Test Definition: C341Q

Complement C3 and C4 with Anti-C1q Antibodies, Serum

Overview

Useful For

Evaluating patients with suspected anti-C1q vasculitis

Predicting renal involvement in patients with systemic lupus erythematosus

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
C3	Complement C3, S	Yes	Yes
C4	Complement C4, S	Yes	Yes
AC1Q	Anti-C1q Antibodies, IgG, S	Yes	Yes

Method Name

AC1Q: Enzyme-Linked Immunosorbent Assay (ELISA)
C3, C4: Nephelometry

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1.5 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial

Specimen Minimum Volume

0.9 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	7 days	
	Frozen	21 days	

Clinical & Interpretive

Clinical Information

Anti-complement 1Q (C1Q) antibodies have been found to be prevalent in hypocomplementemic urticarial vasculitis syndrome (HUVS) (also referred to as anti-C1Q vasculitis) as well as in some patients with systemic lupus erythematosus (SLE).(1,2) These antibodies bind to the collagenous region of C1Q and activate the classic pathway of the complement system.(1,2) This is reflected in the serum by decreased circulating levels of classical pathway components C1Q and C4 as well as C3 seen in these diseases.(3,4) Therefore, testing for serum complement C3 and C4 biomarkers is important in the interpretation of anti-C1Q antibody results.(1-3)

Hypocomplementemic urticarial vasculitis (HUV) is a rare immune complex-mediated cutaneous vasculitis of small vessels characterized by recurrent episodes of wheal-like lesions and the presence of anti-C1Q antibodies.(3). In a French nationwide study, patients with HUV typically presented with low C1Q levels and normal C1 inhibitor levels, in association with anti-C1Q antibodies in 55% of cases.(5) As per the 2012 Revised International Chapel Hill Consensus Conference Nomenclature of Vasculitide, low complement levels and the presence of anti-C1Q antibodies distinguishes HUV from normocomplementemic UV (NUV), another form of UV.(6) Compared to NUV, HUV is associated with more severe disease and can indicate the presence of an underlying systemic disease such as SLE or HUVS.(7,8) In addition, HUVS is characterized by urticaria with hypocomplementemia, arthralgia/arthritis, glomerulonephritis, recurrent abdominal pain, and obstructive lung disease.

With respect to SLE, anti-C1Q antibodies together with anti-dsDNA antibodies, complement C3 and C4 may offer useful additional information to monitor lupus nephritis (LN) activity as well as patient’s overall disease activity status.(5,9,10) In a recent study, baseline levels of anti-C1Q and anti-dsDNA was reported to predict proliferative LN.(10) In this study, anti-C1Q antibodies was also a useful predictor of complete response at the time of kidney biopsy. Overall, the authors of the study concluded that tracking anti-C1Q autoantibodies over time may provide further insights into treatment response and pathogenic mechanisms in proliferative LN patients.

While the presence of anti-C1Q antibodies is considered useful in the evaluation and management of HUV and SLE, these antibodies may also be seen in several other autoimmune and infectious diseases. Therefore, all positive results must be interpreted in the context of patient’s clinical history and presentation.

Reference Values

C3:
75-175 mg/dL

C4:
14-40 mg/dL

AC1Q:
<20 U/mL (Negative)
20-39 U/mL (Weak Positive)
40-80 U/mL (Moderate Positive)
>80 U/mL (Strong Positive)

Interpretation

A positive result for anti-C1q antibodies may support a diagnosis of anti-C1q vasculitis or renal involvement in patients with systemic lupus erythematosus in the appropriate clinical context.

A negative result indicates no detectable IgG antibodies to C1q and does not rule out a diagnosis.

A decrease in C3 levels to the abnormal range is consistent with disease activation in systemic lupus erythematosus.

Cautions

The results are dependent on appropriate specimen transport and storage.

A positive result for anti-C1q antibodies indicates they are detectable above the assay's lower limit of quantitation and does not unequivocally establish any diagnosis.

Clinical Reference

1. Dragon-Durey MA, Blanc C, Marinozzi MC, van Schaarenburg RA, Trouw LA. Autoantibodies against complement components and functional consequences. Mol Immunol. 2013;56(3):213-221
2. Defendi F, Thielens NM, Clavarino G, Cesbron JY, Dumestre-Perard C. The immunopathology of complement proteins and innate immunity in autoimmune disease. Clin Rev Allergy Immunol. 2020;58(2):229-251
3. Marzano AV, Maronese CA, Genovese G, et al. Urticarial vasculitis: Clinical and laboratory findings with a particular emphasis on differential diagnosis. J Allergy Clin Immunol. 2022;149(4):1137-1149
4. Hristova MH, Stoyanova VS. Autoantibodies against complement components in systemic lupus erythematosus - role in the pathogenesis and clinical manifestations. Lupus. 2017;26(14):1550-1555
5. Jachiet M, Flageul B, Deroux A, et al. The clinical spectrum and therapeutic management of hypocomplementemic urticarial vasculitis: data from a French nationwide study of fifty-seven patients. Arthritis Rheumatol. 2015;67(2):527-534
6. Jennette JC, Falk RJ, Bacon PA, et al. 2012 revised International Chapel Hill Consensus Conference Nomenclature of Vasculitides. Arthritis Rheum. 2013;65(1):1-11
7. Mehregan DR, Hall MJ, Gibson LE. Urticarial vasculitis: a histopathologic and clinical review of 72 cases. J Am Acad Dermatol. 1992;26(3 Pt 2):441-448
8. Damman J, Mooyaart AL, Seelen MAJ, van Doorn MBA. Dermal C4d deposition and neutrophil alignment along the dermal-epidermal junction as a diagnostic adjunct for hypocomplementemic urticarial vasculitis (anti-C1q vasculitis) and

underlying systemic disease. Am J Dermatopathol. 2020;42(6):399-406
9. Marto N, Bertolaccini ML, Calabuig E, Hughes GR, Khamashta MA. Anti-C1q antibodies in nephritis: correlation between titres and renal disease activity and positive predictive value in systemic lupus erythematosus. Ann Rheum Dis. 2005;64(3):444-448
10. Fava A, Wagner CA, Guthridge CJ, et al. Association of autoantibody concentrations and trajectories with lupus nephritis histological features and treatment response. Arthritis Rheumatol. Published online July 4, 2024. doi:10.1002/art.42941

Performance

Method Description

C3:
C3 is measured by immunonephelometry. Antiserum to C3 is mixed with patient serum, the light scatter resulting from the antibody interaction with C3 is measured, and the signal is compared to standard concentrations of C3.(Instruction manual: Siemens Nephelometer II Operations. Siemens, Inc; Version 2.4, 07/2019; Addendum to the Instruction Manual 2.3, 08/2017)

C4:
C4 is measured by immunonephelometry. Antiserum to C4 is mixed with patient serum, the light scatter resulting from the antibody interaction with C4 is measured, and the signal is compared to standard concentrations of C4.(Instruction manual: Siemens Nephelometer II Operations. Siemens, Inc; Version 2.4, 07/2019; Addendum to the Instruction Manual 2.3, 08/2017)

Anti-C1q antibodies, IgG:
Testing for antibodies to C1q is accomplished using a laboratory-developed immunoassay.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

C3, C4: Monday through Friday
AC1Q: Wednesday

Report Available

2 to 8 days

Specimen Retention Time

2 weeks

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 x2
83520

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
C341Q	C3 and C4 with Anti-C1q, IgG, S	107555-5

Result ID	Test Result Name	Result LOINC® Value
C3	Complement C3, S	4485-9
C4	Complement C4, S	4498-2
AC1Q	Anti-C1q Antibodies, IgG, S	44702-9