von Willebrand Factor Quantitative Multimer

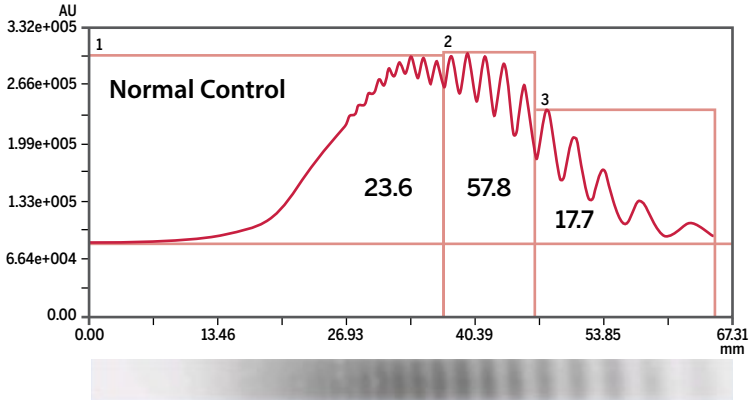
Versiti offers quantitative multimer testing of the von Willebrand factor protein.

von Willebrand disease (VWD) is the most common inherited bleeding disorder characterized by either quantitative or qualitative defects of von Willebrand factor (VWF). VWF subunits assemble into a series of multimers. Higher molecular weight (MW) multimers are more effective in initiating hemostasis at sites of vascular injury. When multimers are released into the circulation, ADAMTS13 cleaves them into somewhat smaller MW sizes.

Patients with VWD have either quantitative or qualitative defects in VWF, which may be inherited or acquired. Accurate diagnosis of the "type" of VWD is essential to provide effective treatment of bleeding symptoms. The multimer distribution is normal in types 1, 2M, and 2N VWD. These types of VWD are diagnosed based on quantitative VWF assays such as ristocetin cofactor, antigen, and binding studies.

Loss of the higher MW multimers (high and sometimes also intermediate MW) is seen in type 2A, type 2B, and platelet-type VWD. When an abnormal multimer pattern is found, further testing is required to distinguish between these three types. Loss of the very highest MW multimers can be acquired secondary to cardiac defects [such as Ventricular Septal Defect (VSD), an abnormal valve, or use of ventricular assist device (VAD)], pulmonary hypertension, Disseminated Intravascular Coagulation (DIC), Hemolytic Uremic Syndrome (HUS), and acute Thrombotic Thrombocytopenic Purpura (TTP); it can also be caused by sample processing artifacts or filtering of the plasma sample. Higher than normal MW multimers may be seen post-DDAVP, in newborns, in patients with recurrent TTP during remission, and with an acute phase response.

Quantitative multimer analysis provides an objective measure of VWF structure to better characterize subtle changes observed in the subtypes of VWD and may help to determine the nature of any additional clinical laboratory testing to reach a clear-cut diagnosis.



Indications for testing:

- Confirmation of normal multimer distribution in patients with suspected type 1 VWD.
- Evaluation of patients with abnormal VWF:RCo/VWF:Ag ratio.
- Distinction of type 2A, 2B, or platelet-type VWD from other VWD types.
- Evaluation of bleeding symptoms in a patient with a VAD in place.

Test method:

Multimer analysis is performed by LiDS-agarose (0.65%) electrophoresis. This technique is considered "low resolution" because the VWF triplet structure is not seen. Electrophoresis separates VWF into multimer bands based on molecular weight (MW). Multimers are detected after transfer to nitrocellulose using a polyclonal antibody with chemiluminescent detection and densitometry analysis. The percentage of low MW (LMW) multimers defined as bands 1 – 5, mid-MW (MMW) multimers (bands 6 – 10) and high MW (HMW) multimers (bands >10) is calculated and compared to the normal plasma control.

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Assay sensitivity and limitations:

von Willebrand disease type cannot be determined based upon the assay of multimer structure alone. Additional testing including (but not limited to) VWF antigen, VWF Ristocetin Cofactor Activity, and FVIII activity are required for classification of variant VWD.

Reporting of results:

Reference Range: 55 – 141 IU/dL.

Specimen requirements:

0.5 mL citrated plasma aliquot, frozen in a plastic tube.

SHIP

Shipping requirements:

Place the frozen specimen and the requisition into plastic bags, seal and place in an insulated container. Surround with at least five pounds of dry ice. Seal the insulated container, place into a sturdy cardboard box, and tape securely. Ship the package in compliance with your overnight carrier guidelines. Send to:

Versiti Client Services
Hemostasis Reference Laboratory
638 N. 18th Street
Milwaukee, WI 53233
800-245-3117, ext. 6250

ORDER

Required forms:

Please complete all pages of the requisition form.

CPT Codes/Billing/Turnaround time:

Test code: 1063

CPT code: For suggested CPT codes, visit the versiti.org/test-catalog

Turnaround time: 7-10 days

Reference:

1. Sadler JE, Budde U, Eikenboom JC et al. Update on the pathophysiology and classification of von Willebrand disease: a report of the Subcommittee on von Willebrand Factor. J.Thromb.Haemost. 2006;4:2103-2114.
2. Pruthi RK, Daniels TM, Heit JA et al. Plasma von Willebrand factor multimer quantitative analysis by in-gel immunostaining and infrared fluorescent imaging. Thromb.Res. 2010;126:543-549.
3. Studt JD, Budde U, Schneppenheim R et al. Quantification and facilitated comparison of von Willebrand factor multimer patterns by densitometry. Am.J.Clin.Pathol. 2001;116:567-574.

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