MAYO CLINIC LABORATORIES

Test Definition: ADNA1

Double-Stranded DNA (dsDNA) Antibodies, IgG, Serum

Overview

Useful For

Evaluating patients with clinical features or at-risk for systemic lupus erythematosus (SLE)

Monitoring disease activity, as an adjunct test, in patients with SLE previously positive for double-stranded DNA IgG antibodies

Testing Algorithm

For more information see First-Line Screening for Autoimmune Liver Disease Algorithm.

Special Instructions

- First-Line Screening for Autoimmune Liver Disease Algorithm

Method Name

Enzyme-Linked Immunosorbent Assay (ELISA)

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

Forms

If not ordering electronically, complete, print, and send a General Request (T239) with the specimen.

Specimen Minimum Volume

See Specimen Required

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

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 a chronic autoimmune condition in which an inflammatory immune response leads to damage of a variety of organ systems, including the skin, joints, kidney, vasculature, lungs, and brain. In 2019, the European League Against Rheumatism/American College of Rheumatology published classification criteria for SLE(1) which includes antibodies to double-stranded DNA (dsDNA) as an SLE-specific autoantibody within the immunology domain. Anti-dsDNA antibodies are also included in the Systemic Lupus International Collaborating Clinics classification criteria (SLICC) for SLE.(2) Detection of IgG antibodies to dsDNA is the most clinically useful isotype.(3-5) The diagnostic performance of dsDNA IgG antibodies in SLE is variable and dependent on several factors, including the immunological method used for their detection, the structure of the DNA antigen, the patient's disease state (early or active vs inactive), and specific clinical manifestations and patient demographics.(3-7) Weak-positive dsDNA IgG antibodies having low affinity and low avidity display variable clinical correlations with SLE.(3)

Testing for IgG antibodies to dsDNA is indicated in patients with clinical features compatible with SLE who are positive for anti-cellular antibody (antinuclear antibody: ANA), particularly the homogeneous pattern identified using HEp-2 substrate by indirect immunofluorescence assay (IFA).(1,2,8) A minority of SLE patients may test negative using HEp-2 by IFA for nuclear antibodies.(8,9) For patients with features of neuropsychiatric disease, testing for antibodies associated with HEp-2 IFA cytoplasmic patterns such as ribosomal P IgG autoantibodies may be useful. In addition, some patients may benefit from testing for additional markers, including Smith, ribonucleoprotein, SSA-52, and SSA-60 antibodies.(8,9)

The reactivity of antibodies to dsDNA may fluctuate with SLE disease activity. Increasing reactivity may be associated with flares while a decline or seronegativity may indicate response to treatment or disease remission.

For more information see First-Line Screening for Autoimmune Liver Disease Algorithm.

Reference Values

<100 IU/mL (negative)
> or =100 IU/mL (positive)
Negative is considered normal.

Reference values apply to all ages.

Interpretation

A positive result for double-stranded DNA (dsDNA) IgG antibodies in the appropriate clinical context is suggestive of systemic lupus erythematosus (SLE). The performance characteristics of dsDNA IgG antibodies in SLE is dependent on the immunological method used for their detection, the patient's disease state including clinical manifestations, and demographics.

Weak-positive dsDNA IgG antibody results have a low-positive predictive value for SLE.

Negative results do not rule out a diagnosis of SLE.

Cautions

Measurements of IgG antibodies to double-stranded DNA (dsDNA) are semiquantitative. Slight changes in reactivity of these antibodies should not be relied upon to predict changes in the clinical course of patients with systemic lupus erythematosus (SLE). Clinical flares of disease in patients with SLE may not be accompanied by changes in the reactivity of dsDNA antibodies. Thus, anti-dsDNA antibody results alone are not sufficient to guide disease management.

False-positive results are usually of low titer.

A negative result does not exclude a diagnosis of SLE.

Anti-dsDNA results at or around the reference interval may not correlate with a diagnosis of SLE. Confirmation with *Crithidia luciliae* indirect immunofluorescence test, which is more specific for SLE, may be useful to establish or exclude the diagnosis in certain circumstances.

Clinical Reference

1. 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. doi:10.1002/art.40930
2. Petri M, Orbai AM, Alarcon GS, et al. Derivation and validation of the Systemic Lupus International Collaborating Clinics classification criteria for systemic lupus erythematosus. Arthritis Rheum. 2012;64(8):2677-2686. doi:10.1002/art.34473
3. Infantino M, Manfredi M, Merone M, et al. Analytical variability in the determination of anti-double-stranded DNA antibodies: the strong need of a better definition of the old and new tests. Immunol Res. 2018;66(3):340-347. doi:10.1007/s12026-018-8992-9
4. Fox BJ, Hockley J, Rigsby P, Dolman C, Meroni PL, Ronnelid J. A WHO Reference Reagent for lupus (anti-dsDNA) antibodies: international collaborative study to evaluate a candidate preparation. Ann Rheum Dis. 2019;78(12):1677-1680. doi:10.1136/annrheumdis-2019-21584
5. Ambrose N, Morgan TA, Galloway J, et al. Differences in disease phenotype and severity in SLE across age groups. Lupus. 2016;25(14):1542-1550. doi:10.1177/0961203316644333
6. Rekvig OP. Autoimmunity and SLE: Factual and semantic evidence-based critical analyses of definitions, etiology, and pathogenesis. Front Immunol. 2020;11:569234. doi:10.3389/fimmu.2020.569234
7. Bragazzi NL, Watad A, Damiani G, Adawi M, Amital H, Shoenfeld Y. Role of anti-DNA auto-antibodies as biomarkers of response to treatment in systemic lupus erythematosus patients: hypes and hopes. Insights and implications from a

comprehensive review of the literature. Expert Rev Mol Diagn. 2019;19(11):969-978. doi:10.1080/14737159.2019.1665511

8. Damoiseaux J, Andrade LEC, Carballo OG, et al. Clinical relevance of HEp-2 indirect immunofluorescent patterns: the International Consensus on ANA patterns (ICAP) perspective. Ann Rheum Dis. 2019;78(7):879-889. doi:10.1136/annrheumdis-2018-214436

9. Choi MY, Clarke AE, St Pierre Y, et al. Antinuclear antibody-negative systemic lupus erythematosus in an international inception cohort. Arthritis Care Res (Hoboken). 2019;71(7):893-902. doi:10.1002/acr.23712

Performance

Method Description

The test kit contains 12 microtiter strips each with 8 break-off reagent wells coated with double-stranded DNA (dsDNA). In the first reaction step, diluted patient samples, calibrators and controls are incubated in the wells. Anti-dsDNA antibodies will bind to the antigens coated in the microtiter wells. The wells are washed to remove any unbound proteins and non-specific antibodies. In a second reaction step, rabbit anti-human IgG-HRP enzyme conjugate is added to each well. The enzyme conjugate will bind to any wells that have human IgG binding to the dsDNA antigen. The wells are washed to remove any unbound HRP enzyme conjugate. 3,3,5,5, tetramethylbenzidine (TMB) enzyme substrate is added. If the HRP enzyme is present in the well (positive reaction), the HRP enzyme will react with the TMB substrate and produce a blue color. After an additional incubation time to allow the color development, a stop solution is added which turns the blue color yellow and inhibits further color development to allow for stable spectrophotometric reading. The test strips are placed in a microplate reader and the optical density of the color is measured. The amount of antigen specific bound antibody is proportional to the color intensity.(Package insert: Anti-dsDNA-NcX ELISA (IgG). EUROIMMUN; 7/8/2020)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

2 to 4 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 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

86225

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ADNA1	dsDNA Ab, IgG, S	33799-8

Result ID	Test Result Name	Result LOINC® Value
ADNA1	dsDNA Ab, IgG, S	33799-8