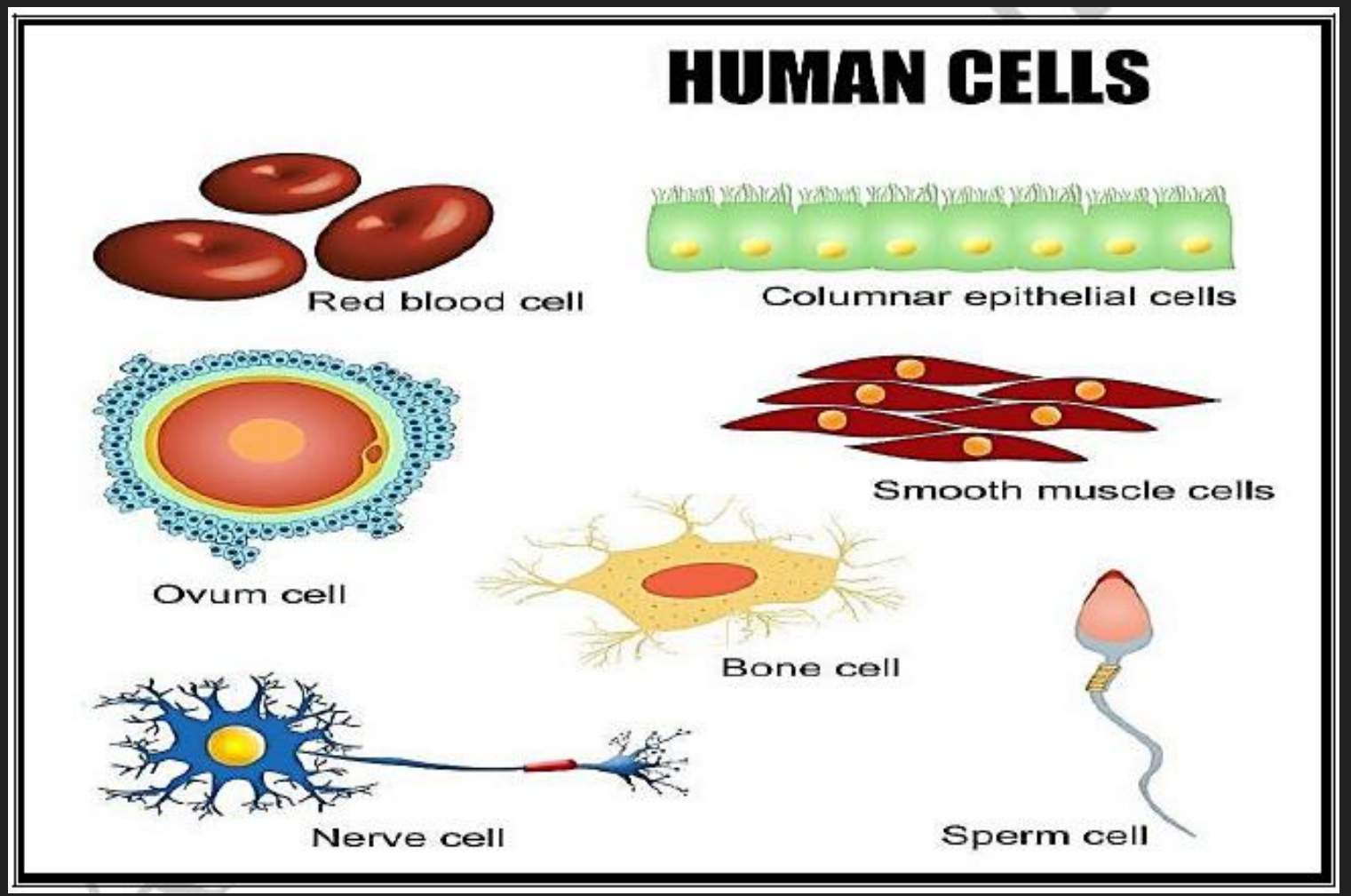
Lab-3-
Cell Types & Functions

Msc. Sarah Mussa Mahmood

Msc. Huda Muhammed

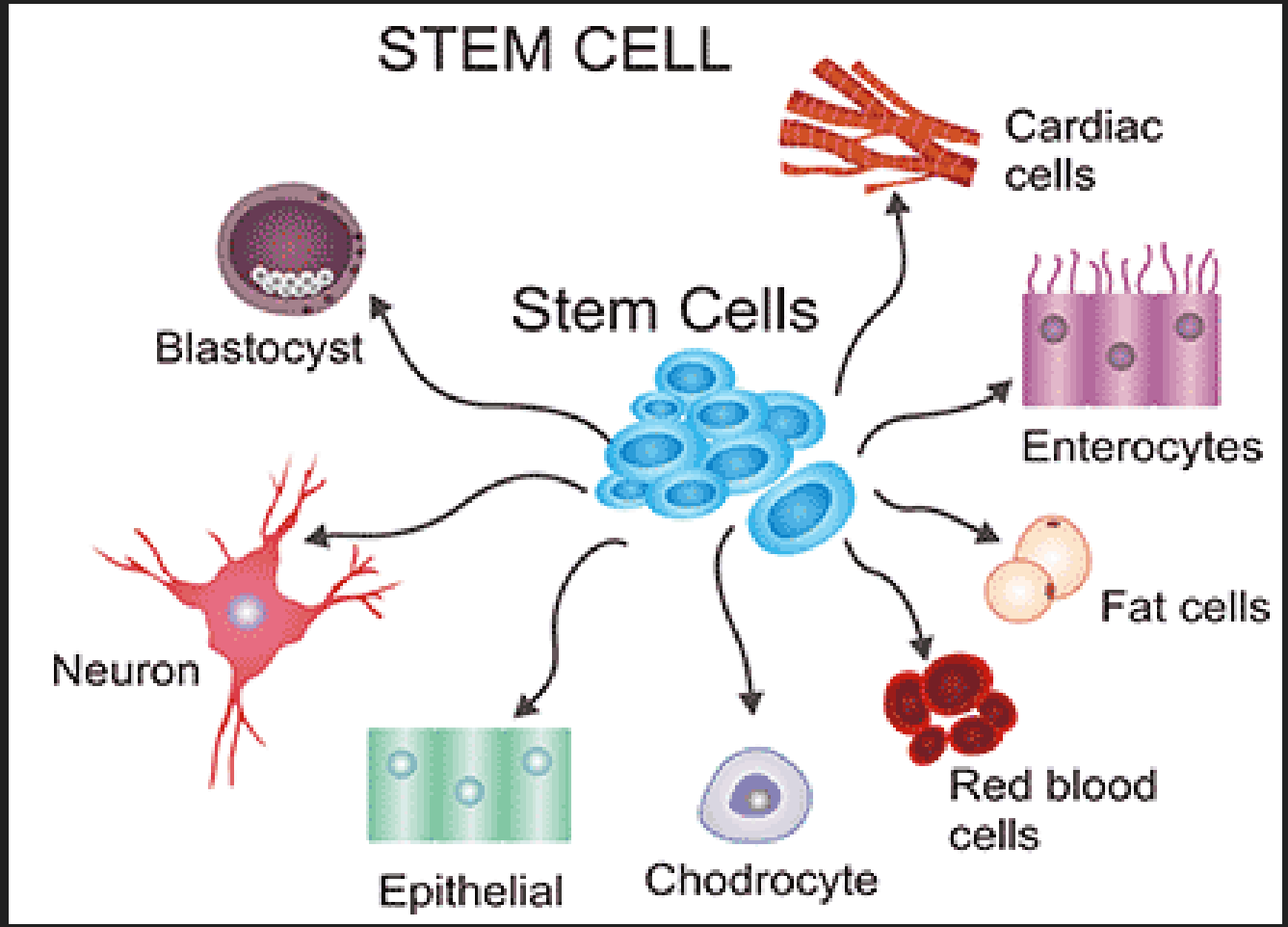
Types of cells in the human body

- There are over 200 different cell types in the human body .
- Each type of cells is specialized to carry out a particular function.

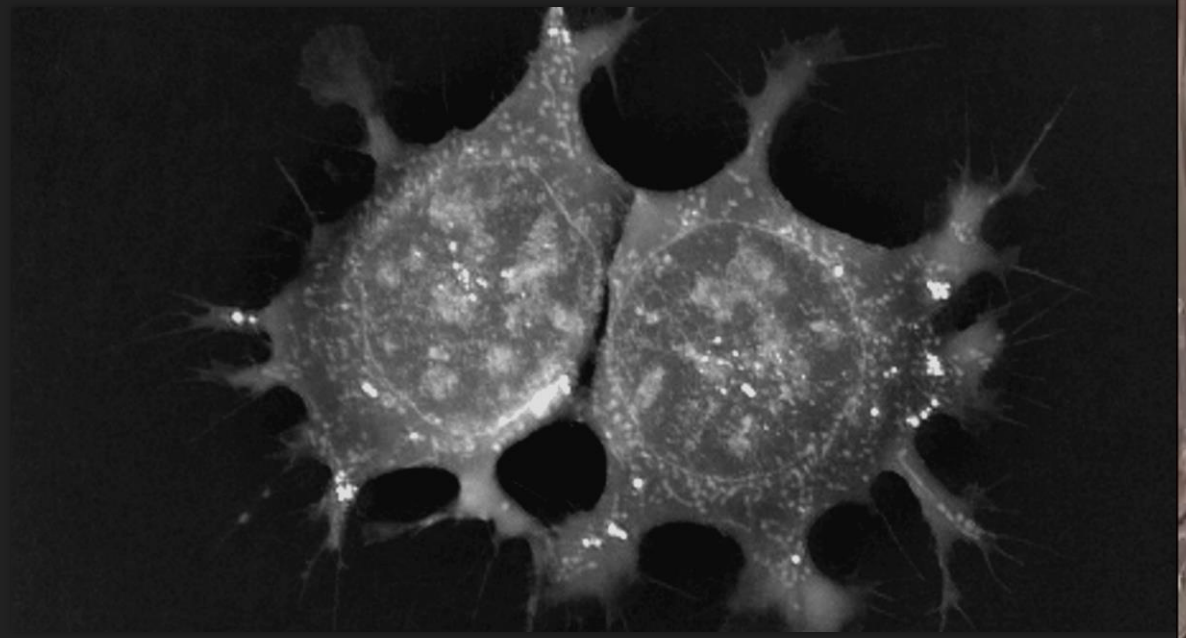


1. STEM CELLS

- Stem cells are cells that do not yet have a specific role and can become almost any cell that is required.
- They can also regenerate damaged tissue under the right conditions.



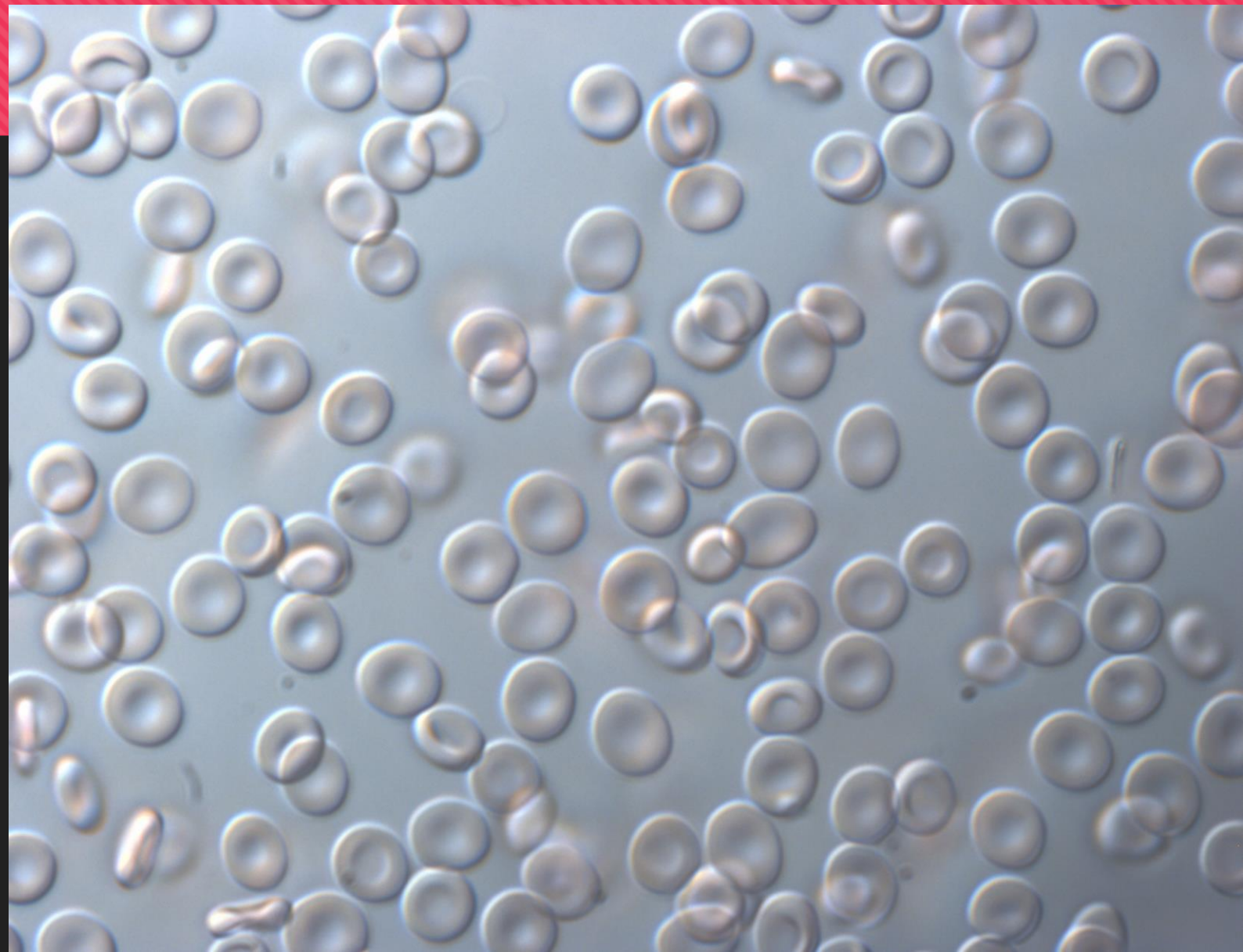
STEM CELLS



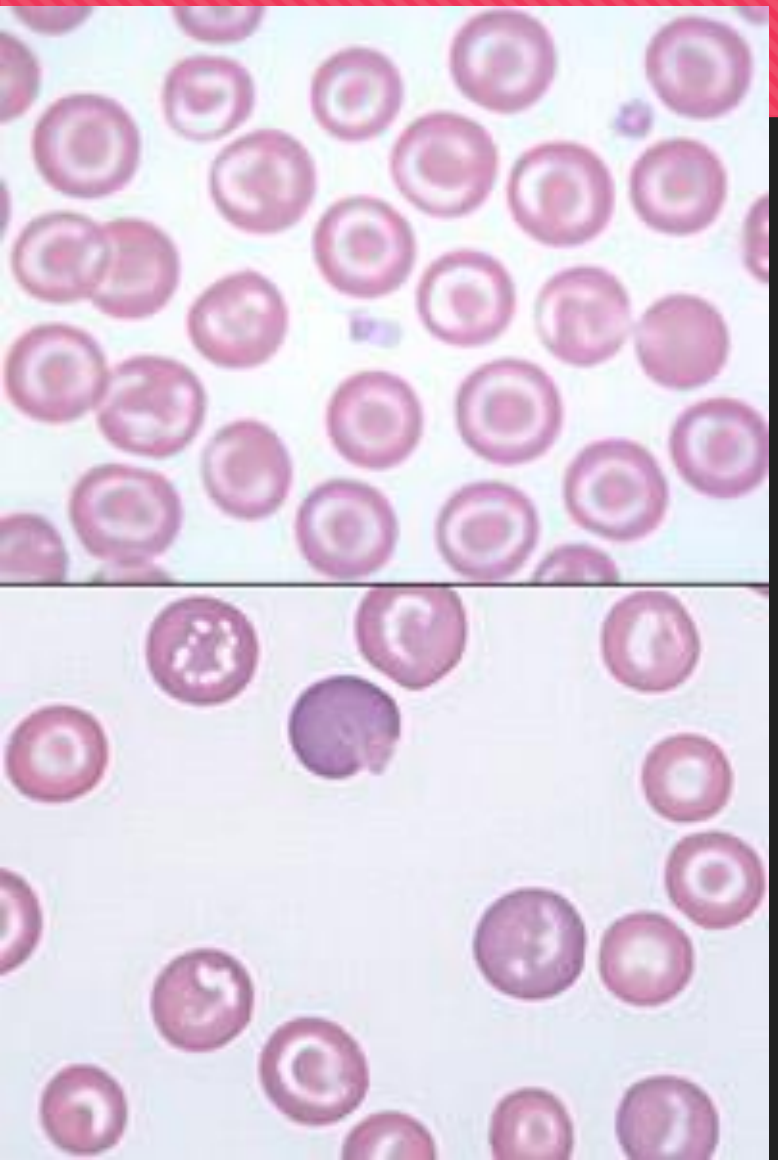
Human Embryonic Stem Cells forms spherical colonies when cultured in-vitro.

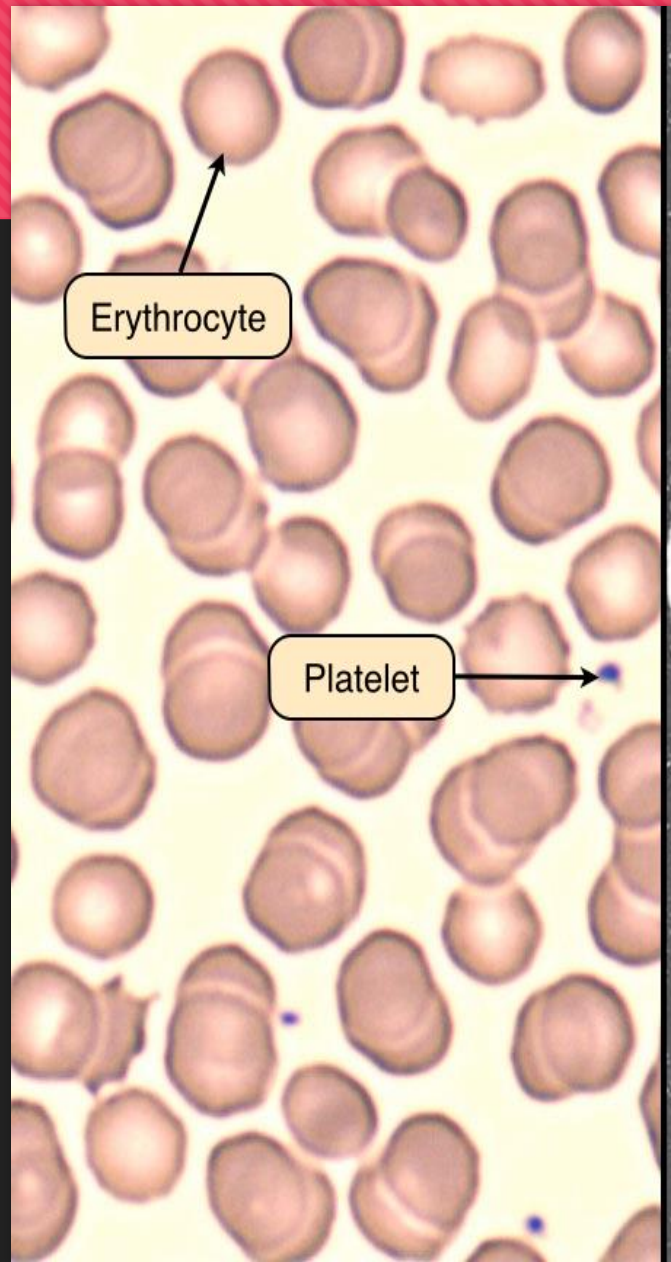
2.RED BLOOD CELLS (RBCS)

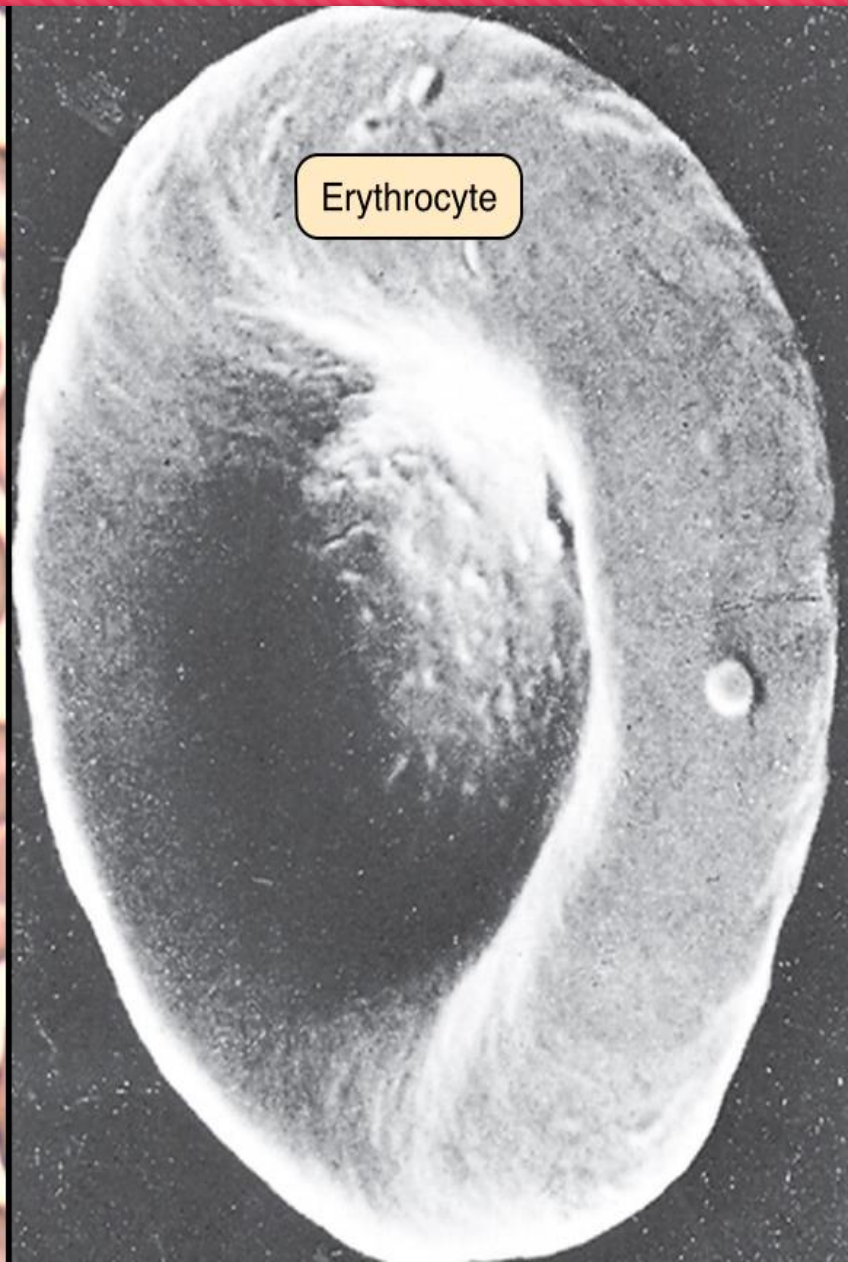
- Red blood cells bring oxygen to the tissues in your body and release carbon dioxide to your lungs for you to exhale.
- Oxygen turns into energy, which is an essential function to keep your body healthy.
- Red blood cells, also known as erythrocytes.



RED BLOOD CELLS

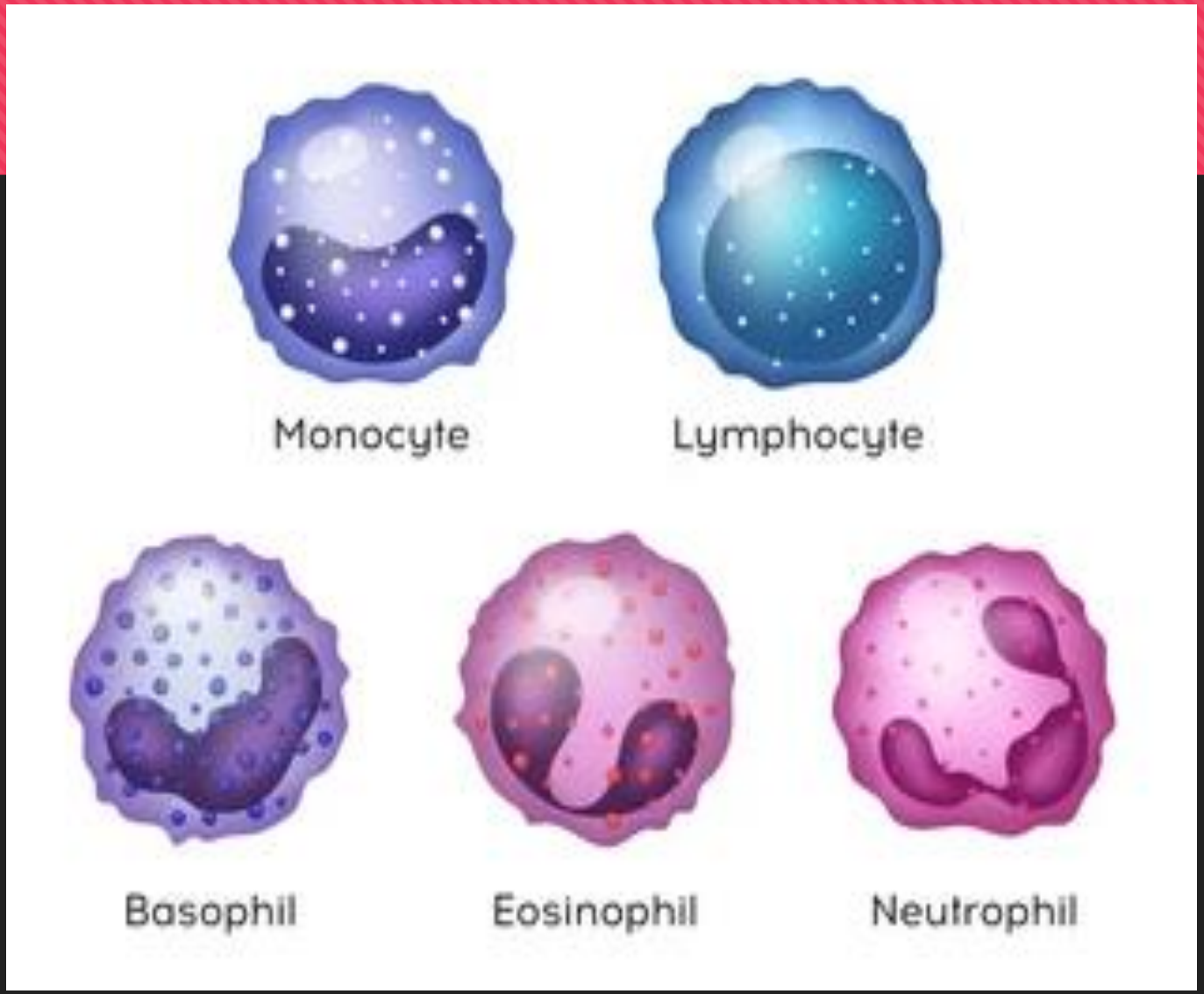






3. WHITE BLOOD CELLS(WBCs)

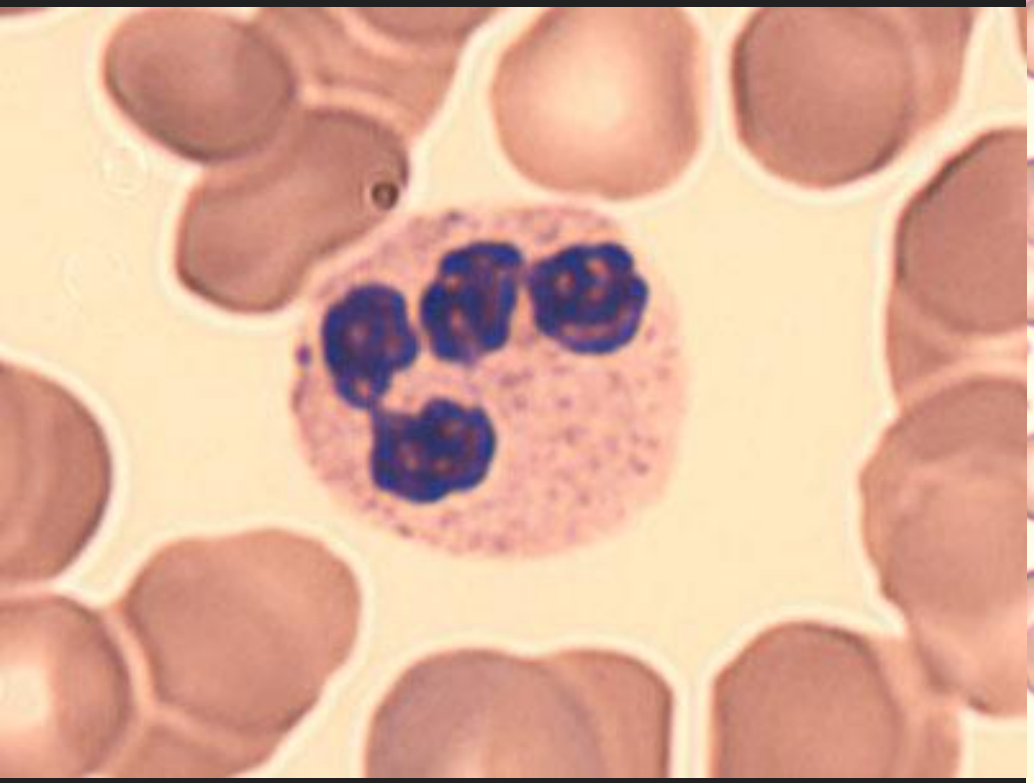
- **White blood cells**, also called **leukocytes**, are cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders.
- When your body is in distress and a particular area is under attack, white blood cells rush in to help destroy the harmful substance and prevent illness.

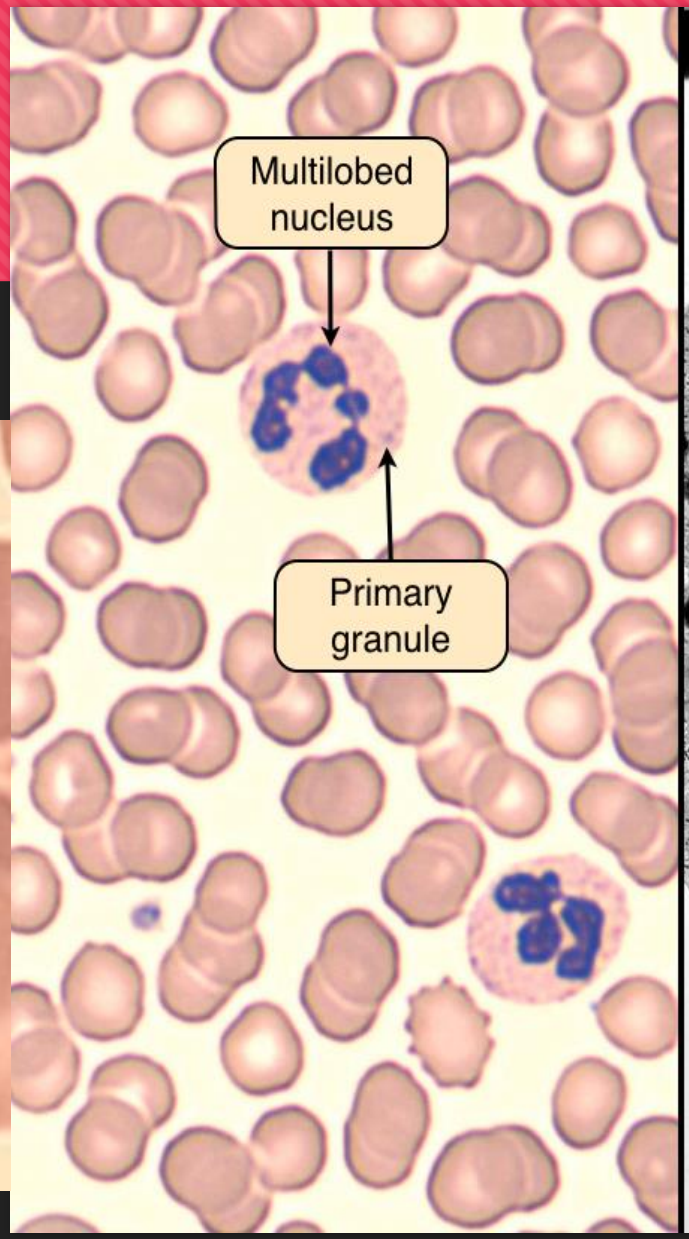


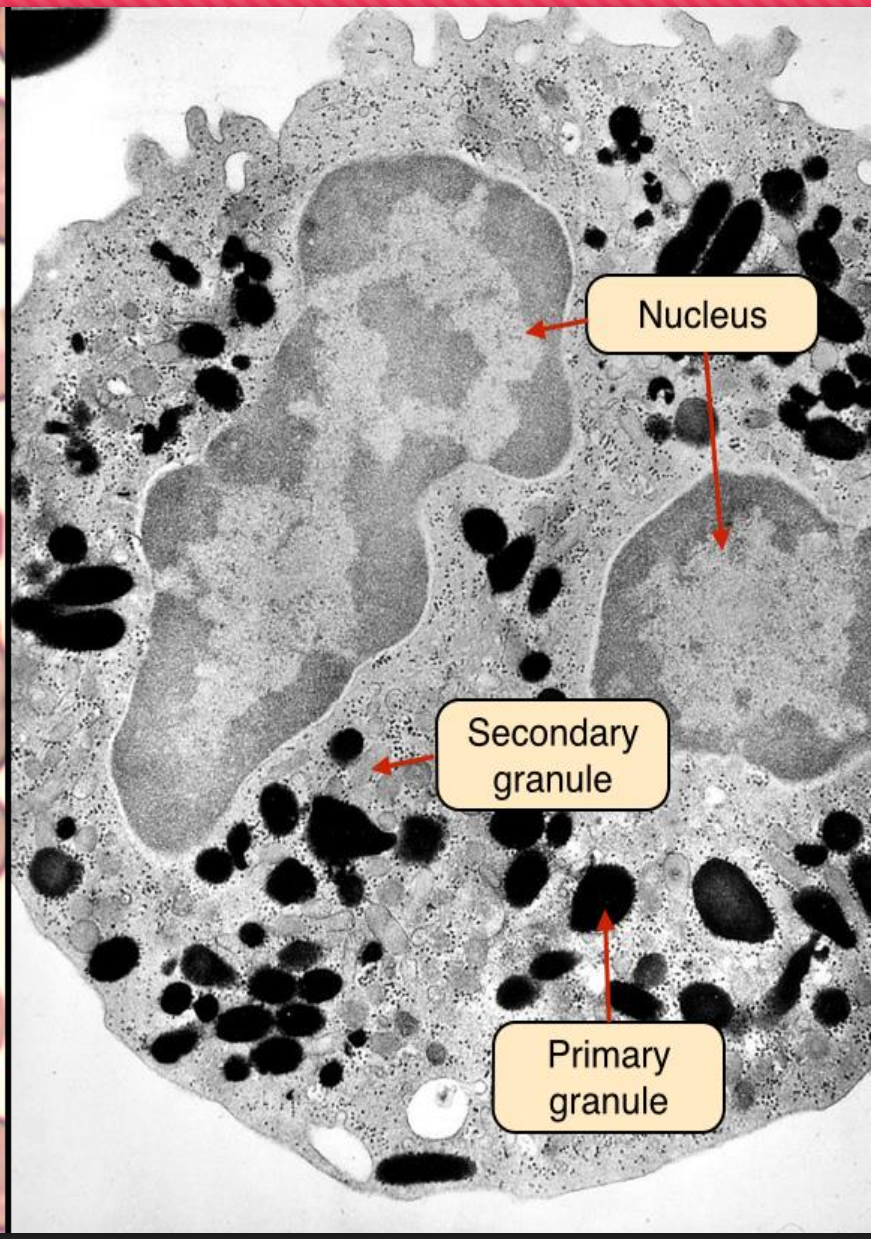
TYPES:

1. **Neutrophils:** are the most common type of leukocyte, making up around 65% of all white blood cells. they destroy the damaged cells and bacteria through phagocytosis
2. **Eosinophils:** They release the specialised enzymes **histaminase** and **arylsulfatase B** which are involved in the inflammatory response.
3. **Basophils:** They are involved in the body's defense against the parasites.
4. **Lymphocytes:** can be divided into two different types, **B-cells** and **T-cells**. Both B-cells and T-cells are involved in the adaptive immune response but have different roles.
5. **Monocytes:** Monocytes circulate in the bloodstream between one and three days before entering the tissues of the body where they become **macrophages**. Macrophages are large **phagocytic cells** that engulf and kill dead cells and bacterial cells.

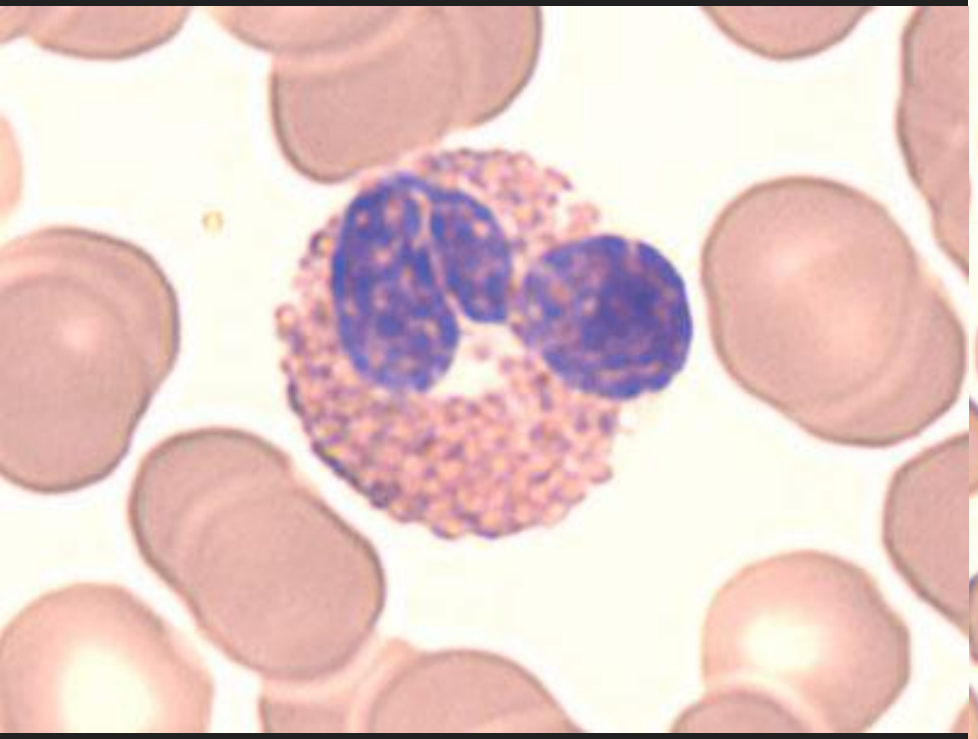
Neutrophils

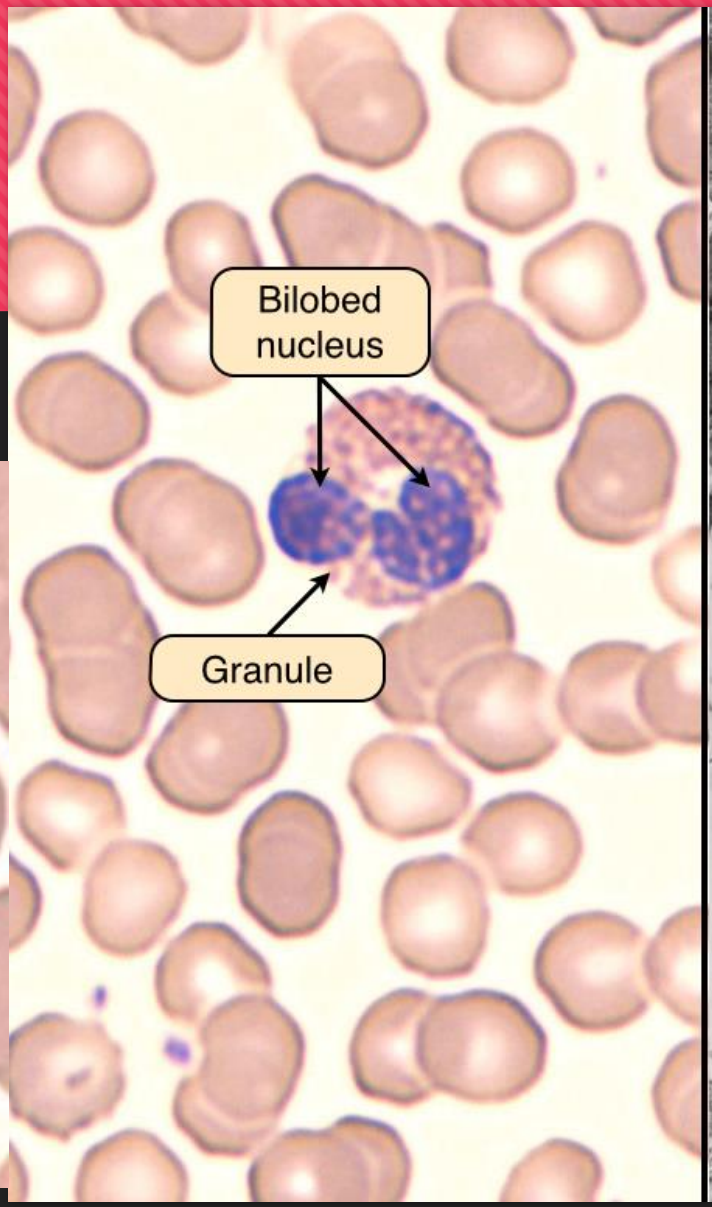


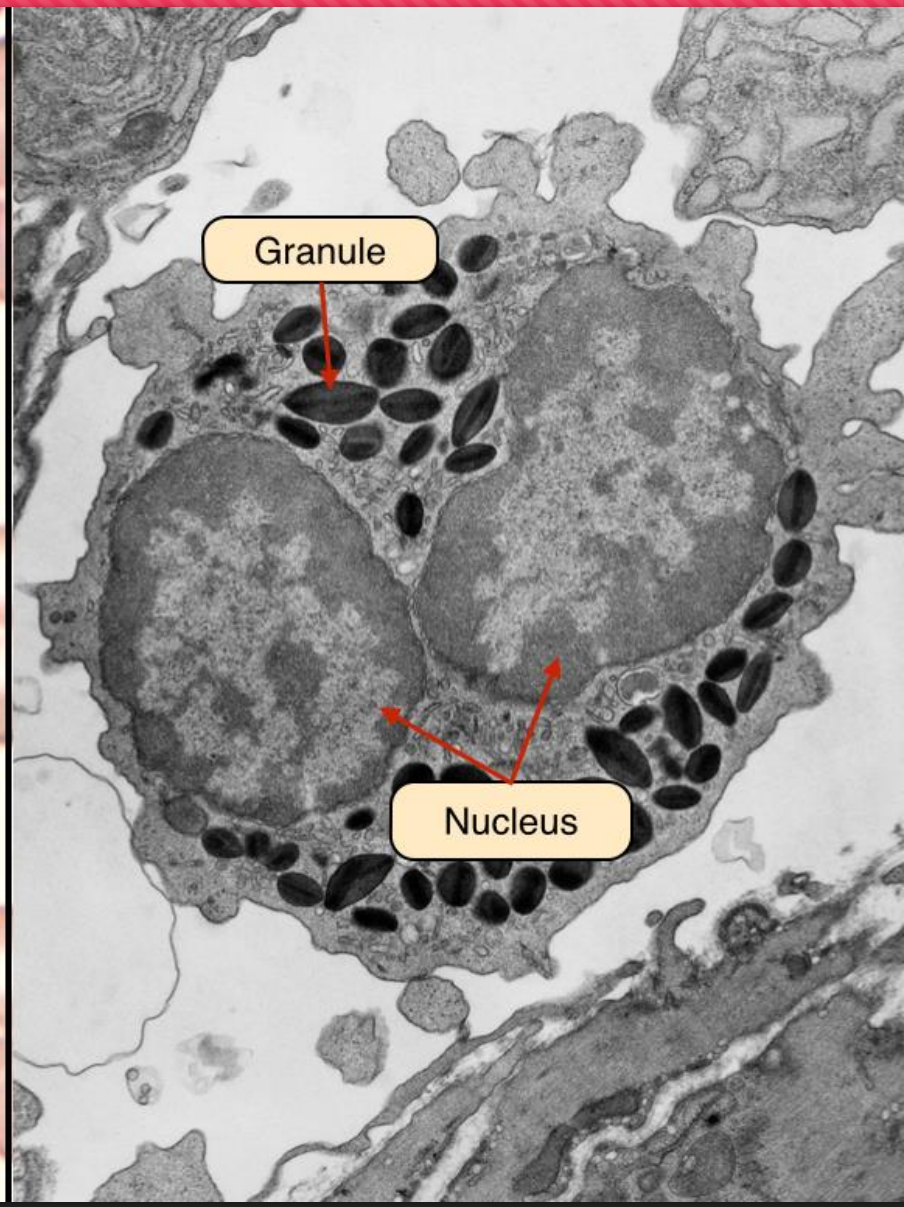




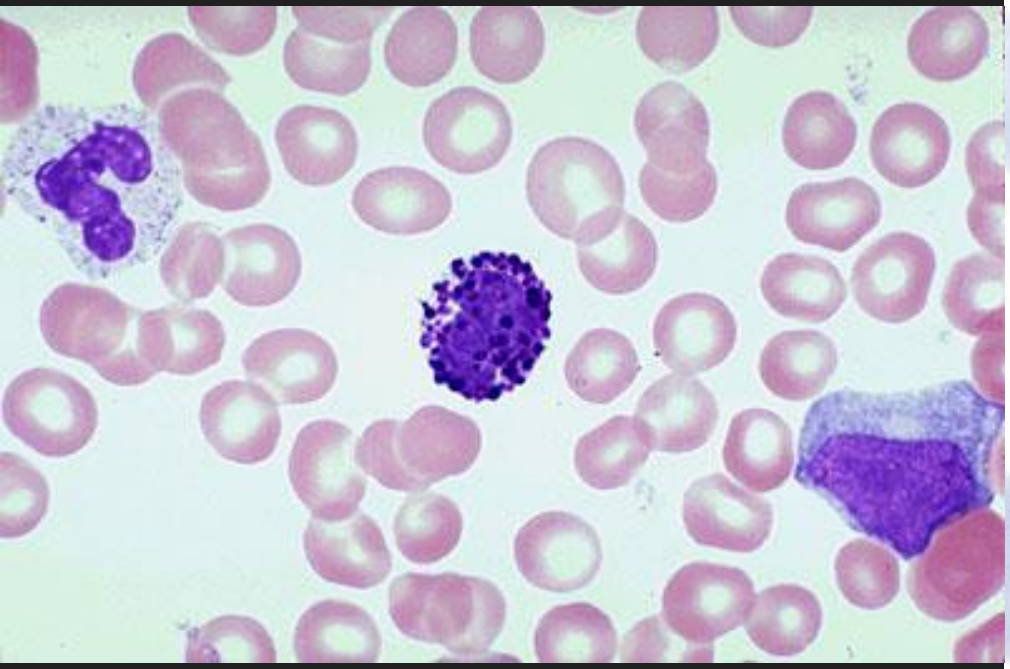
Eosinophils

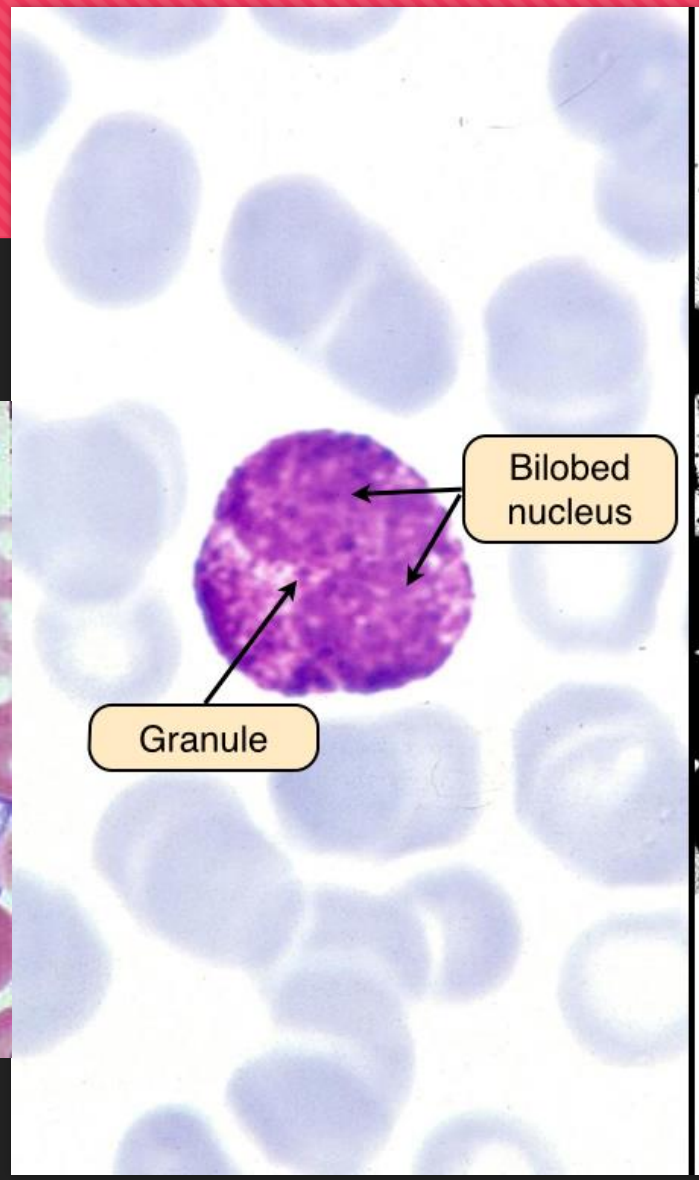


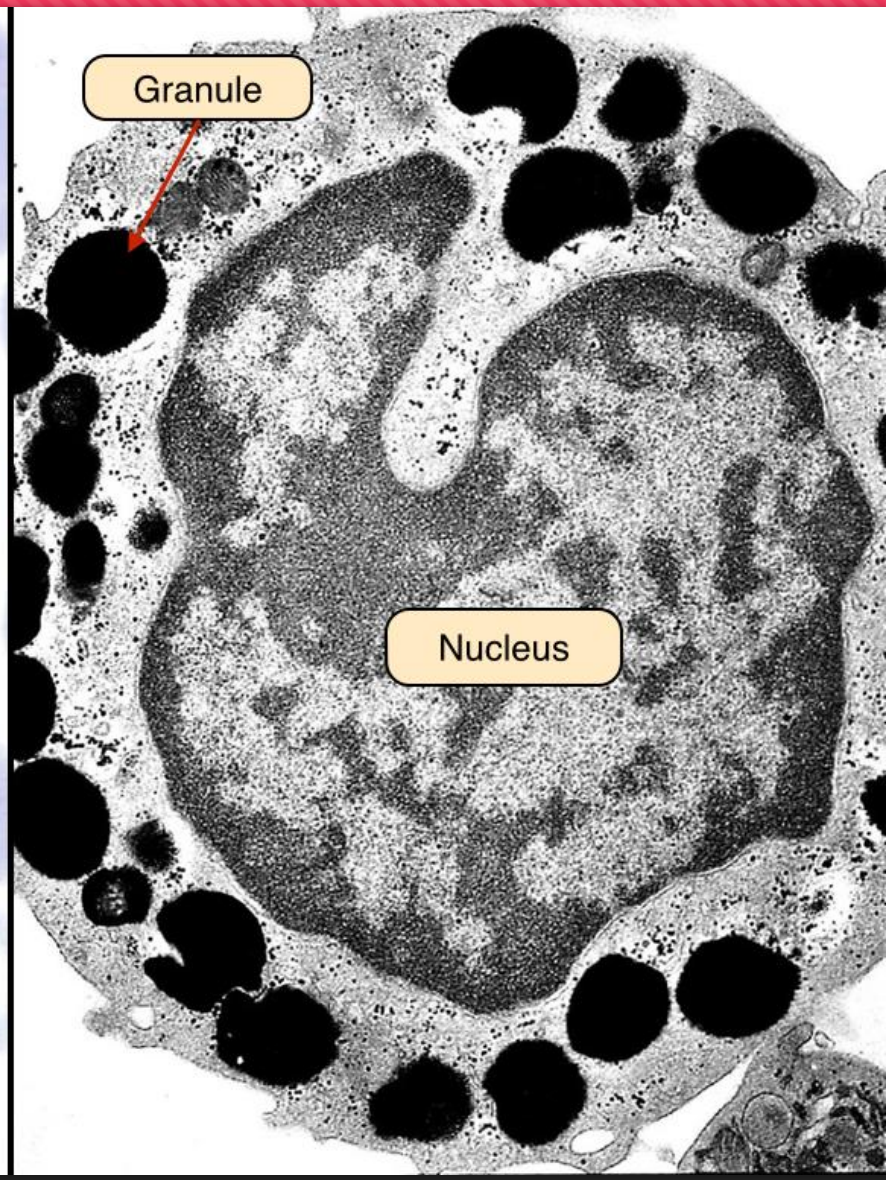




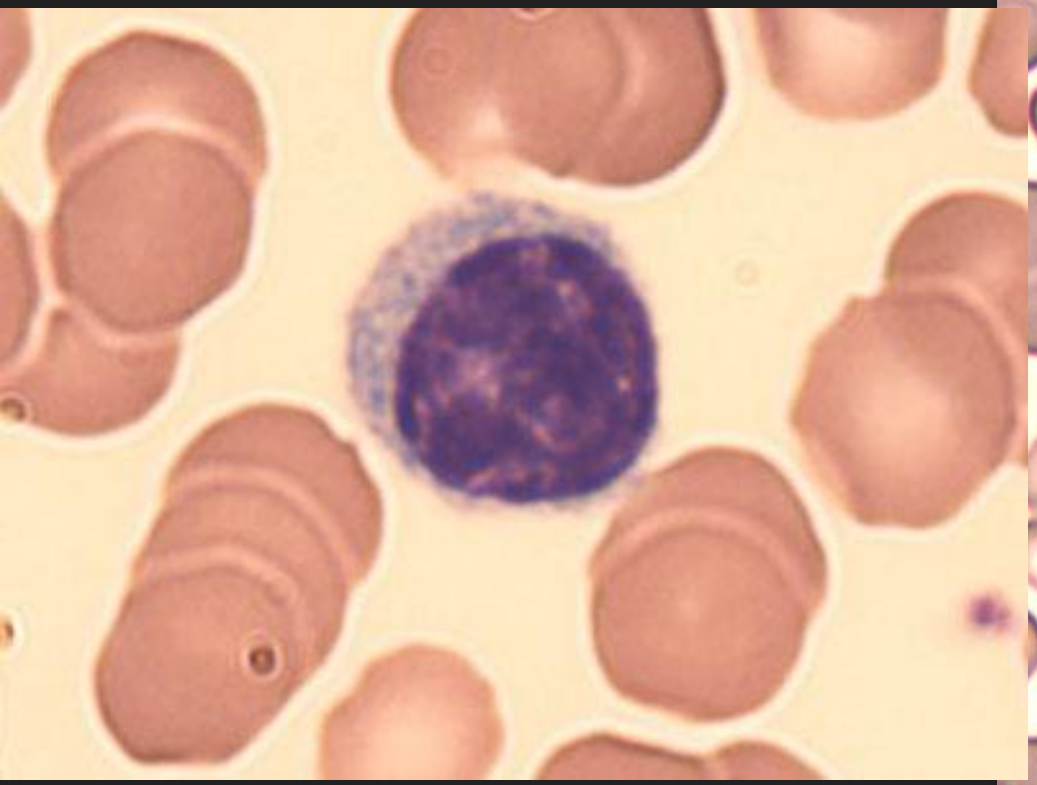
Basophils

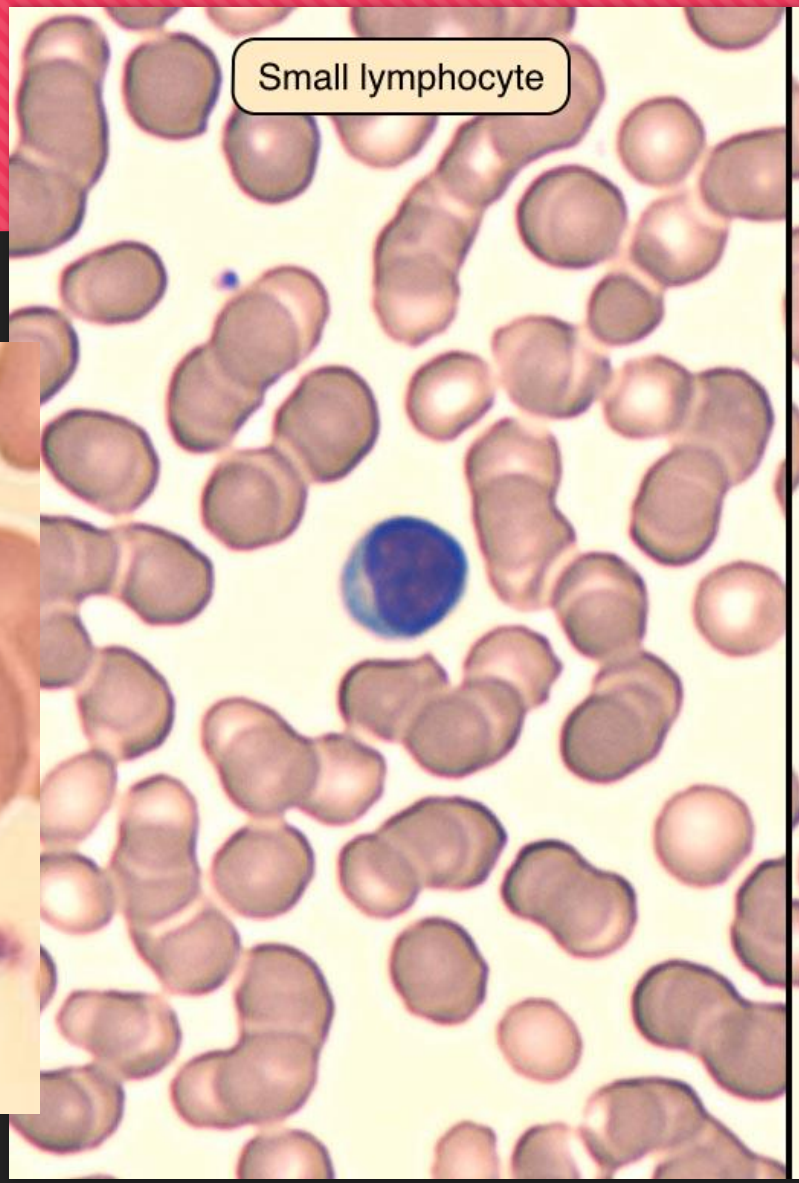


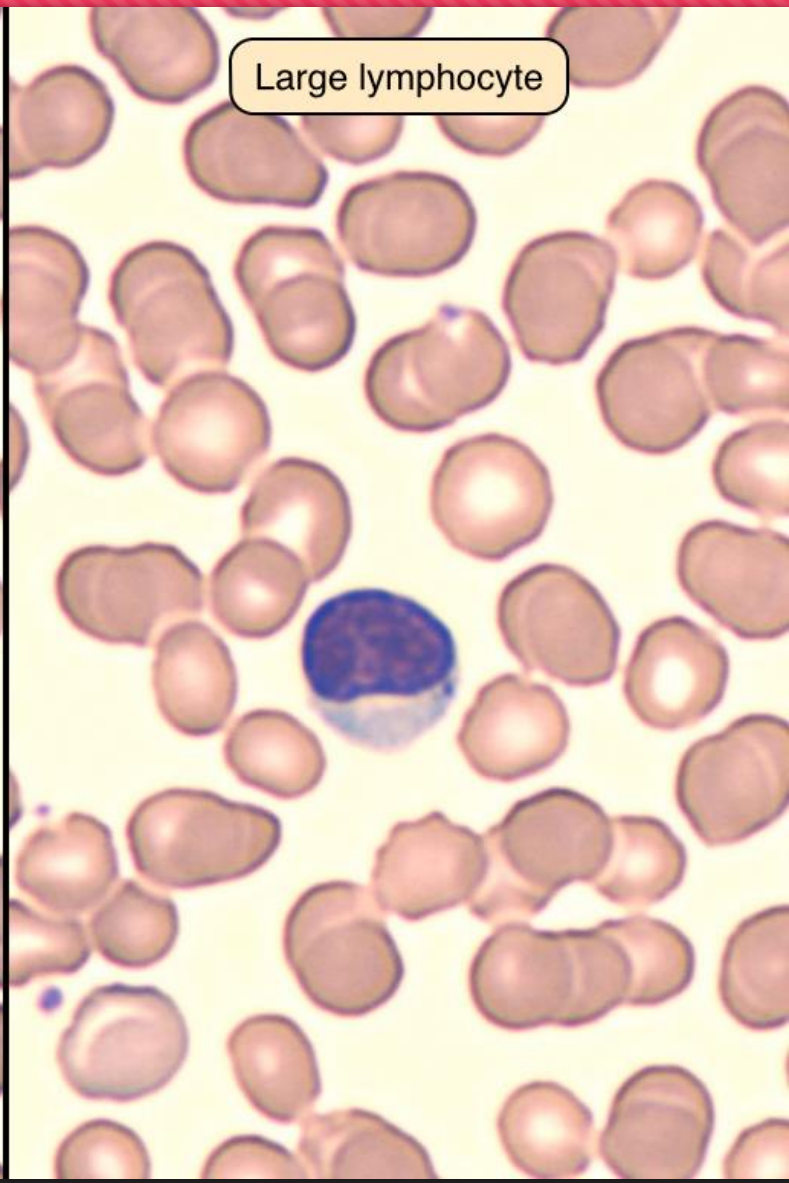




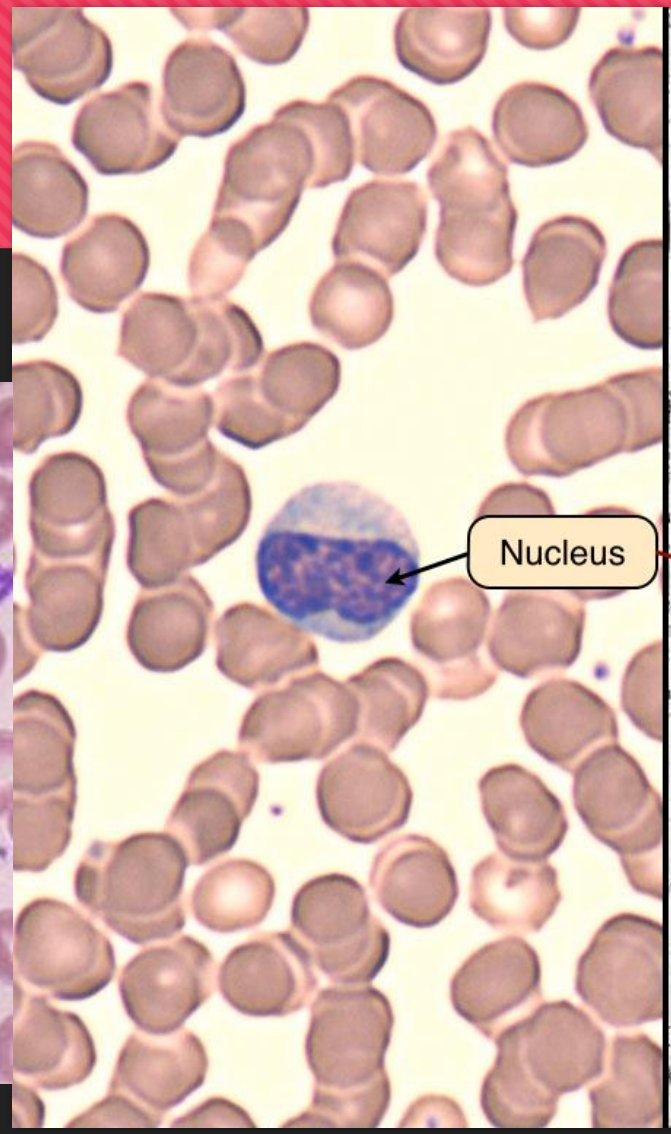
Lymphocytes

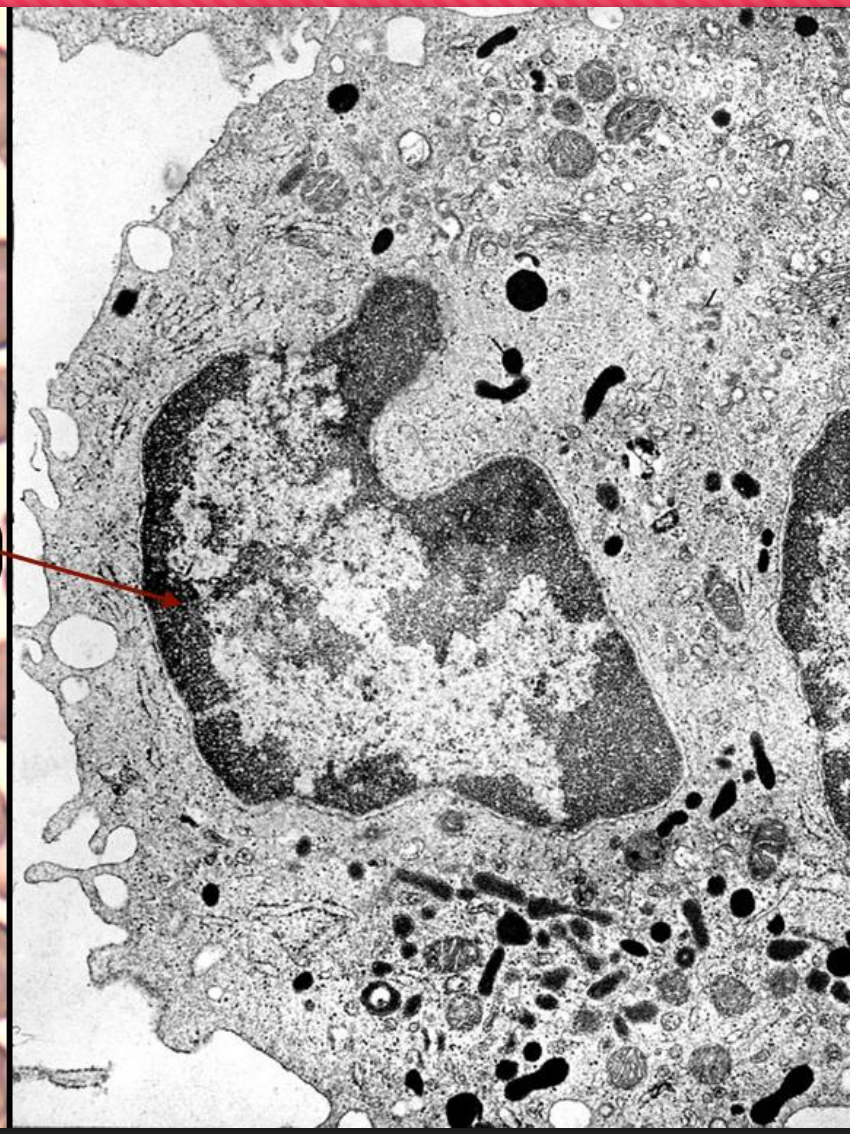






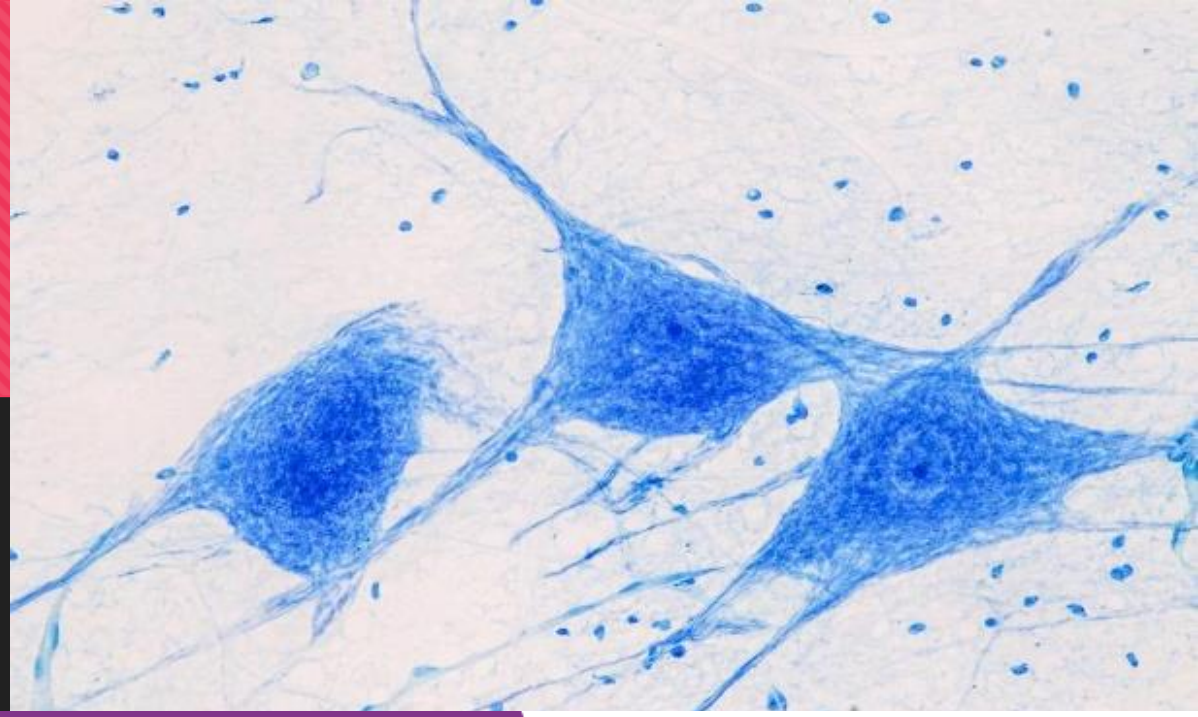
Monocytes

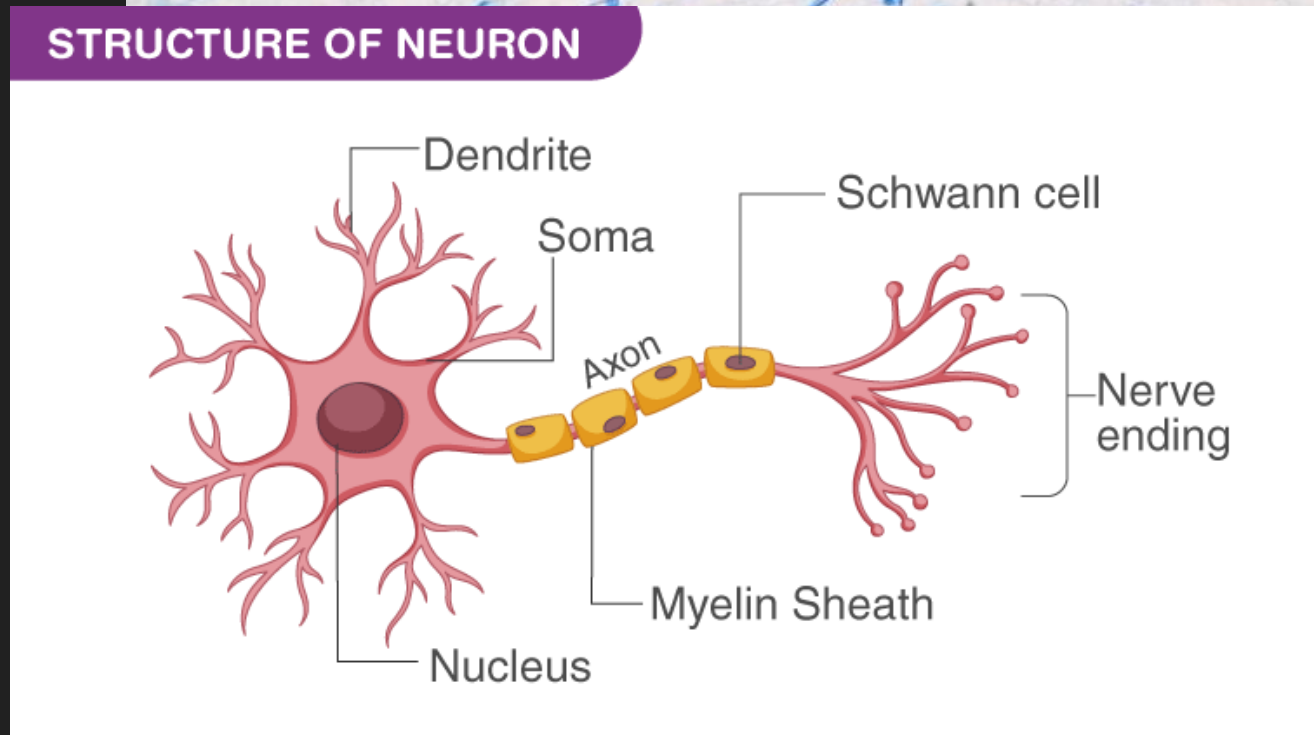




4. NERVE CELLS

- Nerve cells are commonly known as neurons.
- They transmit the information throughout the body in the form of electrical signals or nerve impulses.

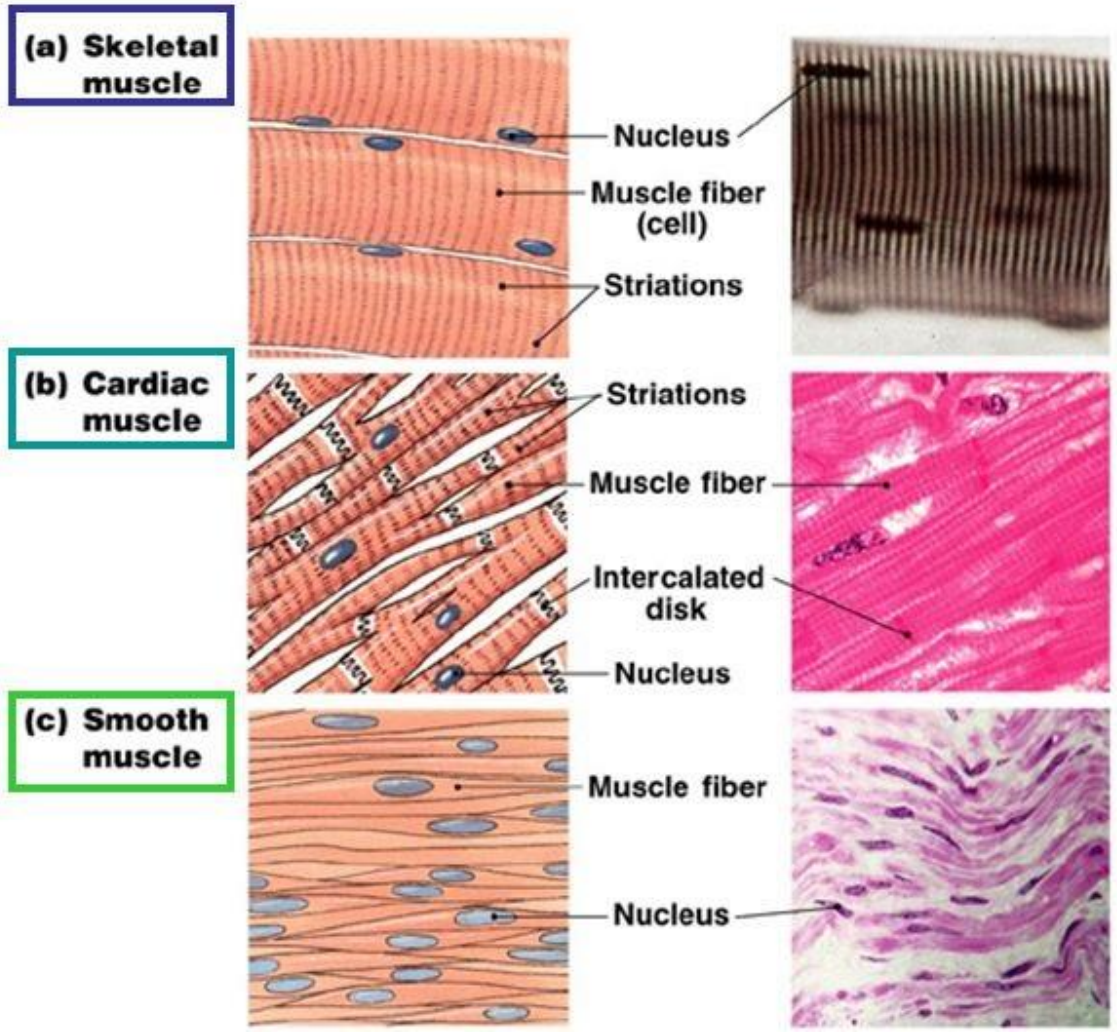




5. MUSCLE CELLS

Three Types of Muscle Cells

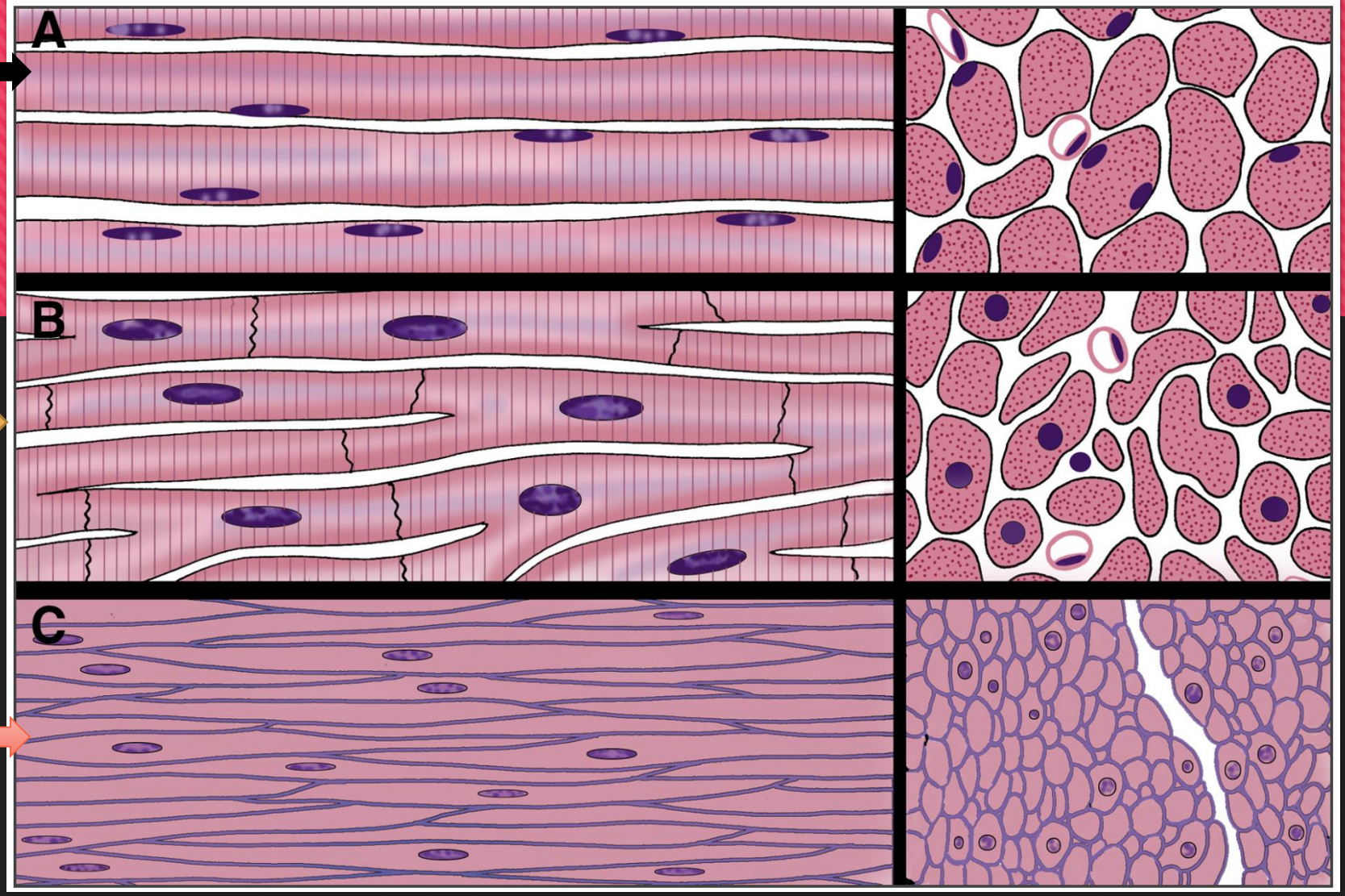
- Skeletal
- Cardiac
- Smooth



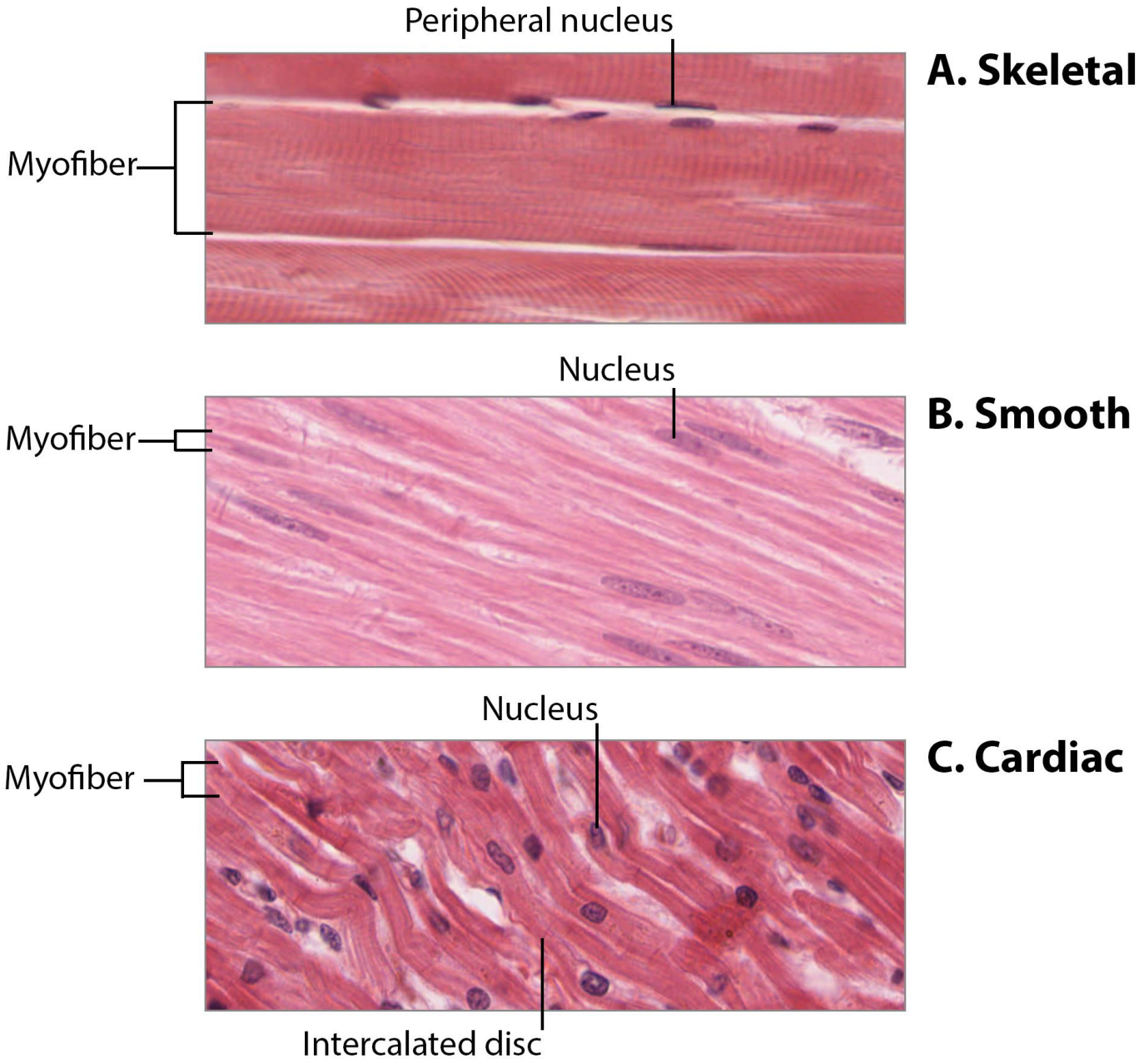
SKELETAL MUSCLE

CARDIAC MUSCLE

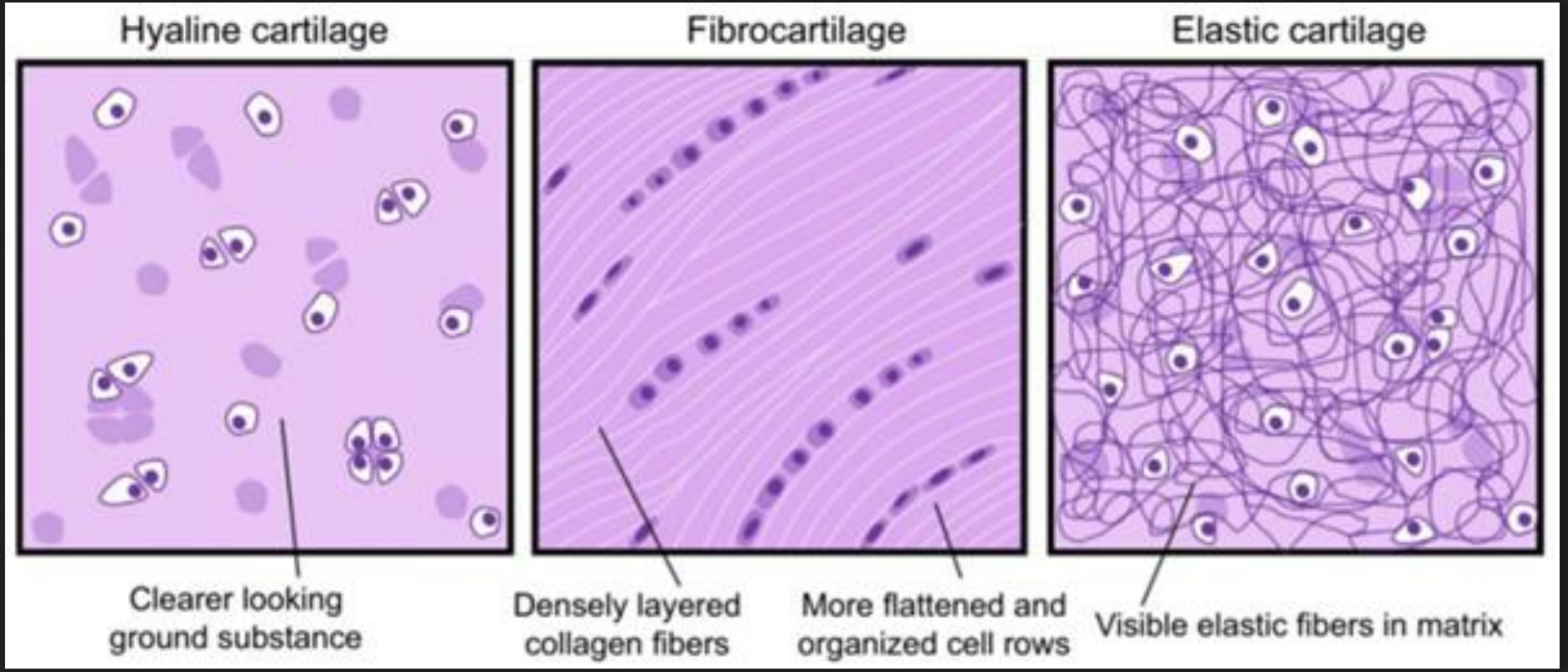
SMOOTH MUSCLE

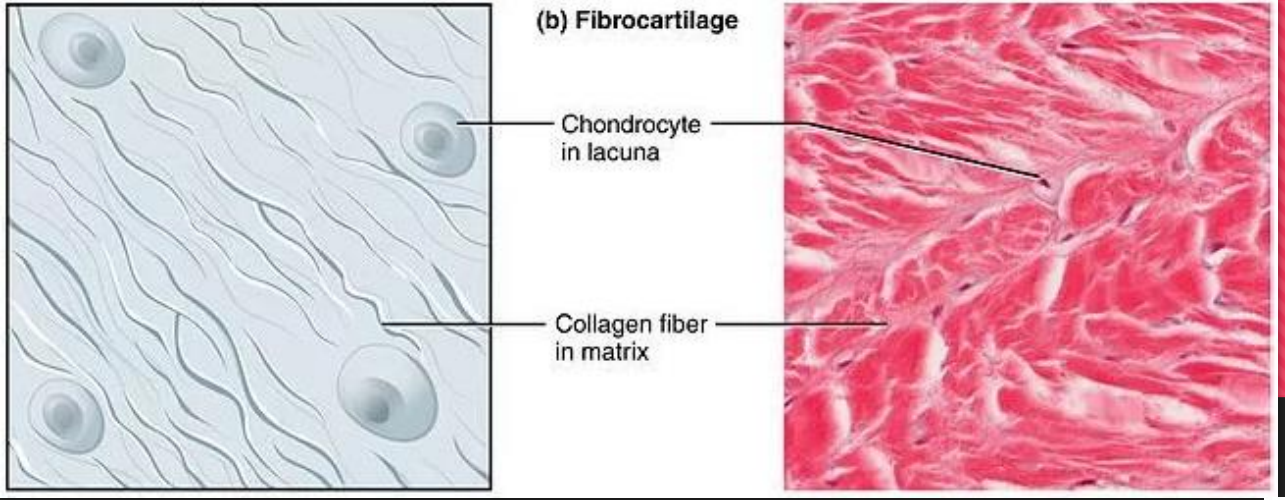


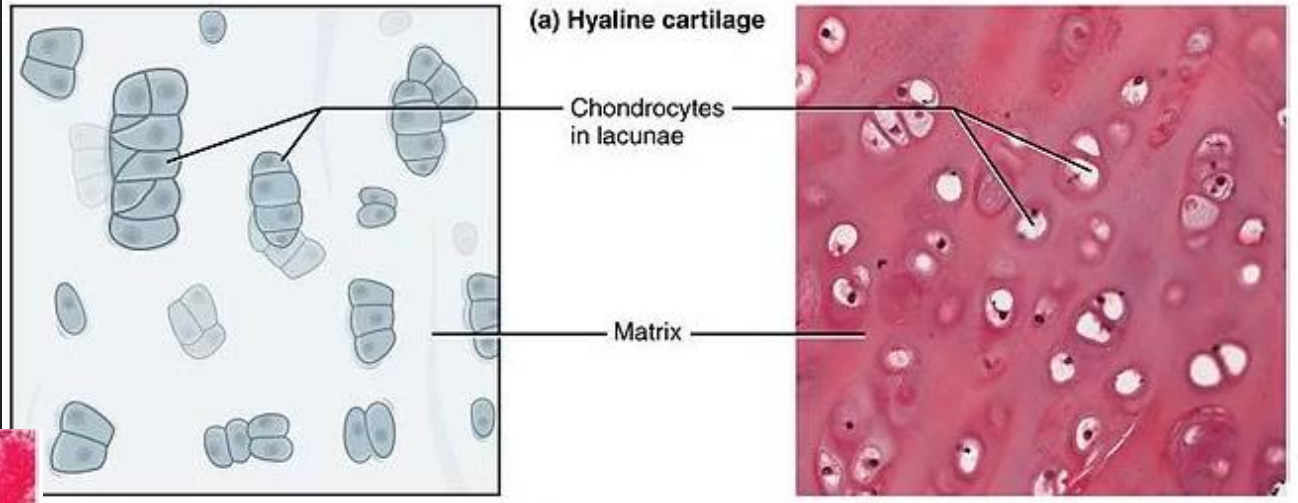
Muscle Tissues Overview. All muscle tissue types have elongated cells that are arranged parallel to each other, giving them a singular axis for contraction. In skeletal muscle (A) the myofibers are long, skinny rods with nuclei on the periphery of the cell. In cardiac muscle (B) the cells are shorted and brached with a centrally located nucleus. Smooth muscle (C) is the only type that is not striated. It has cells that taper at each end and a central nucleus.

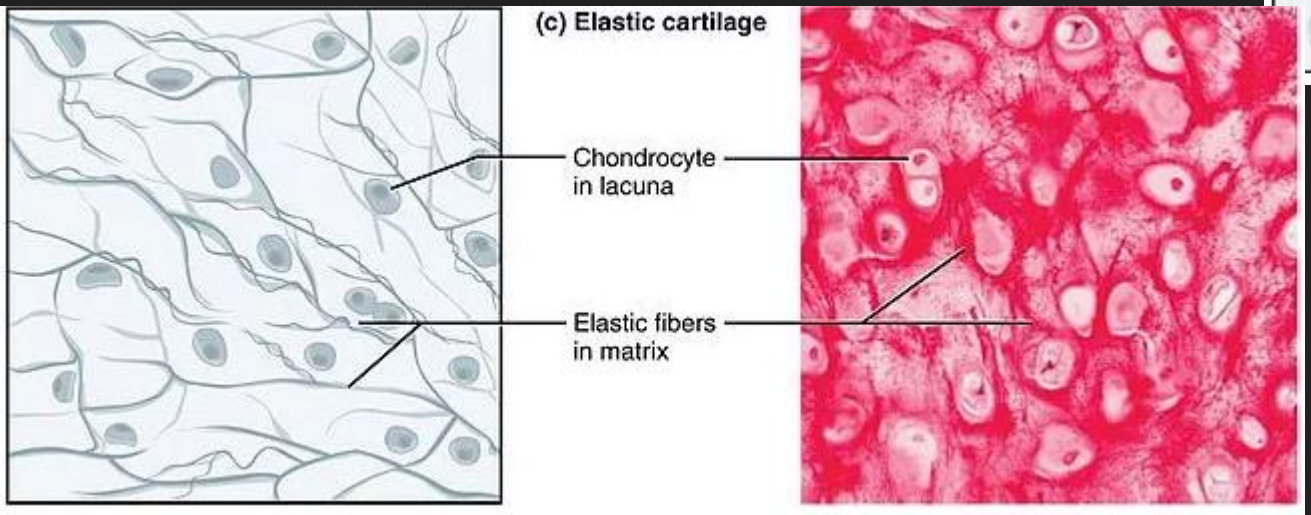

Peripheral nucleus
Myofiber
A. Skeletal
Nucleus
Myofiber
B. Smooth
Nucleus
Myofiber
C. Cardiac
Intercalated disc

6. CARTILAGE CELLS




(b) Fibrocartilage
Chondrocyte in lacuna
Collagen fiber in matrix

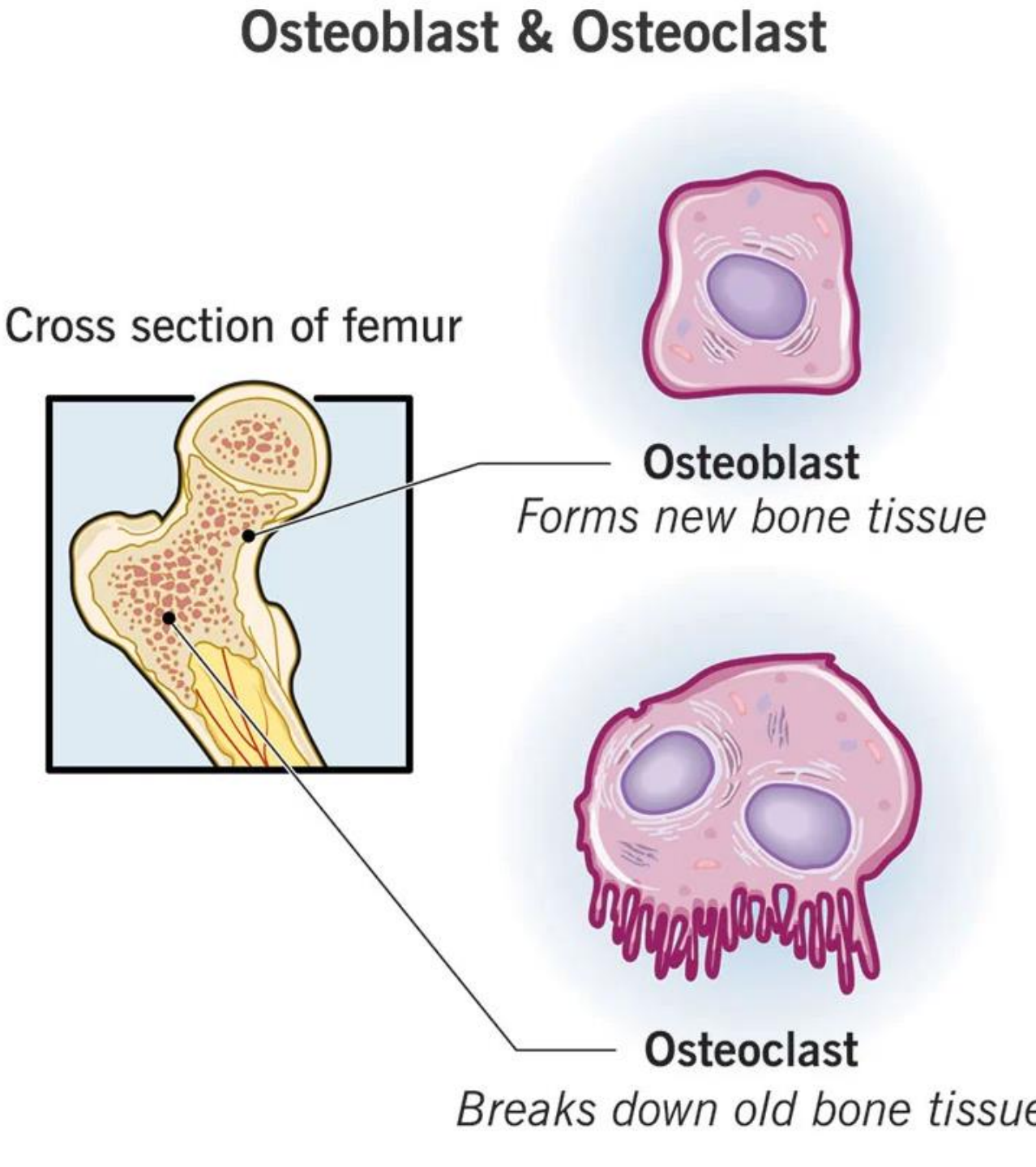

(a) Hyaline cartilage
Chondrocytes in lacunae
Matrix


(c) Elastic cartilage
Chondrocyte in lacuna
Elastic fibers in matrix

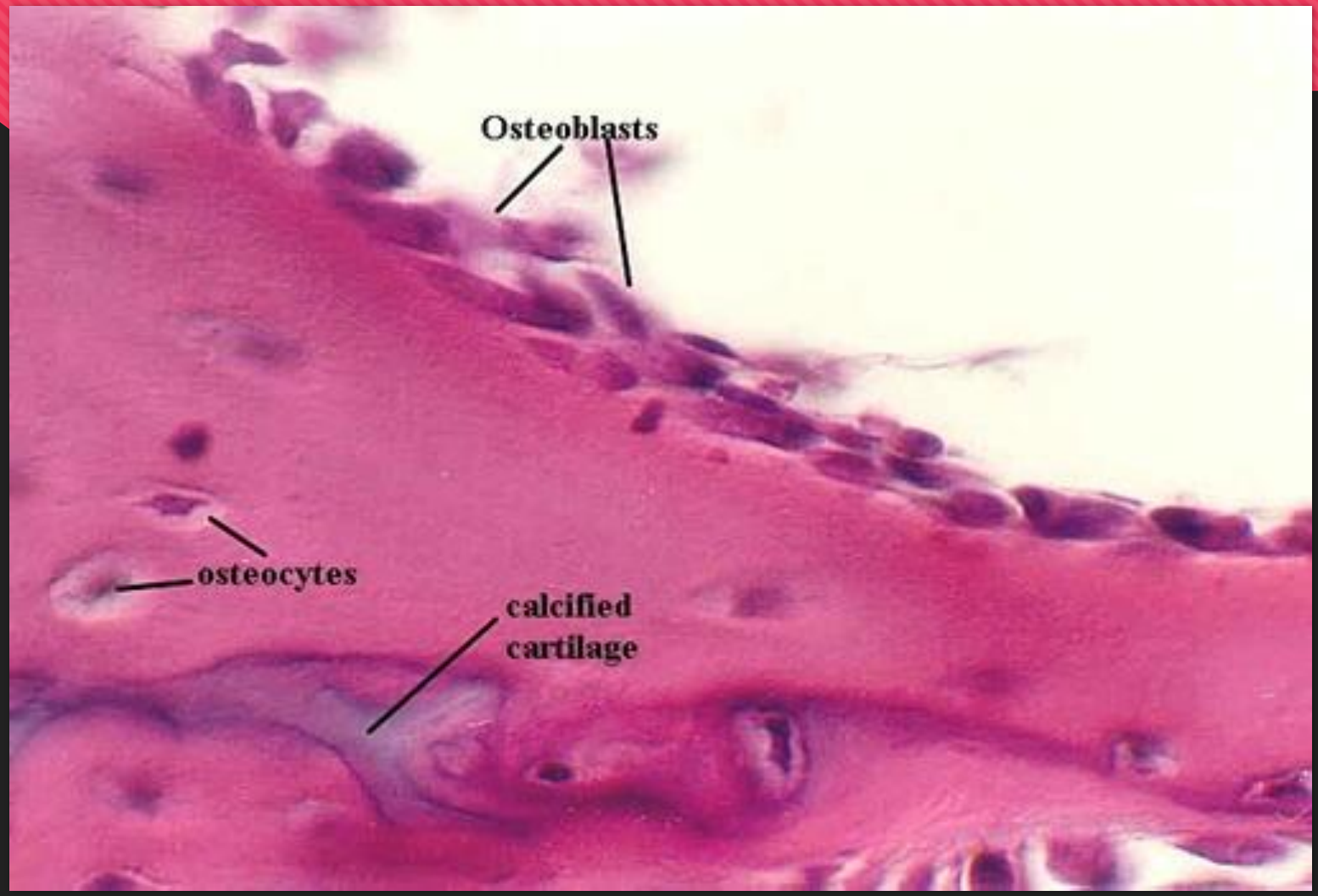
7. BONE CELLS

- Osteoblasts and osteoclasts work together to form new bone cells and break down old or damaged bone tissue.

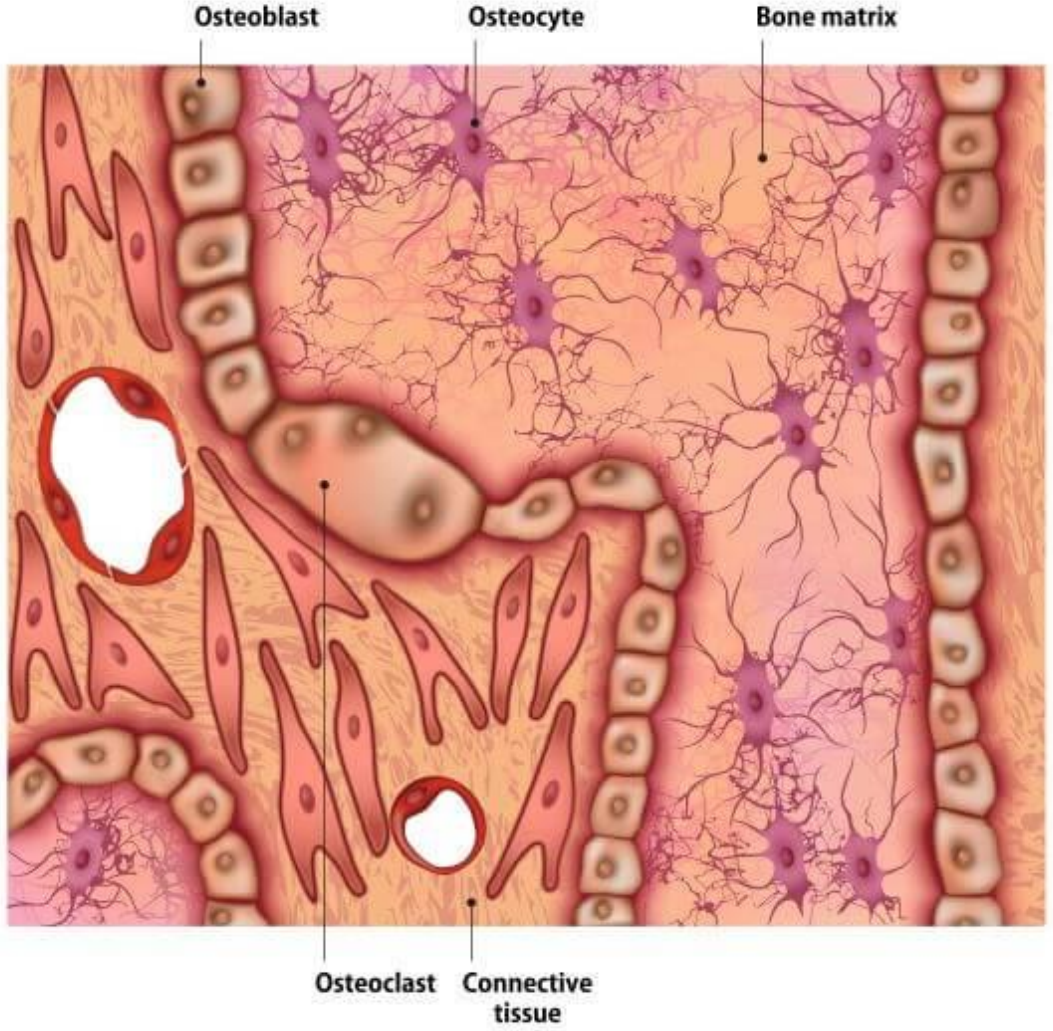
- Osteoblasts form new bone tissue. Osteoclasts break down old bone tissue to make room for new, healthier tissue to replace it.



The inner surface of bone is lined by osteoblasts

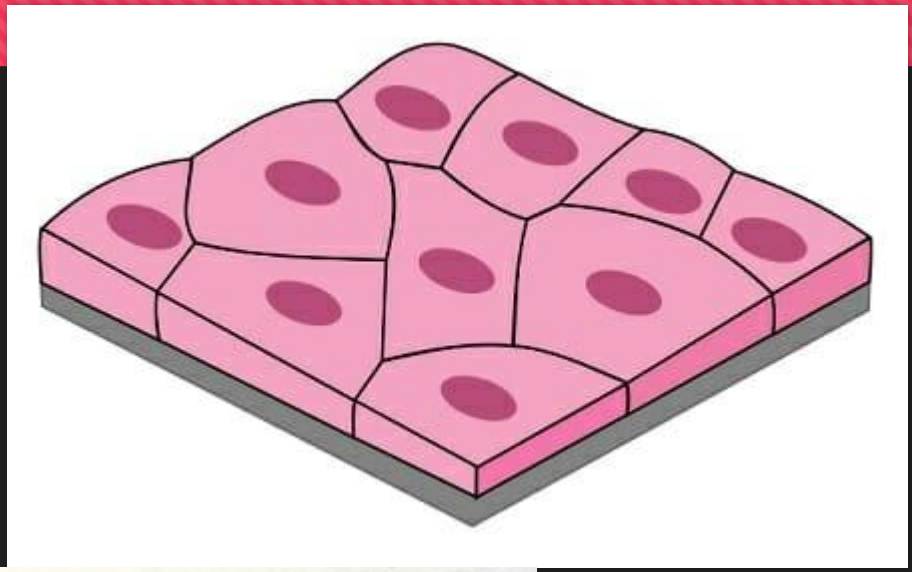


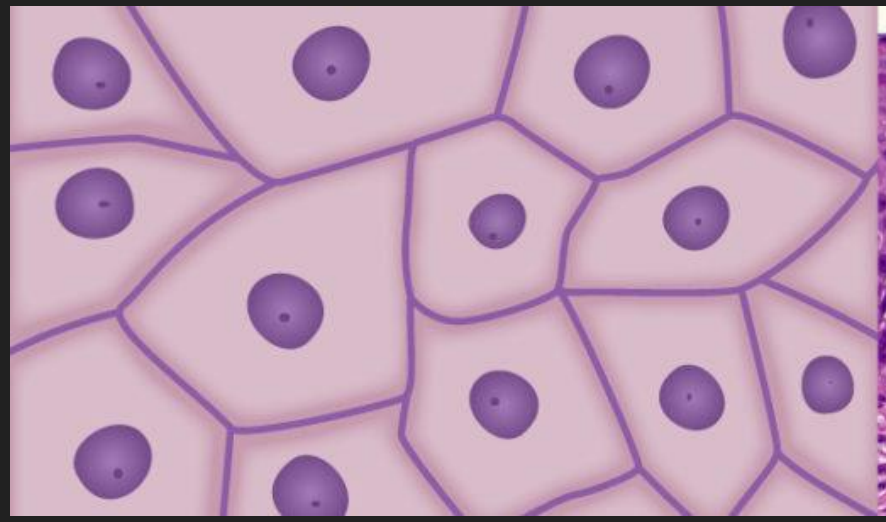
Bone tissue

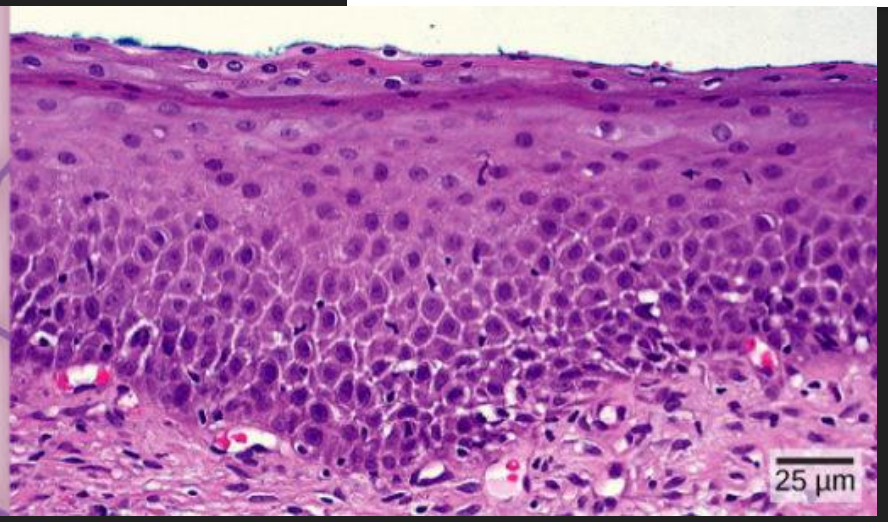

Osteoblast
Osteocyte
Bone matrix
Osteoclast
Connective tissue

Forms (shapes) of human cells

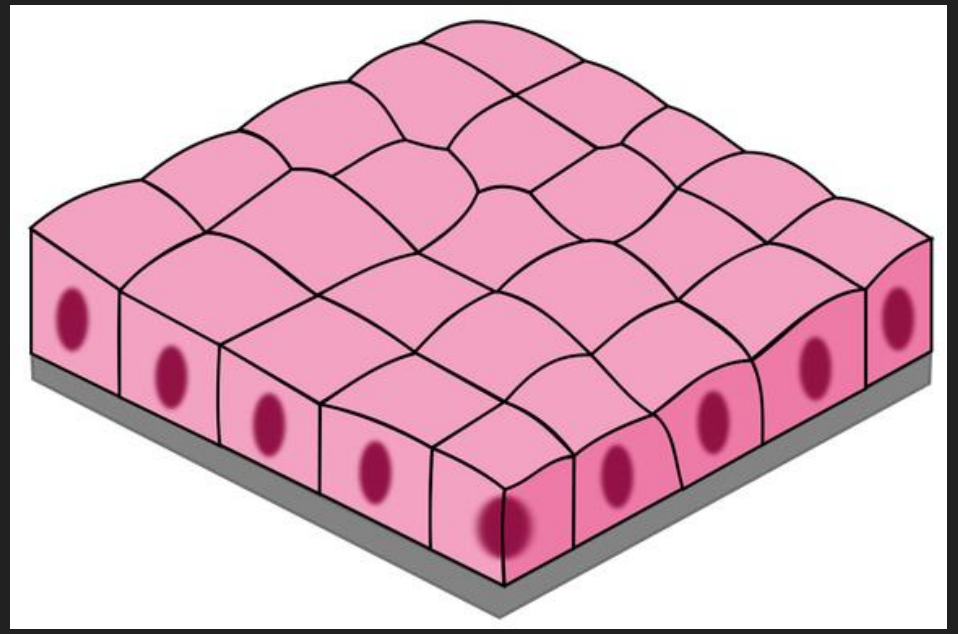
1.Squamous cells: ex. in the skin

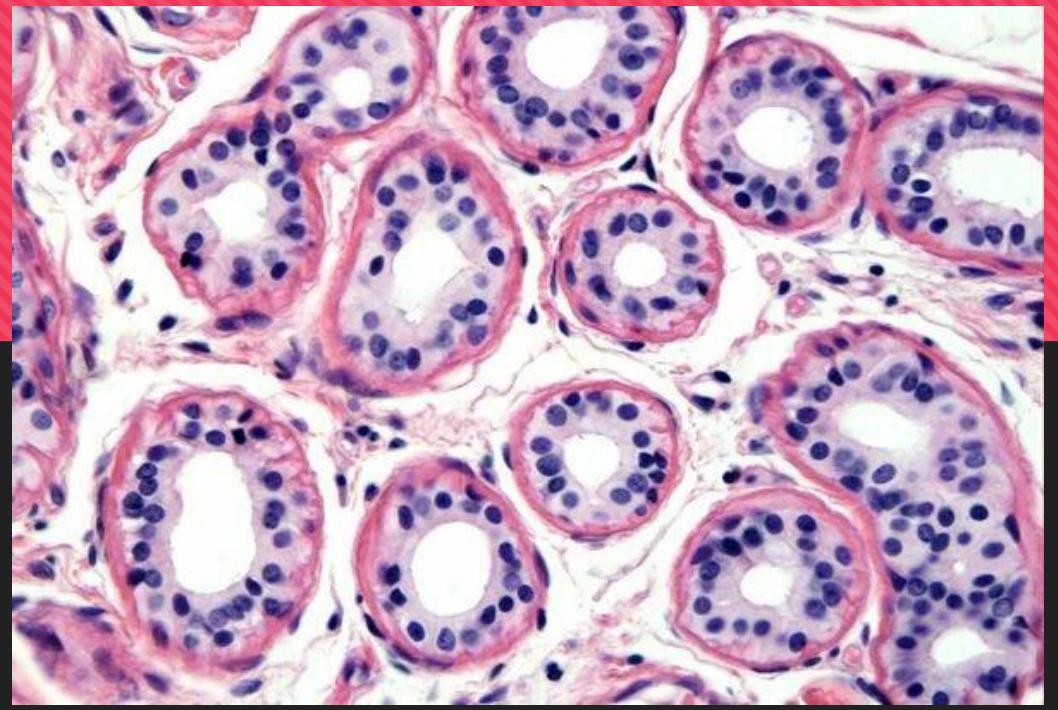


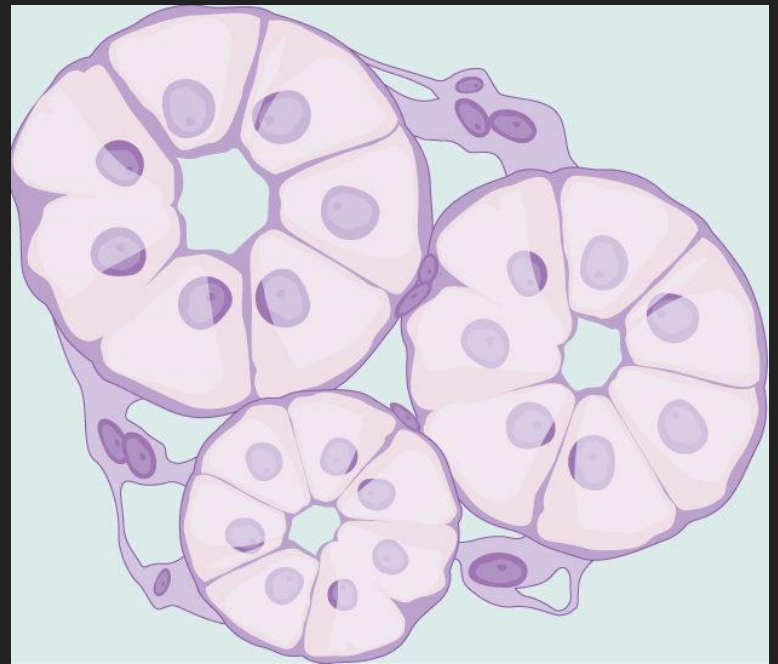




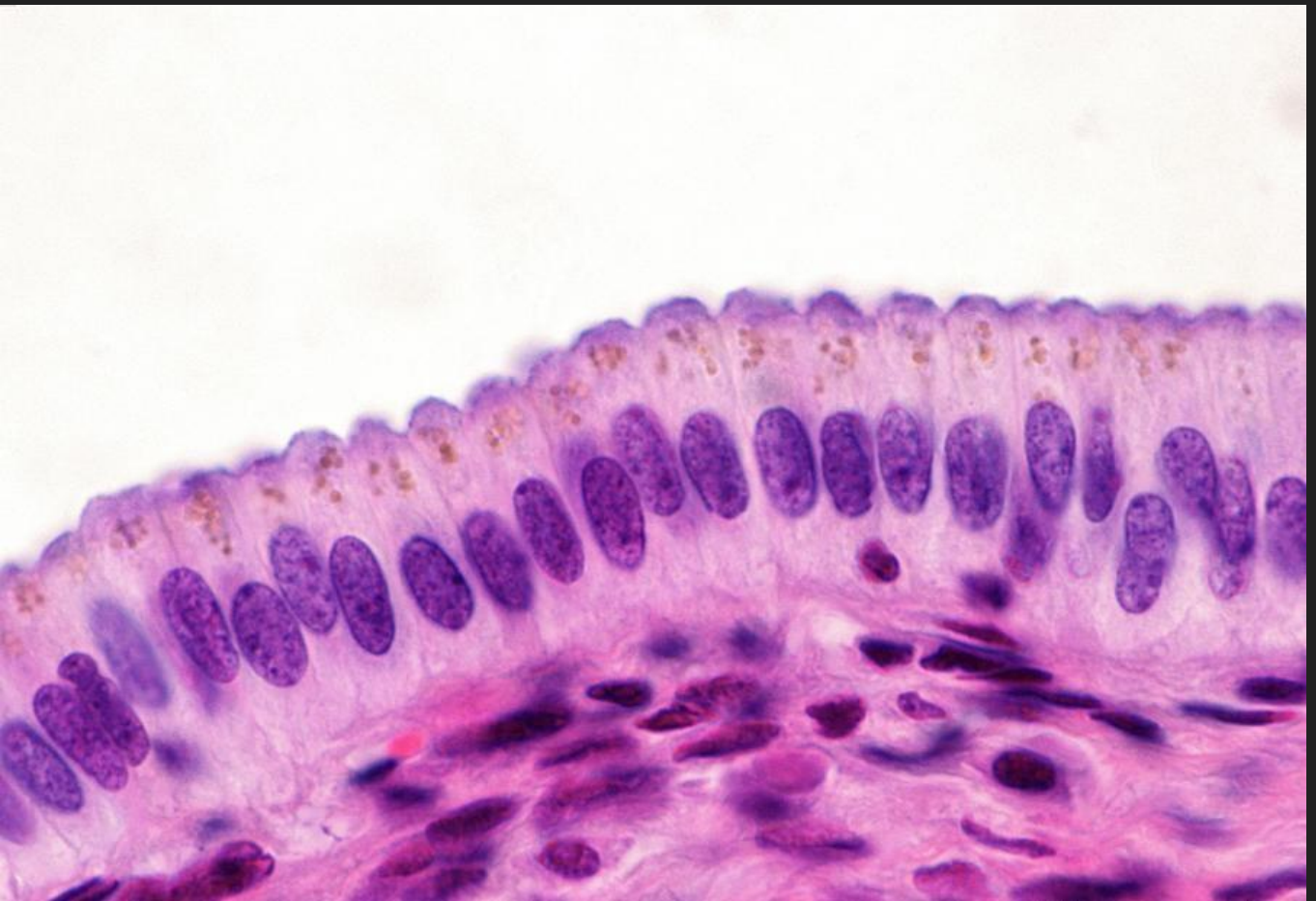
2. Cuboidal cells: ex: in the cuboidal epithelium of the glands.

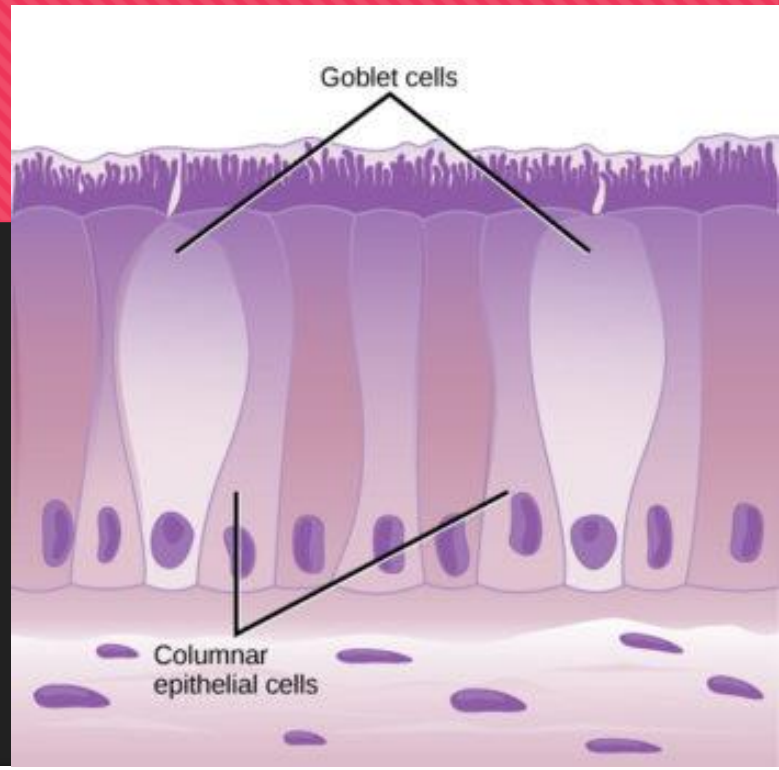


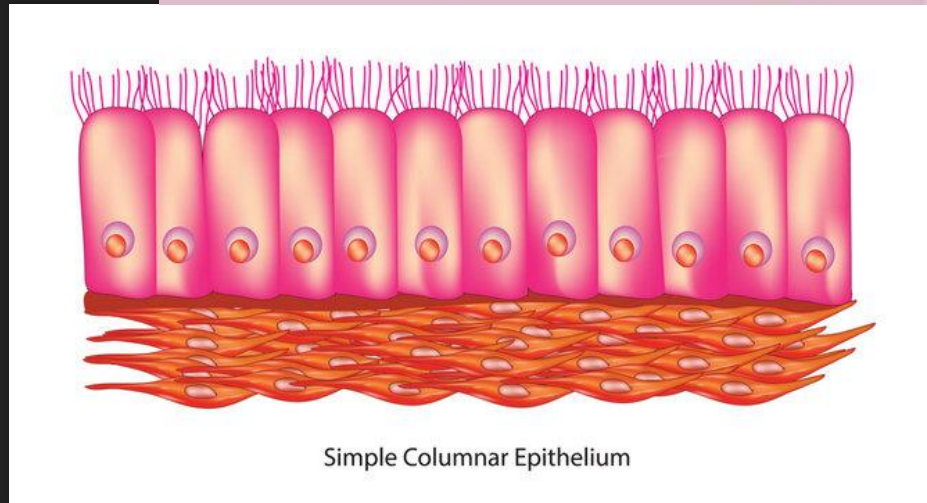




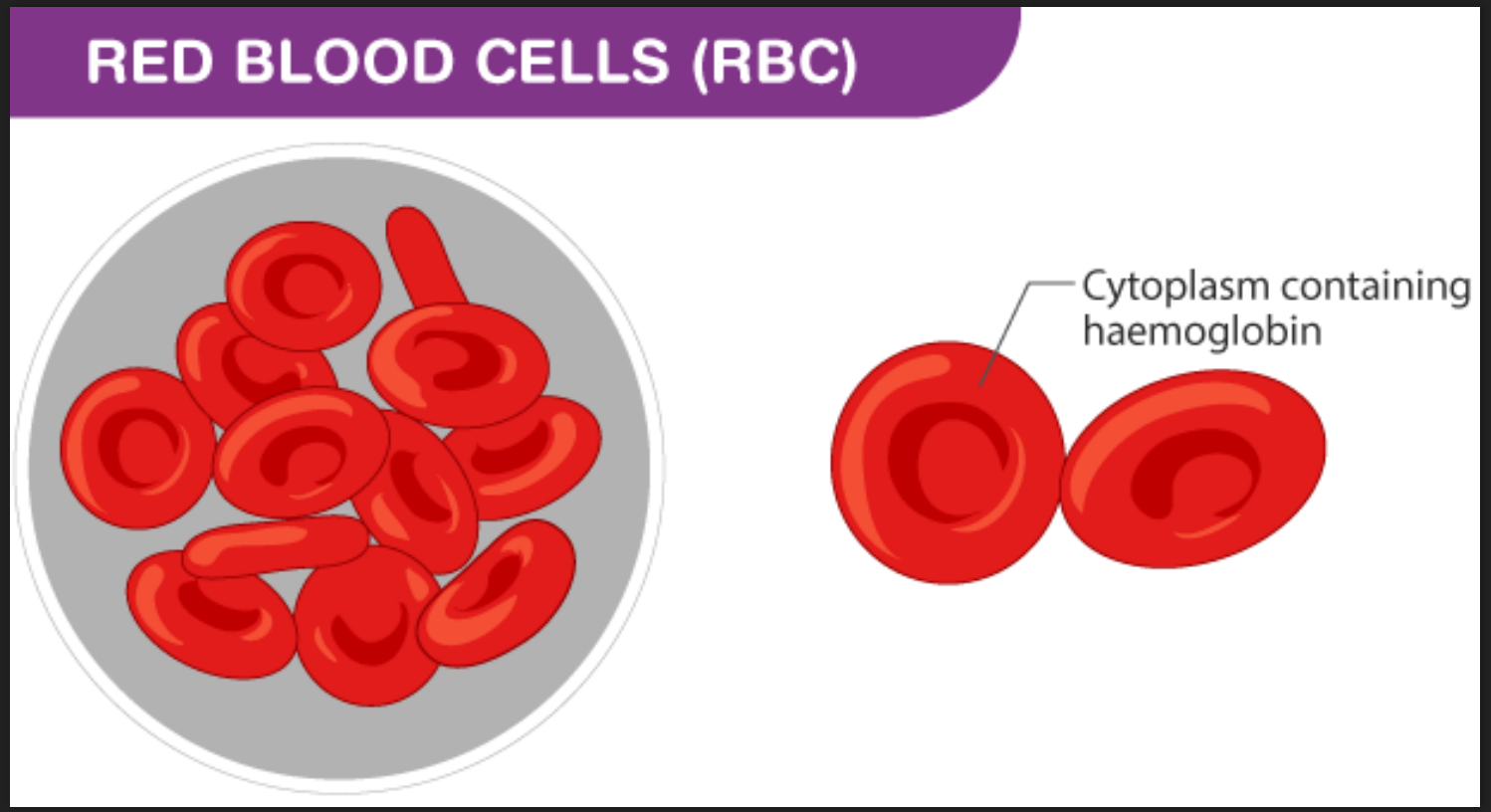
3. Columnar cells: ex: in the epithelium of the stomach and intestine



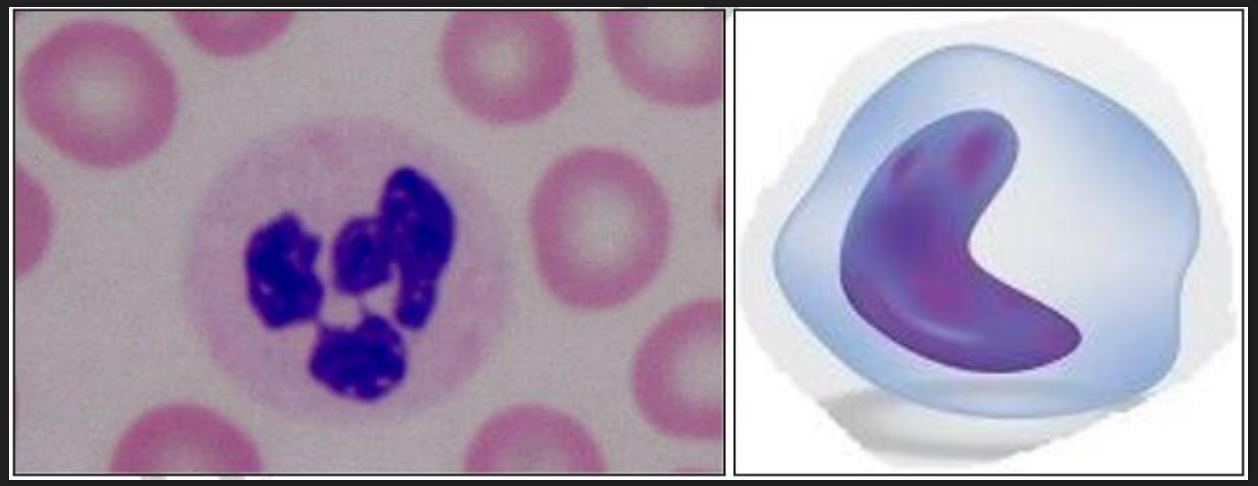


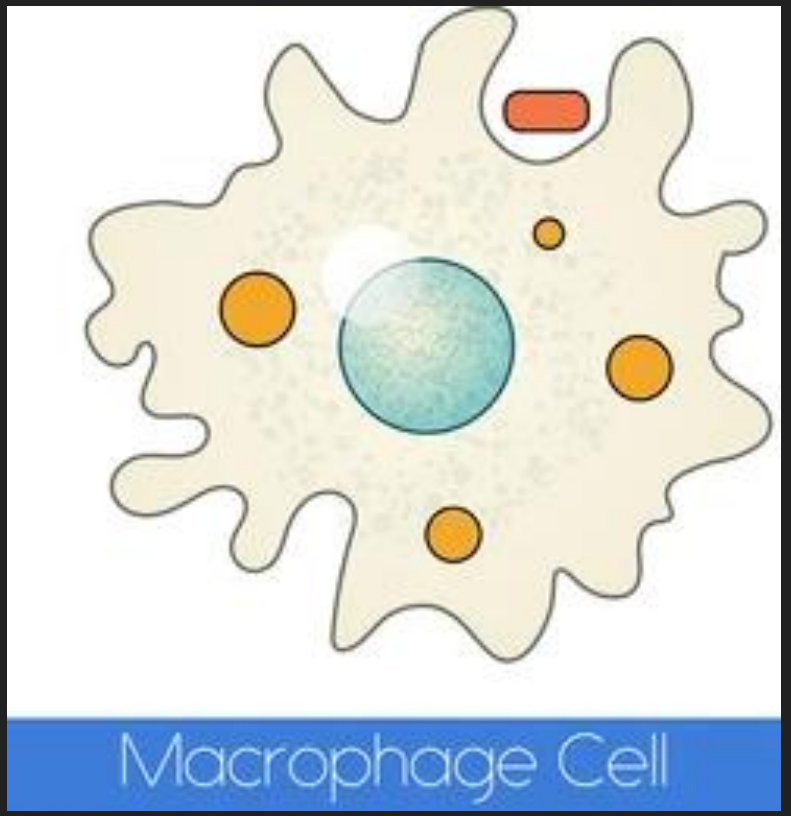


4. Discoid cells: ex: red blood cells (R.B.Cs.)

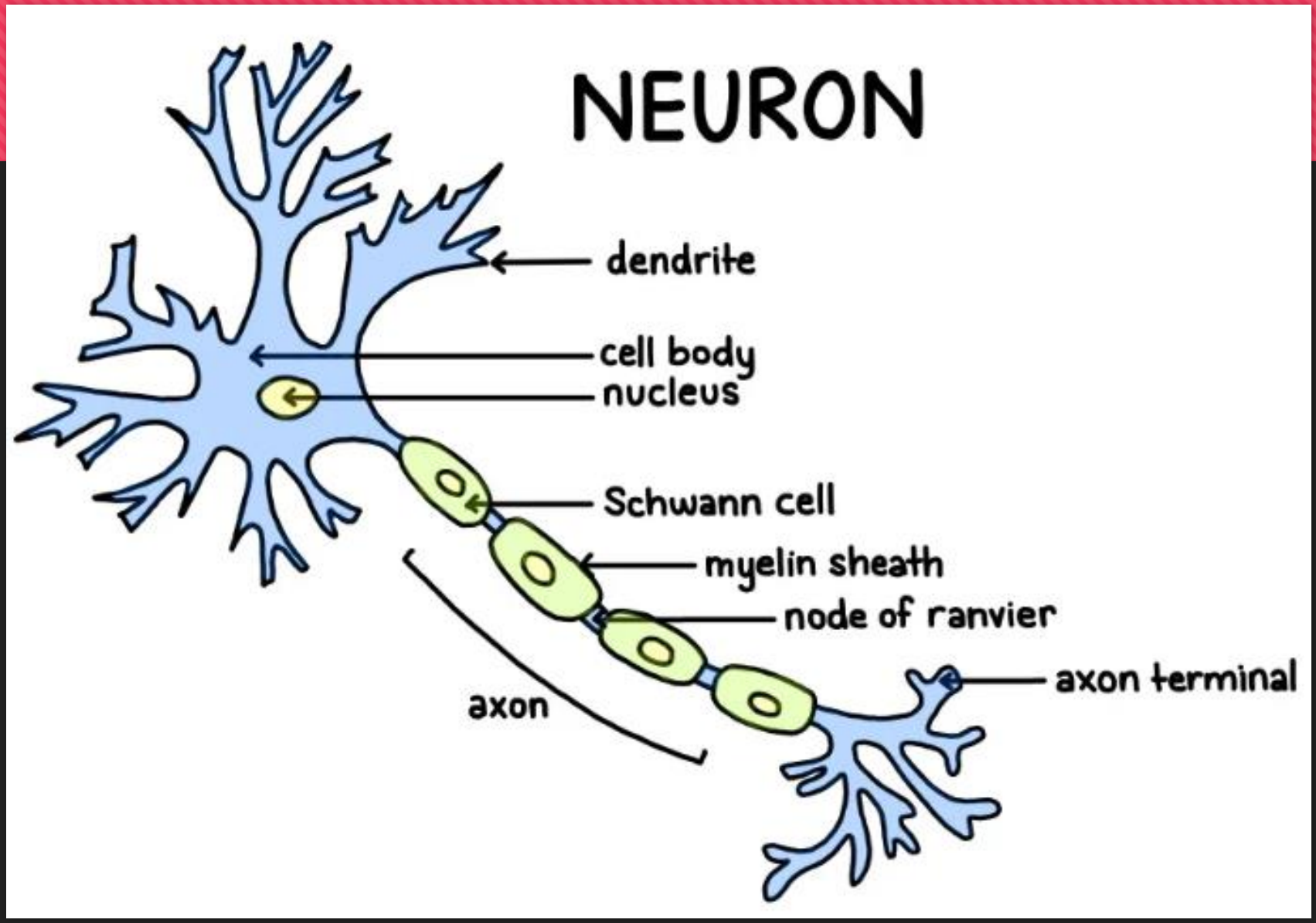


5. Ameboid shape cells (irregular): ex: macrophage cell (white blood cell)

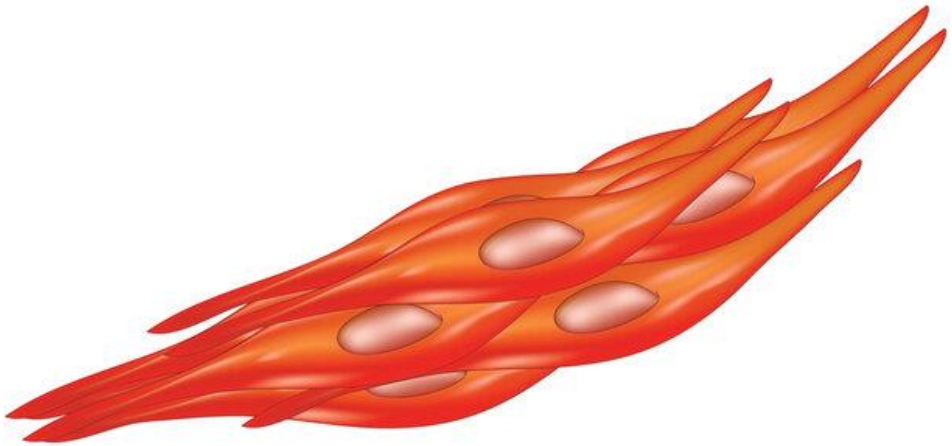




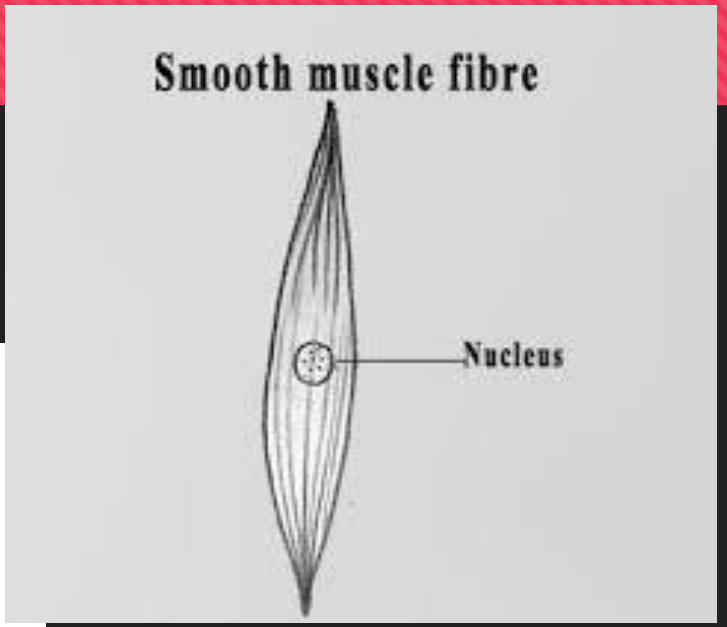
6. Star shaped cells (or satellite): ex: neuron (nerve cell)



7. Spindle shape cells: ex: smooth muscle cells (or fibers)



Smooth muscle



8. Spherical shape cells: ex: fat cell in the adipose tissue