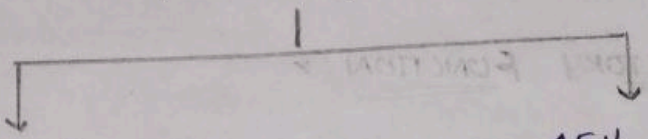
BLOOD:

Blood is a connective tissue fluid circulating in the body.

Blood volume : 5 litres.

composition of blood.



55% of Plasma.

45% of cellular component.

⇒ Red blood cells (5 million)

⇒ White blood cells (4,000 - 11,000)

⇒ Platelets (1.5 - 4 Lakhs).

Plasma :>

- plasma proteins
- plasma lipids

Functions of blood :>

1> TRANSPORT function:

Blood acts as a vechicle to transport substance

2> RESPIRATORY FUNCTION :>

Blood helps to deliver oxygen to tissues & removes CO_2 from the cell.

3> IMMUNE SYSTEM :>

WBC is ~~helps in~~ provide immunity.

4> ~~IMM~~ BLOOD COAGULATION :>

Platelets helps in blood clotting.

5) GAMMA GLOBULIN:-

Gamma globulin forms antibodies

6) DIGESTIVE & NUTRITIVE FUNCTION:-

Blood helps to deliver nutrients to tissue from gut.

7) EXCRETORY FUNCTION:-

Blood removes metabolic waste products.

---

composition of plasma:

Plasma:-

Plasma is a straw coloured liquid present in blood.

- Plasma
  - 99% H_2O
  - 1% Solid
    - Colloids
      - Plasma protein
      - Plasma lipids
    - Crystalloids
      - Na^+, K^+, Ce^{++}, Mg^{++}
      - Cl^-, HCO_3^-, SO_4^{2-}
      - → glucose
      - → urea
      - → Creatinine.
      - → xanthines.

→ Sodium
→ Potassium
→ calcium
→ Magnesium
→ chloride
→ hydrogen carbonate
→ Sulphate

Plasma Proteins:-

Plasma proteins are called colloidal solid present in Plasma.

Total Plasma Protein content: 6-8 gms%.

Types of Plasma Protein:-

1) Albumin:
(5-6gms%)

2) Globulin:
(1.5 - 2.5 gms%)

3) Fibrinogen:
minimal amount

4) prothrombin -

Normal A : G = 2:1.

Plasma protein are synthesised in the liver.

Function of plasma protein:-

1) Maintainance of colloided osmotic pressure.
- Albumin helps to maintain normal colloidal osmotic Pressure. [+ 25 mm Hg].

2) Blood coagulation:
- Fibrinogen & Prothrombin are the first and second clotting proces factors.

3) Immune function:
- Gamma globulin forms antibodies.

4) plasma protein is responsible for viscosity of blood.

5) carrier protein:
B globulin act as carrier protein.
Eg: Cu - Ceruloplasmin.
Fe - Transferrin.

6) Rouleaux formation:

Plasma proteins helps in piling of red cells.

7) Erythrocyte sedimentation Rate:

Plasma proteins are responsible for erythrocyte sedimentation Rate

8) Transport function:

Albumin & Globulin responsible in transport of substances.

Eg: hormones - Thyroxine binding globulin.

9) Plasma protein helps in Trephane formation.

10) Plasma protein act as storage proteins.

Applied Physiology:

1) In Liver diseases:

- Total plasma protein content is decreased.
- And Reversed of A : G

Blood Grouping:

Blood grouping system refer to antigens present on the surface of red cell membrane.

Blood Grouping system:

1) OAB System.
2) Rh system.

3) MN system
4) Lewis system.
5) Duffy system.

Karl Land Steiner's Law:

1) Law I: An individual belonging to a particular Blood Group will possess the same antigen but will lack the corresponding antibody.

2) Law II: A person with a particular antibody will not possess the same antigen.

I. ABO System:

Blood Group	Antigen (Agglutinogen)	Antibody (Agglutinin)
A.	A	Anti B.
B.	B	Anti A.
AB	A & B	—
O	—	anti A & B.

Universal recipient: AB

Universal Donor: O.

II. Rh. System:

[Rhesus factor]

i) Rh positive (95%) } → Presence of Rh antigen.

ii) Rh Negative (5%) } → Absence of Rh antigen

Landsteiner's law does not hold good for Rh system as antibodies to this antigen are not present by birth.

Significance of Blood Group:>

1. Blood Transfusion:

To avoid mis matched Blood Transfusion.

2. Cross - Matching:

It is a Procedure prior to Blood transfusion in which the donors and recepient's blood Sample is treated to look for agglutination.

Type of cross matching:>

i) Major cross matching

ii) Minor cross matching.

3) In disputed paternity.

4) Medico legal cases and Forensic medicine.

5) Erythroblastosis Foetalis: [Haemolytic disease of New born | Icterus Neonatorum].

Erythroblastosis Foetalis is a clinical condition Characterised by agglutination, haemolysis and

Phagocytosis of foetal red cells.

Mechanism:

Erythroblastosis Foetalis occur when a Rh-ve Pregnant mother bear Rh+ve foetus During Parturition of first child, when umbilical cord is cut, blood from the newborn enters maternal circulation following which mother develops antibodies to antigen.

During successive pregnancies, if the baby is Rh+ve, Rh antibodies can cross the placenta resulting in antigen, antibody reaction & agglutination and haemolysis of foetal red cells.

Clinical features:-

i) Anaemia.
ii) Jaundice. [Icterus]
iii) Kernicterus: in which bilirubin get deposited in brain [Basal ganglia] as blood brain barrier is not well developed in new born.
iv) Hepato-splenomegaly.
v) Hydrops foetalis [oedema].
vi) Convulsions.

Treatment:

1. Administration of anti D vaccination to mother following child Birth.

2. Photo Therapy
3. Exchange transfusion.

Blood Transfusion:

Blood transfusion is a life saving procedure indicated in the following conditions.

i) Haemorrhage
ii) Severe Anaemia.
iii) Leukaemia
iv) Co- poisoning.

Precautions:

i) Cross matching of donor's & recipient's blood
ii) Screening of donor's blood for blood borne disease.

eg: HIV, hepatitis, malaria ect.

iii) Anticoagulant used is Acid citrate Dextrose.
iv) Blood should be stored in bottles.
v) storage temperature is 4°C.
vi) shelf life of blood is 21 days.

Autologous Blood Transfusion [self predonation]

Autologous Blood Transfusion is a special type of Blood transfusion in which patients own blood is withdrawn, stored & retransfused during planned surgical procedures.

Significance of Autologous Blood Transfusion:

i) Screening & cross matching are not required
ii) Risk of blood borne transmission is absent.
iii) Cost-effective.

Hazards of Blood Transfusion:

A) Immediate effects:

- Fever with rigor.
- Anaphylatic reaction characterised by skin rash
- circulatory shock in case of haemolysis characterised by hypotension & Tachycardia.

B) Delayed effects:

(i) Transmission of blood borne diseases of screening is not done properly.
(ii) Haemoglobinuria.
(iii) Jaundice
(iv) Renal Failure
(v) Renal Shutdown.

Red blood corpuscles / Erythrocyte (A nucleated).

Shape: Biconcave Disc.

Diameters: 7.2 μ

ERYTHROCYTE

Normal red cell count

a) In Male (♂)

- 5.5 - 6 million

b) In Female (♀)

- 5 - 5.5 million

c) In New born infants:

- 7 - 9 million.

ERYTHROPOIESIS :-

The process of formation, development and maturation of red cells is termed as Erythropoiesis.

Duration of Erythropoiesis : 7 days

Sites of Erythropoiesis:

A) Extra Medullary site:

(i) During embryonic life [Mesoblastic stage]

- Yolk sac

(ii) During early weeks of gestation [Hepatic stage]

- Liver & spleen.

(iii) During last four weeks of gestation [Medullary stage]

- Red Bone Marrow

B) Medullary site of Erythropoiesis;

(i) up to 20 years : RBM of Red bone marrow of long Bone.

(ii) In adult life: Red cells are formed in flat bone.

Eg: - Skull, Vertebra, pelvic Bone, sternum, Ribs, scapula.

Stages of Erythropoiesis:

Pleuripotent hemoporentic Stem cell (PHSC)

↓

committed Stem cells [progenitor Stem cell]

↓

colony forming unit [CFV - E]

↓

Pronormoblast [proerythroblast]

↓

Early normoblast [Early erythroblast]

↓

Intermediate normoblast [Intermediate erythroblast]

↓

Late normoblast [Late erythroblast]

↓

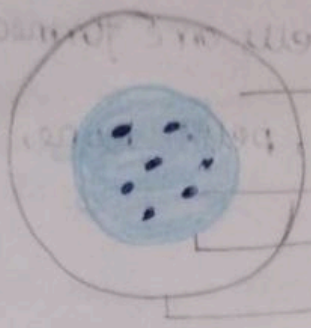
Reticulocyte

↓

Mature red cells

Factors aff

Stages of Erythropoiesis.

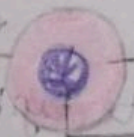


↓ PNB.

↓ ENB.

↓ INB.

(pyknotic nucleus)



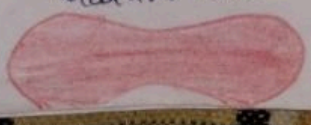
↓

LNB

↓ Reticulocyte — 5 days

↓

Mature RBC



} 2 days.

Factors affecting Erythropoiesis:

1) Erythropoietin is a circulating glycoprotein hormone synthesized by the Liver & kidney.

2) Hypoxia: Decreased tissue oxygenation stimulates kidney to produce Erythropoiesis.

3) Maturation factor: Vitamin B_{12} or extrinsic factor helps in DNA synthesis → continue with next page

---

* Pronormoblast has multiple nucleoli. Nucleoli disappear in Early normoblast stage,

* Haemoglobin begin to appear in Intermediate Normoblast stage.

* In Late normo stage, the nuclear chromatin condenses to form cart wheel pyknotic nuclei

* Reticulocyte is characterised by presence of reticulin fibres.

Reticulocyte:

Normal reticulocyte count is 2-4 %. above which it is called reticulosis which is seen in Megaloblastic anaemia, reticulocyte remains in circulation for 48 hours following which nucleus is extruded to form Biconcave disc shaped Mature red cell.

4) Hormones :>

- Thyroxine, Growth hormone, Cortisol, Testosterone Stimulates Bone Marrow to produce red cells.

oestrogen inhibits Erthropoies.

5) Intrinsic factor of castle produced by oxyntic or parietal cells of stomach, increases Red cell Production.

6) Interleukin – I helps in Erthropoies.

7) Fe helps in the synthesis, Cu, cobelt, Mn.

Life Span & Fate of RBC :>

⇒ Life span of red cells is 120 days.

following which it undergoes haemolysis in Liver & Spleen & hence spleen is the graveyard of red cells; the liberated Haemoglobin is converted to Bilirubin.

Haemoglobin :>

Haemoglobin is an iron containing protein pigment with oxygen carrying capacity. Present inside red cells that give red colour to the blood.

Normal Hb content :>

1) In Male ♂ :>

15 - 17 gms %

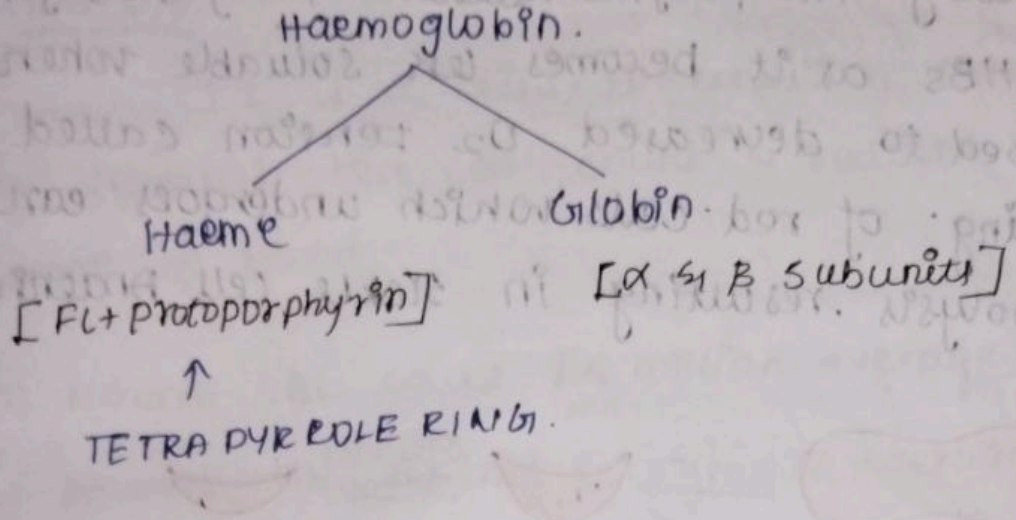
2) In Female ♀ :>

13 – 15 gms %.

3) In New born infants:-

20-23 gms%

Structure of Haemoglobin:-



Types of HB:-

i) Adult HB [HbA]

$\alpha_2 \beta_2$

ii) Foetal HB [HBF]

$\alpha_2 \gamma_2$

iii) Glycosylated HB. [HbA1C].

Significance of HbA1C:-

- HbA1C normal value is 5.
- HbA1C indicates 3 months average plasma glucose level.
- Prognostic value to understand the efficency of drugs.
- HbA1C is a glycoenic index.

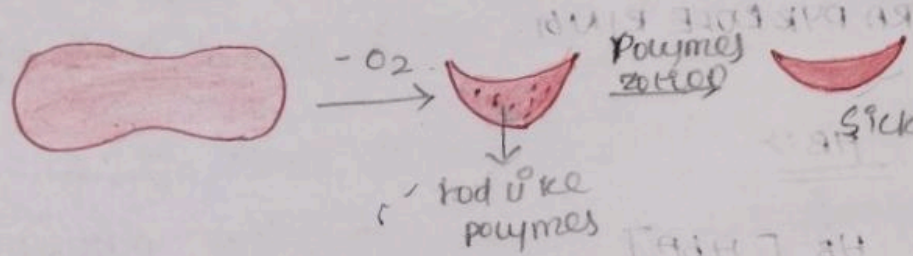
Abnormal Hb:-

i) Sickle cell Hb [HbS]

SC is common in African blacks in whom.

6th position in the β chain:-

i) Valine is replaced by glutomic acid. resulting in polymerization of crystals formed by HBs as it becomes less soluable when exposed to decreased O_2 tension called sickling of red cells which undergoes early haemolysis. resulting in sickle cell Anaemia.



ii) Meth HB.

iii) Cyan Meth HB.

Derivation of HB:-

i) Oxy HB ($Hb + O_2$)

ii) Carbomino Hb ($Hb + CO_2$)

iii) Carboxy Hb ($Hb + Co$)

Functions of Hb:-

1) Transport of Gases:-

Hb helps to carry O_2 from the lungs to tissue & CO_2 from tissue to lungs.

2) Buffer Action:-

Maintainance of Acid-base balance.
- Hb gives red colour to the blood.

Applied Physiology :-

1) Anaemia:

It is a clinical condition characterised by decreased red cell count & reduced haemoglobin content of blood.

a) Normal RBC count [5 million average]
b) Normal Hb content [15 gms%. average]

Classification:-

A) Based on Eteology (causes)

(1) Nutritional deficiency anaemic.

(a) Iron deficiency:-
- Hook worm infestation
- Reduced intake of dietary iron.

(b) (viva) vitamin B_{12} and folic acid deficency anaemia.
[Megablastic or pernicious anaemia].
- Reduced intake of dietary I A & vitami

B_{12} - Partied Gastrectomy.

2) Blood loss anaemia.
- Hemarrhage.
- Bleeding disorder (eg: Haemophilia)
- Leukemia. (Blood cancer)

3) Haemolytic Anaemia

- Sickle cell Anaemia
- Mismatched Blood transfusion
- Hereditary Spherocytosis.

4) Aplastic Anaemia.

- Chemotherapy
- Radiotherapy.
- Drugs.

(B) Morphological classification: (Peripheral smear study).

- MICROCYITIC Hypochromic
  IRON deficiency.
- MACROCYITIC Normothronic
  Vitamin B_{12} and folic acid.

(C) Based on division:

(i) Acute Anaemia
Haemorrhage

(ii) Chornic Anaemia.
Renal failure. (Kidney)

(D) Based on Hb content.

- Mild (10 gms)
- Moderate (8-9 gms)

- Severe (5gm)

Clinical Features of Anaemia:

(i) Lethargy (somberi)

(ii) Dyspnoea (difficulty in breathing).

(iii) Palpitation (increasing heart rate).

(iv) Pedal Oedema (kaal vegurathu).

(v) Functional Murmur. (steth la pakumodhu sound vera ketkum)

(vi) Koilonychia (Spoon Shaped Nail)

(vii) Glossits (kannu killa light colour).

(viii) pallor (Nakku pink colour la erukum).

Investegation:-

- Enumeration of RBC count
- Estimating Hb content (=>haemoglobin)
- peripheral smear study. (Blood Glass la microscope la pakkuratha)
- Red cell indices.

(a) packed cell volume (PCV)

(b) Mean corpuscular haemoglobin (MCH)

(c) Mean Corpuscular Volume (MCV).

Treatment:

1) In Mild Anaemia.

Dietary Supplement (eg: Greens, pomegranate, Dates, Beetroot)

(ii) Deworming Tablet (Stomach la erukkum pulla ah veliya thallum)

(iii) In Moderate Aneamia.

- Oral ferrous Sulphate.
- Oral Vitamin B_{12} & folic acid.
- injectables of iron & Vitamin B_{12}

(iv) In Severe Aneamia:

- Blood Transfusion.
- Clotting factors of Transfusion in haemophile.

2) Polycythemia:

It is a clinical condition characterised by increase in red cell count more than the Normal.

Types:

(A) Primary polycythemia.

(eg) Myelo proliferative disorder.
↳ Bone Marrow

(B) Secondary polycythemia.

High ~~Altidue~~ Altitude (Physiological)

White Blood Cell: (Leucolyte)

(i) Nucleated cell.

(ii) Total Leucoiunt [TLE]

4000 - 11,000 cells.

(iii) Leucopoiesis: The process of formation, development & Maturation of White cells.

(iv) Diameter : 15 M

Classification:

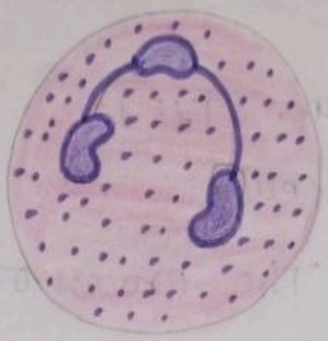
WBC

- Granulocyte
  - (i) Neutrophile (60-70%)
  - (ii) Eosiophile (1-6%)
  - (iii) Basophile (0-1%)
- Agranulocyte
  - (i) Lymphocyte (20-40%)
  - ii) Monocyte (5-10%)
    - (Largest WBC - 20 M)

Differential Leucocyte counting (DLC)

DLC is a ~~Prodtic~~ procedure using Leishman's stain to identify and count the individual White cell.

(i) Neutropil [Many lobes polymorphs]



(a) Nucleus : Multilobes.

(b) Granules : primary & secondary Azurophilic granules containing Myeloperoxidae enezymes.

(iii) Arneth - cooke:

Count: refers to counting the numbers of lobes in the netrophiles.

Significance:

(a) Less Lobes: Young Nutrophiles - shift to left seen in infection.

(b) More Lobes: old Nutrophile - shift to right (eg: Megablastic Aneamia).

(iv) Functions of Neutrophiles:

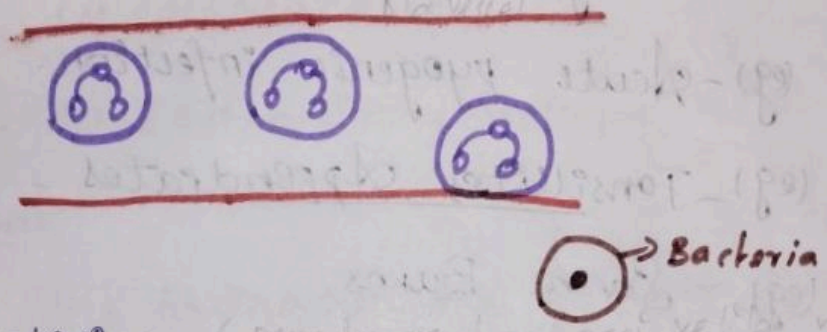
(a) Protective function:

[Defence Mechanism]

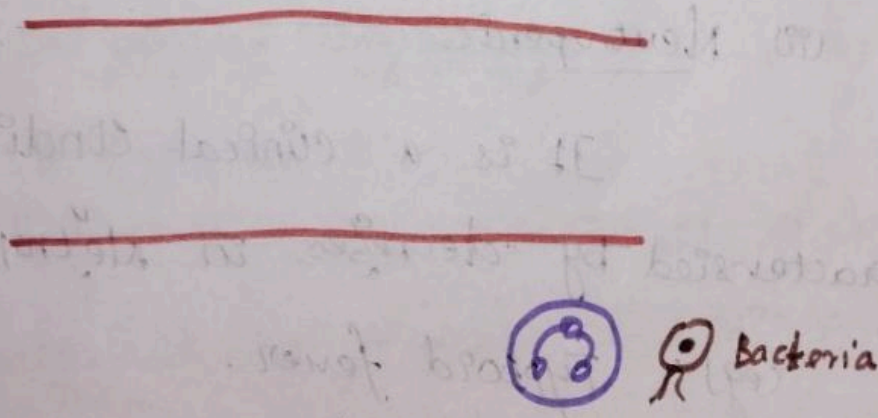
Nutrophile is the first line defence cell which destory Microorganism by phagocytosis which refers to the process of engulfing and degrading forein Materials.

Steps involved en phagocytosis (PC)

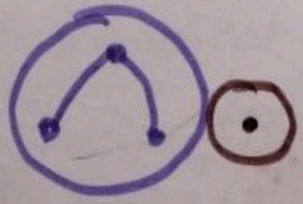
(i) Margination.



(ii) Diapedosis:



(iii) Rebgrition & Attachment Stage.



(iv) Secretion / De granulation stage.

(v) Killing / degradation Stage.

2) OPSONIZATION:

Refers to engulfing opsonia conted brateria.

d) Applied Physiology:

(i) Neutrophilic

It is a clinical conditeon Characterised by increase in Netrophils.

(eg) - Acute pyogenic infection.

(eg) - Tonsillites Appendiates -

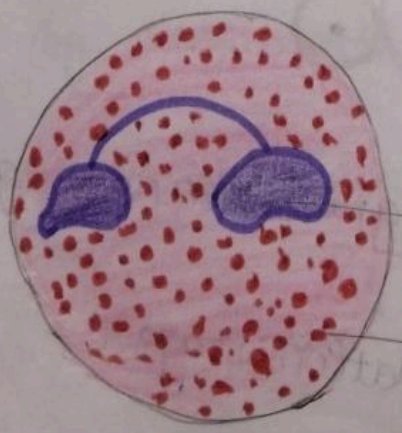
(eg) - Severe Burns.

(ii) Neutropenic

It is a clinical condition Characterised by decreses in Neutropenic count

(eg): Typboid fever.

(2) Eosinophils:



Bibbed spectacles
Slotted lobes.

Course granules

a) Nucleus:

Bibbed spectacle shaped.

b) Granules:

Course reddish pink containing

- Major Basophilic.
- Aryl sulfatase.

c) Function:

(i) CHEMOTAXIS.

(ii) Eosinophil participates in allergic reactions.

(iii) Eosinophil are weakly Phagocytic

d) Applied Physiology:

(i) Eosinophilic:

It is a clinical condition characterised by increase in Eosinophil.

(eg) Allergic condition:

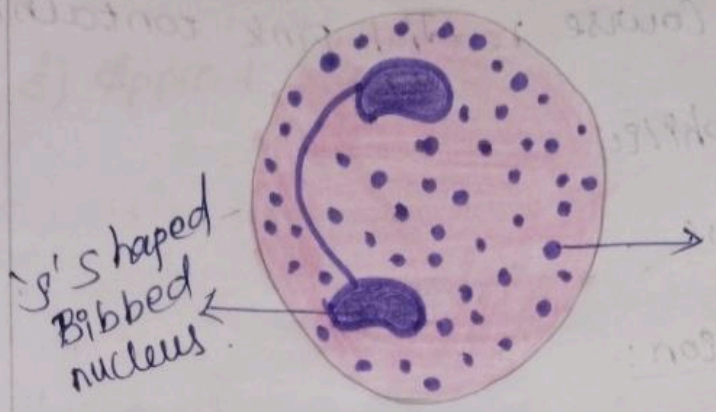
- Bronchial Asthma
- Dermatitis
- Worm Infestations.

(ii) Eosinopenic

It is a clinical condition characterised by decrease in Eosinophil count.

eg) Cortisol & ACTH therapy.

(B) Basophil:



(a) Nucleus: Bibbed. 'S' shaped.

(b) Granules: Course basophile containing Heparin and Histamine.

(i) Function:

(i) Basophile participate in Allergic reaction.

(ii) Heparin acts as a anti coagulant.

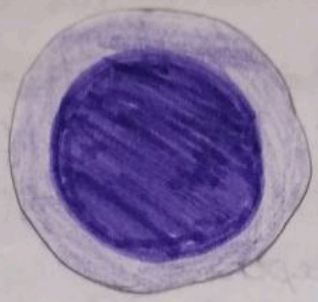
a) Applied Physiology:

(i) Basophilic:

It is a clinical condition characterised by increase in Basophiles.

eg: urticaria Anaphylatic reaction.

A) Lymphocyte:



(i) Nucleus:
- Round occupying the entire cytoplasm

(ii) Types
- T Lymphocyte
- B Lymphocyte
- Small Lymphocyte
- Large Lymphocyte:

(iii) Function:

Role of Lymphocyte in Immune mechanism.

a) T-Lymphocyte participate in cell mediated immunity.

b) B-Lymphocyte participate in antibody immunity.

(iv) Applied Physiology:

a) Lymphocytosis:

It is a clinical condition charactorsied by increase in lymphocyte count

eg: Chronic infecteon, (Arthritis).

b) Lymphocytepenia:

It is a clinical condition charactorsid by decrease in lymphocyte count.

eg: HIV, AIDS, Maligmancy.

5) Monocyte [Largest White Blood cell : 20μ]

(i) Nucleus:

- Peripheral → one side
- Indented → kidney like

(ii) Function:

a) Protective function.

Monocyte is the second line defense cell

b) Tissue Macrophages

- Liver : Kupfferces.
- Lungs : Alvealar macrophages.
- Brain : Glial cell.

c) Monocytes act as Scavenger cell.

(iii) Applied Physiology:

Monocytes :

It is a clinical condition characterised by increase in Monocyte cell count.

eg: Glandular fever.

Applied Physiology: for WBC

1) Leucocytosis :

It is a clinical condition characterised by increase in white cell count.

eg: Infection.

2) Leucopenic :

It is a clinical condition charactorsied by decrease in white ~~Blood~~ cell count.

- Chemotherapy.
- Radiation therapy.

ERYTHROCYTIC SEDIMENTATION RATE (ESR)

ESR is the rate at which the red cells settle down when blood is placed on a vertical glass tube.

Methods to determine ESR:

i) Westergren Method
ii) Wintrobe Method.

Normal ESR:

- In Male (♂):
  0.5 mm at the end of 1 hour.
- In female (♀).
  0-10 mm at the end of 1 hour.

Factors affecting ESR:

i) Shape of RBC
ii) RBC count
iii) Size of RBC
iv) Rouleaux formation.

Significance of ESR:

1) Diagnostic significance:

ESR is increase in fever (infection) & Malignancy & inflammatory diseases.

2) Prognosis ESR:

Help to know the prognosis of a diseases after treatment.

Platelets (Thrombocytes)

i) Anucleated cell.

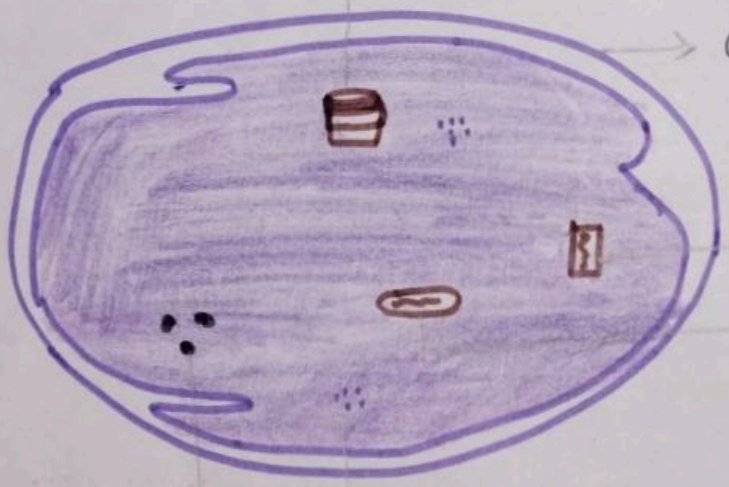
ii) Size: 2-4 μ.

iii) Shape: oval / spherical

iv) Normal cell: 1.5-4 lakhs.

v) Thrombopoiesis: refers to formation, develop and maturation of platelets.

Structure of platelets



The enfoldings are called cisterns

Granules contain serotonin, ATP, ADP,

Thromboxane A_2.

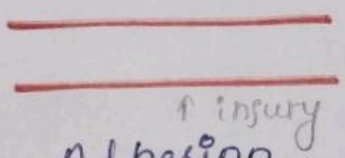
The cell membrane has receptors for various growth factor. Glycocalyx prevents adhesion of platelets to vessel wall.

Functions of platelets:

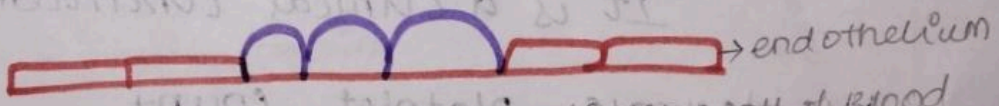
a) Haemostosis: is a productive mechanism to prevent blood loss by temporary platelet plug fromation.

Steps involved in Haemostasic:

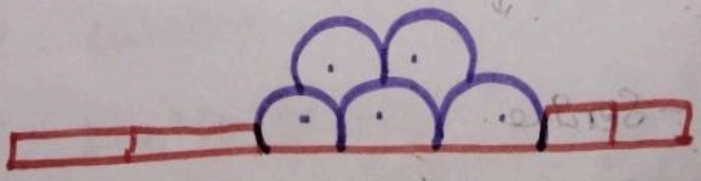
a) Vasoplasm.



b) Platelete Adhesion.



c) Platelete Aggregation.



d) Platelete plug formation.

2) Blood coagulation:

It is a protective Mechanism to prevent blood loss by fibrin (Clot) formation including 8 clotting factors.

3) Clot retraction:

Takes plate between 8-24 hours

1) Protective function:

Platelets phagocytose carbon particle viruses immune complex.

5) Transport & Storage of Serotonin:

Appiled Physiology:

a) Idiopathic thrombocytopenic purpura

It is a clinical condition characterized by decrease platelet count.

Course:

- Senile.
- Dengue fever
- Drugs.

Clinical Manifestation:

- petechiae

[small pinhead haemorrhage resulting in purplish discolouration of skin]

Investigation:

Bleeding time is prolonged

(Normal Bleeding time is 1-3 minutes)

Blood Coagulation:

It is protective Mechanism to prev- t
blood loss by fibrin (clot) formation including 13 clotting factors.

Clotting factors:

Factors: I : Fibrinogen.

Factor II : Prothrombin.

Factor III : Tissue Thromboplastin.

Factor IV : Calcium.

Factor V : Labile factor.

Factor VI : Non existant.

Factor VII : Stable, existant.

Factor VIII : Antihaemophilic factor A.

Factor IX : X mas factor or Antihaemophilic factor B.

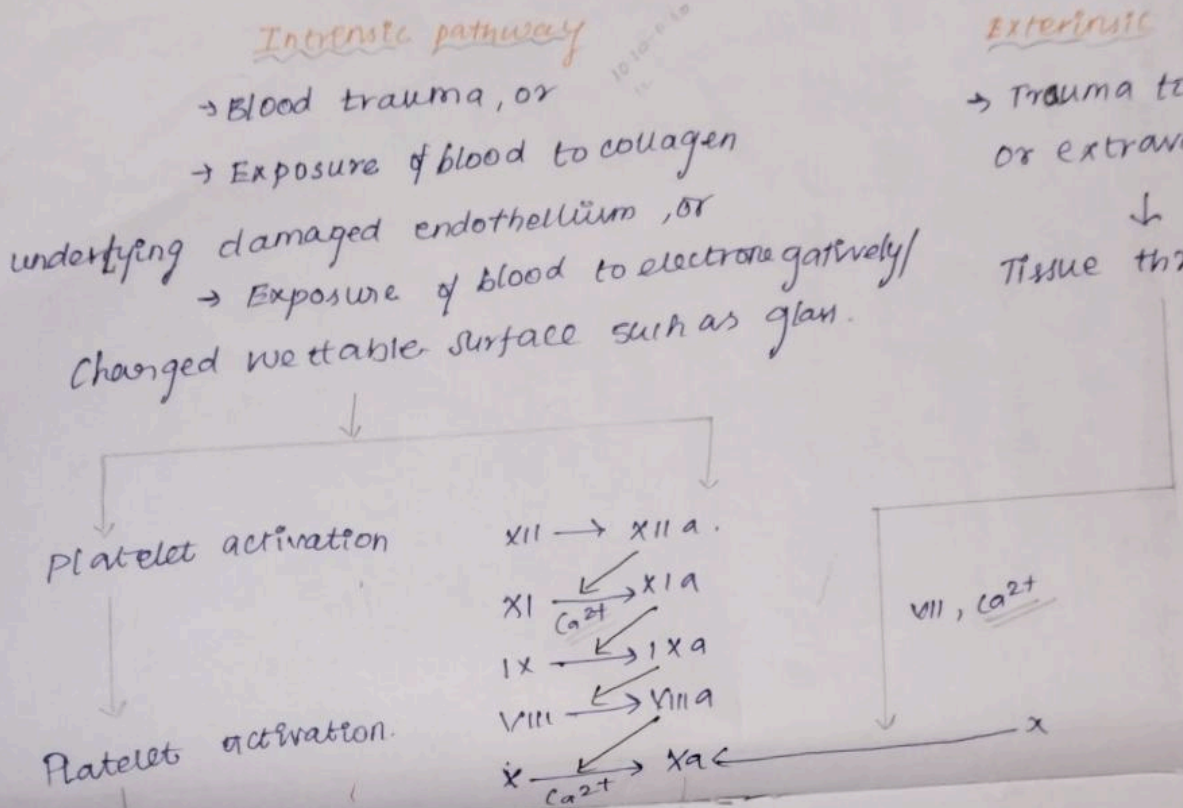
Factor X : STOART - PROWER factor.

Factor XI : Plasma Thromboplastic ANTECEDENT.

Factor XII : HAGEMAN. Factor

Factor XIII : Fibrin Stabilizing factor.

1. Formation of prothrombin activator.



Mechanism of blood coagulation.

Applied Physiology

HAEMOPHILIA:

It is a clinical condition characterised by deficiency of clotting factors.

Haemophilia is a x linked recessive disorder affecting the males and females are carrier.

Types of Haemophilia:

(i) Classical Haemophilia A resulting from deficiency of factor VIII.

(ii) X mas disease resulting from deficiency of factor IX.

CHEMICAL MANIFESTATION:

- Profuse bleeding following injury
- Haemarthrosis.

In Haemophilia clotting time is prolonged (Normal 5-8 min).

ANTICOAGULANTS:

Anticoagulants are agents that prevent Blood coagulation.

Types:

1) Natural Anticoagulation.
   eg: Heparin.
2) Oral Anticoagulation.
   eg: Warfarin
3) Chelating aggents:
   eg: Salts of oxalate & citrate.

IMMUNITY.

Immunity refers to resistance against Patrogens (or) their products (toxins).

Classification:

I. INNATE Immune.

1) Non-specific
2) Specific
3) Racial
4) Species
5) Individual.

II. Acquired Immune:

1. Active Immune

- Natural
- Artificical.

2. Passive Immune

- Natural
- Artificial.

A) Innate Immune:

refers to immune present from birth

1) Mechanical Barrier:

- Gastric Mucosal Barrier
- Skin.
  eg: Sweat Glands.

2) Surface Secretion:

- Sebum.
- Lysozyme in saliva & tears
- HCl in Gastric Juice.

3) Cellular Mechanism:

- complement system.
- Interferons.
- Natural Killer cells.

Natural killer cells are subpopulation of lymphocytes not destroy viruses, Malgant cells.

- Eosinophil granules release Major Basophilic protein that act as LARVICIDAL agent.

- Phagocytosis by Macrophages.

B) Acquired Immune:

refers to immune. acquired during lifetime

1) Active Immune:

(a) Natural
(eg) polio.

(b) Artificial.

(eg) i) Liver Bacteria: BCG vaccine
ii) Killed Bacteria: DPT
iii) Products: T.T
iv) Lower virus: eg) Salk polio vaccine.
v) Killed Virues:
eg) Sabin polio vaccine.

2) Passive Immune:

a) Natural:

- Ig A secretions in Mothers Milk.

(iii) Artificial:

- Anti Tetanus Serum.

Differences between

Active Immune	Passive Immune
i) Mechanism: Body Participate in antibody Production.	Antibodies are administered in ready made form.
ii) Latent period: 4 day - 4 weeks	No latent period.
iii) Negative phase Present	Negative phase absent
iv) Secondary response Present due to Memory cell.	Secondary response absent due to Memory cell.
v) Duration Long Lasting	Short period.
vi) Efficacy Good	Less
vii) Cannot be adapten	can be adapted.

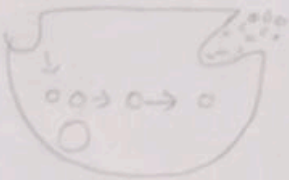
in immune compromised patients.

eg) HN.

O → Antigen (Bacterium).

A

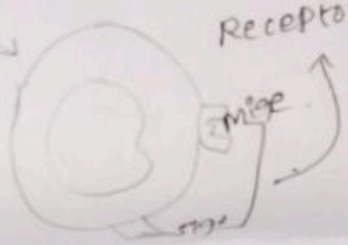
Macrophage



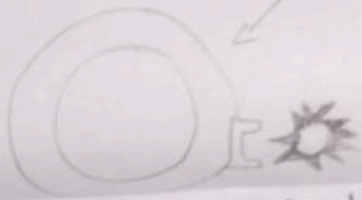
Antigen presenting cell.

Antigen processing.

Processed Antigen.



Receptors.



Sensitized cell.

Sentized B cell

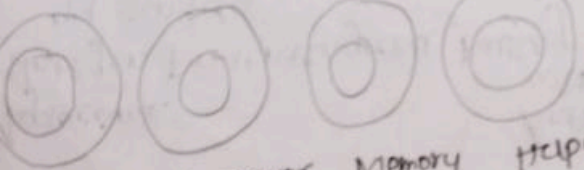
C

BLAST CELL.

Blast cell

B cell growth factor

IL-2



Killer T Cell

Suppressor T-Cell

Memory T cell

Helper cell (CD4T).

Plasma cell.

Memory cell.

1. Antigen processing and presentation.

→ Antigen [Bacteria]