Department of biology

2025-2026

((Theoretical Histology))

Stage (-3-)

LEC- (10)

Muscle tissue

By

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Muscle tissue: Is the tissue that responsible for the movement of the body parts. It composed of thin and elongated cells called muscle fibers that have the ability to contract in order to produce movement. The cytoplasm in the muscle fiber is called sarcoplasm; the membrane surrounding the muscle fiber is called sarcolemma.

Essentially all muscle cells are of mesodermal origin and differentiate by a gradual process of cell lengthening with abundant synthesis of the myofibrillar proteins actin and myosin.

Functions of Muscular Tissue

1. Produce body movements.
2. Stabilize body position and maintain posture.
3. Regulating organs volumes.
4. Store substances within the body like glycogen &myoglobin.
5. Move substances within the body (blood, lymph, urine, air, food and liquids, etc.)
6. Generate heat through thermogenesis.
7. Respiration: automatically drives movement of air into and out of our body.

- **Origin;** Embryonic mesoderm
- **Terminology;**

➢ a muscle cell, usually called **Fibre** .

➢ The cytoplasm is called **Sarcoplasm**.

➢ The cell membrane is called **Sarcolemma**

➢ Mitochondria is called **sarcosome**.

Types of Muscles

About half of the human body's weight is muscle. In the muscular system

The three major histologic categories of muscle

1- Skeletal muscle

2- cardiac muscle

3- smooth muscle

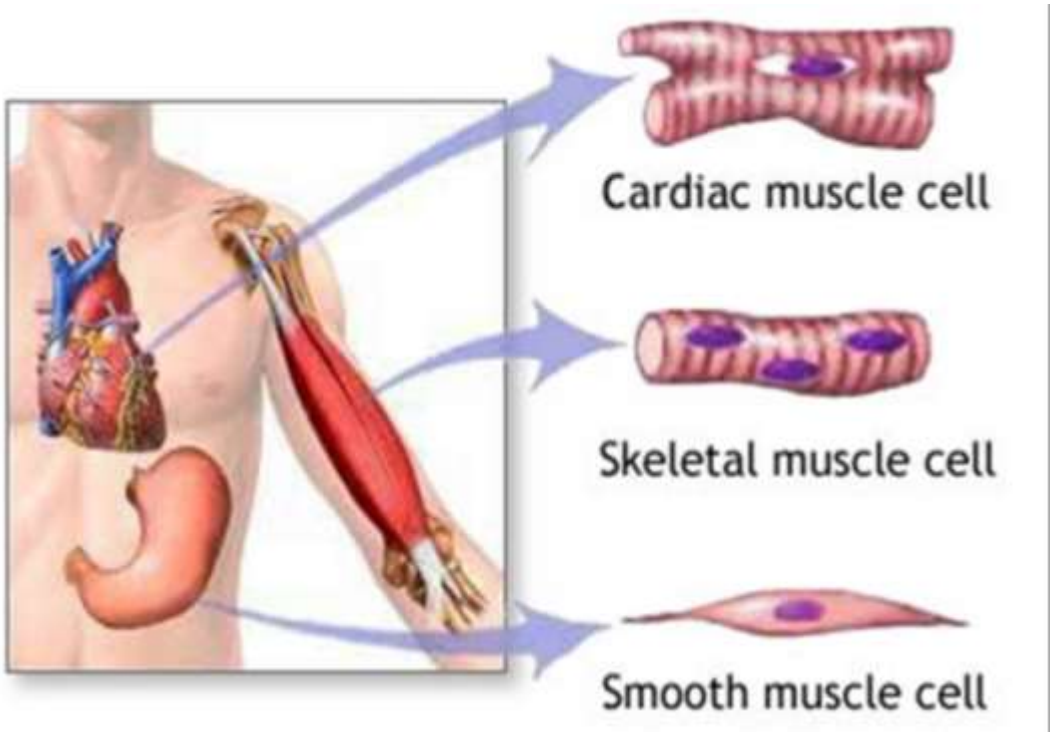
All muscle tissues have 4 characteristics in common:

1. Excitability: it can transmit electrical impulses (respond to stimuli)

2. Contractility

3. Extensibility - they can be stretched

4. Elasticity - they return to normal length after stretching



Types of muscles

	Skeletal Muscle	Smooth Muscle	Cardiac Muscle
1- Fibers	Striated tubular and multinucleated cells	Non-striated, spindle shape and uninucleated	Striated, branched and uninucleated
2- nucleus	Peripheral, adjacent to sarcolemma	Central, at widest part of cell	Central
3- function	Voluntary movements	Involuntary movements	Automatic (involuntary) pumping of blood
4- location	Skeletal muscles, tongue, diaphragm, eyes, and upper esophagus	Blood vessels, digestive and respiratory tracts, uterus, bladder, and other organs	Only covering wall of Heart

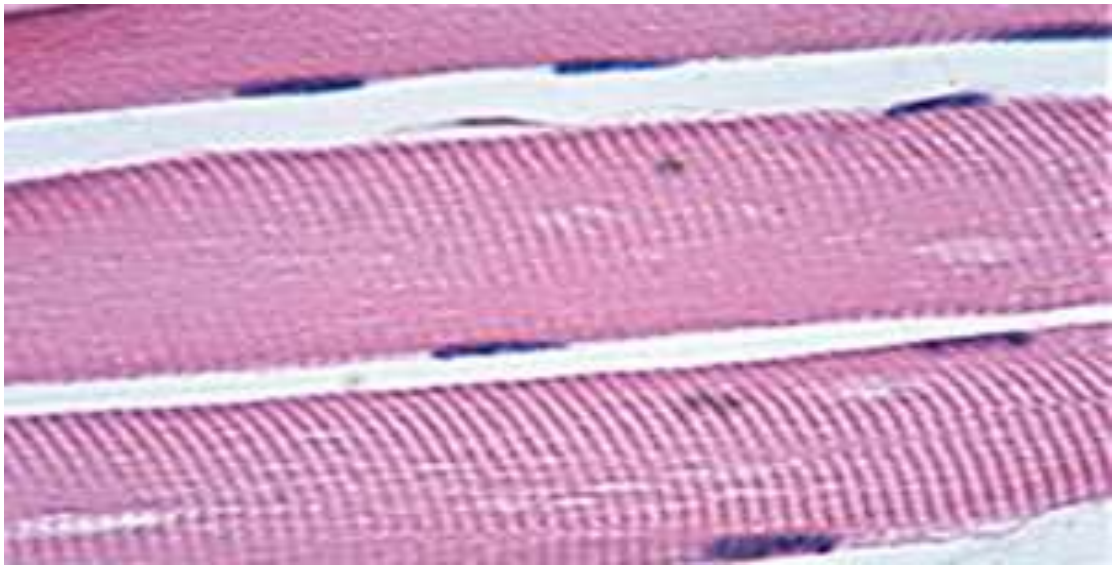
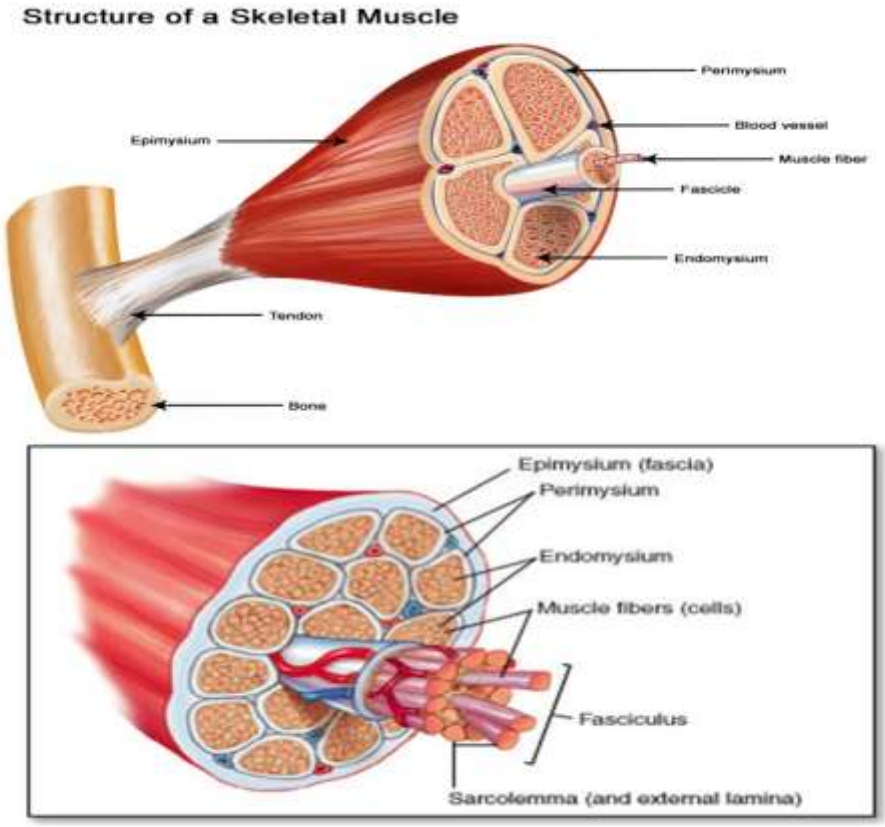
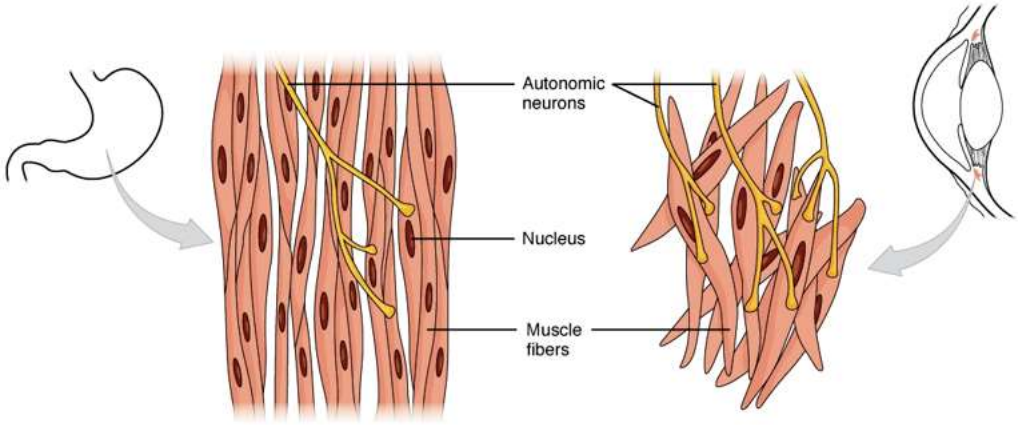


Figure skeletal muscle





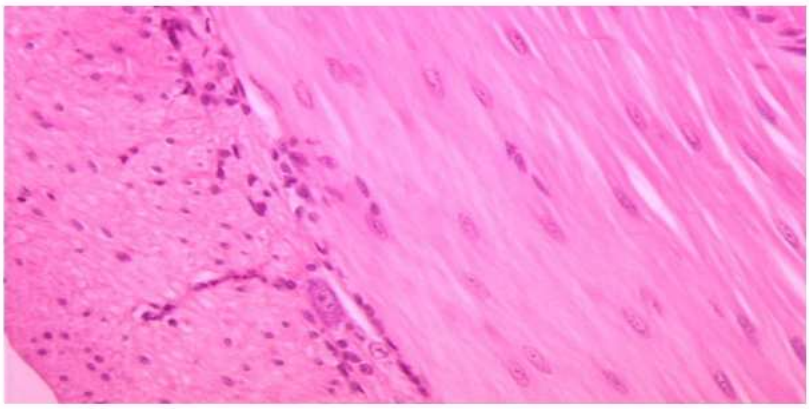


Fig. of (Smooth Muscles)

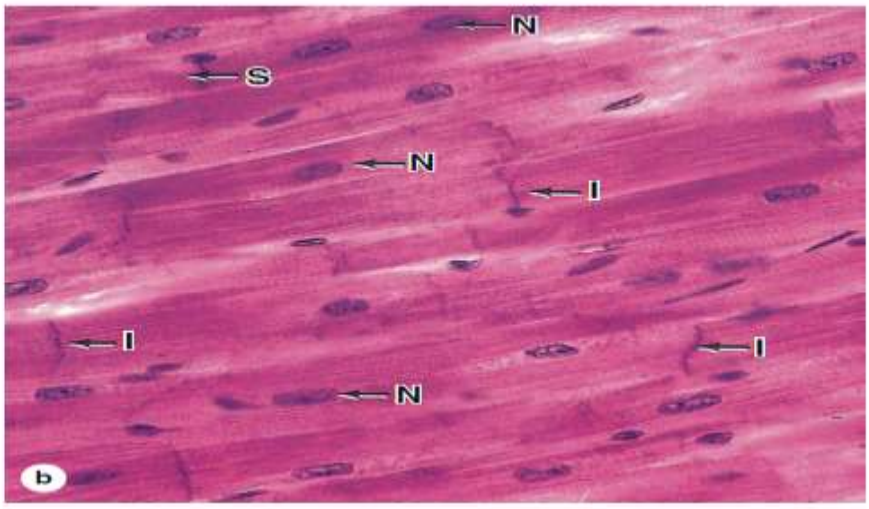


Figure Cardiac muscle

Sarcomere

- **Structural and contractile unit.**
- **Consists of thick and thin filaments.**
- **Between 2 Z lines.**
- I **dark A band** + 2 halves of **light I bands.**
- Central Myosin + Peripheral Actin.
- Actin & myosin overlap in periphery of A.