Overview

Useful For

Evaluating patients with suspected paraneoplastic or other autoimmune movement disorders including patients with ataxia, chorea, dyskinesias, myoclonus, parkinsonism, and stiff-person spectrum in serum specimens

Profile Information

Test ID	Reporting Name	Available Separately	Always Performed
MDSI	Movement Disorder Interp, S	No	Yes
GANG	AChR Ganglionic Neuronal Ab, S	No	Yes
AMPHS	Amphiphysin Ab, S	No	Yes
AGN1S	Anti-Glial Nuclear Ab, Type 1	No	Yes
ANN1S	Anti-Neuronal Nuclear Ab, Type 1	No	Yes
ANN2S	Anti-Neuronal Nuclear Ab, Type 2	No	Yes
ANN3S	Anti-Neuronal Nuclear Ab, Type 3	No	Yes
CS2CS	CASPR2-IgG CBA, S	No	Yes
CRMS	CRMP-5-IgG, S	No	Yes
CRMWS	CRMP-5-IgG Western Blot, S	Yes	Yes
DPPIS	DPPX Ab IFA, S	No	Yes
GD65S	GAD65 Ab Assay, S	Yes	Yes
GRFIS	GRAF1 IFA, S	No	Yes
IG5IS	IgLON5 IFA, S	No	Yes
ITPIS	ITPR1 IFA, S	No	Yes
LG1CS	LGI1-IgG CBA, S	No	Yes
GL1IS	mGluR1 Ab IFA, S	No	Yes
NIFIS	NIF IFA, S	No	Yes
NMDCS	NMDA-R Ab CBA, S	No	Yes
CCN	N-Type Calcium Channel Ab	No	Yes
CCPQ	P/Q-Type Calcium Channel Ab	No	Yes
PCABP	Purkinje Cell Cytoplasmic Ab Type 1	Yes	Yes
PCAB2	Purkinje Cell Cytoplasmic Ab Type 2	Yes	Yes

Test ID	Reporting Name	Available Separately	Always Performed
PCATR	Purkinje Cell Cytoplasmic Ab Type Tr	No	Yes

Reflex Tests

Test ID	Reporting Name	Available Separately	Always Performed
AGNBS	AGNA-1 Immunoblot, S	No	No
AINCS	Alpha Internexin CBA, S	No	No
AMPCS	AMPA-R Ab CBA, S	No	No
AMPIS	AMPA-R Ab IF Titer Assay, S	No	No
AMIBS	Amphiphysin Immunoblot, S	No	No
AN1BS	ANNA-1 Immunoblot, S	No	No
AN2BS	ANNA-2 Immunoblot, S	No	No
DPPCS	DPPX Ab CBA, S	No	No
DPPTS	DPPX Ab IFA Titer, S	No	No
GABCS	GABA-B-R Ab CBA, S	No	No
GABIS	GABA-B-R Ab IF Titer Assay, S	No	No
GRFCS	GRAF1 CBA, S	No	No
GRFTS	GRAF1 IFA Titer, S	No	No
IG5CS	IgLON5 CBA, S	No	No
IG5TS	IgLON5 IFA Titer, S	No	No
ITPCS	ITPR1 CBA, S	No	No
ITPTS	ITPR1 IFA Titer, S	No	No
GL1CS	mGluR1 Ab CBA, S	No	No
GL1TS	mGluR1 Ab IFA Titer, S	No	No
NFHCS	NIF Heavy Chain CBA, S	No	No
NIFTS	NIF IFA Titer, S	No	No
NFLCS	NIF Light Chain CBA, S	No	No
NMDIS	NMDA-R Ab IF Titer Assay, S	No	No
PC1BS	PCA-1 Immunoblot, S	No	No
PCTBS	PCA-Tr Immunoblot, S	No	No

Testing Algorithm

If immunofluorescence assay (IFA) pattern suggests amphiphysin antibody, then amphiphysin immunoblot is performed at an additional charge.

If IFA pattern suggests AGNA-1 antibody, then AGNA-1 immunoblot is performed at an additional charge.

If IFA pattern suggests ANNA-1 antibody, then ANNA-1 immunoblot is performed at an additional charge.

If IFA pattern suggests ANNA-2 antibody, then ANNA-2 immunoblot is performed at an additional charge.

If IFA pattern suggests PCA-1 antibody, then PCA-1 immunoblot is performed at an additional charge.

If IFA pattern suggests PCA-Tr antibody, then PCA-Tr immunoblot is performed at an additional charge.

If IFA pattern suggests IgLON5 antibody, then IgLON5 CBA and IgLON5 titer are performed at an additional charge.

If IFA pattern suggests GRAF1 antibody, then GRAF1 CBA and GRAF1 titer are performed at an additional charge.

If IFA pattern suggests ITPR1 antibody, then ITPR1 CBA and ITPR1 titer are performed at an additional charge.

If IFA pattern suggests AMPA-receptor antibody, then AMPA-receptor cell-binding assay (CBA) and AMPA-receptor titer are performed at an additional charge.

If IFA pattern suggests DPPX antibody, then DPPX CBA and DPPX titer are performed at an additional charge.

If IFA pattern suggests GABA-B-receptor antibody, then GABA-B-receptor CBA and GABA-B-receptor titer are performed at an additional charge.

If IFA pattern suggests mGluR1 antibody, then mGluR1 CBA and mGluR1 titer are performed at an additional charge.

If IFA pattern suggests NMDA-receptor antibody and NMDA-receptor CBA is positive, then NMDA-receptor titer is performed at an additional charge.

If IFA pattern suggests NIF antibody, then alpha internexin CBA, NIF heavy chain CBA, NIF light chain CBA, and NIF titer are performed at an additional charge.

See Movement Disorder Autoimmune Evaluation Algorithm-Serum in Special Instructions.

Special Instructions

- Movement Disorder Autoimmune Evaluation Algorithm-Serum

Method Name

AGN1S, AMPHS, AMPIS, ANN1S, ANN2S, ANN3S, CRMS, DPPIS, DPPTS, GABIS, GL1IS, GL1TS, GRFIS, GRFTS, IG5IS, IG5TS, ITPIS, ITPTS, NIFIS, NIFTS, NMDIS, PCAB2, PCABP, PCATR: Indirect Immunofluorescence Assay (IFA)

AINCS, AMPCS, CS2CS, DPPCS, GABCS, GL1CS, GRFCS, IG5CS, ITPCS, LG1CS, NFHCS, NFLCS, NMDCS: Cell Binding Assay (CBA)

CRMWS: Western Blot

AGNBS, AMIBS, AN1BS, AN2BS, PC1BS, PCTBS: Immunoblot

CCN, CCPQ, GANG ,GD65S: Radioimmunoassay (RIA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Necessary Information

Provide the following information:

-Relevant clinical information

-Ordering provider name, phone number, mailing address, and e-mail address

Specimen Required

Patient Preparation:

1. For optimal antibody detection, specimen collection is recommended prior to initiation of immunosuppressant medication.

2. This test should not be requested in patients who have recently received radioisotopes, therapeutically or diagnostically, because of potential assay interference. The specific waiting period before specimen collection will depend on the isotope administered, the dose given, and the clearance rate in the individual patient. Specimens will be screened for radioactivity prior to analysis. Radioactive specimens received in the laboratory will be held 1 week and assayed if sufficiently decayed, or canceled if radioactivity remains.

Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Specimen Volume: 4 mL

Forms

If not ordering electronically, complete, print, and send a Neurology Specialty Testing Client Test Request (T732) with the specimen.

Specimen Minimum Volume

3 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)	28 days	
	Frozen	28 days	
	Ambient	72 hours	

Clinical and Interpretive

Clinical Information

Autoimmune movement disorders encapsulate a large and diverse group of neurologic disorders occurring either in isolation or accompanying more diffuse autoimmune encephalitic illnesses.

The full range of movement phenomena has been described and, as they often occur in adults, many of the presentations can mimic neurodegenerative disorders, such as autoimmune chorea mimicking Huntington disease. Disorders may be ataxic, hypokinetic (parkinsonism), or hyperkinetic (myoclonus, chorea other dyskinetic disorders).

The autoantibody targets are diverse and include neuronal surface proteins such as leucine-rich, glioma-inactivated 1 (LGI1), as well as antibodies reactive with intracellular antigens (such as Purkinje cell cytoplasmic antibody-1: PCA-1) that are markers of a central nervous system process mediated by CD8+ cytotoxic T cells.

In some instances (such as PCA-1 autoimmunity), antibodies detected in serum and cerebrospinal fluid can be indicative of a paraneoplastic cause, and may direct the cancer search. In other instances (such as 65kDa isoform of glutamic acid decarboxylase: GAD65 autoimmunity), a paraneoplastic cause is very unlikely, and early treatment with immunotherapy may promote improvement or recovery.

Reference Values

Test ID	Reporting Name	Methodology	Reference Value
GANG	AChR Ganglionic Neuronal Ab, S	Radioimmunoassay (RIA)	< or =0.02 nmol/L
AMPHS	Amphiphysin Ab, S	Immunofluorescence assay (IFA)	<1:240
AGN1S	Anti-Glial Nuclear Ab, Type 1	IFA	<1:240
ANN1S	Anti-Neuronal Nuclear Ab, Type 1	IFA	<1:240
ANN2S	Anti-Neuronal Nuclear Ab, Type 2	IFA	<1:240
ANN3S	Anti-Neuronal Nuclear Ab, Type 3	IFA	<1:240
CS2CS	CASPR2-IgG CBA, S	Cell-binding assay (CBA)	Negative
CRMS	CRMP-5-IgG, S	IFA	<1:240
CRMWS	CRMP-5-IgG Western Blot, S	Western blot (WB)	Negative
DPPIS	DPPX Ab IFA, S	IFA	Negative

GD65S	GAD65 Ab Assay, S	RIA	< or =0.02 nmol/L Reference values apply to all ages. Â
GRFIS	GRAF1 IFA, S	IFA	Negative
IG5IS	IgLON5 IFA, S	IFA	Negative
ITPIS	ITPR1 IFA, S	IFA	Negative
LG1CS	LGI1-IgG CBA, S	CBA	Negative
GL1IS	mGluR1 Ab IFA, S	IFA	Negative
NIFIS	NIF IFA, S	IFA	Negative
NMDCS	NMDA-R Ab CBA, S	CBA	Negative
CCN	N-Type Calcium Channel Ab	RIA	< or = 0.03 nmol/L Â
CCPQ	P/Q-Type Calcium Channel Ab	RIA	< or =0.02 nmol/L
PCABP	Purkinje Cell Cytoplasmic Ab Type 1	IFA	<1:240
PCAB2	Purkinje Cell Cytoplasmic Ab Type 2	IFA	<1:240
PCATR	Purkinje Cell Cytoplasmic Ab Type Tr	IFA	<1:240

Reflex Information:

Test ID	Reporting Name	Methodology	Reference Value
AGNBS	AGNA-1 Immunoblot, S	Immunoblot (IB)	Negative
AINCS	Alpha Internexin CBA, S	CBA	Negative
AMPIS	AMPA-R Ab IF Titer Assay, S	IFA	<1:120
AMPCS	AMPA-R Ab CBA, S	CBA	Negative
AMIBS	Amphiphysin Immunoblot, S	IB	Negative
AN1BS	ANNA-1 Immunoblot, S	IB	Negative
AN2BS	ANNA-2 Immunoblot, S	IB	Negative
DPPCS	DPPX Ab CBA, S	CBA	Negative
DPPTS	DPPX Ab IFA Titer, S	IFA	<1:240
GABCS	GABA-B-R Ab CBA, S	CBA	Negative
GABIS	GABA-B-R Ab IF Titer Assay, S	IFA	<1:120
GRFCS	GRAF1 CBA, S	CBA	Negative
GRFTS	GRAF1 IFA Titer, S	IFA	<1:240

IG5CS	IgLON5 CBA, S	CBA	Negative
IG5TS	IgLON5 IFA Titer, S	IFA	<1:240
ITPCS	ITPR1 CBA, S	CBA	Negative
ITPTS	ITPR1 IFA Titer, S	IFA	<1:240
GL1CS	mGluR1 Ab CBA, S	CBA	Negative
GL1TS	mGluR1 Ab IFA Titer, S	IFA	<1:240
NFHCS	NIF Heavy Chain CBA, S	CBA	Negative
NIFTS	NIF IFA Titer, S	IFA	<1:240
NFLCS	NIF Light Chain CBA, S	CBA	Negative
NMDIS	NMDA-R Ab IF Titer Assay, S	IFA	<1:120
PC1BS	PCA-1 Immunoblot, S	IB	Negative
PCTBS	PCA-Tr Immunoblot, S	IB	Negative

Neuron-restricted patterns of IgG staining that do not fulfill criteria for ANNA-1, ANNA-2, CRMP-5-IgG, PCA-1, PCA-2, or PCA-Tr may be reported as "unclassified anti-neuronal IgG." Complex patterns that include nonneuronal elements may be reported as "uninterpretable."

Interpretation

A positive antibody result is consistent with a diagnosis of an autoimmune movement disorder.

A search for cancer may be indicated, depending on the antibody profile.

A trial of immune therapy may bring about improvement in neurological symptoms.

Cautions

A negative antibody test result does not exclude an autoimmune movement disorder.

Corticosteroid treatment prior to the serum collection may cause a false-negative result.

Intravenous immunoglobulin (IVIg) treatment prior to the serum collection may cause a false-positive result.

Clinical Reference

Honorat JA, McKeon A: Autoimmune Movement Disorders: a Clinical and Laboratory Approach. Curr Neurol Neurosci Rep 2017 Jan;17(1):4 doi: 10.1007/s11910-017-0709-2

Performance

Method Description

Indirect Immunofluorescence Assay

The patient's sample is tested by a standardized indirect immunofluorescence assay (IFA) that uses a composite frozen section of mouse cerebellum, kidney, and gut tissues. After incubation with sample and washing, fluorescein-conjugated goat-antihuman IgG is applied. Neuron-specific autoantibodies are identified by their characteristic fluorescence staining patterns. Samples that are scored positive for any neuronal nuclear or cytoplasmic

autoantibody are titrated to an endpoint. Interference by coexisting non-neuron-specific autoantibodies can usually be eliminated by serologic absorption.(Honorat JA, Komorowski L, Josephs KA, et al: IgLON5 antibody: neurological accompaniments and outcomes in 20 patients. Neurol Neuroimmunol Neuroinflamm 2017 Jul 18;4(5):e385. doi: 10.1212/NXI.0000000000000385)

Radioimmunoassay

Duplicate aliquots of patient specimen are incubated with I(125)-labeled antigen. Immune complexes, formed by adding secondary (goat) antihuman immunoglobulin, are pelleted by centrifugation and washed. Gamma emission from the washed pellet is counted, and mean counts per minute (cpm) are compared with results yielded by high positive and negative control sera. Specimen yielding cpm higher than the background cpm yielded by normal human specimen are retested to confirm positivity and titrated as necessary to obtain a value in the linear range of the assay. The antigen binding capacity (nmol per liter) is calculated from the cpm precipitated at a dilution yielding a linear range value.(Griesmann GE, Kryzer TJ, Lennon VA: Autoantibody profiles of myasthenia gravis and Lambert-Eaton myasthenic syndrome. In Manual of Clinical and Laboratory Immunology. Sixth edition. Edited by NR Rose, RG Hamilton, et al. ASM Press, 2002, pp 1005-1012; Jones AL, Flanagan EP, Pittock SJ, et al: Responses to and Outcomes of Treatment of Autoimmune Cerebellar Ataxia in Adults. JAMA Neurol 2015 Nov;72[11]:1304-1312 doi: 10.1001/jamaneurol.2015.2378)

Western Blot

Neuronal antigens extracted aqueously from adult rat cerebellum, full-length recombinant human collapsin response-mediator protein-5 (CRMP-5), or full-length recombinant human amphiphysin protein is denatured, reduced, and separated by electrophoresis on 10% polyacrylamide gel. IgG is detected autoradiographically by enhanced chemiluminescence.(Yu Z, Kryzer TJ, Griesmann GE, et al: CRMP-5 neuronal autoantibody: marker of lung cancer and thymoma-related autoimmunity. Ann Neurol 2001 February;49[2]:146-154; Dubey D, Jitprapaikulsan J, Bi H, et al: Amphiphysin-IgG autoimmune neuropathy: A recognizable clinicopathologic syndrome. Neurology 2019 Oct 17 pii: 10.1212/WNL.0000000000008472. doi: 10.1212/WNL.0000000000008472)

Immunoblot

All steps are performed at room temperature (18-28 degrees C) utilizing the EUROBlot One instrument. Diluted patient serum (1:12.5) is added to test strips (strips containing recombinant antigen manufactured and purified using biochemical methods) in individual channels and incubated for 30 minutes. Positive specimens will bind to the purified recombinant antigen and negative specimens will not bind. Strips are washed to remove unbound serum antibodies and then incubated with anti-human IgG antibodies (alkaline phosphatase-labelled) for 30 minutes. The strips are again washed to remove unbound anti-human IgG antibodies and nitroblue tetrazolium chloride/5-bromo-4-chloro-3-indolylphosphate (NBT/BCIP) substrate is added. Alkaline phosphatase enzyme converts the soluble substrate into a colored insoluble product on the membrane to produces a black band. Strips are digitized via picture capture on the EUROBlot One instrument and evaluated with the EUROLineScan software.(O'Connor K, Waters P, Komorowski L, et al: GABAA receptor autoimmunity: A multicenter experience. Neurol Neuroimmunol Neuroinflamm 2019 Apr 4;6[3]:e552 doi: 10.1212/NXI.0000000000000552)

Cell-Binding Assay

Patient specimen is applied to a composite slide containing transfected and nontransfected HEK-293 cells. After incubation and washing, fluorescein-conjugated goat-antihuman IgG is applied to detect the presence of patient IgG binding.(Package insert: IIFT: Neurology Mosaics, Instructions for the indirect immunofluorescence test. EUROIMMUN, Lubeck, Germany, FA_112d-1_A_UK_C13, 02/2019)

PDF Report

No

Day(s) and Time(s) Test Performed

AGN1S, AMPHS, AMPIS, ANN1S, ANN2S, ANN3S, CRMS, DPPIS, DPPTS, GABIS, GL1IS, GL1TS, GRFIS, GRFTS, IG5IS, IG5TS, ITPIS, ITPTS, NIFIS, NIFTS, NMDIS, PCAB2, PCABP, PCATR:

Monday through Friday; 5 a.m., 7 a.m., 5 p.m.

Saturday, Sunday; 6 a.m.

CCN, CCPQ, GANG:

Monday through Friday; 6 a.m., 8 a.m., 6 p.m.

Saturday, Sunday; 7 a.m.

AMPCS, CS2CS, DPPCS, GABCS, LG1CS, NMDCS:

Monday through Friday; 10 p.m.

Sunday; 10 p.m.

AINCS, NFHCS, NFLCS:

Tuesday, Thursday; 6 p.m.

AGNBS, AMIBS, AN1BS, AN2BS, PC1BS, PCTBS:

Monday through Friday; 6 p.m.

CRMWS:

Monday through Thursday; 8 a.m.

GD65S:

Monday through Friday; 5 a.m., 2 p.m.

Saturday, Sunday; 7 a.m.

GL1CS, GRFCS, IG5CS, ITPCS:

Monday, Thursday; 6 p.m.

Analytic Time

10 days

Maximum Laboratory Time

13 days

Specimen Retention Time

28 days

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. 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. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

83519 x3

86255 x18

84182 x1

86341 x1

84182 AGNBS (if appropriate)

86255 AINCS (if appropriate)

86255 AMPCS (if appropriate)

86256 AMPIS (if appropriate)

84182 AMIBS (if appropriate)

84182 AN1BS (if appropriate)

84182 AN2BS (if appropriate)

86255 DPPCS (if appropriate)

86256 DPPTS (if appropriate)

86255 GABCS (if appropriate)

86256 GABIS (if appropriate)

86255 GRFCS (if appropriate)

86256 GRFTS (if appropriate)

86255 IG5CS (if appropriate)

86256 IG5TS (if appropriate)

86255 ITPCS (if appropriate)

86256 ITPTS (if appropriate)

86255 GL1CS (if appropriate)

86256 GL1TS (if appropriate)

86255 NFHCS (if appropriate)

86256 NIFTS (if appropriate)

86255 NFLCS (if appropriate)

86256 NMDIS (if appropriate)

84182 PC1BS (if appropriate)

84182 PCTBS (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
MDS2	Movement Autoimmune Eval, S	94701-0

Result ID	Test Result Name	Result LOINC Value
61516	NMDA-R Ab CBA, S	93503-1
64279	LGI1-IgG CBA, S	94287-0
64281	CASPR2-IgG CBA, S	94285-4
64930	DPPX Ab IFA, S	82976-2
64928	mGluR1 Ab IFA, S	94347-2
601998	Movement Disorder Interp, S	69048-7
606946	IgLON5 IFA, S	In Process
606952	ITPR1 IFA, S	In Process
606964	NIF IFA, S	In Process
606958	GRAF1 IFA, S	In Process
80776	ANNA-2, S	94343-1
83137	ANNA-3, S	94344-9
81184	N-Type Calcium Channel Ab	94348-0
81185	P/Q-Type Calcium Channel Ab	94349-8
83077	CRMP-5-IgG, S	94815-8
83107	CRMP-5-IgG Western Blot, S	47401-5

Result ID	Test Result Name	Result LOINC Value
84321	AChR Ganglionic Neuronal Ab, S	94694-7
81596	GAD65 Ab Assay, S	94345-6
83138	PCA-2, S	94351-4
9477	PCA-1, S	94350-6
83076	PCA-Tr, S	94352-2
89080	AGNA-1, S	94341-5
81722	Amphiphysin Ab, S	94340-7
80150	ANNA-1, S	94342-3
36349	Reflex Added	77202-0