MAYO CLINIC LABORATORIES

Test Definition: MMLSA

Antimicrobial Susceptibility, Anaerobic Bacteria, Minimal Inhibitory Concentration, Varies

Overview

Useful For

Determining the in vitro susceptibility on isolates of anaerobic bacteria involved in human infections

Directing antimicrobial therapy for anaerobic bacterial infections

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
COMM	Identification Commercial Kit	No, (Bill Only)	No
RMALD	Ident by MALDI-TOF mass spec	No, (Bill Only)	No
GID	Bacteria Identification	No, (Bill Only)	No
ISAE	Aerobe Ident by Sequencing	No, (Bill Only)	No
REFID	Additional Identification Procedure	No, (Bill Only)	No
SALS	Serologic Agglut Method 1 Ident	No, (Bill Only)	No
EC	Serologic Agglut Method 2 Ident	No, (Bill Only)	No
SHIG	Serologic Agglut Method 3 Ident	No, (Bill Only)	No
STAP	Identification Staphylococcus	No, (Bill Only)	No
STRP	Identification Streptococcus	No, (Bill Only)	No
SIDC	Ident Serologic Agglut Method 4	No, (Bill Only)	No
ANAID	Anaerobe Ident	No, (Bill Only)	No
RMALA	Id MALDI-TOF Mass Spec Anaerobe	No, (Bill Only)	No
ISAN	Anaerobe Ident by Sequencing	No, (Bill Only)	No
PCRID	Identification by PCR	No, (Bill Only)	No
BLA	Beta Lactamase	No, (Bill Only)	No
SANA	Anaerobe Suscep per agent	No, (Bill Only)	No
ANIDE	Organism Ref for ID,	Yes	No

	Anaerobic Bact		
MECAB	mecA PCR Test, Bill Only	No, (Bill Only)	No

Additional Tests

Test Id	Reporting Name	Available Separately	Always Performed
BATTA	Anaerobe Suscep Battery	No	Yes

Testing Algorithm

When this test is ordered, the reflex tests may be performed at an additional charge. All anaerobic bacterial organisms recovered will automatically have susceptibility testing performed and billed as appropriate. Antimicrobial agents appropriate to the organism and specimen source will be tested according to Mayo Clinic's practice and the laboratory's standard operating procedures.

For a listing of the antimicrobials routinely tested in this laboratory as well as antimicrobials that may be tested upon request, see Anaerobic Bacteria Antimicrobials. If the organism or antimicrobial agent of interest is not listed in this table, call 800-533-1710 and ask to speak to the Bacteriology Anaerobe Laboratory.

If organism identification is not provided within 72 hours of specimen receipt, referred anaerobic bacteria identification will be performed at an additional charge.

Special Instructions

- Infectious Specimen Shipping Guidelines
- Anaerobic Bacteria Antimicrobials

Method Name

Minimal Inhibitory Concentration (MIC) by Agar Dilution

NY State Available

Yes

Specimen

Specimen Type

Varies

Shipping Instructions

For shipping information, see Infectious Specimen Shipping Guidelines.

Place specimen in a large infectious container and label as an etiologic agent/infectious substance, if appropriate.

Necessary Information

Organism identification and specimen source are required.

Specimen Required

Specimen Type: Organism in pure culture

Supplies:

-Anaerobic Transport Tube (T588)

-Infectious Container, Large (T146)

Container/Tube:

Preferred: Anaerobic transport tube

Acceptable: Thioglycollate broth or any other suitable anaerobic transport system. **Agar plates are NOT acceptable.**

Collection Instructions:

1. Perform isolation of infection bacteria.
2. Organism must be in pure culture and actively growing. **Do not submit mixed cultures.**
3. Place specimen in a large infectious container and label as an etiologic agent/infectious substance if appropriate.

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

Anaerobic bacteria are the greatest component of the human body's normal bacterial flora. Anaerobic bacteria colonize the skin, oral cavity, and genitourinary and lower gastrointestinal tracts and generally do not cause infection. Their presence is important for vitamin and other nutrient absorption and in preventing infection with disease-causing bacteria.

When usual skin and mucosal barriers are compromised, in an anaerobic environment, these bacteria can behave as

pathogens. Typical anaerobic infections include periodontitis, abdominal or pelvic abscesses, endometritis, pelvic inflammatory disease, aspiration pneumonia, empyema and lung abscesses, sinusitis, brain abscesses, gas gangrene, and other soft tissue infections.

Anaerobic bacteria grow aggressively in the body under anaerobic conditions and may possess a variety of virulence factors, including capsules and extracellular enzymes. They also can develop resistance to antimicrobials by producing beta-lactamase and other modifying enzymes, and by alterations in membrane permeability and structure of penicillin-binding proteins. Susceptibility testing results are useful to clinicians because anaerobic bacteria are a significant cause of human infection, and they are often resistant to commonly used antimicrobials. *Bacteroides* and *Parabacteroides* species produce beta-lactamases. Ertapenem, metronidazole, and clindamycin are generally effective agents, although resistance to clindamycin, and occasionally ertapenem, is increasing.

The minimal inhibitory concentration (MIC) obtained during antimicrobial susceptibility testing is helpful in indicating the concentration of antimicrobial agent required at the site of infection necessary to inhibit the infecting organism. For each organism-antimicrobial agent combination, the Clinical and Laboratory Standards Institute and/or the European Committee on Antimicrobial Susceptibility Testing provides interpretive criteria for determining whether the MIC should be interpreted as susceptible, susceptible dose dependent, intermediate, nonsusceptible, resistant, or epidemiological cutoff value.

Reference Values

Susceptibility results are reported as minimal inhibitory concentration (MIC) in mcg/mL. Breakpoints (also known as clinical breakpoints) are used to categorize an organism as susceptible, susceptible-dose dependent, intermediate, resistant, or nonsusceptible according to breakpoint setting organizations such as the Clinical and Laboratory Standards Institute (CLSI), the European Committee on Antimicrobial Susceptibility Testing (EUCAST), or the US Food and Drug Administration (FDA). Breakpoints are updated annually to reflect those published in the most current edition.

Breakpoints published by CLSI are used for routine susceptibility results. For those antimicrobials which do not have CLSI breakpoints, FDA breakpoints are used.

The CLSI breakpoint for clarithromycin and EUCAST breakpoints for antimicrobials other than clarithromycin are utilized for *Helicobacter pylori*.

In some instances, an interpretive category cannot be provided based on available data; therefore, the following comment will be included on the report: There are no established interpretive guidelines for agents reported without interpretations.

For information regarding CLSI and EUCAST susceptibility interpretations, see Susceptibility Interpretative Category Definitions.

Interpretation

In vitro susceptibility does not guarantee clinical response. Therefore, the decision to treat with a particular agent should not be based solely on the antimicrobial susceptibility testing result.

Refrigeration may result in decreased viability of anaerobic organisms.

Cautions

In vitro susceptibility does not guarantee clinical response. Therefore, the decision to treat with a particular agent should not be based solely on the antimicrobial susceptibility testing result.

Clinical Reference

1. Rosenblatt JE, Brook I. Clinical relevance of susceptibility testing of anaerobic bacteria. Clin Infect Dis. 1993;16(Suppl 4):S446-S448
2. Jenkins SG, Schuetz AN. Current concepts in laboratory testing to guide antimicrobial therapy. Mayo Clin Proc. 2012;87(3):290-308
3. Schuetz AN, Carpenter DE. Susceptibility test methods: anaerobic bacteria. In: Carroll KC, Pfaller MA, eds. Manual of Clinical Microbiology. 12th ed. ASM Press; 2019:1377-1397
4. Jenkins SG, Schuetz AN. Current concepts in laboratory testing to guide antimicrobial therapy. Mayo Clin Proc. 2012;87(3):290-308

Performance

Method Description

An agar dilution method is used for routine testing. The antimicrobial is added to agar in various concentrations depending upon levels attainable in serum. A standardized suspension of the organism is applied to the agar plates, which are incubated anaerobically for 42 to 48 hours at 35 to 37 degrees C. The end point is that in which a marked reduction occurs in the appearance of growth on the test plate as compared to that of growth on the control plate. Examples of marked change include a change from confluent growth to a haze, less than 10 tiny colonies, or 1 to 3 normal-sized colonies.(Clinical and Laboratory Standards Institute [CLSI]: Methods for Antimicrobial Susceptibility Testing of Anaerobic Bacteria. 9th ed. CLSI standard M11. CLSI; 2018)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

8 to 14 days

Specimen Retention Time

30 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 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

87186-Antimicrobial Susceptibility, Anaerobic Bacteria, MIC
87076-Organism Ref for ID, Anaerobic Bact (if appropriate)
87076-Anaerobe Ident (if appropriate)
87076-Id MALDI-TOF Mass Spec Anaerobe (if appropriate)
87153-Anaerobe ident by sequencing (if appropriate)
87150-Identification by PCR (if appropriate)
87185-Beta Lactamase (if appropriate)
87181-Anaerobe Susceptibility per Agent (if appropriate)
87150-mecA PCR (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
MMLSA	Susceptibility, Anaerobic, MIC	50545-3

Result ID	Test Result Name	Result LOINC® Value
MMLSA	Susceptibility, Anaerobic, MIC	50545-3