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Blood Testing

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What Is Blood?

Blood is a fluid that circulates within the body. Blood transports oxygen and nutrients to tissues and carries away waste products for elimination. While circulating, blood also helps to regulate the body's temperature, transport immune cells to fight infections, and carry hormones that enable the function of many cells and organs.

Blood, also called whole blood, is made up of both liquids and solids. There are four main components of blood: plasma, red blood cells, white blood cells, and platelets.

Plasma is a liquid composed of water, salts, sugar, fat, and protein. Accounting for more than half of blood's volume, plasma helps to move substances in the body.

Red blood cells are the most abundant blood cells. These donut-shaped cells contain hemoglobin, which contains iron and is responsible for exchanging oxygen and carbon dioxide between the lungs and the rest of the body. Red blood cells usually make up around 40-45% of blood's volume. The percentage of whole blood that is composed of RBCs is called hematocrit.

White blood cells (WBCs) are a part of the immune system. The different types of WBCs are able to quickly gather to defend the body from infection. These important cells only account for about 1% of the blood's volume.

Platelets are fragments of cells that support blood clotting. When there is an injury in the body, platelets gather at the site and clump together to create a scaffolding on which blood can coagulate to prevent or stop bleeding.

Another term used for a liquid portion of blood is serum. Serum is the liquid that remains after removing blood cells and clotting proteins from a blood sample.

Blood moves through the body through the cardiovascular system, also known as the circulatory system, which is made up of the heart and blood vessels. Blood vessels are grouped based on their structure and function and include:

- **Arteries** that carry blood and oxygen away from the heart
- **Veins** that carry blood back to the heart after the oxygen has been removed.
- **Capillaries** that connect the arteries to the veins and exchange oxygen, carbon dioxide, and other substances between blood and tissue

What Is Blood Testing?

Blood tests examine and measure different components of the blood. Blood testing is one of the most common methods of medical testing, used to provide important information about countless aspects of health.

Your doctor may order a blood test as part of a regular checkup, to look for diseases or health conditions, to assess the function of your organs, or to evaluate how well a medical treatment is working.

Broadly, the roles of blood testing in patient care include screening, diagnosis, and monitoring.

Screening tests are ordered to check for medical conditions in people without symptoms. A goal of screening tests is to find medical problems early when treatment may be more effective. Blood tests are used to screen for a wide variety of medical conditions including certain types of cancer, high cholesterol, diabetes, and sexually transmitted diseases (STDs).

Diagnostic tests are used to detect or rule out a specific medical condition. When making a diagnosis, blood tests are often considered alongside other factors like your medical history, vital signs, and the results of a physical exam and imaging tests.

Monitoring tests can be used to check a person's health over time and assess whether medical treatment is working. Periodic monitoring tests may be used to keep track of chronic diseases like diabetes or heart disease or to regularly assess the amount of a specific medicine in your body.

How Often Do I Need a Blood Test?

Your need for blood testing depends on your specific circumstances. Some common situations in which your doctor may recommend blood testing include:

- **Regular checkups:** As part of a checkup, blood testing may be used to understand how well your organs are working and to screen for health issues like high cholesterol and diabetes. The types of blood tests that may be ordered and the frequency of testing vary based on factors such as your age, sex, and health history. Talk to your doctor about how often you should have regular checkups that include blood testing.
- **Finding the cause of symptoms:** Diagnostic blood testing may be used if you have changes in your health or experience symptoms of a health condition. Blood tests may confirm or rule out a diagnosis and are often used in combination with other types of tests. Blood tests may also help your doctor determine the appropriate treatment for your health condition.
- **Follow-up testing:** If you have a health condition that needs to be monitored over time, your doctor may order periodic blood testing. Testing regularly may help monitor the progression of your condition or check whether treatments are working.

Getting a Blood Test

To obtain a sample of blood for testing, a medical professional can access a vein, artery, or capillary. The main procedures for collecting blood samples include:

- **Venipuncture:** Also called phlebotomy or a blood draw, venipuncture is the collection of blood from a vein. Blood is typically taken from a vein on the inside of your elbow or the back of your hand. This common method of collecting a blood sample is used for many blood tests.
- **Arterial blood sampling:** Also called an arterial stick, blood can be drawn from an artery in your wrist, on the inside of your elbow, in your groin, or from another site. Arterial blood samples are most often used to measure blood gases like oxygen and carbon dioxide.
- **Capillary sampling:** A capillary blood sample is collected by piercing the skin with a small needle. This method of collecting blood may be chosen because samples are easy to obtain, allowing testing to be performed with little training. Capillary samples can be collected from many places on the body, including the fingers and heels. Most rapid blood tests and at-home blood tests involve capillary samples taken with a fingerstick.

The way in which blood is collected for testing depends on the needs of the specific blood test. Talk to your doctor for more information about the process for obtaining a blood sample.

How Do I Prepare for a Blood Test?

Your doctor will tell you if there are any pre-test instructions for a specific type of blood test. Many blood tests require no special preparation.

When preparation is needed, a common pre-test instruction is to fast. Because what you eat and drink can affect the results of some blood tests, your doctor may tell you to avoid eating or drinking anything besides water for several hours prior to testing. How long you need to fast depends on which blood test is prescribed. Some of the tests that may require fasting include:

- Glucose Test
- Lipid Panel
- Triglycerides Test
- Calcitonin Test

Less common pre-test instructions include:

- Avoiding certain supplements, prescription medications, or over-the-counter products
- Not ingesting specific foods or drinks
- Resting or abstaining from exercise
- Not smoking
- Certain tests are done at specific times of day

It’s important to talk to your doctor before making any changes to your lifestyle or the medicines you take prior to blood testing.

What Are the Most Common Blood Tests?

A complete blood count (CBC) is a common blood test that measures many different aspects of your blood. A CBC is used to diagnose and monitor a wide variety of health issues and is frequently ordered during a routine checkup.

A CBC can provide a variety of measurements including:

COMPLETE BLOOD COUNT

Test Name	What It Measures
Red Blood Cell Count (RBC)	Number of RBCs
White Blood Cell Count (WBC)	Number and types of WBCs
Platelet Count	Number of platelets
Hemoglobin	Amount of hemoglobin
Hematocrit	Percentage of the blood composed of RBCs
Mean Corpuscular Volume (MCV)	Average size of RBCs
Mean Corpuscular Hemoglobin (MCH)	Amount of hemoglobin carried by each RBC
Mean Corpuscular Hemoglobin Concentration (MCHC)	Amount of hemoglobin carried by RBCs in relation to the size of each cell

Coagulation tests

Coagulation tests measure proteins in your blood that affect blood clotting. These tests may be ordered if your doctor suspects problems or disorders related to blood coagulation or to monitor your health if you take medication to lower your risk of blood clots. They may also be ordered before a surgical procedure.

Common coagulation tests include:

BLOOD CLOTTING TESTS

Test Name	What It Measures

Prothrombin Time (PT)	Certain processes that affect how long it takes for plasma to clot
Partial Thromboplastin Time (PTT, aPTT)	Other processes that affect how long it takes for plasma to clot, performed after the addition of a substance called an activator
Thrombin Time (TT)	How long it takes for plasma to clot during the conversion of fibrinogen to fibrin, the final step in the coagulation process

Lipid panel

A lipid panel is a group of tests that measure certain fat molecules called lipids in the blood. With uses in screening, diagnosis, treatment planning, and monitoring, this panel can be used to assess your risk of cardiovascular issues such as heart disease, heart attack, and stroke.
A lipid panel may include multiple measurements such as:

LIPID PANEL

Test Name	What It Measures
Total Cholesterol	Overall amount of all types of cholesterol
Low-Density Lipoprotein (LDL) Cholesterol	Amount of LDL or “bad” cholesterol
High-Density Lipoprotein (HDL) Cholesterol	Amount of HDL or “good” cholesterol
Triglycerides	Amount of triglycerides, a type of fat associated with cardiovascular disease

Blood chemistry tests

There are hundreds of tests that measure chemicals and other substances in the blood. Two of the most common are the basic metabolic panel (BMP) and comprehensive metabolic panel

(CMP).

The following table provides a comparison of the usual components of the basic and comprehensive metabolic panels:

MEASUREMENT	BASIC METABOLIC PANEL	COMPREHENSIVE METABOLIC PANEL
Glucose	✔	✔
Calcium	✔	✔
Sodium	✔	✔
Potassium	✔	✔
Bicarbonate	✔	✔
Chloride	✔	✔
Blood Urea Nitrogen (BUN)	✔	✔
Creatinine	✔	✔
Albumin		✔
Total Protein		✔
Alkaline Phosphatase (ALP)		✔
Alanine Aminotransferase (ALT)		✔
Aspartate Aminotransferase (AST)		✔

Bilirubin	✔

When Will I Receive My Blood Test Results?

The turnaround time for blood test results depends on many factors including the type of blood test that was ordered and how long it takes for the laboratory to process your blood sample. Many blood test results are available within a few days after the test is conducted. For other tests, results can take up to several weeks.

When multiple tests are conducted at the same time, your doctor may wait to review them with you until all of the results are available. Test results may be provided during a follow-up appointment, over the phone, or through an online medical file.

Related Content

Elsewhere on the Web

National Heart, Lung and Blood Institute: Blood Tests
National Library of Medicine: What You Need to Know About Blood Testing
National Library of Medicine: Fasting for a Blood Test

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Ask a Laboratory Scientist

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