MAYO CLINIC LABORATORIES

Test Definition: VWFMP

von Willebrand Factor Multimer Analysis, Plasma

Overview

Useful For

As a reflex component of several coagulation consultation unit codes, when indicated

When results of complementary laboratory tests are abnormally low or discordant (eg, F8A / Coagulation Factor VIII Activity Assay, Plasma; VWACT / von Willebrand Factor Activity, Plasma; and VWAG / von Willebrand Factor Antigen, Plasma)

To subtype von Willebrand disease (VWD) (primarily identify variants of type 2 VWD)

As an aid in determining appropriate treatment

Method Name

Only orderable as a reflex. For more information see:
ALUPP / Lupus Anticoagulant Profile, Plasma
ALBLD / Bleeding Diathesis Profile, Limited, Plasma
ACBL / Bleeding Diathesis Profile, Comprehensive, Plasma
AVWPR / von Willebrand Disease Profile, Plasma

Agarose Gel Electrophoresis

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
AVWPR / von Willebrand Disease Profile, Plasma

Specimen Minimum Volume

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	42 days	

Clinical & Interpretive

Clinical Information

von Willebrand factor (VWF) is a large multimeric plasma glycoprotein that has essential roles in primary hemostasis. Wild-type VWF molecules are series of multimers varying in size from dimers to multimers over 40 subunits (>10-million Daltons). The largest multimers provide multiple binding sites that can interact with both platelet receptors and subendothelial matrix sites of injury and are the most hemostatically active form of VWF. The biological functions of VWF are as follows:
1. VWF is a ligand and mediates platelet adhesion to the subendothelial collagen at the site of vessel wall injury by binding to the platelet receptor glycoprotein (GP)-Ib, V, IX complex and subendothelial collagen.
2. VWF binds and stabilizes procoagulant factor VIII in the circulation.
3. Under conditions of high shear, VWF also mediates platelet-platelet cohesion by binding to the platelet receptor GP-IIb/IIIa (integrin alpha IIb beta3)

von Willebrand disease (VWD) is the most common hereditary bleeding disorder that is caused by quantitative or qualitative VWF defect. VWD manifests clinically as easy bruising, mucocutaneous bleeding (eg, epistaxis, menorrhagia), and bleeding after trauma or surgery.

von Willebrand disease has been classified into 3 major types:
-Type 1, typically an autosomal dominant disease, is the most common, accounting for approximately 70% of VWD patients. It represents a quantitative deficiency of VWF of variable severity.
-Type 2, which is usually an autosomal dominant disease, is characterized by several qualitative abnormalities of VWF. Four subtypes have been identified: 2A, 2B, 2M, and 2N.
-Type 3, an autosomal recessive disorder, leads to severe disease with virtually undetectable levels of VWF, as well as very low levels of factor VIII.

Acquired von Willebrand syndrome (AVWS) is associated with a number of different disease states and is caused by several different pathophysiological mechanisms, including antibody formation, proteolysis, binding to tumor cells with increased clearance, and decreased synthesis. AVWS is most frequently described in patients with dysproteinemias (including monoclonal gammopathy of undetermined significance, multiple myeloma, and macroglobulinemia), lymphoproliferative disorders, myeloproliferative disorders (eg, essential thrombocythemia), autoimmune diseases (eg, systemic lupus erythematosus), high-shear stress cardiovascular conditions such as severe aortic stenosis,

gastrointestinal angiodysplasia, and hypothyroidism.

Reference Values

Only orderable as a reflex. For more information see:
ALUPP / Lupus Anticoagulant Profile, Plasma
ALBLD / Bleeding Diathesis Profile, Limited, Plasma
AVWPR / von Willebrand Disease Profile, Plasma

An interpretive report will be provided.

Interpretation

The plasma von Willebrand factor (VWF) multimer analysis is a qualitative visual assessment of the size spectrum and the banding pattern of vWF multimers.

This test is used to identify variants of type 2 von Willebrand disease that have fewer of the largest multimers, have unusually large multimers, or have qualitatively abnormal "bands" that indicate an abnormal VWF structure.

Cautions

Von Willebrand factor (vWF) multimer analysis is not useful when the following tests are normal:
-F8A / Coagulation Factor VIII Activity Assay, Plasma
-RIST / Ristocetin Cofactor, Plasma
-VWACT / von Willebrand Factor Activity, Plasma
-VWAG / von Willebrand Factor Antigen, Plasma

Or when:
-The vWF ristocetin cofactor:vWF antigen ratio is greater than or equal to 0.7
-The vWF activity:vWF antigen ratio is greater than or equal to 0.8

Clinical Reference

1. Budde U, Schneppenheim R. von Willebrand Factor and von Willebrand Disease. Rev Clin Exp Hematol. 2001;5(4):335-368
2. Ruggeri ZM. Structure and function of von Willebrand Factor: Relationship to von Willebrand's disease. Mayo Clinic Proc. 1991;66(8):847-861
3. Sadler JE. A revised classification of von Willebrand Disease. Thromb Haemost. 1994;71(4):520-525
4. Laffan M, Brown SA, Collins PW, et al. The diagnosis of von Willebrand disease: a guideline from the UK Haemophilia Centre Doctors Organization. Haemophilia. 2004;10(3):199-217
5. Mannucci PM. Treatment of von Willebrand's Disease. N Engl J Med 2004;351(7):683-694
6. Pruthi RK, Daniels TM, Heit JA, et al. Plasma von Willebrand factor multimer quantitative analysis by in-gel immunostaining and infrared fluorescent imaging. Thrombo Res. 2010;126(6):543-549
7. Favaloro EJ and Lippi G. eds. Hemostasis and Thrombosis, Methods and Protocols. Humana Press 2017

Performance

Method Description

Platelet-poor plasma proteins are denatured using heat and an anionic detergent, sodium dodecyl sulfate. The sample is then electrophoresed through a discontinuous agarose gel on a cooled horizontal electrophoresis unit overnight to separate the von Willebrand factor (VWF) multimers by size. The gel is fixed in acid and isopropanol, washed in water, and incubated with dilute rabbit antihuman VWF. After washing away unbound antibody, the gel is incubated with dilute goat antirabbit IgG antibody tagged with an infrared dye. Excess secondary antibody is washed away, and the gel is scanned using an infrared imaging system. The digitized image of the electrophoretic distribution of the VWF multimers is interpreted by a coagulation consultant and a written report is provided.(Ruggeri ZM, Zimmerman TS: Variant von Willebrand's disease. Characterization of two subtypes by analysis of multimeric composition of FVIII/vWF in plasma and platelets. J Clin Invest 1980;65[6]:1318-1325; Favaloro EJ and Lippi G. eds. Hemostasis and Thrombosis, Methods and Protocols. Humana Press 2017)

PDF Report

No

Day(s) Performed

Monday, Tuesday

Report Available

7 to 14 days

Specimen Retention Time

21 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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

85247

LOINC® Information

MAYO CLINIC LABORATORIES

Test Definition: VWFMP

von Willebrand Factor Multimer Analysis, Plasma

Test ID	Test Order Name	Order LOINC® Value
VWFMP	von Willebrand Factor Multimer, P	32217-2

Result ID	Test Result Name	Result LOINC® Value
604411	von Willebrand Factor Multimer, P	32217-2
604412	VWF Multimer Interpretation	48595-3