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Class:IX	Subject:Biology	Lesson: 6	Topic:Tissues (Part-2)

Animal Tissues

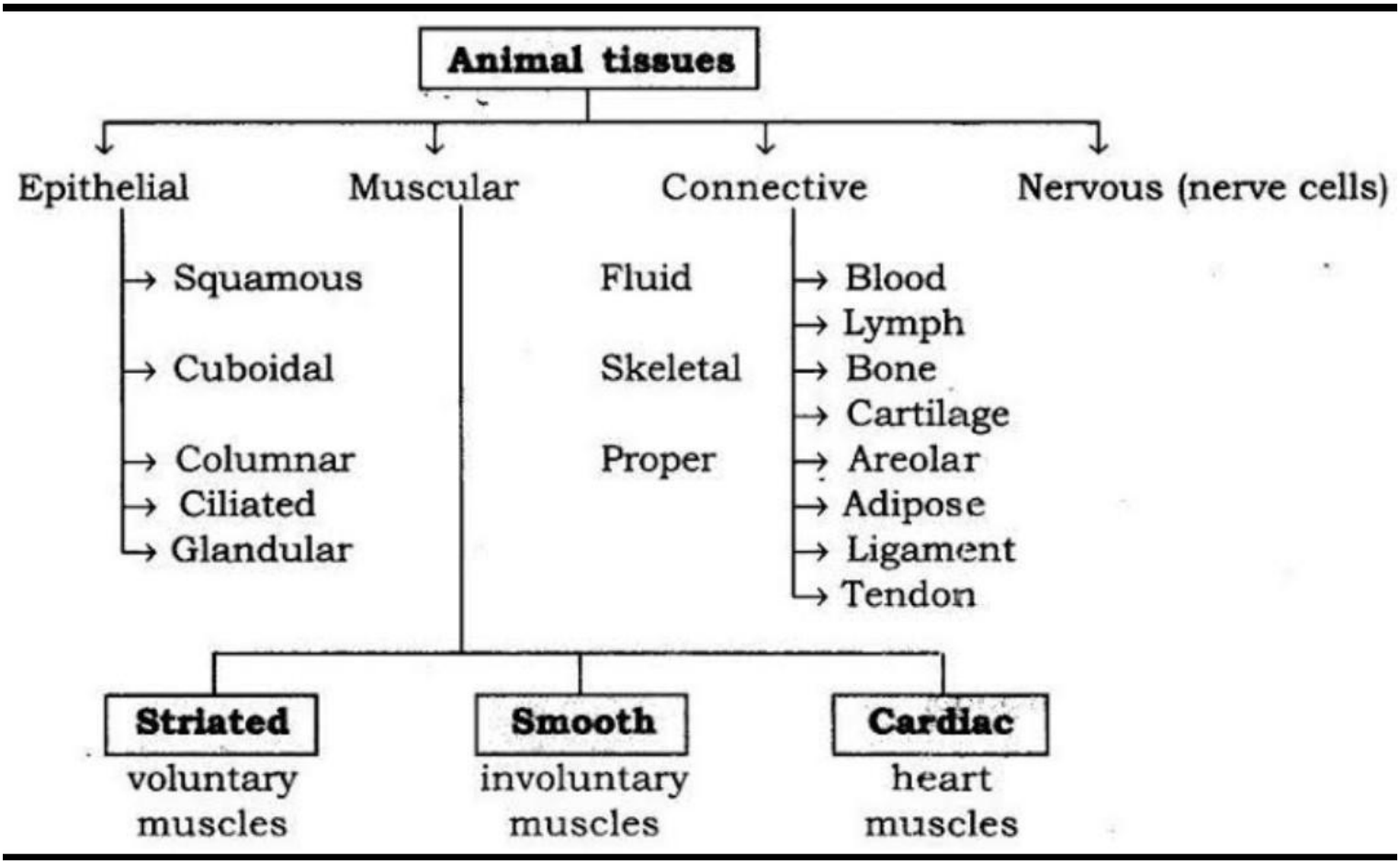
→ Animals move around in search of food, mates and shelter.

→ Most of the tissues they contain are living.

→ The structural organisation of organs and organ systems is far more specialised and localised in animals than in plants.

Types of Animal Tissues:

Animal tissues are classified into four types based on the functions they perform:
(i) Epithelial
(ii) Connective
(iii) Muscular
(iv) Nervous



(i) Epithelial tissues

→ They form the covering of the external surfaces, internal cavities and organs of the animal body.

→ Epithelial tissue cells are tightly packed and form a continuous sheet.

→ The skin, the lining of the mouth, the lining of blood vessels, lung alveoli and kidney tubules are all made of epithelial tissue.

Functions of Epithelial Tissue:
(i) Epithelium covers most organs and cavities within the body.
(ii) It also forms a barrier to keep different body systems separate.
(iii) The permeability of the cells of various epithelial play an important role in regulating the exchange of materials between the body and the external environment.

Types of epithelial tissues:

Various types of epithelial tissues are:

(a) Simple squamous epithelium: In cells lining blood vessels or lung alveoli, where transportation of substances occurs through a selectively permeable surface, there is a simple flat and extremely thin kind of epithelium which is named as simple squamous epithelium.

It is found in the lining of the mouth, oesophagus, lung, alveoli, etc.

(b) Stratified Squamous Epithelium: The skin, which protects the body, is also made of squamous epithelium.

Skin epithelial cells are arranged in many layers to prevent wear and tear. Since they are arranged in a pattern of layers, the epithelium is called stratified squamous epithelium.

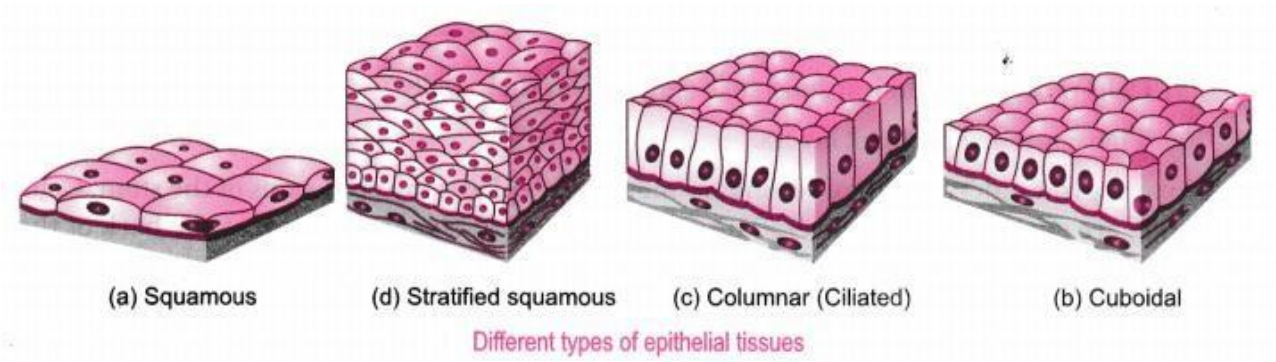
(c) Cuboidal epithelium: This is cuboidal in shape and forms the lining of kidney tubules and ducts of salivary glands.

It performs a function of absorption, secretion and absorption.

(d) Columnar Epithelium: Where absorption and secretion occur, as in the inner lining of the intestine, tall epithelial cells are present and are named as columnar epithelium.

(e) Ciliated Epithelium : The cells posses cilia (hair-like-projection) on the surface of epithelial cells. It is present in respiratory tract, sperm ducts, kidney tubules etc. Movement of cilia pushes the mucus forward to clear it.

(f) Glandular Tissue: When a small portion of the epithelial tissue folds inwards, a multicellular gland is formed.



Different types of epithelial tissues

(ii) Connective tissues

The cells of connective tissue are loosely spaced and embedded in an intercellular **matrix.**

They are specialised to connect various body organs.

For example:
Blood (plasma), bones, Cartilage. ligaments and tendons etc.

Plasma: The fluid (liquid) matrix of blood is called plasma.

Plasma is a yellowish liquid like material.

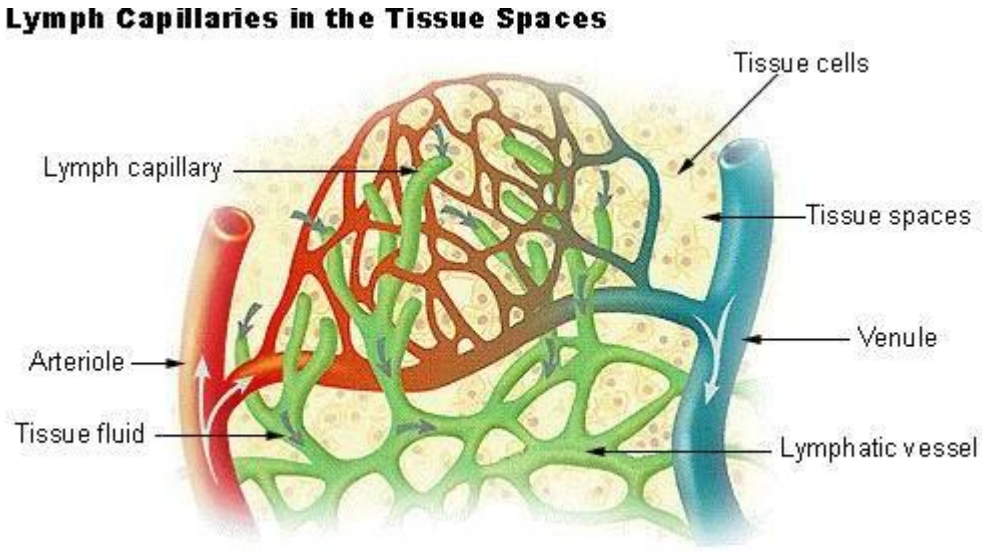
Plasma contains three types of blood cells suspended in it. These are:
(i) RBC - Red blood cells
(ii) WBC - White blood Cells
(iii) Platelets

Blood

1. The main function of blood is to transport gases, food, waste materials and hormones in the body. Therefore, blood has a fluid Matrix present in it which is called Plasma.
2. The plasma contains the red blood cells, the white blood cells and blood platelets.
3. The RBC have hemoglobin pigment which carries oxygen to tissues.
4. White blood cells fight diseases and platelets are involved in clotting of blood when injured.
5. The plasma also contains proteins and hormones in it.

Lymph (OLYMPIAD)

Lymph is a colourless fluid that carries white blood cells throughout the human body in lymphatic vessels. There are lymphoid organs present in the body that produce lymph and together form the lymphatic system. Some of them are lymph nodes and tonsils.



Lymph Capillaries

Bones: It is also a connective tissue that forms the framework that supports the body.

It is a strong and nonflexible tissue.

Bone cells are embedded in a hard matrix that is composed of calcium and phosphorus compounds.

Ligaments: Two bones are connected to each other by a connective tissue called the ligament.

This tissue is flexible or elastic in nature.

Tendons: Bones are connected to muscles by another type of connective tissue named as Tendons.
Tendons are fibrous tissue with great strength but limited flexibility.

Cartilage: Cartilage is another type of connective tissue which has widely spaced cells. The solid matrix of this tissue is composed of proteins and sugars.
Cartilage smoothens bone surfaces at joints and is also present in the nose, ear, trachea and larynx.
Cartilage of ear can be folded.

Types of connective tissue:

Various types of connective tissues are:
(a) Areolar tissue: They are found in the skin and muscles, around the blood vessels, nerves, etc.

Function of areolar tissue:

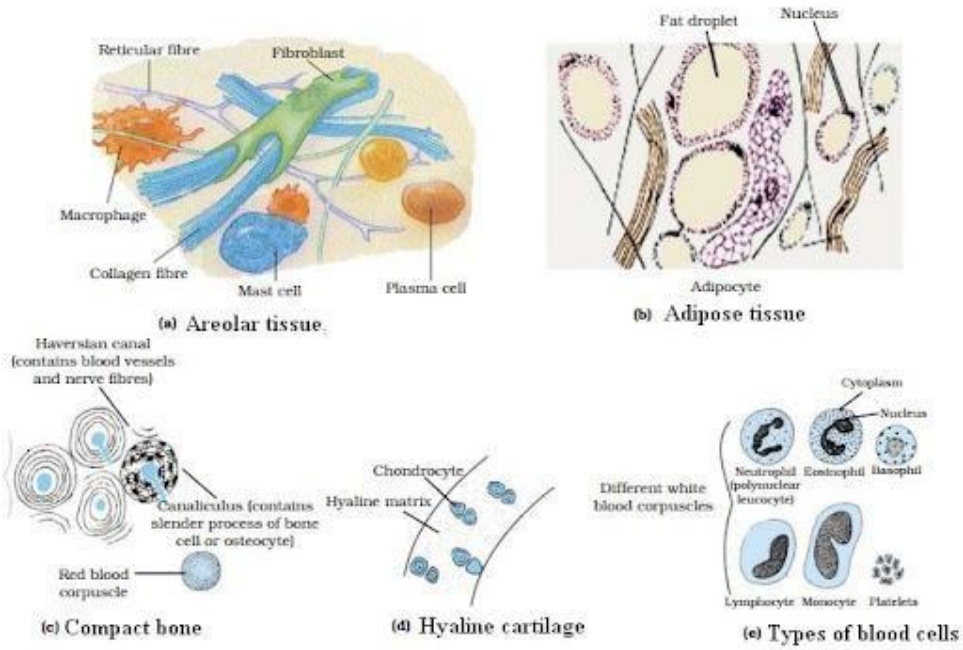
→ It fills the space inside the organs, supports internal organs and helps in repair of tissues.

(b) Adipose tissue: It is found between the internal organs and below the skin.

Function of adipose tissue:

→ It stores fats.

→ It act as an insulator.



(iii) Muscular tissues

Muscular tissue consists of elongated cells, also called muscle fibres. This tissue is responsible for movement in our body.

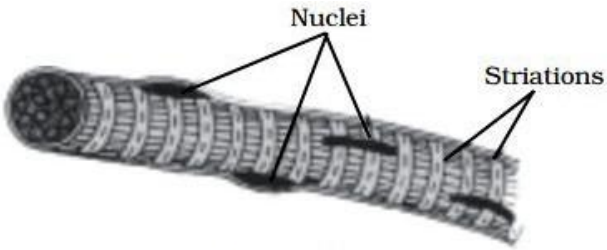
Main function of muscular tissues is to provide movement to the body.

Muscles contain special proteins called contractile proteins, which contract and relax to cause movement.

Types of Muscular Tissues:

Muscular tissues are of three types:
(a) Striated muscles or skeletal muscles or voluntary muscles: These muscles are also called skeletal muscles as they are mostly attached to bones and help in body movement.

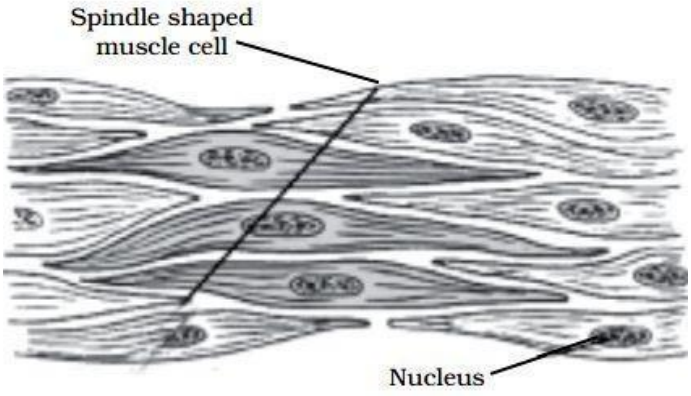
Cells are cylindrical, unbranched and multinucleated.



Striated muscle

(b) Smooth muscles or involuntary muscles: They are found in the iris of the eye, in ureters and in the bronchi of the lungs.

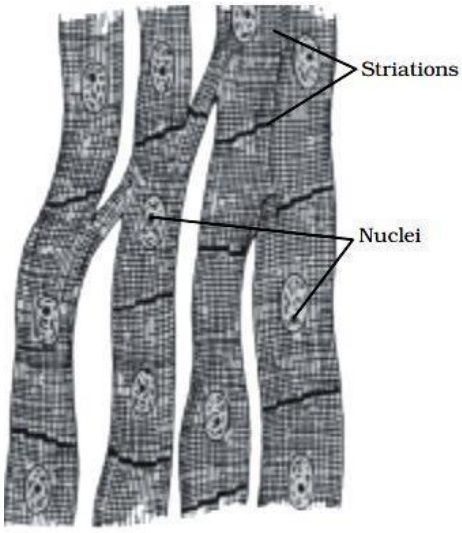
Cells are long, spindle-shaped and possess a single nucleus.



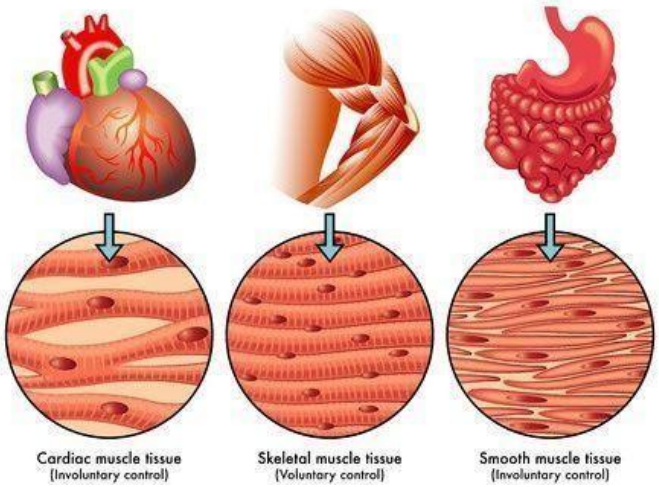
Smooth muscle

(c) Cardiac muscles or involuntary muscles: They help in rhythmic contraction and relaxation of the heart.

Cells are cylindrical, branched and uninucleated.



Cardiac muscle



Muscular Tissue

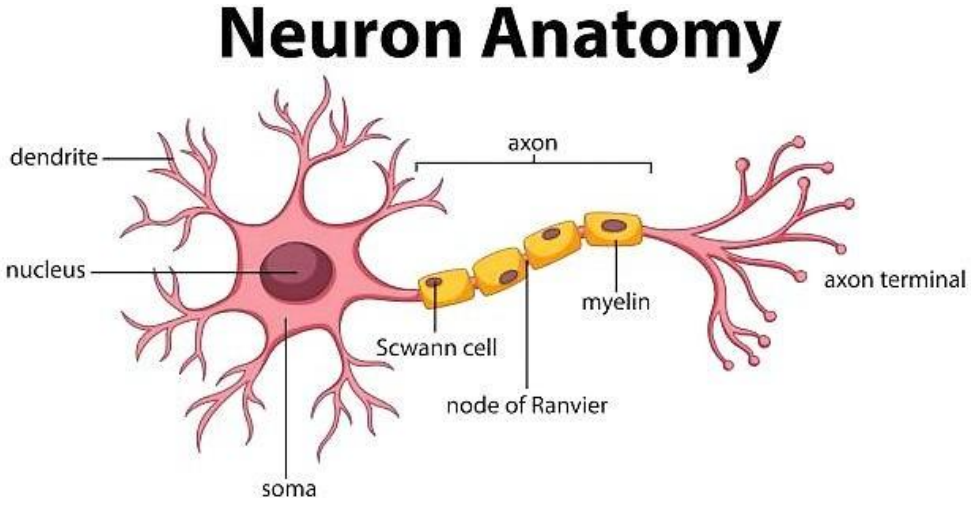
Striated/ Skeletal/ Voluntary muscles	Smooth/ Unstriated/Involuntary muscles
We can move them according to our own will	We cannot start or stop the movement of involuntary muscles.
They are also called **Skeletal Muscles** as they are attached to the bones.	They also called **Smooth Muscles**.
They are also called **Striated Muscles** because of the presence of dark and light bands over them	They are also called **Unstriated Muscles** because they do not have any light or dark bands on them.
The cells of voluntary muscles have more than one nucleus, they do not have any branches, and have a long cylindrical structure.	The cells of the involuntary muscles are long and have pointed ends.
For Example, Muscles of our hands and legs.	**For Example**, The muscles in the alimentary canal and the Iris of our eyes.

(iv) Nervous Tissues

Cells of the nervous tissue are highly specialised for being stimulated and then transmitting the stimulus very rapidly from one place to another within the body.

The brain, spinal cord and nerves are all composed of the nervous tissue.

Neuron: Cells of the nervous tissue are called neurons.
A neuron consists of a cell body, an axon and a dendrites.



Structure of Neuron

Functions of Nervous Tissue-

1- They transmit information from body parts to brain.

2- They transmit messages from brain to different body parts.

3- Nervous and muscular tissue together control body movement in all parts.

Try the following questions:

Q1. Which tissues are called covering or protective tissues?

Q2. Where do you find simple squamous in an animal body?

Q3. What is the shape of cuboidal epithelium? Where do we find these tissues? State one of their main function.

Q4. What type of epithelium tissues are found in respiratory tract and in intestinal lining?

Q5. Name the fat-storing tissues? Where are they located?