

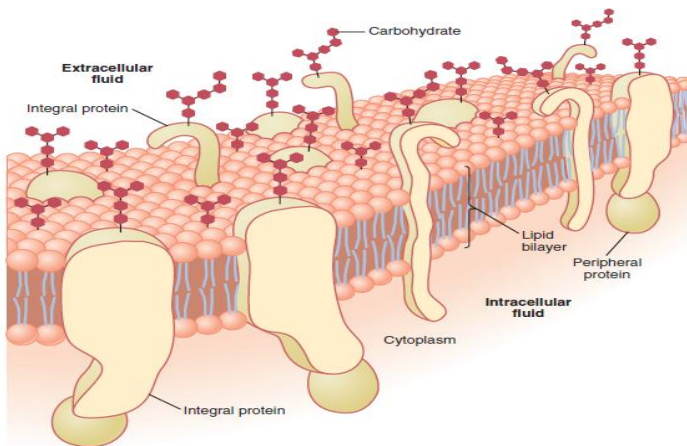
Diagrams & Flowcharts -- GP -Blood

Instruction:

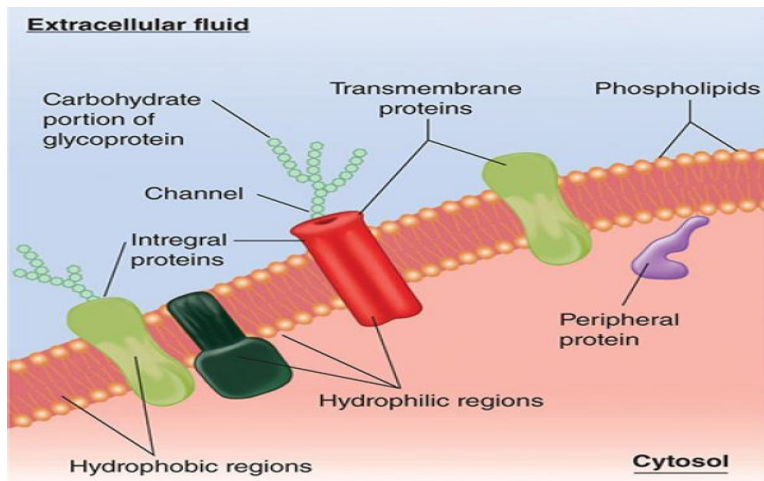
Date: 23/11/2023

1. Write the diagrams/flow charts neatly with proper Labeling in 100page unruled notebook
2. Submit your assignment to the respective Table Teacher on time
3. Clarify your doubts with teacher concerned.
4. **Submit the assignment by 22nd December 2023**

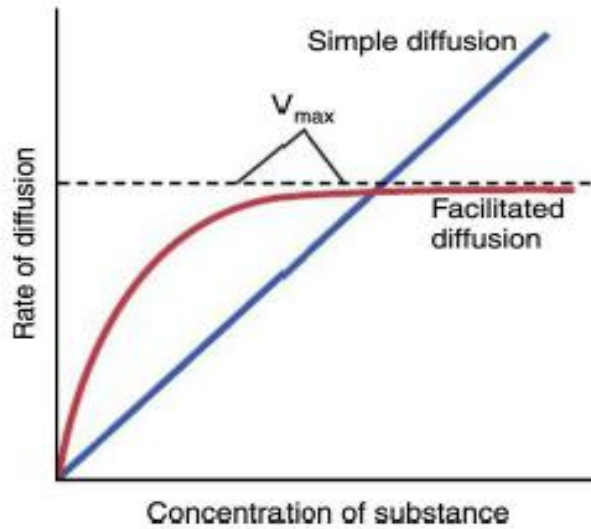
1. Cell membrane Structure (Fluid Mosaic Model)



or

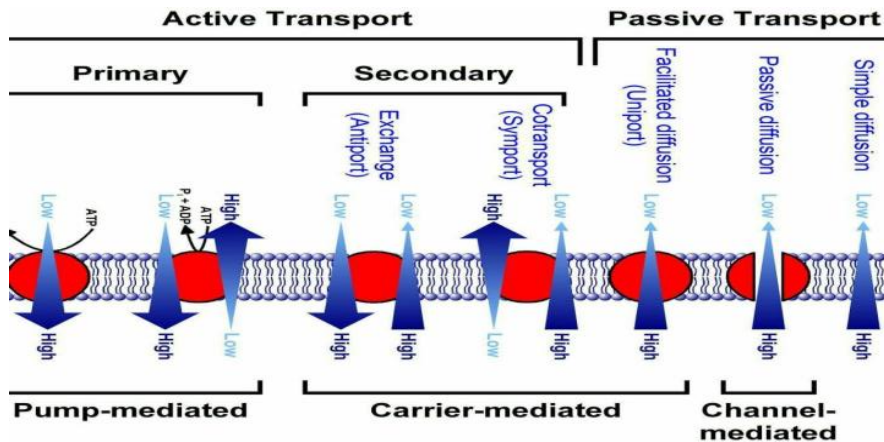
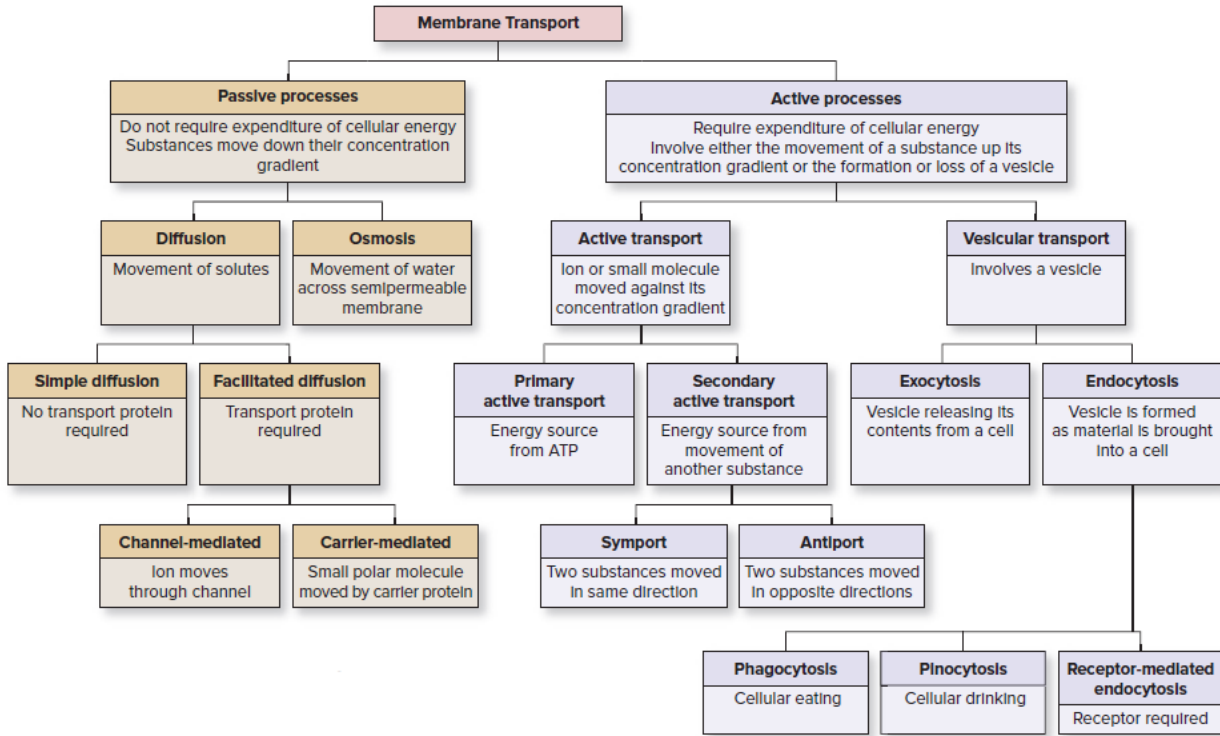


2. Effect of concentration of substance on rate of diffusion (Simple & Facilitated)

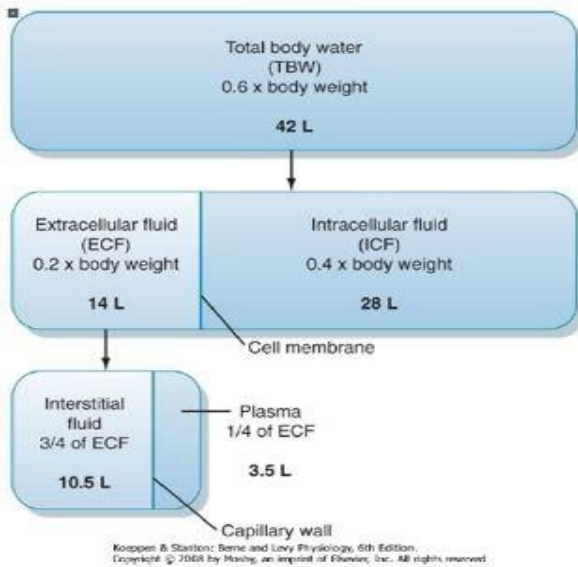


	Simple diffusion	Facilitated diffusion
1. Mode of diffusion	No carrier molecule Involved	Carrier molecule involved
2. Saturation kinetics	No saturation kinetics, diffusion is linear	Has saturation kinetics. No increase in diffusion once saturation is reached
3. Competitive inhibition	Absent	Substances that share the same carrier protein compete for transport
4. Rate of diffusion	May be slow	Faster
5. Specificity	No specificity	Carrier protein may be specific

3. Types of Transport Process



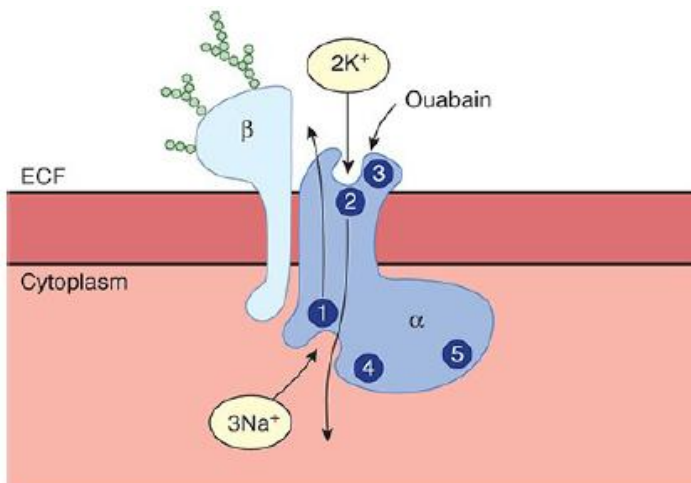
4. Distribution of body fluids



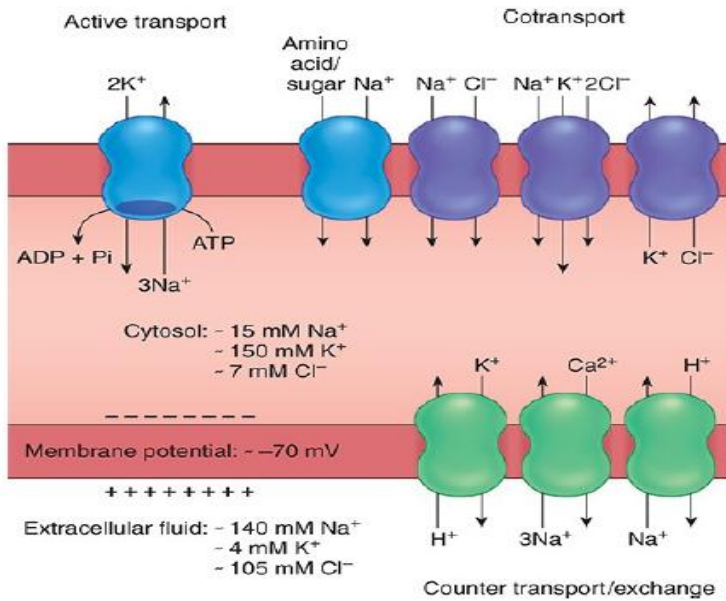
Volume	Indicators
Total Body Water	$^3\text{H}_2\text{O}$, $^2\text{H}_2\text{O}$, Antipyrine
Extracellular Fluid	^{22}Na , ^{125}I -iothalamate, Thiosulfate, Inulin, Sucrose, Mannitol
Intracellular Fluid	(Calculated as Total Body Water - Extracellular Fluid Volume)
Plasma Volume	^{125}I -Albumin, Evan's Blue dye (T-1824)
Blood Volume	^{51}Cr -labeled Red Blood Cells, or calculated as Blood Volume = Plasma Volume / (1 - Hematocrit)
Interstitial Fluid	(Calculated as Extracellular Fluid Volume - Plasma Volume)

5. Na⁺ K⁺ ATPase Pump

- 1 – Na⁺ binding Site 3 – An Ouabain binding site 5 – An ATP binding site
 2 – K⁺ binding Site 4 – Phosphorylation site



6. Composite diagram of Secondary active transport



7. Intercellular Junctions

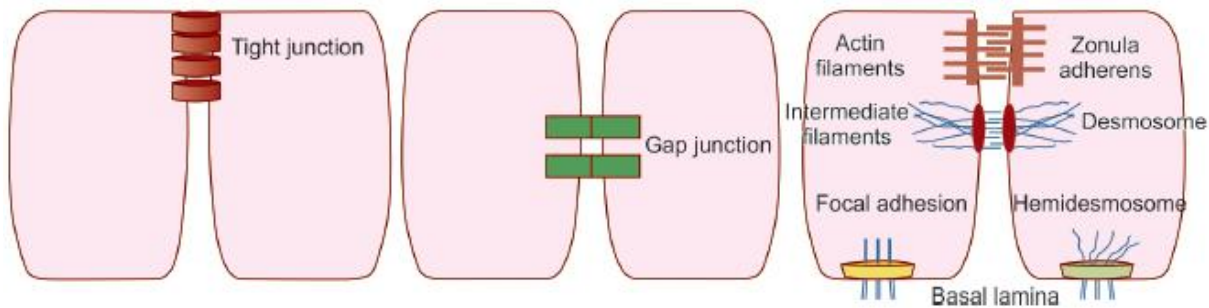
Table 4.5: Types of intercellular connections.

A. Junctions that tie cells together

1. Tight junctions
2. Anchoring junctions
 - a. Cell to cell anchoring junctions
 - Desmosome
 - Zonula adherens
 - b. Cell to basal lamina anchoring junctions
 - Hemidesmosome
 - Focal adhesion

B. Junctions that allow transfer of ions and small molecules

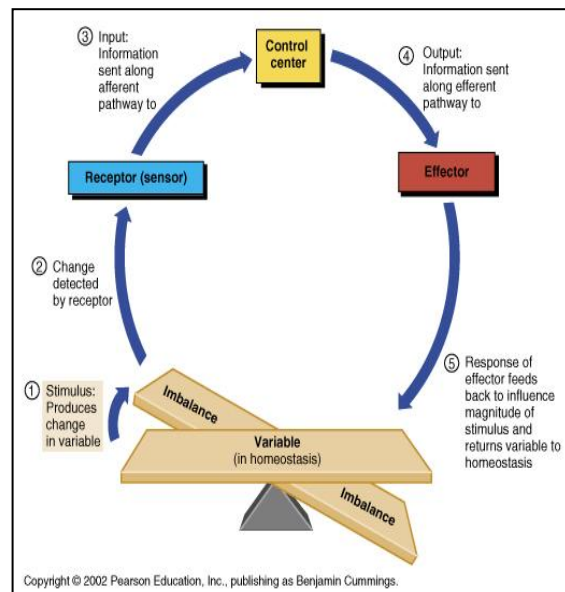
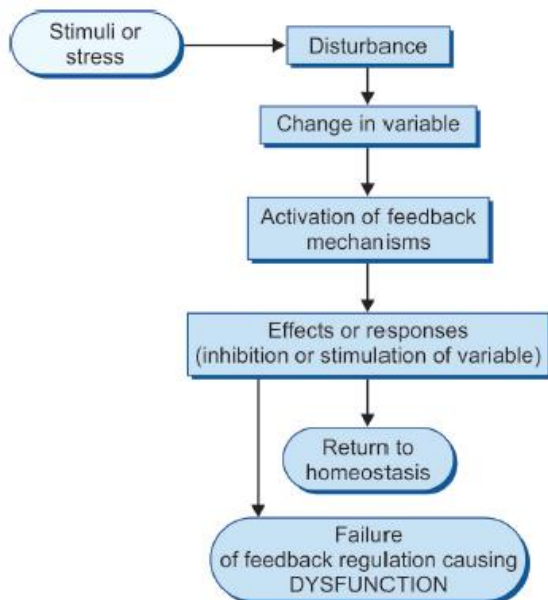
1. Gap junctions



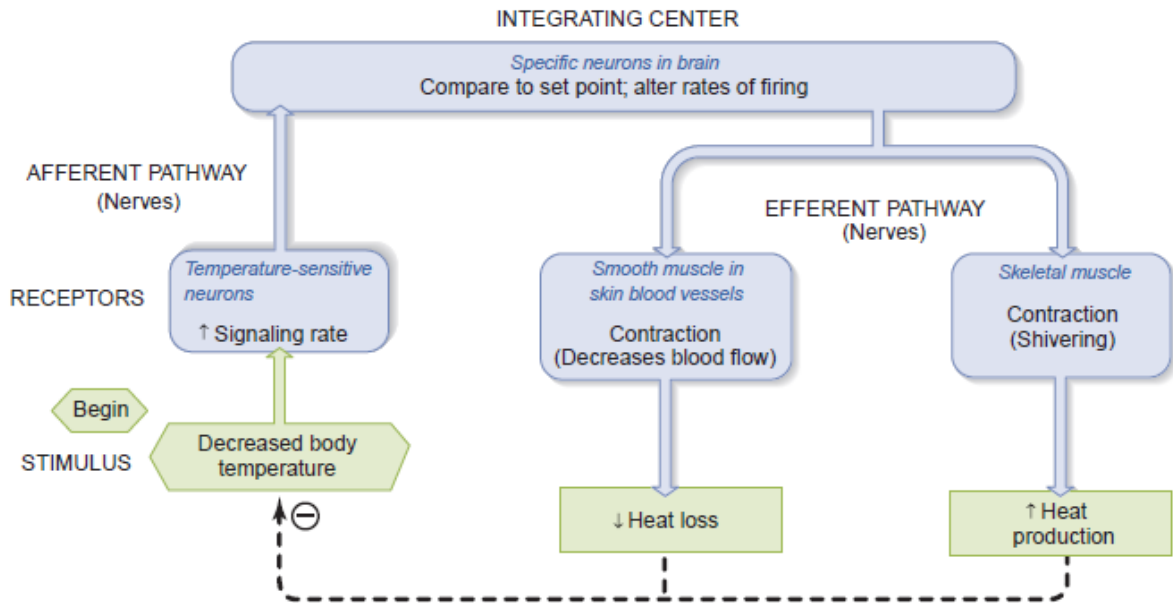
8. Cytoskeletons and its functions

Filament type	Protein subunit	Location	Function
Microfilament	Actin	All cells	Movement of organelles in cytoplasm
Intermediate filament	Several proteins	Cells exposed to frequent mechanical stress	Muscle contraction
Muscle: thick filament	Myosin	All cells – single filaments Muscle cells – bundles of filaments	
Microtubule	Tubulin	Nerve cells	Maintain cylindrical shape
		All cells	Movement of organelles in cytoplasm
		All cells	Chromosome separation during cell division
		Ciliated epithelium	Movement

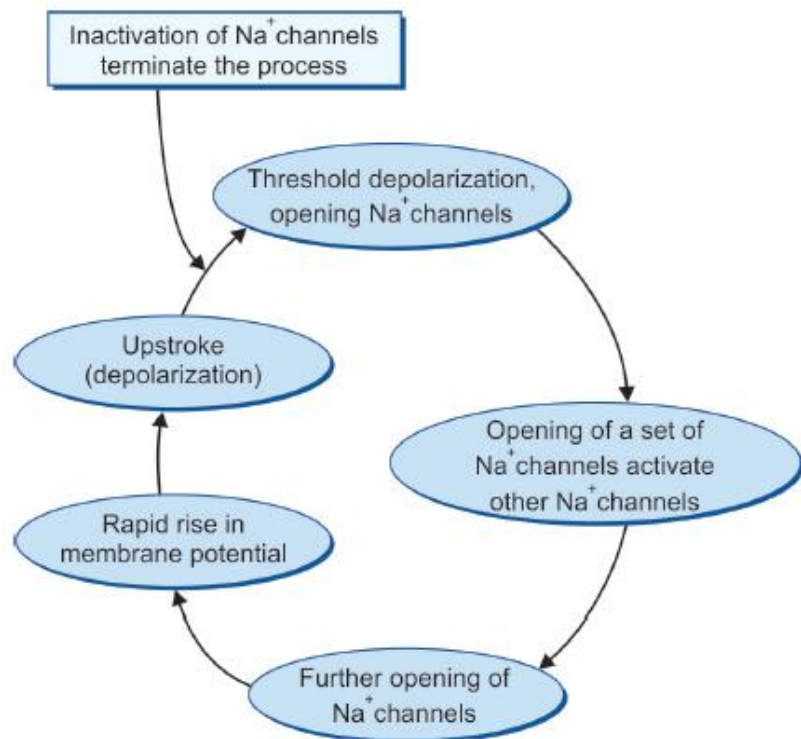
9. Feedback Mechanism of Homeostatic regulation



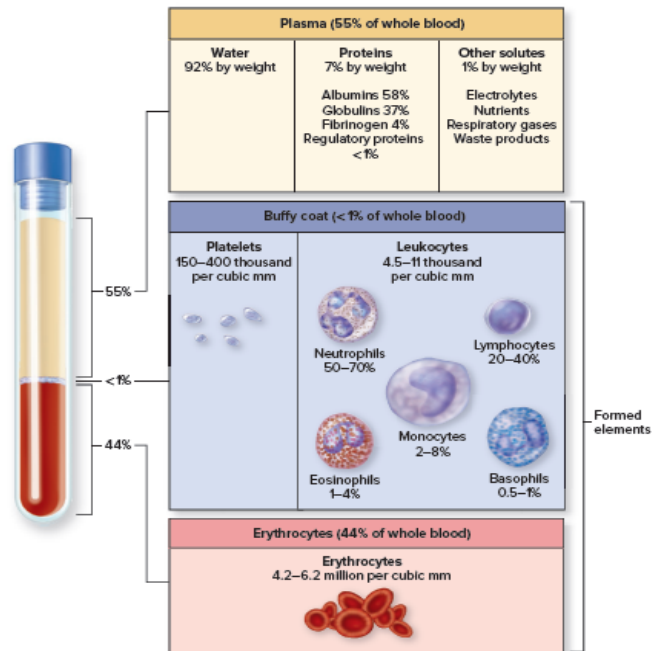
10. Negative feedback mechanism corrects for decreased body temperature



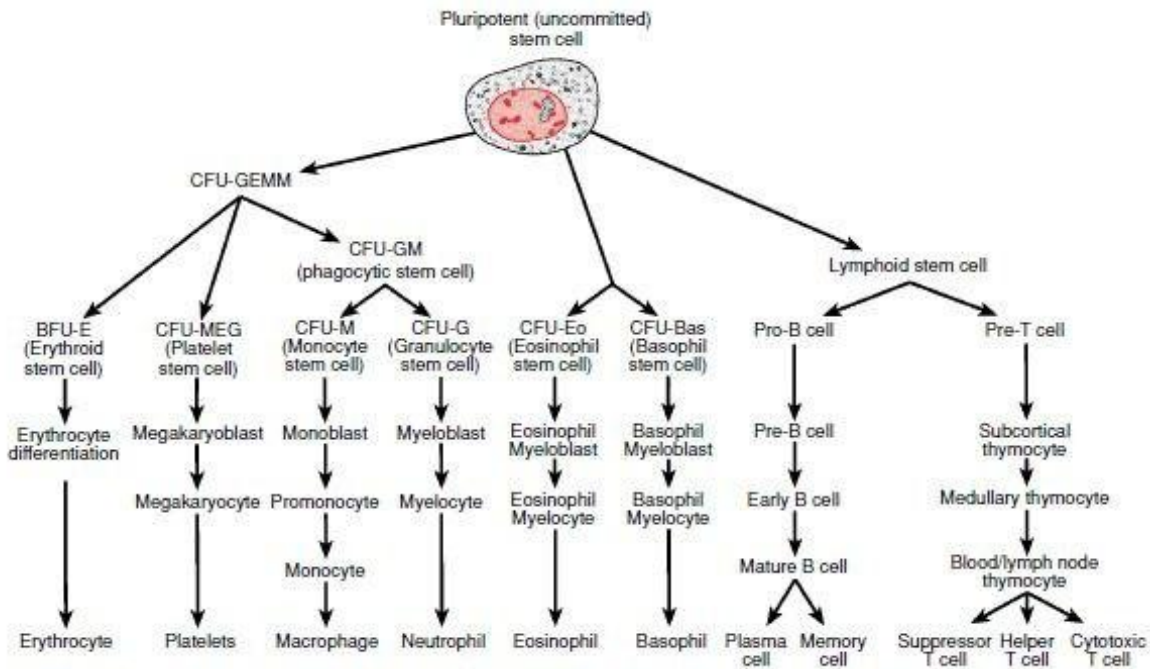
11. Positive feedback mechanism – Depolarization of the Excitable cell (Hodgkin’s cycle)



12. Whole blood composition



13. Origin, differentiation and Maturation of Formed Elements



14. Stages of Erythropoiesis

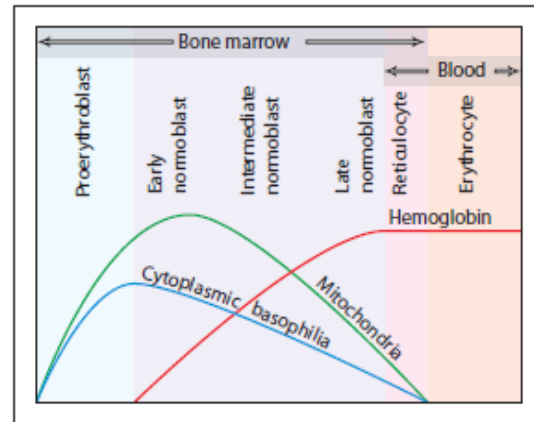
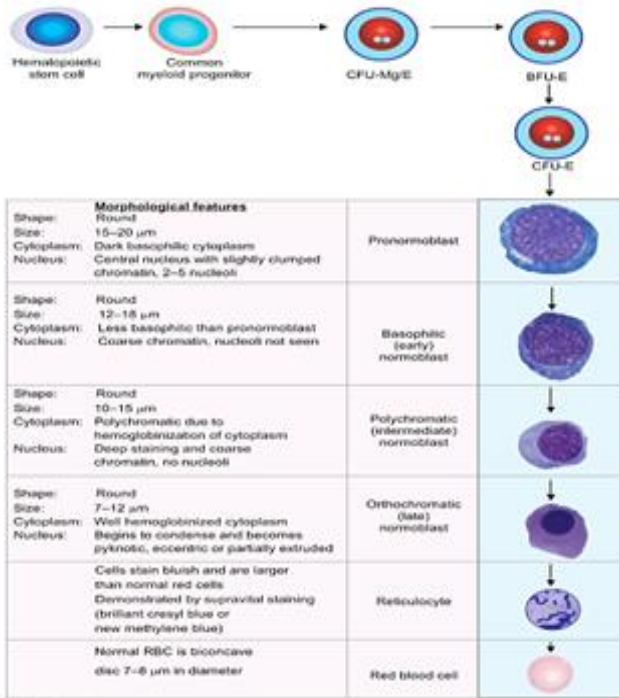


Fig. 32.4 Cytoplasmic changes during erythropoiesis.

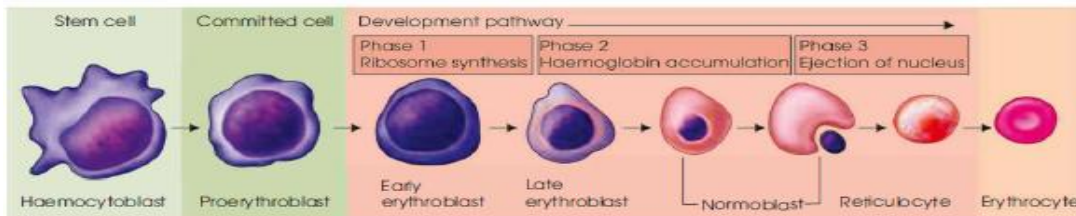
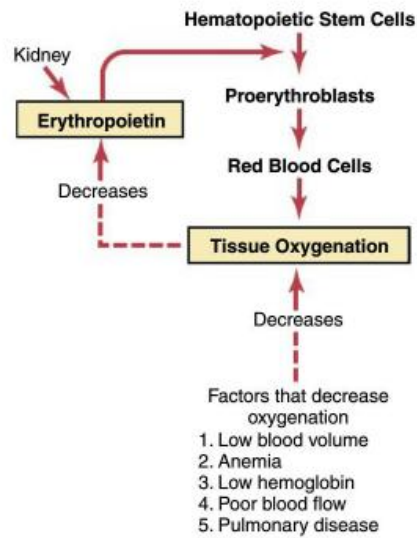


Fig. 12.2: Stages of erythropoiesis

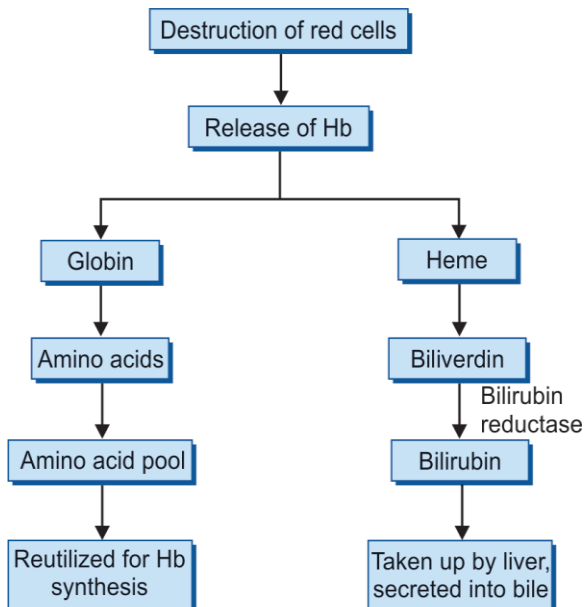
As stages of erythropoiesis proceed, the following changes occur:

- Size of cell reduces
- Nucleus reduces in size and finally disappears
- Nucleolus disappears
- Cytoplasm becomes acidophilic
- Reduced N/C ratio (nucleus/cytoplasm)
- Mitosis reduces
- Haemoglobin concentration increases

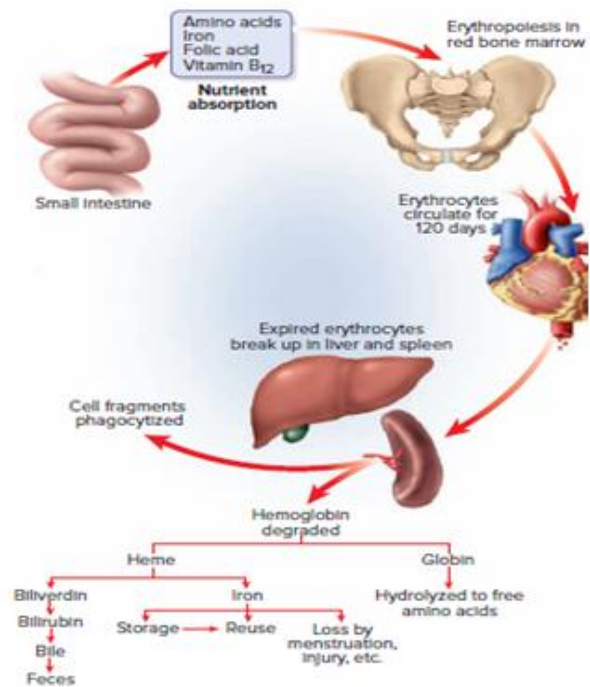
Role erythropoietin in erythropoiesis



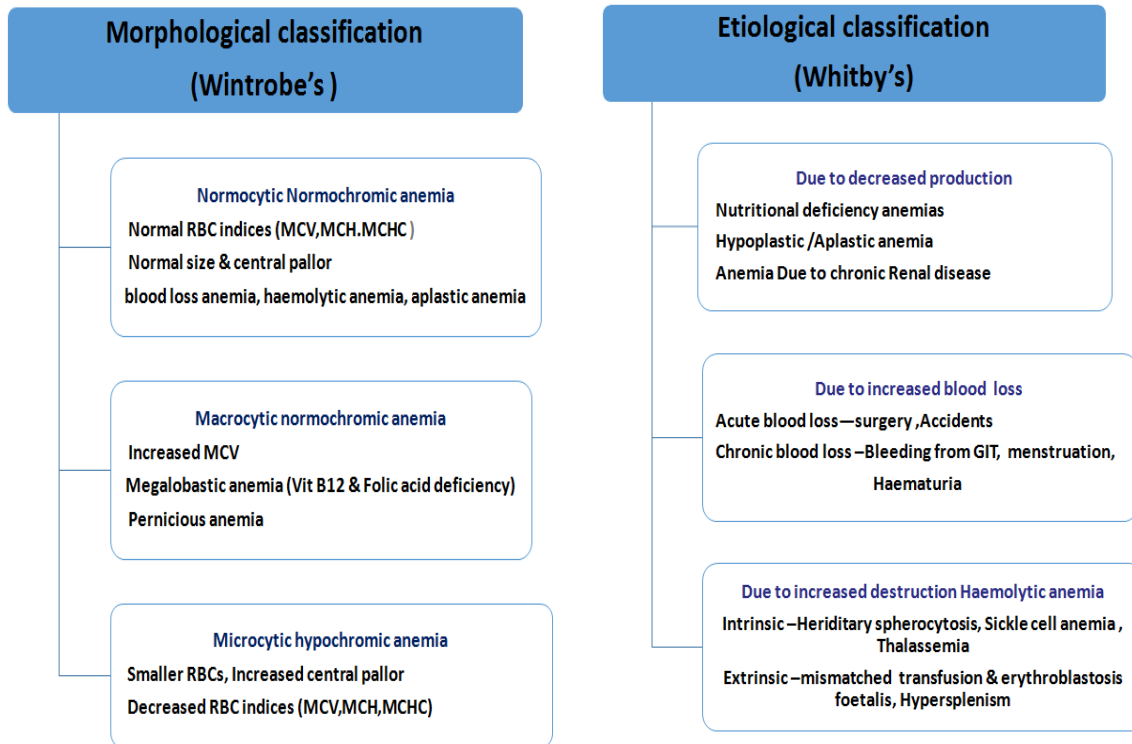
15. Fate of Hemoglobin



Life cycle of Erythrocytes



16. Classification of Anemia

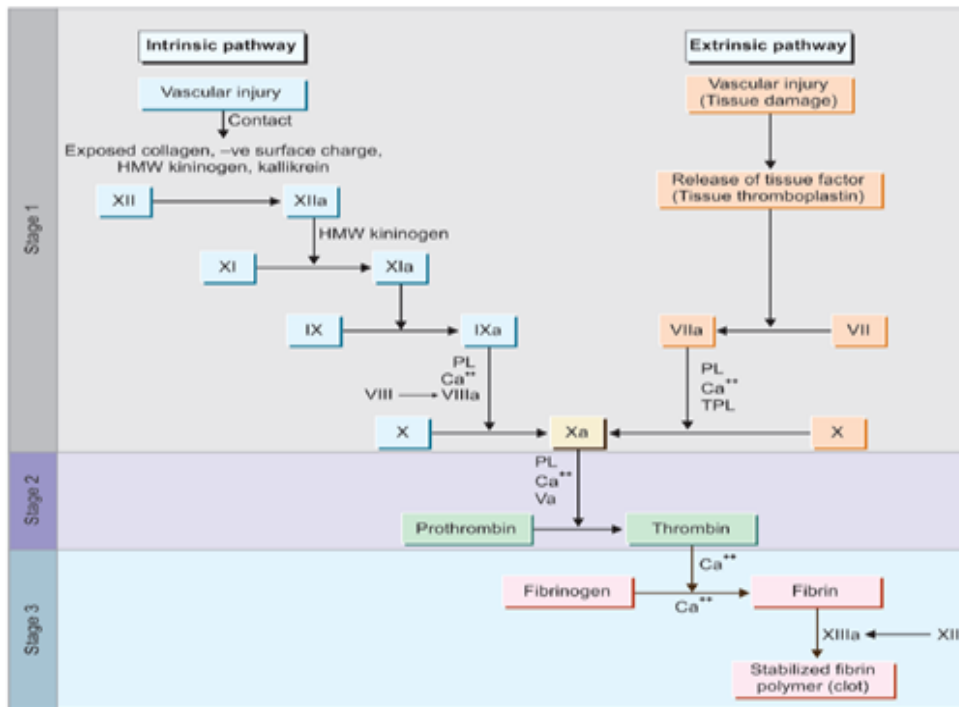
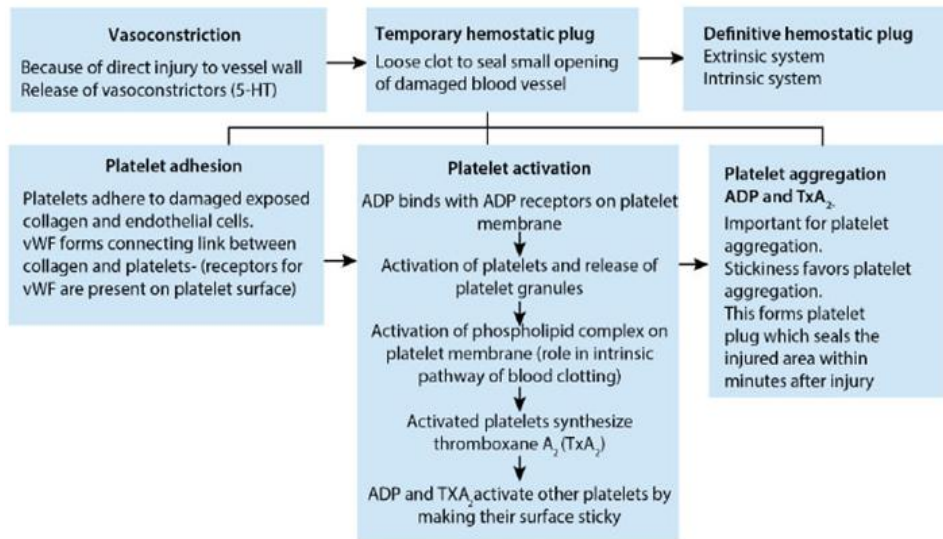


17. Clotting Factors

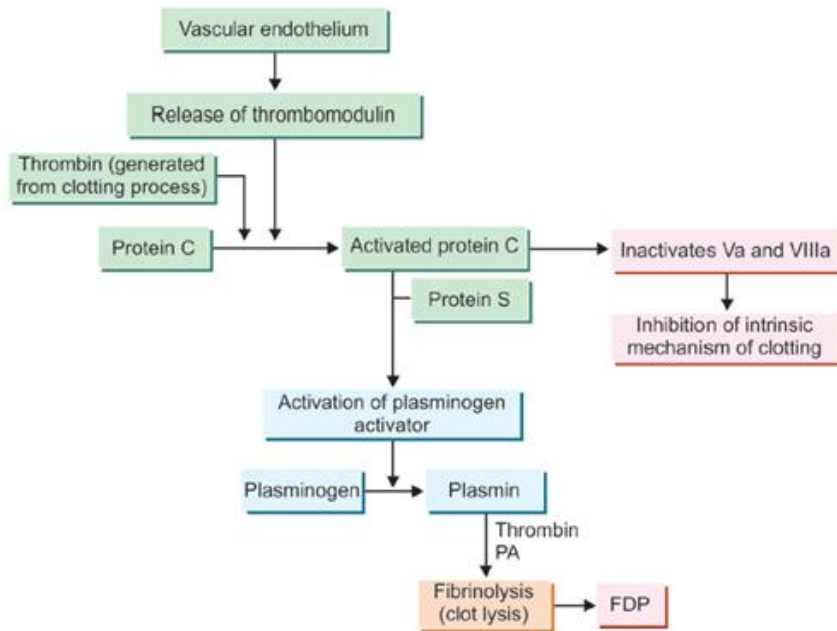
Factors	Name	Extrinsic/ Intrinsic Pathway	Syndrome
I	Fibrinogen	Both	Afibrinogemia (autosomal recessive disorder)
II	Prothrombin	Both	Hypoprothrombinemia (autosomal recessive disorder) decreased synthesis in liver generally due to insufficient vitamin K
III	Tissue factor (thromboplastin)	Extrinsic	-
IV	Calcium	Both	-
V	Proaccelerin	Both	-
VI	does not exist	-	-
VII	Proconvertin	Extrinsic	-
VIII	Antihemophilic factor A	Intrinsic	Hemophilia A (classical hemophilia)
IX	Antihemophilic factor B (Christmas factor)	Intrinsic	Hemophilia B (Christmas disease3);
X	Stuart-Prower factor,	Both	-
XI	Plasma thromboplastin antecedent (antihemophilic factor C)	Intrinsic	Hemophilia C, also known as plasma thromboplastin antecedent (PTA) deficiency (autosomal dominant)
XII	Hageman factor, contact factor	Intrinsic	-

XIII	Fibrin-stabilizing factor	Both	-
	Inhibitors - Protein C - Protein Z - Thrombomodulin - Antithrombin III - Tissue factor pathway inhibitor - Protein Z-dependent protease inhibitor	-	-

18. Steps in Hemostasis & Mechanism of Blood Coagulation



19. Fibrinolytic (Anticlotting) System



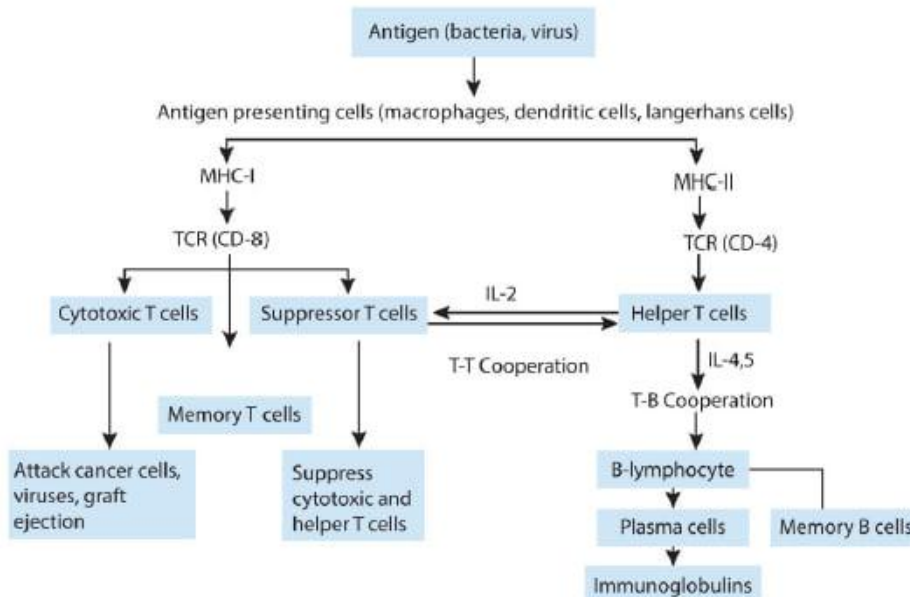
20. Difference between Bleeding & Clotting disorders

Comparison of Bleeding and Clotting Disorders

Test	Bleeding Disorder	Clotting Disorder
Family history	Rare	Usually present
Bleeding from superficial cuts	Profuse	Not unusually increased
Petechiae	Usual	Rare
Deep hematomas	Rare	Usual
Bleeding into joints (hemarthrosis)	Rare	Usual
Bleeding time	Prolonged	Normal
Clotting time	Normal	Prolonged

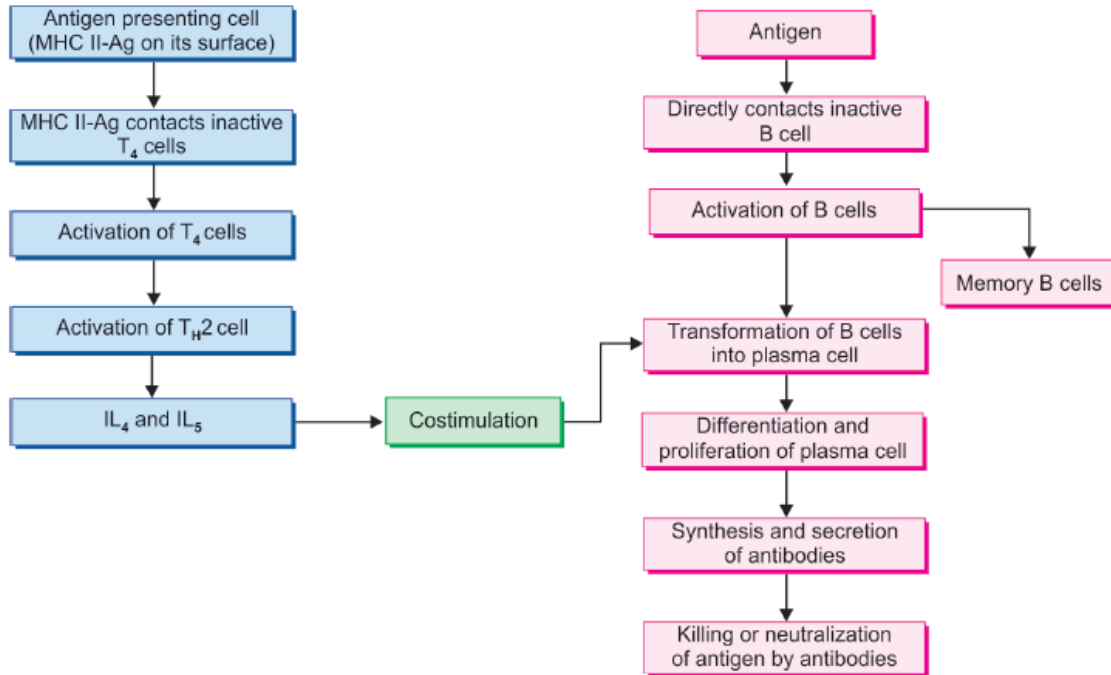
21. Types & mechanism of Immunity

A. Innate (nonadaptive) immunity
1. Nonspecific defenses
2. Relatively specific defense by NK cells
B. Acquired (adaptive) immunity
1. Naturally acquired
a. Active immunity (usually through infections)
- Cellular immunity
- Humoral immunity
b. Passive immunity (transfer of antibody from mother)
- Ig G via placenta
- Ig A via breast feeding
2. Artificially acquired
a. Active immunity
- Vaccination (antigens in vaccines are immunogenic but not pathogenic, stimulate immune responses and produce memory cells).
b. Passive immunity
- I.V. injection of antibodies such as anti-D immunization of Rh -ve mother.

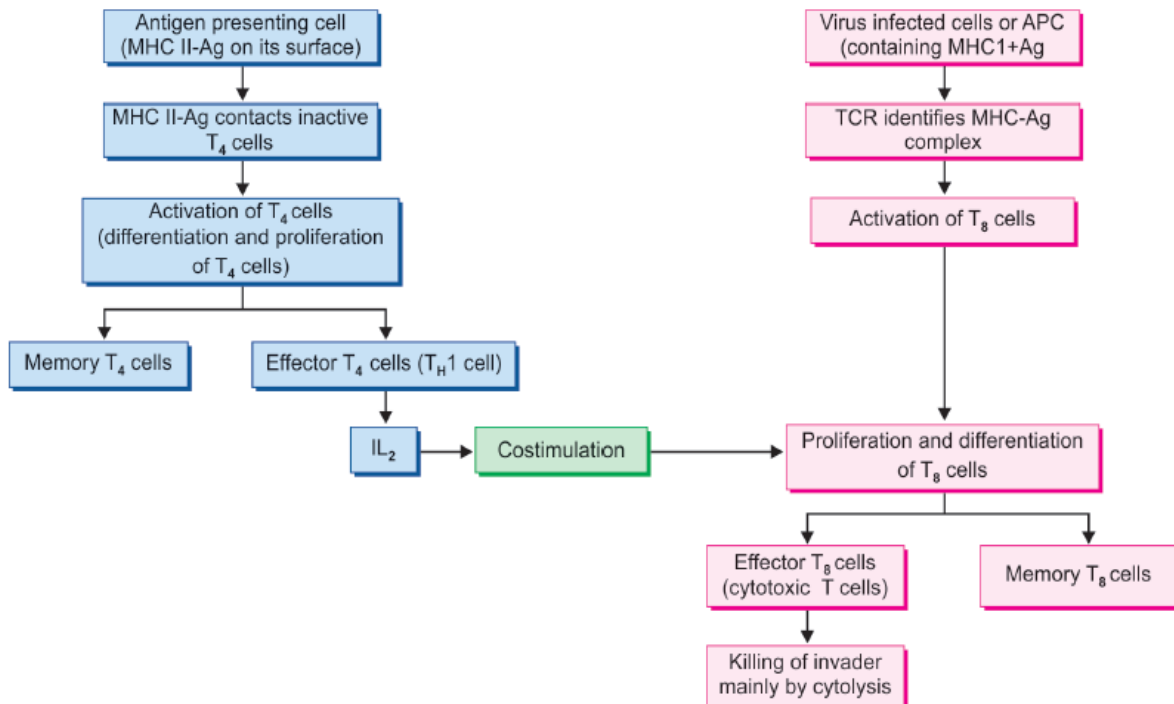


Response of T and B cells on encounter of antigen. TCR, T cell receptor; CD, cluster differentiation.

Mechanism of Humoral immunity



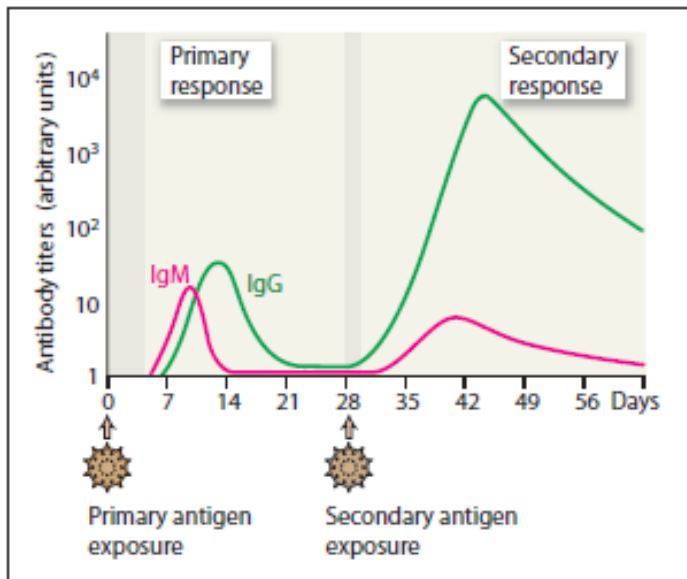
Mechanism of cellular immunity



comparison of Cellular & humoral immunity

Cellular Uses T Lymphocytes				Humoral Uses B Lymphocytes
Primary encounter with foreign cell – cancer cell, virus infected cell, parasites, etc.				Primary encounter with antigen – bacteria, bacterial toxin, some viruses
↓				↓
Cytotoxic T cell ↓ Directly attacks foreign cell (perforins)	Helper T cell (CD4 cells), also called Th1 & Th2 cells ↓ • Secrete interleukins • Recruit macrophages and B cells	Memory T cell ↓ Quick secondary exposure response	Suppressor T cell ↓ • Suppresses immune response • Regulatory role	Plasma cells ↓ Antibodies – IgM, IgG, IgA, IgD, IgE Memory B cells – helps in a quick secondary exposure response

22. Primary and Secondary Immune Response



23. Mononuclear macrophage System

