MAYO CLINIC LABORATORIES

Test Definition: VWAG

von Willebrand Factor Antigen, Plasma

Overview

Useful For

Diagnosis of von Willebrand disease (VWD) and differentiation of VWD subtype (in conjunction with von Willebrand factor ristocetin cofactor activity and factor VIII coagulant activity)

Differentiation of VWD from hemophilia A (in conjunction with factor VIII coagulant assay)

Monitoring therapeutic efficacy of treatment with DDAVP (desmopressin) or von Willebrand factor concentrates in patients with VWD

Special Instructions

- Coagulation Guidelines for Specimen Handling and Processing

Method Name

Latex Immunoassay (LIA)

NY State Available

Yes

Specimen

Specimen Type

Plasma Na Cit

Ordering Guidance

For optimum clinical utility and diagnostic efficiency, this test's results generally must be used together with the results of the von Willebrand factor ristocetin cofactor activity and factor VIII coagulant activity tests. The diagnosis of von Willebrand disease requires a combination of clinical and laboratory information. For a streamlined approach to testing, a panel of tests with reflexive testing and interpretive reporting is recommended. See AVWPR / von Willebrand Disease Profile, Plasma.

Additional Testing Requirements

VWACT / von Willebrand Factor Activity, Plasma and F8A / Coagulation Factor VIII Activity Assay, Plasma are recommended in conjunction with this test (von Willebrand antigen).

Specimen Required

Specimen Type: Platelet-poor plasma
Collection Container/Tube: Light-blue top (3.2% sodium citrate)
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL Platelet-poor plasma

Collection Instructions:

1. For complete instructions, see Coagulation Guidelines for Specimen Handling and Processing.
2. Centrifuge, transfer all plasma into a plastic vial, and centrifuge plasma again.
3. Aliquot plasma into a plastic vial, leaving 0.25 mL in the bottom of centrifuged vial.
4. Immediately freeze plasma (no longer than 4 hours after collection) at -20 degrees C or, ideally, less than or equal to -40 degrees C.

Additional Information:

1. Double-centrifuged specimen is critical for accurate results as platelet contamination may cause spurious results.
2. Each coagulation assay requested should have its own vial.

Forms

If not ordering electronically, complete, print, and send a Coagulation Test Request (T753) with the specimen.

Specimen Minimum Volume

Platelet-poor plasma: 0.5 mL

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

von Willebrand factor (VWF) is a multimeric adhesive glycoprotein that is important for platelet-platelet and platelet-vessel hemostatic interactions. In addition, plasma VWF serves as a carrier protein for coagulation factor VIII, stabilizing its procoagulant activity. VWF circulates in the blood in 2 distinct compartments; plasma VWF mainly reflects VWF synthesis and release from vascular endothelial cells and platelet VWF (about 10% of the blood VWF) reflects VWF synthesis by bone marrow megakaryocytes with storage primarily in the alpha granules of circulating platelets. VWF antigen measurement assesses the mass of plasma VWF protein but does not reflect VWF functions or platelet VWF. The major function of VWF (mediating platelet-platelet or platelet-vessel interaction) is most commonly assessed by measurement of plasma ristocetin cofactor activity.

Decreased VWF antigen may be seen in:
-Congenital von Willebrand disease
-Acquired von Willebrand disease that may be associated with monoclonal gammopathies, lymphoproliferative disorders, autoimmune disorders, and hypothyroidism

Increased VWF antigen may be seen in association with:
-Pregnancy or estrogen use
-Inflammation (acute-phase reactant)
-Exercise or stress
-Liver disease
-Vasculitis
-Thrombotic thrombocytopenic purpura/hemolytic uremic syndrome

Note: VWF antigen measurement is most effective when it is combined with measurement of VWF ristocetin cofactor activity and factor VIII coagulant activity, preferably as a panel of tests with reflexive testing and interpretive reporting. Within this context, VWF antigen measurement can be useful for:
-Diagnosis of von Willebrand disease (VWD) and differentiation of VWD subtype
-Differentiation of VWD from hemophilia A (in conjunction with factor VIII coagulant assay)

Reference Values

55-200%
Neonates, infants, and children have normal or mildly increased plasma VWF antigen, with respect to the adult reference range.

Note: Individuals of blood group "O" may have lower plasma von Willebrand factor (VWF) antigen than those of other ABO blood groups, such that apparently normal individuals of blood group "O" may have plasma VWF antigen as low as 40% to 50%, whereas the lower limit of the reference range for individuals of other blood groups may be 60% to 70%.

Interpretation

Patients with congenital severe type III von Willebrand disease (VWD) have a markedly decreased or undetectable level of von Willebrand factor (VWF) antigen in the plasma (and in the platelets), in addition to a plasma ristocetin cofactor activity that is either very low or not detectable.

Patients with type 2A and 2B variants of VWF (with abnormal plasma VWF function and multimeric structure) may have normal or decreased plasma VWF antigen. However, they typically have decreased plasma ristocetin cofactor activity, along with decreased higher molecular-weight VWF multimers in the plasma.

Patients with types 2M or 2N VWD have normal levels of VWF antigen. In spite of this, they either have decreased vWF ristocetin cofactor activity, not caused by absence of higher molecular weight vWF multimers (type 2M VWD), or decreased factor VIII coagulant activity (type 2N VWD)

Patients with type 1 VWD (with decreased but normally functioning plasma VWF) have concordantly decreased plasma VWF antigen and ristocetin cofactor activity.

Patients with acquired VWD may have either normal or decreased plasma VWF antigen.

Cautions

Lipemic specimens may lead to an underestimation of the von Willebrand factor (VWF) level.

The presence of rheumatoid factor may lead to an overestimation of the VWF level.

von Willebrand factor is an acute-phase reactant and may be elevated above baseline in association with a variety of conditions including inflammation, stress, exercise, liver disease, pregnancy, or estrogen therapy. Baseline VWF levels also increase with aging. These conditions may obscure diagnosis of the milder forms of von Willebrand disease (VWD). Repeat testing may be indicated.

Low normal levels of VWF antigen do not exclude possible diagnosis of VWD.

Borderline low or slightly decreased levels of VWF antigen may be observed in clinically normal individuals of blood group "O."

Supportive Data

Mayo studies demonstrate excellent concordance between the enzyme-linked immunosorbent assay and this automated latex immunoassay (LIA) (r[2]=0.95) in about 80 patient specimens (with von Willebrand factor: VWF antigen ranging from 3% to 800%), and satisfactory concordance between VWF antigen by LIA and ristocetin cofactor activity (r[2]=0.88).

Clinical Reference

1. Sadler JE, Lillicrap DL. von Willebrand disease: Diagnosis, classification, and treatment. In: Marder VJ, Aird WC, Bennett JS, Schulman S, White II GC, eds. Hemostasis and Thrombosis: Basic Principles and Clinical Practice. 6th ed. Lippincott Williams and Wilkins; 2013:670-683
2. Favaloro EJ and Lippi G eds. Hemostasis and Thrombosis, Methods and Protocols. Humana Press; 2017
3. Triplett DA. Laboratory diagnosis of von Willebrand's disease. Mayo Clin Proc. 1991;66(12):832-840

Performance

Method Description

This assay is performed using the HemosIL von Willebrand Factor Antigen kit on the Instrumentation Laboratory ACL TOP. This is a latex immunoassay method using microlatex particles coated with specific rabbit-polyclonal antibody directed against von Willebrand factor (VWF). In the presence of VWF antigen, antibody-coated latex particles agglutinate to form aggregates of diameters greater than the wavelength of the light passing through the sample and more light is absorbed as aggregation increases. The increase in absorption is proportional to the concentration of VWF antigen present in the sample.(Veyradier A, Fressinaud E, Sigaud M, et al. A new automated method for von Willebrand factor antigen measurement using latex particles. Thromb Haemost. 1999;81:320-321)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

1 to 3 days

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
85246

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
VWAG	von Willebrand Factor Ag, P	27816-8

Result ID	Test Result Name	Result LOINC® Value
VWAG	von Willebrand Factor Ag, P	27816-8