

**Overview****Useful For**

Evaluating patients who present with a subacute neurological disorder of undetermined etiology and have risk factors for lung cancer

Reporting an end titer result from serum specimens

**Testing Algorithm**

If the indirect immunofluorescence pattern suggests Purkinje cell cytoplasmic antibody type 2 (PCA-2), then this test will be performed at an additional charge.

**Method Name**

Only orderable as a reflex. For more information see:

- PAVAL / Paraneoplastic, Autoantibody Evaluation, Serum
- DMS2 / Dementia, Autoimmune/Paraneoplastic Evaluation, Serum
- ENS2 / Encephalopathy, Autoimmune/Paraneoplastic Evaluation, Serum
- EPS2 / Epilepsy, Autoimmune/Paraneoplastic Evaluation, Serum
- MDS2 / Movement Disorder, Autoimmune/Paraneoplastic Evaluation, Serum
- MAS1 / Myelopathy, Autoimmune/Paraneoplastic Evaluation, Serum
- AIAES / Axonal Neuropathy, Autoimmune/Paraneoplastic Evaluation, Serum
- DYS2 / Dysautonomia, Autoimmune/Paraneoplastic Evaluation, Serum
- GID2 / Gastrointestinal Dysmotility, Autoimmune/Paraneoplastic Evaluation, Serum

Indirect Immunofluorescence Assay (IFA)

**NY State Available**

Yes

**Specimen****Specimen Type**

Serum

**Specimen Required**

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- AIAES / Axonal Neuropathy, Autoimmune/Paraneoplastic Evaluation, Serum
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- GID2 / Gastrointestinal Dysmotility, Autoimmune/Paraneoplastic Evaluation, Serum

Specimen Minimum Volume

0.6 mL

Specimen Stability Information

| Specimen Type | Temperature              | Time     | Special Container |
|---------------|--------------------------|----------|-------------------|
| Serum         | Refrigerated (preferred) | 28 days  |                   |
|               | Ambient                  | 72 hours |                   |
|               | Frozen                   | 28 days  |                   |

Clinical & Interpretive

Clinical Information

Purkinje cell autoantibodies (PCA) are among the antineuronal autoantibodies (ANNA) recognized clinically as markers of a patient's immune response to specific cancers (paraneoplastic autoantibodies).

In 1976, a PCA, defined by indirect immunofluorescence, was described by Dr. John Trotter and colleagues as a serological accompaniment of cerebellar ataxia related to Hodgkin lymphoma. That autoantibody is now known as anti-Tr or PCA-Tr.

PCA-1 (or anti-Yo), first described in 1983, serves as a serological marker for a new or recurrent carcinoma of the ovary, other Mullerian tissue, or breast. PCA-1-positive patients are women in 99% of cases. They usually present with subacute cerebellar degeneration, but 10% have sensory or motor neuropathy.

In 2000, the Mayo Clinic Neuroimmunology Laboratory described and named PCA-2, a new IgG marker of an immune response to small-cell lung carcinoma (SCLC) in patients presenting with a subacute paraneoplastic neurologic disorder.

Other autoantibody markers of immune responses to SCLC include ANNA-1, ANNA-2, ANNA-3, amphiphysin, collapsin response-mediated protein-5 (CRMP-5)-IgG, anti-glial/neuronal nuclear antibody-type 1 (AGNA-1), neuronal calcium channel antibodies (N-type > P/Q-type), ganglionic acetylcholine receptor antibodies, muscle acetylcholine receptor antibodies, neuronal potassium channel antibodies, and striational antibodies.

Reference Values

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  - ENS2 / Encephalopathy, Autoimmune/Paraneoplastic Evaluation, Serum
  - EPS2 / Epilepsy, Autoimmune/Paraneoplastic Evaluation, Serum
  - MDS2 / Movement Disorder, Autoimmune/Paraneoplastic Evaluation, Serum

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-MAS1 / Myelopathy, Autoimmune/Paraneoplastic Evaluation, Serum  
-AIAES / Axonal Neuropathy, Autoimmune/Paraneoplastic Evaluation, Serum  
-DYS2 / Dysautonomia, Autoimmune/Paraneoplastic Evaluation, Serum  
-GID2 / Gastrointestinal Dysmotility, Autoimmune/Paraneoplastic Evaluation, Serum

<1:240

Neuron-restricted patterns of IgG staining that do not fulfill criteria for Purkinje cell cytoplasmic antibody type 2 may be reported as "unclassified antineuronal IgG." Complex patterns that include non-neuronal elements may be reported as "uninterpretable."

### Interpretation

A positive value (at 1:240 dilution or higher) is consistent with neurological autoimmunity and justifies a thorough search for a lung cancer, particularly small-cell carcinoma. The cancers are usually limited in metastasis. An extrapulmonary primary small-cell carcinoma (eg, skin, breast, larynx, cervix, prostate) should be considered.

Purkinje cell antibody type 2 is found in less than 2% of patients with uncomplicated small-cell lung carcinoma.

### Cautions

Western blot with native neuronal proteins may be required to detect a positive result when interfering autoantibodies preclude interpretation of immunofluorescence pattern.

### Supportive Data

Purkinje cell antibody type 2 (PCA-2) binds to the cytoplasm of cerebellar neurons in a characteristic pattern. Western blots of reduced/denatured cerebellar and small-cell lung carcinoma proteins reveal a common antigenic band, approximately 280 kDa.(1) Nine of 10 seropositive patients initially identified had a subacute neurological presentation (elements of encephalomyeloneuropathy), and 9 of 10 had lung cancer confirmed.(1) Similar neurological and oncological correlations have been observed in 104 subsequently identified seropositive patients.(VA Lennon, unpublished data)

### Clinical Reference

1. Galanis E, Frytak S, Rowland KM, et al: Neuronal autoantibody titers in the course of small-cell lung carcinoma and platinum-associated neuropathy. *Cancer Immunol Immunother*. 1999 May-June;48(2-3):85-90
2. Vernino S, Lennon VA: New Purkinje cell antibody (PCA-2): marker of lung cancer-related neurological autoimmunity. *Ann Neurol*. 2000 Mar;47(3):297-305
3. McKeon A, Tracy JA, Pittock SJ, Parisi JE, Klein CJ, Lennon VA. Purkinje cell cytoplasmic autoantibody type 1 accompaniments: the cerebellum and beyond. *Arch Neurol*. 2011 Oct;68(10):1282-9. doi: 10.1001/archneurol.2011.128
4. Pittock SJ, Kryzer TJ, Lennon VA: Paraneoplastic antibodies coexist and predict cancer, not neurological syndrome. *Ann Neurol*. 2004 Nov;56(5):715-719

### Performance

### Method Description

The patient's specimen is tested by a standardized immunofluorescence assay that uses a composite frozen section of

mouse cerebellum, kidney, and gut tissues. After incubation with the specimen and washing, fluorescein-conjugated goat-antihuman IgG is applied. Neuron-specific autoantibodies are identified by their characteristic fluorescence staining patterns. Specimens that are scored positive for any neuronal nuclear or cytoplasmic autoantibody are titrated. 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;4[5]:e385. Published 2017 Jul 18. doi:10.1212/NXI.0000000000000385)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

5 to 8 days

Specimen Retention Time

2 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

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

86256

LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---------|-----------------|--------------------|
| PC2TS   | PCA-2 Titer, S  | 94351-4            |

| Result ID | Test Result Name | Result LOINC® Value |
|-----------|------------------|---------------------|
| 43438     | PCA-2 Titer, S   | 94351-4             |