

# Muscle Tissue

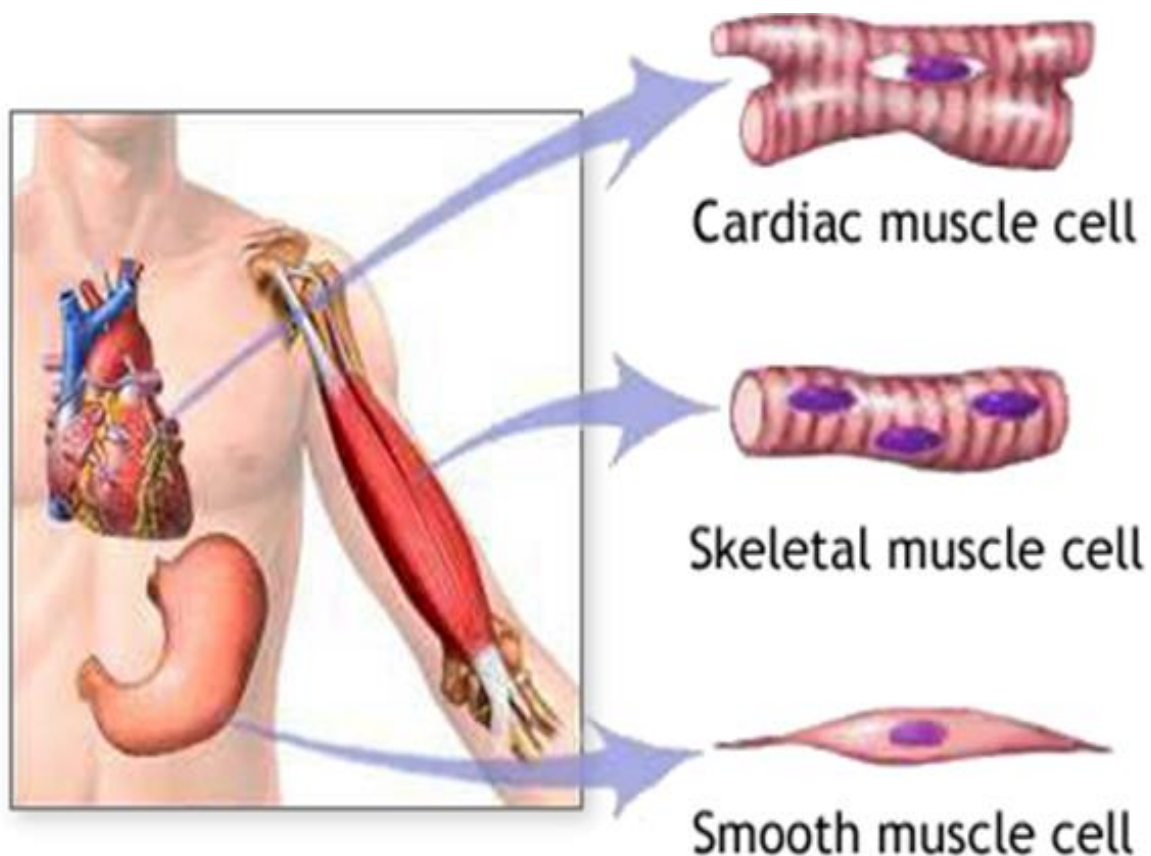
## Lab 8

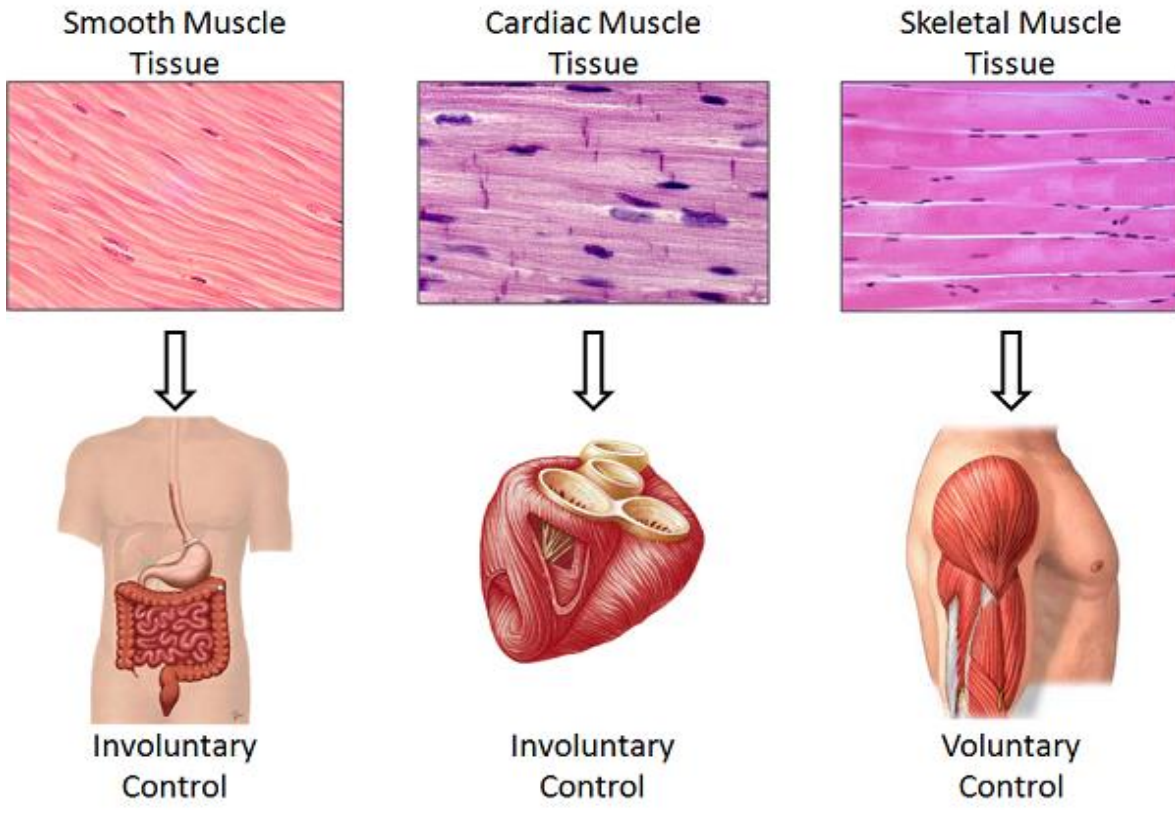
- **Muscle Tissue** is a tissue composed of **bundles of elongated cells** capable of **contraction** and **relaxation** to produce movement in an organ or part.
- The component of muscle tissue consists of **muscle fibers**, **connective tissue**, and **extracellular material**.

### Types of muscle tissue

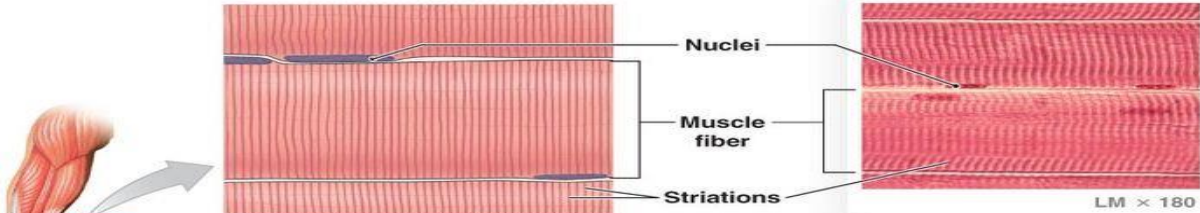
There are **three** types of muscle tissue: **cardiac**, **smooth**, and **skeletal** tissues.

- **Cardiac muscle cells** are located in the **walls of the heart**.
- **Smooth muscle fibers** are located in walls of **hollow visceral organs**, except the heart.
- **Skeletal muscle fibers** occur in muscles that are **attached to the skeleton**.

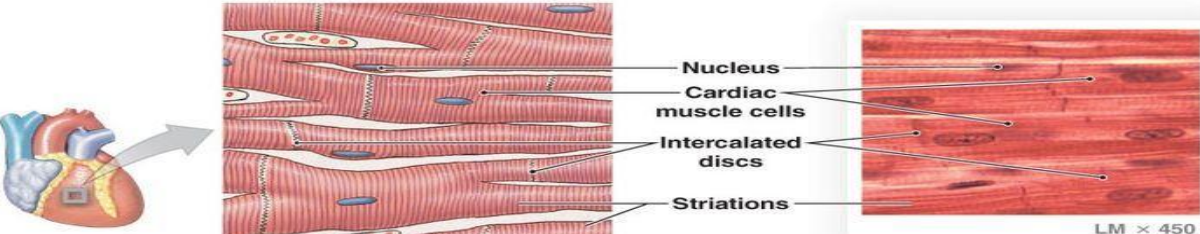




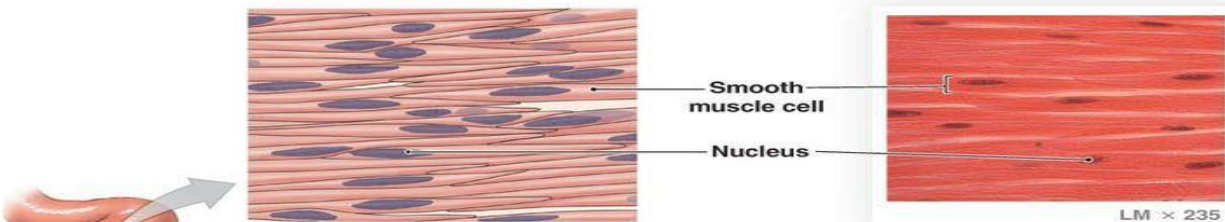
**The structure and function of the three types of muscle tissue**



**Skeletal muscles move or stabilize the position of the skeleton; guard entrances and exits to the digestive, respiratory, and urinary tracts; generate heat; and protect internal organs.**



**Cardiac muscle moves blood and maintains blood pressure.**



**Smooth muscle moves food, urine, and reproductive tract secretions; controls diameter of respiratory passageways and regulates diameter of blood vessels.**

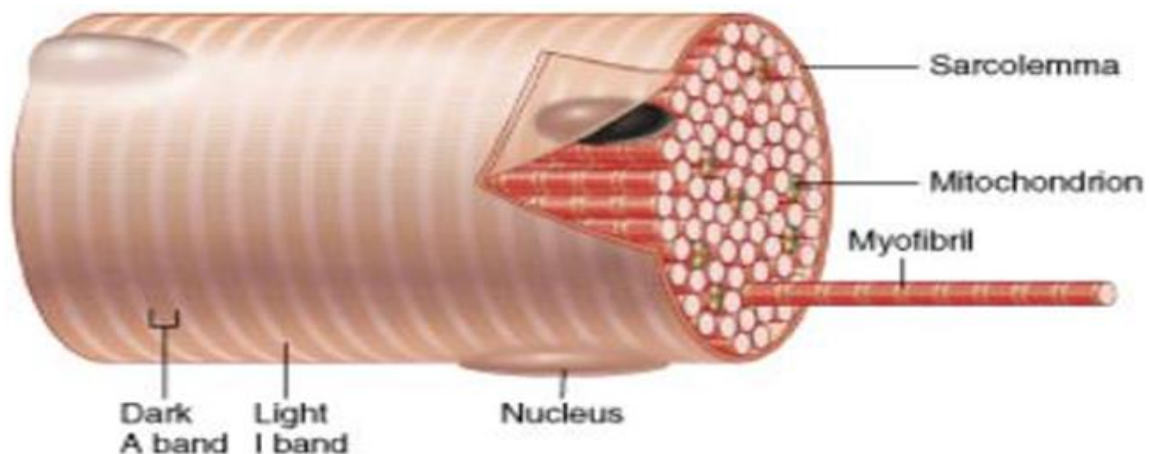
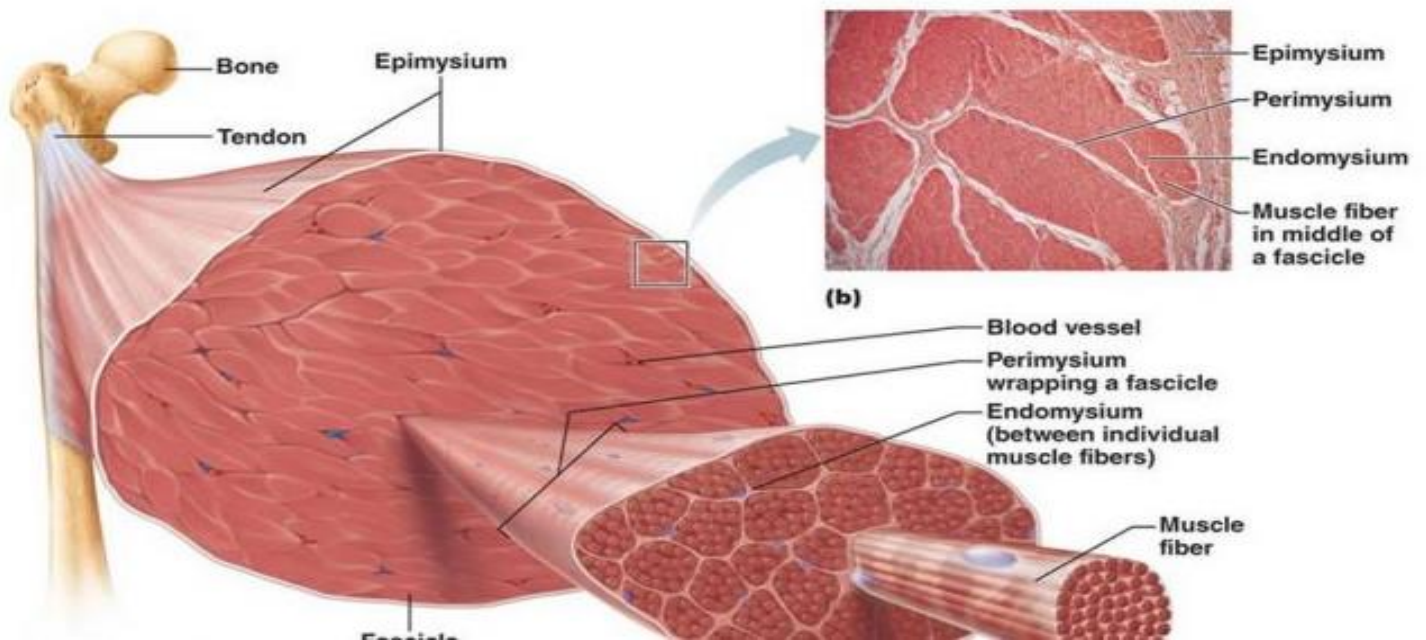
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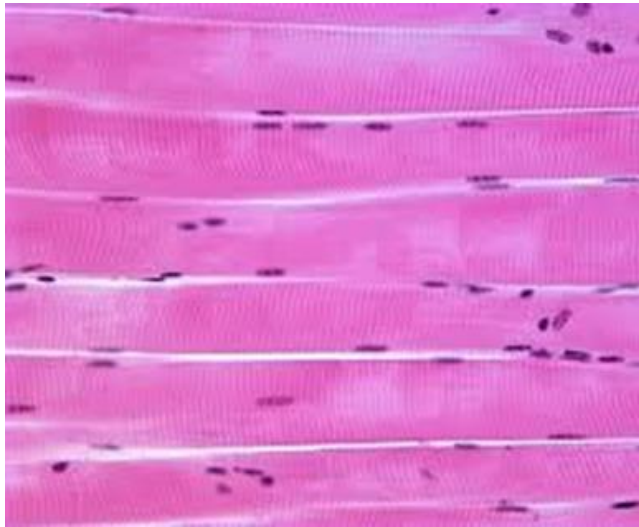
## Skeletal muscle or "voluntary muscle"

- It is anchored by tendons to bone and used to effect skeletal movement such as locomotion and maintaining posture.
- An average adult male is **made up of 42% of skeletal muscle** and an average adult female is **made up of 36%** (as a percentage of body mass).

## The main characteristics of Skeletal muscle cells

- The cells are **elongated** or **tubular**.
- They have **multiple nuclei**, and these nuclei are located on the **periphery** of the cell.
- Skeletal muscle is **striated**. It has an alternating pattern of **light** and **dark bands**.



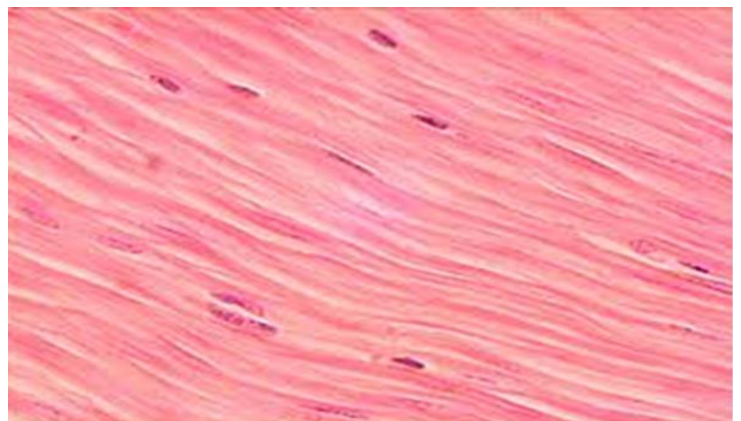
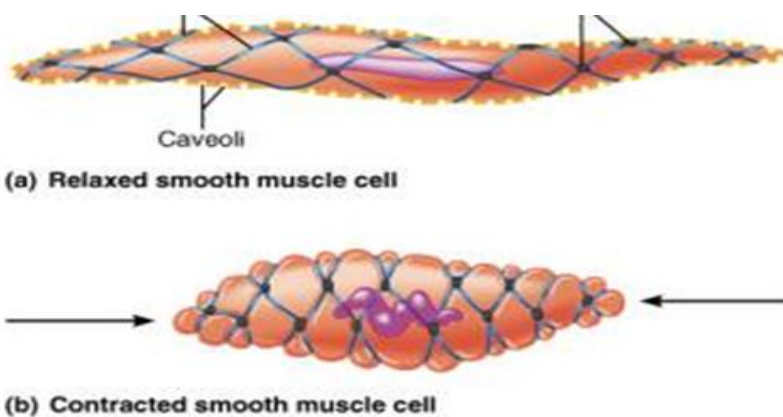


### Smooth muscle or "involuntary muscle"

- It is found within **the walls of organs** and structures such as: **esophagus, stomach, intestine, bronchi, uterus, urethra, bladder, blood vessels,** and the **erector pili** in the **skin** (which controls the erection of body hair).

### The main characteristics of smooth muscle cells

- Smooth muscle cells are described as **spindle-shaped**. They are wide in the middle and narrow to almost a point at both ends.
- Smooth muscle cells have a **single centrally located nucleus**.
- Smooth muscle cells **do not have visible striations**.

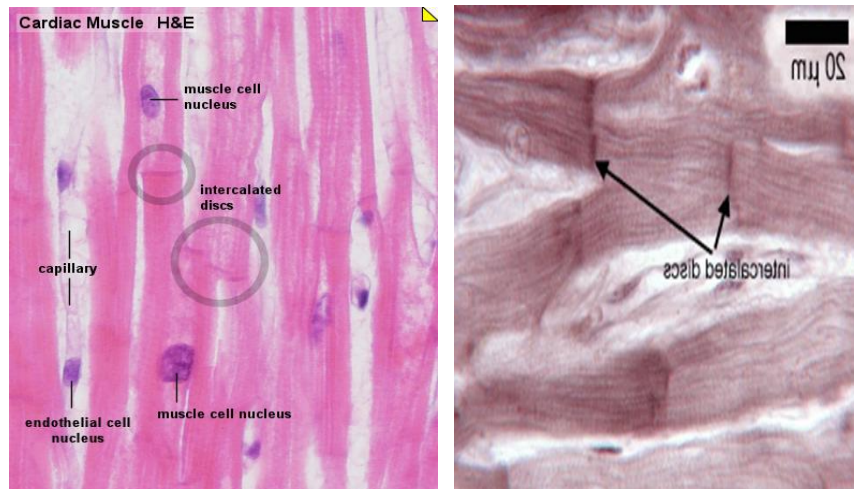


### Cardiac muscle is also an "involuntary muscle"

- Is found only in the **heart**.

**The main characteristics of Skeletal muscle cells:**

- Cardiac muscle cells are **not as long as skeletal muscle cells** and often are **branched** cells.
- Cardiac muscle cells may be **mono-nucleated** or **bi-nucleated**. In either case, the nuclei are located **centrally** in the cell.
- Cardiac muscle is also **striated**.
- In addition, cardiac muscle contains **intercalated discs**.



Character	Striated Muscles	Unstriated Muscles	Cardiac Muscles
<b>1. Shape of cells</b>	Cells are long cylindrical, non-tapering and un-branched	Cells are long with tapering ends (spindle shape) and un-branched.	Cells are non-tapering, cylindrical and branched.
<b>2. Nucleus</b>	Many nuclei (multi-nucleated) which are situated towards the periphery of muscle fibre.	The cells have only one nucleus (uni-nucleated) situated in the center.	Each cell contains one or two nuclei situated in the center.
<b>3. Striation</b>	Transverse alternate light and dark bands present.	Striations or strips are absent.	Cells have faint striations.
<b>4. Mode of Contraction</b>	Voluntary contract rapidly but soon undergo fatigue.	Involuntarily not at our will. Contract comparatively slow but do not fatigue.	Involuntary, rhythmically contract and relax throughout life without fatigue under normal conditions.
<b>5. Example of location</b>	Hands, legs and other skeletal muscles.	Stomach wall, intestine, ureter, bronchi etc.	Present in heart.