

## TISSUES OF THE BODY

Tissues are formed from the assemblage of **cells** and **intercellular materials** in various proportions in which one component predominates. In nervous tissue as an example, nerve cells predominate while in connective tissues such as Ligaments and Tendons, intercellular fibrous materials predominate. A tissue could therefore be described as comprising cells, which share structural and functional similarities and intercellular materials.

In the course of development of the body, cells undergo specialization following which they aggregate, based on functional and structural similarities to form body tissues. This arrangement is responsible for the high level of organization and distribution of labor in the body.

When tissues are assembled in various proportions to form a functional entity, an **Organ** is said to be formed.

The organization of tissues within an organ determines the structure as well as the functional capabilities of the organ.

There are four main types of tissues within the human body. These are commonly referred to as the **Primary (Basic) tissues of the body**. The basic tissues of the body include:

- **Epithelial (Covering) Tissue (See Diagram EP 1):**

Epithelial tissue covers the external and internal surfaces, including cavities and tubes of the body. Three different shapes of cells are encountered in the epithelium. These are:

1. **Squamous (Flat) cells**
2. **Cuboidal cells and**
3. **Columnar cells.**

These three cell types could be arranged in:

- A single layer to form **Simple epithelium** e.g. the lining of the stomach (columnar epithelium) or in
- Several layers to form a **Compound (Stratified) epithelium** e.g. the epidermis of the skin (squamous epithelium)
- **Connective Tissue:** This tissue connects cells and other tissues of the body, offering structural and metabolic support. It also serves as a medium of conveying nutrients to and removing waste from tissues and body organs. It is composed of specialized cells (**Fibroblasts**), intercellular fibrous materials (**Collagen, Reticular and Elastic fibres**) and an extracellular fluid medium called **Matrix (Ground substance)**.

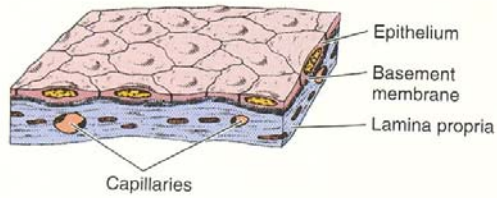
The connective tissue is the most abundant tissue in the body.

Examples of Connective tissues are:

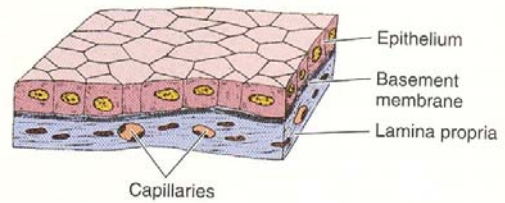
1. Bones
2. Cartilage
3. Ligaments, tendons and facial sheath
4. Areola tissue
5. Adipose (Fat) tissue
6. Blood
7. Mucous

## Diagram EP 1

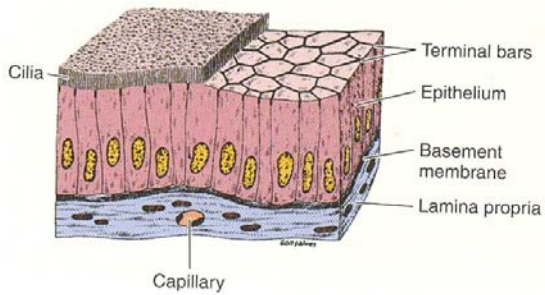
**A** Simple squamous epithelium



**B** Simple cuboidal epithelium

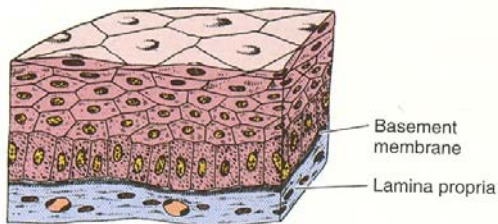


**C** Simple ciliated columnar epithelium

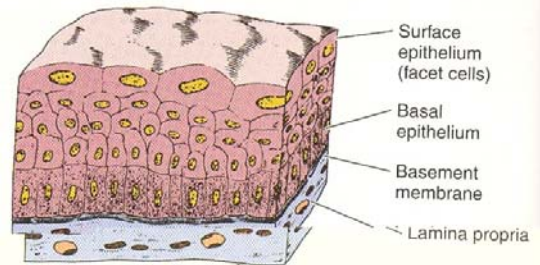


Diagrams of simple epithelia. **A:** Simple squamous epithelium. **B:** Simple cuboidal epithelium. **C:** Simple ciliated columnar epithelium. All are separated from the subjacent connective tissue by a basement membrane. In **C**, note the terminal bars that correspond in light microscopy to the zonula occludens and the zonula adherens of the junctional complex.

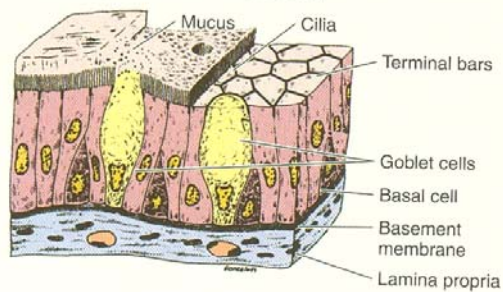
**A** Stratified squamous epithelium



**B** Transitional epithelium



**C** Ciliated pseudostratified epithelium



Diagrams of stratified and pseudostratified epithelia. **A:** Stratified squamous epithelium. **B:** Transitional epithelium. **C:** Ciliated pseudostratified epithelium. The goblet cells secrete mucus, which forms a continuous mucous film over the ciliary layer.

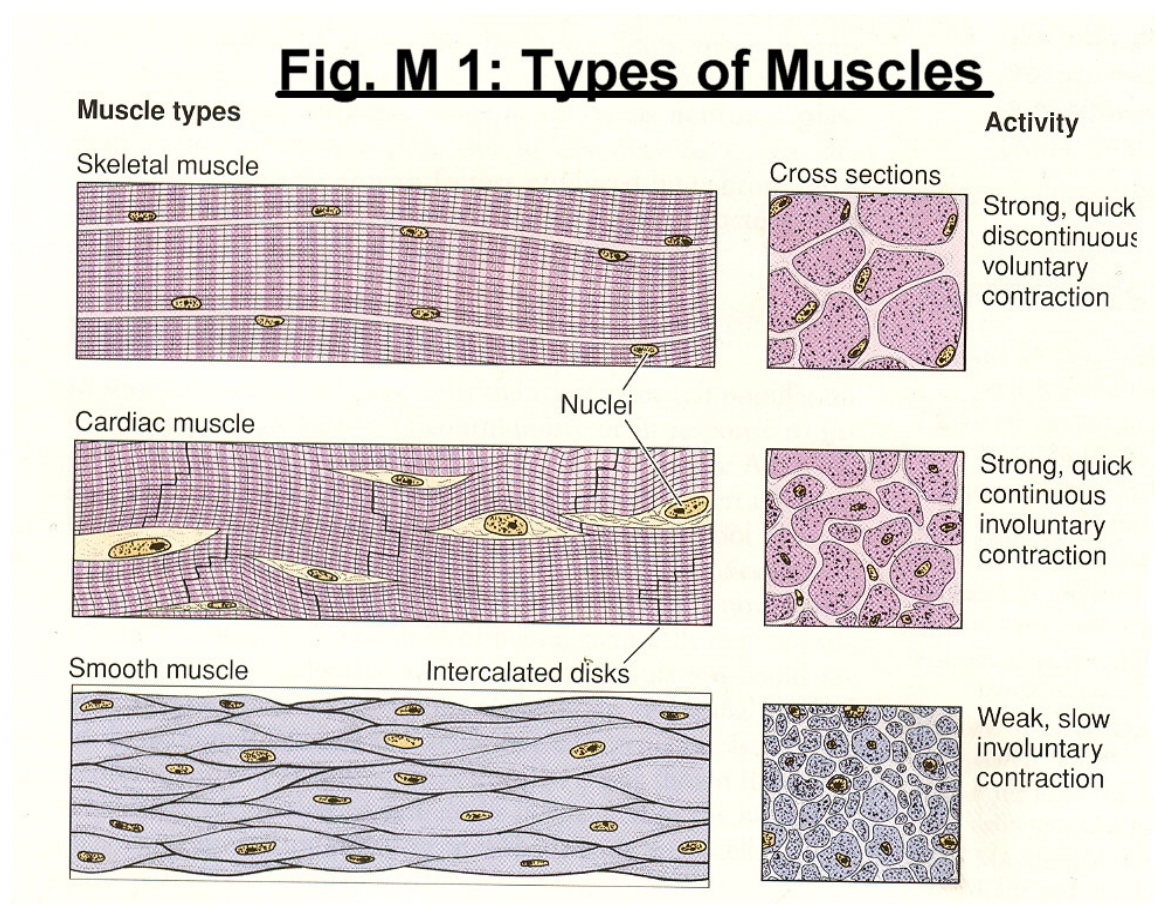
**Muscle Tissue (Fig. M1):** Muscle tissue is composed of highly specialized contractile cells which are often elongated in shape. They are responsible for movements of body parts relative to one another. Cells of the muscle tissues are referred to as **muscle fibres**. Muscle tissues occur in four main types viz.

**Smooth muscles**, which line the walls of tubular (Blood vessels) as well as hollow organs (Stomach and Urinary bladder). These under involuntary control

**Striated skeletal muscles** which are attached to bones, which they move at the joints. These are controlled voluntarily.

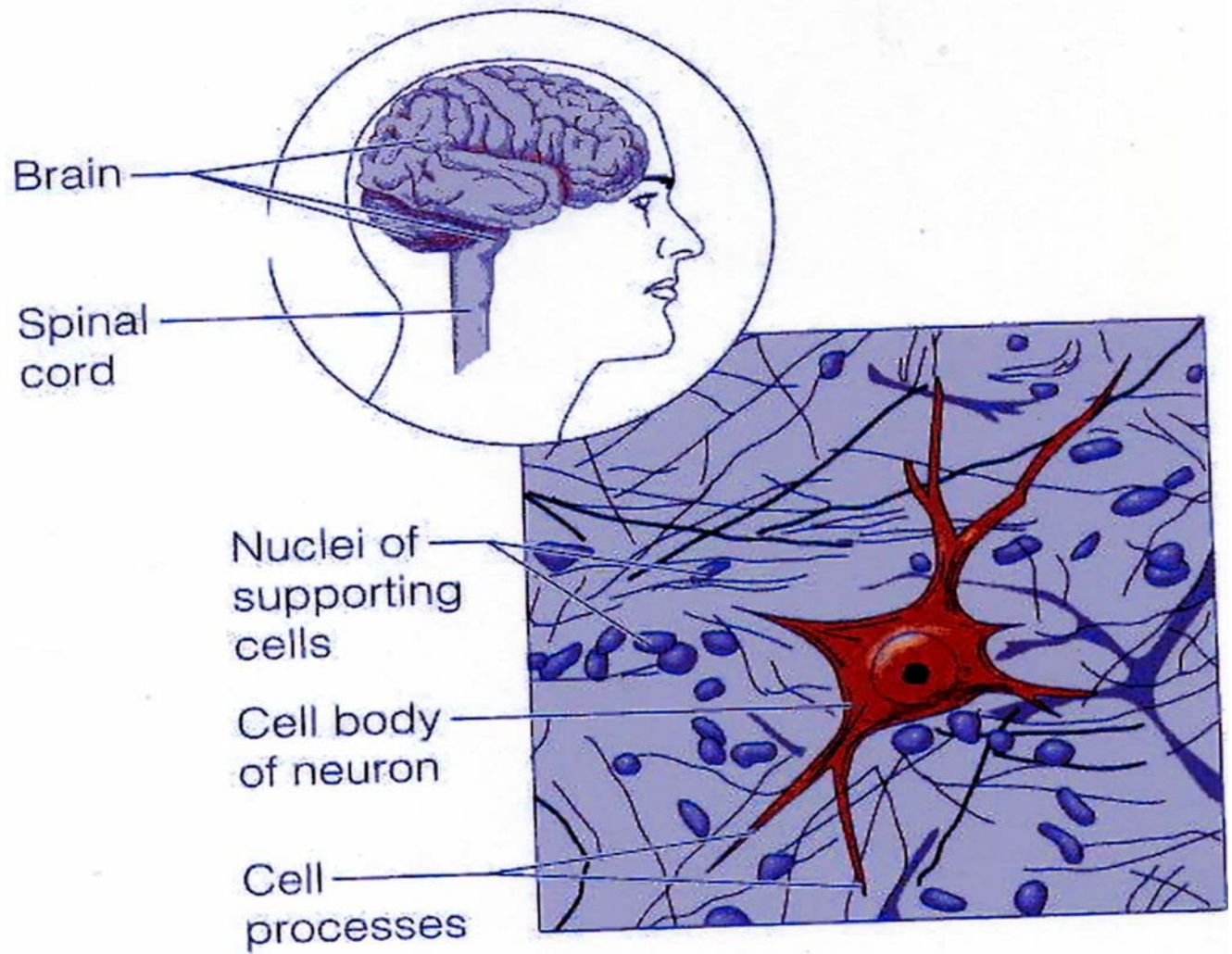
**Striated Non-skeletal muscles** which are not attached to bones and are under involuntary control.

**Striated Cardiac muscles**, which form the wall of the heart and are responsible for the movement leading to heart beat. These are also under involuntary control



**Nervous tissue:** This is the tissue responsible for the body's awareness of its internal as well as its external environment and its ability to respond to the environment as appropriate. It is made up of cells called **Neurons**, which are highly specialized in the properties of **irritability (Excitability)** and **conductivity**. It is also composed of supportive cells called **Neuroglia**, which not only support but nourish the neurons.

The nervous tissue makes up the nervous system of the body. This comprises the brain cranial nerves, spinal cord, spinal nerve fibres and several receptor cells and organs.



**Fig. N1 Nervous tissue.** Neurons and supporting cells form the brain, spinal cord, and nerves.

## **BODY SYSTEMS**

The human body performs various functions each of which requires the input of various specialized organs of the body.

All body organs which are involved in the execution of a particular body function are assembled together as a body system.

This is yet another illustration of the high level of division of labor within the human body.

The generally recognized body systems which will be considered during your basic medical training in years one and two are:

1. Integumentary system also referred to as 'The Skin'
2. Digestive (Alimentary) system
3. Cardiovascular system
4. Lymphatic system
5. Urinary System
6. Respiratory system
7. Nervous system
8. Endocrine system
9. Genital (Reproductive) system
10. Musculoskeletal system