Test Definition: C5AG

C5 Complement, Antigen, Serum

Overview

Useful For

Diagnosis of C5 deficiency

Investigation of a patient with an absent total complement (CH50) level

Method Name

Nephelometry

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

The total complement assay (COM / Complement, Total, Serum) should be used as a screen for suspected complement deficiencies before ordering individual complement component assays. A deficiency of an individual component of the complement cascade will result in an undetectable total complement level.

Specimen Required

Patient Preparation:

Fasting: 12 hours, preferred but not required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)

Collection Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL Serum

Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

Serum: 0.5 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	Reject

Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Frozen (preferred)	60 days	
	Ambient	7 days	
	Refrigerated	28 days	

Clinical & Interpretive

Clinical Information

Complement proteins are components of the innate immune system. There are 3 pathways to complement activation: the classic pathway, the alternative (or properdin) pathway, and the lectin activation (mannan-binding protein: MBP) pathway. The classic pathway of the complement system is composed of a series of proteins that are activated in response to the presence of immune complexes. The activation process results in the generation of peptides that are chemotactic for neutrophils and that bind to immune complexes and complement receptors. The end result of the complement activation cascade is the formation of the lytic membrane attack complex (MAC). More than 30 cases of C5 deficiency have been reported. Most of these patients have neisserial infections.

The C5 antigen test measures the concentration of C5 and is used to study complement component 5 deficiency. If a patient is being treated with eculizumab or another C5 inhibitor, the concentration of C5 may be elevated, as the reagents in this immunoassay cannot distinguish between free C5 and C5 bound to a C5 inhibitor. Testing for alternative pathway function or specifically for C5 function will provide more insight into whether the C5 is free, particularly if the goal of testing is therapeutic drug monitoring for a C5 inhibitor.

Reference Values

10.6-26.3 mg/dL

Interpretation

Low levels of complement may be due to inherited deficiencies, acquired deficiencies, or due to complement consumption (eg, as a consequence of infectious or autoimmune processes).

Absent C5 levels in the presence of normal C3 and C4 values are consistent with a C5 deficiency. Absent C5 levels in the presence of low C3 and C4 values suggest complement consumption.

A small number of cases have been described in which the complement protein is present but is nonfunctional. These rare cases require a functional assay to detect the deficiency; for more information see C5FX / C5 Complement, Functional, Serum.

Cautions

Quantitation of specific proteins by nephelometry may not be possible in lipemic sera due to the extreme light scattering properties of the specimen. Turbidity and particles in the specimen may result in extraneous light scattering signals, resulting in variable specimen analysis.

Clinical Reference

1. Sonntag J, Brandenburg U, Polzehl D, et al. Complement system in healthy term newborns: reference values in umbilical cord blood. Pediatr Dev Pathol. 1998;1(2):131-135
2. Prellner K, Sjoholm AG, Truedsson L. Concentrations of C1q, factor B, factor D and properdin in healthy children, and the age-related presence of circulating C1r-C1s complexes. Acta Paediatr Scand. 1987;76(6):939-943
3. Davis ML, Austin C, Messmer BL, Nichols WK, Bonin AP, Bennett MJ. IFCC-standardized pediatric reference intervals for 10 serum proteins using the Beckman Array 360 system. Clin Biochem. 1996;29(5):489-492
4. Gaither TA, Frank MM. Complement. In: Henry JB. Clinical Diagnosis and Management by Laboratory Methods. 17th ed. Saunders; 1984:879-892
5. O'Neil KM. Complement deficiency. Clin Rev Allergy Immunol. 2000;19(2):83-108
6. Frank MM. Complement deficiencies. Pediatr Clin North Am. 2000;47(6):1339-1354
7. Volokhina EB, van de Kar NC, Bergseth G, et al. Sensitive, reliable and easy-performed laboratory monitoring of eculizumab therapy in atypical hemolytic uremic syndrome. Clin Immunol. 2015;160(2):237-243.
8. Andreguetto B, Murray D, Snyder M, Tostrud L, Willrich MA. Abstract 003: The impact of eculizumab in complement assays. Mol Immunol. 2015;67:119-120. doi:10.1016/j.molimm.2015.03.013
9. Willrich MAV, Braun KMP, Moyer AM, Jeffrey DH, Frazer-Abel A. Complement testing in the clinical laboratory. Crit Rev Clin Lab Sci. 2021;58(7):447-478. doi:10.1080/10408363.2021.19072972

Performance

Method Description

In this Siemens Nephelometer II method, the light scattered onto the antigen-antibody complexes is measured. The intensity of the measured scattered light is proportional to the amount of antigen-antibody complexes in the sample under certain conditions. If the antibody volume is kept constant, the signal behaves proportionally to the antigen volume.

A reference curve is generated by a standard with a known antigen content on which the scattered light signals of the samples can be evaluated and calculated as an antigen concentration. Antigen-antibody complexes are formed when a sample containing antigen and the corresponding antiserum are put into a cuvette. A light beam is generated with a light-emitting diode, which is transmitted through the cuvette. The light is scattered onto the immuno-complexes that are present. Antigen and antibody are mixed in the initial measurement, but no complex is formed yet. An antigen-antibody complex is formed in the final measurement.

The result is calculated by subtracting value of the final measurement from the initial measurement. The distribution of intensity of the scattered light depends on the ratio of the particle size of the antigen-antibody complexes to the radiated wavelength.(Instruction manual: Siemens Nephelometer II Operations. Siemens, Inc; Version 2.4, 07/2019; Addendum to the Instruction Manual 2.3, 08/2017)

PDF Report

No

Day(s) Performed

Tuesday, Friday

Test Definition: C5AG

C5 Complement, Antigen, Serum

Report Available
2 to 5 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

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
86160

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
C5AG	C5 Complement, Antigen, S	4505-4

Result ID	Test Result Name	Result LOINC® Value
C5AG	C5 Complement, Antigen, S	4505-4