CONNECTIVE TISSUE (C.T.)

- Objectives:

By the end of this lecture, the student should be able to:

1. Enumerate the general characteristics of C.T.
2. Classify C.T.
3. Classify C.T. proper (C.T.P.)
4. Describe the structure (components) and distribution of different types of C.T.P.

DEFINITION OF C.T.

- It is a basic type of tissue, of mesodermal origin, which provides structural and metabolic support for other tissues and organs.

GENERAL CHARACTERISTICS

1. C.T. is formed of widely separated, few cells with abundant extracellular matrix.
2. Most C.T. are vascular.

COMPONENTS & TYPES OF CONNECTIVE TISSUE

Components of C.T.

1. **Cells.**
2. **Fibers:** collagenous, elastic & reticular.
3. **Matrix:**

Types of C.T.

- Soft → C.T. Proper
- Rigid (firm, rubbery) → Cartilage
- Hard (solid) → Bone
- Fluid (liquid) → Blood

CONNECTIVE TISSUE (C.T.) PROPER

TYPES OF C.T. PROPER

I. Loose (Areolar) C.T.
II. Dense Collagenous C.T.
III. Elastic C.T.
IV. Reticular C.T.
V. Adipose Tissue.

I- LOOSE (AREOLAR) C.T.

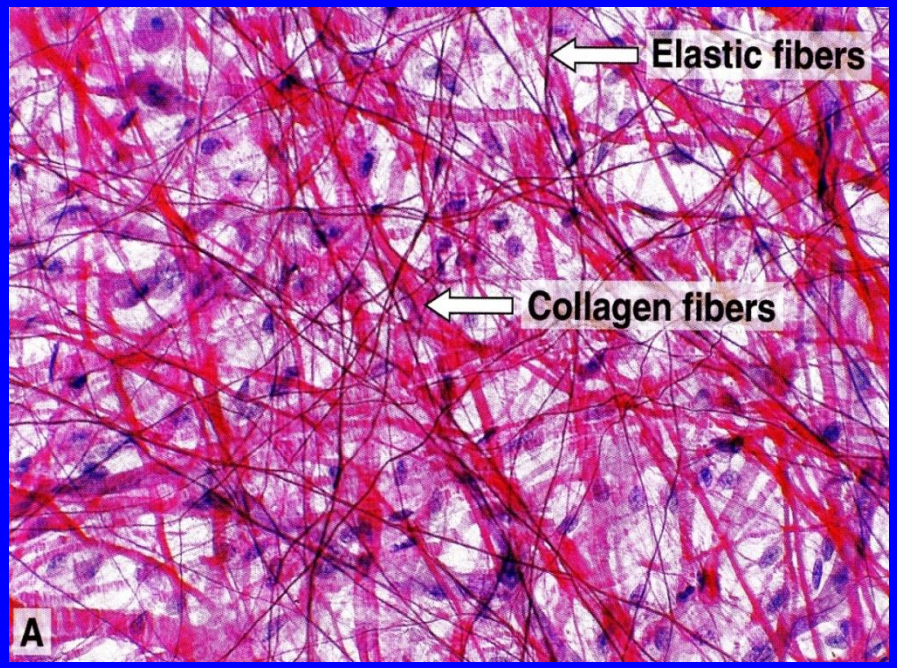
The most common type of C.T. proper.

L/M:

- Contains all the main components of C.T.P.: all types of C.T. cells & fibers + abundant matrix.
- No predominant element in loose C.T.

Sites:

e.g. Dermis of the skin.



(A) Cells

1- Fibroblasts.

2- Macrophages.

3- Mast cells.

4- Plasma cells.

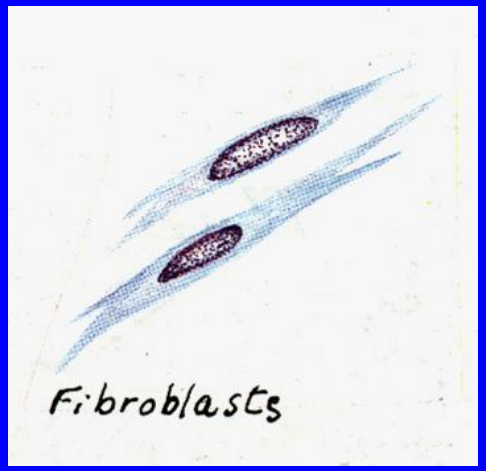
5- Adipose cells (Adipocytes, Fat cells).

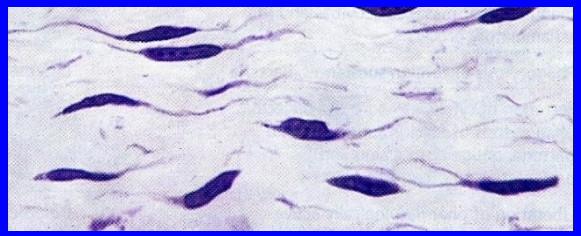
6- Leucocytes.

1- Fibroblasts

L/M:

- Most common cell; found nearly in all types of C.T. proper.
- Flat branched cells (spindle-shaped) with basophilic cytoplasm.
- They can divide.
- Old fibroblasts are called fibrocytes.





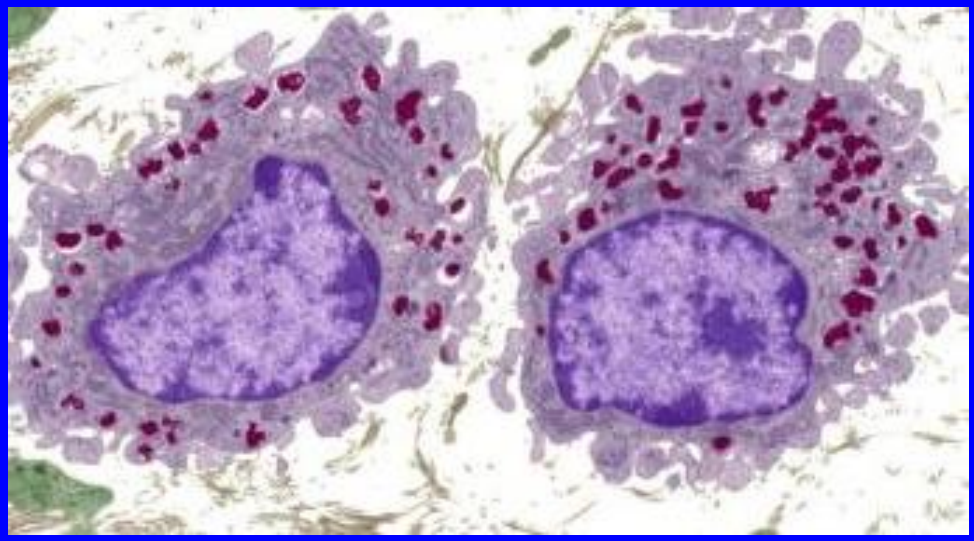
Function:

1. Formation of proteins of C.T. fibers.
2. Formation of C.T. matrix.
3. Healing of wounds.

2- Macrophages

L/M:

- Basophilic cytoplasm, rich in lysosomes.
- Irregular outlines.
- They can divide.
- They originate from blood monocytes.



Function:

Phagocytosis.

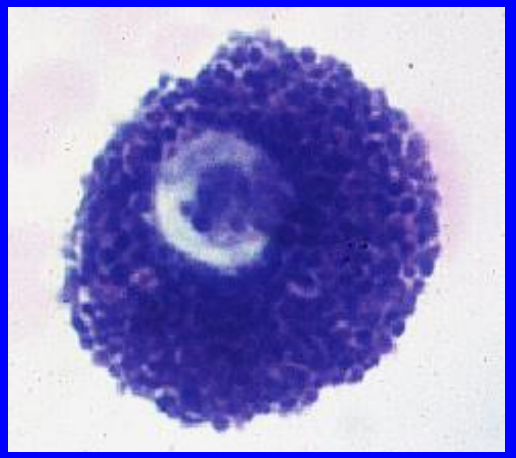
3- Mast Cells

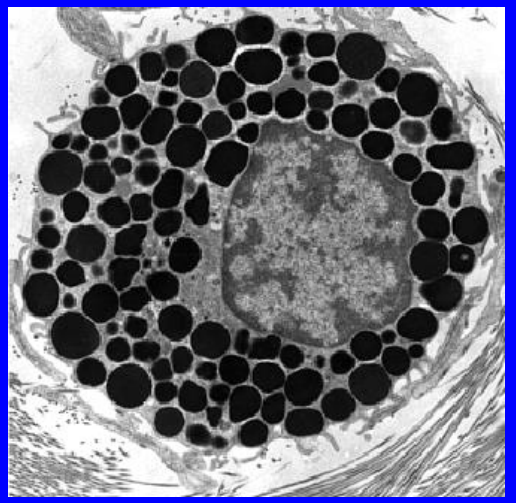
L/M:

- Cytoplasm contains numerous basophilic cytoplasmic granules.

Function:

1. Secrete heparin (anticoagulant).
2. Secrete histamine (allergic reactions).

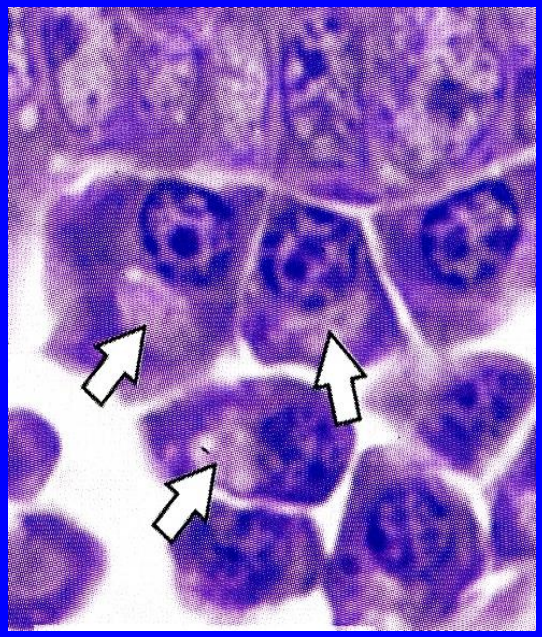




4- Plasma Cells

L/M:

- Basophilic cytoplasm with a negative Golgi image.
- Nucleus: spherical, eccentric with a clock-face appearance of chromatin.
- Derived from B-lymphocytes.



Function:

Secretion of antibodies (immunoglobulins).

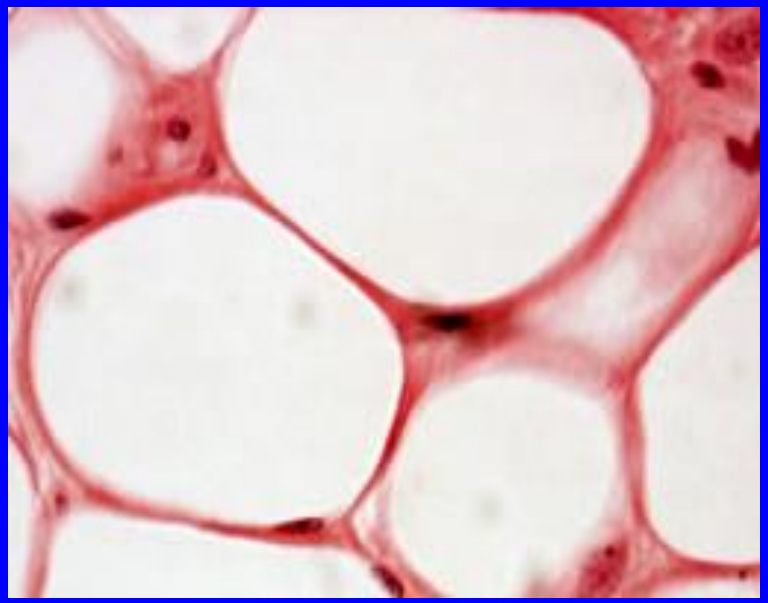
5- Adipose Cells
(Adipocytes, Fat Cells)

L/M of Unilocular Adipose Cells:

- Large spherical, with a single large fat droplet.
- Thin rim of cytoplasm at the periphery.
- Nucleus: flattened, peripheral.

Function:

Storage of fat.



(B) Fibers

1- Collagen Fibers (Collagen type I):

- Non-branched fibers, arranged in bundles.
- Acidophilic.

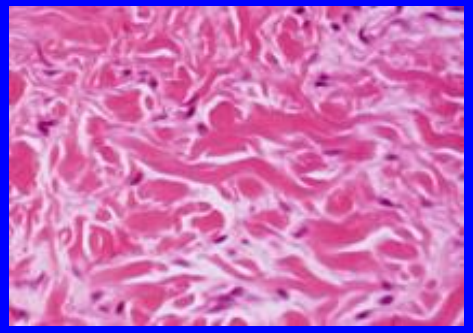
2- Reticular Fibers (collagen type III):

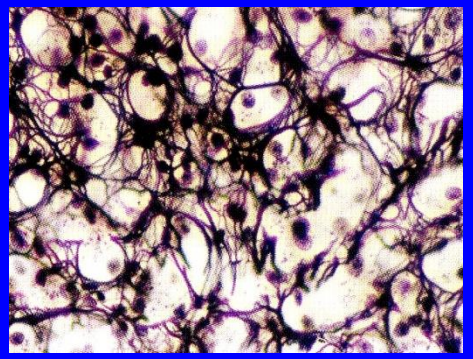
- Branch and form a network.
- Stained black with silver.

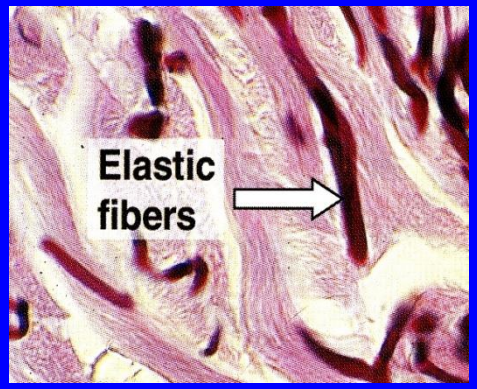
3- Elastic Fibers:

- Branched.
- Stained brown with orcein.

N.B. Other important types of collagen include:
type II (in cartilage).
type IV (in basement membranes)







II- DENSE COLLAGENOUS C.T.

L/M:

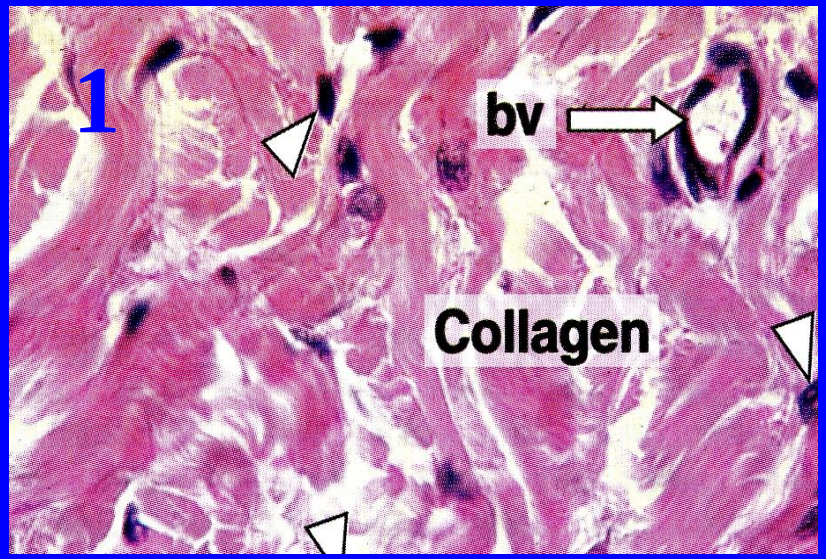
Predominance of collagen fibers + fibroblasts.

Sites:

1- Dense irregular: e.g. dermis of the skin, capsules.

2- Dense regular: e.g. tendons, ligaments.

Function: tough tissue; resistant to stretch.



III- ELASTIC TISSUE

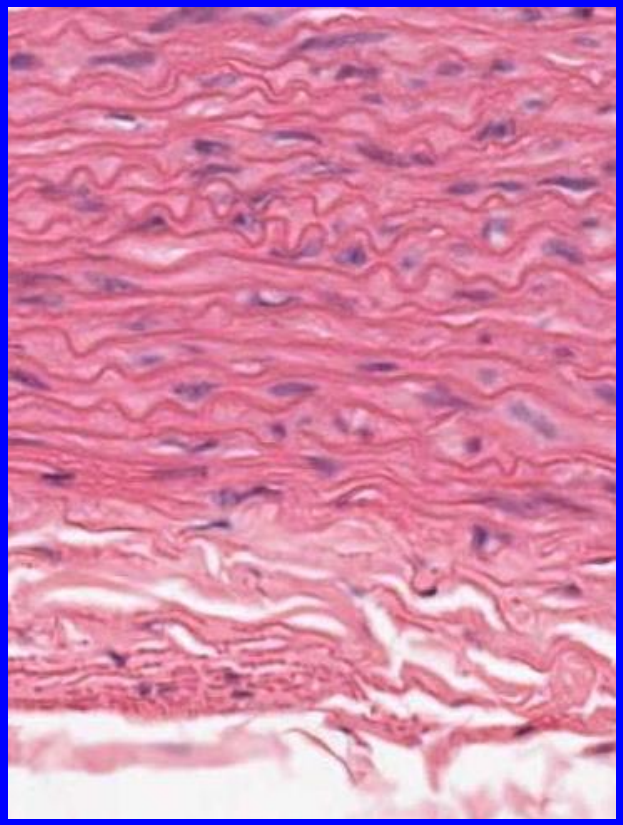
L/M:

Predominance of elastic fibers (sheets or membranes) + fibroblasts.

Sites:

Large arteries, e.g. Aorta

Function: elastic tissue; stretchable.



IV- RETICULAR TISSUE

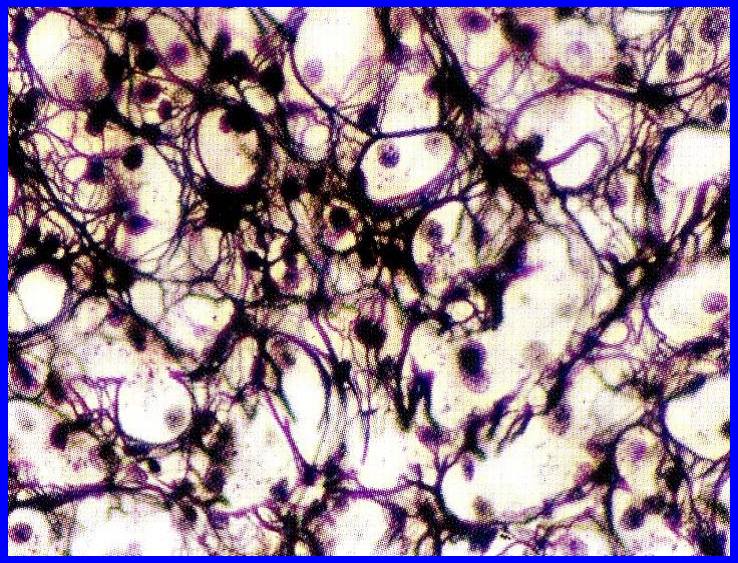
L/M:

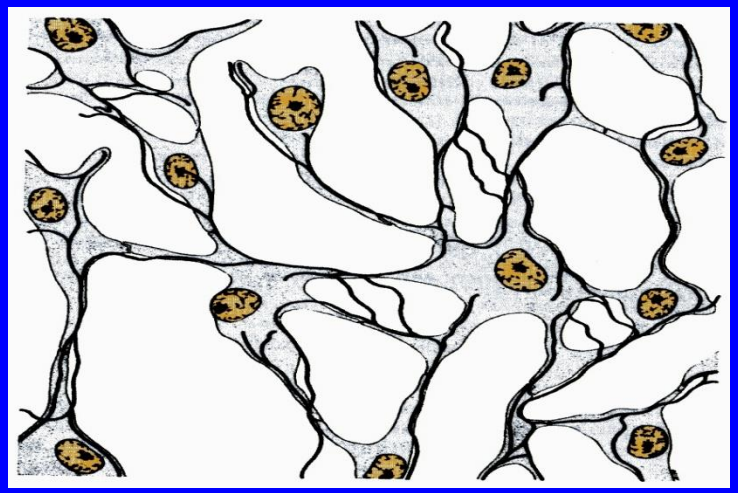
Predominance of reticular fibers + reticular cells (specialized fibroblasts).

Sites:

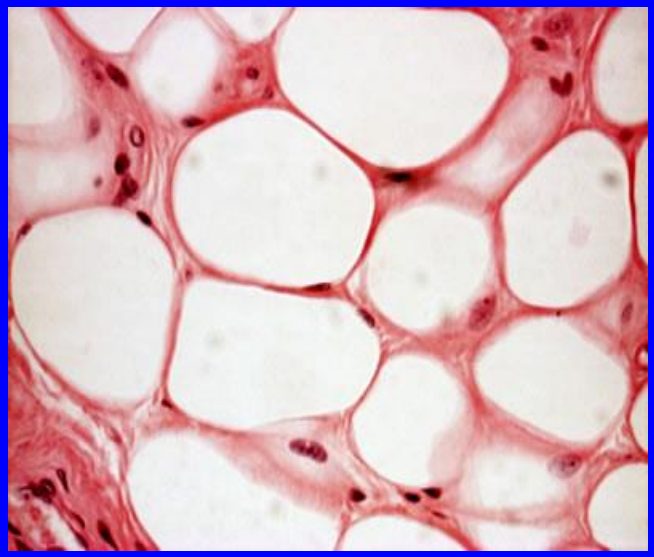
Stroma of organs: e.g. liver, lymph node, spleen.

Function: structural support.





V- UNILOCULAR ADIPOSE TISSUE (WHITE ADIPOSE TISSUE)



L/M:

Predominance of unilocular fat cells.

Sites:

- Subcutaneous tissue, especially in buttocks & hips.
- Abdominal wall.
- Female breast.
- Around the kidney.

Function:

- Synthesis, storage & release of fat.
- Supports organs, e.g. kidney.
- Heat insulation.

Thank you