

# Von Willebrand Disease Testing

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## Abbreviations

|              |  |
|--------------|--|
| FVIII        | Factor VIII  |
| RCo:Ag ratio | Ratio of von Willebrand factor activity (ristocetin cofactor) to von Willebrand factor antigen |
| RIPA         | Ristocetin-induced platelet aggregation  |
| VWD          | von Willebrand disease   |
| VWF          | von Willebrand factor  |
| VWF:Ag       | von Willebrand factor antigen  |
| VWF:RCO      | von Willebrand factor activity (ristocetin cofactor)   |

## INDICATIONS FOR TESTING

Excessive mucosal bleeding (eg, epistaxis, bleeding of gums, menorrhagia, postsurgical bleeding)

## PERFORM

### Initial testing:

- FVIII activity testing
  - VWF testing
  - VWF:Ag testing
- And consider:**
- An assay that reflexes to multimeric analysis

Results compatible with VWD

Results not compatible with VWD

## PERFORM

### Additional testing to confirm subtype:

- RCo:Ag ratio test
- Multimeric analysis
- von Willebrand Disease (VWF) gene sequencing
- RIPA test

### Type 1

- VWF:Ag: <30 IU/dL
- VWF:RCo: <30 IU/dL
- FVIII: low or normal
- RCo:Ag ratio: >0.5-0.7
- Multimer pattern: normal but reduced intensity
- RIPA: usually normal
- Type 1 variant present
- Desmopressin trial: ≤30% decrease from peak VWF 4 hrs after infusion

### Type 1C

- VWF:Ag: <30 IU/dL
- VWF:RCo: <30 IU/dL
- FVIII: low or normal
- RCo:Ag ratio: >0.5-0.7
- Multimer pattern: normal but reduced intensity
- RIPA: usually normal
- Type 1 variant present
- Desmopressin trial: >30% decrease from peak VWF 4 hrs after infusion

### Type 2A

- VWF:Ag: <30-200 (commonly <50) IU/dL
- VWF:RCo: <30 IU/dL
- FVIII: low or normal
- RCo:Ag ratio: <0.5-0.7
- Multimer pattern: abnormal
- RIPA: often reduced at high ristocetin levels; no enhanced aggregation at low ristocetin levels
- Type 2A variant present

### Type 2B and Platelet Type

- VWF:Ag: <30-200 (commonly <50) IU/dL
- VWF:RCo: <30 IU/dL
- FVIII: low or normal
- RCo:Ag ratio: typically <0.5-0.7
- Multimer pattern: abnormal
- RIPA: abnormal; enhanced aggregation at low ristocetin concentrations
- Type 2B variant present or *GP1BA* variant<sup>a</sup> present (for platelet type)

### Type 2M

- VWF:Ag: <30-200 (commonly <50) IU/dL
- VWF:RCo: <30 IU/dL
- FVIII: low or normal
- RCo:Ag ratio: <0.5-0.7
- Multimer pattern: normal pattern, may have reduced intensity
- RIPA: reduced at high ristocetin concentrations
- Type 2M variant present

### Type 2N

- VWF:Ag: 30-200 IU/dL
- VWF:RCo: 30-200 IU/dL
- FVIII: mildly or markedly low
- RCo:Ag ratio: >0.5-0.7
- Multimer pattern: normal pattern, may have reduced intensity
- RIPA: normal
- Type 2N variant present

### Type 3

- VWF:Ag: Absent
- VWF:RCo: Absent
- FVIII: severely low (<10 IU/dL)
- RCo:Ag ratio: n/a
- Multimer pattern: no VWF present
- RIPA: absent
- Type 3 variant present

<sup>a</sup>Genetic testing for the *GP1BA* variant is not available at ARUP Laboratories.

## References

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- American Society of Hematology. Quick Reference: 2012 clinical practice guideline on the evaluation and management of von Willebrand disease (VWD). [Revised: 2012; Accessed: Feb 2021]