TEST

Blood smear

A blood smear examines the size, shape, and appearance of blood cells under a microscope.

WHAT IT MEASURES
Size, shape, number, and appearance of blood cells

SAMPLE
Blood

FASTING NEEDED?
No

HOW LONG IT TAKES
Blood draw usually under five minutes

RESULTS IN
Usually same day to several days; varies by laboratory

USED FOR
Diagnosis and monitoring

MAIN LIMITATION
Interpretation is observer-dependent and findings are often nonspecific

Overview

A blood smear, also called a peripheral blood smear or blood film, examines blood cells under a microscope.

A laboratory professional spreads a drop of blood in a thin layer on a glass slide and stains it so red blood cells, white blood cells, and platelets are easier to see.

The test provides details that an automated complete blood count (CBC) may not show. A CBC measures blood cell numbers and related values, while a smear shows the cells' size, shape, colour, maturity, and arrangement.

Most smears are thin blood films. For parasites such as malaria, the laboratory may prepare both thin and thick films because they provide different information.

Why the test is ordered

A blood smear is usually ordered when symptoms, medical history, or another blood test

suggests that blood cells need closer examination. It is not generally a stand-alone screening test.

Common reasons include:

Some laboratories automatically review a smear when an analyser flags unusual cells or results. In other cases, a clinician must request it.

- Investigating an abnormal CBC
- Assessing possible anaemia
- Checking unusually high or low white blood cell or platelet counts
- Looking for abnormal red blood cell breakdown
- Assessing possible blood or bone marrow disorders
- Looking for blood parasites after relevant symptoms or travel
- Monitoring conditions or treatments that affect blood cells

Who should have the test

You may have a blood smear if your CBC is abnormal or does not explain symptoms such as unexplained tiredness, paleness, repeated infections, unusual bruising, or bleeding. These symptoms have many possible causes and do not necessarily mean that a blood disorder is present.

A smear may also be useful if your clinician suspects a blood parasite, abnormal blood cell production, or increased destruction of red blood cells. People receiving chemotherapy or other treatments that affect bone marrow may have smears for monitoring.

Whether the test is appropriate depends on your history, examination, other laboratory results, and the condition being investigated.

How to prepare

A blood smear does not usually require fasting. You can normally eat and drink as usual.

Tell the person arranging the test about prescription medicines, over-the-counter products, and supplements. Continue your medicines unless you have been told otherwise. Some can affect blood cell counts or appearance.

Also mention pregnancy, a recent transfusion or infection, strenuous exercise, or treatments such as chemotherapy. If other tests are being collected at the same appointment, follow any

fasting or timing instructions for those tests.

Drinking water beforehand can make the blood draw easier.

What happens during the test

Blood is usually taken from a vein in your arm. A band is placed around your upper arm, the skin is cleaned, and a small needle is inserted. Blood is collected into a tube containing a substance that prevents clotting.

The blood draw generally takes less than five minutes. A finger-prick sample may sometimes be used, including for certain parasite tests or in young children.

In the laboratory, a drop of blood is spread on a slide, dried, fixed, and stained. A trained professional examines it with a microscope or validated digital imaging system. Abnormal or uncertain findings may be reviewed by a blood specialist.

Understanding your results

A report may say the blood cells have normal morphology, meaning their appearance is as expected. If changes are present, it may describe which cells are affected and how marked they are.

Red blood cell findings may include:

These patterns can have several causes and rarely confirm one condition by themselves.

White blood cells are assessed for type, maturity, and appearance. Reactive cells may occur with infection or inflammation. Very immature cells, sometimes called blasts, may require prompt investigation, but a smear alone does not establish their cause.

Platelets are checked for size, appearance, and clumping. Clumps can make an automated platelet count appear falsely low.

Findings and CBC reference ranges vary by laboratory, age, sex, pregnancy status, medicines, and clinical context. Results should be interpreted with the CBC and other relevant tests.

- Microcytes or macrocytes: cells smaller or larger than expected
- Anisocytosis: differences in cell size
- Poikilocytosis: variation in cell shape
- Hypochromia: paler cells containing less haemoglobin

- Schistocytes: red blood cell fragments
- Target cells or spherocytes: cells with particular shapes

What affects the results

Timing and sample handling matter. Delayed slide preparation can cause cells to swell, shrink, break down, or develop shapes that were not present in the bloodstream.

Factors that may affect findings include:

Some cause genuine temporary blood changes rather than laboratory errors. The smear may suggest a pattern, but further tests are often needed to identify its cause.

- A difficult blood draw, partly clotted sample, or underfilled tube
- Platelet clumping
- A smear that is too thick, thin, or uneven
- Delayed preparation or poor staining
- A recent transfusion, which mixes donor and recipient cells
- Pregnancy, age, dehydration, smoking, altitude, or intense exercise
- Recent infection, inflammation, bleeding, or surgery
- Medicines that affect blood cell production or survival
- Chemotherapy, radiation treatment, or blood cell growth medicines
- Kidney, liver, or thyroid conditions and nutritional deficiencies

Accuracy and limitations

A well-prepared smear can show cell features that an automated analyser may miss. It can also reveal platelet clumps or unusual cells that explain an unexpected CBC result.

However, only a small blood sample is examined. Rare abnormal cells or low parasite numbers may be missed. If malaria remains a serious possibility after a negative smear, additional samples or another validated parasite test may be needed.

Interpretation involves professional judgement, and reviewers may describe subtle changes differently. Poor collection, delayed preparation, or staining artefacts can also make normal cells appear abnormal.

Automated analysers provide more precise cell counts. Other tests may be needed, such as

flow cytometry, genetic testing, or a bone marrow test. Because many findings occur in several conditions, a smear usually narrows the possibilities rather than providing a final diagnosis.

Risks and complications

The risks are those of a routine blood draw. You may have brief discomfort, a small bruise, or feel light-headed. Applying pressure usually stops minor bleeding.

What happens next

A normal smear may complete the investigation if the CBC and your clinical situation are also reassuring. An abnormal result may lead to comparison with earlier tests, another CBC, iron or vitamin studies, tests for red blood cell breakdown, infection testing, or specialist review.

Mild or expected changes can usually be discussed at a routine follow-up. A laboratory may contact the requesting clinician quickly about potentially important findings, such as certain very immature cells, parasites, or marked cell fragmentation.

Seek urgent medical help for chest pain, severe trouble breathing, fainting, confusion, or bleeding that will not stop. These symptoms require assessment regardless of the smear result. Otherwise, follow the advice given for discussing your report.

Common questions

Can I drink coffee before a blood smear?

Usually, yes. Avoid it if you were told to fast for other blood tests being collected at the same time.

Does the time of day matter?

There is usually no required time. Repeat tests may be scheduled at a similar time because some blood cell counts vary slightly through the day.

Can I exercise beforehand?

Light activity is generally fine. Intense exercise can temporarily change some blood cell counts, so mention recent strenuous activity.

How long will I wait for the result?

Results may be available the same day, but manual or specialist review can take several days.

Does an abnormal smear mean I have a blood cancer?

No. Infections, nutritional deficiencies, medicines, transfusion, inflammation, and sample artefacts can cause abnormal findings. Further testing may be needed.

Is a blood smear the same as a CBC?

No. A CBC mainly measures blood cell values, while a smear examines what the cells look like. The tests provide complementary information.

Sources

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