



RAJASTHAN

PHARMACIST

Rajasthan Subordinate & Ministerial Services Selection Board

Part – B
Volume – 2

Human Anatomy and Physiology



RAJASTHAN PHARMICIST

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Human Anatomy and Physiology

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Human Anatomy and Physiology

* Anatomy ⇒

It is a branch of medical science which deal with the study of structure of Human's body organ.

Surgery is more important for Anatomy

* Physiology ⇒

It is branch of medical science which deal with the study of function of Human's body organ. Physiclan is more important for physiology

Human Body

Consist of various system

Each system consist of various organ

Each organ consist of various tissue

Each tissue consist of cell

cell

* Cell ⇒

It is the smallest unit of the Human body

⇒ Cell is defined as the functional and structural unit of body.

* TISSUE *

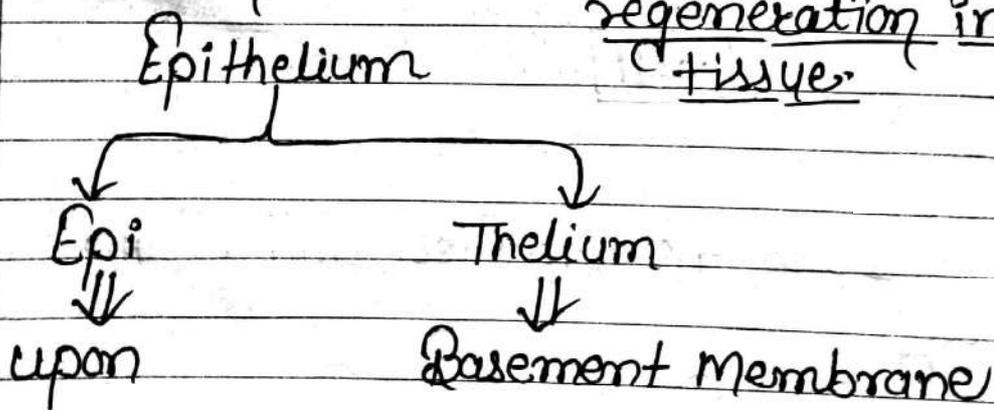
* Definition ⇒ Group of cell known as tissue.

* Histology ⇒ It is a branch of medical science which deal with the study of tissue.

* Type of tissue in Human Body ⇒ There are four type of tissue present in Human body:-

- (1) Epithelium tissue
- (2) Connective tissue
- (3) Muscular tissue
- (4) Nervous tissue

1) Epithelium Tissue ^(13/1) ⇒ Maximum power of regeneration in epithelium tissue.



⇒ This tissue grow upon the basement membrane, usually Avascular in nature.

Teacher's Signature

⇒ This tissue is present outside of the Human body (epidermis), Inner wall of the visceral organ, Inner wall of digestive, Inner wall of Blood vessels + Heart and glands.

* Classification of Epithelium Tissue ⇒

① Depend upon the layer of cells

② Depend upon the shape of cell

(A) Simple Epithelium

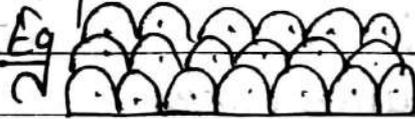
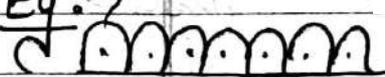
(B) Stratified epithelium

Single layer epithelium

Multiple layer epithelium

Eg: ⇒

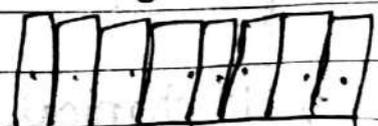
Eg: ⇒



(A) Squamous epithelium

(B) Cuboidal Epithelium

(C) Columnar Epithelium



* Functions of Epithelium tissues → This tissue responsible for →

- (1) protection (skin)
- (2) secretion (Digestive juice & Hormones)
- (3) Absorption

2) Connective Tissues →

Definition →

Connective tissue is responsible connect, separate or to provide mechanical support to Human Body

Connective tissue is classified as →

(A) Mechanical
Connective tissue



It include bone,
Cartilage



osteoblast → Bone forming cell
osteoclast → Bone destroying cell
chondroblast → Cartilage forming cell

(B) Fibrous
Connective
Tissue



(C) Vascular
Connective
Tissue



Eg → Blood &
Lymph



The vascular connective tissue contain liquid matrix. (PK as fibre connective tissue)

⇒ Mechanical Connective tissue is responsible

2nd Heart of Human Body → Calf Muscle

to provide mechanical support to the Human body.

② Fibrous Connective Tissue →

It include: →

* Fibroblast

* Adipocytes

* Elastic fiber

* Collagen fiber

* Ligament

* Tendon

* Ligament →

⇒ It is the one type of fibrous connective tissue which join bone from bone

⇒ Strongest ligament ⇒ Anterior Cruciate Ligament

* Tendon →

It is also is type of fibrous connective tissue which join bone from muscle

⇒ Strongest tendon of Body ⇒ Achilles tendon

OR

Heal cord OR

Calcaneous tendon

↓

which joint → Heal bone to calf muscle.

Pathy \rightarrow Dysfunction
Myo \rightarrow Muscles

Q ~~Q~~ A vascular connective known as false connective tissue because it contain liquid matrix and there cell no present nucleus.

Q In fibrous C-T is it true because it contain solid matrix & nucleus present in cell.

3] Muscular Tissue (45% AIC to weight)
 \Rightarrow Muscular tissue consist of muscles

\Rightarrow Muscles are responsible for the contraction and movement of body part.

* Myocytes \Rightarrow Muscle forming cell

Myogenesis \Rightarrow The process of muscle formation

Classification of Muscles

Features	Skeletal Muscle ↓	Smooth Muscle ↓	Cardiac Muscle ↓
① Location	Found in skeletal	Found in smooth organ/visceral organ	Found in Heart (Myocardium)
② Nature	Voluntary Nature	Involuntary Nature	Involuntary
③ Striation	striated	non-striated	striated

* Total no. of skeletal muscle ⇒ 639

* Sarcomere ⇒ It is the functional & structural unit of skeletal muscle.

* These muscle are commonly presented in skeletal system, oral cavity, External Anal Sphincter of Anus, External Sphincter of Bladder

Q ⇒ Muscular tissue makes the maximum quantity of tissue

Teacher's Signature

4) Nervous Tissue
Nervous tissue are consist of neurons.

Q ⇒ Synapse The junction by which the neurons communicate to each other.

Functions ⇒

This tissue is responsible to send the impulses to body part for function.

* The nervous tissue cannot be divided because due to lack of centrioles, so it has minimum power of regeneration.

Types of Neurons ⇒

① Sensory Neuron/Afferent ⇒

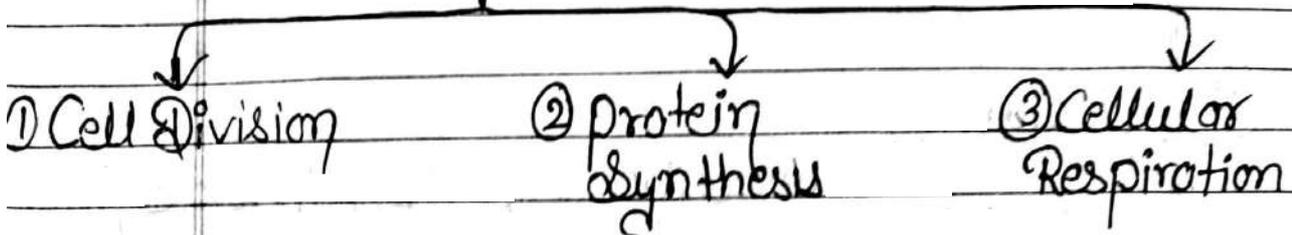
They carry the impulses from body part to Brain.

② Motor/Efferent Neuron ⇒

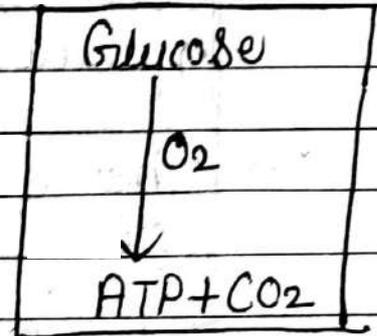
They carry the impulses from Brain to body brain.

③ Mixed Neuron ⇒ Both sensory neuron and motor neuron

* "CELL" *



⇒ Cell word is a greek word.



⇒ The discovery of cell was made by Robert Hook

⇒ The word "cell" is taken from the word "Cella" which means "small rooms."

* Depend upon the presence or absence of nucleus, the cells is classified as

(A) prokaryotic cell



Nucleus is absent

(B) Eukaryotic cell



Nucleus is present

* Terminology

① Cytoplasm \Rightarrow The liquid portion inside the cell b/w the cell membrane and nuclear membrane.

\Rightarrow The cytoplasm contain about 70% of water.

② Cytosol \Rightarrow The liquid portion of cytoplasm is known as cytosol.

③ Nucleoplasm \Rightarrow The liquid portion b/w the nuclear membrane and nucleus.

④ Protoplasm \Rightarrow

protoplasm = cytoplasm + nucleoplasm

⑤ Cytology \Rightarrow It is branch of medical science which deal with the study of cell.

* The cell has studied under 3 Headings:→

- (1) Cell membrane
- (2) Cytoplasm
- (3) Nucleus

(1) CELL-MEMBRANE →

→

The cell membrane is the most outer part of the cell. which is responsible:→

* To provide the shape of the cell, also responsible for the protection of organelles

Composition of cell membrane →

The cell-membrane consist of:→

- (1) protein → Glycoprotein (55%)
- (2) Lipid → Phospholipid (45%)
- (3) CHO → 5%

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Q The nature of cell membrane is selective permeable or semipermeable.

(2) CYTOPLASM → (70% water)

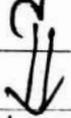
Cytoplasm contain cell organelles

These are:→

- (A) Endoplasmic Reticulum (ER)

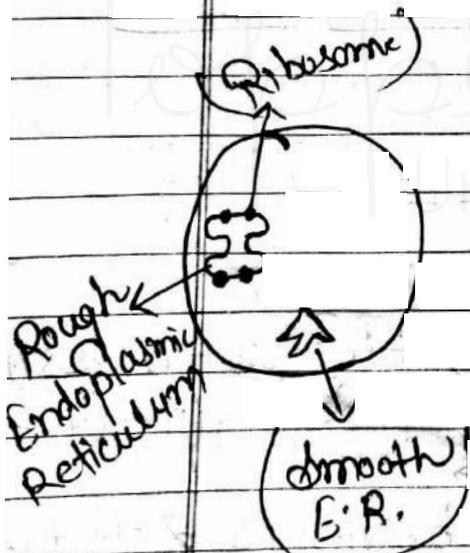
ER (Endoplasmic Reticulum)

(A) Rough E.R.

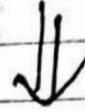


⇒ Ribosomal granules present on its surface

Function → Protein Synthesis



(B) Smooth E.R.



* Ribosomal granules absent on its surface

* Function →
① Formation of lipid Steroids & Cholesterol

② It is responsible for the detoxification of toxic substance

(Non toxic → Toxic)
③ The Smooth E.R. which are present in skeletal muscle are also known as ~~case~~ Sarcoplasmic Reticulum, & also responsible for the storage of Ca.

(B) Golgi Apparatus →

Also known as "post-office" of the cell. Because transportation of protein.

⇒ It is responsible for the processing, packaging & transport of protein from one part to other part of cell.

⇒ Golgi apparatus is situated near the nucleus

(C) Lysosome ⇒

⇒ Lysosomes are the defensive structure of the cell

⇒ It contains the enzymes [Lysozyme/Hydrolytic Enzyme]

⇒ Lysozyme or Hydrolytic enzymes are responsible for the destruction of Bacteria, virus or foreign organism.

⇒ When the lysosomes are deprived from oxygen, they rupture, and Lysozymes come out, Lysozymes destroy the cell's organelles, so, the lysosomes are also known as suicidal bag of the cell.

Q Lysosomes are also known as Garbage system of cell.

(D) Mitochondria ⇒

⇒ Mitochondria is the also known as "power house of the cell" because it is responsible for maximum

ATP production. By the process of oxydative-phosphorylation.

① ⇒ Mitochondria also contain non-genetic DNA.

(E) Centrioes (Centrosome) ⇒

⇒ These are cylindrical structure present inside the cytoplasm near the nucleus.

⇒ These are responsible for the movement of chromosome during the cell division.

② All above organs are membrane bounding Organelles.

(F) RTBosome ⇒

⇒ Ribosome are the membrane less structure.

⇒ It is formed by :-

- (1) Protein
- (2) RNA

⇒ Ribosomes has two types :-

- a) Bounded Ribosome → on Rough E.R.
- b) Free Ribosome → Inside the Cytoplasm.

- ⇒ These are responsible for protein synthesis
- ⇒ Ribosome are also known as "Engine of cell" because initial of protein synthesis
- ⇒ Ribosome are also known as "protein factory of cell".

(G) Microtubules & Microfilaments ⇒

⇒ These are the membrane less structure

⇒ They are Responsible to provide the mechanical support

⇒ These structure also known as "Cytoskeleton of the cell".

Central-vacuoles ⇒



Membrane bound organelles.

Responsible → Storage function