Test Definition: KCSFP

Immunoglobulin Kappa Free Light Chain, Spinal Fluid

Overview

Useful For
Diagnosis of multiple sclerosis and other demyelinating conditions

Method Name
Only orderable as part of a profile. For more information see MSP3 / Multiple Sclerosis (MS) Cascade, Serum and Spinal Fluid.

Nephelometry

NY State Available
Yes

Specimen

Specimen Type
CSF

Ordering Guidance
For evaluation of multiple sclerosis, the following are also available as individually orderable tests:
-SFIG / Cerebrospinal Fluid IgG Index Profile, Serum and Spinal Fluid
-OLIG / Oligoclonal Banding, Serum and Spinal Fluid

Specimen Required
Only orderable as part of a profile. For more information see MSP3 / Multiple Sclerosis (MS) Cascade, Serum and Spinal Fluid.

Specimen Type: Spinal fluid (CSF)
Container/Tube: Sterile vial
Specimen Volume: 1 mL
Collection Instructions:
1. Submit CSF from collection vial number 4 (preferred); vial number 1, 3, and 2 are also acceptable (in this order).
2. Label specimen as CSF.

Specimen Minimum Volume
0.5 mL

Reject Due To

Gross	Reject

hemolysis	
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
CSF	Frozen (preferred)	28 days	
	Ambient	24 hours	
	Refrigerated	72 hours	

Clinical & Interpretive

Clinical Information

Multiple sclerosis (MS) is a chronic demyelinating disease of the central nervous system (CNS). The clinical diagnosis of MS is centered on each individual patient while applying diagnostic guidelines. Immunoglobulin free light chain (FLC) presence in cerebrospinal fluid (CSF) is an alternative for diagnosis of MS using nephelometry. Light chains are produced in excess during antibody formation and secreted from the plasma cells or plasma blasts. Quantitative FLC assays use antisera directed against epitopes that are exposed only when the light chains are free (unbound to heavy chain) in solution. FLC immunoassays can be used to specifically quantitate FLC even in the presence of large concentrations of polyclonal immunoglobulins.

Routine use of isoelectric focusing electrophoresis coupled with IgG-specific immunoblotting identifies immunoglobulins specific to the CNS. This method is part of the diagnostic criteria used in cases of MS, ie, oligoclonal banding (OLIG). However, OLIG / Oligoclonal Banding, Serum and Spinal Fluid is a labor-intensive technique that includes subjective interpretation of IgG bands from paired CSF and serum.

This test, when considered positive at a concentration greater than or equal to 0.1000 mg/dL as a medical decision point, has a sensitivity of 70% with a specificity of 87%, which is comparable in terms of sensitivity and specificity to oligoclonal banding. The differences between this FLC test and the OLIG analysis are not statistically significant.

This profile combines the ease of use and interpretation of the quantitative measurement of kappa-free light chains in CSF and allies it to the traditional interpretation of oligoclonal bands for optimized efficiency in laboratory testing for demyelinating diseases and improved test utilization.

Reference Values

Only orderable as part of a profile. For more information see MSP3 / Multiple Sclerosis (MS) Cascade, Serum and Spinal Fluid.

Medical decision point: 0.1000 mg/dL
Positive: > or =0.1000 mg/dL
Borderline: 0.0600 mg/dL-0.0999 mg/dL
Negative: <0.0600 mg/dL

Interpretation

When result is less than 0.0600 mg/dL, the kappa free light chain concentration measured in cerebrospinal fluid (CSF) is lower than the threshold associated with demyelinating disease. This is a negative result. Testing for oligoclonal banding is not performed. Clinical correlation is recommended.

When result is from 0.0600 to 0.0999 mg/dL, the kappa free light chain concentration measured in CSF is slightly elevated but not above the medical decision point of 0.1000 mg/dL associated with demyelinating disease. This is a borderline result. Reflexing to oligoclonal bands will be automatically performed and clinical correlation is recommended.

When result is greater than or equal to 0.1000 mg/dL, the kappa free light chain concentration measured in CSF is at or greater than the threshold associated with demyelinating disease. This is a positive result. These findings, however, are not specific for multiple sclerosis (MS) because CSF-specific immunoglobulin synthesis may also be detected in patients with other neurologic diseases (infectious, inflammatory, cerebrovascular, autoimmune, and paraneoplastic). Clinical correlation is recommended. Automatic reflexing to oligoclonal bands will occur.

Cautions

No significant cautionary statements

Supportive Data

The McDonald revised criteria states that diagnosis of demyelinating disease can be assumed when 2 unique bands are found in cerebrospinal fluid (CSF) using the oligoclonal banding (OLIG) test.(1)

Based on a published Mayo Clinic study with 325 subjects, this test alone demonstrates comparable performance to OLIG along with increased sensitivity for demyelinating diseases.(2)

After this initial study, a second larger cohort was used to validate kappa free light chain (FLC) results with a larger number of samples.(3) This study found that in comparison to the current standards of detecting 2 unique CSF bands, kappa FLC results at a value greater than or equal to 0.1000 mg/dL showed comparable sensitivity and specificity to OLIG to support diagnosis of multiple sclerosis.

Using the MSP / Multiple Sclerosis (MS) Cascade, Serum and Spinal Fluid and the reflex approach, Mayo Clinic studies with over 1300 subjects report 75.5% sensitivity and 86% specificity to identify demyelinating disease from non-demyelinating disease.

Clinical Reference

1. Thompson AJ, Banwell BL, Barkhof F, et al. Diagnosis of multiple sclerosis: 2017 revisions of the McDonald criteria. Lancet Neurol. 2018;17(2):162-173
2. Gurtner KM, Shosha E, Bryant SC, et al. CSF free light chain identification of demyelinating disease: comparison with oligoclonal banding and other CSF indexes. Clin Chem Lab Med. 2018;56(7):1071-1080
3. Saadeh R, Pittock S, Bryant S, et al. CSF kappa Free Light Chains as a Potential Quantitative Alternative to Oligoclonal Bands in Multiple Sclerosis. American Academy of Neurology Annual Meeting. Philadelphia, PA. 2019
4. Fortini AS, Sanders EL, Weinshenker BG, Katzmann JA. Cerebrospinal fluid oligoclonal bands in the diagnosis of multiple sclerosis. Isoelectric focusing with IgG immunoblotting compared with high-resolution agarose gel electrophoresis and cerebrospinal fluid IgG index. Am J Clin Pathol. 2003;120(5):672-675

5. Awad A, Hemmer B, Hartung HP, Kieseier B, Bennett JL, Stuve O. Analyses of cerebrospinal fluid in the diagnosis and monitoring of multiple sclerosis. J Neuroimmunol. 2010;219(1-2):1-7
6. Hassan-Smith G, Durant L, Tsentemeidou A, et al. High sensitivity and specificity of elevated cerebrospinal fluid kappa free light chains in suspected multiple sclerosis. J Neuroimmunol. 2014;276(1-2):175-179
7. Presslauer S, Milosavljevic D, Brucke T, Bayer P, Huebl W. Elevated levels of kappa free light chains in CSF support the diagnosis of multiple sclerosis. J Neurol. 2008;255(10):1508-1514
8. Presslauer S, Milosavljevic D, Huebl W, et al. Validation of kappa free light chains as a diagnostic biomarker in multiple sclerosis and clinically isolated syndrome: A multicenter study. Mult Scler. 2016;22(4):502-510
9. Presslauer S, Milosavljevic D, Huebl W, Parigger S, Schneider-Koch G, Bruecke T. Kappa free light chains: Diagnostic and prognostic relevance in MS and CIS. PLoS ONE. 2014;9(2):e89945
10. Makshakov G, Nazarov V, Kochetova O, Surkova E, Lapin S, Evdoshenko E. Diagnostic and prognostic value of the cerebrospinal fluid concentration of immunoglobulin free light chains in clinically isolated syndrome with conversion to multiple sclerosis. PLoS One. 2015;10(11):e0143375

Performance

Method Description

In this nephelometric method, the light scattered by the antigen-antibody complexes is measured. The intensity of the measured scattered light is proportional to the amount of antigen-antibody complexes in the sample under certain conditions.

Antigen-antibody complexes are formed when a sample containing antigen and the corresponding antiserum are put into a cuvette. A light beam is generated with a light emitting diode (LED), which is transmitted through the cuvette. The light is scattered by the immuno-complexes that are present. An antigen-antibody complex is formed in the final measurement.

The result is calculated by subtracting the value of the final measurement from the initial measurement. The distribution of intensity of the scattered light depends on the ratio of the particle size of the antigen-antibody complexes to the radiated wavelength.(Instruction manual: Siemens Nephelometer II. Siemens, Inc; Version 2.3, 2008; Addendum to the Instruction Manual 2.3, 08/2017)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

1 to 3 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 modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

83521

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
KCSFP	Kappa Free Light Chain, CSF	48774-4

Result ID	Test Result Name	Result LOINC® Value
KCSFP	Kappa Free Light Chain, CSF	48774-4