Complete Blood Count (CBC)

COMPLETE BLOOD COUNT (CBC)

The most common laboratory test is the complete blood count (CBC). The CBC is a group of tests that examine the cells that circulate in blood, including red blood cells (RBCs), white blood cells (WBCs), and platelets (PLTs). The CBC, along with other lab tests, can evaluate your overall health and detect a variety of conditions, such as infections, anemia, and leukemia.

Most test results are reported as amounts in a sample of blood (for example, cells per milliliter) or as a percentage.

Blood cells are made in the bone marrow, the center of large bones, and are normally released into the bloodstream as needed. Some medications or diseases can damage the bone marrow. This can reduce the numbers of different types of red or white blood cells.

Every laboratory has its own reference range or normal values for the results of each test. Most lab reports show the normal range and highlight any test results outside the normal range.

RED BLOOD CELL (RBC) TESTS

RBCs, also called erythrocytes, carry oxygen from the lungs to cells throughout the body. This is measured by three main tests.

Red Blood Cell (RBC) Count is the total number of RBCs in a blood sample.

Hemoglobin (HGB) is a protein in RBCs that carries oxygen from the lungs to the rest of the body. HGB measures the total amount of the oxygen-carrying protein in the blood, which generally reflects the number of RBCs in the blood.

Hematocrit (HCT) measures the percentage of total blood volume taken up by RBCs.

A high RBC Count is common for people who live at high altitude. It’s a way the body adjusts to thinner oxygen.

Very low readings for RBC Count, HGB, and HCT can indicate anemia. With anemia, the cells do not get enough oxygen to function normally. People with anemia feel tired all the time and might look pale.

RBC indices provide information on the physical features of RBCs:

Mean Corpuscular Volume (MCV): measures the average size of RBCs. A low MCV means that the cells are

smaller than normal. This is usually caused by iron deficiency or chronic disease. A high MCV can be caused by HIV medications. This is not dangerous. However, a high MCV can indicate megaloblastic anemia, where RBCs are large and pale. This is caused by a shortage of folic acid.

Mean Corpuscular Hemoglobin (MCH): measures the average amount of hemoglobin inside RBCs. The MCH is calculated by dividing total hemoglobin by the total number of RBCs.

Mean Corpuscular Hemoglobin Concentration (MCHC): measures the average concentration of hemoglobin inside RBCs.

Red Cell Distribution Width (RDW): measures variation in the size of RBCs. RDW can help diagnose anemia or some vitamin deficiencies.

WHITE BLOOD CELL (WBC) TESTS

WBCs, also called leukocytes, are cells that exist in the blood, the lymphatic system, and tissues and are an important part of the body's natural defense (immune) system. They help protect against infections and also have a role in inflammation and allergic reactions. There are five different types of WBCs and each has a different function: neutrophils, lymphocytes, monocytes, basophils, and eosinophils.

White Blood Cell (WBC) Count is the total number of WBCs in a blood sample. A high WBC Count usually means that the body is fighting an infection. A very low WBC Count can be caused by problems with the bone marrow. This condition, called cytopenia or leukopenia, means that the body is less able to fight off infections.

The **WBC Differential** identifies and counts the number of the five types of WBCs present in the blood sample. The individual count can be reported as an absolute count and/or as a percentage of total. The percentages are multiplied by the WBC Count to get absolute counts. For example, with 30% lymphocytes and a WBC Count of 10,000, absolute lymphocytes are 30% of 10,000, or 3,000.

Neutrophils or **polymorphonuclear cells** fight bacterial infections. They normally account for 55-70% of WBCs. If you have a very low count, you could get a bacterial infection. This condition is called neutropenia. Advanced HIV disease can cause neutropenia, as well as some medications such as ganciclovir, a drug used to treat cytomegalovirus (CMV).

Lymphocytes occur in two forms**.** T cells attack and kill germs and help regulate the immune system. B cells make antibodies, which are special proteins that attack germs. Lymphocytes are normally 20-40% of WBCs. A regular CBC does not give T-cell counts. Most people with HIV infection get special T-cell tests. However, the results of a CBC are needed to calculate T-cell counts so both tests are done at the same time.

Monocytes or **Macrophages** make up 2-8% of WBCs. They fight infections by “eating” germs and telling the immune system what germs they have found. Monocytes circulate in the blood. When monocytes settle in tissues they are called macrophages. A high count usually indicates a bacterial infection.

Basophils are not well understood, but they are involved in long-term allergic reactions such as asthma or skin allergies. They are usually less than 1% of WBCs.

Eosinophils are normally 1-4% of WBCs. They are involved with allergies and reactions to parasites.

Sometimes, HIV disease can cause a high eosinophil count. A high count, especially if you have diarrhea, gas, or stomach bloating, may indicate the presence of parasites.

PLATELET TESTS

Platelets (PLT) help stop bleeding by forming clots and scabs. If you don't have enough PLTs, you might bleed internally or bruise easily. People with HIV disease sometimes have a low PLT count, also called thrombocytopenia. Taking HIV medications usually corrects this problem. Platelets are almost never so high that they cause health problems.

MORE INFORMATION

Normal Laboratory Values

Lab Tests Online: Complete Blood Count (CBC)

MedlinePlus: Blood Count Tests

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