MAYO CLINIC LABORATORIES

Test Definition: CTBID

Culture Referred for Identification, Mycobacterium and Nocardia, Varies

Overview

Useful For

Rapid identification to the species level for *Mycobacterium* species*, Nocardia* species*,* and other aerobic actinomycete genera and species from pure culture isolates

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
RMALM	Id MALDI-TOF Mass Spec AFB	No, (Bill Only)	No
RTBSP	Id, Mtb Speciation, PCR	No, (Bill Only)	No
TBMP	Mycobacteria Probe Ident	No, (Bill Only)	No
TBPB	Mycobacteria Probe Ident Broth	No, (Bill Only)	No
ISMY	ID by 16S Sequencing	No, (Bill Only)	No
LCTB	Id, MTB complex Rapid PCR	No, (Bill Only)	No

Testing Algorithm

When this test is ordered, the reflex test may be performed at an additional charge. All mycobacteria and *Nocardia* (including aerobic actinomycetes) submitted will be identified and billed as appropriate.

See Culture Referred for Identification *Mycobacterium* and *Nocardia* Algorithm.

Special Instructions

- Culture Referred for Identification Mycobacterium and Nocardia Algorithm
- Infectious Specimen Shipping Guidelines

Highlights

Nucleic acid probes used for identification, when applicable, include those for *Mycobacterium avium*-intracellulare complex, *Mycobacterium gordonae*, and *Mycobacterium tuberculosis* complex.

Matrix-assisted laser desorption ionization time-of-flight mass spectrometry and/or 16S rDNA sequencing is used for identification, when applicable, for slowly and rapidly growing *Mycobacterium* species and aerobic actinomycetes (including *Nocardia* species and *Streptomyces* species).

The *Mycobacterium tuberculosis* complex will be further identified to the species level upon request, using rapid polymerase chain reaction testing.

Method Name

Nucleic Acid Probe/16S rDNA Sequencing/Matrix-Assisted Laser Desorption Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS)/Rapid PCR

NY State Available
Yes

Specimen

Specimen Type
Varies

Shipping Instructions
1. See Infectious Specimen Shipping Guidelines in Special Instructions.
2. Place specimen in a large infectious container (T146) and label as an etiologic agent/infectious substance.

Necessary Information
1. Specimen source is required.
2. Isolate description is required: Gram stain reaction, morphology, tests performed.

Specimen Required
Specimen Type: Organism in pure culture
Supplies: Infectious Container, Large (T146)
Container/Tube: Middlebrook (7H10 or 7H11) or Lowenstein-Jensen medium slant or in broth (eg, Mycobacteria Growth Indicator Tube [7H9] broth)
Specimen Volume:
Visible growth of isolate on solid media
Isolate in broth media: > or =3 mL
A minimum volume of 3 mL is recommended in order to perform all initial testing, this may include: stains, sub-culture media, nucleic acid probes, and any additional testing that may be required to determine the identification. If the broth sample volume is <3 mL, initial testing may be limited, and increased turnaround time is likely.
Collection Instructions: Organism must be in pure culture, actively growing. **Do not submit mixed cultures.**

Forms
If not ordering electronically, complete, print, and send a Microbiology Test Request (T244) with the specimen.

Reject Due To

Agar plate	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Varies	Ambient (preferred)		
	Refrigerated		

Clinical & Interpretive

Clinical Information

There are approximately 200 recognized species of mycobacteria and more than 100 *Nocardia* species. Many of these species are human pathogens and, therefore, identification to the species level is important to help guide patient care. In addition, there are other aerobic actinomycete genera that can be human pathogens including, but not limited to, *Tsukamurella*, *Rhodococcus*, and *Gordonia* species.

Nucleic acid hybridization probes are utilized that identify specific ribosomal RNA sequences of *Mycobacterium tuberculosis* complex, *Mycobacterium avium* complex, and *Mycobacterium gordonae.* Other *Mycobacteria* species, *Nocardia* species and other aerobic actinomycete genera are identified using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) or nucleic acid sequencing of a 500-base pair region of the 16S ribosomal RNA gene.

Reference Values

Not applicable

Interpretation

Organisms growing in pure culture are identified to the species level whenever possible.

Cautions

If the organism is received in mixed culture or contaminated, the report may be delayed or identification may not be possible.

Clinical Reference

1. Martin I, Pfyffer GE, Parrish N: Mycobacterium: General characteristics, laboratory detection and staining procedures. In: Carroll KC, Pfaller MA, Landry ML, et al, eds. Manual of Clinical Microbiology. 12th ed. Vol 1. ASM Press; 2019:558-575

2. Warshauer DM, Salfinger M, Desmond E, Lin SYG: Mycobacterium tuberculosis complex. In: Carroll KC, Pfaller MA, Landry ML, et al, eds. Manual of Clinical Microbiology. 12th ed. Vol 1. ASM Press; 2019:576-594

3. Caulfield AJ, Richter E, Brown-Elliott BA, Wallace RJ Jr, Wengenack NL: Mycobacterium: Laboratory characteristics of slowly growing mycobacteria other than Mycobacterium tuberculosis. In: Carroll KC, Pfaller MA, Landry ML, et al, eds. Manual of Clinical Microbiology. 12th ed. Vol 1. ASM Press; 2019:595-611

4. Brown-Elliott BA, Wallace RJ Jr: Mycobacterium: Clinical and laboratory characteristics of rapidly growing mycobacteria. In: Carroll KC, Pfaller MA, Landry ML, et al, eds. Manual of Clinical Microbiology. 12th ed. Vol 1. ASM Press; 2019:612-629

5. Conville PS, Brown-Elliott BA, Witebsky FG: Nocarida, Rhodococcus, Gordonia, Actinomadura, Streptomyces and other eerobic Actinomycetes. In: Carroll KC, Pfaller MA, Landry ML, et al, eds. Manual of Clinical Microbiology. 12th ed. Vol 1. ASM Press; 2019:525-557

Performance

Method Description

The Gen-Probe AccuProbe system uses an acridinium-labeled, single-stranded DNA probe that is complementary to the ribosomal RNA of the target organism. After the ribosomal RNA is released from the organism, the labeled DNA probe combines with the target organism's ribosomal RNA to form a stable DNA:RNA hybrid. Chemiluminescence is used as an indicator to detect specific hybrids.(Musial CE, Tice LS, Stockman L, Roberts GE: Identification of mycobacteria from culture by using Gen-Probe rapid diagnosis system for *Mycobacterium avium* complex and *Mycobacterium tuberculosis* complex. J Clin Microbiol. 1988 Oct;26(10):2120-2123)

The DNA sequence analysis utilizes a 500 base pair region of the 16S rRNA gene as the target for identification of mycobacteria and is performed using the MicroSeq kit from Applied Biosystems. Sequence data generated is compared to several different databases of known mycobacterial and aerobic actinomycete sequences to obtain organism identification. These include MicroSeq, NCBI GenBank, and Mayo Clinic Mycobacteria database. A 100% or greater agreement with a database strain is needed for an acceptable identification to the species level.(Hall L, Doerr KA, Wohlfiel SL, Roberts GD: Evaluation of the MicroSeq system for identification of mycobacteria by 16S ribosomal DNA sequencing and its integration into a routine clinical mycobacteriology laboratory. J Clin Microbiol. 2003 Apr;41[4]:1447-1453)

Matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) analysis is done using the Bruker BioTyper platform and the Bruker BDAL library, Bruker Mycobacterial Library and the Mayo Clinic Library. A spectral score of > or =2.0 is required for identification to the species level. (Buckwalter SP, Olson SL, Connelly BJ, et al: Evaluation of matrix-assisted laser desorption ionization-time of flight mass spectrometry for identification of Mycobacterium species, Nocardia species, and other aerobic actinomycetes. J Clin Microbiol 2016 Feb;54[2]:376-384)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

60 to 70 days

Specimen Retention Time

2 years

Performing Laboratory Location

Rochester

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

Culture Referred for Identification, *Mycobacterium*
87118-Identification of mycobacteria
87158-Identification of mycobacteria by other methods (if appropriate)
87118 -Id MALDI-TOF Mass Spec AFB (if appropriate)
87153-Mycobacteria Identification by Sequencing (if appropriate)
87150-Mycobacteria Probe Ident, Solid (if appropriate)
87150-Mycobacteria Probe Ident, Broth (if appropriate)
87150-Id, Mtb Speciation, PCR (if appropriate)
87150- Id, MTB complex Rapid PCR (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CTBID	Culture Refer for ID, Mycobacterium	543-9

Result ID	Test Result Name	Result LOINC® Value
CTBID	Culture Refer for ID, Mycobacterium	543-9