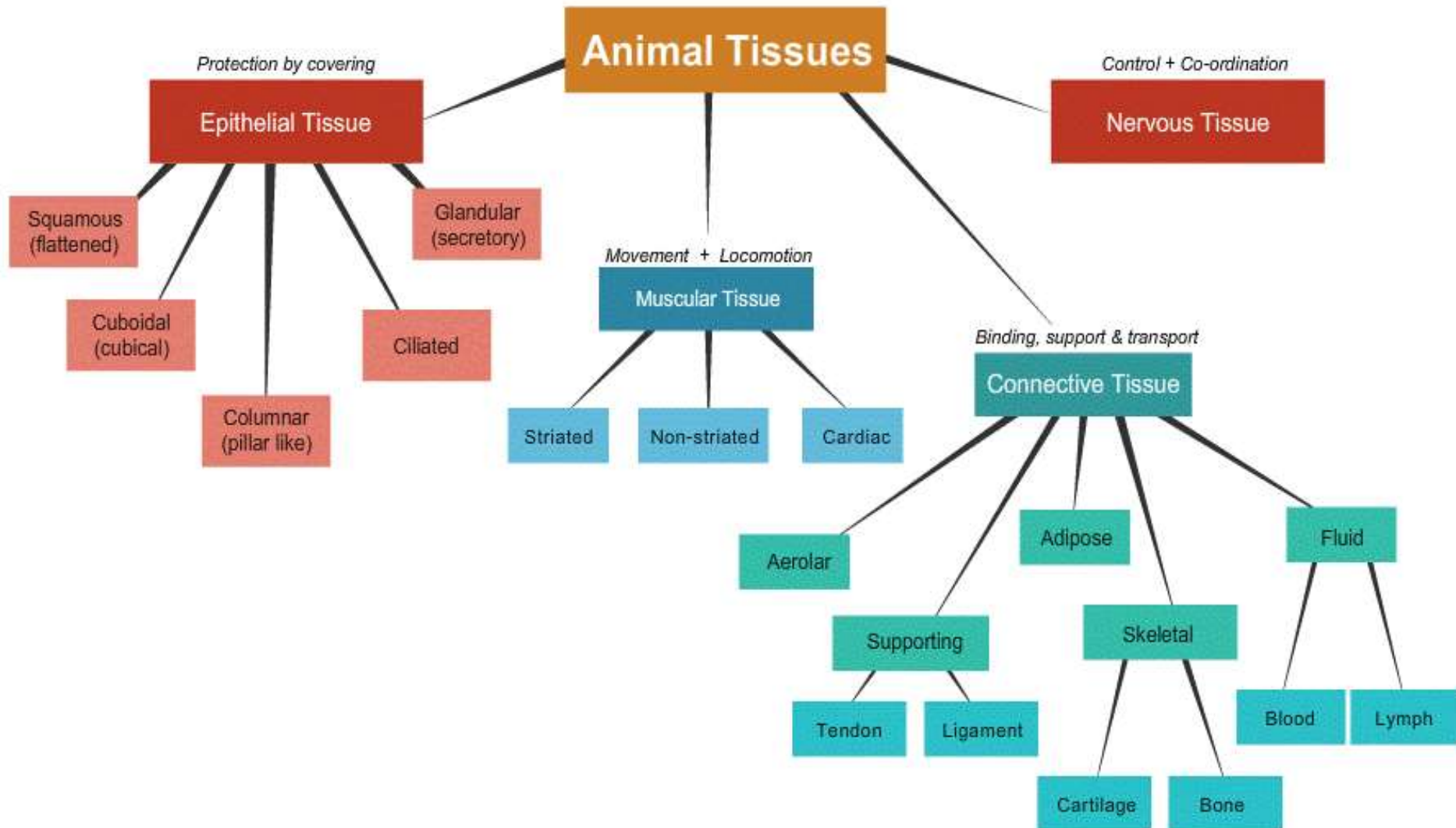


TISSUES

ANIMAL TISSUES



ANIMAL TISSUE



EPITHELIAL TISSUE



They are the protective tissues of the human body. They cover many organs and cavities that are present inside the body.

Where are the epithelial tissues found in the human body?

- The lining of the blood vessels

- The lining of the mouth

- Kidney tubules

- Skin

- Lung alveoli

Structure and functions of the epithelial tissues -

- The main function of the epithelial tissues is to act as a barrier and separate different organs and systems from each other.

- There is no space between the cells of epithelial tissues

- The cells are permeable. This makes it possible for them to exchange materials between different parts of the body and also between the body and the external environment.

- The epithelial tissues remain separated from the tissues beneath them because of a thin membrane over them.

TYPES OF EPITHELIUM

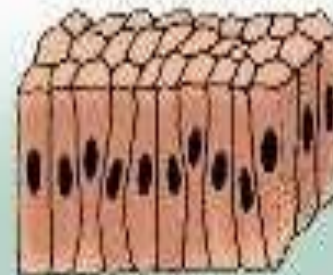
Types of Epithelium



Simple squamous

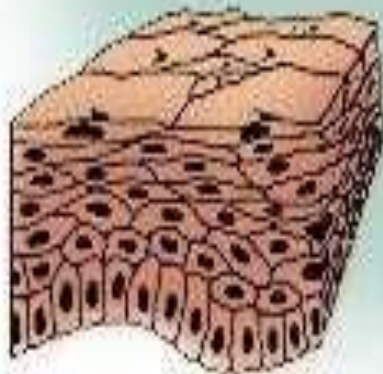
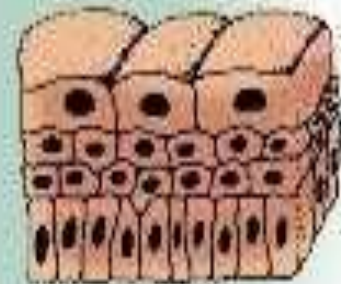


Simple cuboidal

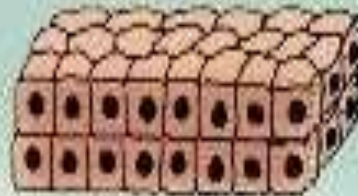


Simple columnar

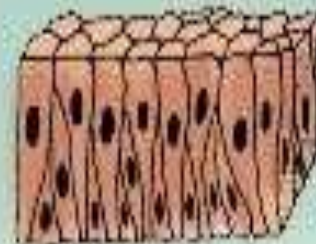
Transitional



Stratified squamous



Stratified cuboidal



Pseudostratified columnar

DIFFERENCES

Different types of epithelium tissues	Simple Squamous	Stratified Squamous	Columnar	Ciliated Columnar	Cuboidal	Glandular
Structure	They have delicate cell lining and possess a flat thin structure	The epithelium Squamous cells are arranged in several layers	They are the column-like shape tissues	Columnar epithelial tissues which have Cilia present on them	They are cube-shaped cells which are involved in absorption and secretion.	These are special gland cells that can secrete substances
Found in	Alveoli and bowman's capsule-nephron in kidney	Skin	Intestine	Respiratory system	Kidney tubules	Sweat glands in the skin

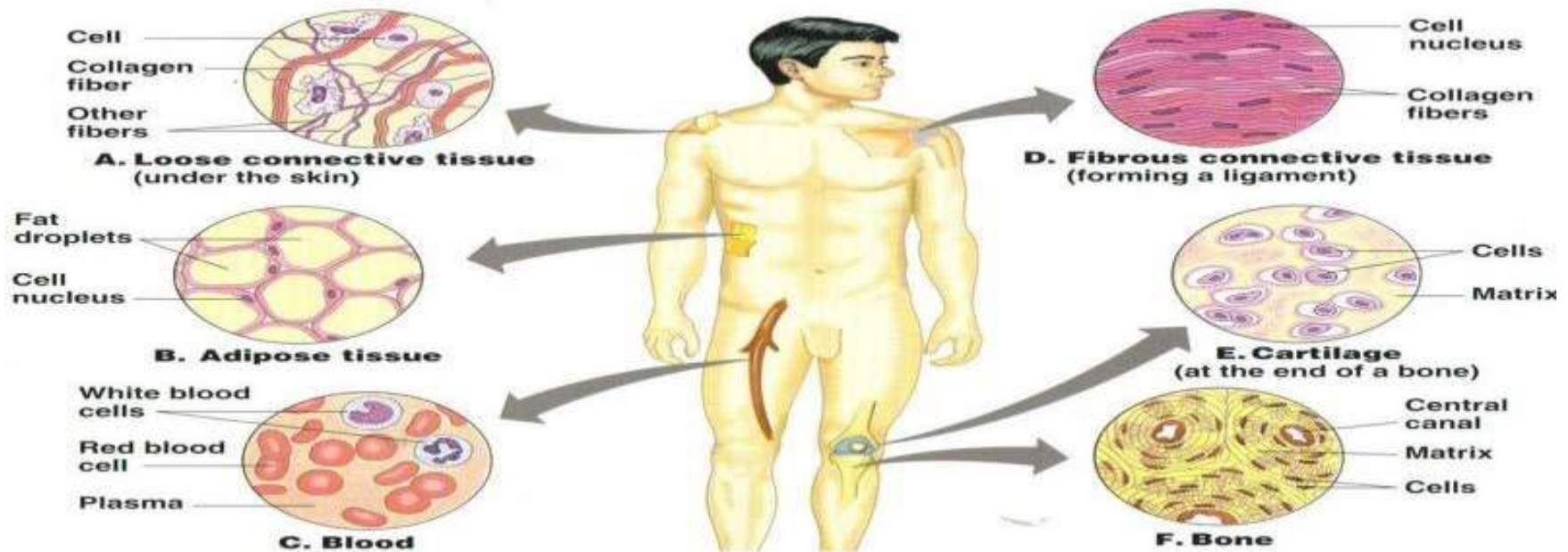
CONNECTIVE TISSUE

- **Structure and function of connective tissues**

- ❖ They are loosely bound cells present in an intercellular Matrix.
- ❖ This matrix can be of different types – Dense, Rigid, Fluid or Jelly-like.
- ❖ Depending upon the functionality of the connective tissue, the nature of the matrix varies in them.

- **Examples of Connective Tissues**

Figure : Connective Tissues



BLOOD & LYMPH

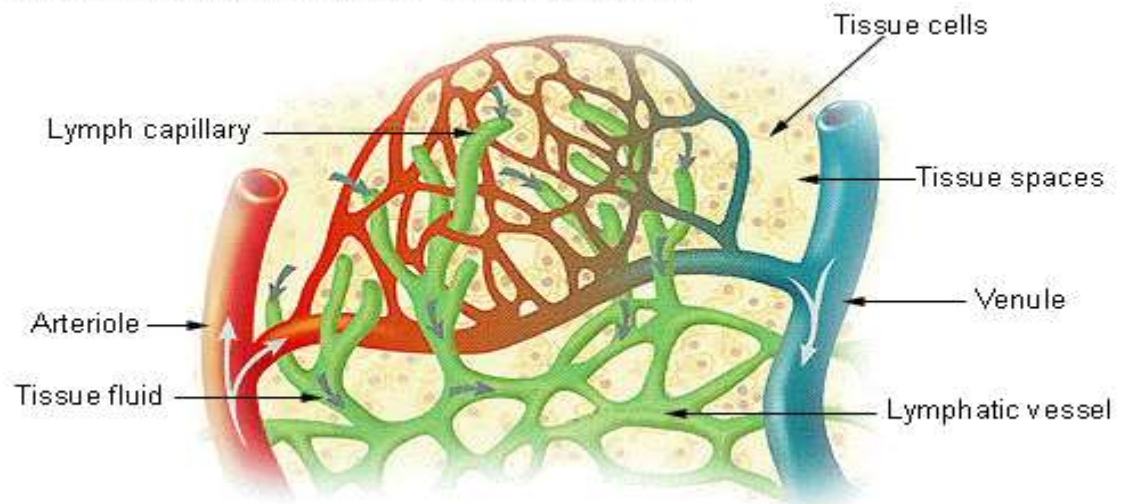
Blood

- 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**.
- The plasma contains the red blood cells, the white blood cells and blood platelets.
- The RBC have hemoglobin pigment which carries oxygen to tissues.
- White blood cells fight diseases and platelets are involved in clotting of blood when injured.
- The plasma also contains proteins and hormones in it.

Lymph 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 in the Tissue Spaces

Figure Lymph Capillaries



LYMPH IS SIMILAR TO BLOOD EXCEPT FOR A FEW DIFFERENCES

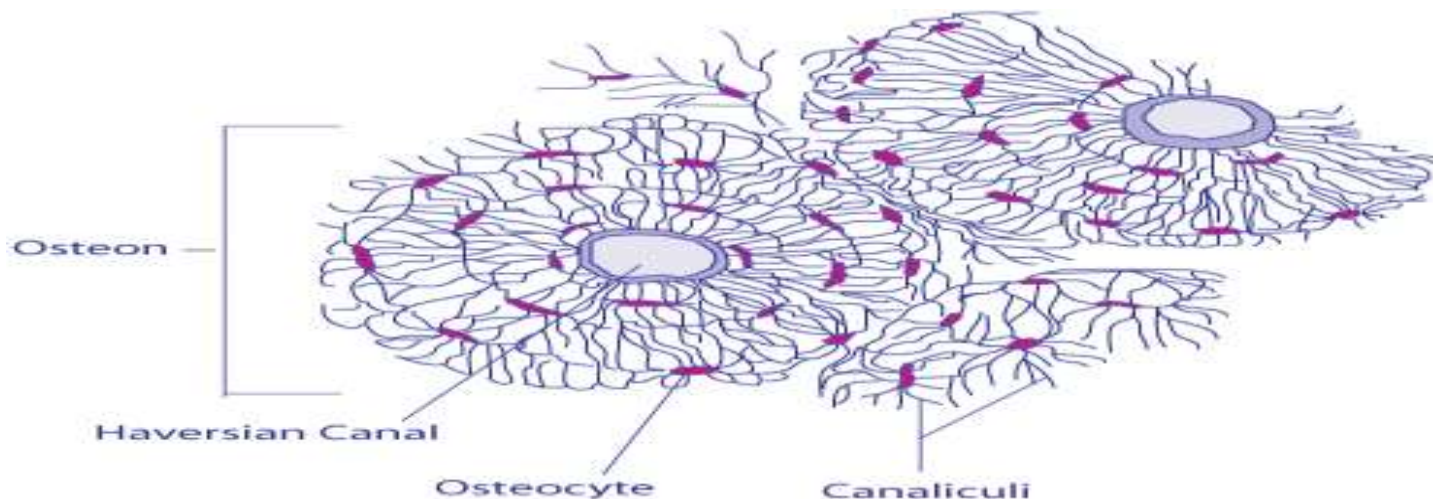
- It contains only white blood cells.
- It contains less amount of blood proteins, calcium and phosphorous but more glucose.
- It flows in one direction only.
- Lymph moves in the body through its normal function unlike blood which is pumped by the heart.
- **Constituents of Lymph:**
- **Lymph Plasma** – Lymph Plasma carries infection-fighting proteins along with other substances such as water, calcium and phosphorous.
- **Lymph Corpuscles** – Lymph Corpuscles comprises white blood cells. Red blood cells and platelets are not present in lymph.
- **Functions of Lymph:**
- It carries oxygen and minerals to the cells in the body and carries back carbon dioxide and waste materials back into the blood.
- It keeps the body cells moist.
- It maintains the volume of the blood.
- It helps in eliminating harmful bacteria and virus from the body and hence is responsible for the immunity of human beings.
- It absorbs fats from the intestine and transports them throughout the body.

BONES

- ❖ Bones form a framework of the body over which the muscles are wrapped together.
- ❖ The bone tissue is strong and inflexible in nature.
- ❖ Therefore, the bone cells are present in a rigid matrix which is formed from calcium and phosphorus.

HAVERSIAN CANAL

- ❖ The bones comprises of microscopic tubes called **Haversian Canals**.
- ❖ They are contained in osteons, rough cylindrical structures present along the axis of the bone.
- ❖ They allow the blood vessels, lymphatic vessels, and nerve fibres to travel through them.
- ❖ These canals have concentric channels called **Lamellae** around them.
- ❖ The Haversian canals communicate with bone cells through connections called **Canaliculi**.



CARTILAGE

- ❖ Cartilage is present over the joints of the bones and provides them with a smooth structure.
- ❖ **For Example** in the nose tip and ear pinna, trachea, larynx.
- ❖ They contain solid matrix made of protein and sugar. They have homogenous matrix.
- ❖ It provides support and flexibility to various parts of our body.

LIGAMENTS AND TENDON



Ligaments

- A ligament connects two bones together.
- It has an elasticity which facilitates the connection.
- The cells of ligaments have a little matrix.

Tendons

- The tendons tissues are responsible for connecting bones and muscles together.
- They have limited flexibility but very great strength.

AREOLAR TISSUE

- This tissue acts as a filter in between the spaces present inside the organs of the body.
- It helps in repairing other tissues as well.
- It is found in the skin and bone marrow.
- **Components of the areolar connective tissue**

Cell types

Macrophage

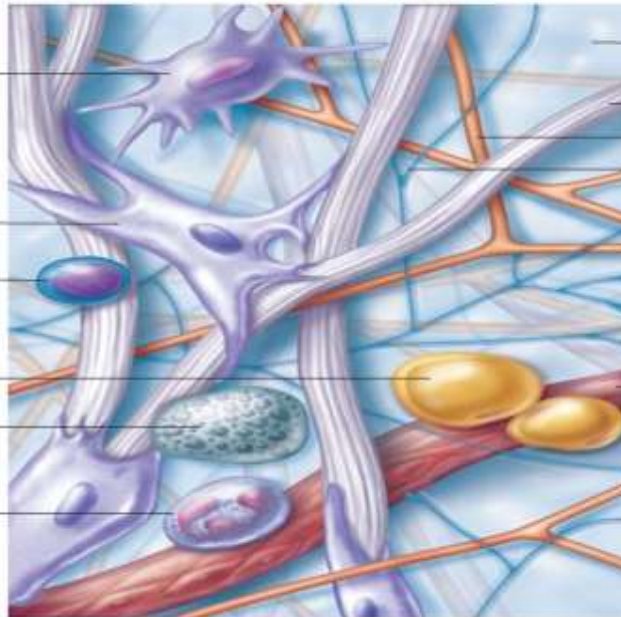
Fibroblast

Lymphocyte

Fat cell

Mast cell

Neutrophil



Extracellular matrix

Ground substance

Fibers

- Collagen fiber
- Elastic fiber
- Reticular fiber

Capillary

CELLS AND FIBRES



1. Cells

- **Fat Cells (Adipocytes)** – They are responsible for secretion of lipids.
- **Fibroblasts** – They are the present in the highest amount in areolar tissues. They are responsible for secretion of fibres.
- **Mast Cells** – They release histamine that plays role in allergic reactions
- **Macrophages** – They eat any germs or infectious cells in the body
- **Plasma Cells** – They produce antibodies

2. Fibres

- **Collagen Fibres** – They provide tensile strength to the tissue
- **Elastin Fibres** – They provide elasticity to the tissue
- **Ground Substance** – It is a fluid matrix that holds cells and fibres of the tissue

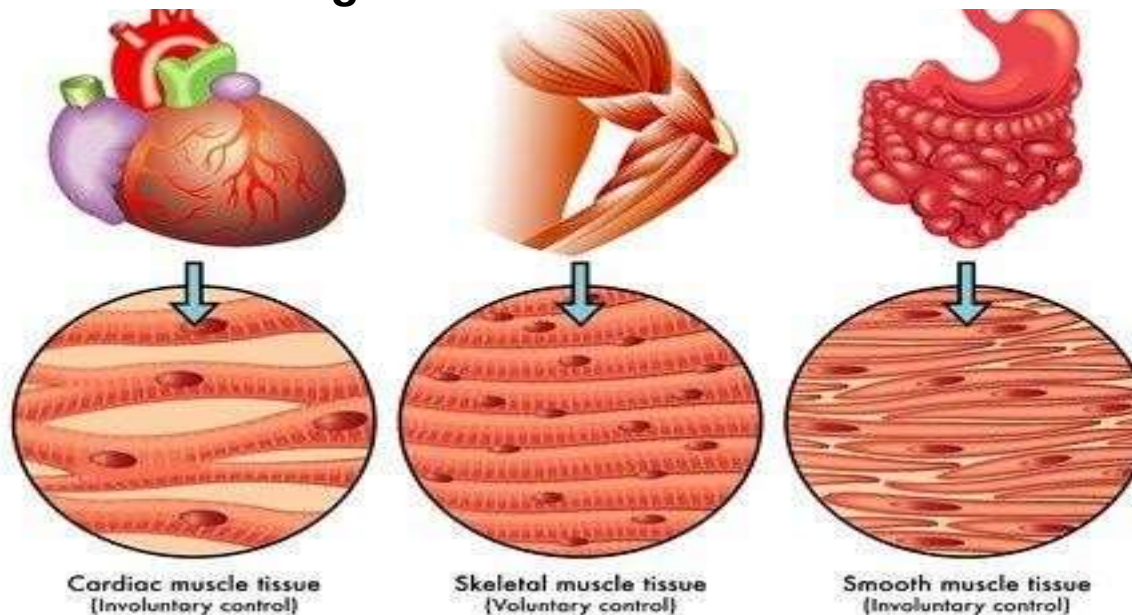
Adipose

- Fats are stored in our body in the adipose tissues.
- They are found below the skin and between the organs of the body.
- Provides cushioning to the organs.

MUSCULAR TISSUE

- ❖ It is made up of muscle fibers which are long cells.
- ❖ It allows movements in our body.
- ❖ **How muscles can cause movement?**
- ❖ They contain special proteins called **Contractile Proteins**. These proteins cause contraction and relaxation of the muscles.
- ❖ There are two kinds of muscles found in our body - Voluntary Muscles and Involuntary Muscles.

Figure Muscular Tissue



DIFFERENCES BETWEEN STRIATED AND UNSTRIATED MUSCLES



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.

CARDIAC MUSCLES

- ❖ **Cardiac Muscles**
- ❖ These are special kinds of involuntary muscles.
- ❖ The muscles of the heart are called **Cardiac Muscles** they perform rhythmic contraction and relaxation throughout our life.
- ❖ They are cylindrical in shape, they have branches and there is a single nucleus.
- ❖ Cardiac muscle consists of individual heart muscle cells connected by intercalated discs to work as a single functional organ

THE NERVOUS TISSUE



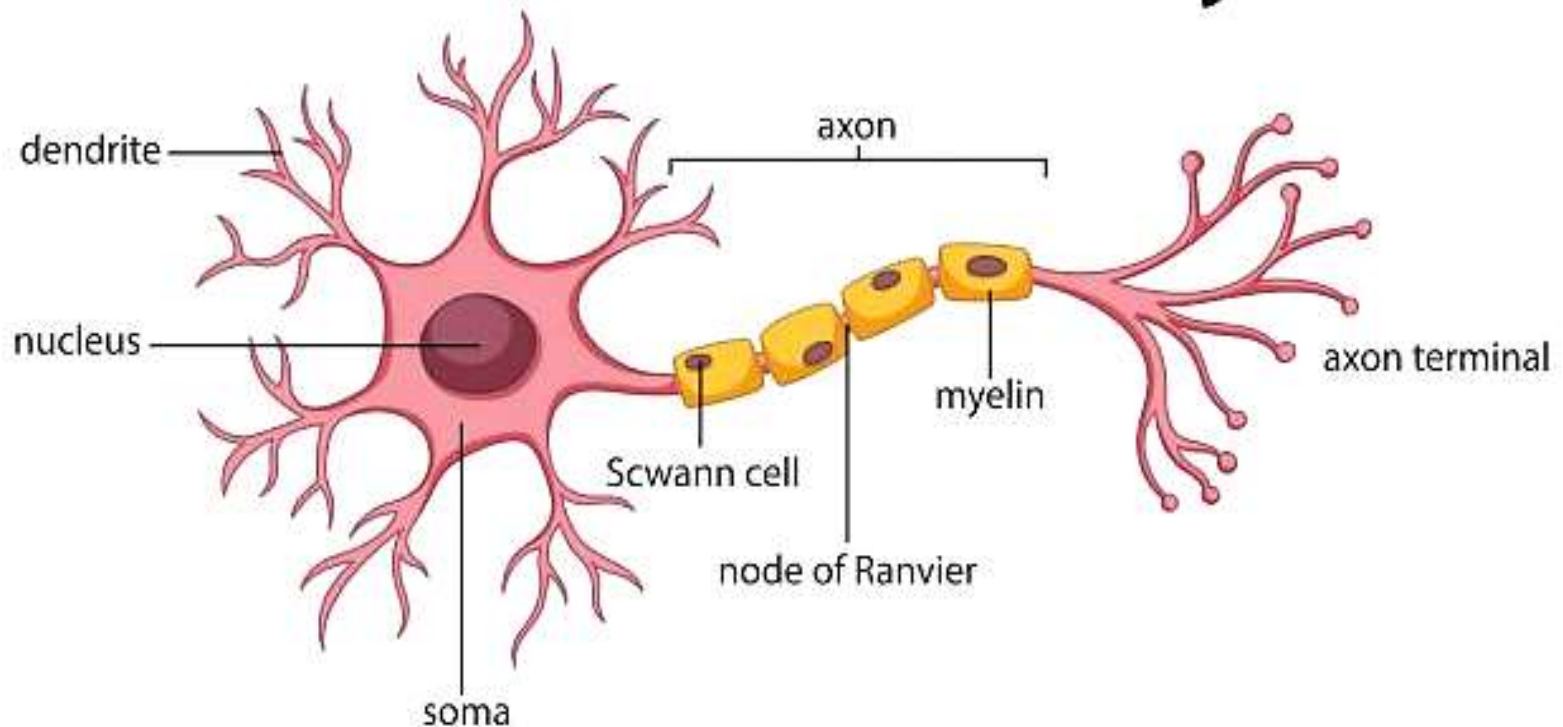
❖ How do we react to stimuli?

- ❖ This is because of the nervous tissues present in our body. They are capable of transmitting information quickly from the brain to different parts of the body and vice-versa.
- ❖ Therefore nervous tissues are found in nerves, brain, and spinal cord.
- ❖ The Nervous tissue is made up of cells called the **Nerve Cells** or **Neurons**.
- ❖ These neurons connect together to form the nerves of our body.
- ❖ **Structure of a Neuron**

- ❖ It is an elongated cell with a Cell Body that consists of some branch-like structure called Dendrites.
- ❖ There is a Nucleus present in the center of the cell body.
- ❖ The Nerve Endings of the cell are connected with the cell body via Axon.
- ❖ A nerve cell can be up to 1 m long.

NEURON

Neuron Anatomy



THE STRUCTURE OF NEURON



■ Dendrites

- ❖ They are tree-like extensions (highly-branched) at the beginning of a neuron.
- ❖ They increase the surface area of the neuron.
- ❖ They receive chemical signals from different neurons of the body.
- ❖ They then convert these chemical signals into electrical signals and pass them to the neuron cell body.
- ❖ A neuron can have a single dendrite or multiple dendrites

❖ 2. Cell Body

- ❖ Also called **Soma**.
- ❖ The main function of the cell body and nucleus of the neuron is to maintain the functionality of the cell.
- ❖ It does not play an active role in the transmission of the signal.
- ❖ It produces proteins that are required by different parts of the neuron to work properly.
- ❖ It contains different cell organelles such as mitochondria, Golgi apparatus etc that perform various functions of the cell.

❖ 3. Axon

- ❖ Neurons have one axon in general.
- ❖ It is a long structure that connects the cell body to the terminals and it also connects with other neurons, cells and organs of the body through nerve terminals.
- ❖ It allows in fast transmission of signals. The larger the diameter of the axon the faster it will transmit signals.
- ❖ It is covered with a special insulating substance called myelin. It helps in rapid transmission of signals.

❖ 4. Schwann Cells

- ❖ The Myelin sheath that covers the axon is produced by Schwann cells.
- ❖ The Myelin sheath keeps the signal intact

**Thank
You**

