



Laboratory Service Manual

Lab Dept: Coagulation

Test Name: PROTEIN S ACTIVITY

General Information

Lab Order Codes: PRSA

Synonyms: Protein S

CPT Codes: 85306 – Clotting inhibitors or anticoagulants; protein S

Test Includes: Protein S Activity reported as a percent (%).

Logistics

Test Indications: Protein S, a vitamin K dependent plasma protein is the cofactor of activated Protein C. It stimulates the proteolytic inactivation of Factor V and Factor VIII by Protein C, thereby stimulating its coagulation inhibiting effect. A diminished Protein S activity increases thromboembolic risk. Homozygous Protein S deficiency, like homozygous Protein C deficiency, leads to Purpura fulminans in neonates.

Functional assays should be performed first, because all types of Protein S deficiencies will be detected. The free antigen is needed only if the functional assay is decreased and the total antigen assay is needed only if the free antigen is decreased in order to determine the deficiency subtype. If the antigen assays are performed without the functional assay, patients with certain subtypes will not be detected.

Lab Testing Sections: Coagulation (Minneapolis Campus)

Phone Numbers:

Minneapolis: 612-813-6280

Saint Paul: 651-220-6550

Test Availability: Monday – Friday (0630 – 1500)

Turnaround Time: 1 – 3 days

Special Instructions: Protein S is decreased in Coumadin® therapy/Vitamin K deficiency.

Specimen

Specimen Type: Whole blood



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Container:	Light Blue top (Buffered Na citrate 3.2%) tube
Draw Volume:	2.7 mL blood in a 3 mL tube (Minimum: 1.8 mL in a 2 mL tube)
Processed Volume:	Minimum 1.8 mL (plasma).
Collection:	<p>A clean venipuncture is essential.</p> <p>If the patients hematocrit is >55%, call the laboratory for a special tube. Fill tube completely.</p> <p>Mix thoroughly by gentle inversion.</p>
Special Processing:	<p>Lab Staff: All testing will be performed in Minneapolis.</p> <p>St.Paul Lab: Send whole blood specimens to Mpls. For processing via courier. Must be processed within 4 hours of collection. Contact Mpls. Prior to sending</p>
Patient Preparation:	<p>If the patient is being treated with Coumadin®, this should be noted. Coumadin® will lower Protein S</p>
Sample Rejection:	Improper tube; clotted sample; underfilled tube; mislabeled or unlabeled specimens

Interpretive

Reference Range:	<p>Reference range: 70 – 130%</p> <p>Note: There are insufficient data concerning Protein S activity in normal infants, neonates and children; but normal or near normal activity probably is present by age 3-6 months.</p>
Critical Values:	N/A
Limitations:	<p>This test detects functionally active Protein S.</p> <p>Activated Protein C resistance (e.g.heterozygosity or homozygosity for the factor V Leiden mutation) may lead to a diminished recovery of Protein S.</p> <p>The antiphospholipid antibodies (e.g. Lupus anticoagulant) may be accompanied by either increased or decreased Protein S activity results.</p> <p>This assay should not be performed on patients that are on hirudin or argatroban anticoagulation.</p>



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Methodology:

Protein C proteolytically cleaves Factor V which is generated by the activation of the coagulation cascade by Russells Viper Venom (RVV). In this reaction Protein S acts as a cofactor, which accelerates the reaction. As a result the coagulation time increases proportionally to the activity of Protein S in the sample. The addition of deficient plasma ensures that the test mixture has a sufficient supply of fibrinogen, Factor V and other necessary coagulation factors. Coagulation is triggered at the level of Factor X by the Factor X activator of RVV. Factor X forms thrombin from prothrombin under the action of the remaining Factor V. The resulting thrombin finally converts fibrinogen to fibrin. The coagulation time is then detected optically.

References:

Protein S Ac Reagent package insert (May 2008) Standard Human Plasma package insert, Siemens Healthcare Diagnostics Inc., Newark, DE

Control Plasma N package insert (December 2007) Siemens Healthcare Diagnostics, Newark, DE

Control Plasma P package insert (December 2007) Siemens Healthcare Diagnostics, Newark, DE

Application Sheet for Protein S Ac on BCS and BCSXP.

Andrew M, Paes B, Milner R, et al, (1987) "Development of the Human Coagulation System in the Full Term Infant," Blood, 70(1):165-72

Thrombophilia Powerpoint presentation Kandice Kottke-Marchant M.D. PhD.

http://aniaracorp.s3.amazonaws.com/PhyFiles/Thrombophilia2/Marchant_medium.wmv

An Algorithmic Approach to Hemostasis Testing Kottke-Marchant (2008) CAP Press

Updates:

2/6/2012: Test moved from referral to Fairview University to being performed inhouse at Children's Laboratory.