

College of Biomedical Engineering

Biology

First Stage

Lecture Three

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Type of Animals Cell

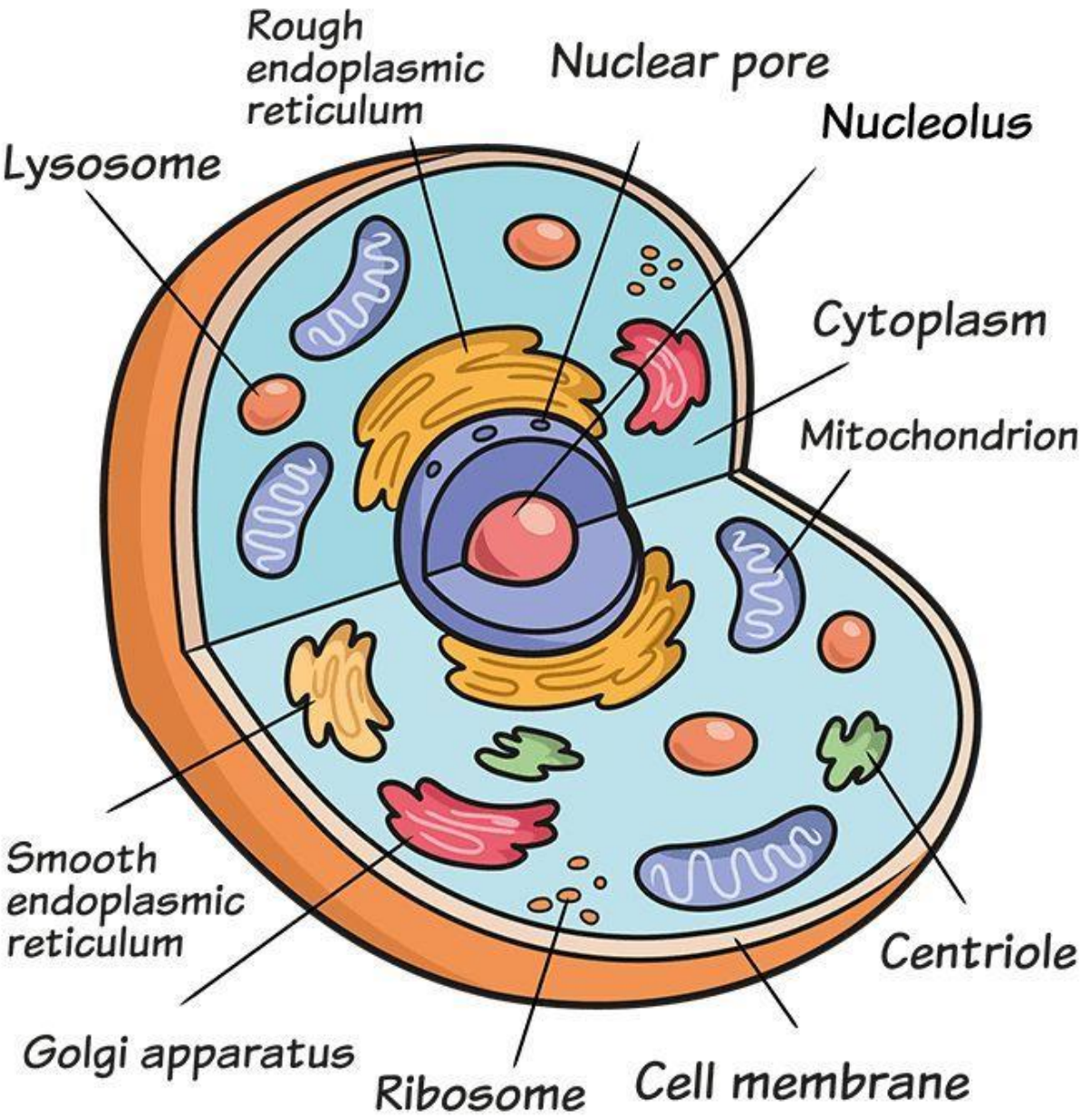
Introduction:

Animal cells are the basic structural and functional units of all animals. Unlike plant cells, animal cells do not have cell walls or chloroplasts, but they contain a variety of specialized structures (organelles) that perform different functions essential for the survival and functioning of the cell.

1. Structure of Animal Cells

Animal cells are typically **eukaryotic**, meaning they have a defined nucleus. The main components of an animal cell include:

- **Cell Membrane**: A semi-permeable membrane that surrounds the cell, controls what enters and exits the cell, and maintains the integrity of the cell.
- **Cytoplasm**: The jelly-like substance inside the cell where organelles are suspended and most of the cell's activities take place.
- **Nucleus**: The control center of the cell, housing the cell's DNA and managing processes like growth, metabolism, and reproduction.
- **Organelles**: Specialized structures that perform specific functions.



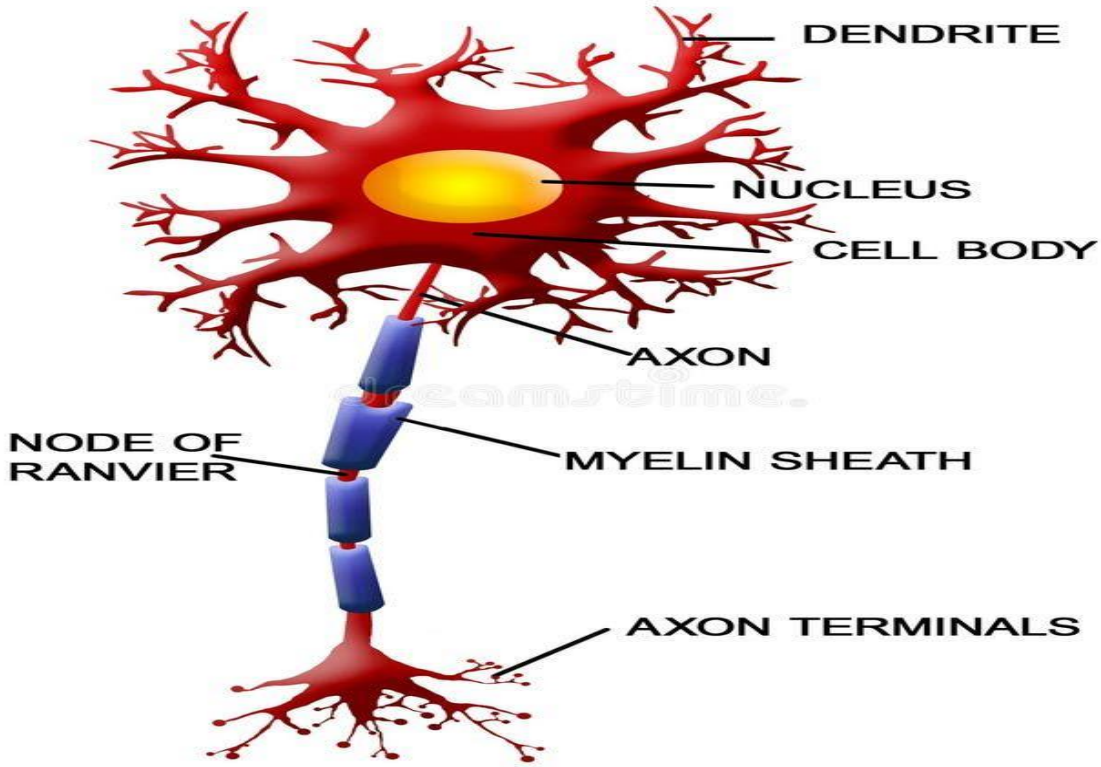
Structure of Animal Cells

2. Major Types of Animal Cells

Animal cells come in a variety of types, each adapted to specific functions. Below are some of the key types:

A. Nerve Cells (Neurons)

- **Function**: Neurons are specialized for transmitting electrical signals throughout the body.
- **Structure**: Neurons have long, branched structures called dendrites and axons that help in the transmission of electrical impulses.



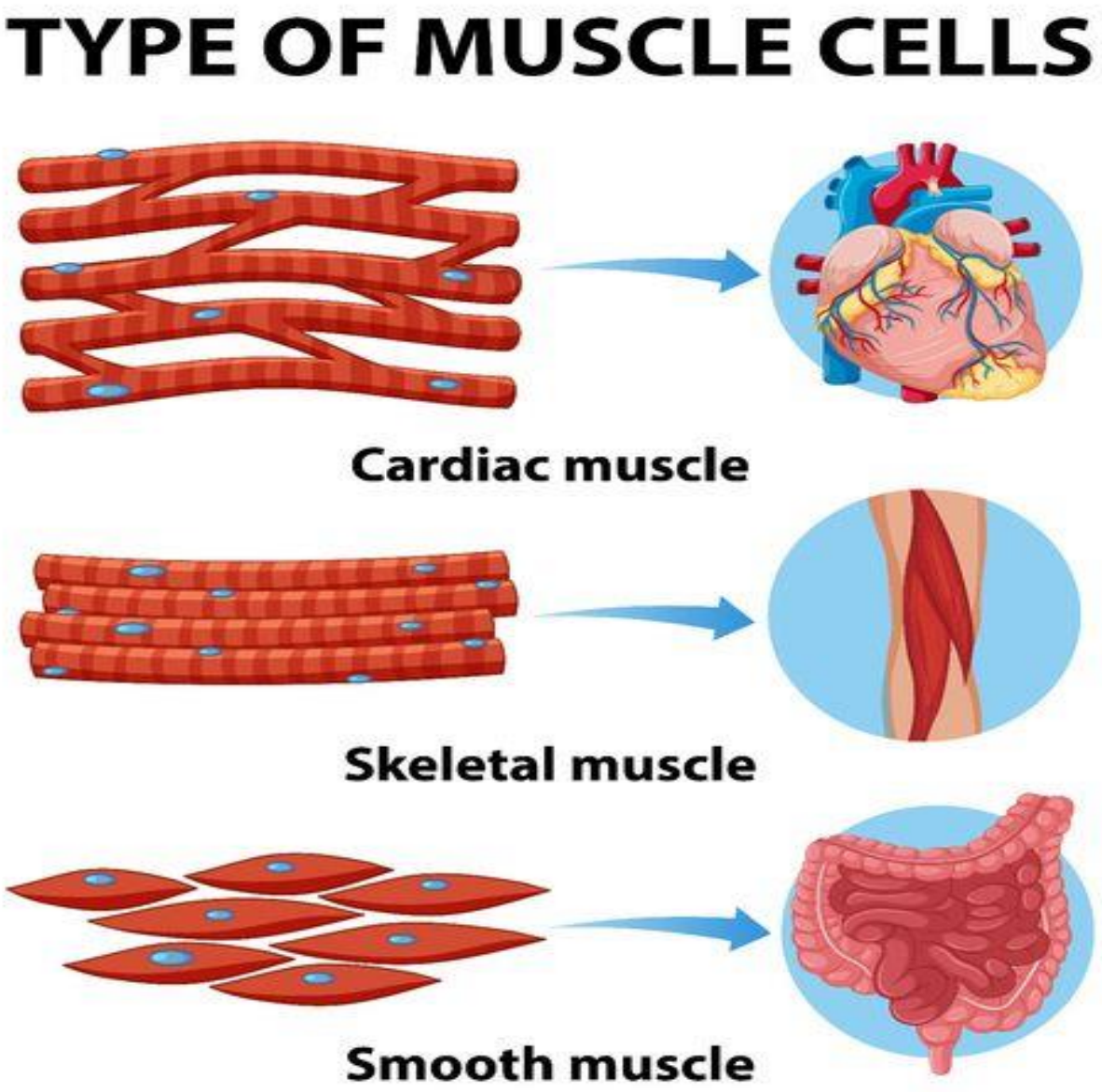
B. Muscle Cells

- **Function**: Muscle cells are responsible for contraction and movement in the body.
- **Structure**: These cells are elongated and contain contractile proteins like actin and myosin. There are three types of muscle cells:

1-Skeletal muscle cells: Voluntary movement

2-Cardiac muscle cells: Involuntary movement, found in the heart

3-Smooth muscle cells: Involuntary movement, found in organs like the stomach and blood vessels.

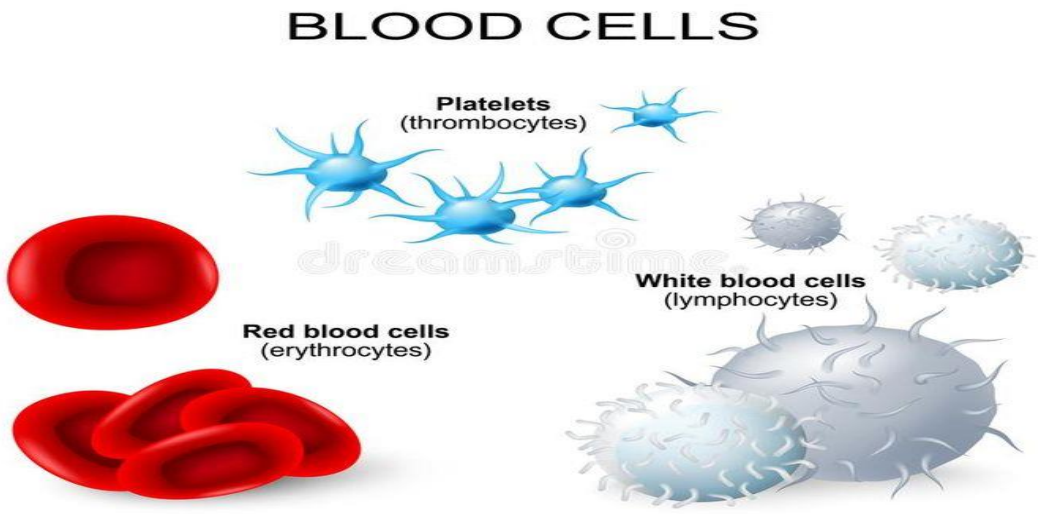


C. Red Blood Cells (Erythrocytes)

- **Function**: Red blood cells are responsible for carrying oxygen from the lungs to the tissues and carbon dioxide back to the lungs.
- **Structure**: These cells are biconcave in shape, which increases surface area for gas exchange. They lack a nucleus to maximize space for hemoglobin.

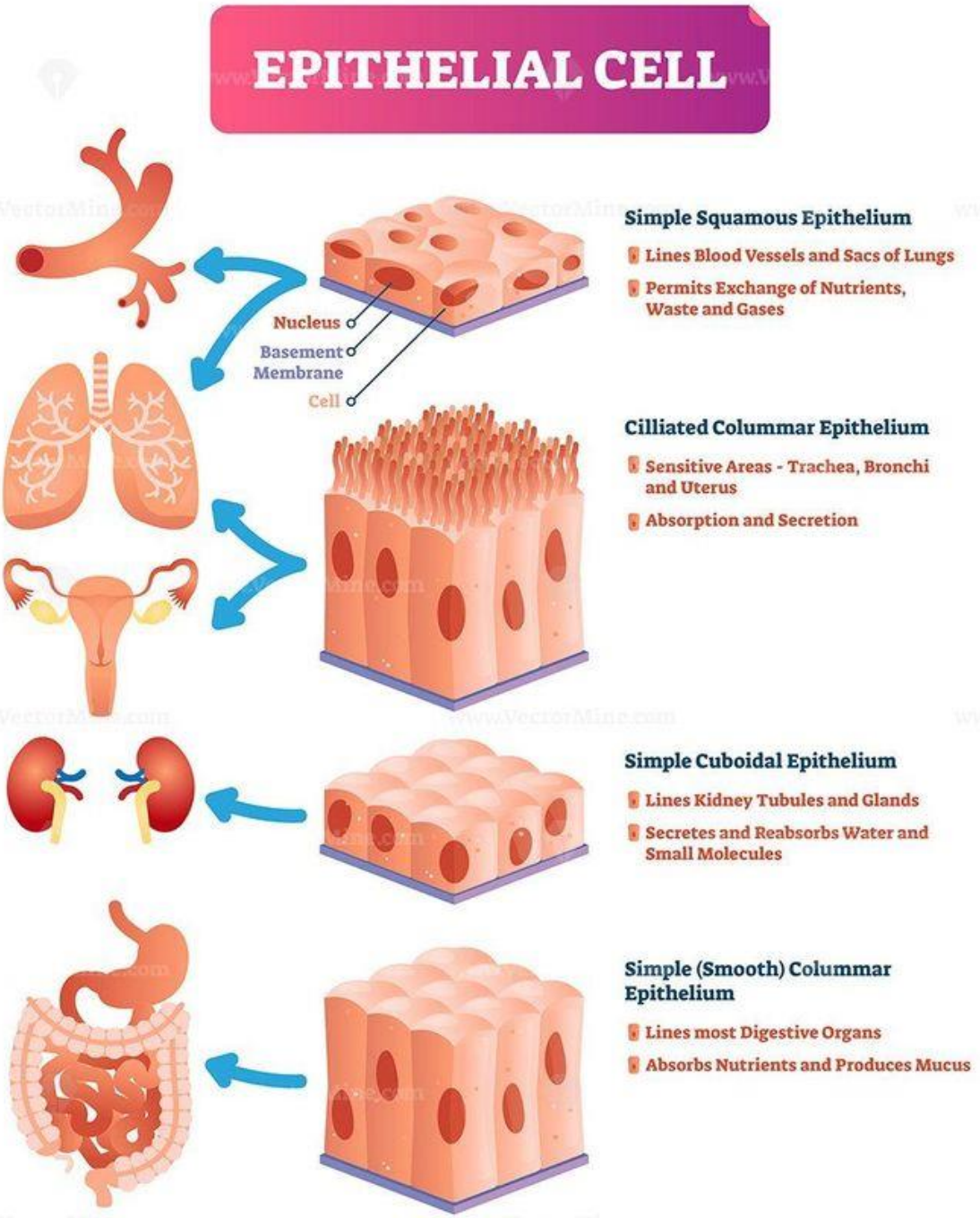
D. White Blood Cells (Leukocytes)

- **Function**: White blood cells are involved in the immune response, protecting the body from infections and foreign invaders.
- **Structure**: They vary in shape and size, and they contain a nucleus. Some white blood cells can engulf and digest pathogens.



E. Epithelial Cells

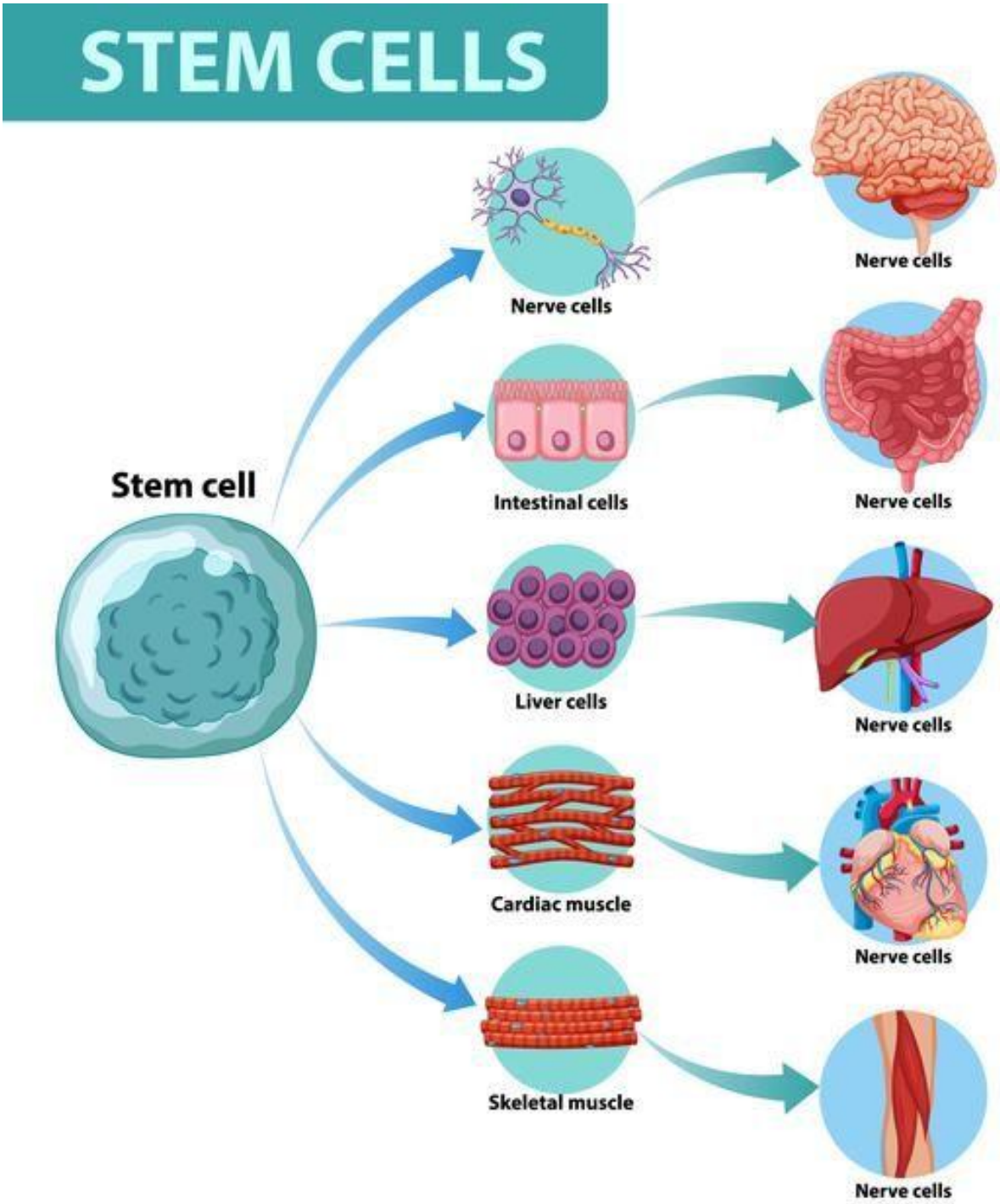
- **Function**: Epithelial cells form protective layers and linings in the body, such as the skin and the lining of the digestive tract.
- **Structure**: These cells are tightly packed together to form barriers. They can be flat, cuboidal, or column-shaped depending on their location and function.



F. Stem Cells

- **Function**: Stem cells are undifferentiated cells that have the potential to develop into various types of specialized cells.

- **Structure**: Stem cells are characterized by their ability to divide and differentiate into other cell types, such as muscle cells, nerve cells, and blood cells.



G. Fat Cells (Adipocytes)

- **Function**: Fat cells store energy in the form of lipids and are important for insulation and cushioning.
- **Structure**: Fat cells contain large vacuoles filled with fat. They are typically round or oval in shape.

