MAYO CLINIC LABORATORIES

Test Definition: SM

Smith (Sm) Antibodies, IgG, Serum

Overview

Useful For

Evaluating patients with clinical features suggestive of antinuclear antibody associated connective tissue disease and the confirmation of a diagnosis of systemic lupus erythematosus.

Testing for Smith antibodies is **not useful** in patients without demonstrable antinuclear antibodies.

Testing Algorithm

For more information see:

Connective Tissue Disease Cascade

First-Line Screening for Autoimmune Liver Disease Algorithm

Special Instructions

- Connective Tissue Disease Cascade
- First-Line Screening for Autoimmune Liver Disease Algorithm

Method Name

Multiplex Flow Immunoassay

NY State Available

No

Specimen

Specimen Type

Serum

Specimen Required

Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Submission Container/Tube: Plastic vial

Specimen Volume: 0.5 mL

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

Forms

If not ordering electronically, complete, print, and send a Kidney Transplant Test Request with the specimen.

Specimen Minimum Volume

0.35 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	OK
Heat treated	Reject

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Systemic lupus erythematosus (SLE) is an autoimmune disease characterized by circulating autoantibodies to many intracellular targets. Of these autoantibodies, the anti-Smith (Sm) antibody associated with a positivity for antinuclear antibodies (ANA) is one of the earliest to be described.(1) The Sm antigen is a complex molecule consisting of a group of core proteins with molecular weights ranging from 9 to 29.5 kDa [B (B1, 28 kDa), B' (B2, 29 kDa), N (B3, 29.5 kDa), D1 (16 kDa), D2 (16.5 kDa), D3 (18 kDa), E (12 kDa), F (11 kDa), and G (9 kDa)].(2) Of these core proteins, the B and D polypeptides are frequently targeted by the Sm autoimmune response.(3) The Sm proteins, together with ribonucleoproteins and small nuclear RNA form a RNA-protein complex or small nuclear ribonucleoprotein, which is involved in precursor messenger RNA (mRNA) splicing, a process which ultimately leads to mature mRNA generation.(4)

The presence of antibodies to Sm is specific for SLE with a sensitivity of 5% to 30%.(1) Based on the 2019 American College of Rheumatology/European League Against Rheumatism classification criteria for SLE, patients positive for anti-Sm antibodies already fulfil 60% of the criteria required for SLE classification.(5,6) However, anti-Sm antibodies may occur together ribonucleoprotein antibodies in certain ANA-associated connective tissue disease such as mixed connective tissue disease, systemic sclerosis and idiopathic inflammatory myopathies.(7) In a recent study, patients double-positive for anti-dsDNA and anti-Sm antibodies at the time of the diagnosis of SLE were reported to be at higher risk of flares and may benefit from stringent monitoring and early preventive treatment.(8) In addition, some studies have suggested that positivity for anti-Sm antibody may be dependent on patient's ethnicity.(8)

In routine clinical practice, antigen-specific (solid-phase) immunoassays such as enzyme-linked immunosorbent assays, addressable laser bead immunoassays, line immunoassays, chemiluminescent immunoassays, BioPlex immunoassay and fluorescent enzyme immunoassays are widely used in determination of anti-Sm antibodies.(6,9) These immunoassays use, either a mixture of (native) Sm antigens or a specific (recombinant) Sm antigen, usually obtained by purification of nuclear extract or produced by in vitro translation, respectively, coated to a solid phase (e.g. plate/well, membrane, bead).(6) In the past, anti-Sm tests used a mixture of all Sm proteins purified from a native source. These mixtures often also contained other proteins, such as U1-RNP, which must be taken into consideration when interpreting results. Based on the analytical differences in immunoassays for detecting anti-Sm antibodies, the method used for their detection is likely to impact the diagnostic performance characteristics.

For more information see:
Connective Tissue Disease Cascade
First-Line Screening for Autoimmune Liver Disease Algorithm

Reference Values
<1.0 U (negative)
> or =1.0 U (positive)
Reference values apply to all ages.

Interpretation
A positive anti-Smith antibody result in the appropriate clinical context is consistent with a diagnosis of systemic lupus erythematosus.

Cautions
No significant cautionary statements

Clinical Reference
1. Tan EM, Kunkel HG. Characteristics of a soluble nuclear antigen precipitating with sera of patients with systemic lupus erythematosus. J Immunol. 1966;96(3):464-471
2. Zieve GW, Khusial PR. The anti-Sm immune response in autoimmunity and cell biology. Autoimmun Rev. 2003;2(5):235-240
3. Billings PB, Hoch SO. Characterization of U small nuclear RNA-associated proteins. J Biol Chem. 1984;259(20):12850-12856
4. Battle DJ, Kasim M, Yong J, et al. The SMN complex: an assembly machine for RNPs. Cold Spring Harb Symp Quant Biol. 2006;71:313-320
5. Aringer M, Costenbader K, Daikh D, et al. 2019 European League Against Rheumatism/American College of Rheumatology Classification Criteria for Systemic Lupus Erythematosus. Arthritis Rheumatol. 2019;71(9):1400-1412
6. van Beers JJBC, Schreurs MWJ. Anti-Sm antibodies in the classification criteria of systemic lupus erythematosus. J Transl Autoimmun. 2022;5:100155
7. Migliorini P, Baldini C, Rocchi V, Bombardieri S. Anti-Sm and anti-RNP antibodies. Autoimmunity. 2005;38(1):47-54
8. Kwon OC, Park MC. Risk of systemic lupus erythematosus flares according to autoantibody positivity at the time of diagnosis. Sci Rep. 2023;13(1):3068
9. Llorente MJ, Jimenez J, Gonzalez C, et al. Effectiveness of different methods for anti-Sm antibody identification. A multicentre study. Clin Chem Lab Med. 2005;43(7):748-752

Performance

Method Description
Affinity-purified Sm antigens are bound to polystyrene microspheres, which are impregnated with fluorescent dyes to create a unique fluorescent signature. Sm antibodies, if present in diluted serum, bind to the Sm antigens on the microspheres. The microspheres are washed to remove extraneous serum proteins. Phycoerythrin (PE)-conjugated antihuman IgG antibody is then added to detect IgG anti-Sm bound to the microspheres. The microspheres are washed to remove unbound conjugate, and bound conjugate is detected by laser photometry. A primary laser reveals the

fluorescent signature of each microsphere to distinguish it from microspheres that are labeled with other antigens, and a secondary laser reveals the level of PE fluorescence associated with each microsphere. Results are calculated by comparing the median fluorescence response for Sm microspheres to a 4-point calibration curve.(Package insert: BioPlex 2200 ANA Screen. Bio-Rad Laboratories; 02/2019)

PDF Report
No

Day(s) Performed
Monday through Friday, Sunday

Report Available
1 to 3 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Jacksonville Clinical Lab

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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information
86235

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
SM	Sm Ab, IgG, S	18323-6

Result ID	Test Result Name	Result LOINC® Value
SM	Sm Ab, IgG, S	18323-6