TISSUES AND ITS TYPES

INTRODUCTION

- Cells are the body's smallest functional units they are grouped together to form **tissues**, each of which has specialized functions,e g.blood , muscle

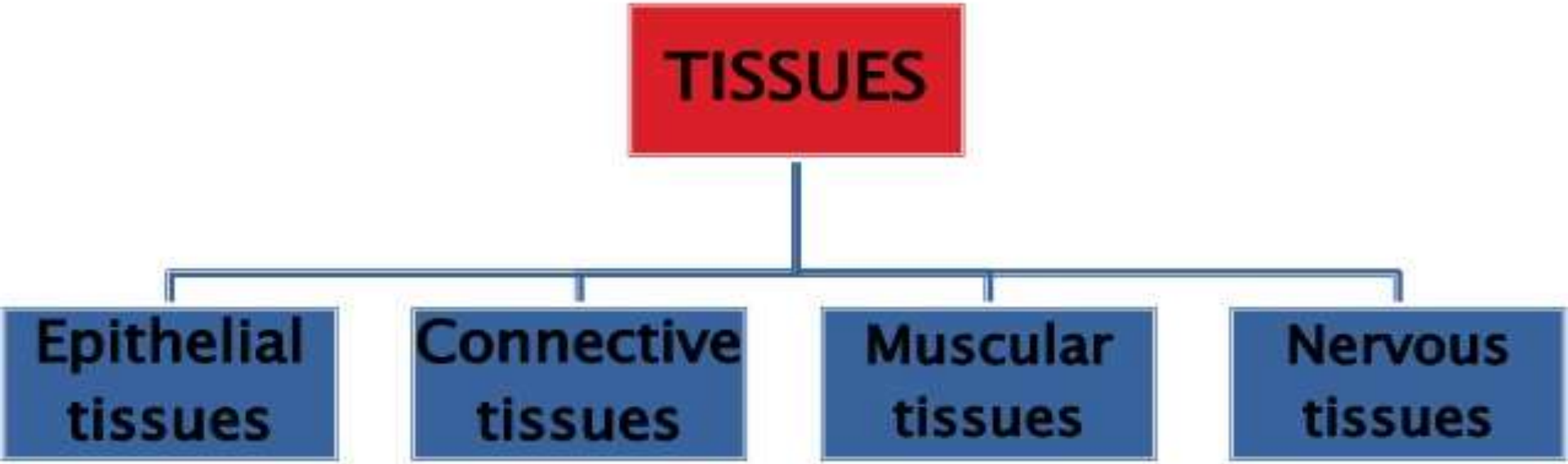
- Study of tissues is called **histology**.

- Tissues are grouped together to form **organs** e.g heart,stomach ,brain.
- Organs are grouped together to form **system**,each of which performs a particular functions.eg digestive system

TISSUES

- **DEFINITION:**
- Tissue is a collection of cells which have similar structure and perform relatively common functions.

TYPES OF TISSUES

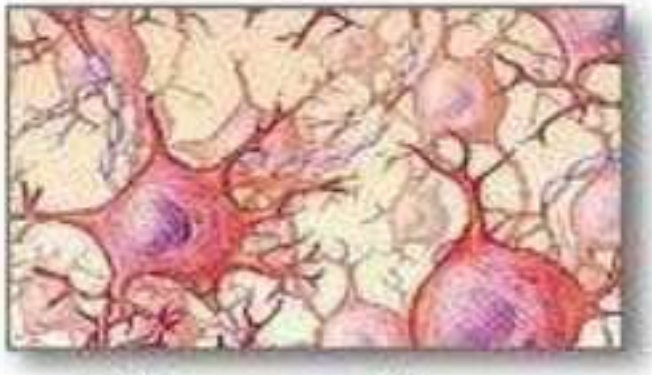


Four types of tissue

Connective tissue

Epithelial tissue

Muscle tissue



Nervous tissue

A.D.A.M.

EPITHELIAL TISSUES

CHARACTERISTICS

- Cells are closely packed without any intercellular spaces
- Lie on basement membrane

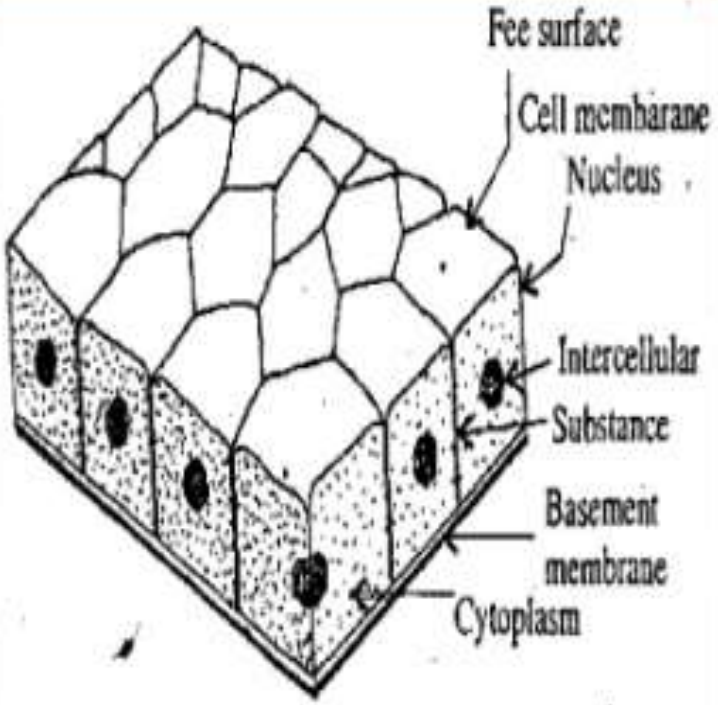


Fig. 10.1 General Structure of Epithelia

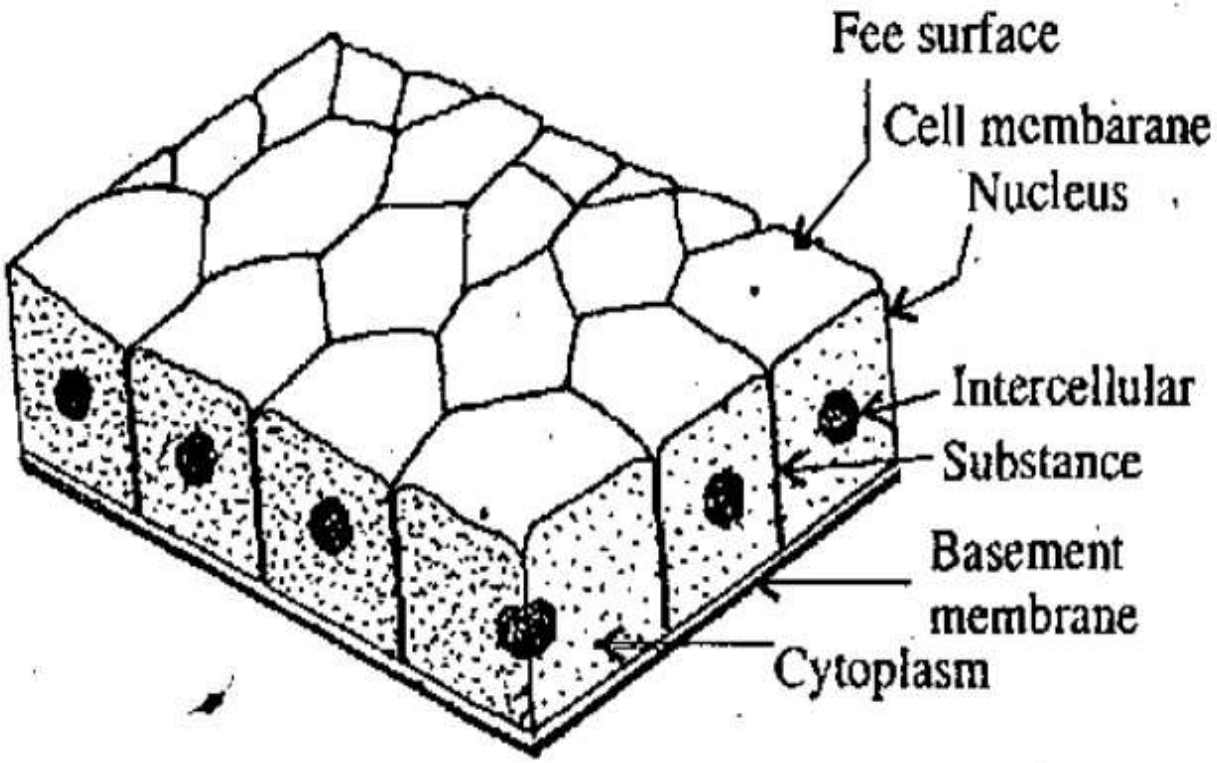
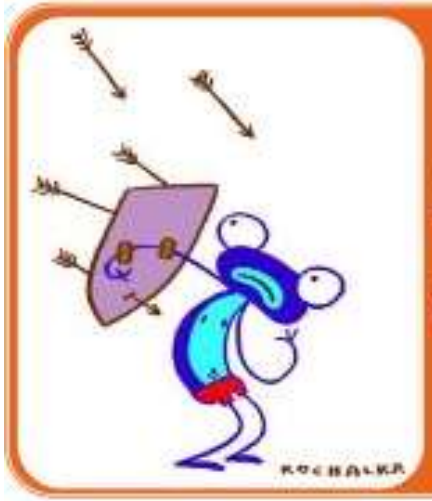


Fig. 10.1 General Structure of Epithelia

LOCATION

- Found covering the body and lining cavities and tubes. Outer and inner linning of most of the body organs such as gastrointestinal tract(GIT), urinary tract , blood vessels, heart chambers uterus.
- Found on the entire exposed surface of the body such as skin.
- Also found in glands

FUNCTIONS OF EPITHELIAL TISSUES



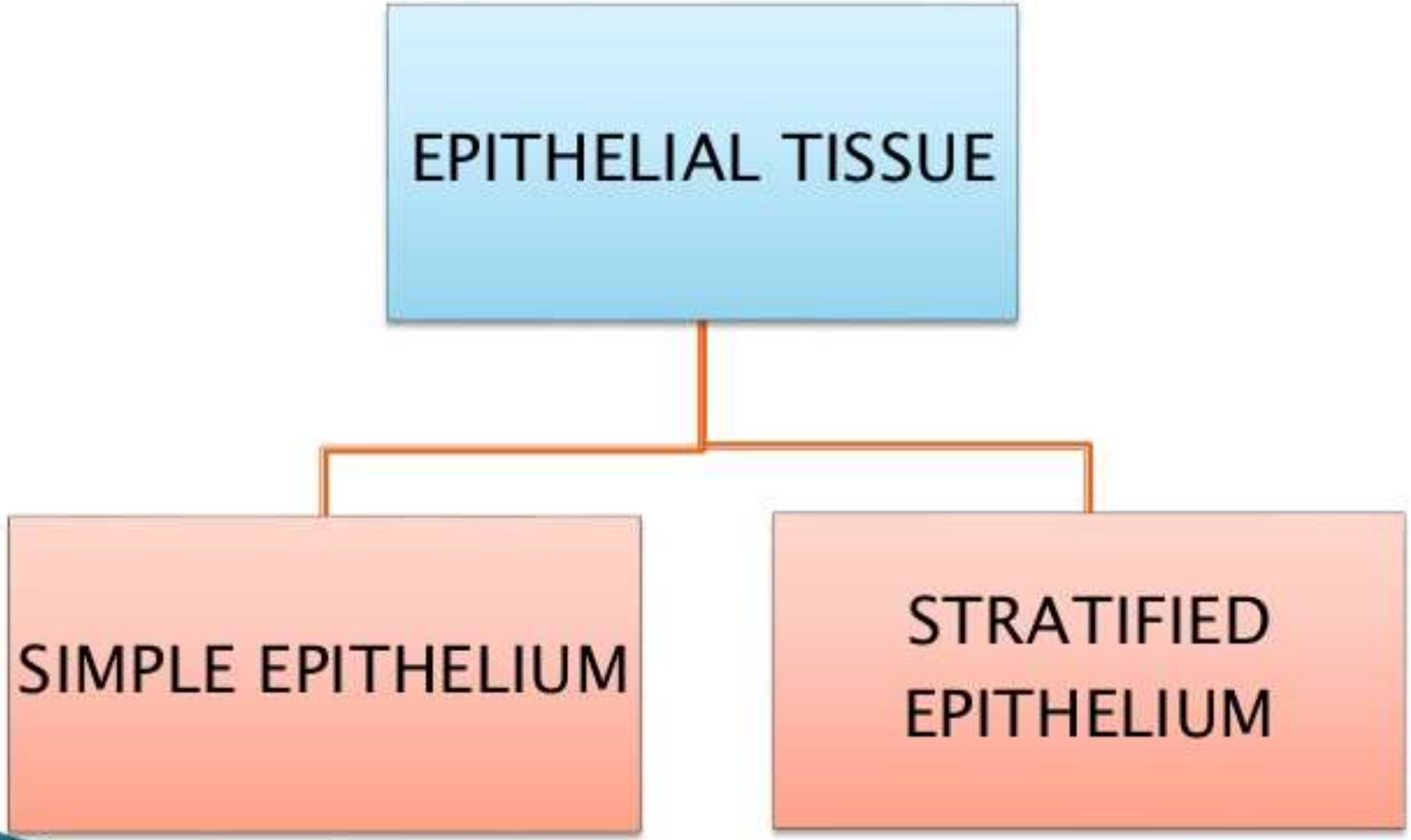
Role of defense and protect body organs

Secret gastric juice in stomach.

FUNCTIONS CONT....

Absorb digested food in intestine.

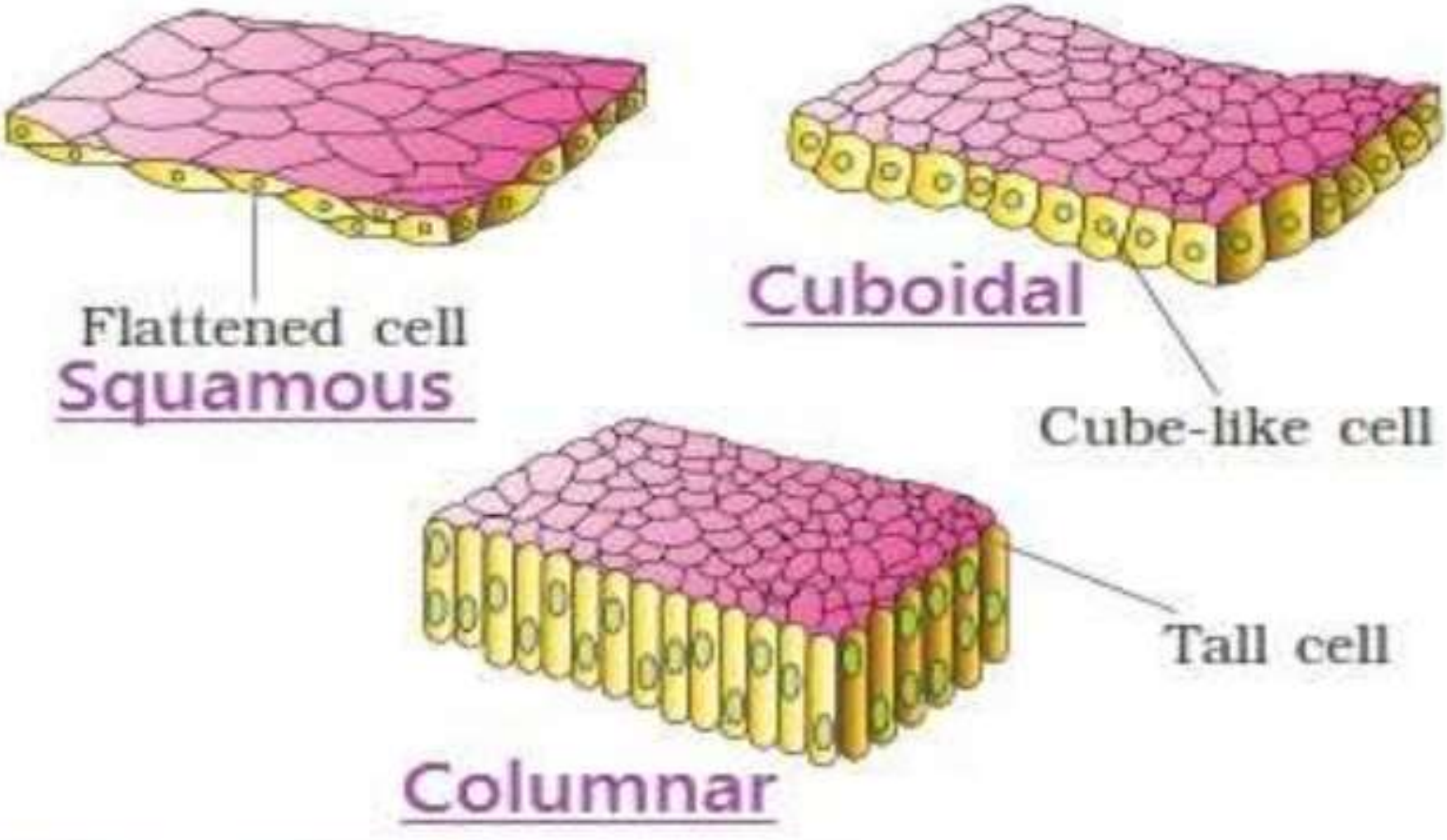
Removes waste as sweat in skin.


EPITHELIAL TISSUE
SIMPLE EPITHELIUM
STRATIFIED EPITHELIUM

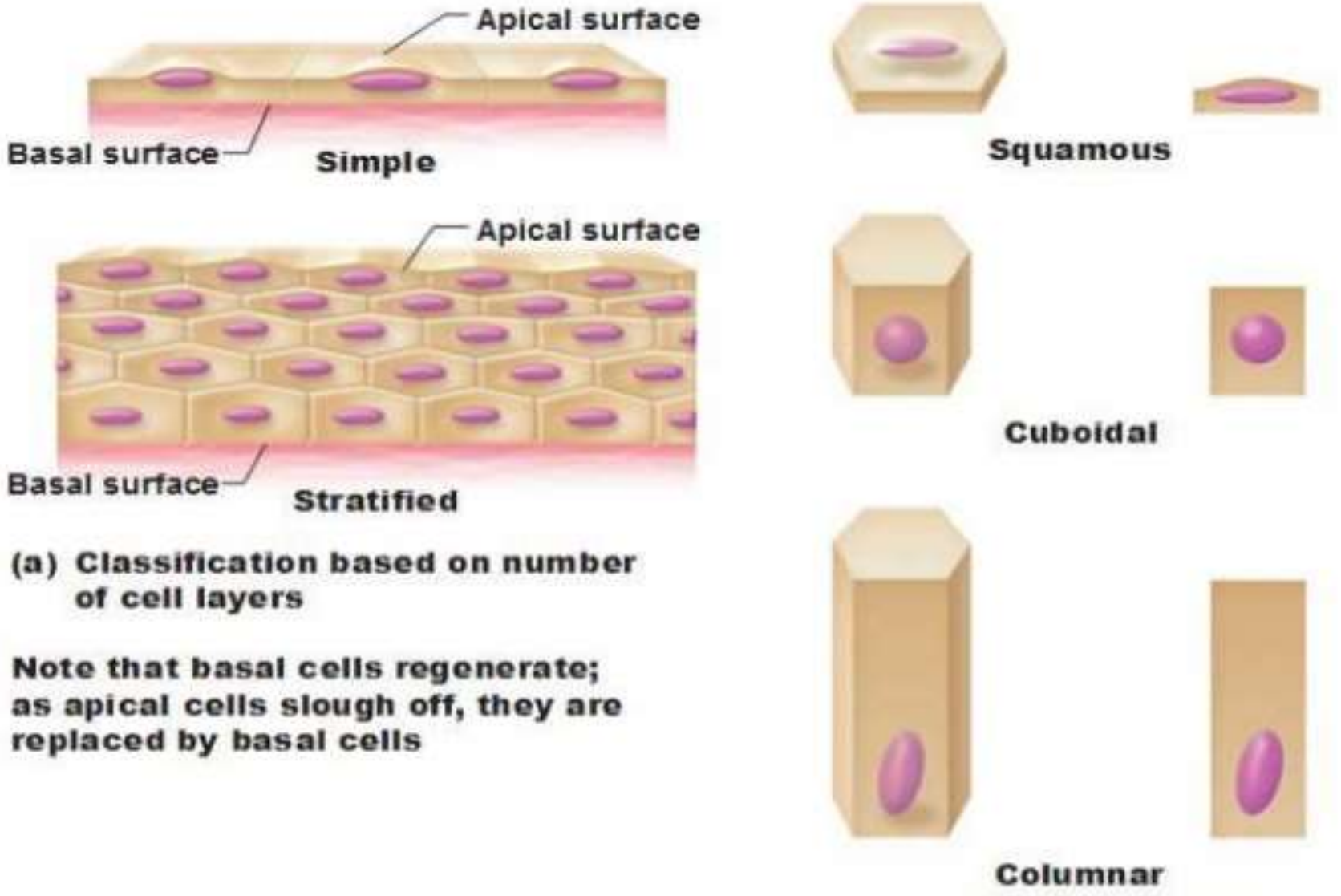
SIMPLE EPITHELIAL TISSUE

- Consists of a single layer of identical cells
- Found on absorptive or secretary surfaces
- Divided into three main types.

TYPES OF SIMPLE EPITHELIUM TISSUE



Classifications of Epithelia

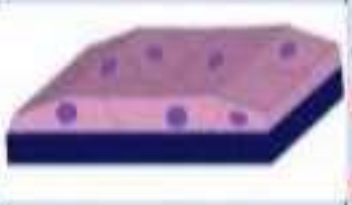
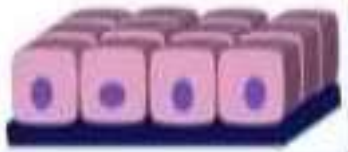


(a) Classification based on number of cell layers

Note that basal cells regenerate; as apical cells slough off, they are replaced by basal cells

(b) Classification based on cell shape

DIFFERENT TYPES OF SIMPLE EPITHELIUM TISSUE

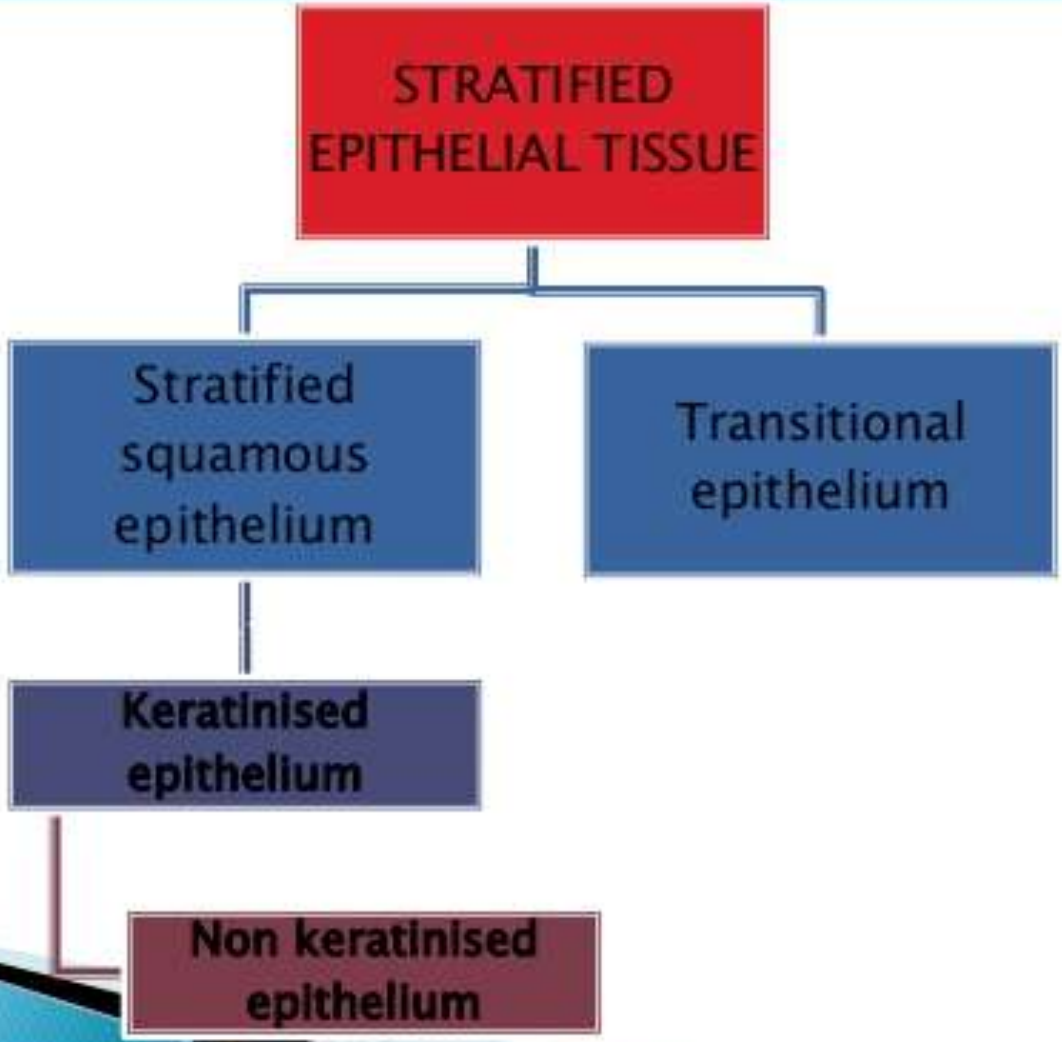
Type of Epithelium	Structure	Location in the body	Function
Squamous epithelium 	Cells are thin, flat, irregular cells which fit like floor tiles to form delicate lining called **PAVEMENT EPITHILIUM** **Nuclei in centre**	Oesophagus,lining of mouth, alveoli of the lungs, blood vessels	Protects the underlying tissue from injury,grems Exchange of gases in lungs and materials between cells and blood
Cuboidal epithelium 	Cells are cuboidal with round nucleus in centre **Nuclei in centre**	Kidney tubules, duct of salivary glands	Gives mechanical support At times the epithelial tissue folds,forms a gland that secretes substances. Such epithilium is called **GLANDULAR EPITHILIUM**
Columnar epithelium 	Cells are more tall and less wide (**PILLAR LIKE**), placed side by side. Nucleus is situated near the base. (Rectangular shape) **Nuclei near base**	Inner lining of intestine, In respiratory tract,cells have cilia (hair like) that move and push the mucous to clear it.Such epithilium is called **CILIATED COLUMNAR EPITHILIUM**	Helps in absorption excretion and secretion

STRATIFIED EPITHELIAL TISSUE

Characteristics

- Consists of several layers of cells of various shapes.
- Continual cell divison in the lower layers pushes cells above nearer and nearer to the surface where they are shed.
- Basement membrane are usually absent.
- Main function is to protect underlying structure from mechanical wear and tear.

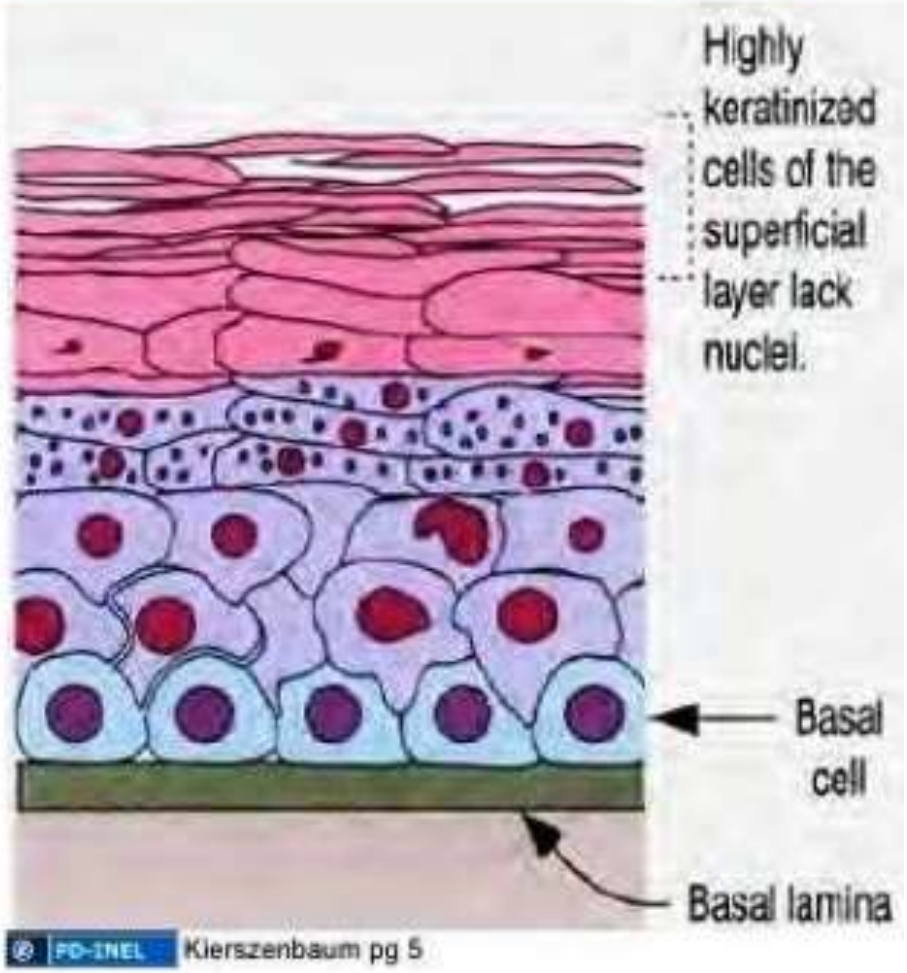
TYPES OF STRATIFIED EPITHELIAL TISSUES



KERITINISED SQUAMOUS EPITHELIUM

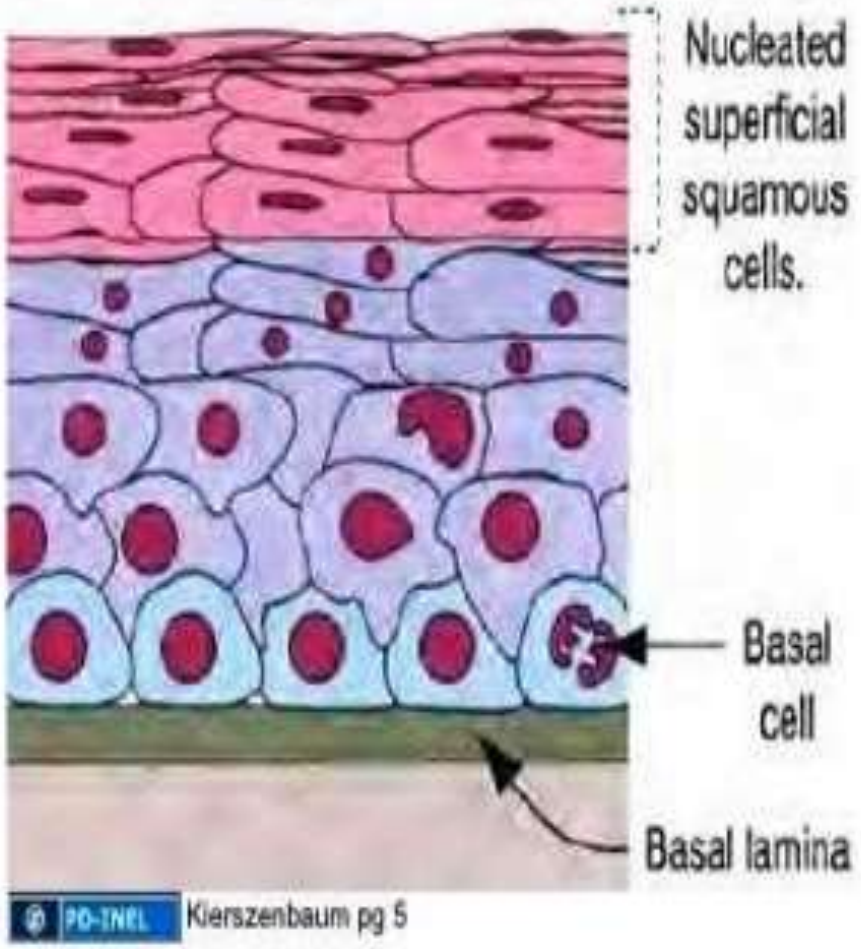
- Found on dry surfaces subjected to wear and tear.
- Consists of dead epithelial cells that have lost their nuclei and contain the protein keratin.
- **Sites**

  Skin, hairs and nails



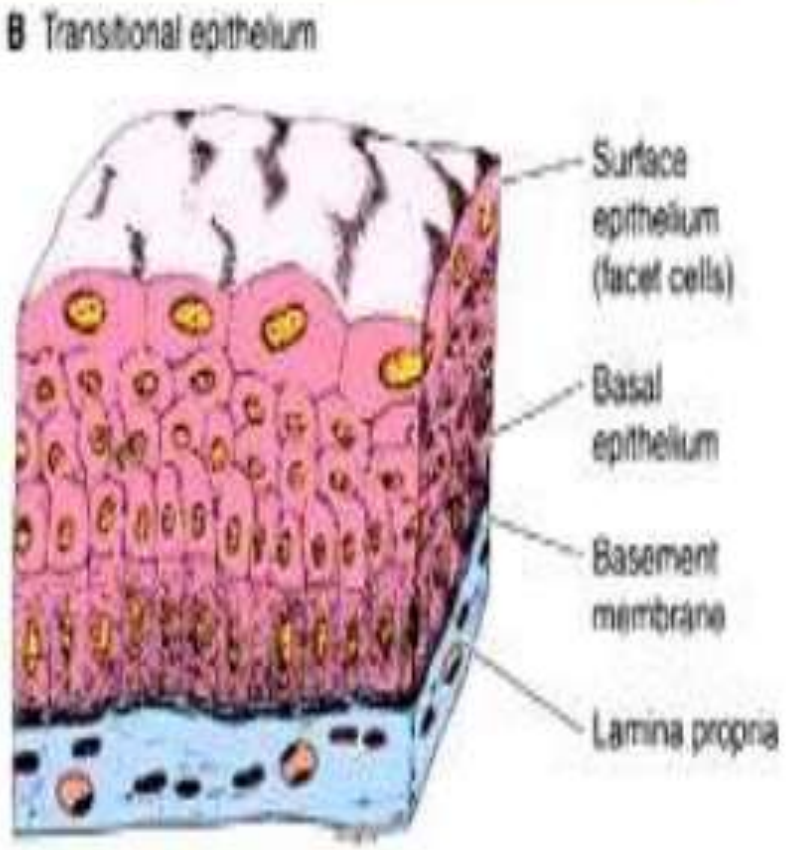
NON-KERATINISED EPITHELIUM

- Protects moist surfaces subjected to wear and tear and prevents them from drying out.
- **Sites**
- Conjunctiva of the eyes, the lining of the mouth, the vagina.



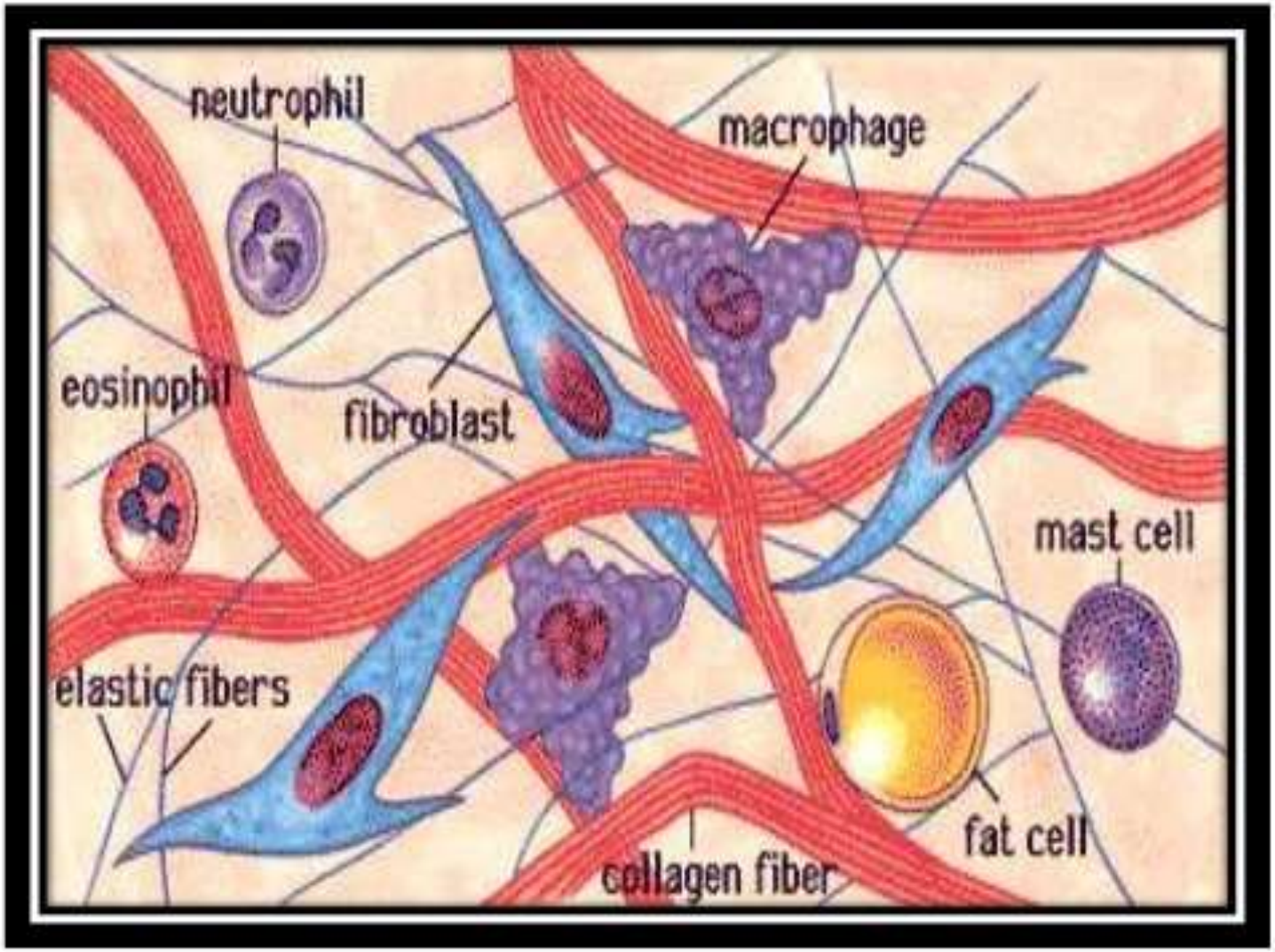
TRANSITIONAL EPITHELIUM

- Composed of several layers of pear shaped cells which are very elastic and have the capacity of dividing themselves.
- **Sites**
- Lines several parts of the urinary tract including the bladder.



CONNECTIVE TISSUES

- It is most abundant tissue in the body
- Connective tissues cells are more widely separated from each other than in epithelial tissues and intercellular substance (matrix) is present in larger amount
- Made up of cells like **fibroblast, fat cells, macrophages,leukocytes and mast cells.**


neutrophil
macrophage
eosinophil
fibroblast
mast cell
elastic fibers
fat cell
collagen fiber

FUNCTIONS OF CONNECTIVE TISSUES

- Provide support
- Transport materials from one part of the body to another
- Store energy.
- Protection
- Insulation

FIBROBLASTS

- They are large cells with irregular processes Manufacture collagen and elastic fibres and a matrix of extracellular material.
- Functions
- Active in tissue repair

- FAT CELLS

- Also known as adipocytes
- These cells occur singly or in groups in many types of connective tissues and are especially abundant in adipose tissue.

- MACROPHAGES

- These are large irregular shaped cells with granules in the cytoplasm.

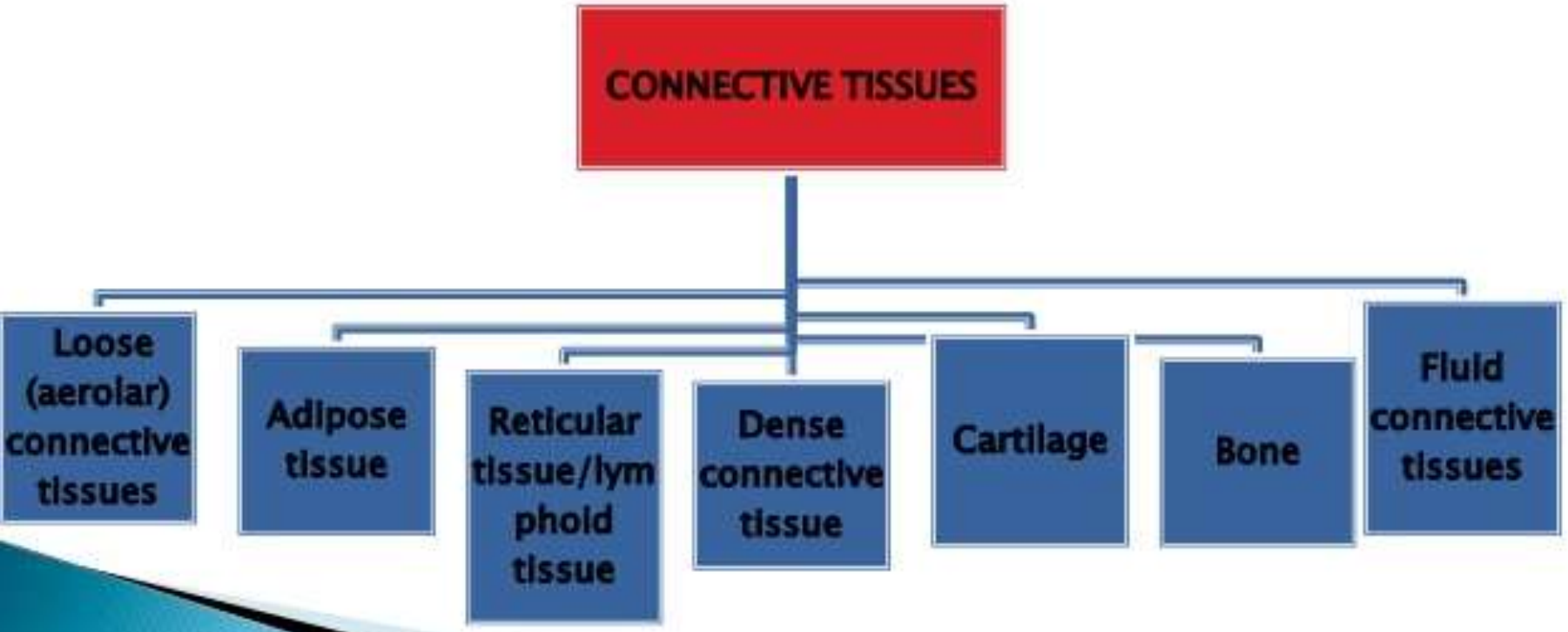
- Important part of the body defence mechanism because they are actively phagocytic, engulfing and digesting cell debris, bacteria and other foreign bodies.

- LEUCOCYTES
- White blood cells are normally found in small numbers in healthy connective tissues.
- Synthesis and secret specific defensive antibodies into the blood and tissue

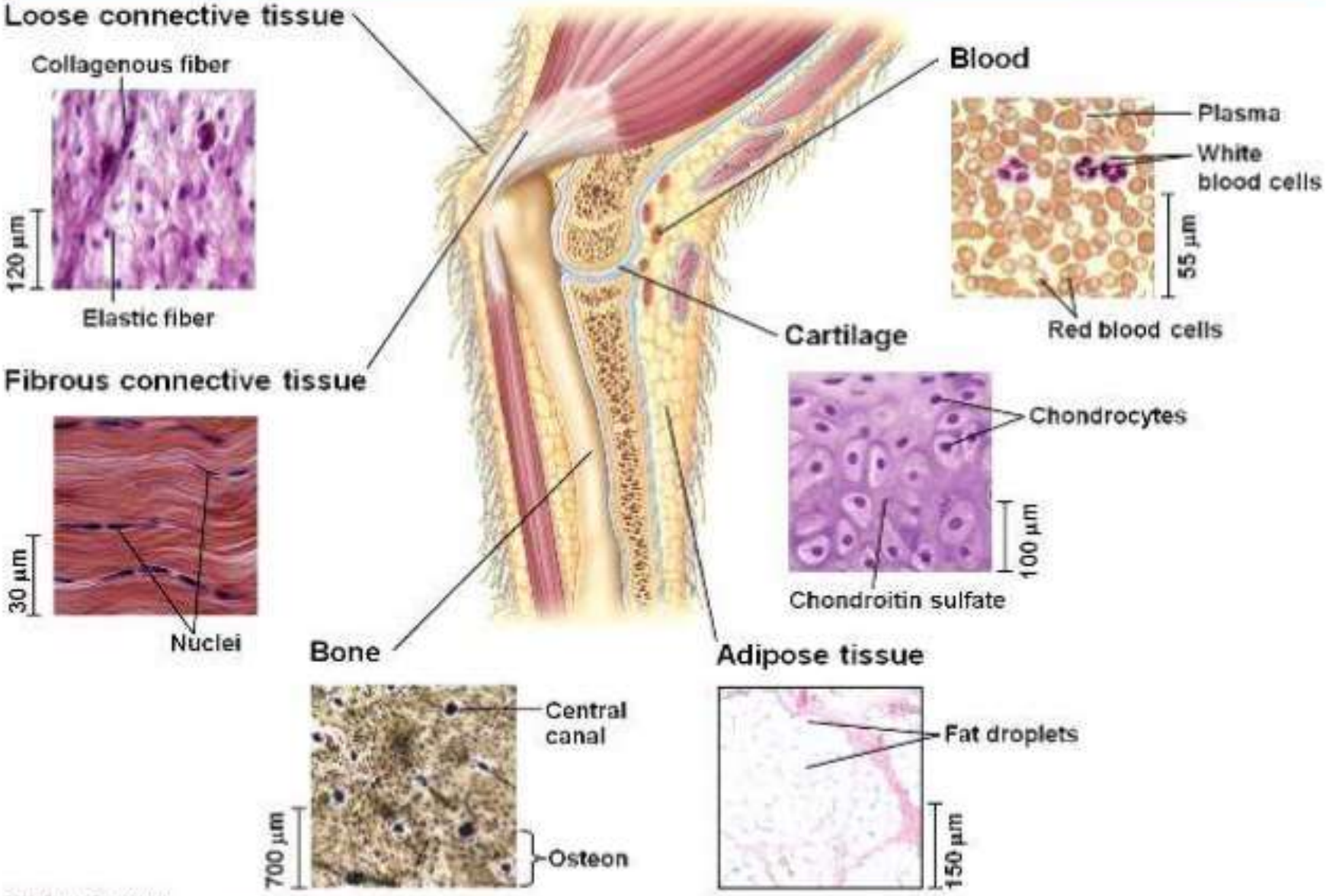
- MAST CELLS

- Similar to basophilic leukocytes
- Found in loose connective tissues, under the fibrous capsules of some organs.eg.liver and spleen.

TYPES OF CONNECTIVE TISSUES



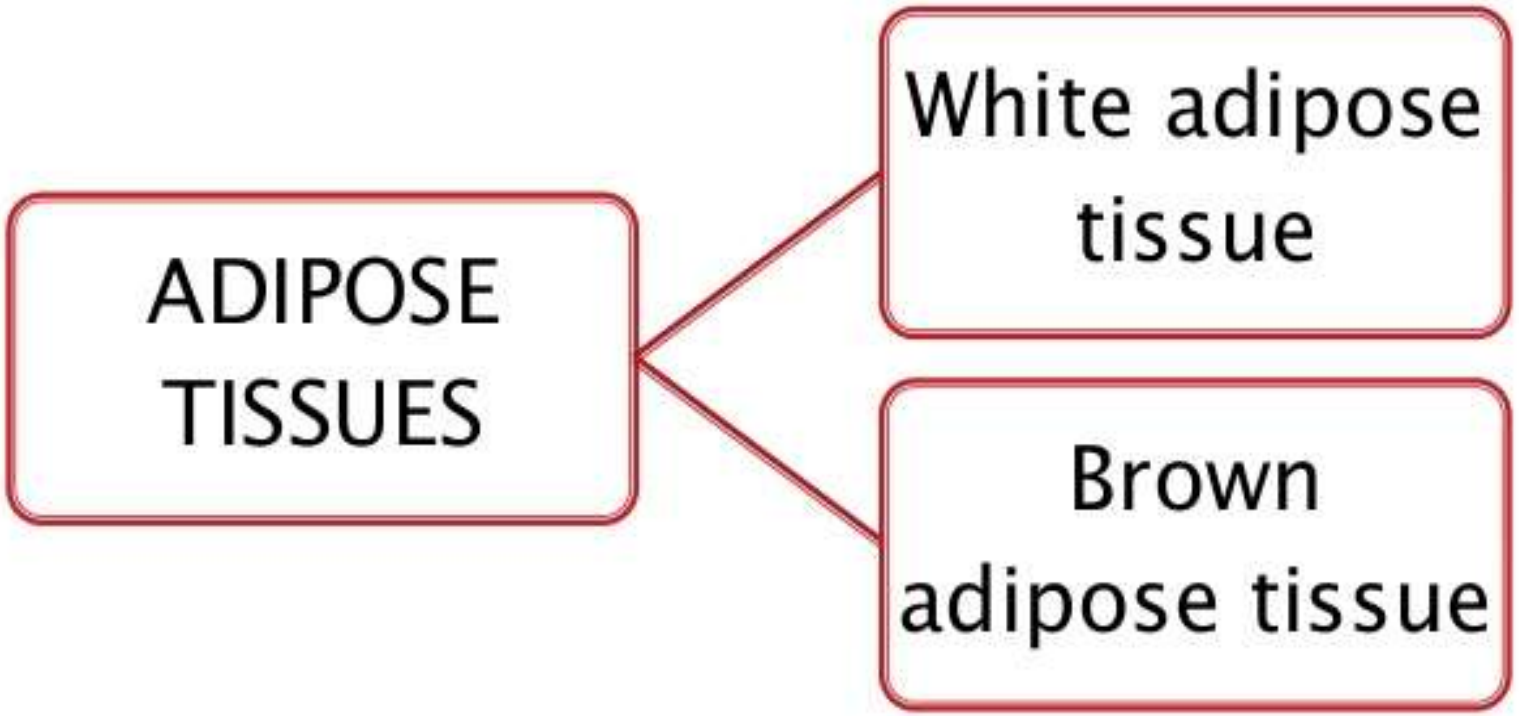
Connective Tissue



ADIPOSE TISSUE

- Consists **of fat cells(adipocytes)**, containing large fat globules, in a matrix .

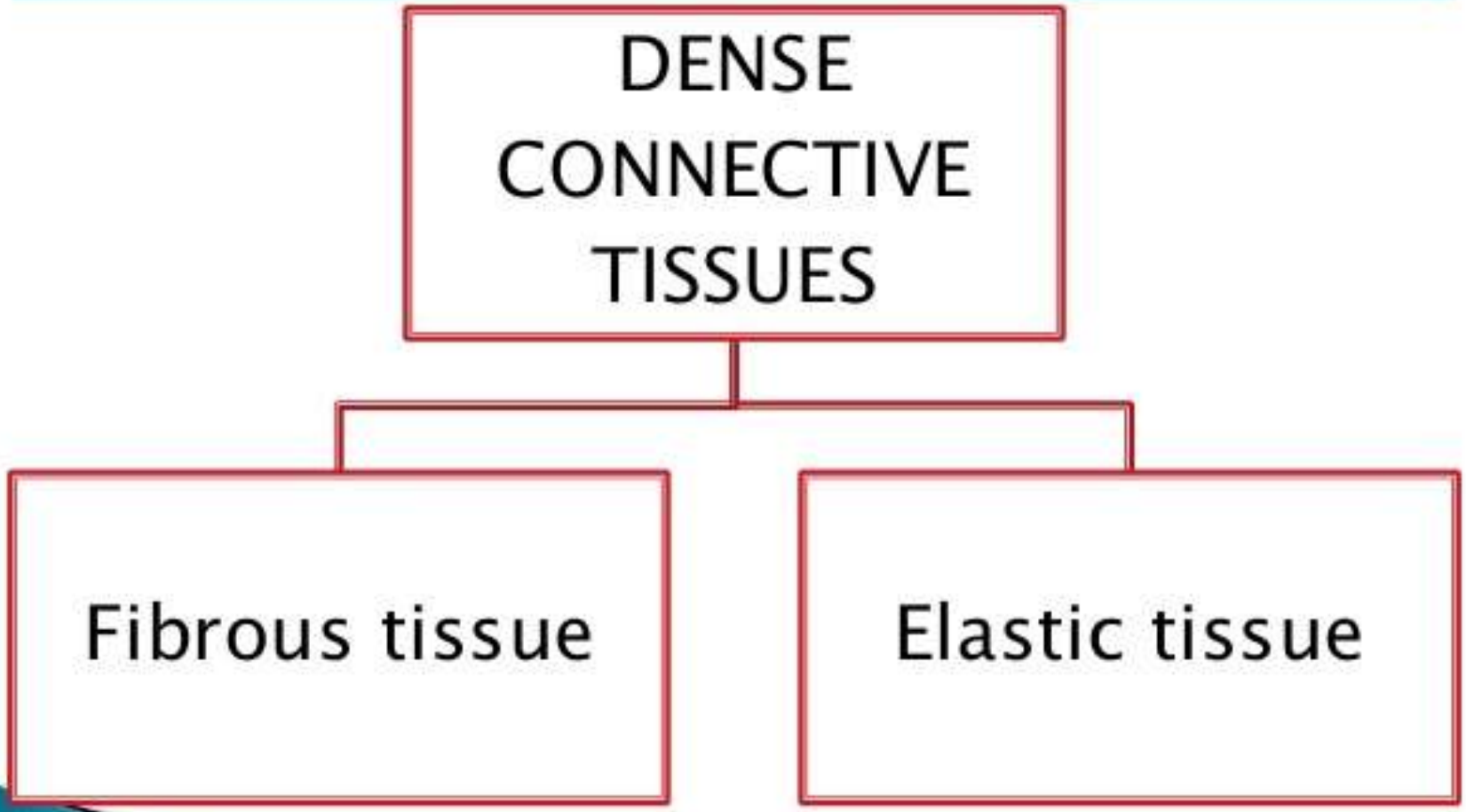
TYPES OF ADIPOSE TISSUES



DENSE CONNECTIVE TISSUE

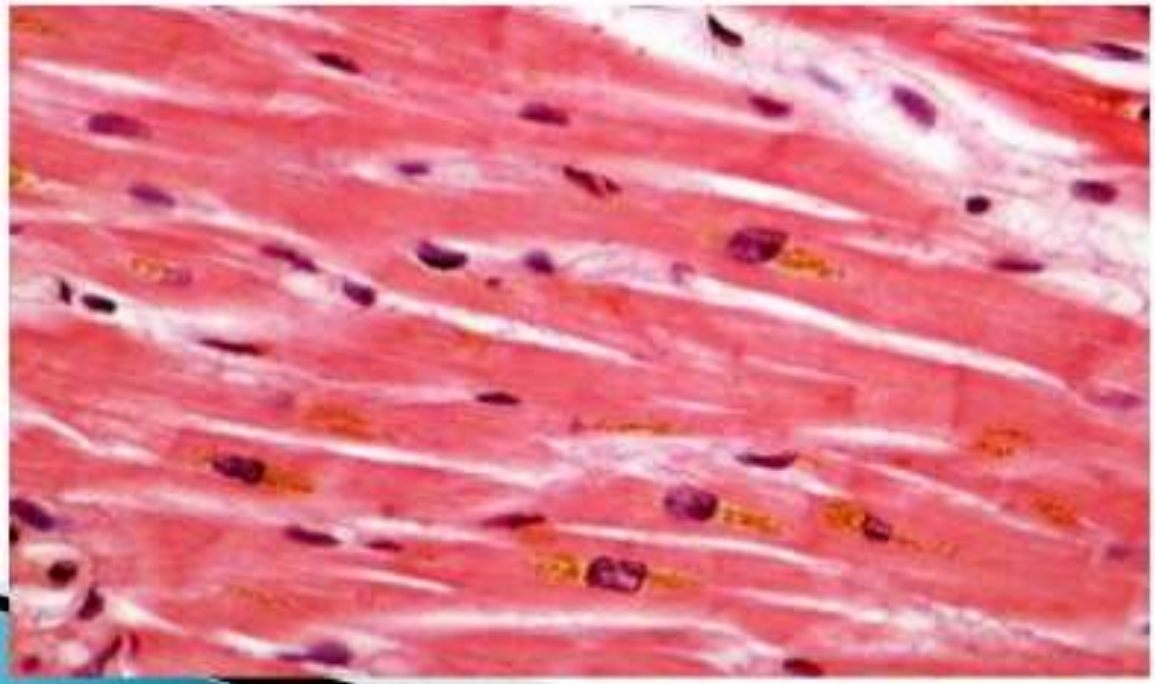
- These contains **more collagen fibers and** fewer cells than loose connective tissues.

TYPES OF DENSE CONNECTIVE TISSUE



MUSCULAR TISSUES

- It is made up of muscle cells(muscle fibers) which unite to form muscle.
- It contracts and relaxes rhythmically.

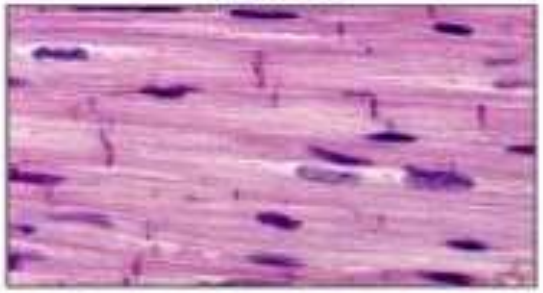


TYPES OF MUSCULAR TISSUES

Smooth Muscle Tissue

Involuntary Control

Cardiac Muscle Tissue



Involuntary Control

Skeletal Muscle Tissue

Voluntary Control

COMPARISION OFMUSCULAR TISSUES

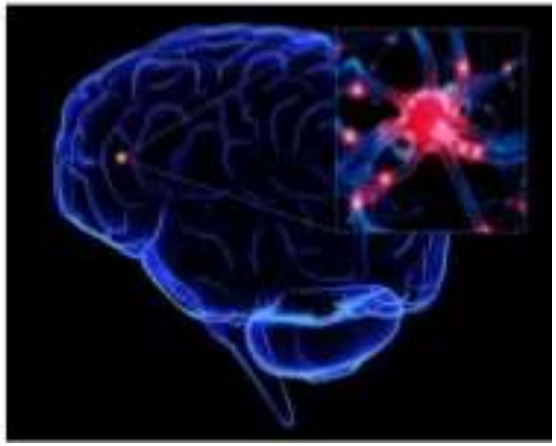
	SMOOTH	CARDIAC	SKELETAL
Location	Wall of hollow organs, vessels, respiratory passageways	Wall of heart	Attached to bones
Cell characteristics	Tapered at each end, branching networks, nonstriated 	Branching networks; special membranes (intercalated disks) between cells; single nucleus; lightly striated 	Long and cylindrical; multinucleated; heavily striated 
Control Action	Involuntary Produces peristalsis; contracts and relaxes slowly; may sustain contraction	Involuntary Pumps blood out of heart; self-excitatory but influenced by nervous system and hormones	Voluntary Produces movement at joints; stimulated by nervous system; contracts and relaxes rapidly

Compare muscle tissue

	Skeletal	Cardiac	Smooth
Striation:	striated	somewhat striated	non-striated
Cells:	straight cylindrical parallel, non-branching	tapered cylinders parallel & branched	spindle shape
Nucleus:	multi-nuclei, peripheral	mostly uni-nucleus most peripheral	uni-nucleus central
Discs:	none	intercalated	none
Location:	attach bones	cardiac wall	hollow organs
Control:	voluntary	involuntary	involuntary
Function:	body movement	heart contraction	visceral & circulatory
Speed of contraction:	fastest	intermediate	slowest

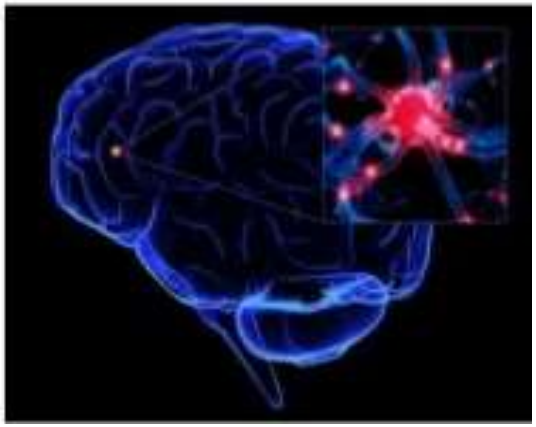
NERVOUS TISSUE

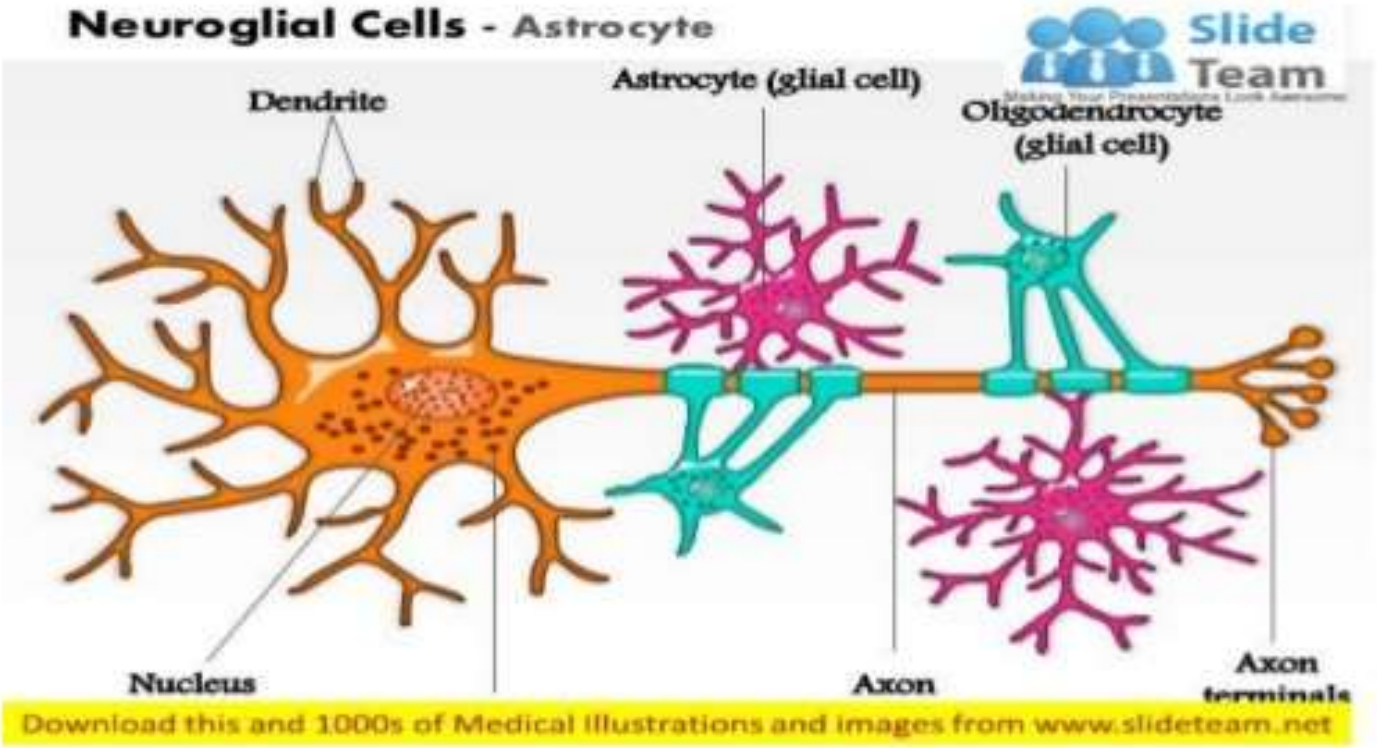
- These types of tissues are found in nervous system.
- **Types**
- Excitable cells-neurones
- Non excitable cells- Neuroglia



NERVOUS TISSUE CONTD…

- **Functions**
- Irritability – the capacity to react to various physical and chemical agents.
- Conductivity– the ability to transmit the resulting reaction from one point to another.




Neuroglial Cells - Astrocyte
Slide Team
Dendrite
Astrocyte (glial cell)
Oligodendrocyte (glial cell)
Nucleus
Axon
Axon terminals
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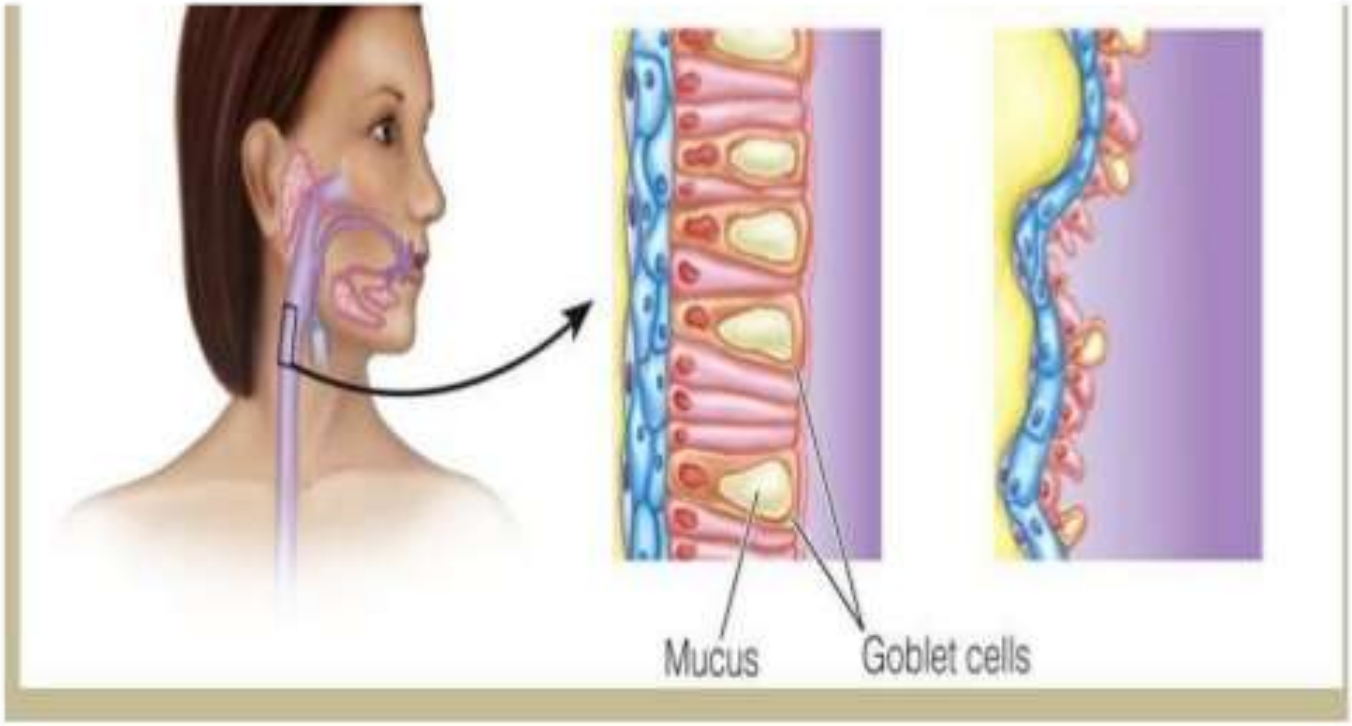
MEMBRANE

- Membranes are sheets of epithelial tissue and their supporting connective tissue that cover or line internal structures or cavities

- The main membranes are:
  - mucous
  - serous
  - synovial
  - Cutaneous

- **Mucous membrane**
- **Moist lining of the alimentary tract, respiratory tract and genitourinary tracts and is sometimes referred to as the mucosa**
- Membrane consists of epithelial cells, some of which produce a secretion called mucus, a slimy tenacious fluid.

Mucous membrane

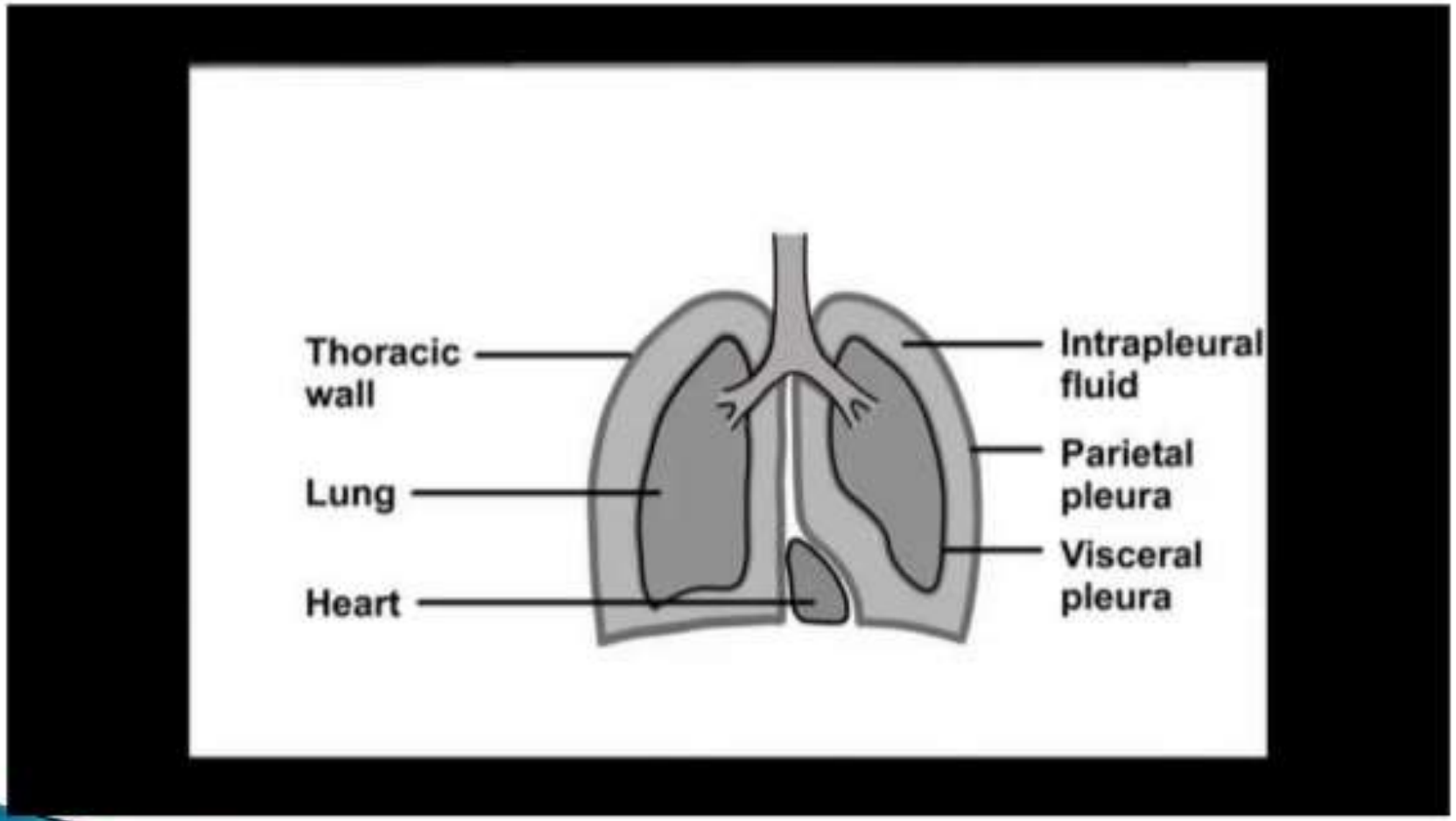


Serous membrane

- Serous membranes, or serosa **secrete serous watery fluid.**
- They consist of a double layer of loose areolar connective tissue lined by simple squamous epithelium.
- The **parietal layer lines a cavity** and the **visceral layer surrounds organs** within the cavity.
- The two layers are separated by serous fluid secreted by the epithelium.

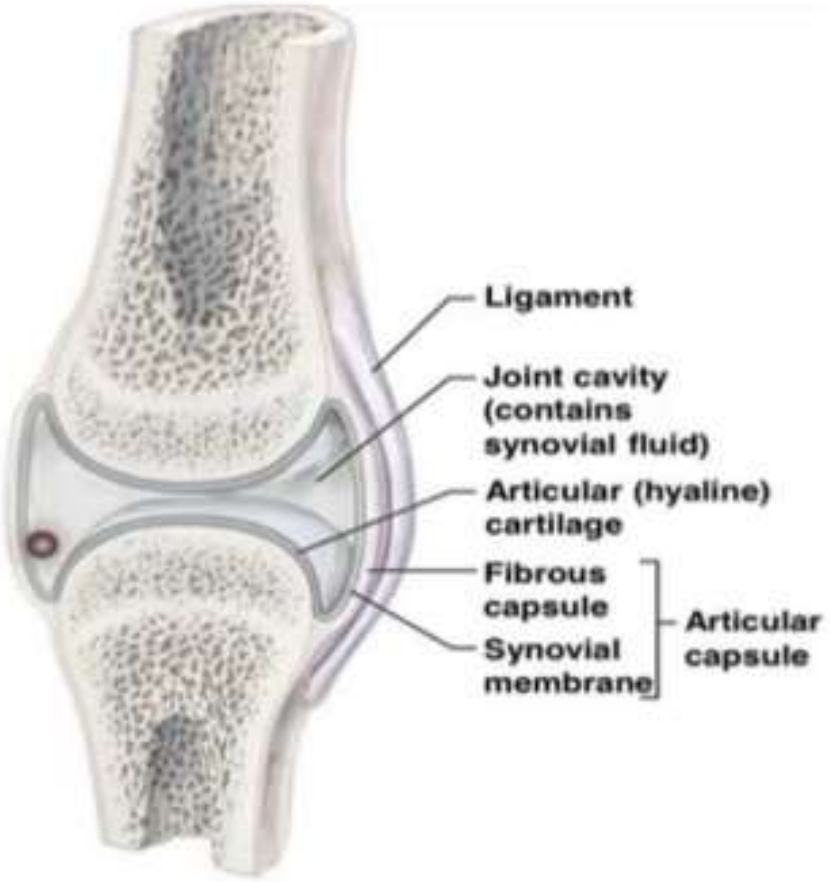
Contd..

- **There are three sites where serous membranes are found**
- the **pleura** lining the thoracic cavity and surrounding the lungs
- the **pericardium** lining the pericardial cavity and surrounding the heart
- the **peritoneum** lining the abdominal cavity and surrounding abdominal organs


Thoracic wall
Lung
Heart
Intrapleural fluid
Parietal pleura
Visceral pleura

SYNOVIAL MEMBRANE

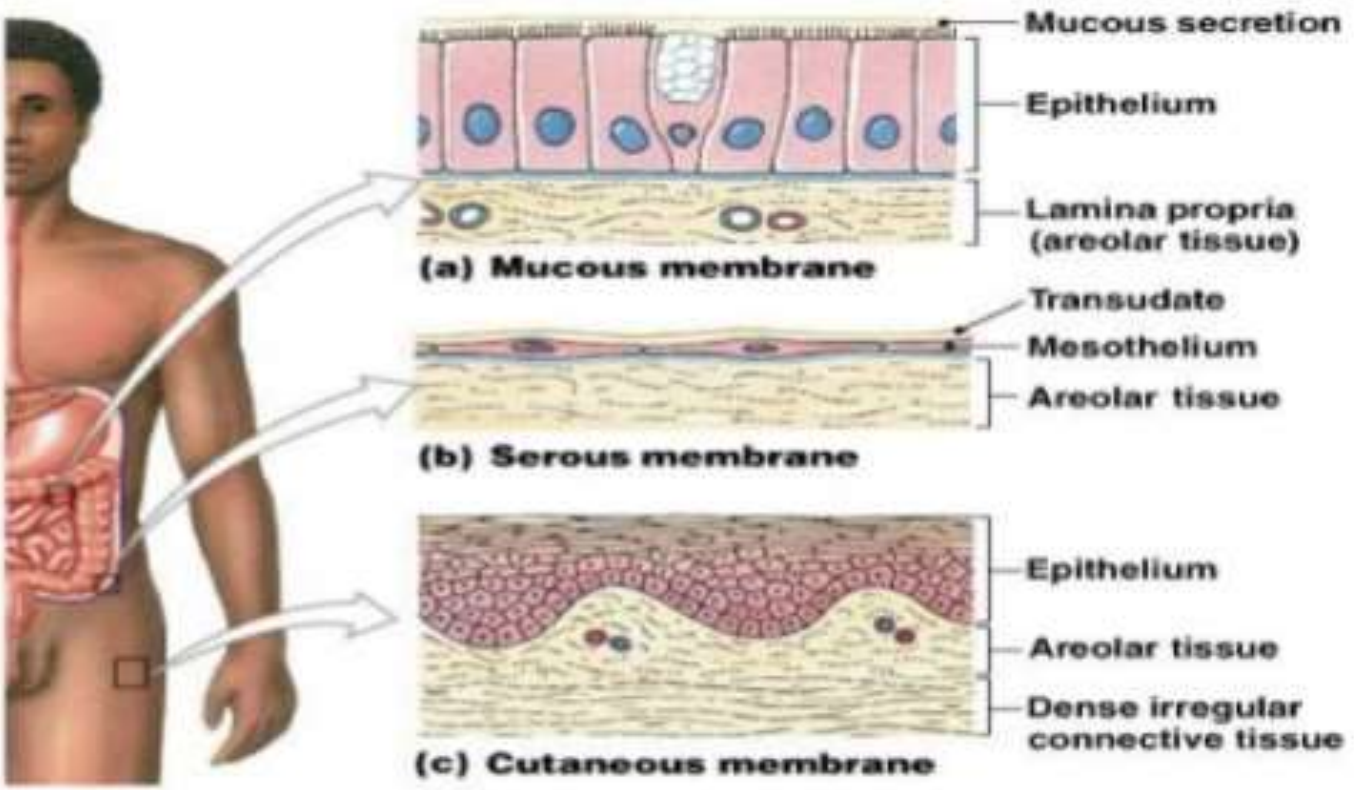
- **Synovial membrane:** This membrane is found lining the joint cavities and surrounding tendons, which could be injured by rubbing against bones, e.g. over the wrist joint.
- Made up of a layer of fine, flattened epithelial cells on a layer of delicate connective tissue.
- Synovial membrane **secretes clear, sticky, oily synovial fluid,** which acts as a lubricant to the joints and helps to maintain their stability



ation, Inc.

Figur

Cutaneous membrane- e.gSkin



GLANDS

- Glands are groups of epithelial cells which produce specialised secretions.
- TYPES OF GLANDS
- **Exocrine and endocrine gland**

- **Exocrine glands** are glands that produce and secrete substances onto an epithelial surface **by way of a duct**.
- Example: sweat, salivary, mammary, ceruminous, lacrimal, sebaceous, and mucous.

Exocrine glands vary considerably in size, shape and complexity

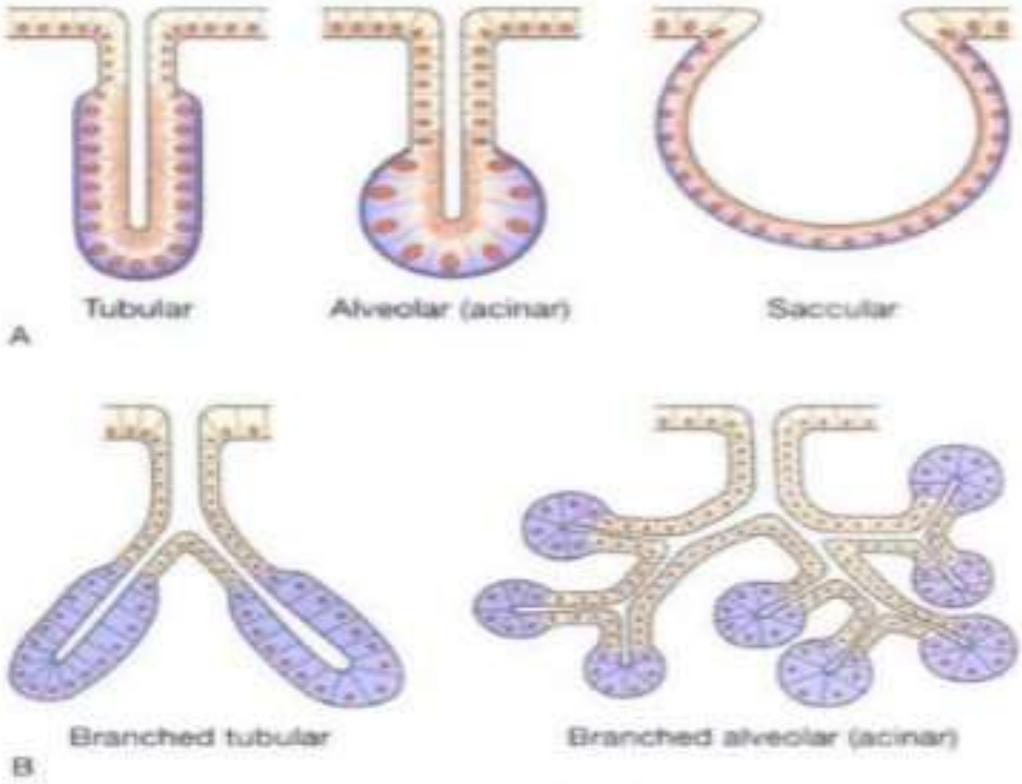


Figure 3.26 Exocrine glands: A. Simple glands. B. Compound (branching) glands.

- **Endocrine glands(ductless gland)** are glands of the endocrine system that secrete their products, *hormones*, **directly into the blood rather than through a duct**.
- E.g: the pineal gland, pituitary gland, pancreas, ovaries, testes, thyroid gland, parathyroid gland, hypothalamus and adrenal glands.

THANK YOU