

## **COMPLETE BLOOD CELL (CBC) COUNT**

### **What is a CBC?**

A CBC is just our short hand term for a “complete blood cell” count. In doing this blood test, the different types of cells in your blood are actually examined and counted either manually or by a special machine in the laboratory designed just for this.

### **What Does the CBC Consist of?**

The CBC is actually composed of six different tests. They include the following:

- Red Blood Cell (RBC) Count
- Hematocrit
- Hemoglobin
- White Blood Cell (WBC) Count
- Differential Blood Count (Diff)
- Platelet Count

### **What Does Each One of These Mean?**

#### ***Red Blood Cell (RBC) Count:***

- Red blood cells are the most common type of cell in your blood -- in fact there are millions and millions of these disc-shaped, oxygen carrying, cells within your body.
- Your doctor will be able to evaluate whether you have a normal RBC, a high RBC (called polycythemia), or a low RBC (called anemia).
- Your doctor will also learn more about the size and shape of your cells, which can help him to diagnose your specific problem and treat it more effectively.
- Common causes of abnormal RBCs include:
  - Anemia:
    - Iron Deficiency Anemia
      - Adults most commonly suffer from this due to chronic blood loss (e.g., menstruation, colon or rectal bleeding in small amounts, and occasionally due to a diet lacking in iron).
      - Children having anemia most often are lacking enough iron in their diets.
    - Acute Blood Loss (e.g., acute bleeding ulcer, trauma)
    - Hereditary Disorders (e.g., sickle cell anemia, thalassemias)
  - Other Causes

#### ***Hematocrit (Hct):***

- The hematocrit measures just how much of your blood is made up of red cells. It will also let your doctor know whether your RBC count is high, low, or normal.
- If your hematocrit is the only test result that your doctor needs, it can be obtained without doing an entire CBC test. The Hct test itself only requires a drop of blood that can be obtained by pricking your finger with a miniature needle and drawing the drop of blood up into a small glass tube. The RBCs are then "packed" down and measured by spinning them in a centrifuge. This is far simpler for children than actually having blood drawn from a vein in their arm or hand.
- Common causes of abnormal hematocrit include:
  - Anemia:
    - Iron Deficiency Anemia
      - Adults most commonly suffer from this due to chronic blood loss (e.g., menstruation, colon or rectal bleeding in small amounts, and occasionally due to a diet lacking in iron).

- Children having anemia most often are lacking enough iron in their diets.
- Acute Blood Loss (e.g., acute bleeding ulcer, trauma)
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### ***Hemoglobin (Hgb):***

- Hemoglobin is found in red blood cells and gives them their red color.
- It's also the chemical compound which combines with oxygen from your lungs and then delivers the oxygen to cells throughout your entire body.
  - The cells use this oxygen to produce energy.
  - Once the cell has extracted the oxygen from the blood, the blood "picks up" carbon dioxide -- the waste product of this energy production process -- and returns it to the lungs, where the carbon dioxide is exhaled. And then the process starts all over!
- People with low hemoglobin levels have anemia. This is usually accompanied by a low red blood cell count and a low hematocrit.
- Common causes of very low hemoglobins include:
  - Anemia
  - Iron deficiency anemia, which may be caused by not enough iron in the diet.
  - Blood loss from internal bleeding (e.g., ulcer) or external bleeding (e.g., trauma)

### ***White Blood Cell (WBC) Count:***

- White blood cells, or WBCs, lack hemoglobin.
- These cells can be viewed through a microscope, using a special stain. They appear light beige or blue, with a dark blue-stained nucleus (center).
- By comparison, normally there are definitely far fewer white blood cells than red blood cells in your body.
- White blood cells are the body's protectors. If you have an infection, extra WBCs are produced and sent from your body's bone marrow to the blood stream to find and attack the virus or bacteria causing the infection.
- A high WBC count usually indicates an infection process somewhere in your body, though it can be found in certain kinds of bone marrow disorders.
  - **High WBC counts are commonly seen with:**
    - Infections
    - Leukemia (a much rarer problem than infections!)
- A low WBC count makes it much harder for your body to fight off infections. People with low WBCs are prone to catch simple viral illnesses, such as the common cold, very easily and tend to get extremely ill from more serious diseases. They are said to be "immunocompromised."
  - **Low WBC counts are sometimes seen with:**
    - Major infections (the most common reason)
    - AIDS
    - Cancer

### ***Differential Blood Count (Diff):***

- Like RBCs, white blood cells also come in several shapes and sizes. The lab staff can identify, examine, and count the different variations in your blood by collecting a sample of your blood and looking at it under a microscope or by using a machine called a hematology analyzer.

- WBCs come in 5 different variations with each having its own function in your blood. They include:
  - Neutrophils
  - Lymphocytes
  - Monocytes
  - Eosinophils
  - Basophils
- By ordering a differential blood count, your doctor can target your illness much more effectively. Here are some of the common links involving the WBC variations.
  - A high eosinophil count often indicates allergies, skin diseases, or parasitic infections.
  - A low lymphocyte count may be seen in AIDS.
  - A high monocyte count usually indicates an infection, and is commonly found in people with mononucleosis (mono).
  - A high neutrophil count is seen in infections, some cancers, arthritis and sometimes during times when the body is under stress (e.g., after trauma, surgery, or a heart attack).
  - Immature white cells of all types might be present with bacterial infections and leukemia.

***Platelet Count:***

- Platelets are the smallest type of cell found in the blood. Their function is to help control or stop bleeding after an injury. To do this, they converge around the site of the injury to plug the hole in the bleeding vessels and help the blood to clot more rapidly.
- Your doctor might order a Platelet count if you complain of bruising easily or are about to have surgery.
- A low platelet count is called thrombocytopenia.
- Common causes of low platelet counts include:
  - Cancer treatment with radiation or chemotherapy
  - Some leukemias and bone marrow disorders
  - Certain types of cancers themselves
  - Immune system disorders (The body will sometimes destroy its own platelets.)