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STRUCTURAL ORGANIZATION IN ANIMALS

Epithelial Tissue

This tissue provides covering or lining for some part of the body. Types of tissues are:

- Simple epithelium
- The compound epithelium
- The squamous epithelium
- Cuboidal epithelium
- Columnar epithelium
- Columnar 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.

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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.

Areolar Connective Tissue	Adipose Connective Tissue
It contains fibroblast, macrophages and mast cells	Fibroblast, macrophages and mast cells. are absent

- On connective tissue contains fibres and fibroblast compactly packed. The orientation of fibres may be regular or irregular pattern_

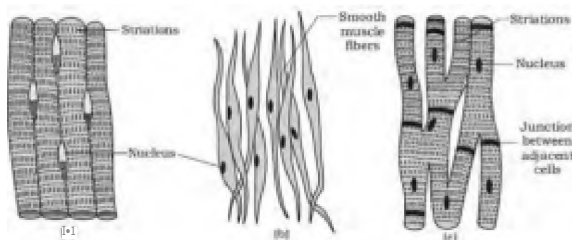
Cartilage	Bone
They are soft skeletal tissue	Bones are hard skeletal tissue
Chondrocytes are enclosed in small cavities with matrix	They are rich in Calcium salt and collagen fibres
They are present in tips of nose, outer ear, between vertebral bones	They form the skeletal framework of vertebrates like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

- Blood is fluid connective tissue containing plasma, red blood cells, white blood cells and platelets.

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
They are also known as striated, voluntary muscles.	They are known as unstriated or involuntary muscles.	They are known as heart muscles and are involuntary in nature,
They are multinucleated with visible dark bands_	They are uninucleated without bands.	Uninucleated with faint light and dark bands_
They are attached with bones	Present in vessels, esophagus.	Present in wall of heart.
Fibrous and un-branched, cylindrical in shape	Fibrous and un-branched, spindle shaped	Fibrous and branched, cylindrical in shape.

Neural Tissue

The unit of neural system is neuron. Neuroglial cell protect and supports the neuron.

Earthworm

- 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 prostomium which contain mouth. 14-16 segments are covered by dark band called clitellum.
- Single genital pore is present on mid ventral line of 14th segments. A pair of male genital pore is present on 15th segment on ventro-lateral side.
- All the segment except 1st last and clitellum contain S-shaped setae for locomotion.
- Alimentary canal is straight tube from 1st to last segment having, buccal cavity, muscular pharynx, oesophagus that leads to gizzard, which help in grinding the soil particles and decaying leaves. Stomach and small intestine feeds to anus.
- **CDS**— 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 10th and 11th Segment. Prostate and spermatic duct open to surface as male genital pore on 15th segment.
- one pair of ovaries is attached to the intersegmental septum of 12th and 13th segments. Female genital pore open on ventral side of 14th 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 fertilization takes place.

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.

Digestive System of Cockroach-

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

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- Cockroaches are dioecious. Male reproductive system consists of a pair of testes one lying on each lateral side in 5th abdominal segments. The female reproductive system consists of two large ovaries situated on 6th abdominal segments.
- The fertilized eggs are enclosed in capsule called oothecae. 5 to 20 oothecae are produced by each female.

Frog Rana tigrina

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

- Digestive system consists of alimentary canal and digestive glands.
- Skin acts as aquatic respiratory organs. On land skin, buccal cavity and lungs act as respiratory organs.
- Heart is 3-chambered. Blood consists of plasma and blood cells. RBC is absent.