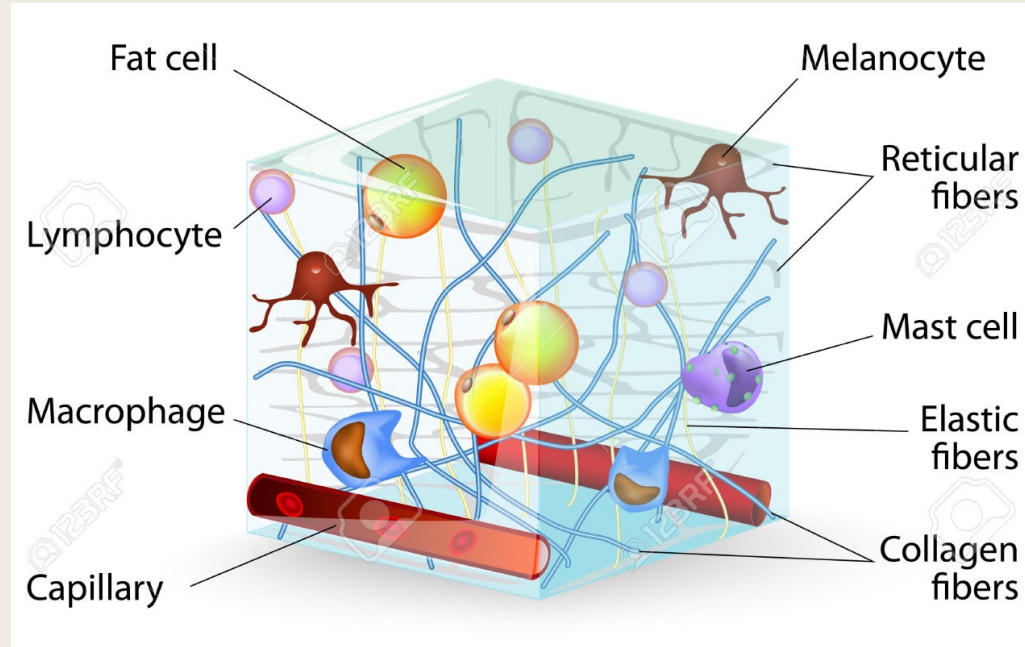
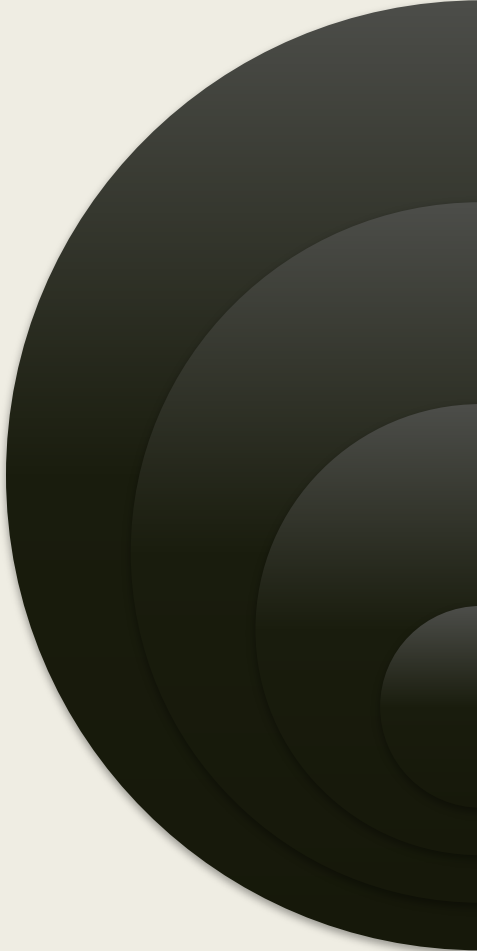


# Connective Tissue



# General Features



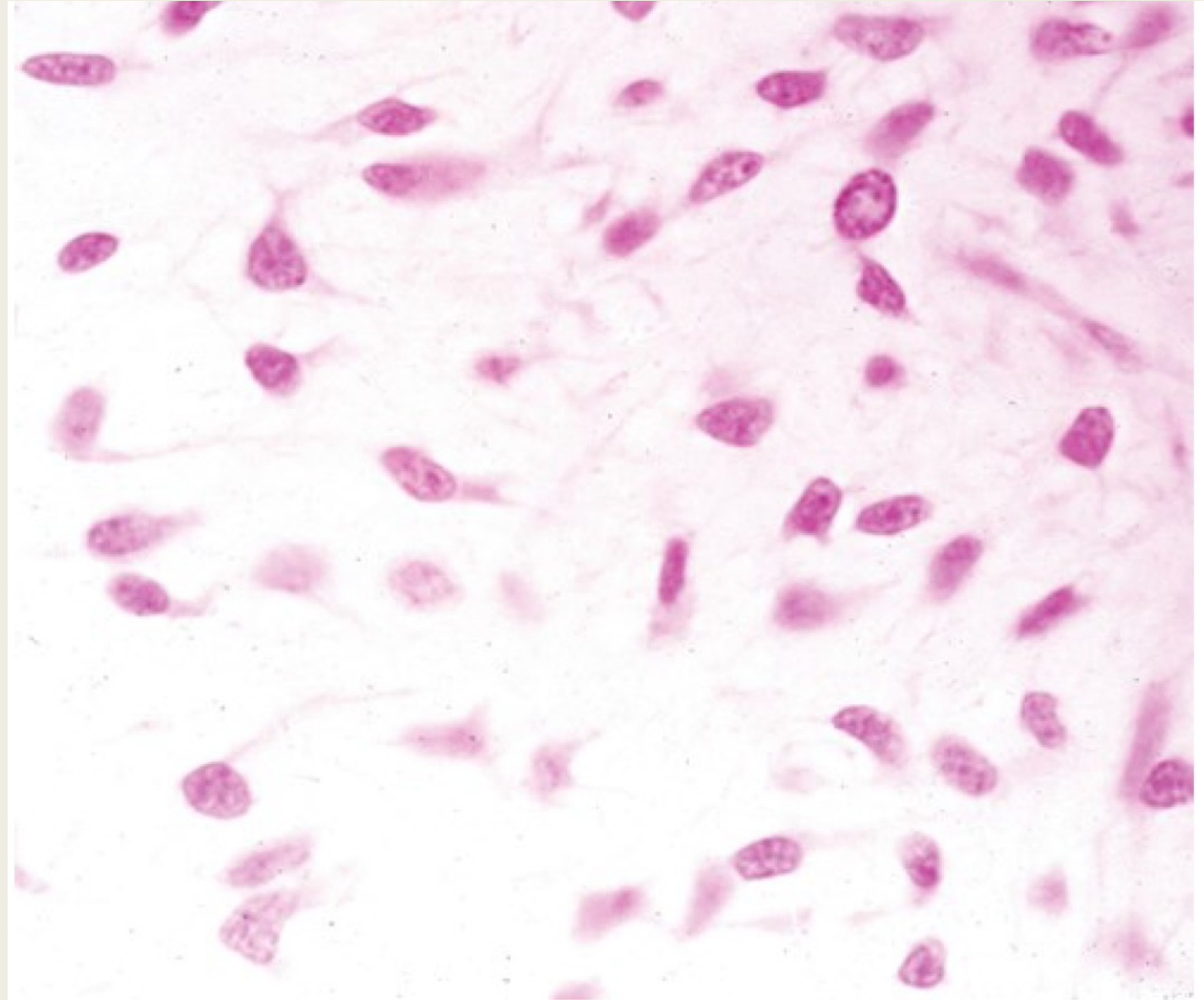
Originates from the mesoderm (Except some parts of the head and neck).

Composed of cells (fixed and wandering), fibres and ground substance.

Variable vascularity.

Variable regenerative power.

# Mesenchyme



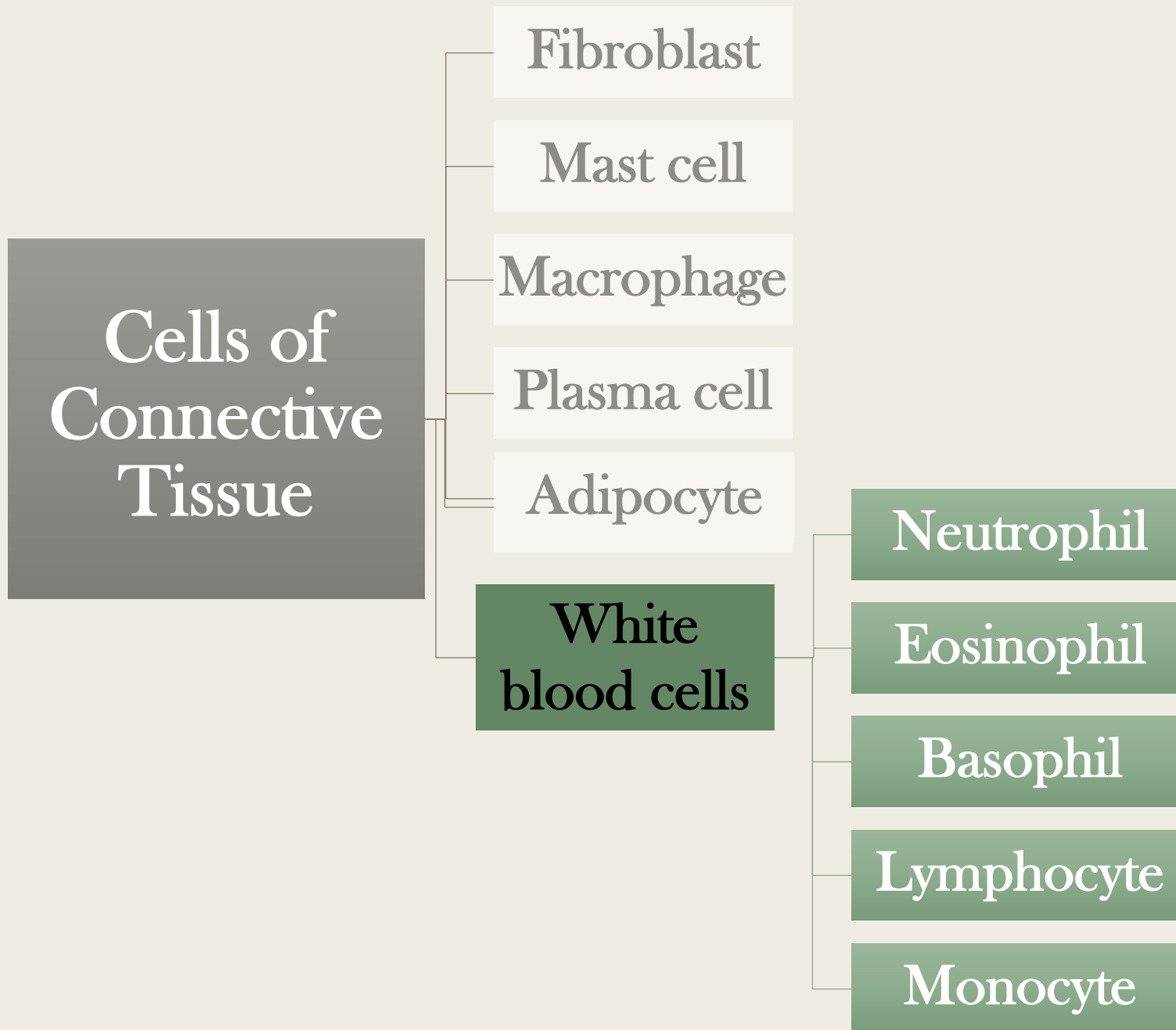
# Components

- Cells
- Fibers
- Ground substance

# Functions

1. Structural framework for body.
2. Transportation of fluids and dissolved substances.
3. Protection of delicate organs.
4. Supports, surrounds, and connects other tissues.
5. Storage of energy in the form of lipids.
6. Defend the body against microorganisms.

# **Cellular Components of connective tissue**





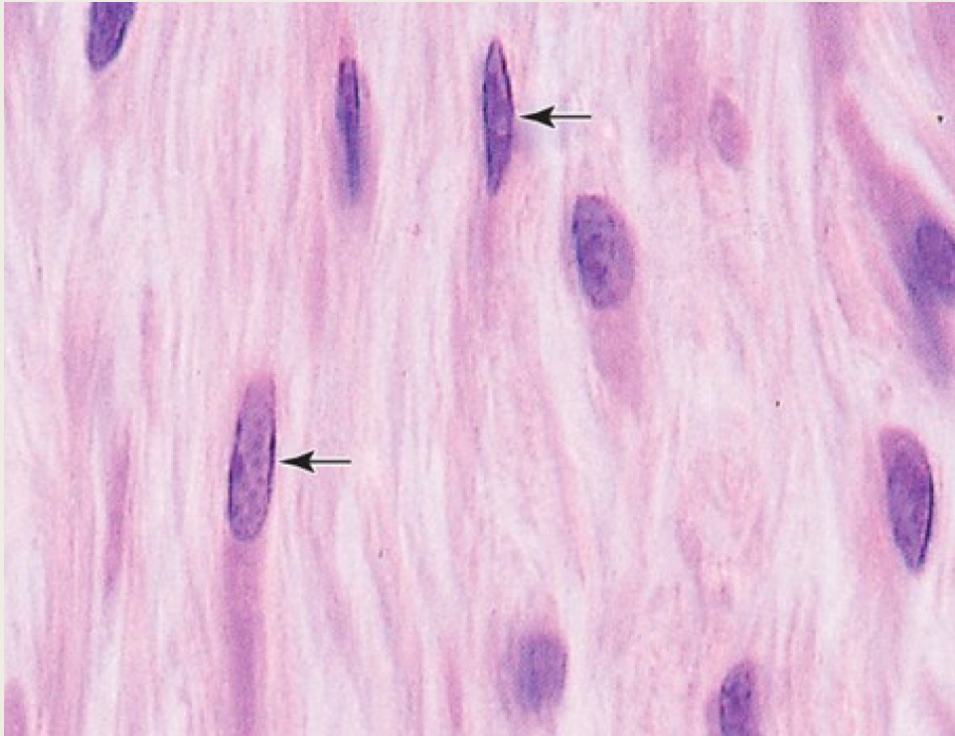
- |                                |                      |               |                     |
|--------------------------------|----------------------|---------------|---------------------|
| 1. Fibroblast                  | 2. Plasma cell       | 3. Adipocyte  | 4. large lymphocyte |
| 5. Macrophage                  | 6. Fibrocyte         | 7. Eosinophil | 8. Neutrophil       |
| 9. Cell with pigment granulaes | 10. Small lymphocyte |               |                     |
| 11. Mast cell                  |                      |               |                     |



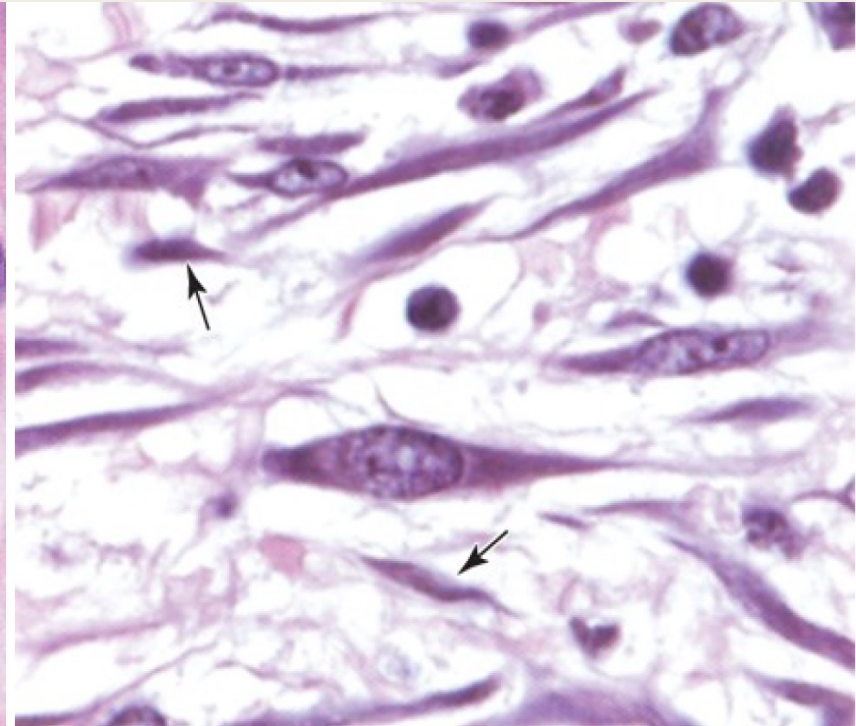
# Connective tissue cells

Cell Type	Major Product or Activity
Fibroblasts (fibrocytes)	Extracellular fibers and ground substance
Plasma cells	Antibodies
Lymphocytes (several types)	Various immune/defense functions
Eosinophilic leukocytes	Modulate allergic/vasoactive reactions and defense against parasites
Neutrophilic leukocytes	Phagocytosis of bacteria
Macrophages	Phagocytosis of ECM components and debris; antigen processing and presentation to immune cells; secretion of growth factors, cytokines, and other agents
Mast cells and basophilic leukocytes	Pharmacologically active molecules (eg, histamine)
Adipocytes	Storage of neutral fats

# Fibroblast



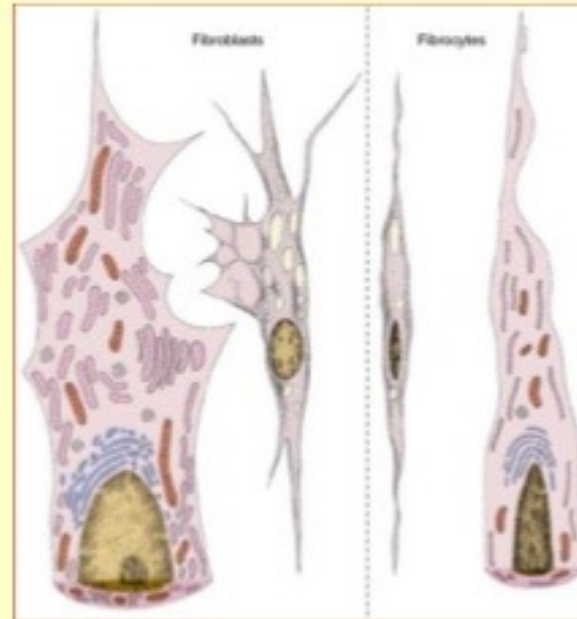
# Fibrocyte



## Fibroblasts \_ Fibrocytes

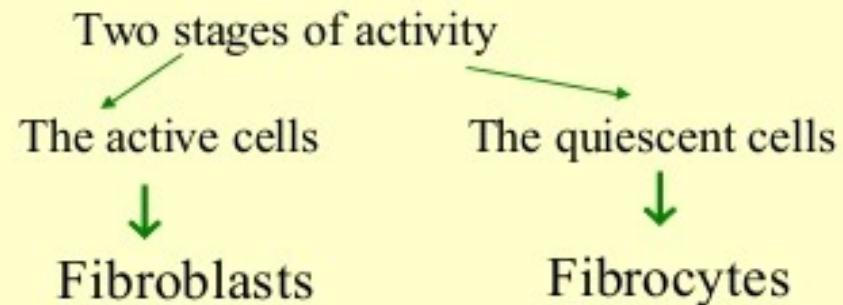
### ✓ Fibroblasts

- the most common cells in connective tissue
- cells responsible for the synthesis of extracellular matrix components
- an abundant and irregularly branched cytoplasm
- ovoid, large and pale staining nucleus with nucleolus
- rich in RER and well developed Golgi complex
- produce the growth factors → influence growth and cells differentiation
- proliferate when the additional fibroblasts are required



### ✓ Fibrocytes

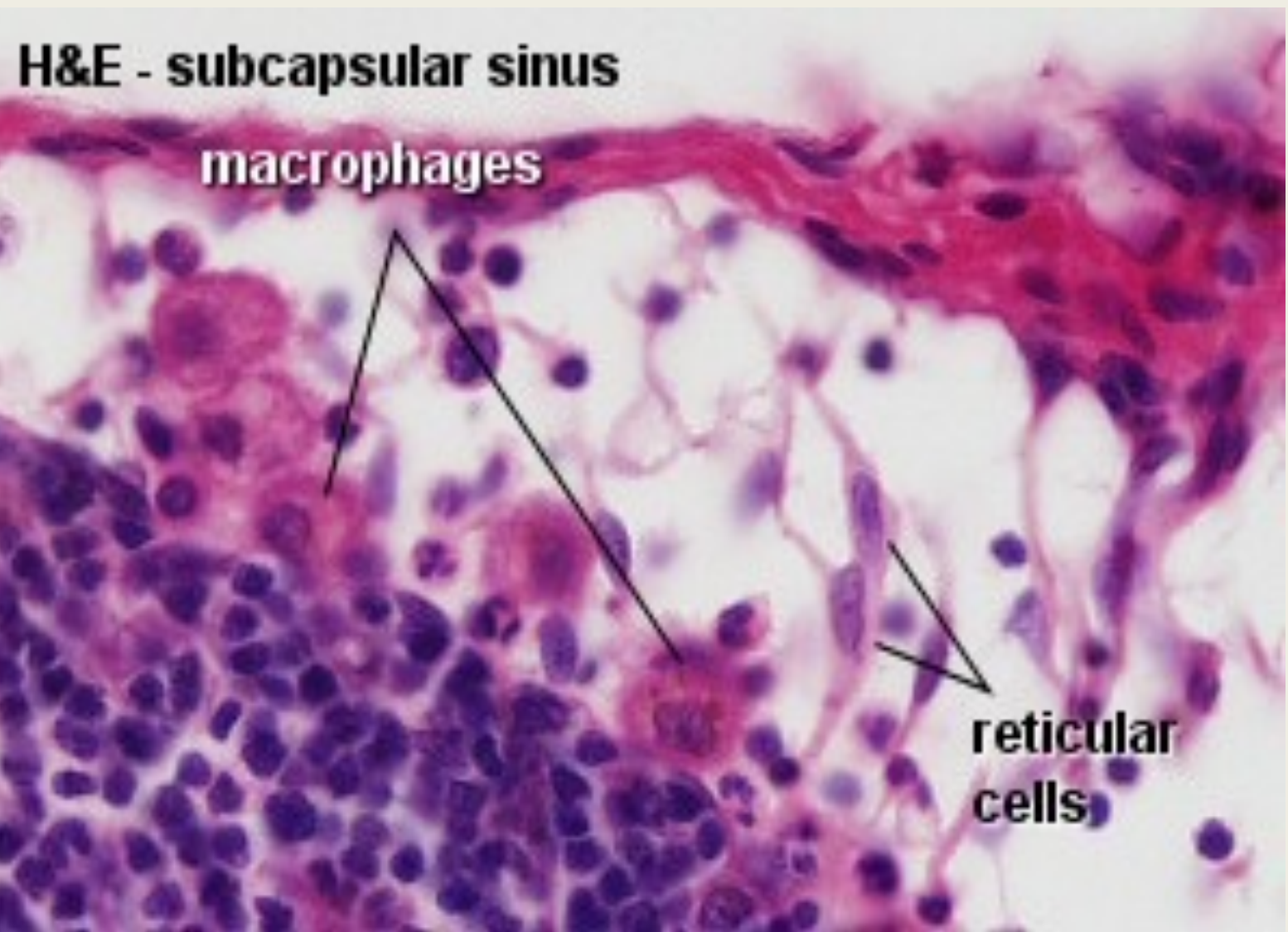
- smaller than fibroblasts
- fewer processes
- smaller, darker, elongated nucleus
- small amount of RER



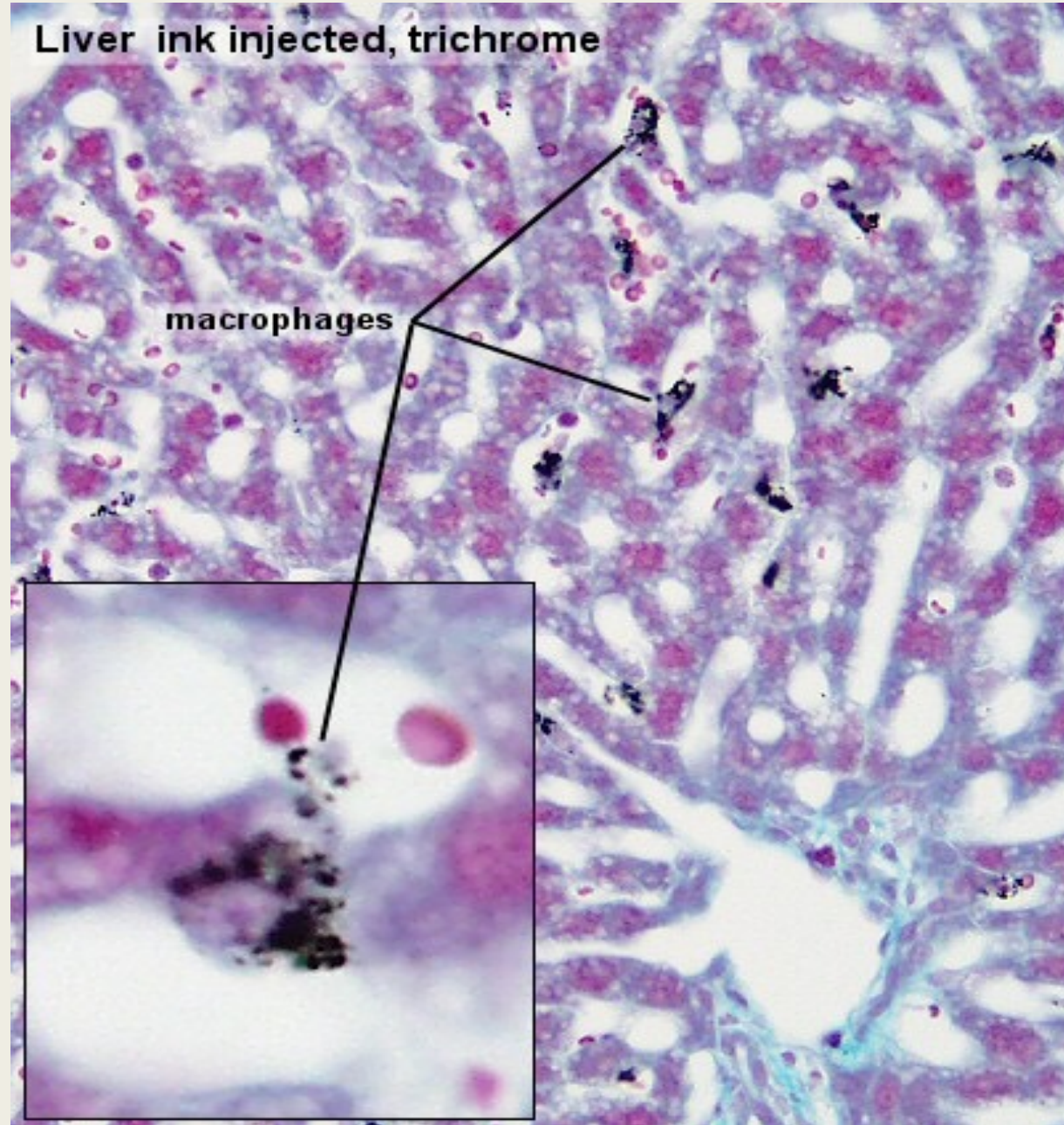
**Macrophage**

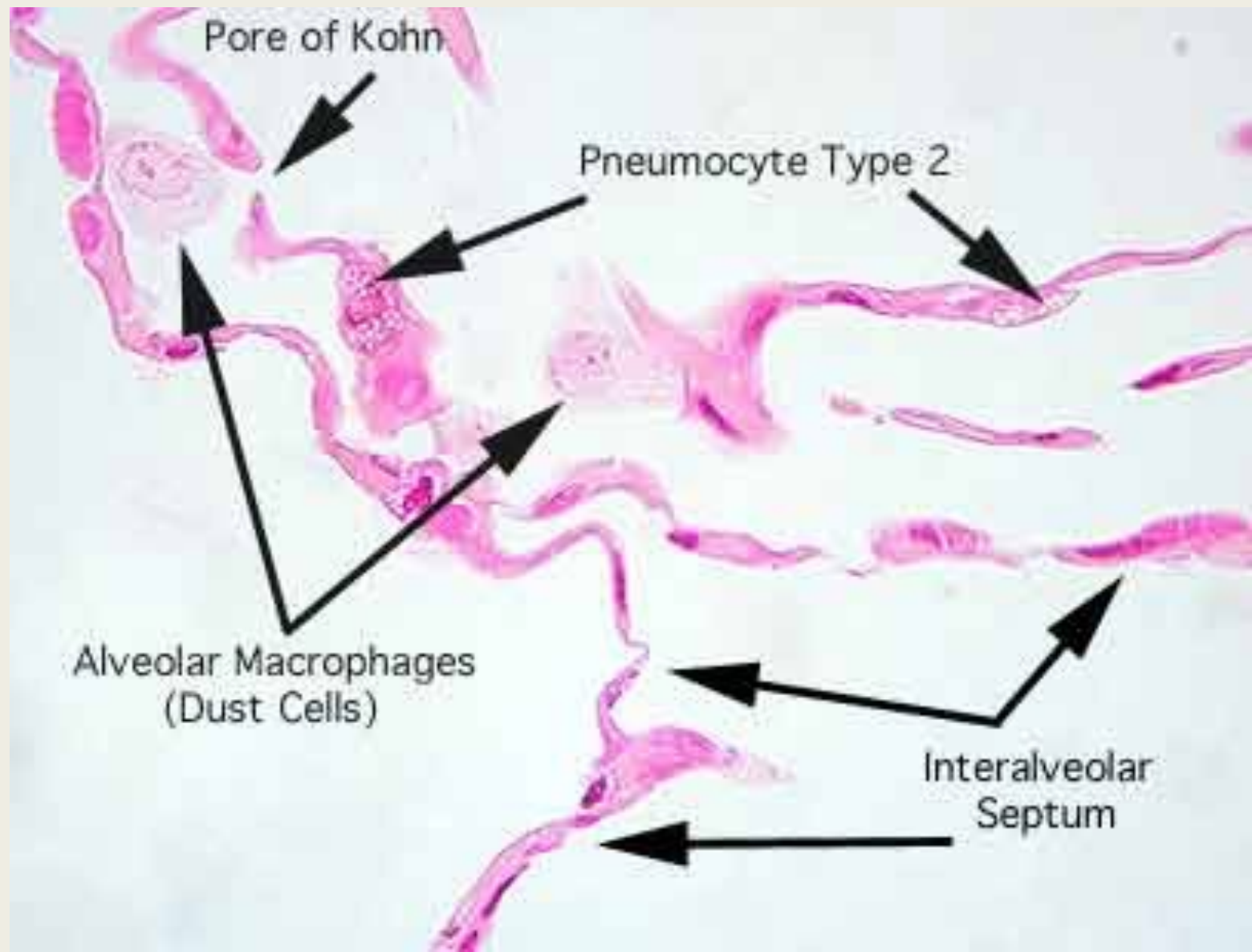
# Mononuclear phagocyte system

Cell Type	Major Location	Main Function
Monocyte	Blood	Precursor of macrophages
Macrophage	Connective tissue, lymphoid organs, lungs, bone marrow, pleural and peritoneal cavities	Production of cytokines, chemotactic factors, and several other molecules that participate in inflammation (defense), antigen processing, and presentation
Kupffer cell	Liver (perisinusoidal)	Same as macrophages
Microglial cell	Central nervous system	Same as macrophages
Langerhans cell	Epidermis of skin	Antigen processing and presentation
Dendritic cell	Lymph nodes, spleen	Antigen processing and presentation
Osteoclast (from fusion of several macrophages)	Bone	Localized digestion of bone matrix
Multinuclear giant cell (several fused macrophages)	In connective tissue under various pathological conditions	Segregation and digestion of foreign bodies



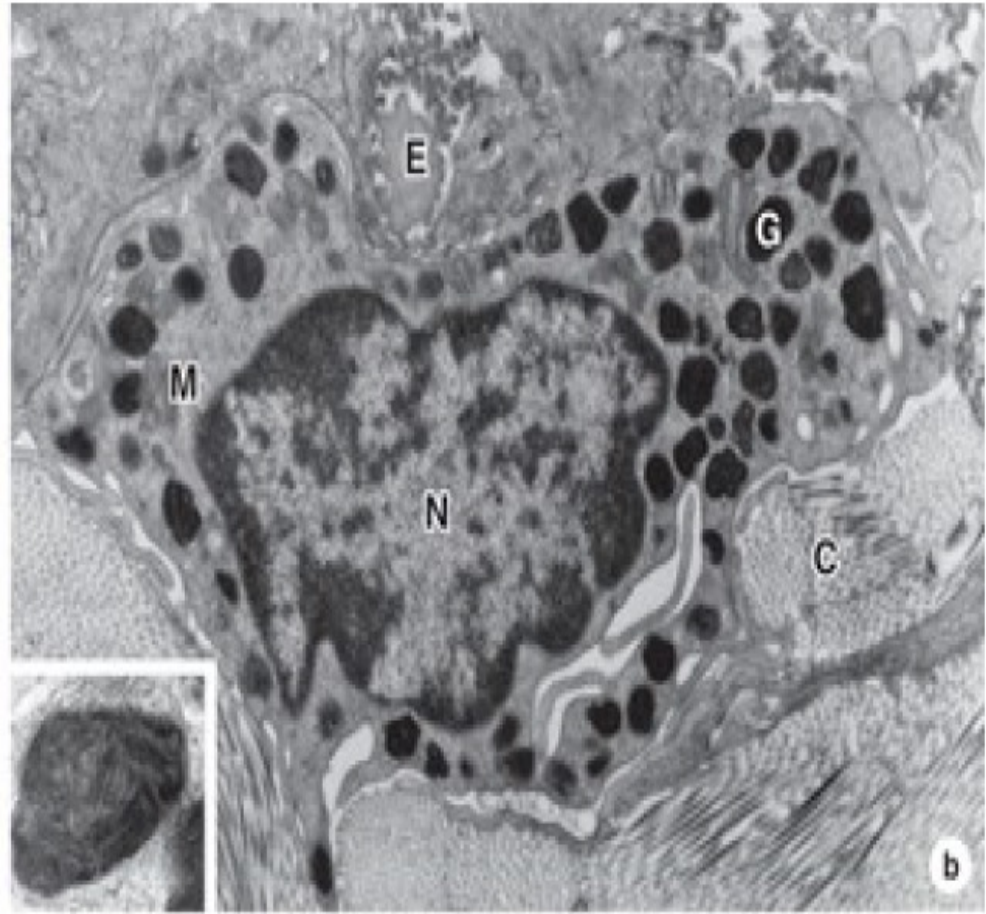
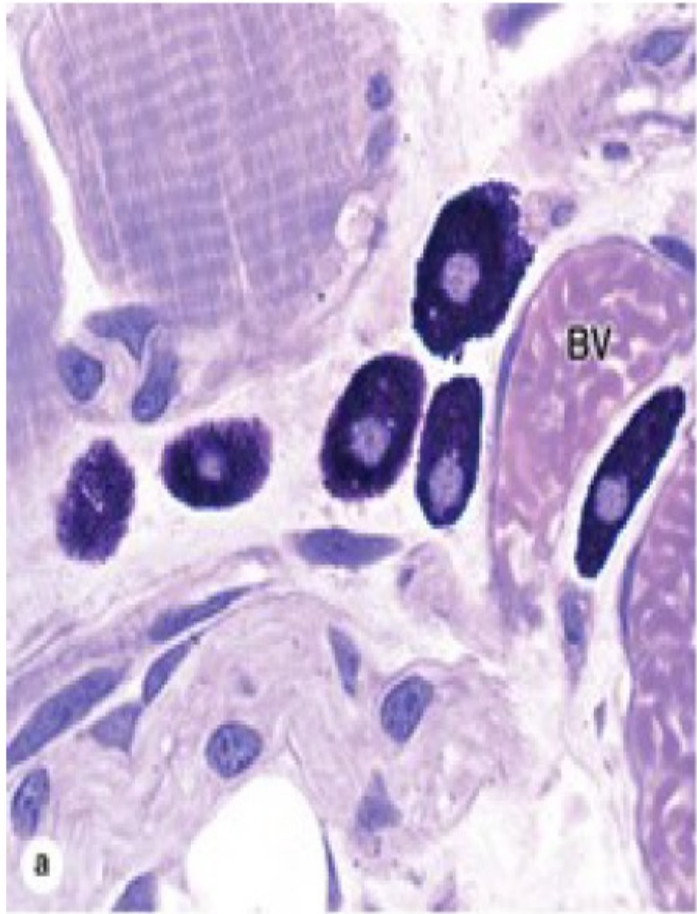
Liver ink injected, trichrome



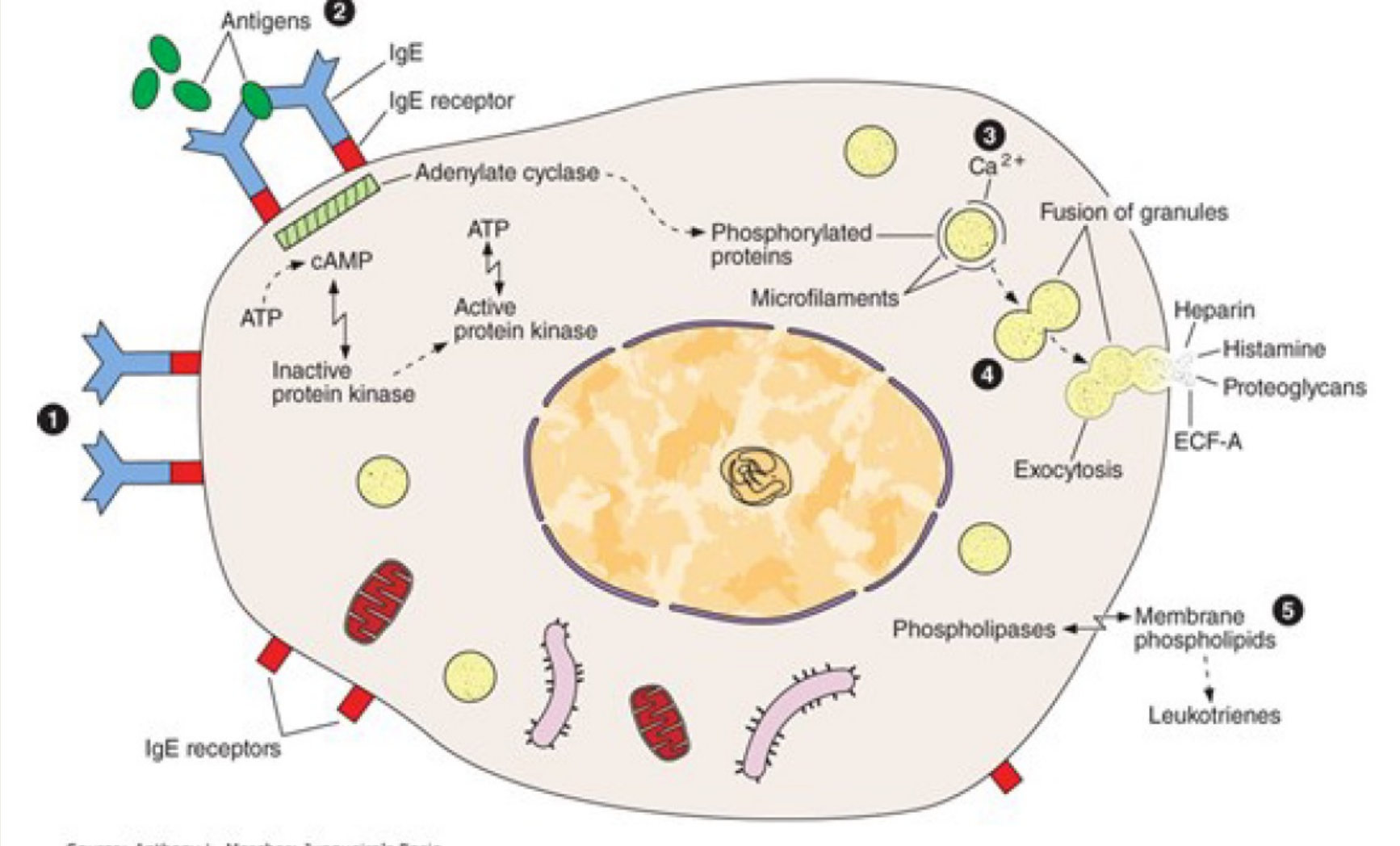




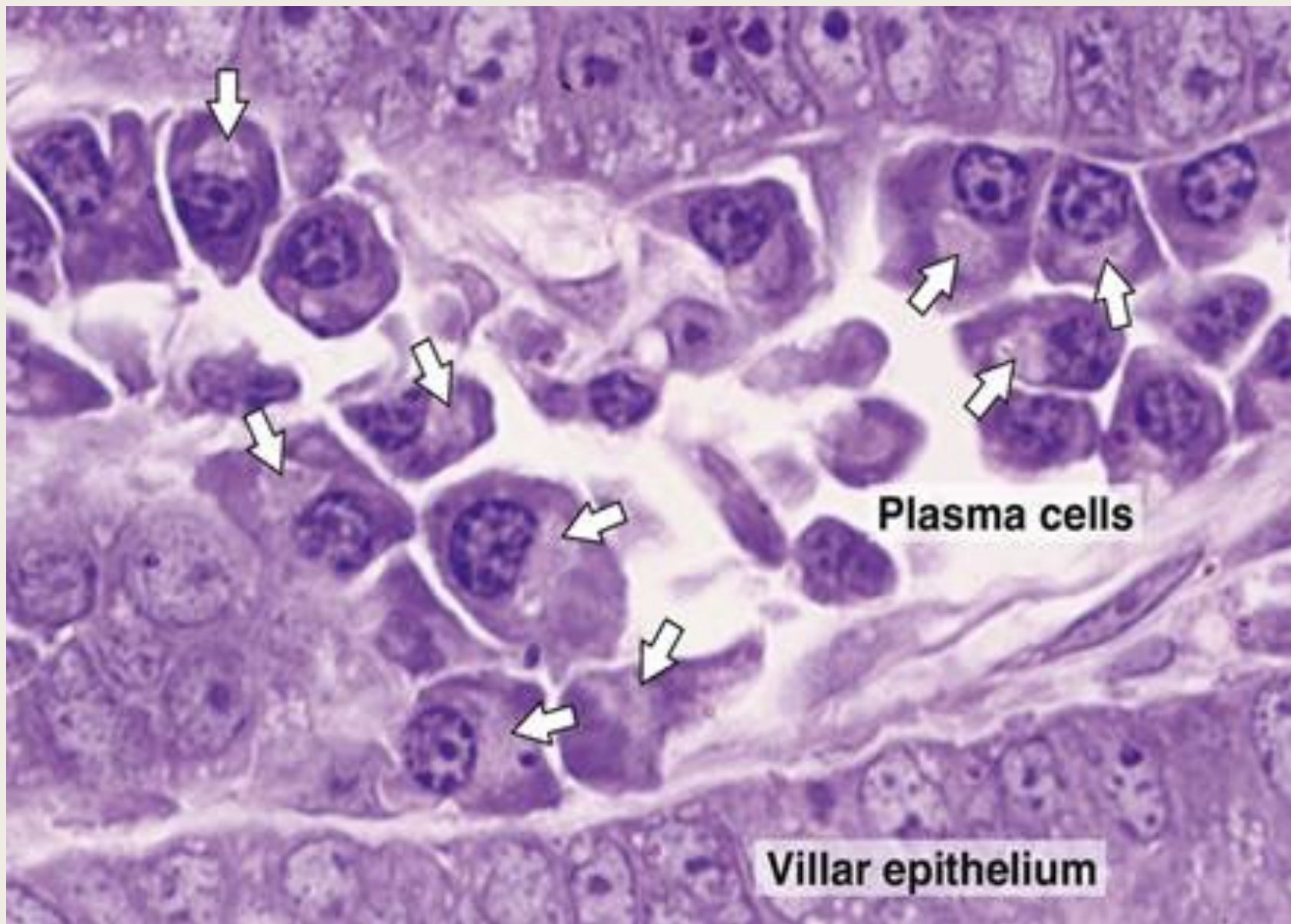
**Mast cell**

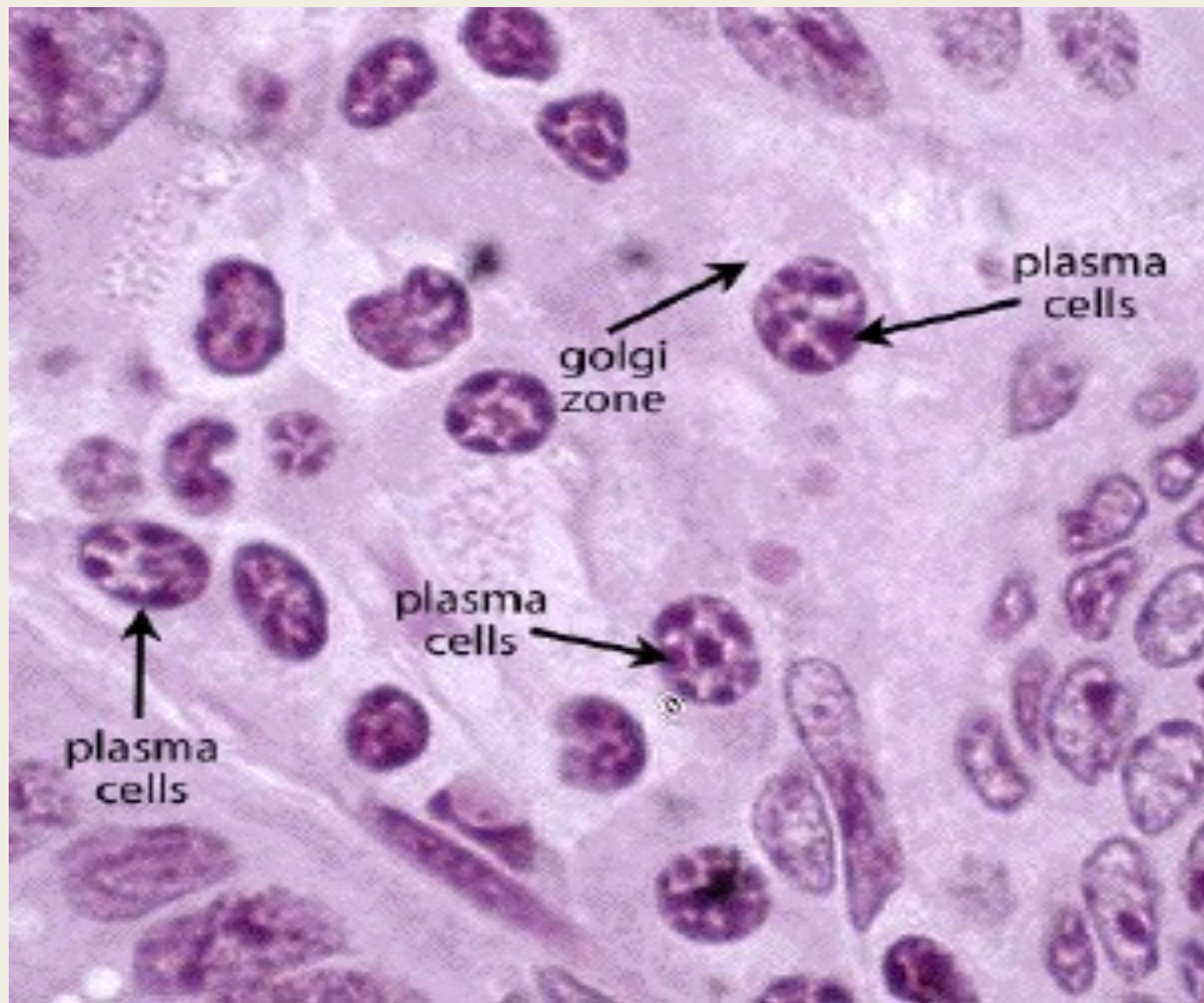


# Mast cells



**Plasma cell**





# Connective Tissue Fibers

## Collagen

Undulating course of longitudinally striated bundles, form meshwork of variable texture, stain pink-red in H&E. Nonextensile.

## Elastic

Forms sheets or lamina, Unstained in H & E. Reversibly extensible. Stains brown-black in Orcein, Resorcin Fuchsin, and Verhoeff-van Gieson's

## Reticular

Delicate network, Unstained in H & E. Reversibly extensible. PAS +ve, stains black in AgNO<sub>3</sub> (Argyrophilic).