TEST

# Mycobacterial culture

A mycobacterial culture grows tuberculosis and related bacteria from a body sample

**WHAT IT MEASURES**
Growth of living tuberculosis or related mycobacteria

**SAMPLE**
Sputum, other body fluids, tissue, or blood

**FASTING NEEDED?**
No, unless required for the sample collection procedure

**HOW LONG IT TAKES**
About 10-20 minutes for sputum collection

**RESULTS IN**
Days for positives; final negatives often 6-8 weeks, laboratory-specific

**USED FOR**
Diagnosis, species identification, and drug susceptibility testing

**MAIN LIMITATION**
Slow growth and poor samples can cause missed infections

## Overview

A mycobacterial culture looks for living mycobacteria in a sample from your body. Mycobacteria are a group of slow-growing bacteria that includes the Mycobacterium tuberculosis complex, which causes tuberculosis (TB), and nontuberculous mycobacteria, often called NTM.

Sputum-the mucus coughed up from deep in the lungs-is the most common sample. Depending on where an infection is suspected, the laboratory may instead test urine, blood, tissue, or fluid from around the lungs, joints, brain, or other organs.

Culture is different from an acid-fast bacillus, or AFB, smear. A smear looks under a microscope for bacteria with certain staining features. Culture tries to grow living bacteria, so it can find smaller amounts and may allow the laboratory to identify the species and test which medicines are likely to work.

Because these bacteria grow slowly, final results can take several weeks.

## Why the test is ordered

The test is mainly used to investigate possible active TB or an infection caused by NTM. It may be ordered after symptoms, imaging, examination findings, or another laboratory test raises concern about one of these infections.

Culture can help:

A mycobacterial culture is not the usual test for latent TB infection. Latent TB means TB bacteria may be present in the body without evidence of active disease. Blood tests and tuberculin skin tests are used for that purpose, although neither can confirm active TB by itself.

- Confirm whether living mycobacteria are present
- Separate TB bacteria from NTM
- Identify the specific mycobacterial species
- Test whether TB bacteria are resistant to certain medicines
- Check whether treatment is reducing bacteria in sputum

## Who should have the test

You may be offered this test if active TB or an NTM infection is being considered. Reasons can include a cough that does not settle, unexplained changes on a chest X-ray or scan, coughing up blood, fever, night sweats, or weight loss. These findings have many possible causes and do not by themselves mean you have a mycobacterial infection.

Testing may also be appropriate when an infection is suspected outside the lungs, when previous tests are unclear, or when treatment response or drug resistance needs to be assessed.

Several sputum samples are often requested because the number of bacteria can vary from one sample to another. Follow the collection schedule provided by your testing service.

## How to prepare

For an ordinary sputum culture, fasting is usually unnecessary. You can normally drink water and take your usual medicines unless you receive different instructions.

The laboratory or clinic may prefer an early-morning sample because mucus has collected overnight. Rinsing your mouth with plain water can remove food particles. Avoid putting

antiseptic mouthwash into the sample.

Tell the healthcare team if you are taking antibiotics like amoxicillin or doxycycline now or have recently taken them. Medicines that act against mycobacteria can reduce the number of living bacteria and make culture less likely to detect them. Do not stop prescribed medicine unless the prescriber tells you to.

If the sample will be collected during bronchoscopy, biopsy, or another procedure, you may need to fast or adjust medicines beforehand. Follow the instructions for that procedure.

## What happens during the test

For a sputum sample, you will take deep breaths and cough mucus up from your lungs into a sterile container. Sputum is usually thick or sticky and is not the same as saliva. Collection may take place in a well-ventilated area or a special room to protect other people if TB is possible.

If you cannot produce sputum, a salty mist may be used to help you cough. This is called induced sputum. Sometimes bronchoscopy is needed. During bronchoscopy, a thin flexible camera is passed through the nose or mouth into the airways so fluid or mucus can be collected.

Samples from other parts of the body may require a urine collection, blood draw, lumbar puncture, fluid drainage, or biopsy. The experience and preparation depend on the procedure.

In the laboratory, the sample is processed and placed into liquid culture, solid culture, or both. Staff monitor it for growth. Any mycobacteria found may undergo identification and drug susceptibility testing.

## Understanding your results

A positive culture means mycobacteria grew from the sample. The full report should state whether they belong to the M. tuberculosis complex or are a type of NTM.

Growth of M. tuberculosis complex usually supports a diagnosis of active TB when it matches the sample and clinical findings. Drug susceptibility results may follow later.

An NTM result needs careful interpretation. These bacteria occur naturally in water and soil and can sometimes enter a sample without causing disease. For lung disease, repeated positive cultures and supporting symptoms or scans may be needed before the finding is considered significant.

A negative culture means no mycobacteria grew during the laboratory's incubation period. It

makes infection less likely but does not completely exclude it. Low bacterial numbers, prior antibiotics, or a sample that did not come from the affected area can lead to a negative result.

A result reported as contaminated , overgrown , or unsuitable may mean another sample is needed.

Reference methods and reporting language vary by laboratory, age, sex, pregnancy status, medicines, and clinical context. For this test, the sample site, treatment history, and reason for testing are usually more important than age or sex.

## What affects the results

Several factors can change the result even when the laboratory has performed the test correctly:

A recent blood transfusion does not usually affect sputum culture. Pregnancy, age, food, coffee, exercise, and time of day do not directly alter bacterial growth, although early-morning sputum may be easier to produce and sometimes contains more organisms.

Tell the testing team about previous TB or NTM treatment and recent bladder treatment with BCG, a weakened form of M. bovis , because these can affect interpretation.

- Sample quality: Saliva may contain too little material from the lungs
- Sample site: A sample from the wrong body area may miss the infection
- Low or intermittent bacterial release: One sample may be negative while another is positive
- Antibiotics: Current or recent treatment can stop bacteria growing in culture
- Transport problems: Long delays, leakage, or incorrect storage can reduce sample quality
- Other microorganisms: Faster-growing bacteria or fungi can overgrow the culture
- Environmental contamination: Water or equipment can introduce NTM into a sample
- Laboratory processing: Chemicals used to control contamination can also kill some mycobacteria

## Accuracy and limitations

Culture can detect fewer bacteria than an AFB smear and is often treated as the main laboratory method for confirming TB. However, it is not perfect.

It may miss an infection when very few bacteria are present, the sample is poor, antibiotics

were started before collection, or the affected area was not sampled. Collecting more than one good-quality sputum specimen can improve the chance of finding bacteria.

A culture can occasionally suggest infection when there is none. This can happen through laboratory cross-contamination or when environmental NTM enter a respiratory sample but are not causing disease.

Culture is also slow. A molecular test, often called a nucleic acid amplification test or NAAT, is usually better when a rapid answer about TB is needed. Molecular tests detect bacterial genetic material and may provide results within hours, but culture remains important for detecting some cases and completing drug susceptibility testing.

No single result should be interpreted alone. Smear microscopy, molecular testing, imaging, symptoms, examination findings, and sometimes tissue microscopy may all contribute.

## Risks and complications

Coughing up sputum has no major procedural risk, although repeated forceful coughing can be uncomfortable or briefly make you light-headed.

Risks from induced sputum, bronchoscopy, fluid drainage, or biopsy come from the collection procedure rather than the culture itself. Before one of these procedures, you should receive specific information about common risks, pain control, and recovery.

## What happens next

If the culture is negative and concern is low, no further mycobacterial testing may be needed. If concern remains, another sample, molecular test, scan, bronchoscopy, or biopsy may be considered.

A positive TB culture usually leads to prompt contact from the clinical and public health teams. Identification and drug susceptibility results help guide treatment and decisions about infection precautions. An NTM result may require repeat cultures and comparison with symptoms and scans before treatment is considered.

While waiting, seek routine advice if symptoms continue or worsen. Seek urgent medical care for increasing breathlessness or repeated coughing of blood. Call emergency services for severe difficulty breathing, a large amount of coughed-up blood, fainting, or new confusion.

## Common questions

Can I drink coffee before the test?

Usually yes for a sputum sample. If you are having sedation, bronchoscopy, or a biopsy, follow the fasting instructions for that procedure.

Does the time of day matter?

Early-morning sputum is often preferred because secretions collect overnight. Use the timing given by your clinic or laboratory.

Can I exercise beforehand?

Exercise does not directly affect culture results. Avoid strenuous activity if it worsens coughing, breathlessness, or makes sample collection difficult.

Why do I need more than one sputum sample?

Mycobacteria may not be released into sputum continuously. Several properly collected samples reduce the chance of missing a low-level infection.

Am I contagious while waiting for results?

The test cannot answer this immediately. Your risk depends on the suspected organism, symptoms, imaging, smear or molecular results, and whether treatment has started. Follow any masking or isolation instructions you have been given.

Should I stop antibiotics before collecting the sample?

Do not stop prescribed medicine on your own. Tell the testing team what you take and when you started it, because some antibiotics can reduce culture growth.

## Sources

- Centers for Disease Control and Prevention. Clinical and Laboratory Diagnosis for Tuberculosis
- Centers for Disease Control and Prevention. Core Curriculum on Tuberculosis: What the Clinician Should Know, seventh edition
- Lewinsohn DM, Leonard MK, LoBue PA, et al. Official ATS/IDSA/CDC Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clinical Infectious Diseases . 2017;64(2):e1-e33



- Daley CL, Iaccarino JM, Lange C, et al. Treatment of Nontuberculous Mycobacterial Pulmonary Disease: An ATS/ERS/ESCMID/IDSA Clinical Practice Guideline. Clinical Infectious Diseases . 2020;71(4):e1-e36
- World Health Organization. WHO consolidated guidelines on tuberculosis, Module 3: Diagnosis-Rapid diagnostics for tuberculosis detection, 2021 update