HAEMETOLOGY → STUDY OF BLOOD

DEFINATION → Specialized connective tissue with

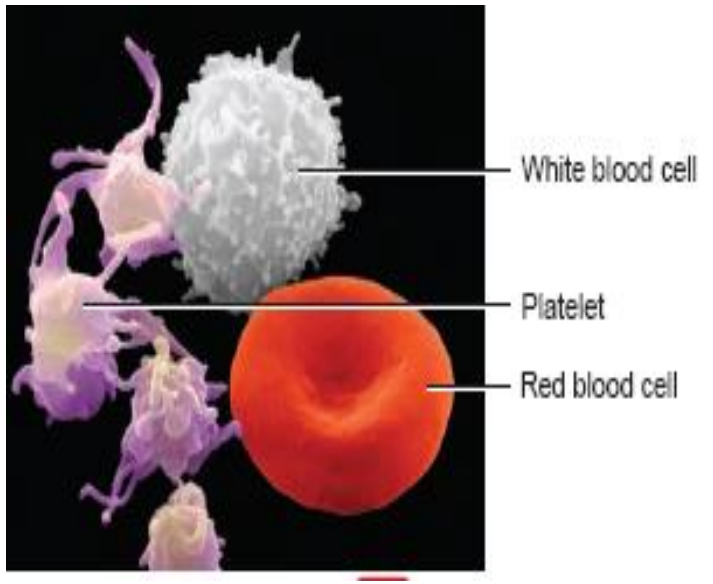
fluid matrix : plasma

and formed elements :

Erythrocytes -- RBC,

Leucocytes -- WBC,

Thrombocytes -- Platelets



PHYSICAL CHARACTERISTICS →

(1) COLOUR -- Red

(2) VISCOSITY -- 4 TO 5 times that of water

(3) TEMPERATURE -- 38° C / 100.4° F

(4) Ph -- 7.35 to 7.45

(5) SPECIFIC GRAVITY --- 1055 to 1065

(6) SALINITY -- 0.9%

(7) % OF BODY WEIGHT -- 8%

(8) BLOOD VOLUME -- MALES -- 5 to 6 liters.

FEMALES -- 4 to 5 liters.

SEPARATION OF CELLS AND FLUID :-

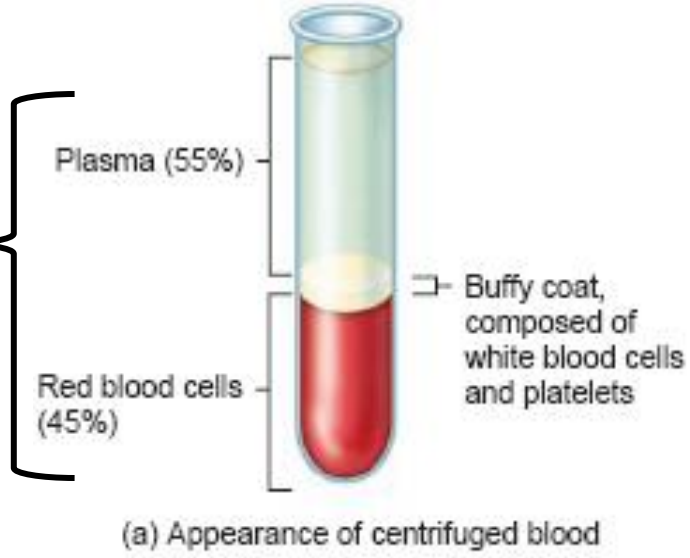
2 methods →

[1] Add ANTICOAGULANT & centrifuge

→ CELLS & PLASMA

[2] NO ANTICOAGULANT -- BLOOD CLOTS

→ CELLS & SERUM



(a) Appearance of centrifuged blood

PLASMA	SERUM
[1] has fibrinogen	[1] No fibrinogen
[2] has prothrombin	[2] No prothrombin
[3] has clotting factors V and VIII.	[3] no factors V & VIII
[4] No platelet derived growth factors	[4] Has additional platelet growth factors that stimulate repair of broken vessel wall.

COMPOSITION OF BLOOD

CELLS

40% TO 45%

ERYTHROCYTES – RBC →

Adult male → 5.2 million/cu mm of blood

{4.9 mill to 5.5 mill/cu mm}

Adult female → 4.7 mill/cu mm of blood

{ 4.4 mill to 5 mill/cu mm }

LEUCOCYTES – WBC →

Adults (M & F) →7500 / cu mm of blood

{ 4000 to 11,000 / cu mm of blood}

THROMBOCYTES – PLATELETS

Adults (M & F) →

2.5 lakhs / cu mm of blood

{1.5 lakhs to 4 lakhs /cu mm of blood }

PLASMA

55% TO 60%

WATER

91% TO 92%

SOLIDS

8% TO 9%

A) INORGANIC :- 0.9%

mainly :- Na^+, Cl^-, $HCO3^{-}$ $^{-}$

also :- K^+, Ca^{++}, Mg^+, Fl^-, Br^-, Cu^{++}etc.

B) ORGANIC :- 7.1% TO 8.1%

a) Proteins:- 7%, Albumin, Globulin, Fibrinogen, Prothrombin.

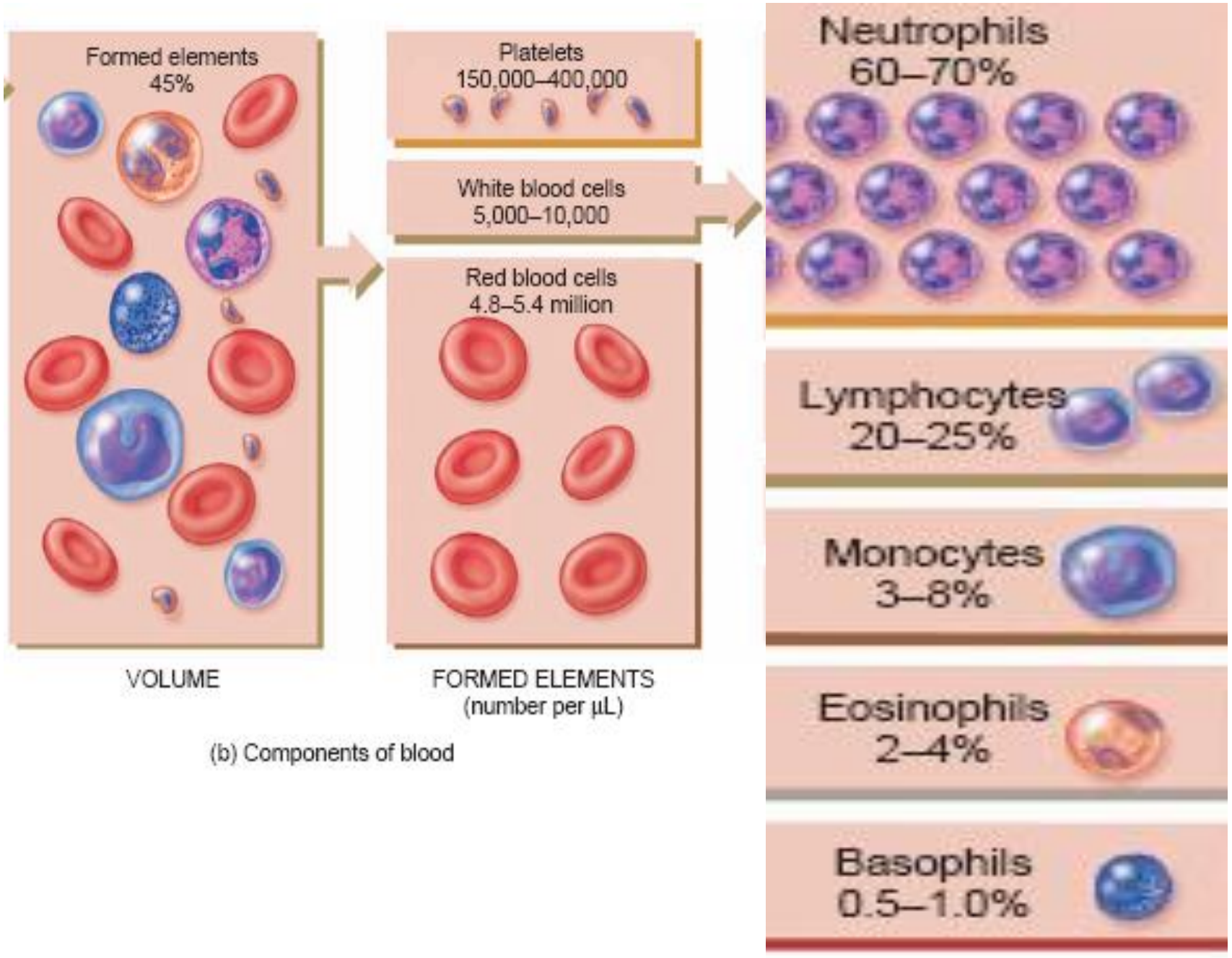
b) NPN (non protein nitrogenous) urea, uric acid, creatine, creatinine, xanthine, hypoxanthine etc.

c) Fats :- Tri glycerides, Phospholipids, cholesterol (LDL, HDL)

d) Carbohydrates:- Glucose -----

e) Enzymes :- carbonic anhydrase , Transaminase

f) Hormones :-- Thyroxin, Insulin, ACTH, TSH, Growth hormone, FSH, LH, ADH etc



(b) Components of blood

FUNCTIONS OF BLOOD →

[I] TRANSPORT →

(a) Gases →

(b) Nutrients →

(c) Waste and toxic materials→

(d) Hormones →

[II] MAINTENANCE →

[i] Water balance → between cells and plasma by maintaining osmotic pressure with help of Na^{+} and plasma proteins.

[ii] Acid-base balance→ by buffers in blood like :-

$H_2CO_3 \leftrightarrow HCO_3^{--}$ system

Phosphate buffer system

Oxy ↔ reduced hemoglobin buffers.

[iii] Body temperature → by the specific properties of water :-

a) High specific heat of water helps absorb heat from inner parts and bring heat to surface .

b) High latent heat of evaporation helps sweat evaporate and carry heat away from surface.

[III] STORES → of Glucose, aminoacids, electrolytes, water, etc

[IV] DEFENCE → by properties of Leucocytes (WBC), immune system & complement proteins found in blood the body is protected against microorganisms & foreign matter.

[V] PREVENTION OF BLOOD LOSS → by forming a clot. by the clotting factors and thrombocytes