



# Test Definition: APMSC

Activated Partial Thromboplastin Time (APTT)  
Mix 1:1, Plasma

## Overview

### Useful For

Screening for certain coagulation factor deficiencies and abnormalities (eg, factor VIII, IX, XI, or XII).

Detection of coagulation inhibitors such as lupus anticoagulant, antiphospholipid antibodies, specific factor inhibitors, and nonspecific inhibitors

### Method Name

Only orderable as a reflex. For more information see:

ALUPP / Lupus Anticoagulant Profile, 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

Optical Clot-Based

### NY State Available

Yes

## Specimen

### Specimen Type

Plasma Na Cit

### Specimen Required

Only orderable as a reflex. For more information see:

ALUPP / Lupus Anticoagulant Profile, 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 hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

**Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Plasma Na Cit	Frozen	14 days	

**Clinical & Interpretive****Clinical Information**

The activated partial thromboplastin time (APTT) mixing test is only performed to evaluate a prolonged APTT test result, especially when mixing test results are combined with results of other coagulation tests and clinical information, to assist in differentiating coagulation factor deficiencies from coagulation inhibitors.

The APTT measures the integrity of the intrinsic (factors VIII, IX, XI, and XII) and common (factors II, V, X, and I [fibrinogen]) pathway coagulation factors as well as contact factors, prekallikrein (PK) and high-molecular-weight kininogen (HMWK). The APTT assay depends on the phospholipid (a partial thromboplastin), contact activator (eg, silica), and ionic calcium supplied in the reagents.

A prolonged APTT may be caused by congenital or acquired coagulation factor deficiencies, anticoagulant effect such as heparin anticoagulation therapy, and inhibition due to lupus anticoagulants as well as other nonspecific coagulation inhibitors (eg, monoclonal immunoglobulins).

Although the APTT is commonly used as an initial test for detecting coagulation factor deficiencies, various reagents differ considerably in their sensitivity to deficiencies of coagulation factor proteins. The reagents are generally most sensitive to deficiencies of "contact factors" (XII, PK, and HMWK) and factor XI, less sensitive to deficiencies of factors VIII and IX (the "antihemophilic factors"), and least sensitive to deficiencies of common procoagulant pathway factors (X, V, II, I). The APTT prolongs typically when the activities of factors XI and XII are below the hemostatically adequate level of 40% to 50%. Although factor XII deficiency does not cause bleeding, it is a relatively common cause of APTT prolongation. Nevertheless, an APTT may still be normal when the factor VIII level is as low as 25% to 35%; factor IX as low as 20% to 30%, as seen in some patients with mild hemophilia A or B, respectively a shortened APTT due to increased factor VIII activity secondary to inflammation, pregnancy, or estrogen use, or other conditions may masquerade deficiencies of other factors.

The APTT also has divergent sensitivity to nonspecific inhibitors of the intrinsic and common coagulation pathways, such as lupus anticoagulant (LAC) and specific coagulation factor inhibitors. LAC's are antibodies directed towards neoepitopes presented by complexes of phospholipid and proteins, such as prothrombin (factor II) or beta 2 glycoprotein I, instead of coagulation factors. They interfere with the in vitro phospholipid component of APTT assay, and result in a prolonged clotting time. Clinically, lupus anticoagulant represents an important marker of thrombotic tendency. In contrast, patients with specific coagulation inhibitors, such as factor VIII inhibitor antibodies, have a significant risk of hemorrhage and often require specific treatment for effective management.

**Reference Values**

Only orderable as a reflex. For more information see:

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ALUPP / Lupus Anticoagulant Profile, Plasma

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ADIC / Disseminated Intravascular Coagulation/Intravascular Coagulation and Fibrinolysis (DIC/ICF) Profile, Plasma

25-37 seconds

### Interpretation

Prolongation of the activated partial thromboplastin time (APTT) can occur as a result of deficiency of 1 or more coagulation factors (acquired or congenital in origin), or the presence of an inhibitor of coagulation such as heparin, a lupus anticoagulant, a "nonspecific" inhibitor such as a monoclonal immunoglobulin, or a specific coagulation factor inhibitor.

The APTT mixing study, using equal volumes of patient and normal pool plasma, may be performed on specimens with a prolonged APTT to assist in differentiating coagulation factor deficiencies from coagulation inhibitors of all types. Correction of the APTT mix to within the normal reference range usually indicates a coagulation factor deficiency (normal plasma in the mixture ensures at least 50% activity of all coagulation factors). If the prolonged APTT is due to an inhibitor (eg, specific coagulation factor inhibitor, lupus anticoagulant, heparin), the APTT mix typically fails to correct a prolonged APTT. However, the presence of a weak inhibitor may be missed by the APTT mixing study.

Accurate interpretation of both APTT and APTT mixing study results may often require additional testing. For example, the thrombin time test is helpful for identifying or excluding the presence of heparin, the platelet neutralization procedure (using a modified APTT method) for identifying or excluding lupus anticoagulant, the prothrombin time and dilute Russell's viper venom time for further assessment of the common procoagulant pathway, and coagulation factor assays to detect and identify deficient or abnormal factors. These assays are available as components of reflexive and interpretive testing panels in the Special Coagulation Laboratory (eg, APROL / Prolonged Clot Time Profile, Plasma).

Shortening of the APTT usually reflects either elevation of factor VIII activity secondary to acute or chronic illness or inflammation, or spurious results from suboptimal venipuncture, specimen collection or processing. A normal or shortened APTT result does not exclude a hemostatic defect; and specific clotting factor assays should be performed despite a normal APTT when there is clinical impression of bleeding diathesis.

### Cautions

For diagnostic activated partial thromboplastin time (APTT) testing, other than heparin therapeutic monitoring, specimens should not have any residual heparin present.

Mild coagulation factor deficiency may not result in prolongation of the APTT. APTT testing will not detect all lupus anticoagulants or coagulation inhibitors.

Lipemic specimens may interfere with the instrument clot detection mechanism.

APTT mixing studies have no utility when the patient APTT is normal.

### Clinical Reference

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Favaloro EJ, Lippi G. eds. Hemostasis and Thrombosis: Methods and Protocols. 1st ed. Humana Press; 2017

## Performance

### Method Description

The activated partial thromboplastin time (APTT) mix assay is performed on the Instrumentation Laboratory ACL TOP. Patient plasma is mixed in a 1:1 ratio with normal pooled plasma then combined and incubated with an APTT reagent containing phospholipid, a negatively charged contact factor activator, and buffer. After a specified incubation time, calcium is added to trigger the coagulation process in the mixture. Subsequently, the time to clot formation is measured optically using a wavelength of 671 nm. (Package insert: HemilsIL SynthASil Instrumentation Laboratory Company; 06/2017)

### PDF Report

No

### Day(s) Performed

Monday through Friday

### Report Available

Same day/1 day

### Specimen Retention Time

7 days

### Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

## 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 modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

### CPT Code Information

85732

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Activated Partial Thromboplastin Time (APTT)

Mix 1:1, Plasma

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## LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
APMSC	APTT Mix 1:1	5946-9

Result ID	Test Result Name	Result LOINC® Value
APMSC	APTT Mix 1:1	5946-9