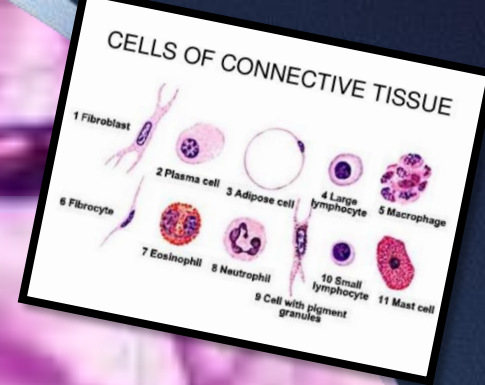
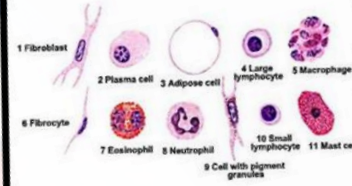


# CONNECTIVE TISSUE





## ■ General Features:

1. Contain three basic elements: cells, ground substance and fibers (Extracellular Matrix).
2. Matrix which may be fluid, semi-fluid, gelatinous, fibrous or calcified is usually secreted by the connective tissue cells
3. Do not usually occur on free surfaces.
4. Have a nerve supply.
5. Highly vascular.
6. Cells in connective tissue are derived from mesenchymal cells.

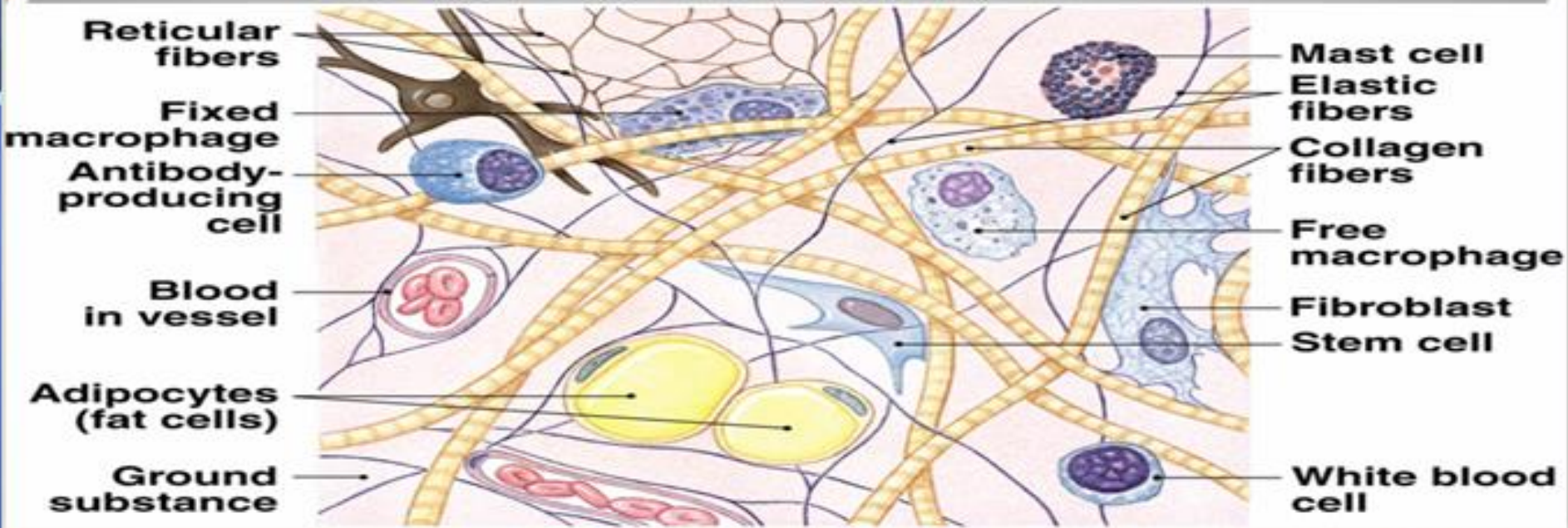


- **Composition**
  - Cells of connective tissues:

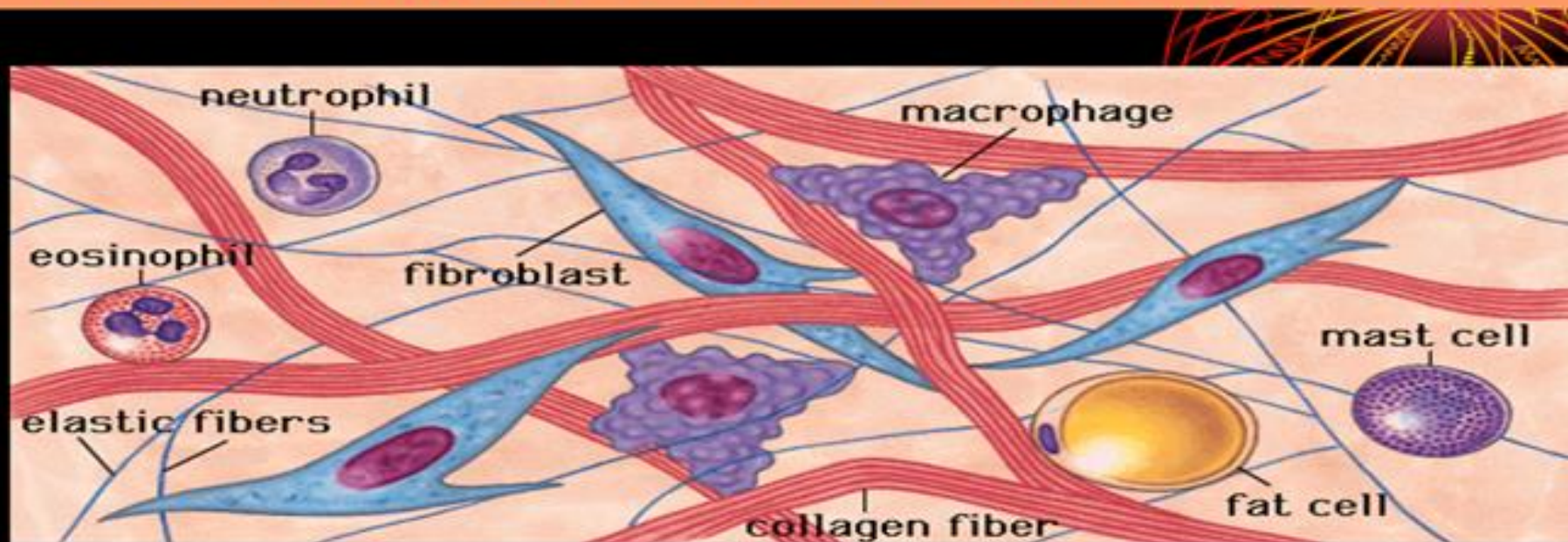
Type of cells	Description	Distribution	Function
<i>Fibroblasts, chondroblast, &amp; osteoblast</i>	Large, flat	Most numerous connective tissue cells	Secrete fibers and ground substances into the matrix
<i>Macrophages</i>	Rounded contain phagocytosed material	Lungs and spleen	Capable of engulfing bacteria and cellular debris through phagocytosis
<i>Plasma Cells</i>	Small cells, oval-shaped cells	gastrointestinal and respiratory tracts	Secrete antibodies
<i>Mast cells and basophiles</i>	Round to oval-shaped cells	Abundant near blood vessels	Produce histamine
<i>Adipocytes</i>	Flattened peripheral nucleus	Below the skin and around organs	Store neutral fats
<i>White Blood cells (Neutrophils and eosinophils)</i>	Generally spherical cells	gather at sites of infection	Phagocytosis and participate in inflammatory reaction
<i>Lymphocyte</i>	Small spherical cells with indentation	Lymphatic tissues	Production of immunocompetent cells

- **Ground substance:** an amorphous substance contain water and large molecules such as polysaccharide and proteins. Its functions:
  - Supports cells.
  - binds cells together.
  - Provides medium for substance exchange

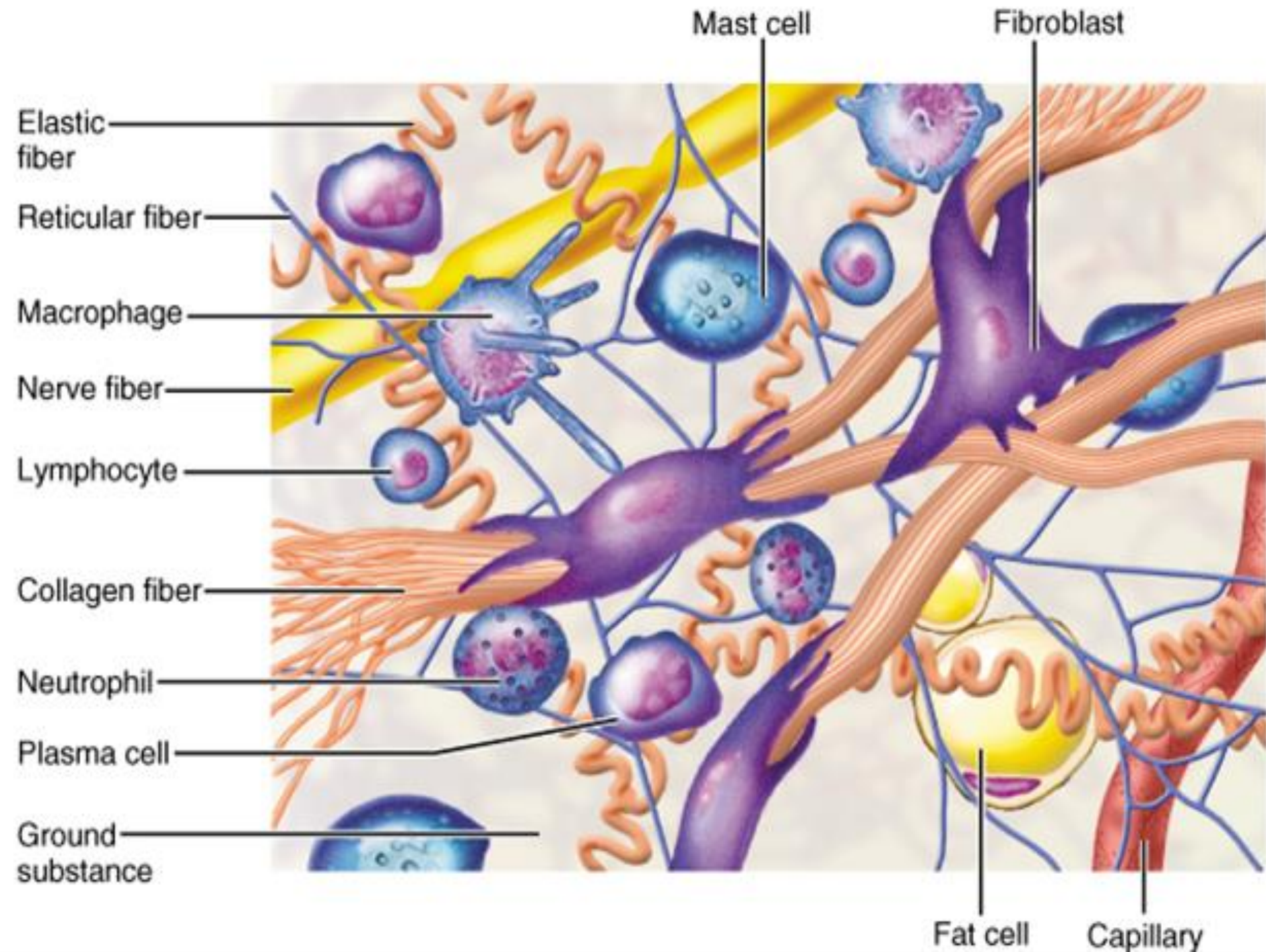
# Cells and Fibers of Connective Tissue Proper



## Some of connective tissues cells and fibers





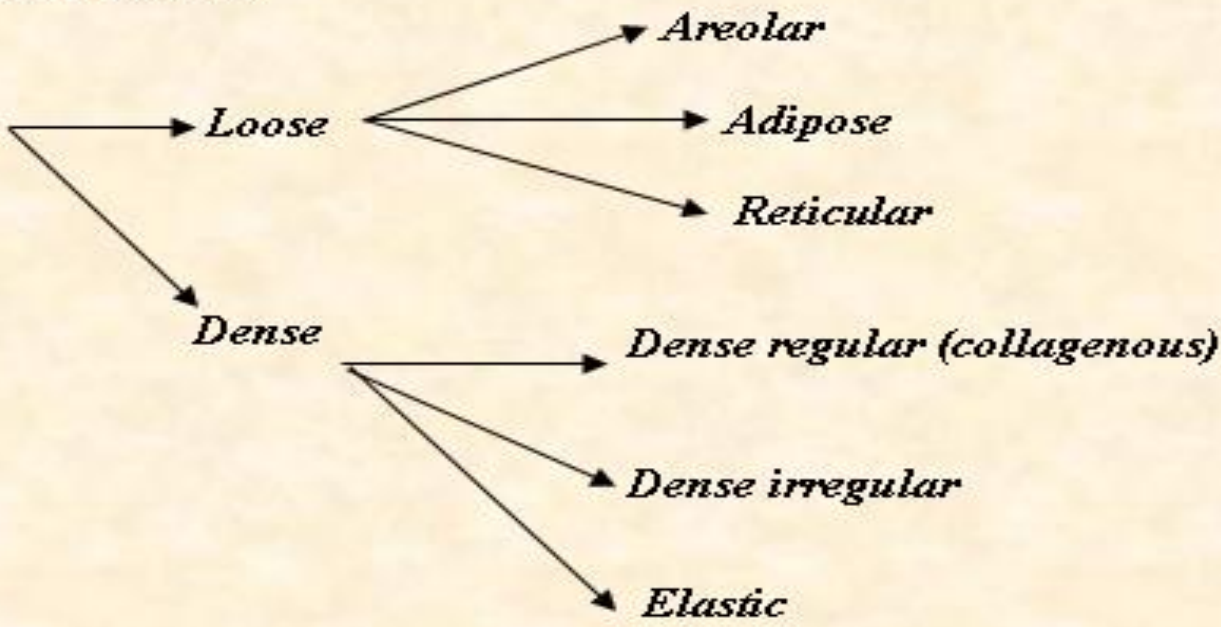


- **Fibers:** there are 3 types of fibers collagen, elastic, and reticular fiber

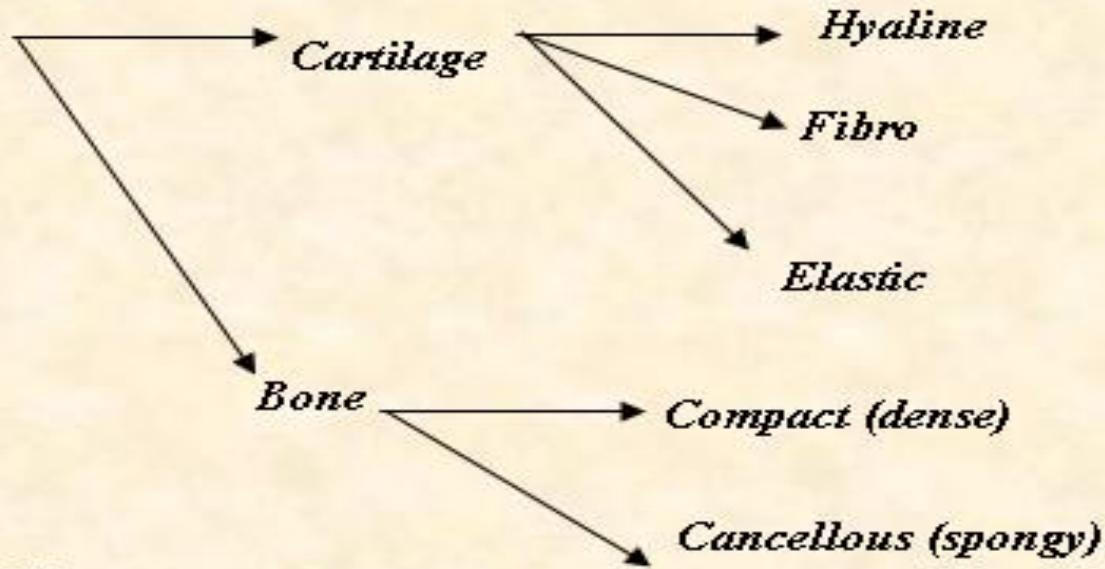
Type of fiber	Composition	Properties	Distribution	Function
<i>Collagen</i>	Collagen I, II	Inelastic, eosinophilic	bone, cartilage, tendons, ligaments	Strong, resist pulling forces. Promote flexibility and toughness.
<i>Reticular</i>	Collagen III	Inelastic, branched, argyrophilic	blood vessels spleen, lymph nodes	Support walls of blood vessels. Supporting framework for soft organs.
<i>Elastic</i>	elastin and fibrillin	Elastic, eosinophilic	skin, blood vessel walls, and lung tissue	Promote resilience.

■ **Classification of connective tissues**

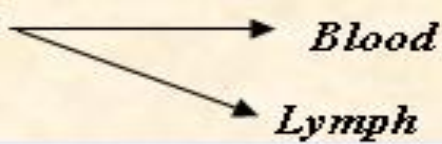
1. Proper connective tissues:



2. Supporting connective tissues:



3. Fluid connective tissues:



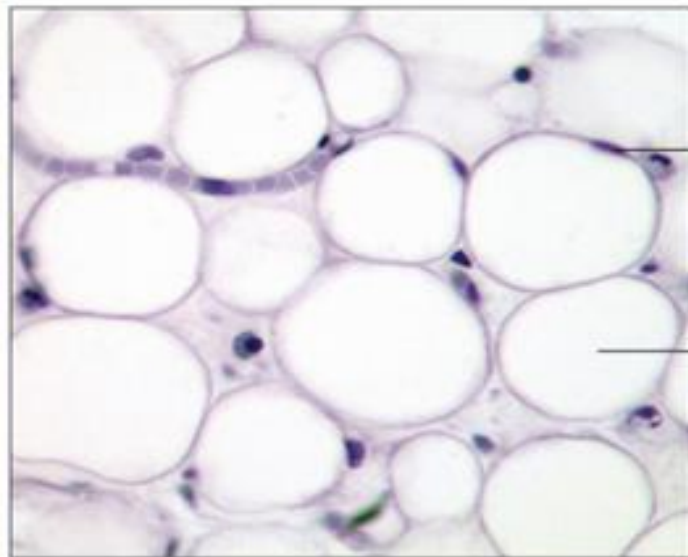


▪ Types of proper connective tissues:

Type of tissue	Ground substance	Fiber type and arrangement	Main cell type	Where found	Function
<i>Loose C.T.</i>	Gel, more ground than fibers and cells	Collagen, elastic, reticular, random.	Fibroblast	Skin, around blood vessels and organ under epithelia	Provides padding between and around organ and tissues
<i>Dense, irregular C.T.</i>	More fibers than ground	Mostly collagen, random	Fibroblast	Muscle and nerve sheaths	Forms capsule of organs
<i>Dense, regular C.T.</i>	More fibers than ground	Collagen, parallel	Fibroblast	Tendons and ligaments	Provides strength
<i>Adipose C.T.</i>	Very little	None	Brown fat and white fat	Under skin in the hypodermis, around the kidneys and eyeballs	Provides energy storage and insulation
<i>Reticular C.T.</i>	very little ground substance	Reticular, network	Lymphocyte	Lymph nodes, bone marrow, and spleen	supports motile cells & filters body fluids.
<i>Elastic C.T.</i>	Ground substance is sparse	Elastin, parallel	Fibroblast	Walls of aorta and vocal ligament	provides flexible support



c) Connective tissue proper: loose connective tissue, adipose

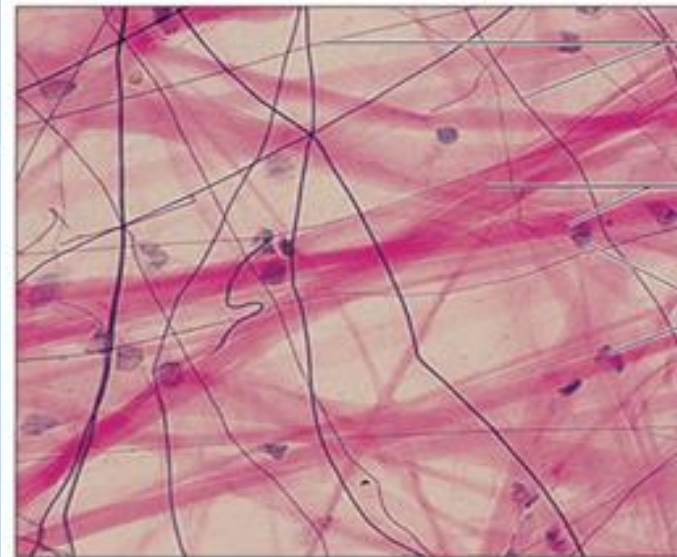


Nucleus of fat cell

Vacuole containing fat droplet

**Photomicrograph:** Adipose tissue from the subcutaneous layer under the skin (350x).

c) Connective tissue proper: loose connective tissue, Areolar



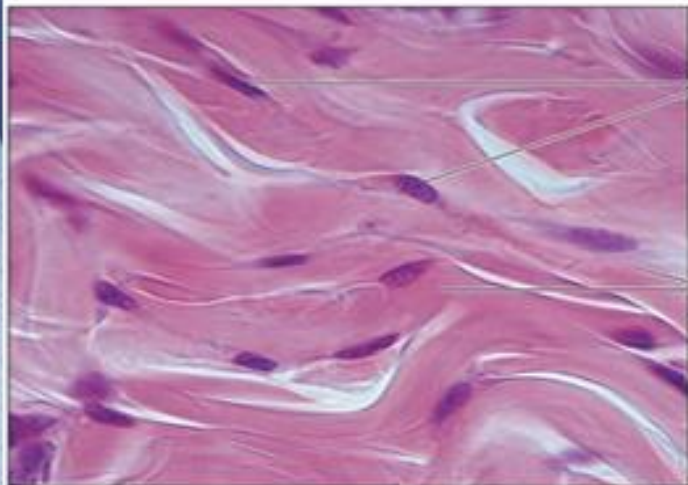
Elastic fibers

Collagen fibers

Fibroblast nuclei

**Photomicrograph:** Areolar connective tissue, a soft packaging tissue of the body (300x).

(e) Connective tissue proper: dense connective tissue, dense irregular

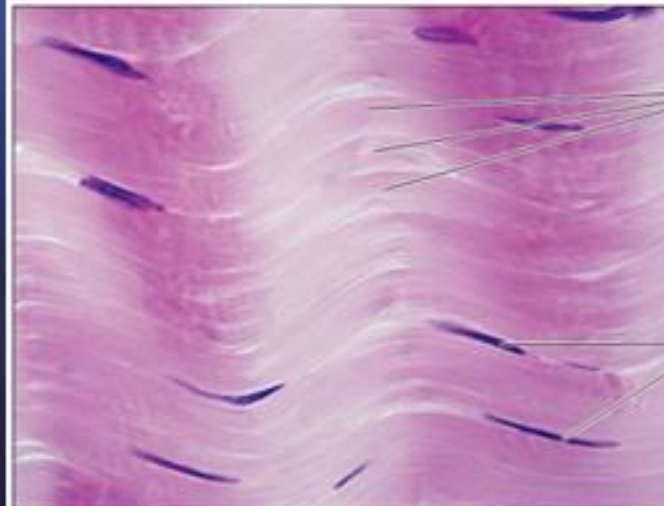


Nuclei of fibroblasts

Collagen fibers

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

d) Connective tissue proper: dense connective tissue, dense regular

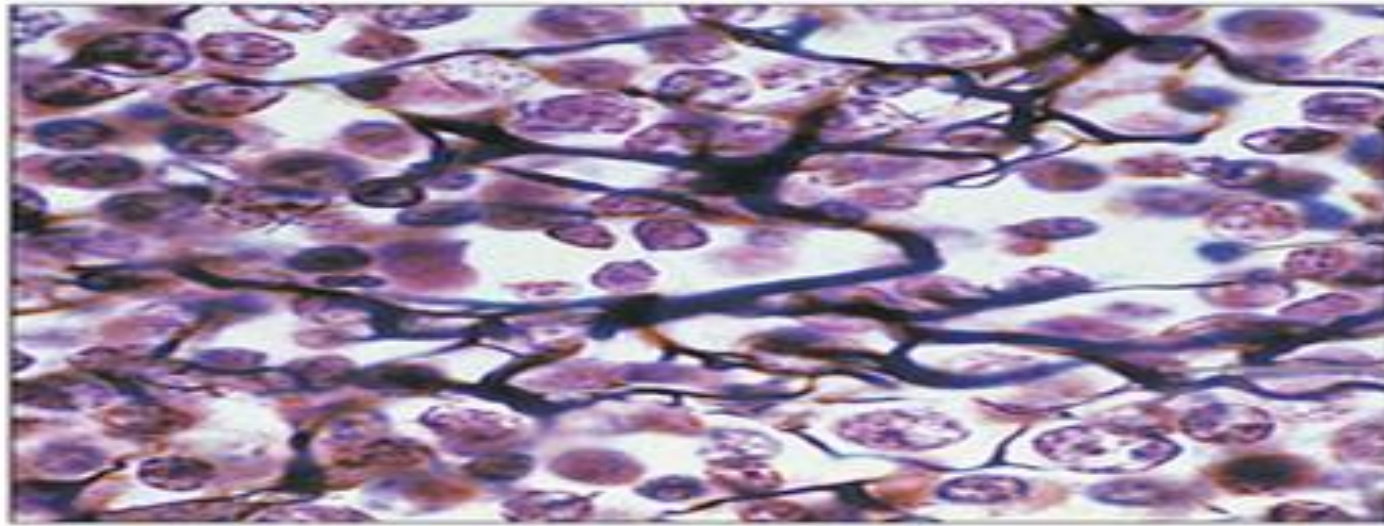


Collagen fibers

Nuclei of fibroblasts

**Photomicrograph:** Dense regular connective tissue from a tendon (500x).

Connective tissue proper: loose connective tissue, reticular

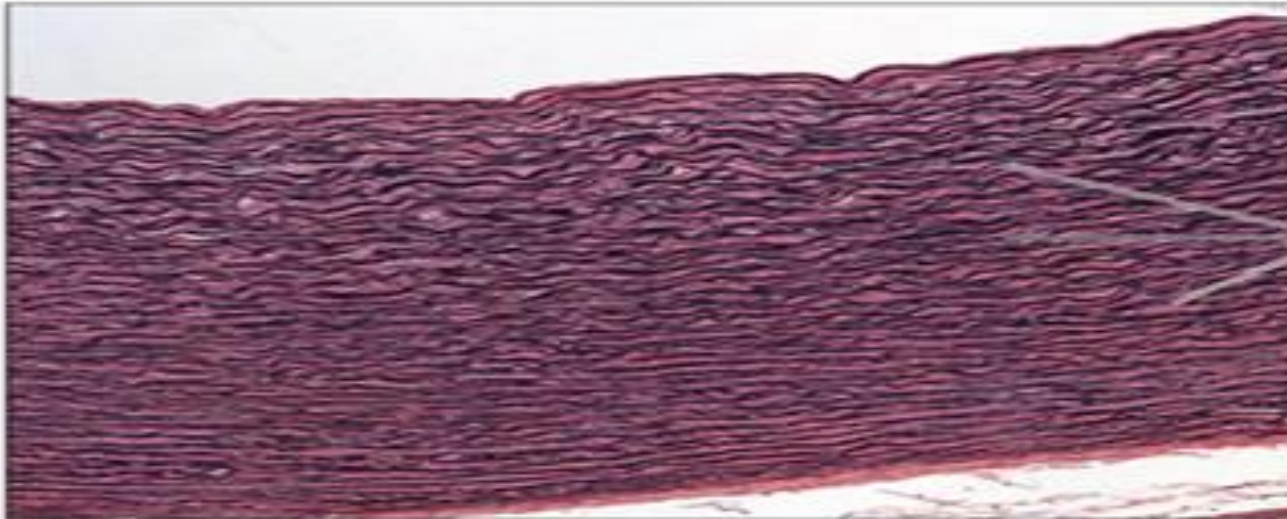


White blood cell  
(lymphocyte)

Reticular  
fibers

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

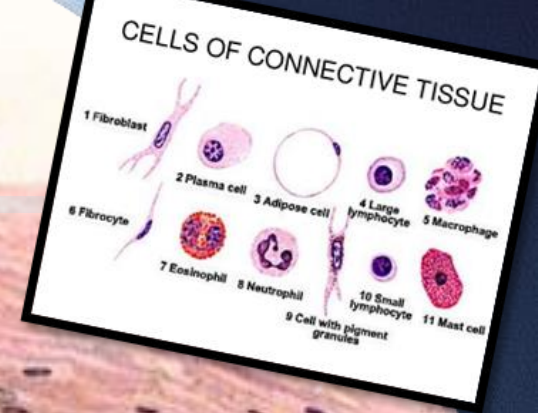
Connective tissue proper: dense connective tissue, elastic



Elastic fibers

**Photomicrograph:** Elastic connective tissue in the wall of the aorta (250x).





# Thank You !