Client: Example Client ABC123
123 Test Drive
Salt Lake City, UT 84108
UNITED STATES

Physician: Doctor, Example

Patient: Patient, Example

DOB	5/19/1959
Gender:	Female
Patient Identifiers:	01234567890ABCD, 012345
Visit Number (FIN):	01234567890ABCD
Collection Date:	00/00/0000 00:00

Thrombotic Risk Reflexive Panel

ARUP test code 2006385

Homocysteine, Total	7 umol/L		(Ref Interval: <=10)

INTERPRETIVE INFORMATION: Homocysteine, Total

Elevated total homocysteine (tHcy) concentrations may be associated with vitamin B12 deficiency, folate deficiency, or inherited disorders of methionine metabolism. tHcy may also be used as a weak-graded risk factor for cardiovascular disease or stroke.

Protein C Functional	102 %		(Ref Interval: 83-168)

INTERPRETIVE INFORMATION: Protein C, Functional

Patients on warfarin may have decreased protein C values. Patients should be off warfarin therapy for two weeks for accurate measurement of protein C levels. Artificially increased functional protein C values may be due to heparin therapy or the presence of direct thrombin inhibitors or factor Xa inhibitors.

Access complete set of age- and/or gender-specific reference intervals for this test in the ARUP Laboratory Test Directory (aruplab.com).

Protein S Ag Free	68 %		(Ref Interval: 55-123)

INTERPRETIVE INFORMATION: Protein S Ag, FREE

Patients on warfarin may have decreased free protein S values. Patients should be off warfarin therapy for two weeks for accurate measurement of free protein S levels. Decreased levels of free protein S are also associated with DIC, liver disease, pregnancy, and inflammatory syndromes.

Access complete set of age- and/or gender-specific reference intervals for this test in the ARUP Laboratory Test Directory (aruplab.com).

Antithrombin, Enzymatic (Activity)	84 %		(Ref Interval: 76-128)

REFERENCE INTERVAL: Antithrombin, Enzymatic (Activity)

Access complete set of age- and/or gender-specific reference intervals for this test in the ARUP Laboratory Test Directory (aruplab.com).

APC Resistance	**1.40**	**L**	**(Ref Interval: >=2.00)**

H=High, L=Low, *=Abnormal, C=Critical

	TEST INTERPRETATION: APC Resistance Profile Ratios less than 2.00 suggest APC resistance. This method uses factor V deficient plasma; therefore, APC resistance due to a nonfactor V mutation will not be detected. Extreme factor V deficiency may cause abnormal ratio.	
Prothrombin Time	13.0 sec	(Ref Interval: 12.0-15.5)
dRVVT Screen	**29 sec L**	**(Ref Interval: 33-44)**
dRVVT 1:1 Mix	Not Applicable sec	(Ref Interval: 33-44)
dRVVT Confirmation	Not Applicable	(Ref Interval: Negative)
PTT-LA Screen (PTT-D)	**120 sec H**	**(Ref Interval: 32-48)**
Thrombin Time	**121.1 sec H**	**(Ref Interval: 14.7-19.5)**
Reptilase Time	17.0 sec	(Ref Interval: <=21.9)
PTT-D Heparin Neutralized	46 sec	(Ref Interval: 32-48)
PTT-D 1:1 Mix	Not Applicable sec	(Ref Interval: 32-48)
Platelet Neutralization (PTT-D, Confirm)	Not Applicable	(Ref Interval: Negative)
Hexagonal Phospholipid Neutral Reflex	Not Applicable	(Ref Interval: Negative)
Lupus Anticoagulant Interpretation	See Note	

H=High, L=Low, *=Abnormal, C=Critical

Lupus anticoagulant not detected.

Elevated thrombin time with a normal PTT following heparin neutralization indicates the presence of heparin (therapy with unfractionated or low molecular weight heparin or contamination from a line).

Lupus anticoagulant antibodies are heterogeneous and antibody titers fluctuate over time. Laboratory tests used to identify lupus anticoagulants demonstrate variable sensitivity. If there is strong clinical suspicion for antiphospholipid antibody syndrome (APS), consider testing for cardiolipin and beta-2 glycoprotein 1 antibodies (IgG and IgM) if this testing has not already been performed.

Thrombosis Interpretation - Risk	See Note	

Activated protein C resistance due to a factor V Leiden mutation, and a positive IgG Beta-2 Glycoprotein 1 antibody are identified as a risk factors for thrombosis.

B2Glycoprotein 1, IgG Antibody	**39 SGU H**	**(Ref Interval: 0-20)**
B2Glycoprotein 1, IgM Antibody	7 SMU	(Ref Interval: 0-20)

INTERPRETIVE INFORMATION: B2Glycoprotein I, IgG and IgM Antibody

The persistent presence of IgG and/or IgM beta 2 glycoprotein I (B2GPI) antibodies (greater than 99th percentile) is a laboratory criterion for the diagnosis of antiphospholipid syndrome (APS). Persistence is defined as moderate or high levels of IgG and/or IgM B2GPI antibodies detected in two or more specimens drawn at least 12 weeks apart (J Throm Haemost. 2006;4:295-306). B2GPI results greater than 20 SGU (IgG) and/or SMU (IgM) are considered positive based on the cutoff values established for this test. International reference materials and consensus units for anti-B2GPI antibodies have not been established (Clin Chim Acta. 2012;413(1-2):358-60; Arthritis Rheum. 2012;64(1):1-10.). Strong clinical correlation is recommended for a diagnosis of APS. Low positive IgG and IgM B2GPI antibody levels should be interpreted in light of APS-specific clinical manifestations and/or other criteria phospholipid antibody tests.

Cardiolipin Antibody IgG	6 GPL	(Ref Interval: 0-14)

H=High, L=Low, *=Abnormal, C=Critical

INTERPRETIVE INFORMATION: Anti-Cardiolipin IgG Ab

0-14 GPL: Negative
15-19 GPL: Indeterminate
20-80 GPL: Low to Moderately Positive
81 GPL or above: High Positive

The persistent presence of IgG and/or IgM cardiolipin (CL) antibodies in moderate or high levels (greater than 40 GPL and/or greater than 40 MPL units or greater than 99th percentile) is a laboratory criterion for the diagnosis of antiphospholipid syndrome (APS). Persistence is defined as moderate or high levels of IgG and/or IgM CL antibodies detected in two or more specimens drawn at least 12 weeks apart (J Throm Haemost. 2006;4:295-306). Lower positive levels of IgG and/or IgM CL antibodies (above cutoff but less than 40 GPL and/or less than 40 MPL units) may occur in patients with the clinical symptoms of APS; therefore, the actual significance of these levels is undefined. Results should not be used alone for diagnosis and must be interpreted in light of APS-specific clinical manifestations and/or other criteria phospholipid antibody tests.

Cardiolipin Antibody IgM	**14 MPL H** (Ref Interval: 0-12)

INTERPRETIVE INFORMATION: Anti-Cardiolipin IgM

0-12 MPL: Negative
13-19 MPL: Indeterminate
20-80 MPL: Low to Moderately Positive
81 MPL or above: High Positive

The persistent presence of IgG and/or IgM cardiolipin (CL) antibodies in moderate or high levels (greater than 40 GPL and/or greater than 40 MPL units or greater than 99th percentile) is a laboratory criterion for the diagnosis of antiphospholipid syndrome (APS). Persistence is defined as moderate or high levels of IgG and/or IgM CL antibodies detected in two or more specimens drawn at least 12 weeks apart (J Throm Haemost. 2006;4:295-306). Lower positive levels of IgG and/or IgM CL antibodies (above cutoff but less than 40 GPL and/or less than 40 MPL units) may occur in patients with the clinical symptoms of APS; therefore, the actual significance of these levels is undefined. Results should not be used alone for diagnosis and must be interpreted in light of APS-specific clinical manifestations and/or other criteria phospholipid antibody tests.

FACV REF Specimen	Whole Blood
Factor V Leiden by PCR	**Heterozygous** *

H=High, L=Low, *=Abnormal, C=Critical

Indication for testing: Assess genetic risk for thrombosis.

HETEROZYGOUS: One copy of the factor V Leiden variant, c.1601G>A; p.Arg534Gln, was detected. This is associated with activated protein C resistance and a four to eight fold increased risk for venous thrombosis in comparison to individuals without this variant. Genetic consultation is recommended.

BACKGROUND INFORMATION: Factor V Leiden (F5) R506Q Mutation

CHARACTERISTICS: Venous thromboembolism (VTE) is multifactorial caused by a combination of genetic and environmental factors. The Factor V Leiden (FVL) variant is the most common cause of inherited VTEs, accounting for over 90 percent of activated protein C (APC) resistance. Because the FVL variant eliminates the APC cleavage site, factor V is inactivated slower, thus persisting longer in blood circulation, leading to more thrombin production. Other genetic risk factors for VTE include, male sex and variants in antithrombin, protein C, protein S, or factor XIII. Non-genetic risk factors include, age, smoking, prolonged immobilization, malignant neoplasms, surgery, pregnancy, oral contraceptives, estrogen replacement therapy, tamoxifen and raloxifene therapy.
INCIDENCE OF FACTOR V LEIDEN VARIANT: Approximately 5 percent of Caucasians, 2 percent of Hispanics, 1 percent of African Americans and 0.5 percent of Asians are heterozygous; homozygosity occurs in 1 in 1500 Caucasians.
INHERITANCE: Semi-dominant; both heterozygotes and homozygotes are at increased risk for VTE.
PENETRANCE: Lifetime risk of VTE is 10 percent for heterozygotes and 80 percent of homozygotes.
CAUSE: The pathogenic gain of function in the F5 gene variant c.1601G>A (p.Arg534Gln). Legacy nomenclature: R506Q (1691G>A)
CLINICAL SENSITIVITY: 20-50 percent of individuals with an isolated VTE have the FVL variant.
METHODOLOGY: Polymerase chain reaction and fluorescence monitoring.
ANALYTICAL SENSITIVITY AND SPECIFICITY: 99 percent.
LIMITATIONS: Diagnostic errors can occur due to rare sequence variations. F5 gene mutations, other than p.Arg534Gln, will not be detected.

Test developed and characteristics determined by ARUP Laboratories. See Compliance Statement C: aruplab.com/CS

This result has been reviewed and approved by Hunter Best, Ph.D.

PT PCR Specimen	Whole Blood
Prothrombin (F2) G20210A Variant	Negative

H=High, L=Low, *=Abnormal, C=Critical

Indication for testing: Assess genetic risk for thrombosis.

NEGATIVE: The Factor II, prothrombin G20210A mutation, was not detected. Other causes of elevated prothrombin levels and hereditary forms of venous thrombosis have not been excluded.

Recommendations: If clinically indicated, testing for other inherited or acquired thrombophilic disorders is recommended including DNA testing for the factor V Leiden mutation, measurement of total plasma homocysteine concentration, serological assays for anticardiolipin antibodies, multiple phospholipid-dependent coagulation assays for lupus inhibitor, protein C activity, protein S activity or free protein S antigen, and antithrombin activity.

This result has been reviewed and approved by Pinar Bayrak-Toydemir, M.D., Ph.D.

BACKGROUND INFORMATION: Prothrombin (F2) c.*97G>A (G20210A) Pathogenic Variant
CHARACTERISTICS: The Factor II, c.*97G>A (G20210A) pathogenic variant is a common genetic risk factor for venous thrombosis associated with elevated prothrombin levels leading to increased rates of thrombin generation and excessive growth of fibrin clots. The expression of Factor II thrombophilia is impacted by coexisting genetic thrombophilic disorders, acquired thrombophilic disorders (eg, malignancy, hyperhomocysteinemia, high factor VIII levels), and circumstances including: pregnancy, oral contraceptive use, hormone replacement therapy, selective estrogen receptor modulators, travel, central venous catheters, surgery, and organ transplantation.
INCIDENCE: Approximately 2 percent of Caucasians and 0.3 percent of African Americans are heterozygous; homozygosity occurs in 1 in 10,000 individuals.
INHERITANCE: Incomplete autosomal dominant.
PENETRANCE: The risk of thrombosis is increased 2-4 fold for heterozygotes and further increased for homozygotes.
CAUSE: Homozygosity or heterozygosity for F2 c.*97G>A (G20210A).
PATHOGENIC VARIANT TESTED: F2 c.*97G>A (G20210A).
CLINICAL SENSITIVITY FOR VENOUS THROMBOSIS: Approximately 10 percent.
METHODOLOGY: Polymerase chain reaction and fluorescence monitoring.
ANALYTICAL SENSITIVITY AND SPECIFICITY: 99 percent.
LIMITATIONS: Diagnostic errors can occur due to rare sequence variations. F2 gene variants, other than c.*97G>A (G20210A), will not be detected.

Test developed and characteristics determined by ARUP Laboratories. See Compliance Statement C: aruplab.com/CS

VERIFIED/REPORTED DATES

Procedure	Accession	Collected	Received	Verified/Reported
Homocysteine, Total	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Protein C Functional	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Protein S Ag Free	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Antithrombin, Enzymatic (Activity)	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
APC Resistance	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Prothrombin Time	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
dRVVT Screen	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
dRVVT 1:1 Mix	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
dRVVT Confirmation	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
PTT-LA Screen (PTT-D)	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Thrombin Time	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Reptilase Time	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
PTT-D Heparin Neutralized	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
PTT-D 1:1 Mix	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Platelet Neutralization (PTT-D, Confirm)	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Hexagonal Phospholipid Neutral Reflex	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Lupus Anticoagulant Interpretation	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Thrombosis Interpretation - Risk	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
B2Glycoprotein 1, IgG Antibody	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
B2Glycoprotein 1, IgM Antibody	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Cardiolipin Antibody IgG	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Cardiolipin Antibody IgM	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
FACV REF Specimen	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Factor V Leiden by PCR	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
PT PCR Specimen	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Prothrombin (F2) G20210A Variant	19-323-123621	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

END OF CHART

H=High, L=Low, *=Abnormal, C=Critical