MAYO CLINIC LABORATORIES

Test Definition: HEXLA

Hexagonal Lupus Anticoagulant, Plasma

Overview

Useful For

Confirming or excluding the presence of a lupus anticoagulant (LA), in conjunction with other appropriate coagulation tests

Differentiating between deficiencies or inhibitors of specific coagulation factors and LA inhibitors

Evaluating a prolonged activated partial thromboplastin time resulting from inhibition

Method Name

Only orderable as part of a reflex. For more information see:
ALUPP / Lupus Anticoagulant Profile, Plasma
ACBL / Bleeding Diathesis Profile, Comprehensive, Plasma
ALBLD / Bleeding Diathesis Profile, Limited, Plasma
AATHR / Thrombophilia Profile, Plasma and Whole Blood
APROL / Prolonged Clot Time Profile, Plasma
ADIC / Disseminated Intravascular Coagulation/Intravascular Coagulation and Fibrinolysis (DIC/ICF) Profile, Plasma

Spectrophotometric

NY State Available

Yes

Specimen

Specimen Type

Plasma Na Cit

Specimen Required

Only orderable as part of a reflex. For more information see:
ALUPP / Lupus Anticoagulant Profile, Plasma
ACBL / Bleeding Diathesis Profile, Comprehensive, Plasma
ALBLD / Bleeding Diathesis Profile, Limited, Plasma
AATHR / Thrombophilia Profile, Plasma and Whole Blood
APROL / Prolonged Clot Time Profile, Plasma
ADIC / Disseminated Intravascular Coagulation/Intravascular Coagulation and Fibrinolysis (DIC/ICF) Profile, Plasma

Reject Due To

Gross	Reject

hemolysis	
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Plasma Na Cit	Frozen	60 days	

Clinical & Interpretive

Clinical Information

Lupus anticoagulant (LA) is one of several antibodies referred to as antiphospholipid antibodies (APA). Lupus anticoagulants are immunoglobulins (IgG, IgM, IgA, or a combination of these) that interfere with specific coagulation factor-phospholipid interactions, typically causing prolongation of one or more phospholipid-dependent clotting time tests (eg, activated partial thromboplastin time [aPTT]; dilute Russell's viper venom time due to inhibition). The characteristic in vitro inhibition caused by the presence of LA inhibitors can be overcome by additional phospholipid, which can be used to confirm the presence of LA. However, the most common in-vivo clinical manifestations of presence of APA are vascular thrombosis and recurrent miscarriage, among other organ manifestations. The combination of clinical manifestations and persistent presence of APA satisfies the criteria for APA syndrome. The hexagonal LA assay system enhances the sensitivity and specificity of aPTT-based LA detection by employing:
1. A partial thromboplastin that is more responsive to LA than many other reagents.
2. Inverted hexagonal phase phospholipid for neutralization of LA inhibition.

Reference Values

Only orderable as part of a reflex. For more information see:
ALUPP / Lupus Anticoagulant Profile, Plasma
ACBL / Bleeding Diathesis Profile, Comprehensive, Plasma
ALBLD / Bleeding Diathesis Profile, Limited, Plasma
AATHR / Thrombophilia Profile, Plasma and Whole Blood
APROL / Prolonged Clot Time Profile, Plasma
ADIC / Disseminated Intravascular Coagulation/Intravascular Coagulation and Fibrinolysis (DIC/ICF) Profile, Plasma

Hex LA delta:
<13 seconds

Interpretation

The diagnosis of a lupus anticoagulant (LA) requires performance and interpretation of complex coagulation testing, as well as correlation with available clinical information. Because of the heterogeneous nature of LA antibodies, no single coagulation test can identify or exclude all LAs. Consequently, a combination or panel of coagulation tests are performed, including the activated partial thromboplastin time (aPTT) and the dilute Russell's viper venom time (dRVVT). If the aPTT or dRVVT is prolonged, additional testing may include mixing tests with normal plasma (to demonstrate inhibition) and the use of excess phospholipid in appropriate assay systems to confirm the presence of LA.

Interpretation of hexagonal LA testing is complex and must be done within the context of several additional laboratory tests (eg, aPTT with reflexive aPTT mixing study and platelet neutralization procedure [PNP]; and dRVVT with reflexive mixing study and confirmatory procedure). Hexagonal LA is effective in evaluating a prolonged aPTT resulting from inhibition. The assay involves the addition of a reaction mixture with and without hexagonal phase phospholipid to the patient's platelet-poor plasma. A silica-based aPTT is done on both mixtures and the clotting times are compared. Plasma containing a LA will demonstrate significant shortening of the aPTT with addition of hexagonal phase phospholipid (by at least 13 seconds), when compared to aPTT without hexagonal phase phospholipid. Additional phospholipid supplied by the hexagonal phase phospholipid reagent can absorb LA antibody (anti-protein/phospholipid), thereby diagnostically shortening the aPTT. A Hexagonal LA delta of less than 13 indicates LA negative and greater or equal to 13 seconds is LA positive for this assay.

Per manufacturer studies Hexagonal LA compared to Staclot LA data demonstrated positive percent agreement of 95.6% (95% CI, 91-98%), negative percent agreement of 95.2% (95% CI, 92%-97%), and overall agreement of 95.3% (95% CI, 93%-97%).

Cautions

Hexagonal lupus anticoagulant (LA) testing is not interfered with up to the following limits:
-Hemolysis: Hemoglobin < or =150 mg/dL
-Icterus: Bilirubin (unconjugated)< or =20 mg/dL, Bilirubin (conjugated) < or =45 mg/dL
-Lipemia: SMOFlipid < or =10,000 mAbs (TOP HIL), Intralipid < or =500 mg/dL
-Heparin: Unfractionated heparin < or =2 IU/mL, Low molecular weight heparin < or =2 IU/mL
-Elevated factor VIII activity (up to 180%)
-Plasma samples with elevated INR (up to 4.5)

Interpretation of hexagonal LA test results is not influenced but the delta correction may increase in the following circumstances:
-Elevated fibrinogen concentrations
-C-reactive protein concentrations above 15 mcg/mL
-Dabigatran, rivaroxaban, and fondaparinux
-Abnormally low factor X activities (below 50%)

Interpretation of hexagonal LA test results may be falsely normal in the following circumstances:
-High platelet counts (>10,000 platelets/mc/L) showed interference with hexagonal LA results when compared with platelet poor (<10,000/mcL, single centrifuged) or platelet free (double centrifuged) plasma samples from the same donors.
-Abnormally low factor II activities (below 50%) may interfere with the interpretation of hexagonal LA, potentially resulting in false-negative results for weakly LA positive plasma specimens.
Interferences or conditions known to affect hexagonal LA testing have been provided by manufacturer package insert or internal studies.

Clinical Reference

1. Sammaritano LR. Antiphospholipid syndrome. Best Pract Res Clin Rheumatol. 2020 Feb;34(1):101463
2. Brandt JT, Triplett DA, Alving B, Sharrer I: 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 Oct;74(4):1185-1190
3. Blanco AN, Cardozo MA, Candela M, Santarelli MT, Bianco RP, Lazzari MA: Anti-factor VIII inhibitors and lupus

anticoagulants in haemophilia A patients. Thromb Haemost, 1997 Apr;77(4):656-659
4. Rauch J, Tannenbaum M, Janoff AS: Distinguishing plasma lupus anticoagulants from anti-factor antibodies using hexagonal (II) phase phospholipids. Thromb Haemost. 1989 Nov 24;62(3):892-896

Performance

Method Description

Hexagonal lupus anticoagulant (Hex LA) is an integrated (screen and confirm) silica-based aPTT assay for qualitative LA detection performed on the Instrumentation Laboratory ACL TOP instrument. The procedure is based on the following principle: the test plasma that is suspected to contain a LA is incubated either with hexagonal phase phospholipid (tube 2) or without (tube 1). A pooled normal plasma (mixing test) and a heparin neutralizer are present in both tubes to correct for any prolongation of the clotting time due to factor deficiencies that may be present. Next, an activated partial thromboplastin time (aPTT) is performed on both tubes using a LA-sensitive partial thromboplastin reagent. If LA is present in the test plasma, the LA would typically be neutralized by the hexagonal phase phospholipid in tube 2 but not by the buffer in tube 1, resulting in shortening of the clotting time (by 13 seconds or greater) of tube 2 compared with that of tube 1. By comparing the difference between the 2 clotting times, the presence of LA antibodies (anti-protein/phospholipid) in the test plasma can be identified.(Triplett DA, Barna LK, Unger GA: A hexagonal II phase phospholipid neutralization assay for lupus anticoagulant identification. Thromb Haemost. 1993 Nov 15;70[5];787-793; Clinical Laboratory Standards Institute (CLSI). Laboratory Testing for the Lupus Anticoagulant; Approved Guideline. CLSI H60-A. CLSI; 2014; package insert: Hex LA Kit, Precision Biologic; Rev. 04 Dec 2020)

The incorporation of a heparin neutralizer in the Hex LA assay system allows testing when heparin is in the sample. Accurate results can be expected in samples containing up to 2 IU/mL of heparin. The Hex LA method also includes the addition of normal plasma to correct for coagulation factor deficiencies that may result in a prolonged aPTT. This enables testing of specimens from patients receiving oral anticoagulant therapy, as well as those with other congenital or acquired coagulation factor deficiencies, as a cause of the prolonged aPTT.

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

2 to 4 days

Specimen Retention Time

7 days

Performing Laboratory Location

Rochester

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

85598

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
HEXLA	HEX LA, P	96267-0

Result ID	Test Result Name	Result LOINC® Value
HXDLT	HEX LA Delta	96267-0