Connective Tissues

- Functions of connective tissue
- Components : Fibres and Cells
- Classification of connective tissue

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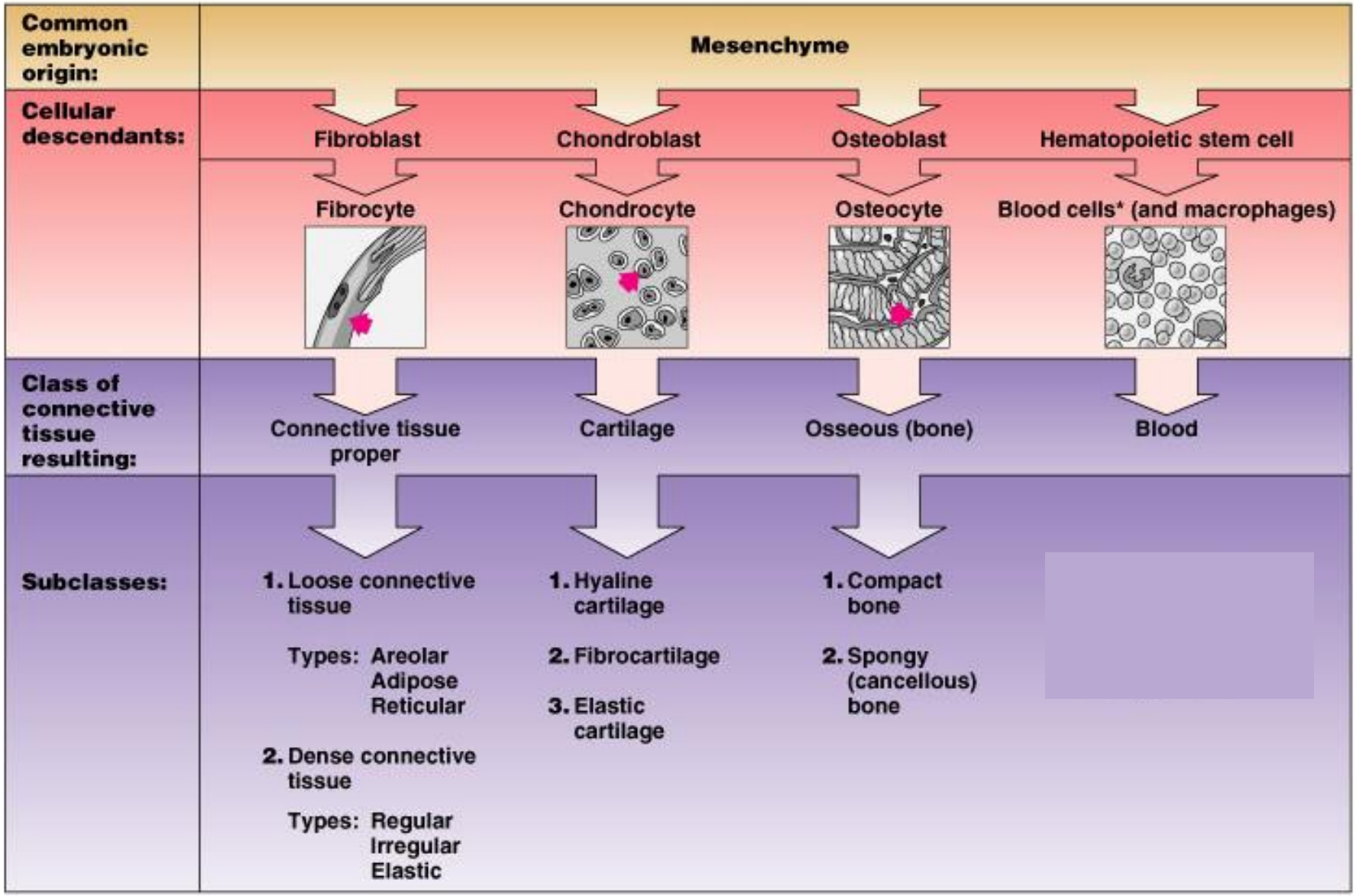
Four basic types of tissue

- Epithelium
- **Connective tissue**
  - **Connective tissue proper**
  - **Cartilage**
  - **Bone**
  - **Blood**
- Muscle tissue
- Nervous tissue

Classes of Connective Tissue



Connective Tissue

Function:

- **to protect,**
- **support**
- **bind**
  - **Bones, ligaments, tendons**
  - **Areolar cushions; adipose insulates and is food source**
  - **Blood cells replenished; body tissues repaired**
- **extracellular matrix**

Basic functions of connective tissue

- Support and binding
- Holding body fluids
- Defense : macrophages, plasma cells, mast cells, WBCs
- Storing nutrients as fat

Extracellular Matrix

- Nonliving
- By cells and then extruded
- strength

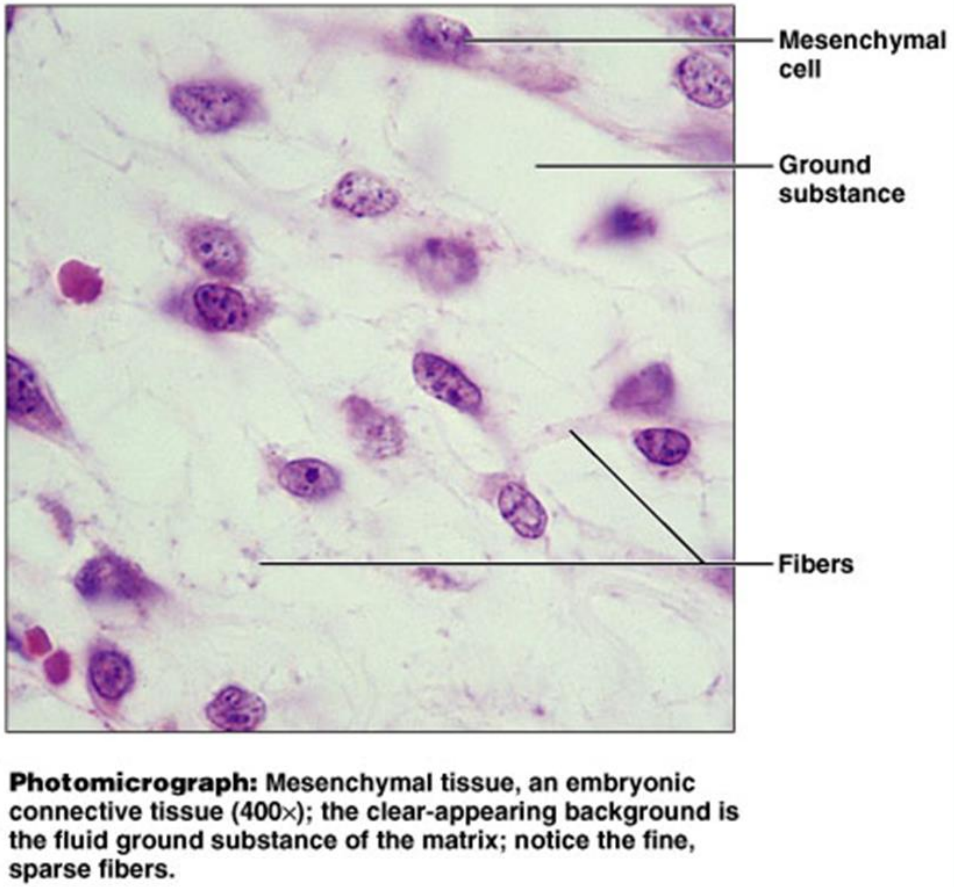
- **Two components**
  1. **Ground substance**
     - **Connective tissue fluid, adhesion proteins, proteoglycans**
     - **Liquid, semisolid, gel-like or very hard**
  2. **Fibers: collagen, elastic or reticular**

MESENCHYME

- Embryonic
- Gel-like ground substance :

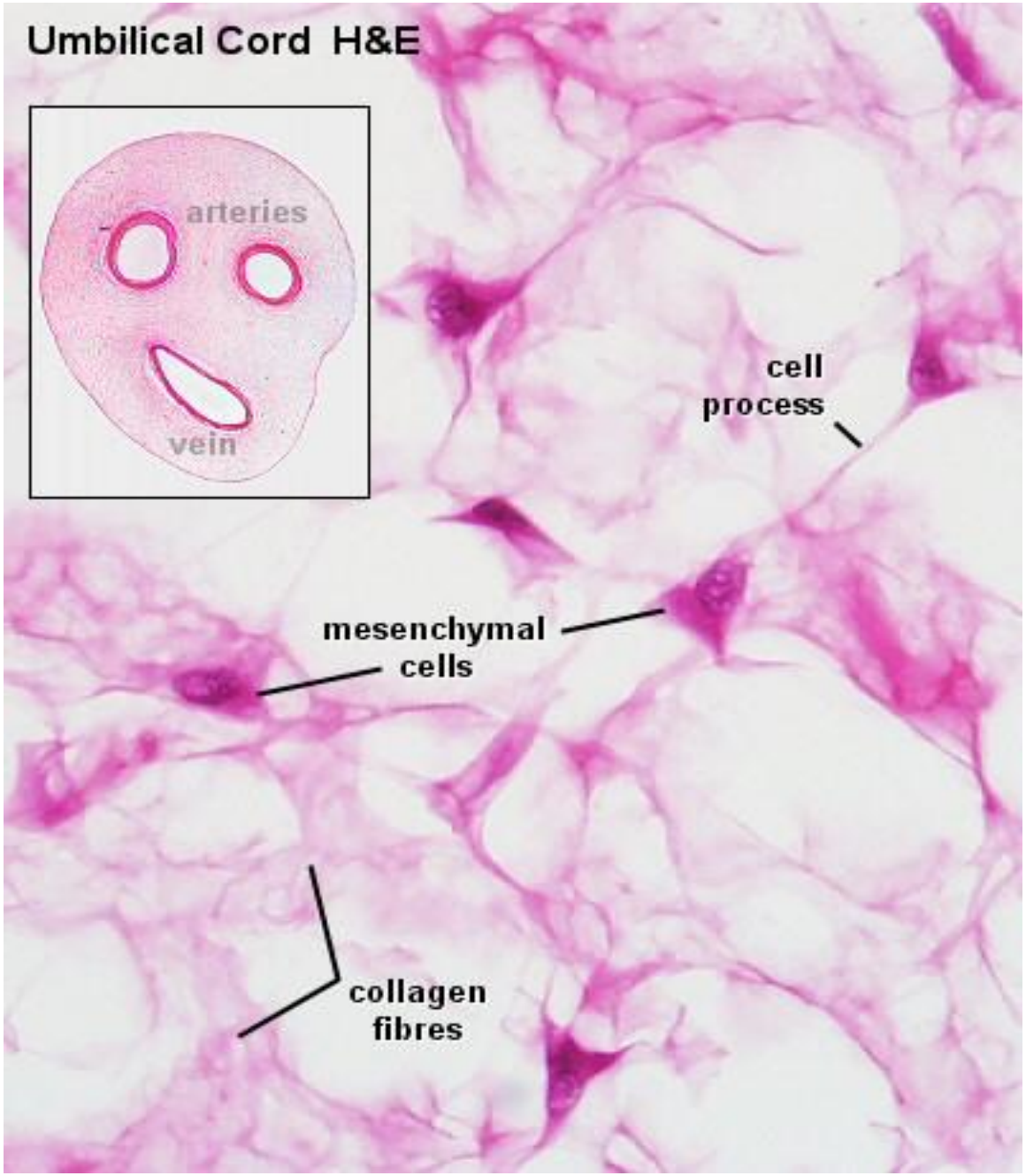
fibres and star shaped cells.

- Gives rise to all other connective tissue types.



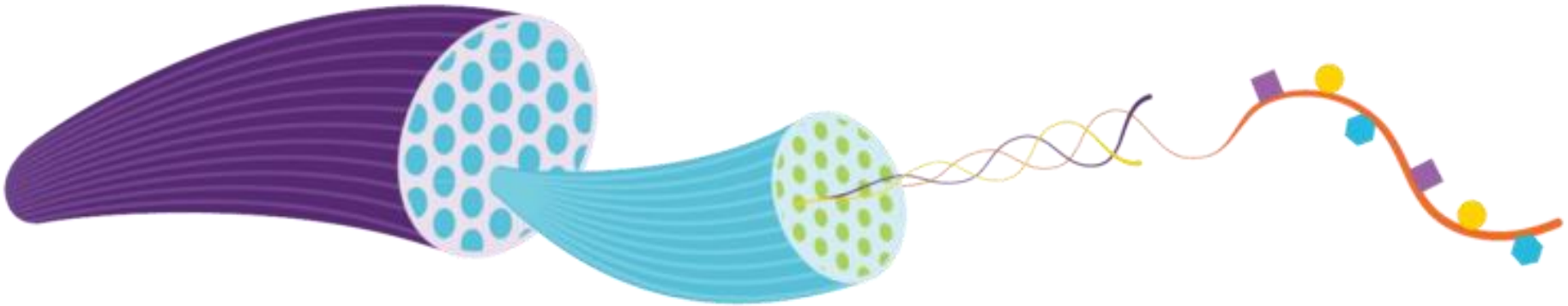
Photomicrograph: Mesenchymal tissue, an embryonic connective tissue (400×); the clear-appearing background is the fluid ground substance of the matrix; notice the fine, sparse fibers.

- Umbilical cord



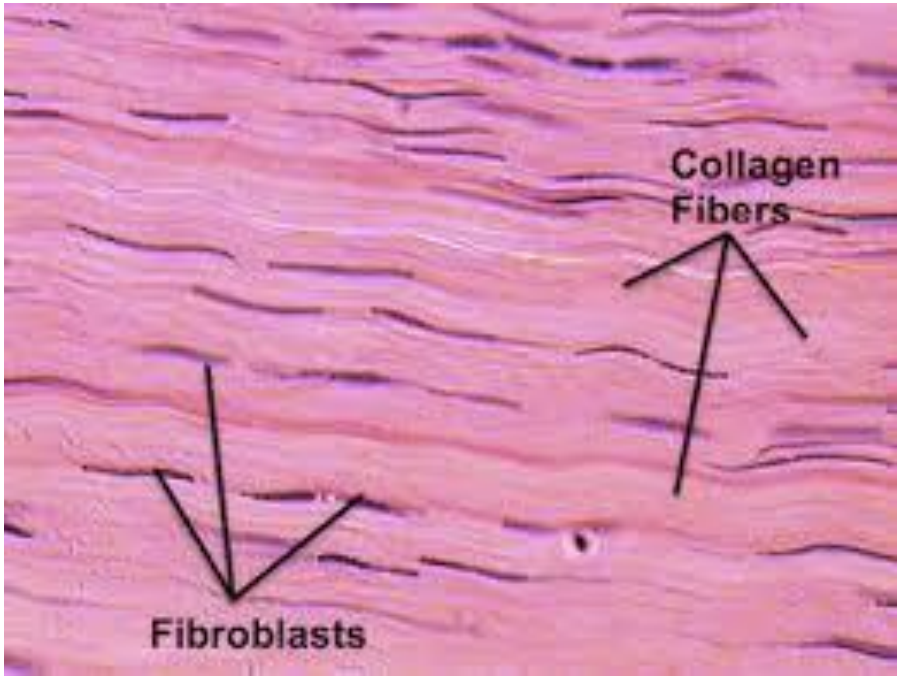
Connective tissue fibres

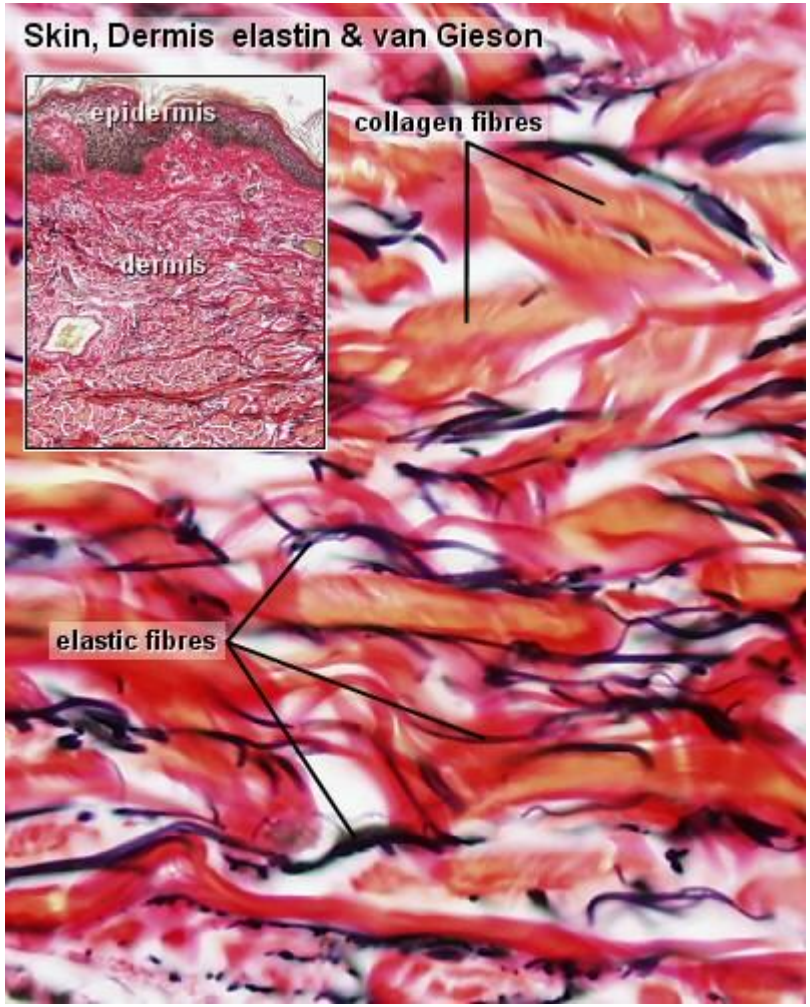
- **Collagen**
- dominant fibre type
- add strength to the connective tissue.
- thickness ~ 1 to 10 µm



Collagen fibres

- H&E





Collagen

- Types I-XXV based on aminoacids
- Commonest types:

a) I- dermis, tendon, ligaments, bone

b) II- hyaline cartilage, elastic cartilage

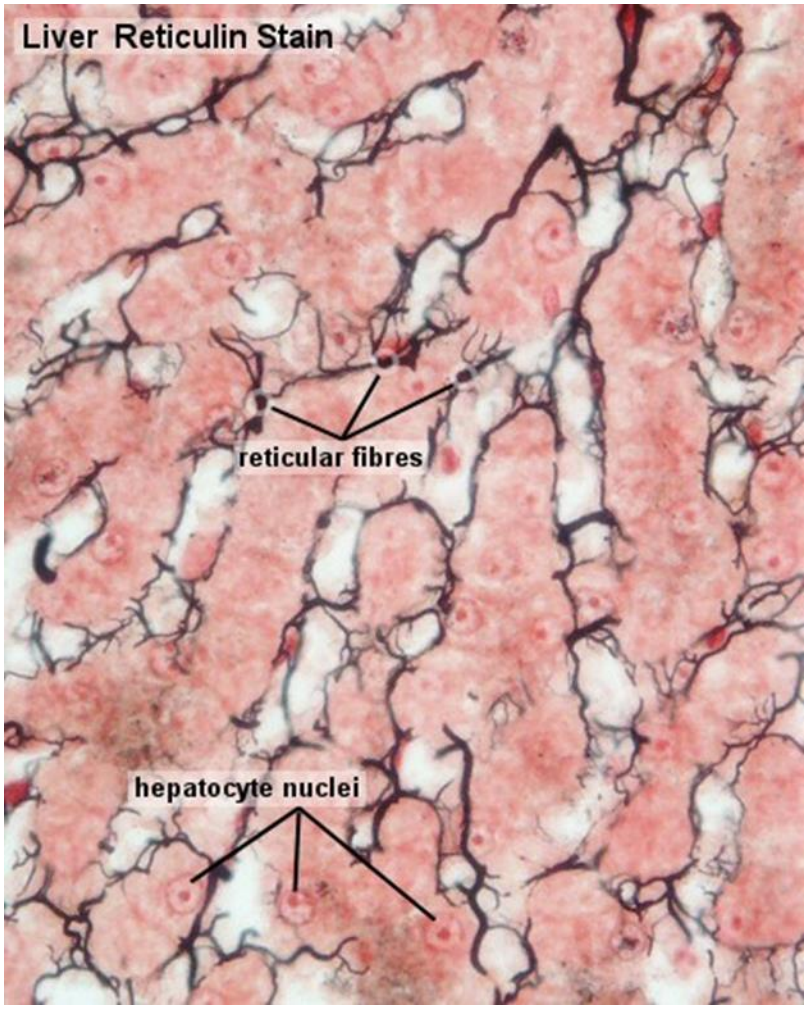
c) III- reticular fibres- lymph node, spleen, bone marrow

d) IV- basal lamina

e) V- Foetal membranes, blood vessels

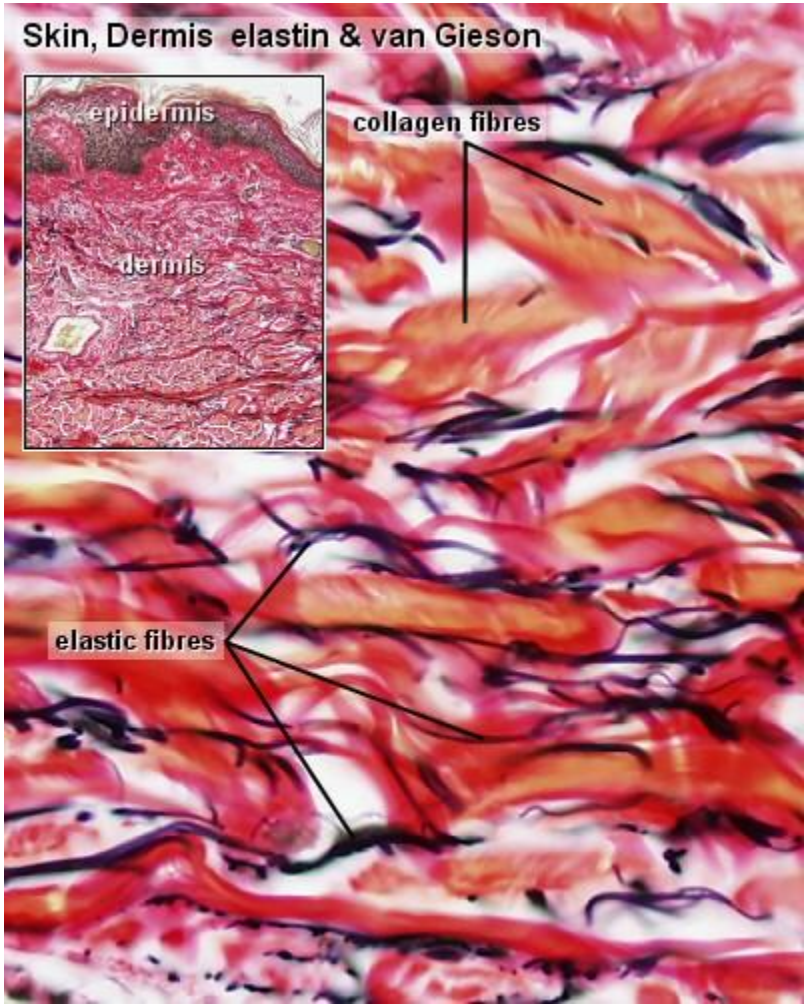
Reticular fibres

- delicate network - branching fibres
- larger than fibrocyte
- nuclei - typically large - lightly stained with H&E



Elastic fibres

- Run singly, branch and anastomose.
- Elastin, Fibrillin, Desmosin
- Fine, dark violet and gently undulating fibres in the tissue.

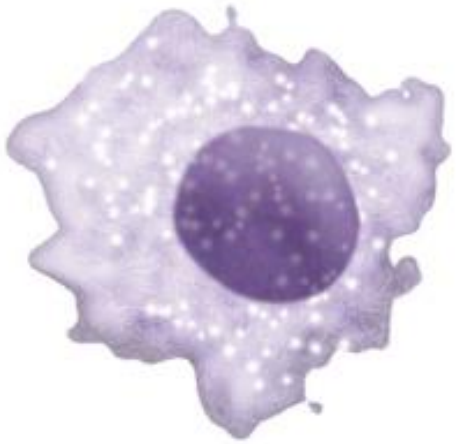


Connective tissue cells

- Fibroblasts—Fibrocytes

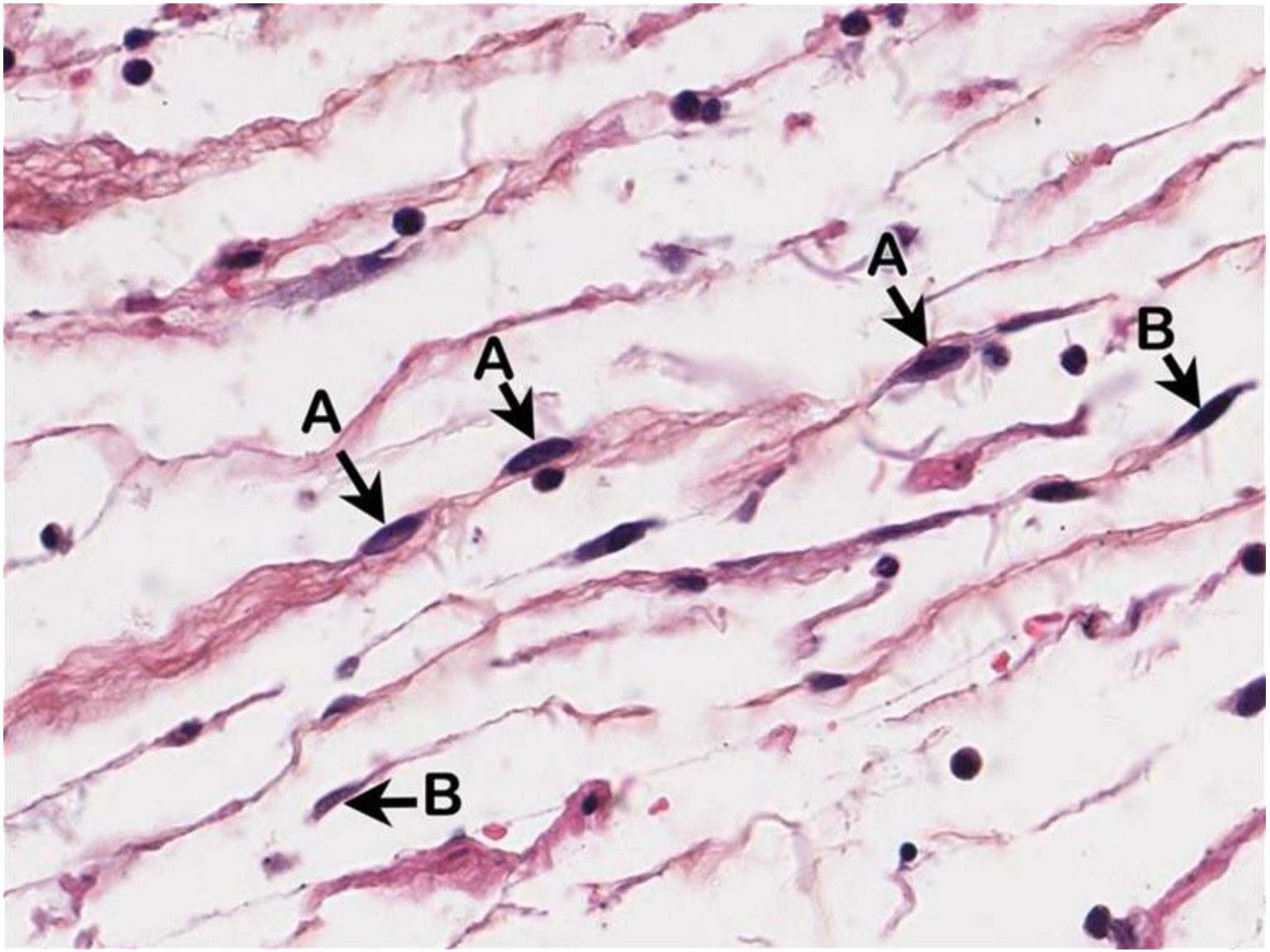
- Adipocytes

- Macrophages/ histiocytes

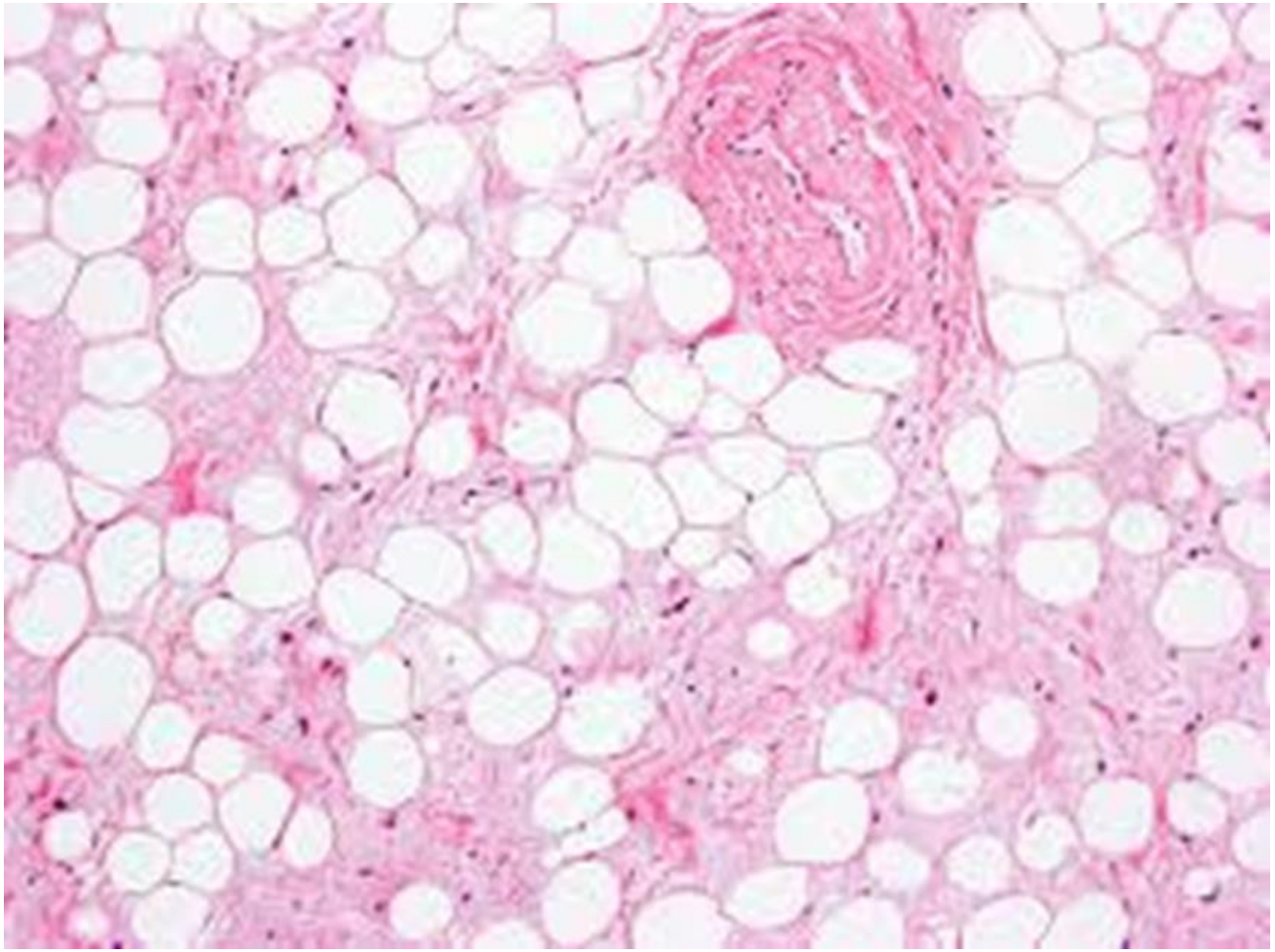


Macrophage

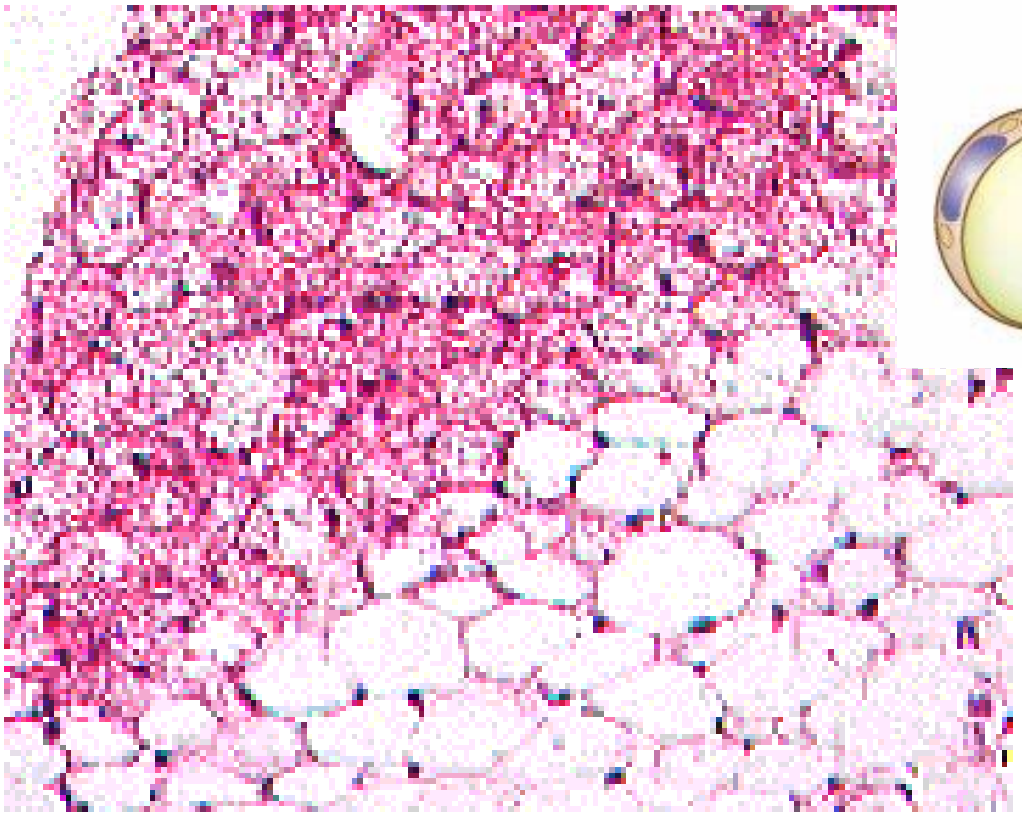
Fibroblast

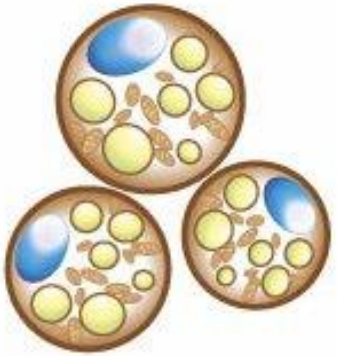


Adipose tissue

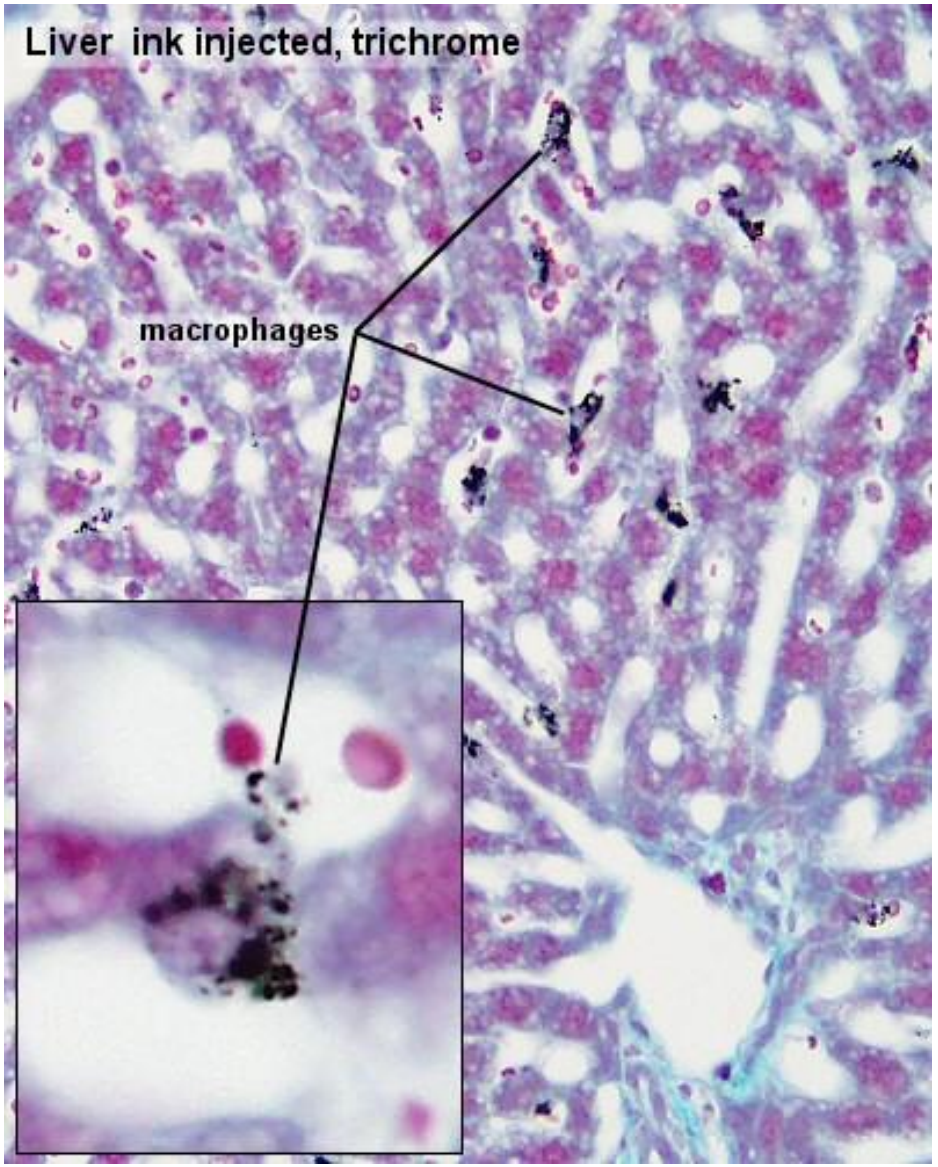


Brown adipose vs White adipose

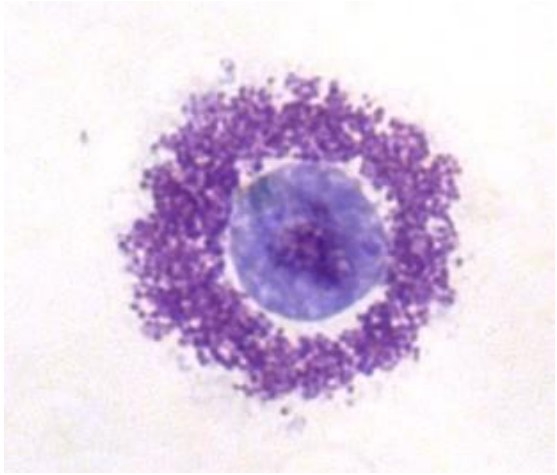




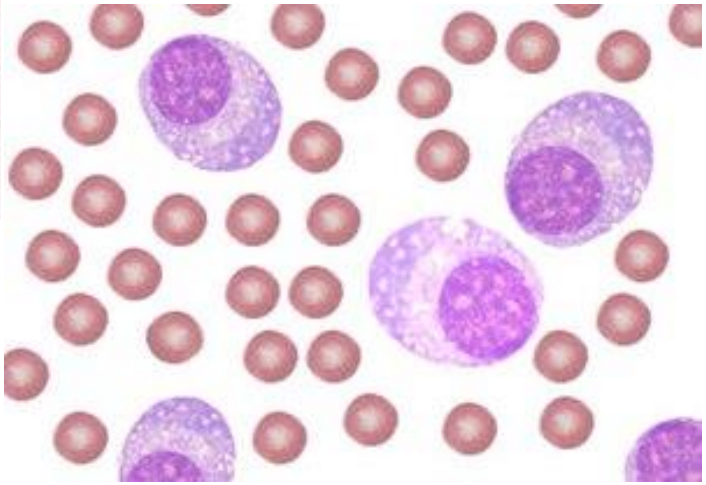
Macrophage



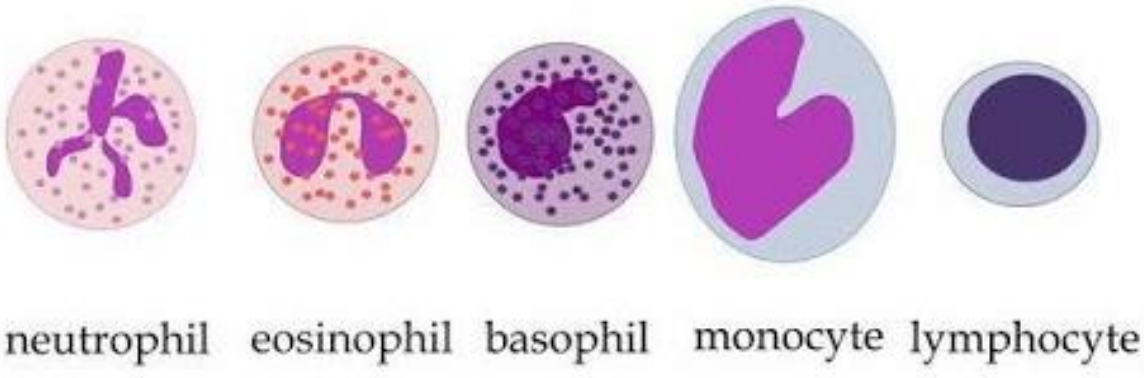
- Mast cells



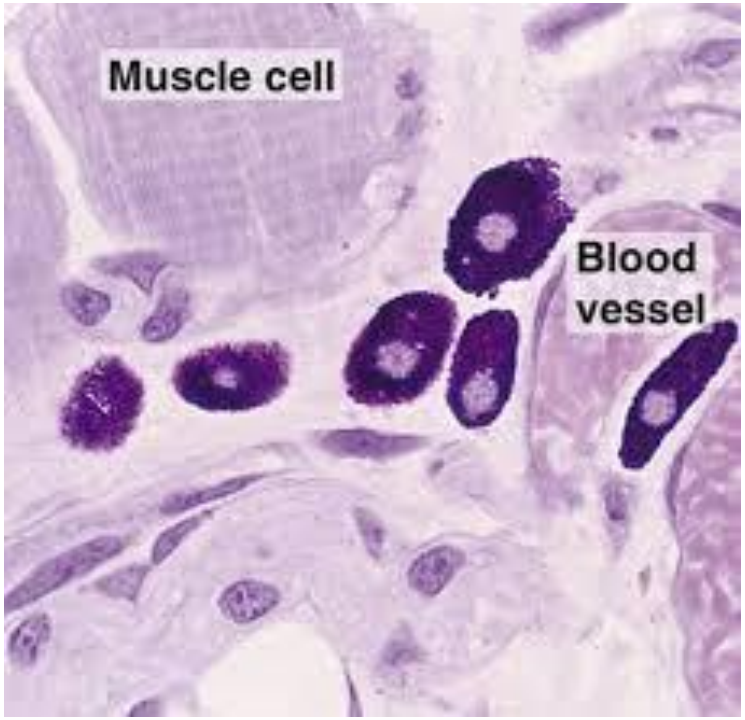
- Plasma cells



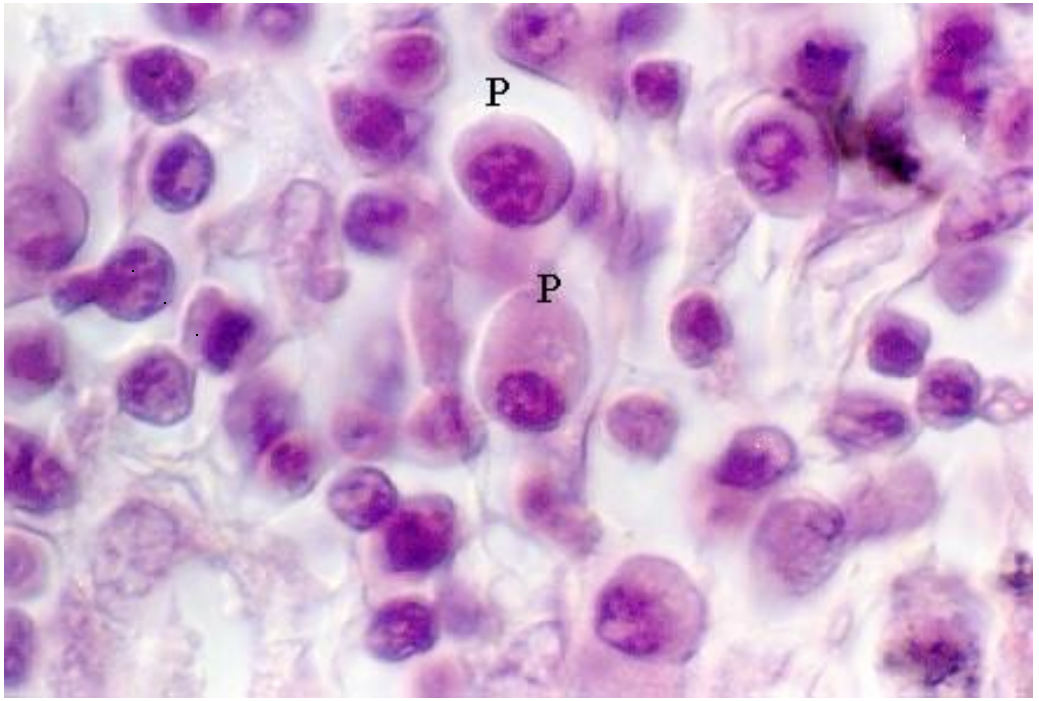
- Leukocytes



Mast cell



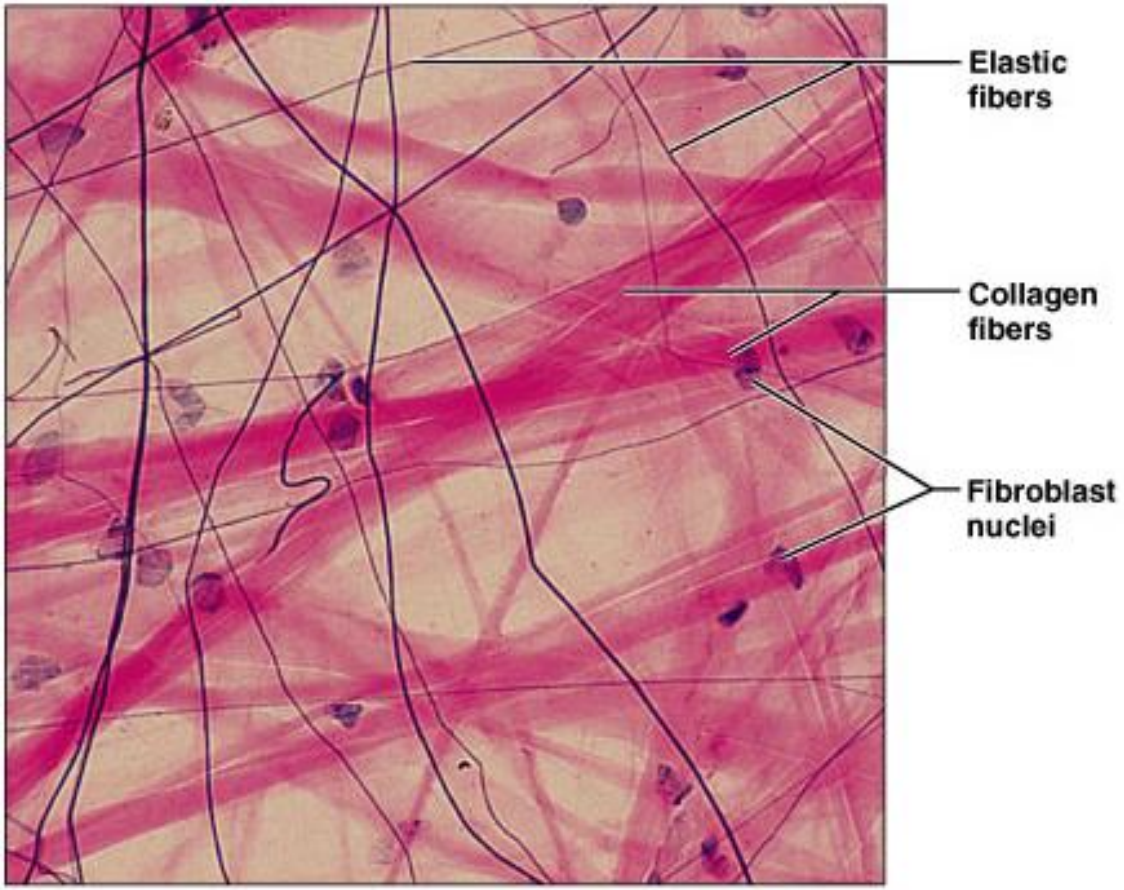
Plasma cell



Classification of connective tissue

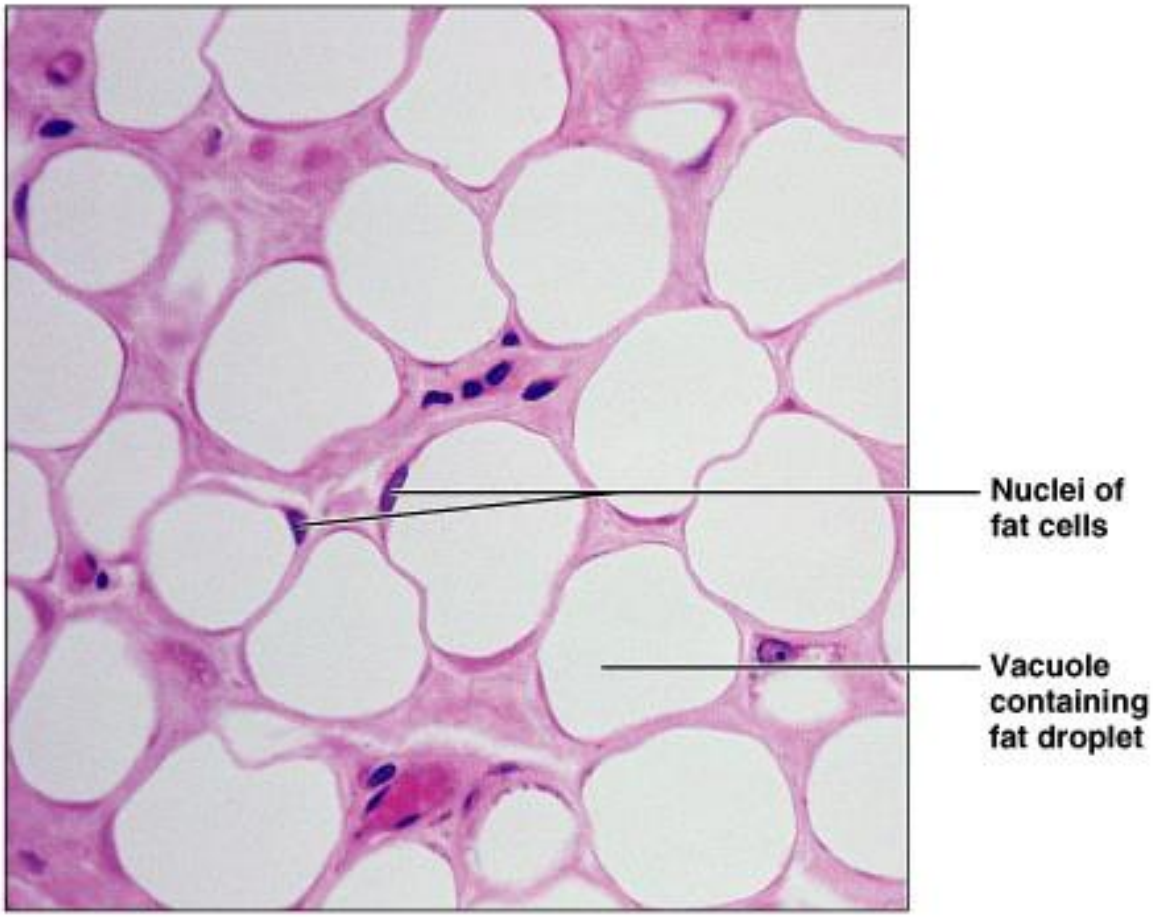
- Loose Connective tissue
  - Areolar
  - Adipose
  - Reticular
- Dense connective tissue
  - Irregular
  - Regular
  - Elastic

Loose connective tissue, areolar



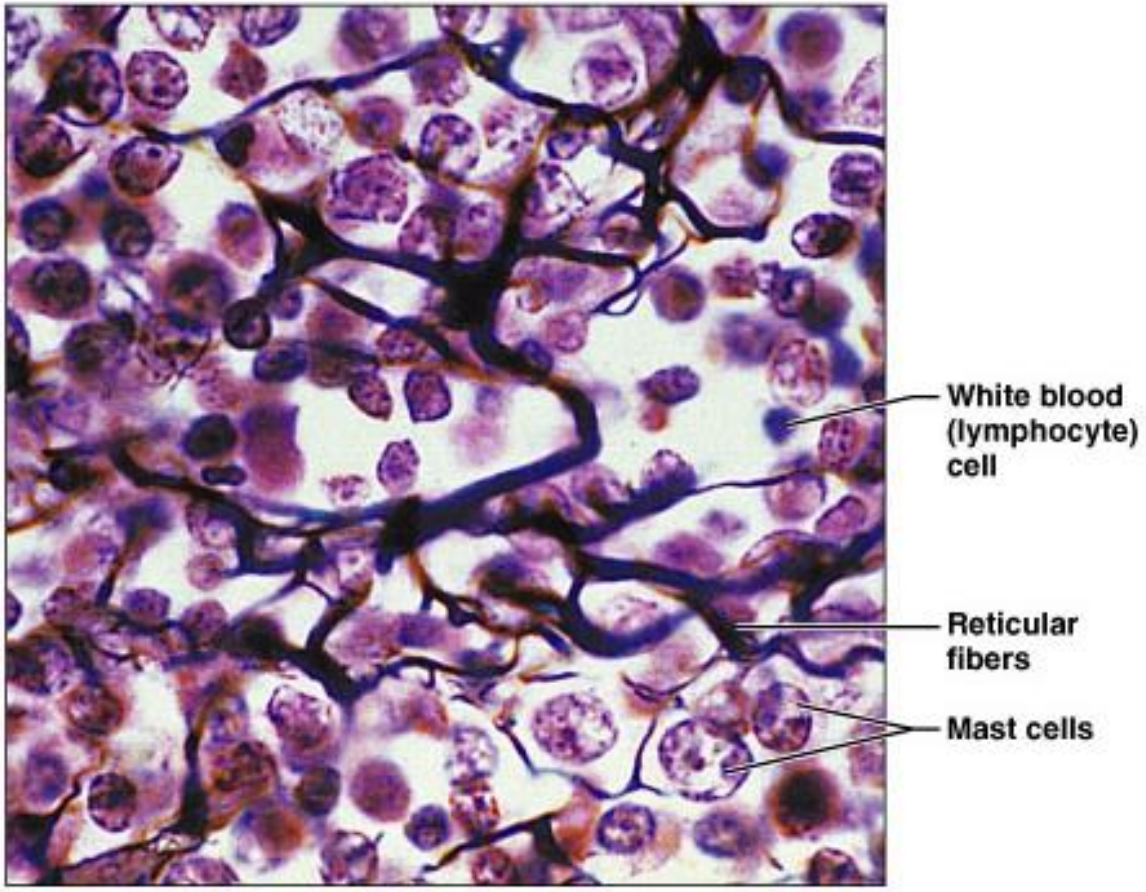
Photomicrograph: Areolar connective tissue, a soft packaging tissue of the body (400×).

Loose connective tissue, adipose



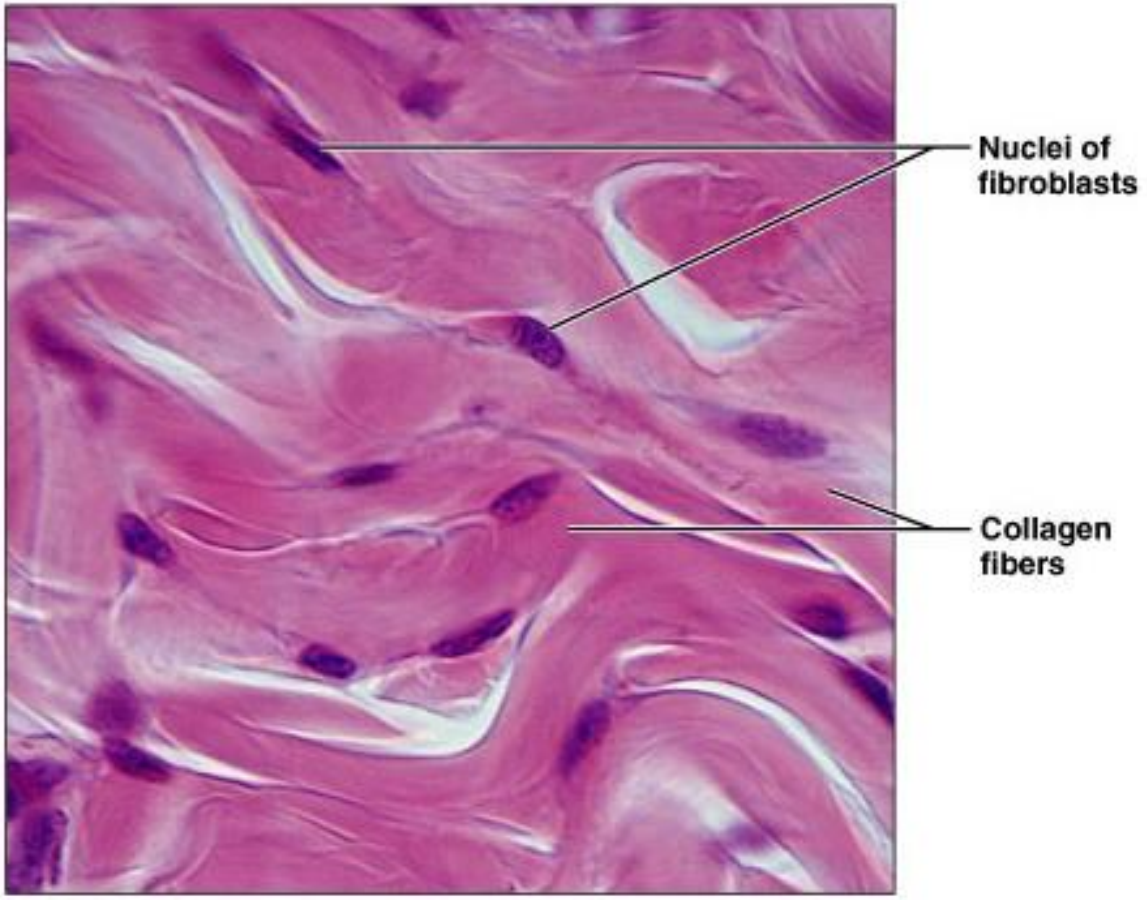
Photomicrograph: Adipose tissue from the subcutaneous layer under the skin (600×).

Loose connective tissue, reticular



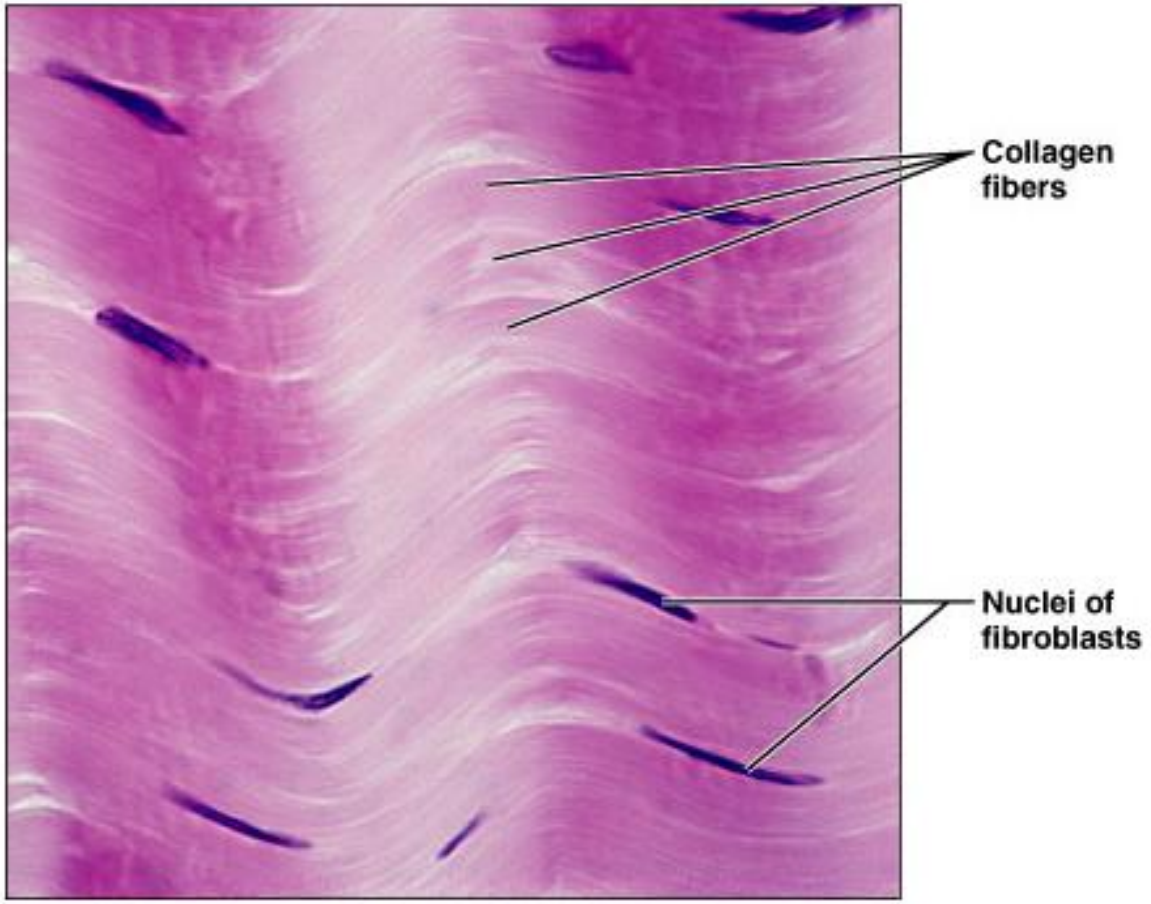
Photomicrograph: Dark-staining network of reticular connective tissue fibers forming the internal skeleton of the spleen (350×).

Dense connective tissue, irregular



Photomicrograph: Dense irregular connective tissue from the dermis of the skin (400×).

Dense connective tissue, regular



Photomicrograph: Dense regular connective tissue from a tendon (1000×).

IDENTIFY