

Notes  
Chapter-2  
Structural Organisation in Animals

Tissue

In multicellular organisms a group of similar cells along with intercellular substances <sup>which</sup> perform a specific function. Such organisation is called tissue.

Animal Tissues

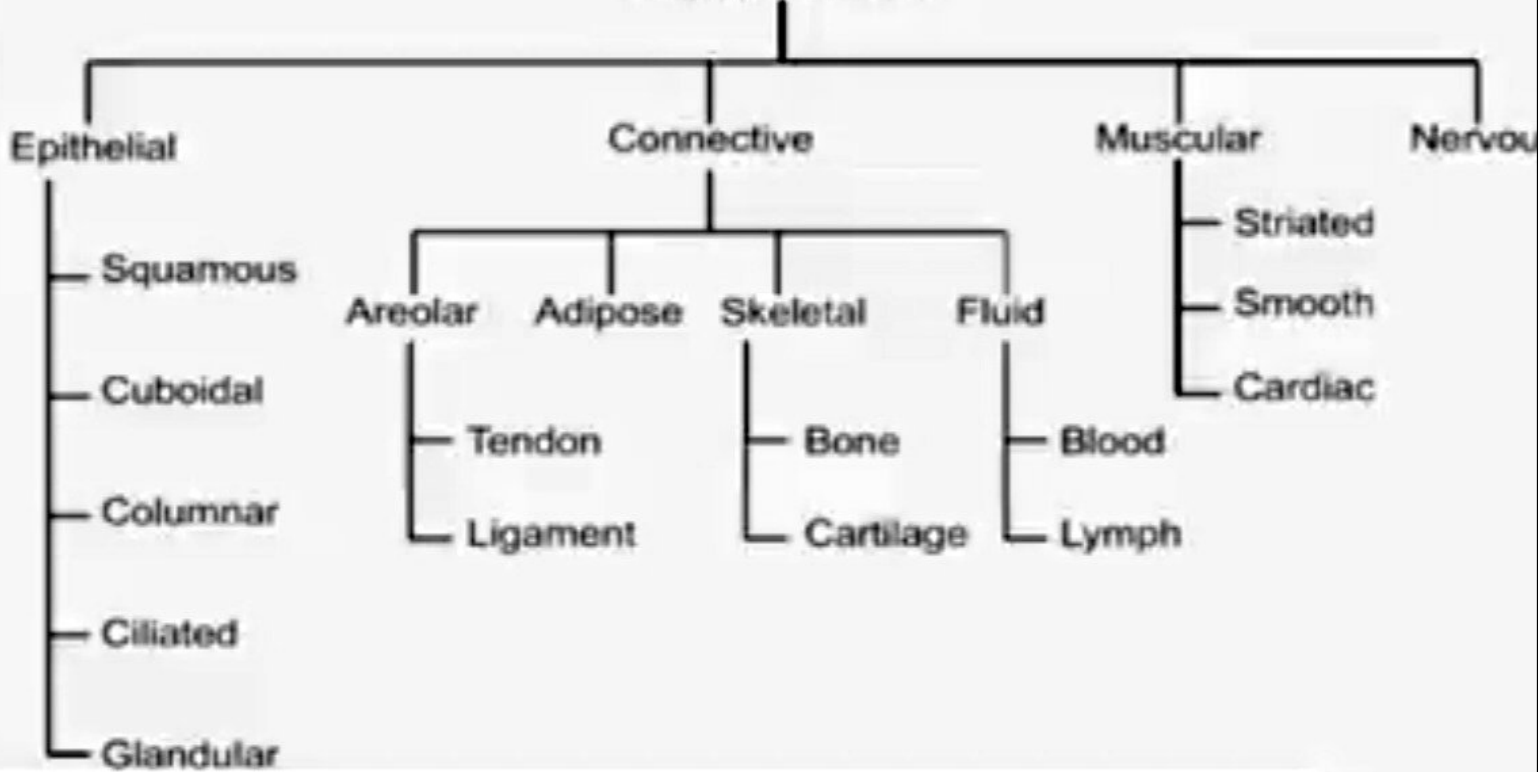
Animal tissues are classified into four types:

Animal Tissue			
Epithelial	Connective	Muscular	Neural

⇒ Epithelial Tissue

The tissue provides covering or lining for some part of the body. These tissues commonly called Epithelium. & And their cells are compactly packed with little intercellular matrix.

# Animal Tissue



# Epithelial Tissue

Simple

Compound

Squamous

Cuboidal

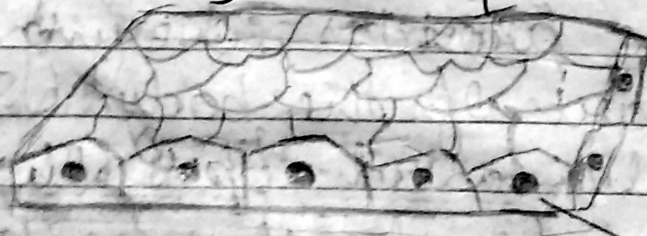
Columnar

## → Simple Epithelium

Simple Epithelium is composed of a single layer of cells and functions as a lining for body cavities, ducts and tubes.

### a) Squamous Epithelium

The Squamous Epithelium is made up of single layer of flattened cells with irregular boundaries. They are present in lining of blood vessels, air sacs of lungs.

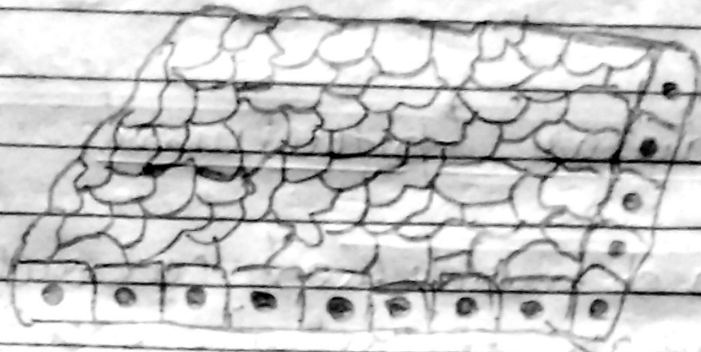


Flattened cells

### b) Cuboidal Epithelium

Cuboidal Epithelium is made up of

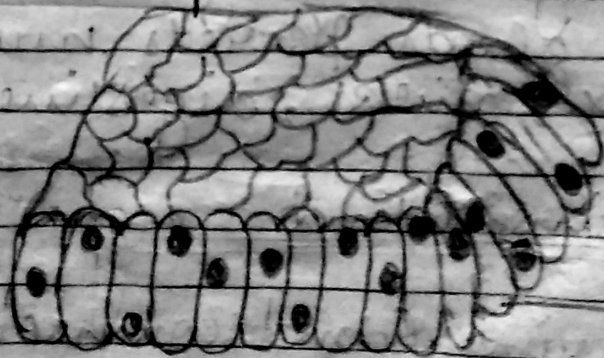
Single layered cube-like cells and found in ducts of glands and tubular part of Nephron of kidney for absorption and secretion.



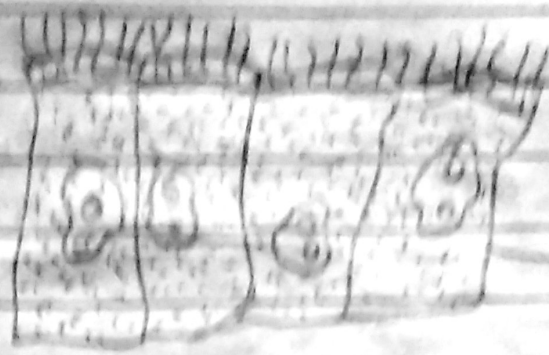
Cube-like cell

### c) Columnar Epithelium

Columnar Epithelium are made up of tall and slender cells. The nuclei are located at the base. Free surface may have ~~set~~ microvilli found in lining of stomach and intestine. The ciliated ~~one~~ are called as ciliated. If the columnar or cuboidal cells bear cilia on their free surface they called ciliated epithelium.



Tall cell



Ciliated bronchial cells

## d) Glandular Epithelium

It is a modified cuboidal or columnar epithelium which is get specialised for secretion. It may be unicellular as in goblet cells of airway/alimentary canal or multicellular as in Salivary Gland.

Glands are divided into two categories

### a) Exocrine Gland

The secretory product transported to a point by means of a duct or tubes.

These glands secrete mucus, saliva, ear wax, milk, digestive enzymes etc.

### b) Endocrine Gland

Endocrine Gland commonly called as ductless gland, because they secrete products directly into blood. The gland secretes

hormones.

## → Compound Epithelium

- i) The compound epithelium made up of two or more than two layers of cells and has protective function.
- ii) Limited role in absorption and secretion.
- iii) Main function is to provide protection against chemical and mechanical stresses.
- iv) They cover the dry surface of skin, moist surface of buccal cavity, Tharynx, inner lining of duct of salivary gland and Pancreatic ducts.

## Junctions

Epithelial cells are held together by intercellular material to form specialised junctions.

Three types of junctions

- a) Tight Junction :- help to stop substances from leaking across a tissue.
- b) Adhering Junctions :- Perform cementing

to keep neighbouring cells together.

c) Gap Junctions : facilitate the cell to communicating the cytoplasm of adjoining cells, for rapid transfer of ions, small molecules.

## Connective Tissues

Connective tissue is found throughout the body, provide support and shock absorption ~~tissue~~ for tissues and bones. All connective tissues except blood cells, secrete fibres of structural protein called collagen or elastin to provide elasticity and flexibility.

### Connective Tissue

Loose Connective tissue	Dense Connective tissue	Specialised Connective tissue
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#### 1. Loose Connective Tissue

It contain cells and fibres loosely arranged in semi-fluid ground substance. It includes areolar <sup>tissue</sup> substance and adipose ~~substance~~ Tissue.

Auricular	Adipose
1. It contains fibroblast, macrophages, and mast cells.	Fibroblast, macrophages and mast cells are absent.
2. It acts as support framework for epithelium.	The cells are specialized to store fats beneath the skin.

## 2. Dense Connective Tissue

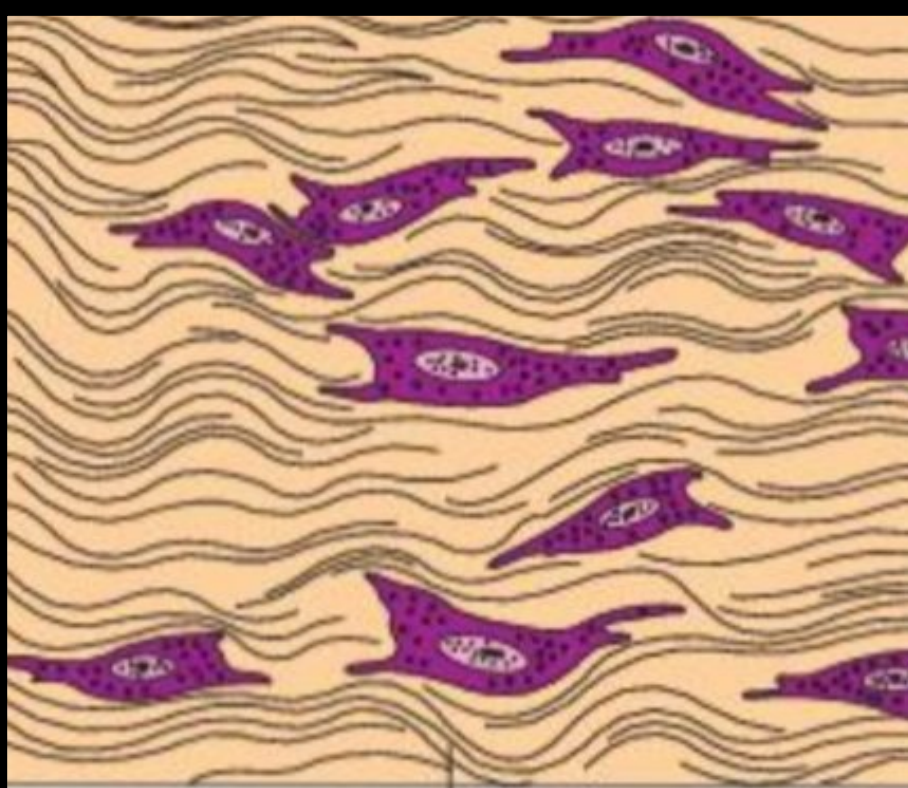
- It contains fibres and fibroblast compactly packed. The orientation of fibres may be regular or irregular pattern.
- In dense regular connective tissues collagen fibres are present in rows between parallel bundles of fibres as in tendons and ligaments.

### → Tendon

- Tendon connects bones to skeletal muscles.
- It is made up of white fibrous tough tissue.

### → Ligaments





(a)

Collagen fibre



(b)

**Figure 7.5** Dense connective tissue  
(a) Dense regular  
(b) Dense irregular

Ligaments connects one bone to another bone.

- It is made up of yellow elastic tissue with collagen fibres.

## Specialised Connective tissue

Cartilage, Bones and blood are specialised connective tissue.

### 1. Cartilage

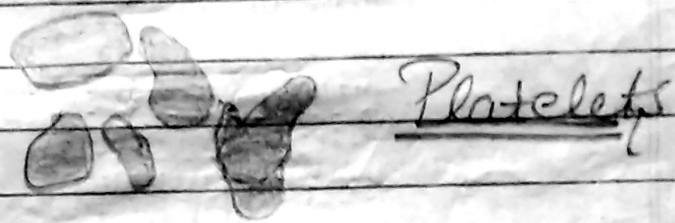
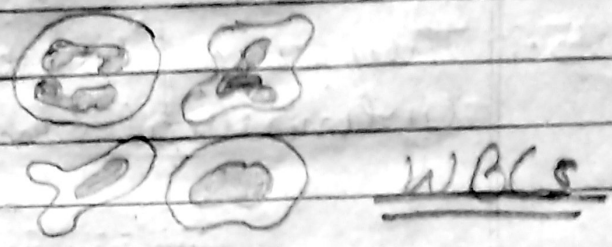
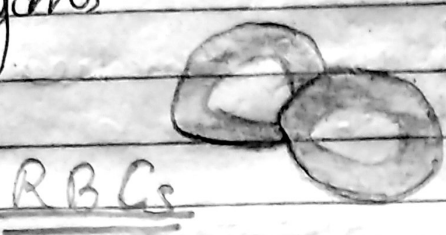
1. They are soft skeletal tissue.
2. Chondrocytes are enclosed in small cavities with matrix.
3. They are present in tips of nose, outer ear, between vertebral bones.

### 2. Bones

1. Bones are hard skeletal tissue.
2. They are rich in calcium salt and collagen fibres.
3. Bones support and protect softer tissues and organs.
4. They form the skeletal framework of vertebrates like limbs, legs, etc.

### 3 Blood

It is a fluid connective tissue containing plasma, red blood cells (RBC), white blood cells (WBC) and Platelets. It helps in transportation of various substances between organs.



### Muscle Tissue

Each muscle is made up of long cylindrical fibres arranged parallel to each other. Fibres are composed of fine fibrils called myofibrils. Muscles fibres contract and relax in response to stimulation.

They are of three types :

1. Skeletal
2. Smooth
3. Cardiac

#### → Skeletal Muscle tissue

10 They are also known as striated, voluntary

muscles.

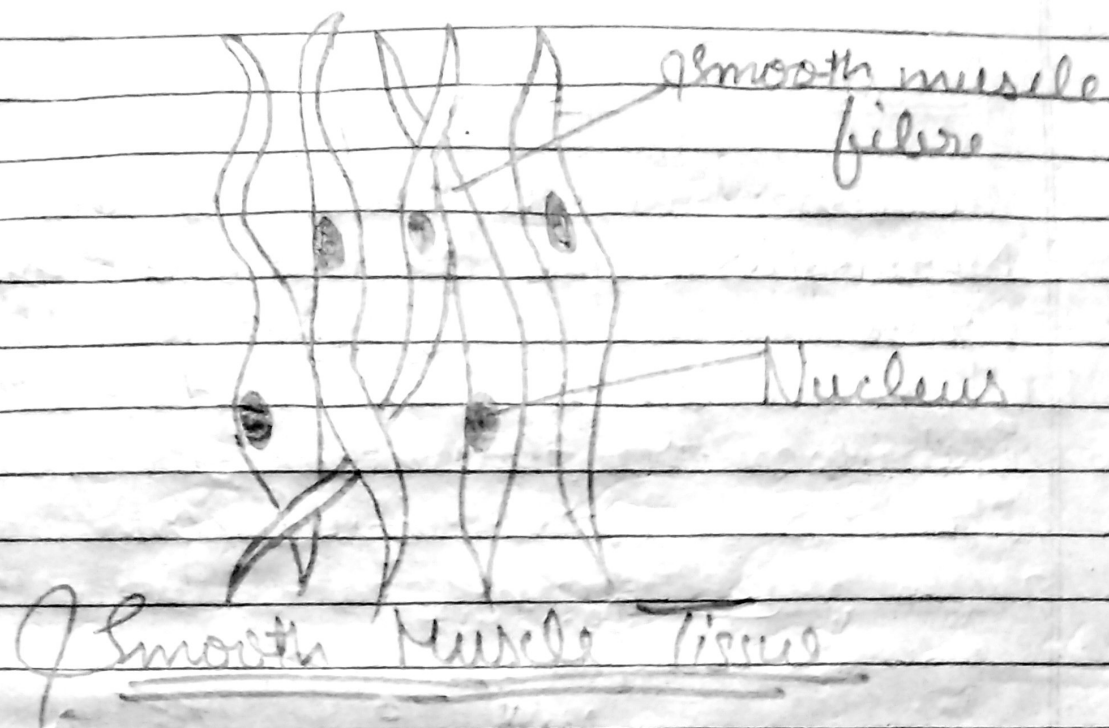
2. Multinucleated with light and dark bands.
3. They are attached with bones.
4. In a typical muscle, such as the biceps, striped skeletal muscle fibres are bundled together in a parallel fashion.
5. They are fibrous and un-branched, cylindrical in shape.



## Skeletal Striped Muscle Tissue

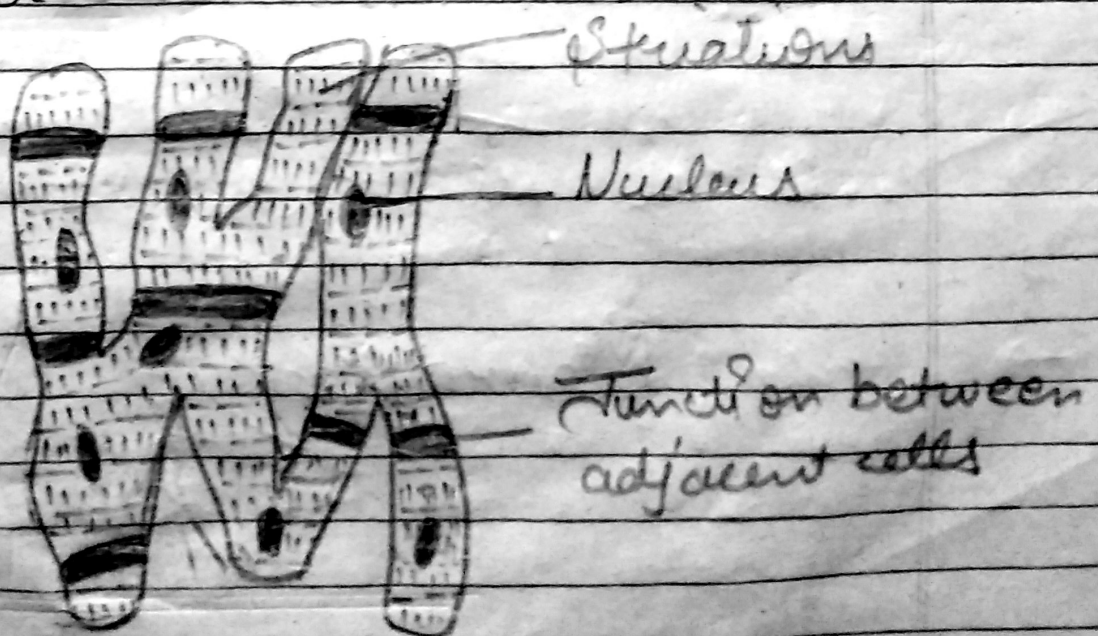
### → Smooth Muscle Tissue

1. They are known as unstriated or involuntary muscles.
2. They are uninucleate without bands.
3. They are present in vessels, oesophagus, stomach and intestine.
4. They are fibrous and un-branched, spindle shaped.



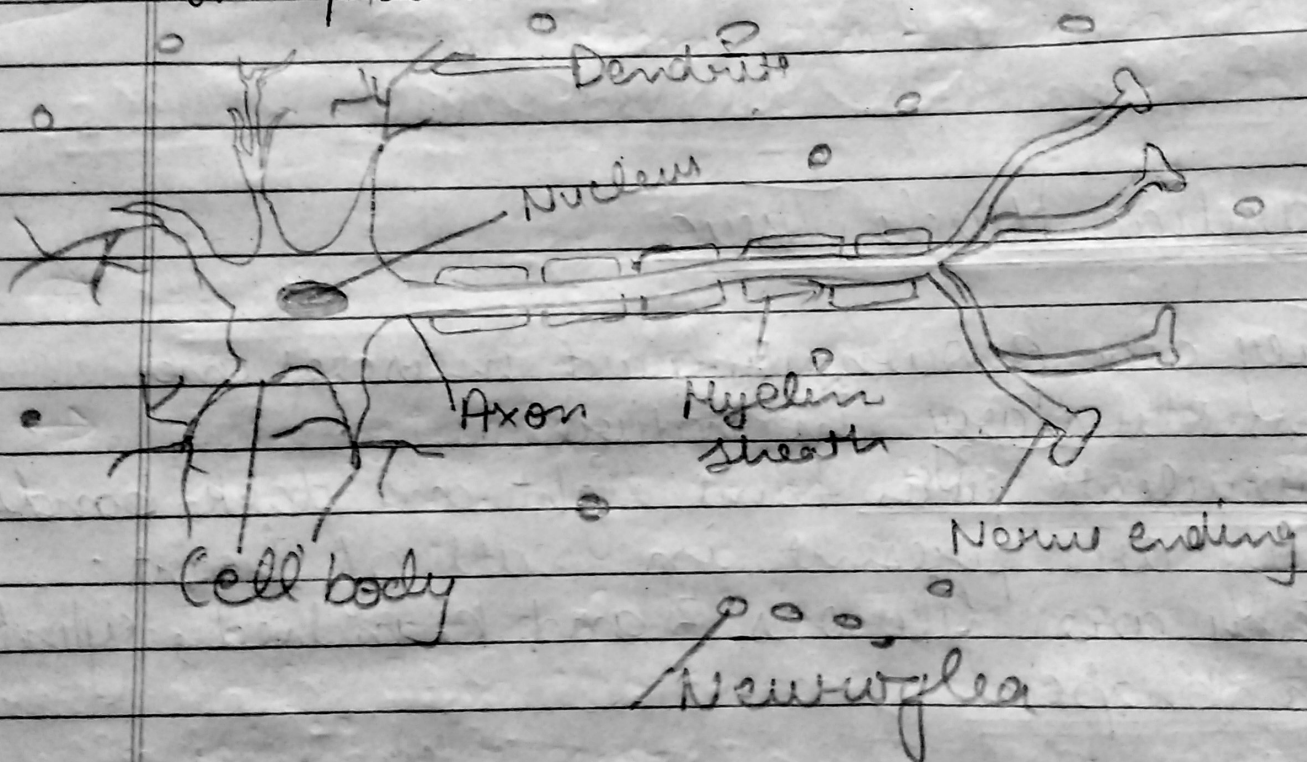
### → Cardiac Muscle Tissue

1. They are known as heart muscles and involuntary in nature.
2. Uninucleate with faint light and dark bands
3. They are present in wall of heart.
4. They are fibrous and branched, cylindrical in shape.



## Neural Tissue

1. The unit of neural system is neuron. Neuroglial cell protects and supports the neuron.
2. When neuron get stimulated, electrical impulses are generated that travel along the plasma membrane (axon).



Neural Tissue (Neuron with  
Neuroglia)