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WHAT ARE THE COMPONENTS OF THE BLOOD?

Blood is a special fluid connective tissue that flows throughout your body via blood vessels. It makes up about 7–8% of your body weight and is essential for maintaining life functions

Components of Blood

Blood is composed of four main components — 20% consists of cellular solids, and 80% consists of water (fluid content).

Component	Volume % of Blood	Description & Function
Plasma	~55%	Pale-yellow fluid is mostly made of water (90%), proteins, electrolytes, hormones, and waste. It transports blood cells, nutrients, hormones, clotting factors, antibodies, and helps regulate body temperature and pH balance
Red Blood Cells (RBCs)	~40–45%	Disc-shaped cells containing hemoglobin. Shelf life around ~120 days and are responsible for carrying oxygen from the lungs to tissues and returning carbon dioxide from tissues to the lungs
White Blood Cells (WBCs)	<1%	Part of the immune system. It includes different types of cells, mainly neutrophils (first-line defense), lymphocytes, monocytes, eosinophils, and basophils. These cells protect the body against infections and disease.
Platelets (Thrombocytes)	<1%	Small, disc-shaped cell fragments that remain in the bloodstream for 7–10 days. They help form blood clots to stop bleeding.

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Key Functions of Blood:

1. **Transportation**
   Carries oxygen, nutrients, hormones, and removes waste like carbon dioxide and metabolic by-products
2. **Defense**
   White blood cells and antibodies defend your body against infections, bacteria, viruses, and abnormal cells.
3. **Clotting (Hemostasis)**
   Platelets, along with clotting proteins in plasma, stop bleeding when blood vessels are injured.
4. **Homeostasis**
   Helps maintain body temperature, pH, and fluid balance throughout the body.

Where Is Blood Made?

All blood cells (red, white, and platelets) are produced in bone marrow, located inside bones like the spine, ribs, pelvis, and sternum.

Why It Matters to Complete Blood Count (CBC):

- Blood tests like the CBC check for healthy levels of red blood cells (RBCs), white blood cells (WBCs), platelets, and hemoglobin (Hb).
- A balanced diet and proper hydration support healthy blood — for example, iron helps build hemoglobin, and proteins support plasma function.
- Helps determine what is needed to support healthy blood composition and circulation.
- Especially important if the patient is experiencing fatigue, frequent infections, easy bruising, or abnormal bleeding.

When is the CBC Test Requested?

- During routine checkups.
- To monitor the effectiveness of iron therapy, platelet production, and hemoglobin levels.

Type of sample: whole blood. Fasting is not required.

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Blood Collection Tubes: Types, Additives, and Uses:

Tube Color	Additive	Yield*	Primary Uses (Example Tests)
Light Blue 	Sodium citrate (3.2%)	Plasma	Coagulation studies: PT, PTT, INR, fibrinogen, D-dimer
Red 	None or silica clot activator	Serum	Chemistry, serology, blood bank (no gel)
Yellow (SST) 	Clot activator + gel separator	Serum	Chemistry panels, immunology, hormones, lipids, Vitamin D
Green (Dark) 	Sodium heparin	Plasma	Specialized chemistry or cytometry; avoid for lithium levels
Lavender 	K_2 EDTA	Whole Blood	Hematology: CBC, ESR, HbA1c, blood typing, immunohematology
Gray 	Potassium oxalate + sodium fluoride	Plasma / Whole Blood	Glucose (GTT), lactate, alcohol testing

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Reference ranges for the Test Parameters:

Parameters	Normal Range
WBC **Male** **Female** **Children**	4-10 10^9/L 4-10 10^9/L 5-15 10^9/L
RBC **Male** **Female** **Children**	4.5-5.5 10^9/L 3.8-4.8 10^9/L 4.0-5.2 10^9/L
Hb **Male** **Female** **Children**	130-170 mg/L 120-150 mg/L 110-140 mg/L
PLT **Male** **Female** **Children**	130-430 10^9/L 130-430 10^9/L 200-490 10^9/L
Frequency of Testing	First visit and then every 3 months
Turn Around Time (TAT)	24 hrs (one Day)

CBC Test Results Interpretation:

If CBC results show high WBCs, RBCs, PLTs, or Hb, it may indicate infection, inflammation, or other medical conditions. If levels are low, it could suggest anemia, bleeding, immune issues, or bone marrow problems.

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