



Test Definition: LFACX

Cryptococcus Antigen with Reflex, Spinal Fluid

Overview

Useful For

Aiding in the diagnosis of cryptococcosis

This test **should not be used** as a test of cure or to guide treatment decisions.

This test **should not be performed** as a screening procedure for the general population.

Profile Information

| Test Id | Reporting Name | Available Separately | Always Performed |
|---------|-------------------------------------|----------------------|------------------|
| CLFA | Cryptococcus Ag Screen w/Titer, CSF | Yes | Yes |

Reflex Tests

| Test Id | Reporting Name | Available Separately | Always Performed |
|---------|---------------------------------|----------------------|------------------|
| CLFAT | Cryptococcus Ag Titer, LFA, CSF | Yes | No |
| FGENC | Fungal Culture, CSF | Yes, (Order FGEN) | No |

Testing Algorithm

If result is positive, *Cryptococcus* antigen titer will be performed at an additional charge.

If *Cryptococcus* antigen titer is positive, then fungal culture will be performed at an additional charge.

Method Name

Lateral Flow Assay (LFA)

NY State Available

Yes

Specimen

Specimen Type

CSF

Specimen Required

Container/Tube: Sterile vial

Specimen Volume: 1 mL

Collection Instructions: Submit specimen from collection vial 2 (preferred), 3, or 4.

Forms

If not ordering electronically, complete, print, and send [Infectious Disease Serology Test Request](#) (T916) with the specimen.

Specimen Minimum Volume

0.5 mL

Reject Due To

| | |
|-----------------|--------|
| Gross hemolysis | Reject |
|-----------------|--------|

Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---------------|--------------------------|---------|-------------------|
| CSF | Refrigerated (preferred) | 14 days | |
| | Frozen | 14 days | |

Clinical & Interpretive

Clinical Information

Cryptococcosis is an invasive fungal infection caused by *Cryptococcus neoformans* or *Cryptococcus gattii*. *C neoformans* has been isolated from several sites in nature, particularly weathered pigeon droppings. *C gattii* was previously only associated with tropical and subtropical regions. More recently, however, this organism has been found to be endemic in British Columbia and the Pacific Northwestern United States and is associated with several different tree species.

Infection is usually acquired via the pulmonary route. Patients are often unaware of any exposure history.

Approximately half of the patients with symptomatic disease have a predisposing immunosuppressive condition such as AIDS, steroid therapy, lymphoma, or sarcoidosis. Symptoms may include fever, headache, dizziness, ataxia, somnolence, and cough. While the majority of *C neoformans* infections occur in immunocompromised patient populations, *C gattii* has a higher predilection for infection of healthy individuals.(1,2)

In addition to the lungs, cryptococcal infections frequently involve the central nervous system (CNS), particularly in patients infected with HIV. Mortality among patients with CNS cryptococcosis may approach 25% despite antibiotic therapy. Untreated CNS cryptococcosis is invariably fatal. Disseminated disease may affect any organ system and usually occurs in immunosuppressed individuals.

Reference Values

CRYPTOCOCCUS ANTIGEN SCREEN WITH TITER

Negative

Reference values apply to all ages.

CRYPTOCOCCUS ANTIGEN TITER, LFA

Negative

Reference values apply to all ages.

FUNGAL CULTURE

Negative

If positive, fungus will be identified.

Reference values apply to all ages.

Interpretation

The presence of cryptococcal antigen in any body fluid (serum or cerebrospinal fluid [CSF]) is indicative of cryptococcosis. Specimens that are positive by the lateral flow assay (LFA) screen are automatically repeated by the same method utilizing dilutions to generate a titer value. CSF specimens submitted for initial diagnosis that test positive by LFA should also be submitted for routine fungal culture. Culture can aid in differentiating between the 2 common *Cryptococcus* species causing disease (*Cryptococcus neoformans* and *Cryptococcus gattii*) and can be used for antifungal susceptibility testing, if necessary. CSF specimens submitted to monitor antigen levels during treatment do not need to be cultured.

Disseminated infection is usually accompanied by a positive serum test.

Higher *Cryptococcus* antigen titers appear to correlate with more severe infections. Declining titers may indicate regression of infection. However, monitoring titers to cryptococcal antigen should not be used as a test of cure or to guide treatment decisions, as low-level titers may persist for extended periods of time following appropriate therapy and the resolution of infection.

Cautions

A traumatic lumbar puncture and contamination of the cerebrospinal fluid (CSF) specimen with plasma may lead to a positive *Cryptococcus* antigen result from CSF in patients without neuroinvasive cryptococcosis.

A negative result does not preclude diagnosis of cryptococcosis, particularly if only a single specimen has been tested and the patient shows symptoms consistent with cryptococcosis.

A positive result is indicative of cryptococcosis; however, all test results should be reviewed considering other clinical findings.

Testing should not be performed as a screening procedure for the general populations and should only be performed when clinical evidence suggests the diagnosis of cryptococcal disease.

Although rare, extremely high concentrations of cryptococcal antigen can result in weak test lines and, in extreme instances, yield false-negative test results.

This assay has not been evaluated for cross-reactivity in patients with trichosporonosis.

Supportive Data

Cerebrospinal fluid (CSF) retrospective specimens (111) were tested in a blinded fashion by the IMMY *Cryptococcus* Antigen Lateral Flow Assay (LFA) and the Meridian Latex Agglutination (Meridian Bioscience Inc) assay within a 24-hour period. Of these 111 specimens, 45 were also tested by the Meridian *Cryptococcus* Antigen EIA also within a 24-hour

period. Samples with discordant results after initial testing were repeated by both assays during the same freeze/thaw cycle. The results are summarized below in Table 1 and Table 2:

Table 1. Comparison of the IMMY LFA to the Meridian latex agglutination assay in CSF

| LFA IMMY | Meridian latex agglutination | | |
|----------|------------------------------|----------|----------|
| | | Positive | Negative |
| Positive | 18 | 0 | 18 |
| Negative | 0 | 93 | 93 |
| Total | 18 | 93 | 111 |

Sensitivity: 100% (18/18); 95% CI: 81.2%-100%

Specificity: 100% (93/93); 95% CI: 96.0%-100%

Overall Percent Agreement: 100% (111/111); 95% CI: 99.0%-100%

Table 2. Comparison of the IMMY LFA to the Meridian *Cryptococcus* antigen EIA in CSF

| LFA IMMY | Meridian EIA | | |
|----------|--------------|----------|----------|
| | | Positive | Negative |
| Positive | 12 | 0 | 12 |
| Negative | 0 | 33 | 33 |
| Total | 12 | 33 | 45 |

Sensitivity: 100% (12/12); 95% CI: 72.2%-100%

Specificity: 100% (33/33); 95% CI: 87.8%-100%

Clinical Reference

- Speed B, Dunt D: Clinical and host differences between infections with the two varieties of *Cryptococcus neoformans*. Clin Infect Dis. 1995;21(1):28-34
- Chen S, Sorrell T, Nimmo G, et al: Epidemiology and host- and variety-dependent characteristics of infection due to *Cryptococcus neoformans* in Australia and New Zealand. Australasian Cryptococcal Study Group. Clin Infect Dis. 2000 Aug;31(2):499-505. doi: 10.1086/313992
- Perfect JR: Cryptococcosis (*Cryptococcus neoformans* and *Cryptococcus gattii*). In: Bennett JE, Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Elsevier; 2020:3146-3161
- Chang CC, Harrison TS, Bicanic TA, et al. Global guideline for the diagnosis and management of cryptococcosis: an initiative of the ECMM and ISHAM in cooperation with the ASM [published correction appears in Lancet Infect Dis. 2024;24(8):e485
- Perfect JR, Bicanic T. Cryptococcosis diagnosis and treatment: What do we know now. Fungal Genet Biol. 2015;78:49-54. doi:10.1016/j.fgb.2014.10.003

Performance

Method Description

The *Cryptococcus* antigen (CrAg) lateral flow assay is a sandwich immunochromatographic assay. Specimens and diluent are added to a test tube and the lateral flow device is added. The test uses specimen wicking to capture gold-conjugated, anticryptococcal antigen monoclonal antibodies and gold-conjugated control antibodies deposited on the test membrane. If cryptococcal antigen is present in the specimen, it binds to the gold-conjugated, anticryptococcal

antigen antibodies. This complex wicks up the membrane and interacts with the test line, which has immobilized anticryptococcal antigen monoclonal antibodies. The antigen-antibody complex forms a sandwich at the test line causing a visible line to form. A valid test shows a visible line at the control line. Positive test results create 2 lines (control and specimen), while negative results form only the control line. (Package insert: CrAg Lateral Flow Assay. IMMY; Rev 06/27/2019)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 35 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

87899-Cryptococcus Ag Screen w/Titer, CSF

87899-Cryptococcus Ag Titer, LFA, CSF (as appropriate)

87102-Fungal Culture, CSF (as appropriate)

LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---------|------------------------------------|--------------------|
| LFACX | Cryptococcus Ag w/Reflex, LFA, CSF | 29896-8 |

| Result ID | Test Result Name | Result LOINC® Value |
|-----------|-------------------------------------|---------------------|
| 62074 | Cryptococcus Ag Screen w/Titer, CSF | 29896-8 |