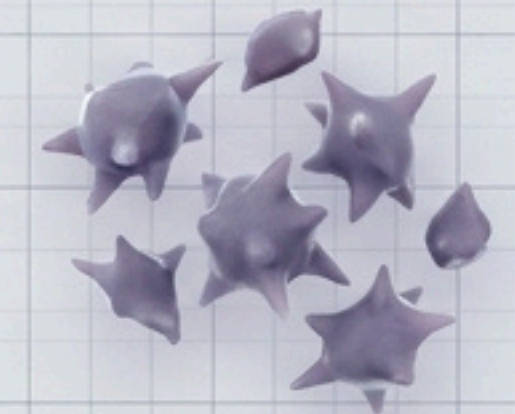
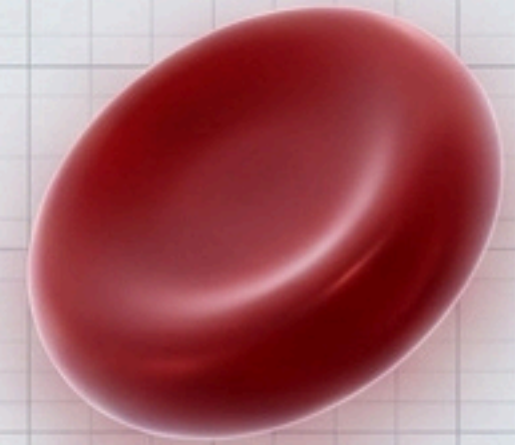


RBCs, WBCs, and Platelets

A Clinical Atlas of the Formed
Elements of Human Blood



THE 45% BASELINE

Blood is a specialized connective tissue. While the fluid matrix (plasma) makes up the majority of blood volume, the active cellular work is performed by the “formed elements”.

Centrifuge Tube



FORMED ELEMENTS = 45%
OF TOTAL BLOOD VOLUME

Erythrocytes
(Red Blood Cells)

Leucocytes
(White Blood Cells)

Platelets
(Thrombocytes)

ERYTHROCYTES: THE OXYGEN CARRIERS

The most abundant cells in the blood, responsible for the transport of respiratory gases via the iron-containing complex protein, haemoglobin.



CELL COUNT

5,000,000 - 5,500,000 mm^{-3}

HAEMOGLOBIN LEVEL

12 - 16 g / 100 ml

Biological Caveat: To maximize carrying capacity, RBCs are devoid of a nucleus in most mammals and utilize a biconcave shape.



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THE 120-DAY LIFECYCLE

ORIGIN

Red Bone Marrow



The site of RBC formation in adults.

TRANSIT

AVERAGE LIFESPAN:
120 DAYS



Constant circulation to deliver oxygen and remove carbon dioxide.

DESTRUCTION

The Spleen



Acts as the biological 'graveyard' where aged RBCs are destroyed and recycled.

LEUCOCYTES: THE DEFENDERS



TOTAL WBC: 6000–8000 mm⁻³

(Nucleated, colorless due to lack of haemoglobin, short-lived).

Diagnostic Matrix

Granulocytes			Agranulocytes		
Neutrophils	[60–65%]	(Most abundant) Phagocytic cells; destroy foreign organisms.	Lymphocytes	[20–25%]	'B' and 'T' forms; responsible for primary immune responses.
Eosinophils	[2–3%]	Resist infections; associated with allergic reactions.	Monocytes	[6–8%]	Phagocytic cells; destroy foreign organisms.
Basophils	[0.5–1%]	(Least abundant) Secrete histamine, serotonin, heparin; drive inflammatory reactions.			

Platelets: The Repair Crew

Also known as thrombocytes, these are not full cells but cell fragments produced from specialized bone marrow cells called megakaryocytes.

ABUNDANCE: 1,500,000 - 3,500,000 mm^{-3}

Function: Release a variety of substances fundamentally involved in the coagulation (clotting) of blood.



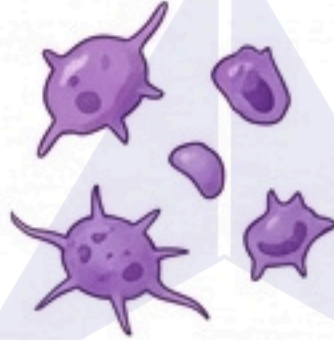
CRITICAL RISK: A reduction in platelet count leads to clotting disorders, which can result in excessive, potentially fatal loss of blood from the body.

The Cellular Roster

Diagrammatic synthesis of the formed elements.



ERYTHROCYTE

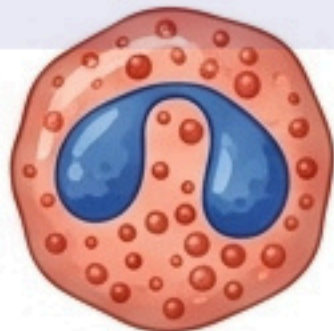


PLATELETS

Granulocytes



NEUTROPHIL



EOSINOPHIL



BASOPHIL

Agranulocytes



MONOCYTE



B-LYMPHOCYTE



T-LYMPHOCYTE

System Synthesis



The 45% That Keeps Us Alive.

While plasma provides the fluid highway, the formed elements act as the specialized biological workforce. Together, they form an interdependent triad vital for survival:



1. **RBCs:** Continuous systemic oxygenation.



2. **WBCs:** Comprehensive immunological defense.



3. **Platelets:** Immediate structural repair and vascular integrity.



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