

Whole Blood Viscosity Test

Measurement of viscosity by determining the time required to flow through calibrated tubes. Intended for use to monitor changes in the amount of solids present in blood plasma in various disorders.



Specimen Requirements	Viscosity Test, Whole Blood
Collect	EDTA vacutainer tube (Lavender tube).
Volume	Min 3 mL whole blood.
Specimen Preparation	Refrigerated. Do not freeze.
Transport	Ship all specimens priority overnight (next business morning) within 36 hours of collection using Rheovector viscosity shipping kit with preprinted carrier label.
Storage	All specimens must be refrigerated at 2°C - 10°C until shipped. Refrigerate immediately upon specimen collection. Do not freeze. Ambient stability 8 hours. Refrigerated stability 4 days.
Specimen Rejection	Specimens are unacceptable if collected in a tube with any anticoagulant other than EDTA. Specimens also rejected if frozen, clotted, hemolyzed, or warm when received, or if the specimen is received more than 4 days after collection.



Test Methodology

Blood viscosity tests are performed by Rheovector with the Hemathix Blood Analyzer, a computerized scanning capillary viscometer, which uses a calibrated capillary tube to subject whole blood specimens to a complete range of shear rates. Shear rate is the ratio between blood flow velocity and lumen diameter, and blood viscosity is shear-dependent. The Hemathix Blood Analyzer measures the viscosity of blood at shear rates from 1 to 1000 sec^{-1} in increments of 0.1 sec^{-1} . Blood viscosity tests are performed at 37°C. Changes in viscosity can result from variations in one or more of the components of blood, including plasma proteins and cellular content. Blood viscosity is a biophysical assay which is determined by a combination of factors including hematocrit, erythrocyte deformability/rigidity and aggregation, as well as plasma content. Our blood viscosity test is a dynamic measure of the inherent resistance of blood to flow.

Assay Development

Previously, using manual rotating viscometers, blood viscosity has been associated with cardiovascular events and every major risk factor for cardiovascular diseases. Studies involving viscosity have appeared in more than 10,000 peer-reviewed publications over five decades. The Hemathix Blood Analyzer was created by leading hemodynamics experts to overcome the limitations of single-point rotating viscometers by employing a computerized platform to scan viscosity simultaneously across a range of shear rates. This diagnostic technology was originally called the Rheolog viscometer and re-launched as the Hemathix Blood Analyzer in 2011. The Hemathix or Rheolog has played an important role in more than 10 clinical studies.

Applications

Hyperviscosity syndromes can arise in a wide range of disease states such as polycythemia vera, dysproteinemias, myeloma, leukemia, and sickle cell anemia. Hyperviscosity includes syndromes of serum hyperviscosity where patients may experience bleeding and neurologic or ocular disorders; syndromes of polycythemic hyperviscosity that result in reduced blood flow or capillary perfusion and increased organ congestion; and syndromes of hyperviscosity caused by reduced deformability of red blood cells as in sickle cell anemia.