MAYO CLINIC LABORATORIES

Test Definition: MMLSG

Antimicrobial Susceptibility, Acid-Fast Bacilli, Slowly Growing, Varies

Overview

Useful For

Determination of resistance of slowly growing mycobacteria to antimicrobial agents

Additional Tests

Test Id	Reporting Name	Available Separately	Always Performed
RSLG	Susceptibility Slow Grower	No, (Bill Only)	Yes

Testing Algorithm

When this test is ordered, susceptibility for slow growers will be performed at an additional charge. Antimicrobials are tested and reported using the Clinical and Laboratory Standards Institute (CLSI) guidelines.(1,2)

Antimicrobials tested for *Mycobacterium avium* complex (MAC): amikacin, clarithromycin, clofazimine, linezolid, and moxifloxacin. Per the CLSI standards set in document M24 for susceptibility testing of *M avium* complex, Minimum inhibitory concentration (MIC) data for ethambutol, rifampin, and rifabutin have shown poor correlation with clinical response.(1,2) Therefore, although these drugs are in the recommended Infectious Diseases Society of America treatment regimen for MAC, breakpoints for these agents that separate susceptible from resistant strains cannot be determined.(3,4) Reporting of MICs for these drugs is not recommended for use in patient care. Synergy testing for nontuberculous mycobacteria has also not been standardized and its value is unclear at this time. For these reasons, ethambutol, rifampin, rifabutin and combinations of these drugs will not be tested or reported. *M avium* complex isolates will not be forwarded to other institutions for susceptibility testing of rifampin, rifabutin, ethambutol or synergy testing since this practice is not recommended by the CLSI nor the IDSA.(5,6) An Infectious Diseases expert with experience in difficult or refractory MAC cases should be consulted since in vitro MIC values are not useful for these drugs.

Antimicrobials tested for all other slowly growing *Mycobacterium* species: amikacin, clarithromycin, clofazimine, ciprofloxacin, doxycycline, linezolid, minocycline, moxifloxacin, rifabutin, rifampin, and trimethoprim /sulfamethoxazole. Interpretive criteria are provided according to the CLSI standards.(1,2)

Clofazimine interpretive criterion is not available.

Special Instructions

- Infectious Specimen Shipping Guidelines

Method Name

Microtiter Broth Dilution

NY State Available

Yes

Specimen

Specimen Type
Varies

Ordering Guidance
For *Mycobacterium tuberculosis* complex, see TB1LN / Antimicrobial Susceptibility, *Mycobacterium tuberculosis* Complex, First Line, Varies and TBPZA / Susceptibility, *Mycobacterium tuberculosis* Complex, Pyrazinamide, Varies.

Additional Testing Requirements
CTB / Mycobacteria and *Nocardia* Culture, Varies or CTBID / Culture Referred for Identification, *Mycobacterium* and *Nocardia*, Varies **must also** be ordered and will be charged separately **unless identification of organism is provided**.

Shipping Instructions
1. For shipping information see Infectious Specimen Shipping Guidelines.
2. Place specimen in a large infectious container and label as an etiologic agent/infectious substance.

Necessary Information
Specimen source and organism identification are required.

Specimen Required
Specimen Type: Organism
Supplies: Infectious Container, Large (T146)
Container/Tube: Middlebrook 7H10 agar slant or other appropriate media
Specimen Volume: Isolate
Collection Instructions: Organism must be in pure culture, actively growing.

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

Specimen Minimum Volume
See Specimen Required

Reject Due To

Agar plate	Reject

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

The slowly growing nontuberculous mycobacteria are associated with a variety of infections including pulmonary, extra-pulmonary, and disseminated disease.

Slowly growing mycobacteria differ from the rapidly growing mycobacteria and *Mycobacterium tuberculosis* complex by their growth rates, metabolic properties, and antimicrobial susceptibility profiles. The antimicrobial susceptibility profile of an organism within this group varies depending on the species and is performed according to the Clinical and Laboratory Standards Institute (CLSI) guideline for slowly growing mycobacteria.(1,2)

The antimicrobials listed below are included on the routine panel. Those marked with an "X" are routinely reported.

Organism	**Antimicrobial agent**							
	Amikacin	**Clarithromycin**	**Clofazimine**	**Ciprofloxacin**	**Doxycycline**	**Linezolid**	**Minocycline**	**M ci**
***Mycobacterium avium* complex**	X	X	X			X		X
Other slowly growing nontuberculous *Mycobacterium* species	X	X	X	X	X	X	X	X

The extremely fastidious slowly growing mycobacteria (*Mycobacterium genavense* and *Mycobacterium haemophilum*) will not be tested. *Mycobacterium malmoense* can be difficult to grow in the test medium so some isolates may not be amenable to testing.

Mycobacterium xenopi requires incubation at a higher temperature and may require extended incubation times.

Mycobacterium gordonae is frequently encountered in the environment and in clinical laboratories but is almost always considered nonpathogenic; therefore, antimicrobial susceptibility testing for *M gordonae* is performed by specific request only.

Reference Values

Interpretive criteria and reporting guidelines are followed using the Clinical Laboratory Standards Institute (CLSI) M24S document.

Interpretation

Results are reported as the minimum inhibitory concentration in micrograms/mL.

Cautions

No significant cautionary statements

Clinical Reference

1. CLSI: Susceptibility Testing of Mycobacteria, Nocardia spp., and Other Aerobic Actinomycetes. 3rd ed. CLSI standard M24. Clinical and Laboratory Standards Institute; 2018
2. CLSI: Performance Standards for Susceptibility Testing of Mycobacteria, Nocardia spp., and Other Aerobic Actinomycetes. CLSI supplement M62. Clinical and Laboratory Standards Institute; 2018
3. Daley CL, Iaccarino JM, Lange C, et al. Treatment of nontuberculous mycobacterial pulmonary disease: an official ATS/ERS/ESCMID/IDSA clinical practice guideline. Eur Respir J. 2020;56(1):2000535. doi:10.1183/13993003.00535-2020
4. Daley CL, Iaccarino JM, Lange C, et al. Treatment of nontuberculous mycobacterial pulmonary disease: An official ATS/ERS/ESCMID/IDSA clinical practice guideline. Clin Infect Dis. 2020;71(4):e1-e36. doi:10.1093/cid/ciaa241
5. Griffith DE, Winthrop KL. You gotta make me see, what does it mean to have an MIC?. Chest. 2021;159(2):462-464. doi:10.1016/j.chest.2020.11.007
6. Schon T, Chryssanthou E. Minimum inhibitory concentration distributions for Mycobacterium avium complex-towards evidence-based susceptibility breakpoints. Int J Infect Dis. 2017;55:122-124. doi:10.1016/j.ijid.2016.12.027

Performance

Method Description

The method employed in this assay is microtiter broth dilution using the commercially available SLOMYCO2 plate from Trek Diagnostics. Antimicrobials included in the assay are tested according to Clinical and Laboratory Standards Institute guidelines.(Clinical and Laboratory Standards Institute (CLSI). *Susceptibility Testing of Mycobacteria,* Nocardia *spp., and Other Aerobic Actinomycetes.* CLSI standard M24. Clinical and Laboratory Standards Institute (CLSI). *Performance Standards for Susceptibility Testing of Mycobacteria,* Nocardia *spp., and Other Aerobic Actinomycetes*. CLSI supplement M24S)

PDF Report

No

Day(s) Performed

Varies

Report Available

12 to 35 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 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

87186

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
MMLSG	Susc, AFB, Slowly Growing	29579-0

Result ID	Test Result Name	Result LOINC® Value
MMLSG	Susc, AFB, Slowly Growing	29579-0