TEST

Sputum culture

A sputum culture grows germs from lung mucus to help identify an infection

WHAT IT MEASURES
Germs growing from mucus coughed up from the lungs

SAMPLE
Sputum, the mucus coughed up from your lungs

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually 10 to 20 minutes to collect

RESULTS IN
Usually 2-3 days; weeks for some germs, laboratory-specific

USED FOR
Diagnosing infection and helping choose treatment

MAIN LIMITATION
Saliva contamination can hide or mimic lower-airway germs

Overview

A sputum culture is a laboratory test of mucus coughed up from your lungs. This mucus is called sputum or phlegm. It is different from saliva, which is made in your mouth.

The laboratory places the sample in conditions that allow certain germs to grow. Staff can then identify bacteria or fungi that may be causing an infection. They may also test which antibiotics like amoxicillin or doxycycline are likely to work against bacteria that grow.

A routine sputum culture does not test well for every cause of a chest infection. Viruses, tuberculosis bacteria and some other germs need separate or additional tests.

Why the test is ordered

A sputum culture may help explain symptoms such as a cough producing phlegm, fever or worsening breathlessness. It may be ordered when a bacterial or fungal lung infection is possible.

The result can be particularly useful when:

Not everyone with a cough or suspected pneumonia needs a sputum culture. Your symptoms, medical history, examination and other test results help determine whether it is likely to be useful.

- An infection is severe, persistent or returning
- Initial treatment has not worked as expected
- You have bronchiectasis, cystic fibrosis or another long-term lung condition
- Your immune system is weakened
- The choice of antibiotic needs to be guided by laboratory testing

Who should have the test

A healthcare professional may recommend this test if you are coughing up sputum and identifying a germ could affect your care.

People with long-term lung conditions sometimes have sputum cultures during a flare-up or as part of planned monitoring. In these conditions, bacteria can sometimes live in the airways without causing a new infection. The result must therefore be compared with your usual symptoms and previous cultures.

If tuberculosis is possible, the laboratory needs to know because it uses special handling, staining, molecular tests and longer culture methods. A routine bacterial culture cannot rule out tuberculosis.

How to prepare

Fasting is not usually needed. However, an early-morning sample collected before eating or drinking is often preferred because mucus may collect overnight.

Follow the instructions supplied with your container. You may be asked to rinse your mouth with plain water first. Avoid antiseptic mouthwash unless the collection instructions say otherwise, because it could reduce the number of germs in the sample.

Drink enough water in the hours before collection unless you have been told to limit fluids. This may make thick sputum easier to cough up.

Tell the healthcare team about antibiotics or antifungal medicines you are taking or recently finished. These medicines can prevent germs from growing. Do not delay or stop prescribed treatment unless the professional responsible for your care tells you to do so.

What happens during the test

You will receive a sterile container. After taking several deep breaths, you cough deeply from your chest and spit the sputum into the container. The sample should be thick mucus rather than clear saliva.

You may need to try more than once. Close the container without touching its inside and follow the instructions for labelling, storage and delivery.

If you cannot produce sputum, a clinic may use a salty mist to help you cough. This is called sputum induction. In selected situations, a sample may instead be collected during bronchoscopy, when a thin flexible camera is passed into the airways. Bronchoscopy is a separate procedure with its own preparation and risks.

Understanding your results

Results usually describe whether potentially important germs grew and, if so, which ones. Common report terms include:

A positive culture does not always prove that the germ is causing your symptoms. Some organisms can live in damaged or chronically inflamed airways without causing a new infection. This is called colonisation.

A negative result does not completely exclude an infection. The sample may not contain enough of the germ, antibiotics may have reduced its growth, or the cause may require a different test.

There is no universal "normal range" for sputum culture. Interpretation varies with laboratory methods, age, sex, pregnancy status, medicines and clinical context. For this test, sample quality, recent antibiotics and underlying lung conditions are especially important.

- No growth: No germs covered by that culture grew
- Normal respiratory flora: Mostly germs commonly found in the mouth and upper airway grew
- Mixed growth: Several organisms grew, sometimes because saliva entered the sample
- Positive culture: A particular bacterium or fungus grew
- Susceptibility results: Laboratory findings showing which medicines may work against the organism

What affects the results

Several factors can change the result even when the laboratory has processed the sample correctly:

Recent exercise usually does not change which organisms grow, although it can loosen mucus. A recent blood transfusion does not usually affect sputum culture. Pregnancy and kidney function may affect treatment decisions, but they do not normally alter the culture itself.

- Saliva contamination: Mouth bacteria can overgrow or hide germs from the lungs
- Recent antibiotics or antifungals like fluconazole or terbinafine : Treatment can stop organisms from growing
- Collection timing: A first-morning sample may contain more sputum
- Small or shallow samples: Saliva from the mouth may not represent the lower airways
- Delayed delivery: Some organisms may die while others multiply
- Storage conditions: Heat or prolonged room-temperature storage may alter growth
- Long-term airway colonisation: A germ may grow without causing the current symptoms

Accuracy and limitations

The accuracy of a sputum culture depends heavily on collecting mucus from deep in the lungs. A good-quality sample is more likely to find a bacterial or fungal cause when one is present. A saliva-heavy sample is more likely to miss it or produce a misleading result.

Culture can miss an infection if there are too few organisms, treatment has already started or the germ does not grow under routine laboratory conditions. Viruses do not appear on a standard bacterial culture. Tuberculosis bacteria, some fungi and certain slow-growing organisms need special cultures that may take weeks.

The test can also suggest infection when the organism is only colonising the airways or came from the mouth. Symptoms, imaging, blood tests and the quality of the sample help clarify what a positive result means.

Molecular tests, such as PCR, may be faster or better for germs that are difficult to grow. A sample collected during bronchoscopy may be more useful when an ordinary sputum sample cannot answer the question.

Risks and complications

Producing a sputum sample is low risk. Deep coughing may briefly cause throat irritation, chest discomfort, light-headedness or breathlessness.

Sputum induction can cause coughing or wheezing, particularly if you have sensitive airways. It is usually performed where staff can monitor you. Bronchoscopy has additional risks that should be explained separately before the procedure.

What happens next

Your result is considered alongside your symptoms, examination and any chest imaging. A named organism and its susceptibility results may help guide antibiotic or antifungal treatment. A mixed or poor-quality sample may need to be repeated.

Routine follow-up is appropriate if you are waiting for results, your symptoms remain stable, or you have questions about whether a repeat or special culture is needed. Do not stop or change prescribed medicine based only on the wording of a laboratory report.

Seek urgent medical advice for worsening breathlessness, persistent high fever, dehydration or blood in your sputum. Seek emergency help for severe difficulty breathing, blue or grey lips, new confusion, severe chest pain, collapse, or coughing up a large amount of blood.

Common questions

Can I drink coffee before a sputum culture?

Fasting is usually unnecessary. If you were asked for a first-morning sample before food or drink, collect it before coffee. Otherwise, follow the instructions from your laboratory and rinse your mouth with plain water.

Does the time of day matter?

An early-morning sample is often preferred because mucus collects overnight. A sample taken later can still be useful, especially if you are producing sputum at that time.

Can I exercise beforehand?

Exercise does not usually change the culture result. Gentle activity may loosen mucus, but avoid activity that leaves you too breathless to collect the sample safely.

Should I brush my teeth first?

Instructions differ between laboratories. Rinsing with plain water is commonly advised. Avoid antiseptic mouthwash, and follow any directions about toothpaste.

What if I can only produce saliva?

Tell the healthcare team or laboratory. Saliva is less useful because it mainly contains organisms from the mouth. You may be asked to try again or have sputum induced.

Can I collect the sample after starting antibiotics?

Yes, if that is when you were asked to collect it, but antibiotics can make a culture negative. Do not postpone prescribed treatment just to obtain a sample unless specifically instructed.

Sources

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