initiators should also be collected after the citrate tubes. Centrifuge and (without disturbing the cells) carefully remove the plasma using a plastic transfer pipette. Transfer plasma into a LabCorp plastic screw-cap tube with cap (LabCorp ID N° 9566589372). The specimen should be **frozen** immediately and maintained frozen until tested. **To avoid delays in turnaround time when requesting multiple tests on frozen samples, please submit separate frozen specimens for each test requested.**

Storage Instructions Freeze

Patient Preparation Avoid warfarin (Coumadin®) therapy for two weeks and heparin therapy for two days prior to the test. **Do not** collect specimen from an arm with a heparin lock or a heparinized catheter.

Causes for Rejection Gross hemolysis; clotted specimens; specimens that have thawed in transit; improperly labeled specimen.

Use Diagnosis of fibrinogen deficiency, both congenital and acquired.⁶ Normal values for reptilase time when thrombin time is prolonged suggest the presence of heparin.

Limitations The RT test is a qualitative assay of fibrinogen function and do not always indicate a specific disorder, thus additional testing may be required for clarification of prolongation in test results.

Methodology The reptilase time measures the rate of fibrin clot formation after the addition of reptilase, a proteolytic enzyme derived from the venom of Bothrops atrox, to citrated plasma.

Additional Information Reptilase is a thrombin-like enzyme. Unlike thrombin, which cleaves fibrinogen to produce fibrinopeptides A and B, reptilase cleaves the fibrinogen molecule to release only fibrinopeptide A.^{6,7} The reptilase clotting time may be used in place of or in conjunction with the thrombin time to measure fibrin formation. Both reptilase time and thrombin time will be extended when functional fibrinogen levels are below 100 mg/dL.^{6,7} This can occur due to congenital conditions, including afibrinogenemia (complete lack of fibrinogen), hypofibrinogenemia and in dysfibrinogenemia, a condition characterized by the presence of dysfunctional fibrinogen. Acquired conditions can lead to diminished fibrinogen levels and extended reptilase times include liver disease, renal disease, disseminated intravascular coagulation (DIC), amyloidosis, malignancy and thrombolytic therapy.⁶ Paraproteins and fibrin degradation products, especially fragments D and E, interfere in fibrin polymerization thus prolonging both the thrombin time and reptilase time. Bovine thrombin inhibitors (antibovine thrombin antibody) may develop in patients previously treated with "fibrin glue" during surgical procedures (most fibrin glue products contain bovine thrombin). This acquired inhibitor prolongs the (bovine-derived reagent) thrombin time, but does not prolong the reptilase time. A thrombin time using human-derived thrombin reagent will not be prolonged in the presence of a bovine thrombin inhibitor. Unlike thrombin, reptilase is not affected by the presence of heparin, heparinoids or hirudin and may be a useful tool in evaluating test plasma for their presence.⁶ A prolonged thrombin time in a patient with a normal reptilase time suggest heparin therapy or contamination.

Footnotes

1. Adcock DM, Kressin DC, Marlar RA. Effect of 3.2% vs 3.8% sodium citrate concentration on routine coagulation testing. *Am J Clin Pathol.* 1997; 107(1):105-110.

2. Reneke J, Etzell J, Leslie S, et al. Prolonged prothrombin time and activated partial thromboplastin time due to underfilled specimen tubes with 109 mmol/L (3.2%) citrate anticoagulant. *Am J Clin Pathol.* 1998; 109(6):754-757.

3. National Committee for Clinical Laboratory Standards. *Collection, Transport, and Processing of Blood Specimens for Coagulation Testing and General Performance of Coagulation Assays; Approved Guideline.* 3rd ed. Villanova, Pa: NCCLS;999. Document H21-A3:11(23).

4. Gottfried EL, Adachi MM. Prothrombin time and activated partial thromboplastin time can be performed on the first tube. *Am J Clin Pathol.* 1997; 107(6):681-683.

5. McGlasson DL, More L, Best HA, et al. Drawing specimens for coagulation testing: Is a second tube necessary? *Clin Lab Sci.* 1999; 12(3):137-139.

6. Adcock DM, Jensen R, Johns CS, Macy PA. *Coagulation Handbook.* Austin, Texas: Esotex Coagulation; 2002.

7. Van Cott EM, Laposata M. Coagulation. In: Jacobs DS, Oxley DK, eds. *Laboratory Test Handbook.* Hudson, Ohio: Lexi-Comp; 2001:327-358.

References

Goodnight SH, Hathaway WE, eds. *Disorders of Hemostasis and Thrombosis: A Clinical Guide.* 2nd ed. New York, NY: McGraw-Hill; 2001.

Coleman RW, et al, eds. *Hemostasis and Thrombosis: Basic Principles and Clinical Practice.* 4th ed. Ogunakadekohia; Pa: Lippincott Williams & Wilkins; 2001.

Sirridge MS. In: *Laboratory Evaluation of Hemostasis.* 2nd ed. Philadelphia, Pa; 1974.

Rosendaal FR. Risk factors for venous thrombosis: Prevalence, risk, and interaction. *Semin Hematol.* 1997; 34:171.

Spero JA. Complications of the treatment of hemostatic disorders. In: Ratnof OD, Forbes CD, eds. *Disorders of Hemostasis.* 3rd ed. Philadelphia, Pa: WB Saunders; 1996.

Announcements

Continuing Medical Education (CME) Opportunities

LabCorp® is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to sponsor continuing medical education (CME) for physicians. In addition, LabCorp is accredited by the ASCLS PACE® program, Florida Department of Health-Board of Clinical Laboratory Personnel,

and the state of California Department of Health Services as a provider of continuing medical education for laboratory personnel. CME titles currently available are listed below, along with publication numbers and expiration dates.

Title	Publication N°	Expiration Date
Alpha ₁ -Antitrypsin Deficiency: A Critical Component of Chronic Obstructive Pulmonary Disease	L1106-0804-1	August 1, 2006
Screening for Aneuploidy in the First Trimester	L1145-0805-2	November 1, 2006
Clinical Significance and Assessment of 25-OH Vitamin D	L1162-0305-1	February 1, 2007
Human Papillomavirus and Cervical Cancer: An Update	L1173-0605-1	June 1, 2007
When Good Food Makes You Sick, Part 1: Celiac Disease	L1192-1005-1	September 1, 2007
When Good Food Makes You Sick, Part 2: Food Allergy	L1208-0106-1	February 1, 2008
Genetic Causes of Male Infertility	3450-0206-1	May 1, 2008

For more information, or for copies of any of the available materials, please contact the LabCorp CME office at 336-436-4990. In addition, the CME arti-

cles listed above may also be accessed and printed at www.labcorp.com/cme/index.html.

New Platelet Antibody Assay

The **Platelet Antibodies, Qualitative, Serum** (014068) test will be replaced by **Platelet Antibody Profile, Serum** (014086) on **May 1, 2006**. The new test provides information about the specific platelet antigen to which the platelet antibody is formed. Antibody specificity can be correlated with the cause of thrombocytopenia, including autoimmune thrombocytopenia purpura (AITP), neonatal alloim-

mune thrombocytopenia (NAIT), posttransfusion purpura (PTP), and refractoriness to platelet transfusions.^{1,2} Both tests are shown with their respective CPT codes and National Limitation Amounts in the table below. The inclusion of additional CPT code may result in increased reimbursement from some payors including Medicare. If there are any questions, please contact your LabCorp representative.

Test Name (Number)	CPT Code(s)	NLA
Platelet Antibodies, Qualitative, Serum (014068) — Discontinued	86022	\$25.66
Platelet Antibody Profile, Serum (014086) — New	86022(x4)	\$102.64

1. American Association of Blood Banks. *Technical Manual*. 14th ed. Bethesda, Md: AABB; 2002.

2. Norton A, Allen DL, Murphy MF. Review: Platelet alloantigens and antibodies and their clinical significance. *Immunohematol*. 2004; 20(2):89-102.

New and Revised CPT Codes

The list below includes new and revised CPT code(s) for 2006. This list consists of routine tests only; it does not include custom profiles created for individual clients. Please contact your local LabCorp account manager if you have questions.

Number Test Name

500550	11-Deoxycortisol
140269	Alpha Subunit, Free
117199	APTT Mixing Studies
480510	BCR-ABL1 Kinase Domain
010108	C-Peptide
052200	Chromosome, Prenatal, With Reflex to Comparative Genomic Hybridization (CGH)
510020	Comparative Genomic Hybridization (CGH) Analysis, Amniotic Fluid
511154	Factor V Leiden Mutation Analysis
138790	Hepatitis B Virus (HBV) NAT (COBAS AmpliScreen™)
551499	Human Immunodeficiency Virus (HIV), PhenoSense™ (Phenotype) Comprehensive
138837	Influenza Virus Types A and B, RSV, Real-time PCR
140152	Insulin-Like Growth Factor Binding Protein 3 (IGFBP-3)
489200	JAK2 V617F Mutation Detection
884247	NMR LipoProfile
480704	Pancreatic Polypeptide

CPT Code(s)

82634
83520
85730; 85732(x3)
83891; 83902; 83898(x6); 83894; 83892; 83909(x4); 83912
84681
88235; 88269; 88280; 88285; 88291
83891; 88271 (x83); 83894; 88291
83891; 83894; 83898 (x2); 83912
87516
87903; 87904(x8)
87801
83520
83891; 83900; 83909; 83912
83704; 82465
83519

Note: The CPT codes listed here are in accordance with the current edition of *Current Procedural Terminology*, a publication of the American Medical Association. CPT codes are provided for the convenience of our clients; however, correct coding often varies from one carrier to another. Consequently, the codes presented here are intended as general guidelines and should not be used without confirming with the applicable payor that their use is appropriate in each case.

Updates to the *Directory of Services and Interpretive Guide*

Test Name	Number	Field/Change
Alpha Subunit, Free	140269	Specimen Serum, Frozen Volume 1.0 mL Collection Transfer the serum into a lavender colored frozen transfer tube with cap (LabCorp ID No 956658972). The specimen should be frozen immediately and maintained frozen until tested. To avoid delays in turnaround time when requesting multiple test on frozen samples, please submit separate frozen specimens for each test requested. Storage Instructions Freeze Causes for Rejection Nonserum specimen Methodology Immunochemiluminometric Assay (ICMA)
Aminolevulinic Acid, Delta, 24-Hour Urine	096354	Storage Instructions Freeze . Protect from light. Not stable preserved with sodium carbonate. Stable preserved with 30% glacial acetic acid and frozen (-20° to 0°C) for one year. Stable preserved with 30% glacial acetic acid and refrigerated (2° to 8°C) for four months.
Aminolevulinic Acid, Delta, Random Urine	007351	Storage Instructions Freeze . Protect from light. Not stable preserved with sodium carbonate. Stable preserved with 30% glacial acetic acid and frozen (-20° to 0°C) for one year. Stable preserved with 30% glacial acetic acid and refrigerated (2° to 8°C) for four months.
C-Peptide, Serum	010108	Special Instructions This procedure does not provide serial monitoring; it is intended for one-time use only. If serial monitoring is required, please use the serial monitoring number 480108 to order. Values obtained with different assay methods should not be used interchangeably in serial testing. It is recommended that only one assay method be used consistently to monitor each patient's course of therapy.
Chronic Leukemia Profile, Flow Cytometry	489090	Limitations Not for the assessment of chronic myeloid leukemia (use Acute Leukemia Profile, Flow Cytometry [489110]). Genotyping, to detect T-cell receptor gene rearrangements, is recommended when the immunophenotyping profile suggests a clonal T-cell process. See T-Cell Receptor Gene Rearrangements for Leukemia (480707) .
Estimated Glomerular Filtration Rate (eGFR)	100768	Use The estimated glomerular filtration rate (eGFR) provides an assessment of the filtering capacity of the kidney. The eGFR is calculated from a serum creatinine using the MDRD equation. Aside from the serum creatinine, other variables required for the equation are sex, age, and race. The eGFR has been shown to be more accurate in estimating the glomerular filtration rate than a 24-hour urine collection for creatinine clearance. Among patients with chronic kidney disease (CKD) the eGFR is instrumental in determining the stage of disease according to the K/DOQI CKD classification. Filtration Rate (GFR) and Staging of Kidney Disease. While a normal GFR in young adults is approximately 120 to 130 mL/min/1.73m ² , it declines with age and values of <60 mL/min/1.73m ² for three or more months is defined as CKD. To determine the presence of proteinuria, low eGFR results may be followed up with albumin/creatinine ratio. An albumin/creatinine ratio of >30 mg/g would be indicative of kidney damage.
Heparin-induced Platelet Antibody	150075	Reference Interval 0.0 - 0.4 OD Units Additional Information HIT, also referred to as heparin-associated thrombocytopenia (HAT), occurs in 1% to 5% of patients treated with standard unfractionated heparin. ¹⁻³ The most common form of HIT presents as a mild thrombocytopenia one to five days after initiation of heparin therapy. Type I HIT is not thought to be immune-mediated and often occurs in patients on their first exposure to heparin. ¹ In this condition, platelet counts typically normalize within a few days, regardless of whether or not heparin therapy continued. Type II HIT is a much more clinically significant, immune-mediated response to heparin that is frequently associated with the production of HIPA. Type II HIT can be associated with severe thrombosis. The thrombocytopenia typically begins later than that of type I HIT, usually occurring some 5 to 10 days after the initiation of heparin therapy in patients who had never been previously exposed to heparin. Patients with prior exposure to heparin can develop thrombocytopenia more quickly on re-exposure due to earlier sensitization. In type II HIT, heparin is thought to bind to platelet factor 4 and produce a conformational change exposing antigenic sites for antibody formation. ² These antibodies bind to the heparin-PF4 complex and can activate platelet and produce severe venous or arterial thrombosis. Heparin treatment should be stopped and alternative anticoagulation considered in patients who develop type II HIT. ^{1,2} Like other serologic (EIA-based) assays, this assay has a high negative predictive value and only a moderate positive predictive value for HIT. ⁴ Recent studies have shown that the magnitude (optical density, OD) of the result relative to the cut-off of 0.4 OD can provide useful information regarding the probability of developing HIT. ^{4,8} The likelihood of developing HIT is significantly higher when the OD is greater than 2.0 than when the OD is closer to the cut-off. ^{4,8} One recent study revealed that patients with negative results just below the cut-off of 0.4 OD have a high probability of having positive results on repeat testing a few days later. ⁹ Footnotes 1. Adevick DM, Jensen R, Johns CS, Macy PA. <i>Coagulation Handbook</i> . Austin, Texas: Esotex Coagulation, 2002. 2. Warkentin TE. Heparin-induced thrombocytopenia. In Kitchens CS, Alving BM, Kessler CM, eds. <i>Consultative Hemostasis and Thrombosis</i> . Philadelphia, Pa: WB. Saunders; 2002:355-372. 3. Fabris F, Ahmad S, Cella G, Jeske WP, Walenga JM, Fareed J. Pathophysiology of heparin-induced thrombocytopenia. Clinical and diagnostic implications—a review. <i>Arch Pathol Lab Med</i> . 2000 Nov; 124(11):1657-1666 4. Warkentin TE, Greinacher A. Heparin-induced thrombocytopenia: recognition, treatment, and prevention: The Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. <i>Chest</i> . 2004 Sep;126(3 Suppl):311S-337S. 5. Warkentin TE, Sheppard JA, Horsewood P. Impact of the patient population on the risk for heparin-induced thrombocytopenia. <i>Blood</i> . 2000 Sep 1;96(5):1703-1708. 6. Warkentin TE, Heddle NM. Laboratory diagnosis of immune heparin-induced thrombocytopenia. <i>Curr Hematol Rep</i> . 2003 Mar;2(2):148-157. 7. Fabris F, Luzzatto G, Soini B. Risk factors for thrombosis in patients with immune mediated heparin-induced thrombocytopenia. <i>J Intern Med</i> . 2002 Aug;252(2):149-154. 8. Zwicker JI, Uhl L, Huang WY. Thrombosis and ELISA optical density values in hospitalized patients with heparin-induced thrombocytopenia. <i>J Thromb Haemost</i> . 2004 Dec; 2(12):2133-2137. 9. Refaai MA, Laposata M, Van Cott EM. Clinical significance of a borderline titer in a negative ELISA test for heparin-induced thrombocytopenia. <i>Am J Clin Pathol</i> . 2003 Jan;119(1):61-65.
Porphobilinogen (PBG), Quantitative, 24-Hour Urine	003103	Storage Instructions Freeze immediately and protect from light. Stable preserved with sodium carbonate to a pH of 8 and frozen for eight months. Stable preserved with sodium carbonate to a pH of 8 and refrigerated for 72 hours. Stable preserved with 30% glacial acetic acid and frozen for one month. Stable preserved with 30% glacial acetic acid and refrigerated for one day.
Porphobilinogen (PBG), Quantitative, Random Urine	003053	Storage Instructions Freeze immediately and protect from light. Stable preserved with sodium carbonate to a pH of 8 and frozen for eight months. Stable preserved with sodium carbonate to a pH of 8 and refrigerated for 72 hours. Stable preserved with 30% glacial acetic acid and frozen for one month. Stable preserved with 30% glacial acetic acid and refrigerated for one day.
Renin, Direct	142026	This test is currently nonorderable. Please order Renin Activity, Plasma (002006) . Please consult the <i>Directory of Services and Interpretive Guide</i> for specimen requirements.
Rheumatoid Arthritis (RA) Factor	006502	Specimen Serum or plasma Container Red-stopper tube, gel-barrier tube, or lavender-stopper (EDTA plasma) tube

Note: For the most up-to-date test information, please consult the electronic *Directory of Services and Interpretive Guide* (e-DoS) at www.LabCorp.com. Questions regarding *LabHorizons* should be addressed to David Carrozza (carrozd@labcorp.com).

