

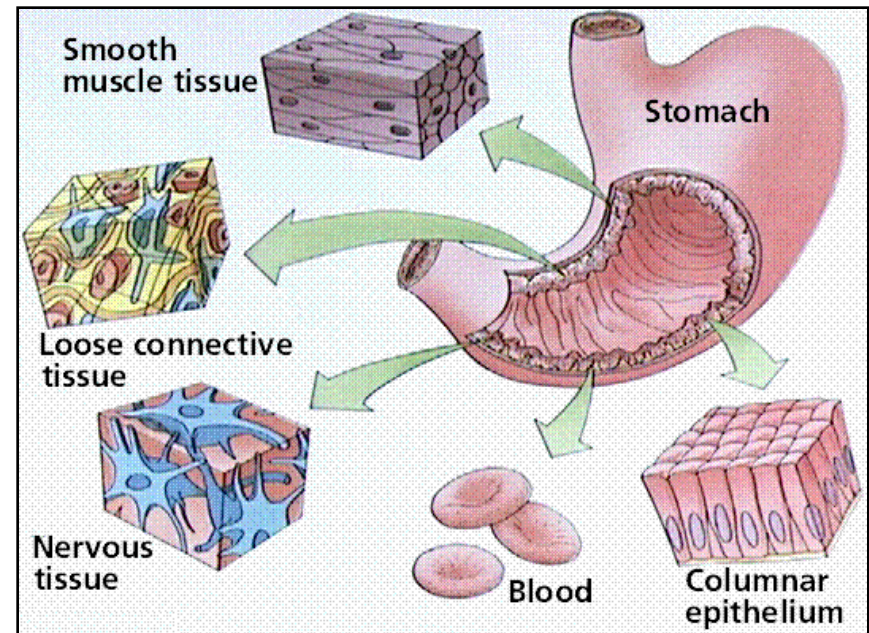
Animal Tissues

Animal Tissues → Histology

- Animals are multicellular organisms with their specialized cells grouped into **tissues**.
- In most animals, combinations of various tissues make up functional units called **organs**, and groups of organs that work together form **systems**.
 - For example, the human digestive system consists of a stomach, small intestine, large intestine, and several other organs, each a composite of different tissues.
- **A tissue** is a group of cells with a common structure and function.
(**A group of similarly specialized cells associated to perform one or more functions**)
 - Different types of tissues have different structures that are especially suited to their functions.
 - A tissue may be held by a sticky extra-cellular matrix that coats the cells or weaves them together in a fabric of fibers.

Organization of the Animal Body

- Organs in animals are composed of a number of different tissue types.
- Organs are composed of tissues, which are in turn composed of cells





A

Cellular level
Muscle cell



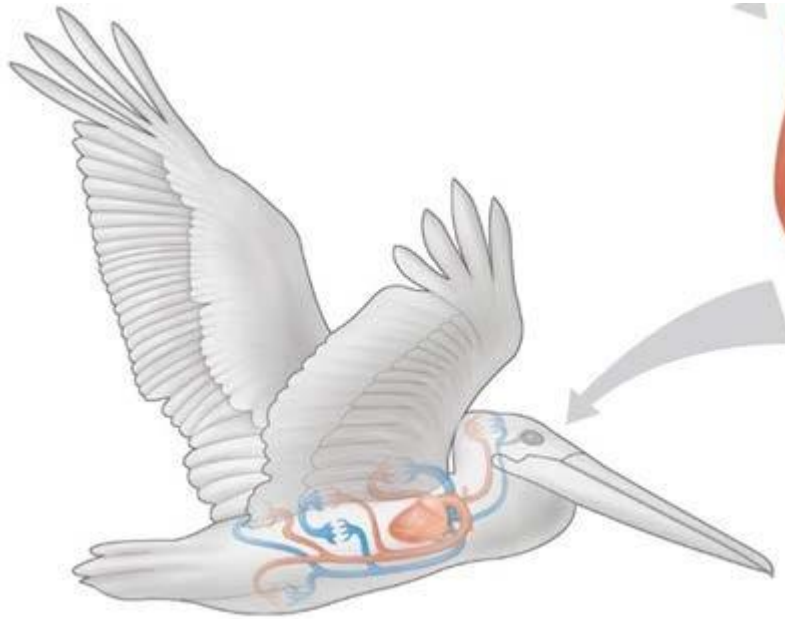
B

Tissue level
Muscle tissue



C

Organ level
Heart



D

Organ system level
Circulatory system



E

Organism level
Many organ systems functioning together

Structure fits the function

Animals consist of a hierarchy of levels of organization.

Structure fits the function at all levels of organization in the animal body.

- Animals have four main categories of tissues
 - 1) Epithelial tissue
 - 2) Connective tissue
 - 3) Muscle tissue
 - 4) Nervous tissue

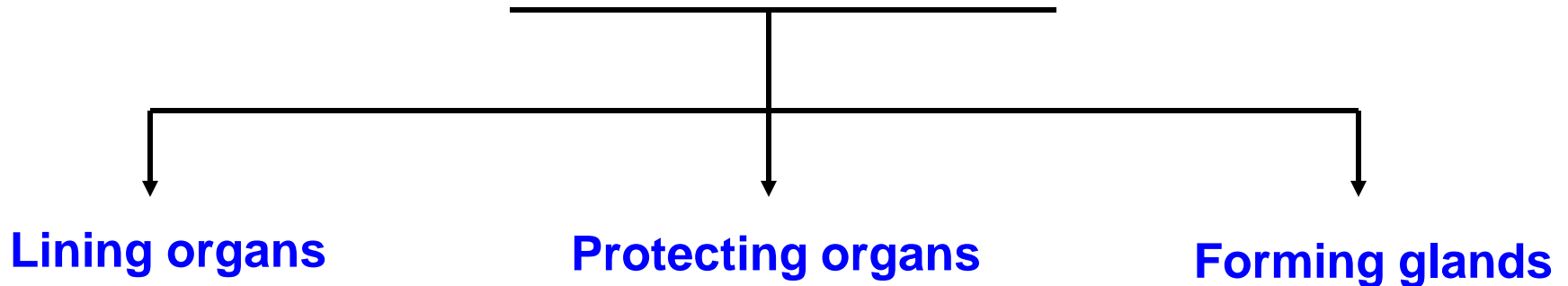
General Traits or characteristics of Epithelial tissue

1. found on a body surface either internal or external
2. tightly packed cells
3. free border or free surface
4. rest on a basement membrane
5. nonvascular

(1) Epithelial Tissues

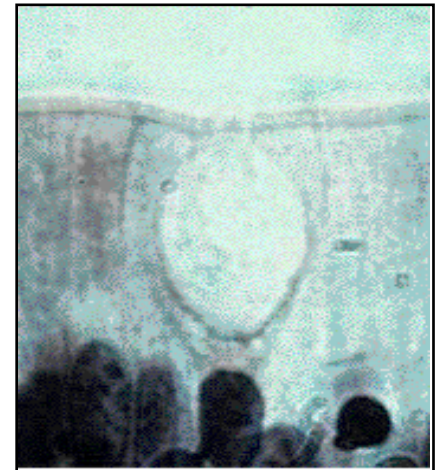
Covers body surfaces and **lines** body cavities

Function of Epithelium



Glands can be single epithelial cells, such as the goblet cells that line the intestine.

Multicellular glands include the endocrine glands.



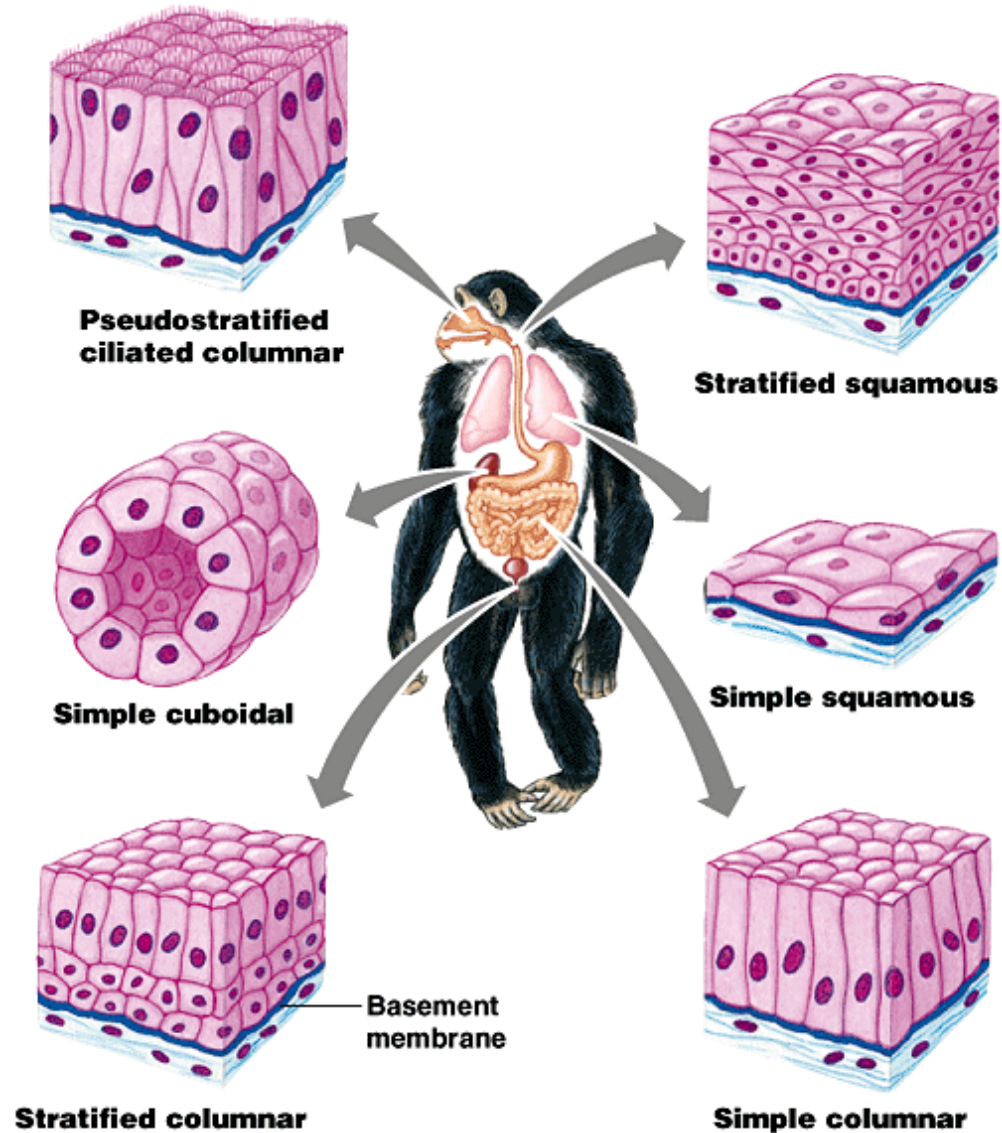
- Epithelia are classified by the **number of cell layers** and the **shape of cells** on the free surface.

Types of epithelia

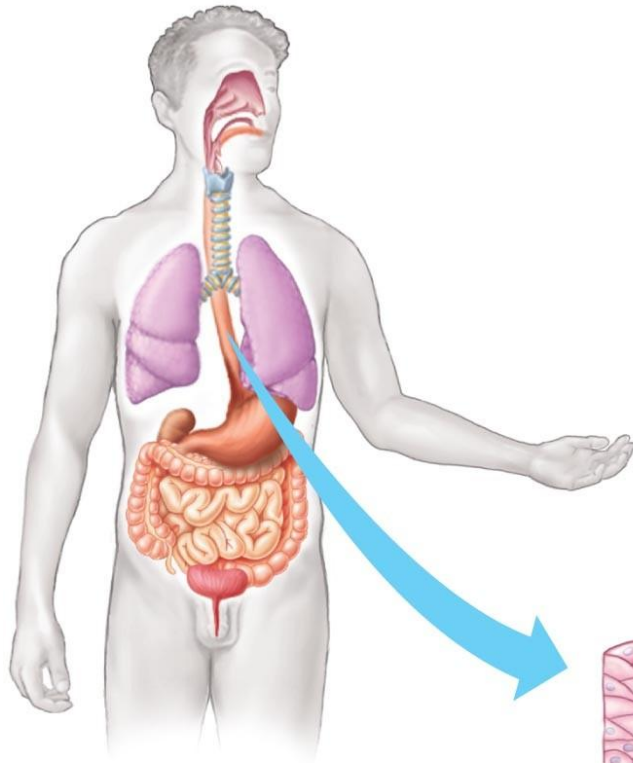
- Simple epithelium:**
of cells,
- Stratified epithelium :**
is multiple layers of cells.
- Pseudostratified epithelium:**
single layer of cells
layers.

Types of epithelial cells:

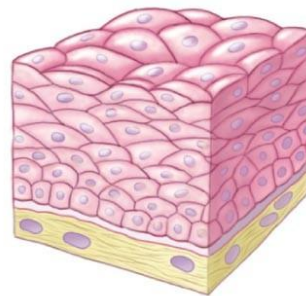
- Cuboidal,
- Columnar ,
- Squamous .



Epithelial tissue covers the body and lines its organs and cavities



- Stratified epithelial cells are stacked on top of each other



**Stratified squamous epithelium
(esophagus)**

**Types of epithelial tissue;
Stratified squamous
epithelium
(lining the esophagus)**

2- Connective Tissues



- **Cells embedded in intercellular substance**
 - **Microscopic collagen fibers, elastic fibers, reticular fibers (thin branched fibers)**
 - **Scattered through a matrix (thin gel of polysaccharides)**
- **Connective tissue can be grouped into six major types**
 1. **Loose connective tissue (under the skin)**
 2. **Fibrous connective tissue (forming a tendon)**
 3. **Adipose tissue**
 4. **Cartilage at the end of a bone**
 5. **Bone - Bone-Forming Cells**
 6. **Blood**

Common traits

1. possess fibers
2. widely scattered cells
3. ground tissue (matrix)
4. analogy

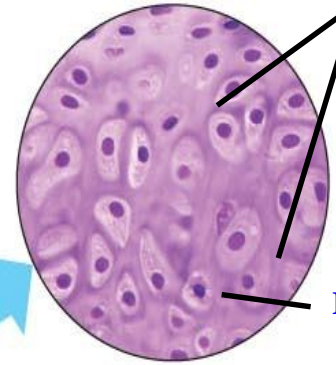


Fat droplets



C Adipose tissue

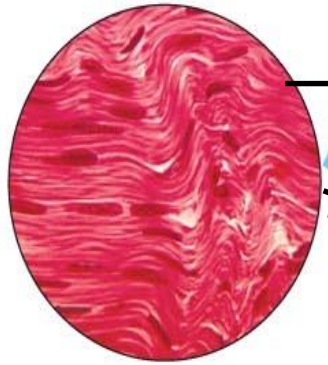
Cartilage-
Forming cells



Matrix

D Cartilage
(at the end of a bone)

Cell nucleus



Collagen fibers

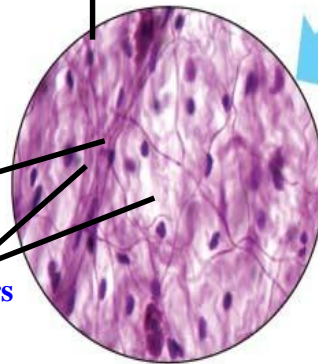
B Fibrous connective tissue
(forming a tendon)

(forming a tendon)

Collagen fiber

Elastic fibers

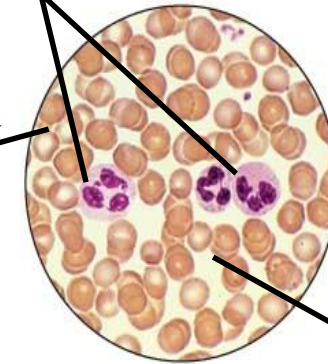
Cell



A Loose connective tissue
(under the skin)

White blood
Cells

Red blood
cell

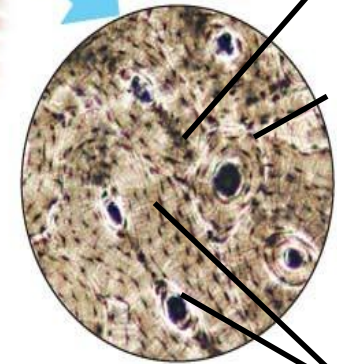


Plasma

F Blood

Central
Canal

Matrix



E Bone
Bone-Forming Cells

Types of connective tissue

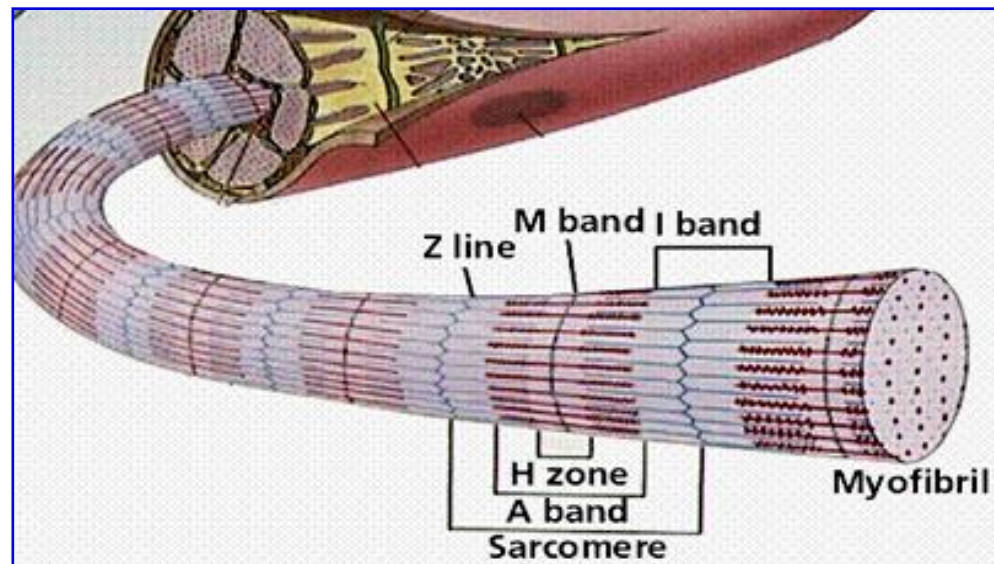
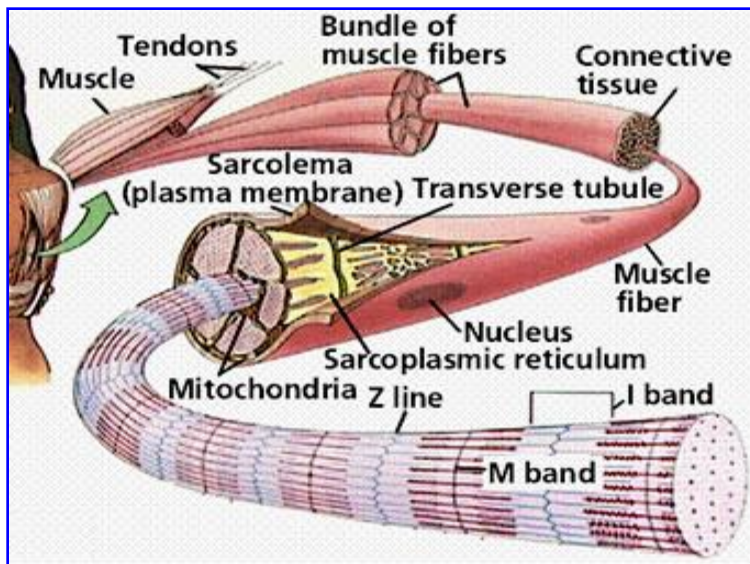
3. Muscle tissue :

Is composed of long cells called **muscle fibers** that are capable of contracting when stimulated by nerve impulses.

- It has large numbers of **myofibrils** made of the contractile proteins **actin** and **myosin** .
- Muscle is the most abundant tissue in most animals,

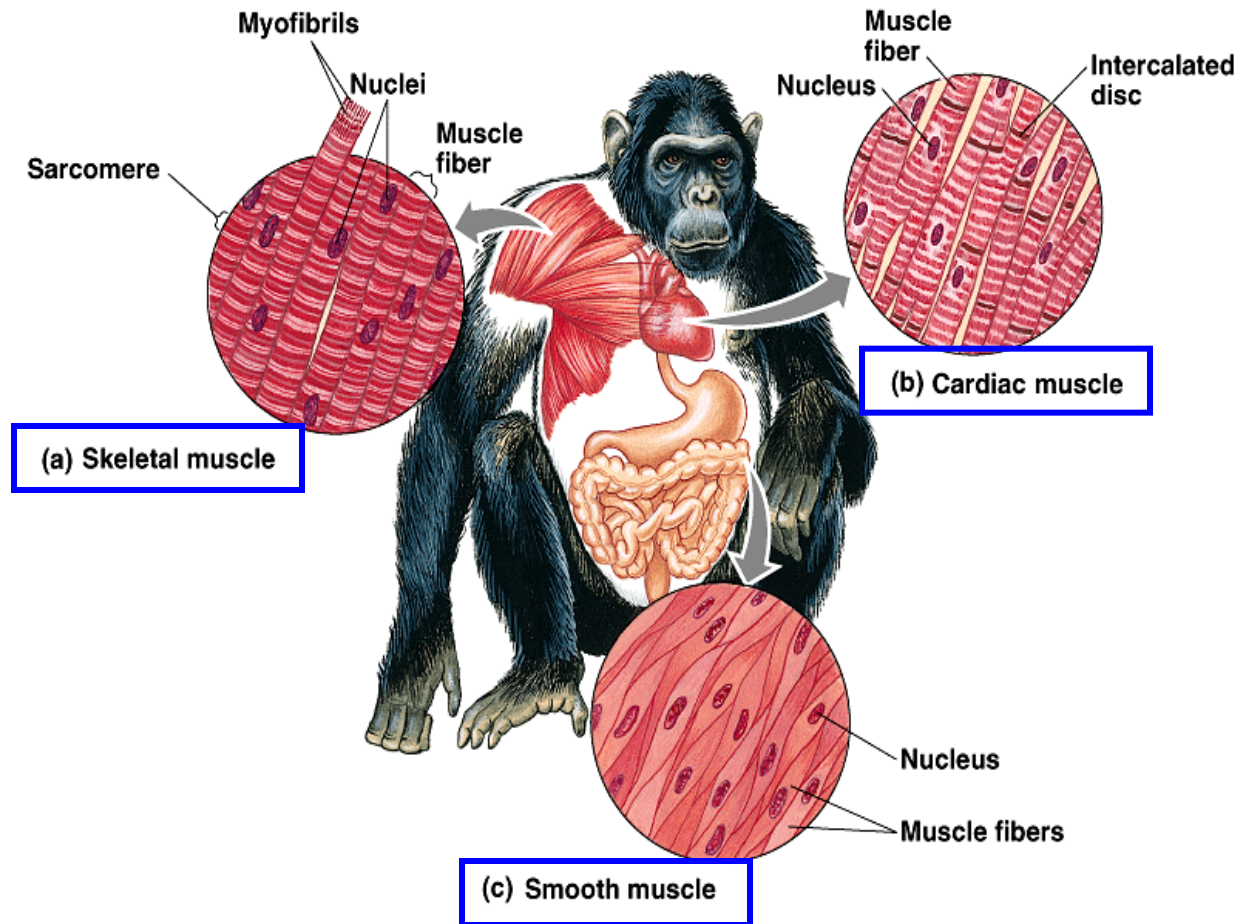
General traits

1. excitable tissue
2. can shorten



- There are three types of muscle tissue in the vertebrate body:

- a) Skeletal muscle,
- b) Cardiac muscle,
- c) Smooth muscle.



a) Skeletal muscle:

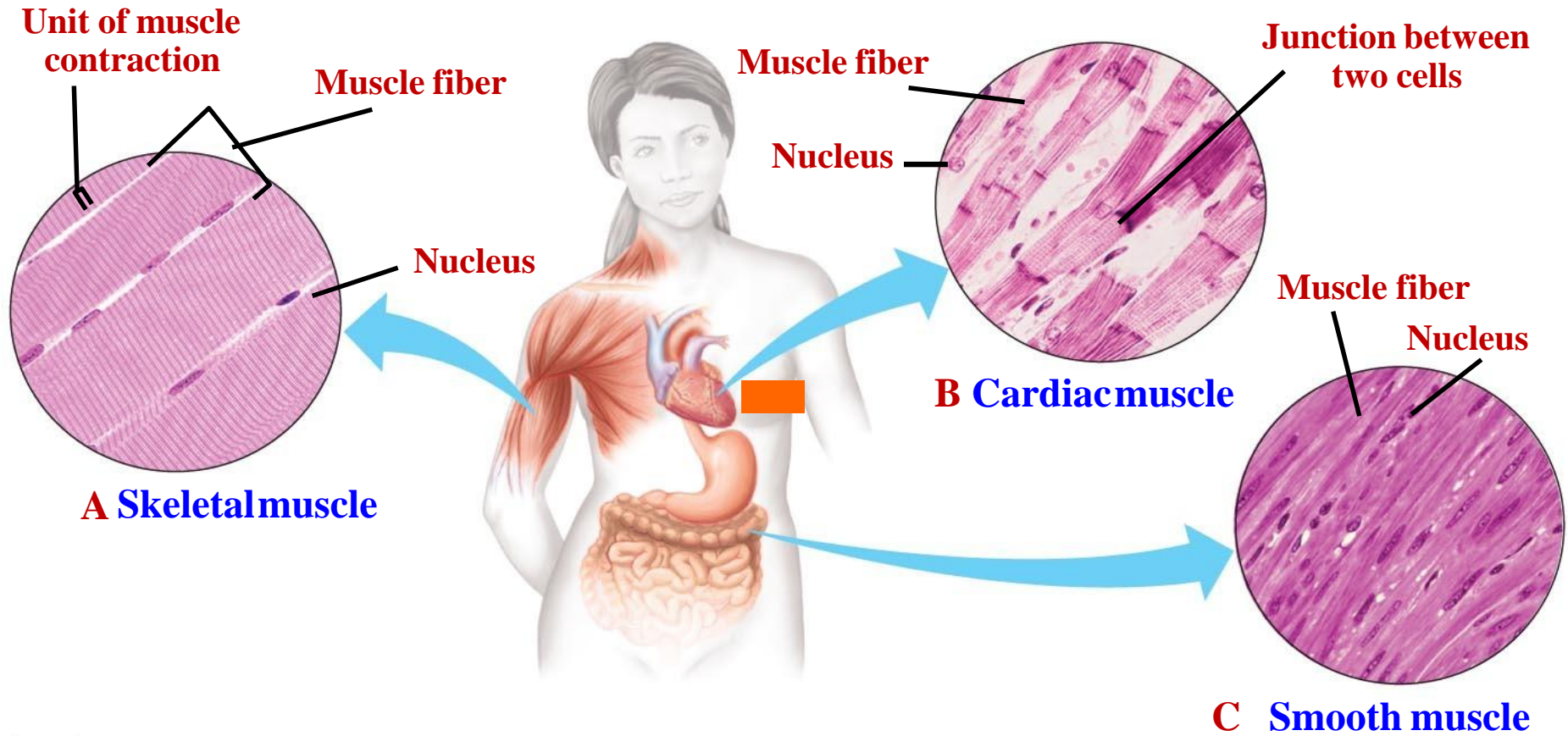
- It attaches to bones by **tendons**, skeletal muscle is responsible for voluntary movements.
- Also called striated muscle.

b) Cardiac muscle:

- forms the contractile wall of the heart.
- Cardiac cells are branched.

c) Smooth muscle:

- No striations,
- Is found in the walls of the digestive tract, urinary bladder, arteries, and other internal organs.
- Its cells are spindle-shaped.



The three types of muscle

4- Nervous tissue (Neuron cells)

- **Neurons**
 - Carry signals by conducting electrical impulses
 - **Elongated cells**
 - **Receives and transmits information**
- **Synapse**
 - **A junction between neurons**

General Traits

1. Irritable
2. Conductive

Organs are made up of tissues

- **Each tissue performs specific functions**
- **The heart has epithelial, connective, and nervous tissues**
 - **Epithelia line the heart chambers**
 - **Connective tissues make the heart elastic**
 - **Neurons regulate contractions**

