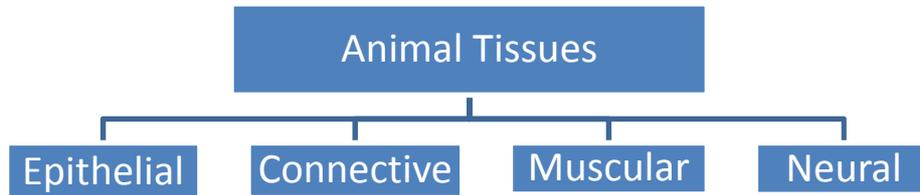


**CBSE Quick Revision Notes (Class-11 Biology)**  
**CHAPTER-07 STRUCTURAL ORGANIZATION IN ANIMALS**

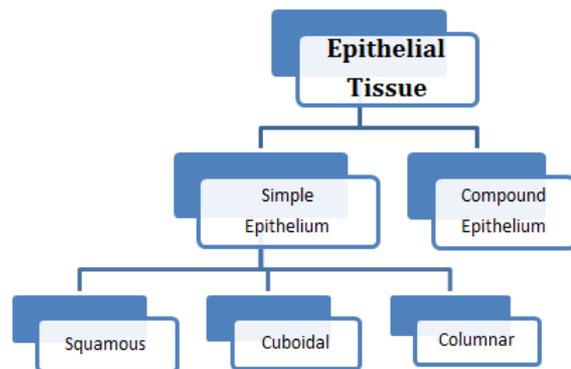
In multicellular organism a group of similar cells along with intercellular substances perform a specific function. Such organization is called tissue.



**Epithelial Tissue**

This tissue provides covering or lining for some part of the body. Cells are compactly packed without intercellular space.

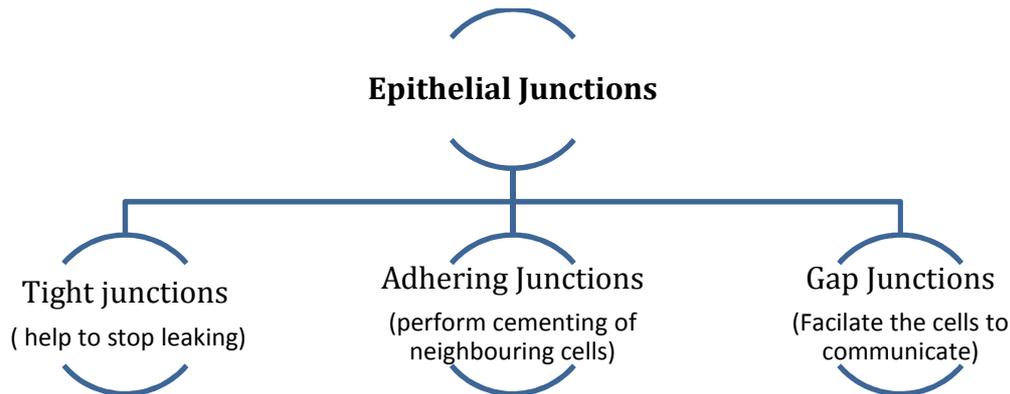
- ❖ Simple epithelium is composed of single layers of cells and function as lining of body cavities, ducts and tubes.
- ❖ The compound epithelium consists of two or more than two layers of cells and has protective function.
- ❖ The squamous epithelium made up of single layer of flattened cells with irregular boundaries. They are present in blood vessels, air sacs of lungs.



- ❖ 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.
- ❖ Columnar epitheliums are made up of tall and slender cells. The nuclei are located at the base. Free surface may have microvilli found in ling of stomach and intestine. The ciliated one are called as ciliated epithelium.
- ❖ Columnar and cuboidal epithelium specialized for secretion are known as glandular epithelium, which may be unicellular as in goblet cells of alimentary canal or multicellular as in salivary gland.

<b>Endocrine glands</b>	<b>Exocrine glands</b>
a. Secretes enzymes, milk, mucus, saliva etc.	a. Exocrine gland secretes hormones.
b. Products are released through ducts.	b. Products are directly released at target sites through blood.

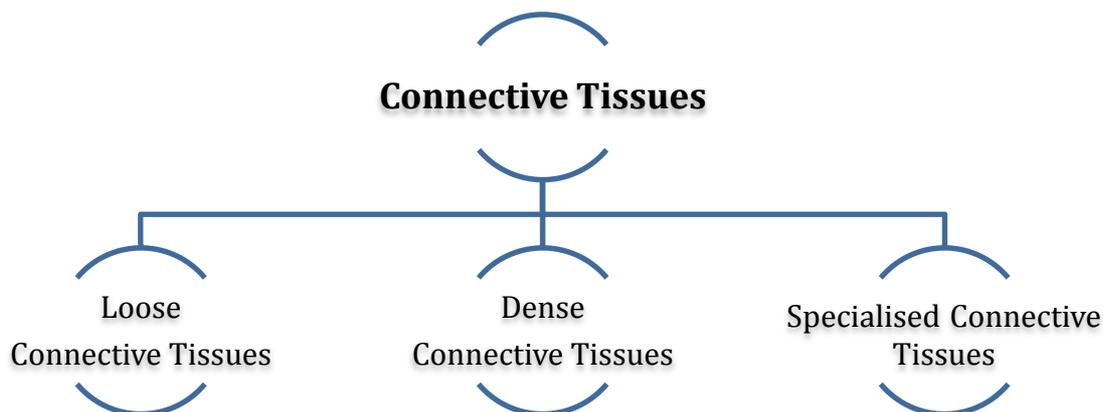
- Main function of compound epithelium tissue is to provide protection chemical and mechanical stress. They cover the dry surface of skin, moist surface of buccal cavity etc.
- Epithelial cells are held together by intercellular material to form specialized junction.



### **Connective Tissues**

They are most abundant and widely distributed tissues which link and support the other tissues. All connective tissue except blood, cell secretes fibres of structural protein called collagen or elastin to provide elasticity and flexibility.

- **Loose Connective Tissues** contain cells and fibres loosely arranged in semi-fluid ground substance. It includes areolar tissue and adipose tissue.



<b>Areolar Connective Tissue</b>	<b>Adipose</b>
a. It contains fibroblast, macrophages and mast cells.	a. fibroblast, macrophages and mast cells are absent.
b. It acts as support framework for epithelium.	b. The cells are specialized to store fats beneath the skin.

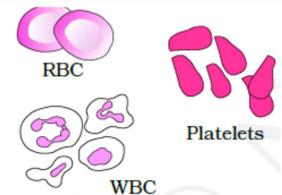
- **Dense connective Tissue** contains fibres and fibroblast compactly packed. The orientation of fibres may be regular or irregular pattern.
- In dense regular connective tissues collagen fibres are present in rows between parallel bundles of fibres as in tendons and ligaments.

<b>Tendon</b>	<b>Ligament</b>
a. Tendon connects bones to skeletal muscles.	a. Ligament connects one bone to another bone.
b. It is made up of white fibrous tough tissue.	b. It is made up of yellow elastic tissue with collagen fibres.

- Cartilage, bones and blood are specialized connective tissue.

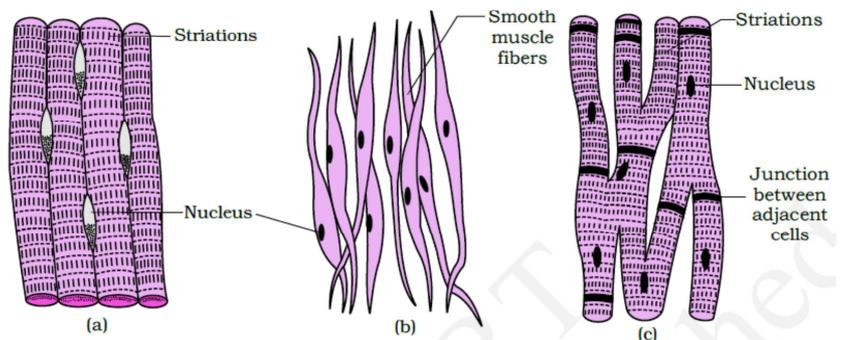
Cartilage	Bone
a.	a.
b. Chondriocytes are enclosed in small cavities with matrix.	b. They are rich in Calcium salt and collagen fibres.
c. They are present in tips of nose, outer ear, between vertebral bones.	c. They form the skeletal framework of vertebrates like limbs, legs etc.

- Blood is fluid connective tissue containing plasma, red blood cells, white blood cells and platelets. It helps in transportation of various substances between organs.



### Muscle Tissue

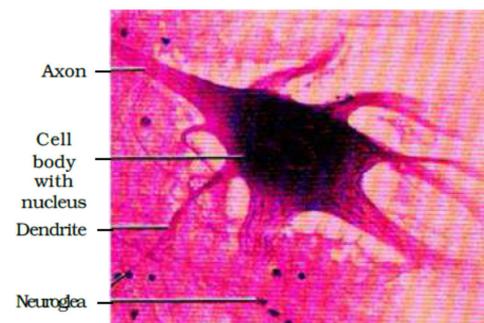
- Each muscle is made up of long cylindrical fibres arranged parallel to each other. Fibres are composed of fine fibrils called myofibrils. Muscle fibres contract and relax in response to stimulation.



Skeletal	Smooth	Cardiac
a. They are also known as striated, voluntary muscles.	a. They are known as unstriated or involuntary muscles.	a. They are known as heart muscles and involuntary in nature.
b. Multinucleated with light and dark bands.	b. They are uninucleate without bands.	b. Uninucleate with faint light and dark bands.
c. They are attached with bones.	c. They are present in vessels, esophagus.	c. They are present in wall of heart.
d. They are fibrous and un-branched, cylindrical in shape.	d. They are fibrous and un-branched, spindle shaped.	d. They are fibrous and branched, cylindrical in shape.

### Neural Tissue

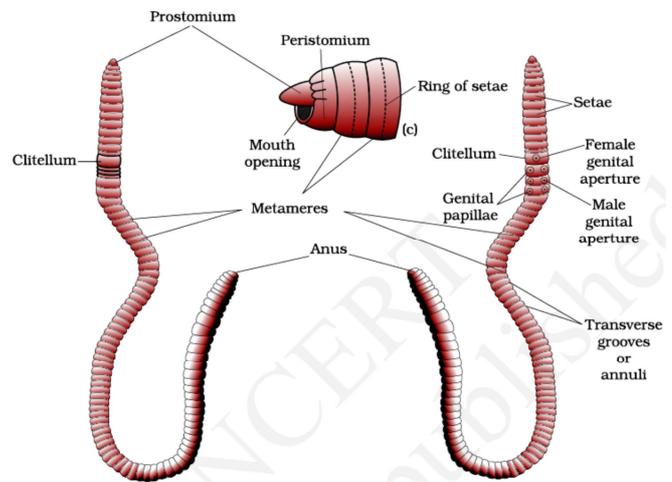
- The unit of neural system is neuron. Neuroglial cell protect and supports the neuron.
- When neuron get stimulated, electrical impulses are generated that travel along the plasma membrane (axon).



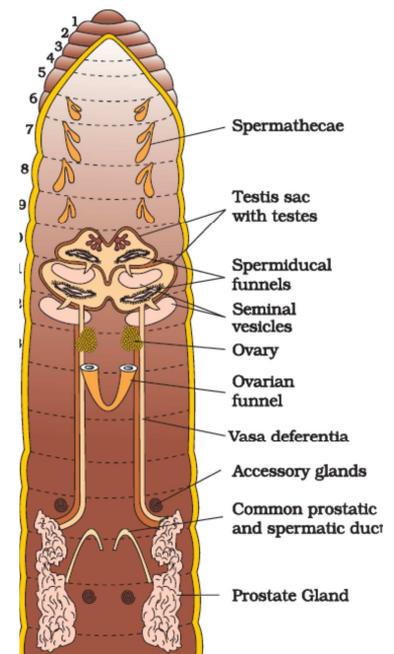
The tissues organize to form organs which in turn associate to form organ system in multicellular organisms.

## Earthworm

- Earthworm is reddish brown terrestrial invertebrate that lives in upper layer of moist soil. The common Indian earthworms are *Pheretima* and *Lumbricus*.
- Earthworms have long cylindrical body divided into segments called metameres. The ventral surface contain genital pore and dorsal surface contain mid dorsal line.
- First body segment is called **peristomium** which contain mouth. 14-16 segments are covered by dark band called **clitellum**.



- Single genital pore is present on mid ventral line of 14<sup>th</sup> segments. A pair of male genital pore is present on 18<sup>th</sup> segment on ventro-lateral side.
- All the segment except 1<sup>st</sup>, last and clitellum contain S-shaped setae for locomotion.
- Alimentary canal is straight tube from 1<sup>st</sup> to last segment having, buccal cavity, muscular pharynx, oesophagus that leads to gizzards, which help in grinding the soil particles and decaying leaves. Stomach and small intestine leads to anus.
- Closed vascular system consists of heart, blood vessels and capillaries. Earthworms lack respiratory organs and respire through moist skin.
- Excretory organs is coiled segmental tubules called nephridia. There are three types of nephridia. Septal nephridia, integumentary nephridia and pharyngeal nephridia.
- Earthworm is hermaphrodite. Two pairs of testis is present 10<sup>th</sup> and 11<sup>th</sup> segment. Prostrate and spermatic duct open to surface as male genital pore on 18<sup>th</sup> segment.
- One pair of ovaries is attached to the intersegmental septum of 12<sup>th</sup> and 13<sup>th</sup> segments. Female genital pore open on ventral side of 14<sup>th</sup> segment. Mutual exchange of sperms takes place during mating.
- Mature sperms and egg cells along with nutritive materials are deposited in cocoon in the soil where fertilisation takes place.
- Earthworms are known as friends of farmer because they make burrows in soil to make it porous for respiration and root penetration. Earth worms are also used for vermicomposting and as bait in game fishing.



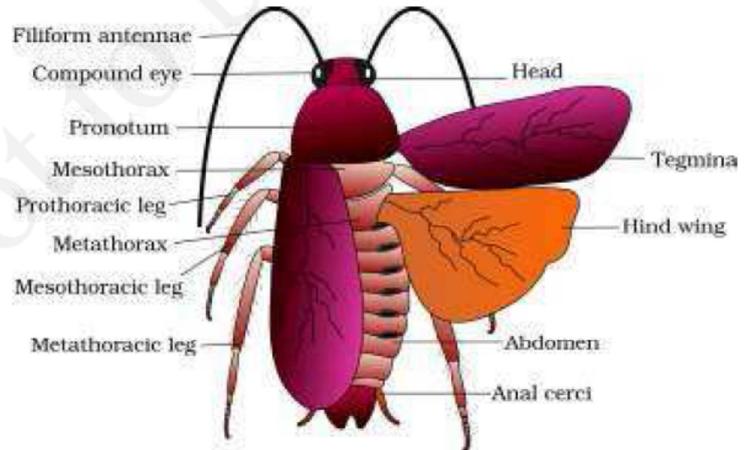
## Cockroach (*Periplaneta Americana*)

❖ Cockroaches are nocturnal omnivorous organism that lives in damp places everywhere. The body of cockroach is segmented and divisible into **head, thorax and abdomen**. The body is covered by hard chitinous exoskeleton.

❖ Head is triangular in shape formed by fusion of six segments to show flexibility. Head bears compound eyes.

Antenna attached on head help in monitoring the environment.

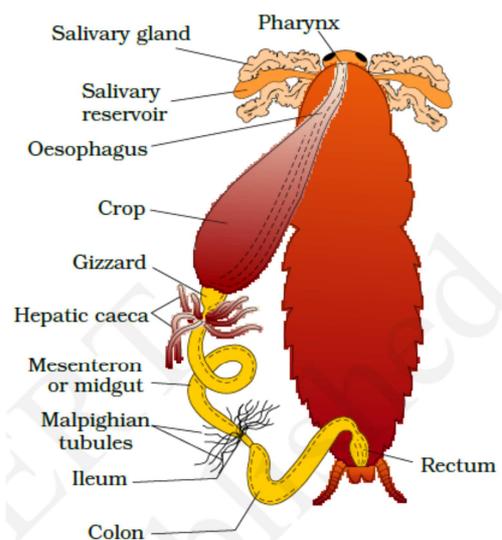
❖ Thorax consists of three parts- prothorax, mesothorax and metathorax. Forewings and hind wings are attached with thorax. Abdomen consists of 10 segments.



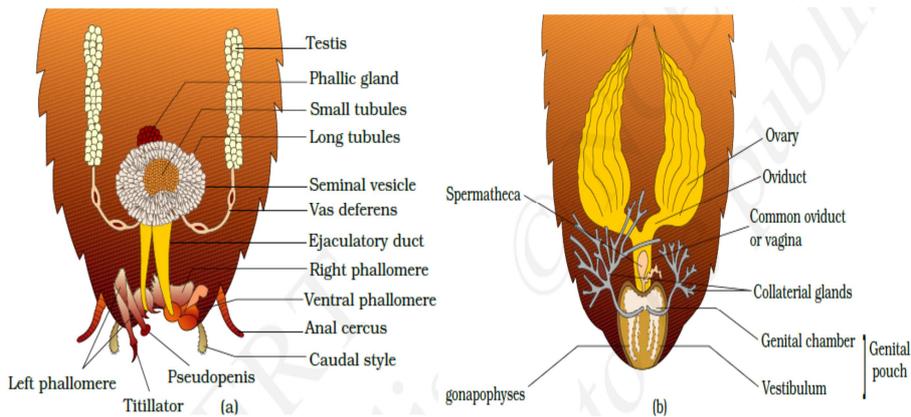
a. The abdomen is long and narrow.	a. The abdomen is short and broad.
b. Brood pouch is absent.	b. Brood pouch is present.
c. Male have longer antenna.	c. Female have shorter antennae.
d. Anal styles are present.	d. Anal styles are absent.

### Digestive System of Cockroach-

- Alimentary canal is divided into foregut, midgut and hindgut. Food is stored in crop used for storing the food. Gizzard help in grinding the food particles.
- At the junction of midgut and hindgut yellow coloured filamentous Malpighian tubules which help in excretion.
- Blood vascular system is open type having poorly developed blood vessels. The haemolymph colourless plasma and haemocytes.
- Respiratory system consists of network of trachea which open through 10 pairs of spiracles on lateral side.



- Cockroaches are dioecious. Male reproductive system consists of a pair of testes one lying on each lateral side in 4<sup>th</sup> -6<sup>th</sup> abdominal segments. The female reproductive system consists of two large ovaries situated on 2<sup>nd</sup> -6<sup>th</sup> abdominal segments.



### Male reproductive system

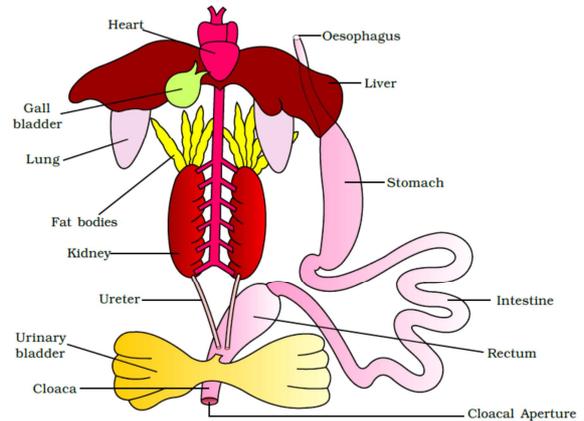
### Female reproductive system.

- The fertilized eggs are encased in capsule called oothecae. 9 to 10 oothecae are produced by each female.
- Cockroaches are pests and destroys the food, contaminate with smelly excreta.

### Frog (*Rana tigrina*)

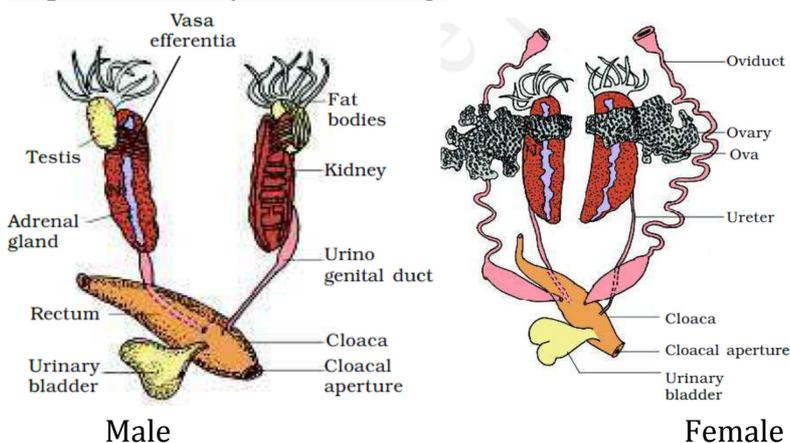
Frogs are cold-blooded organism having ability to change colours to hide from enemies. Body is divisible into head and trunk, bulged eyes covered by nictating membrane. Male frog is different from female having vocal sacs and copulatory pad on first digit of forelimb.

- Digestive system consists of alimentary canal and digestive glands.



- Digestion start in stomach and final digestion occurs in small intestine. Digested food is absorbed by villi and microvilli present in the inner wall of small intestine.
- Skin acts as aquatic respiratory organs. On lands skin, buccal cavity and lungs acts as respiratory organs.
- Heart is 3-chambered. Blood consist of plasma and blood cells. RBC is absent.

### Reproductive systems of frog-



Male

Female