Connective Tissue
Lab . 4

Second year

Histology

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Connective Tissue

- They are the most abundant and widely distributed tissue type in the body.

- Connective tissues run the gamut for vascularity. Some tissues are avascular (Cartilage), some are poorly vascularized (dense connective tissue), and some have rich blood supplies (bone).

Connective Tissue is characterized by:

- Binding and supporting the organs.
- It is vascular except the cartilage.
- It is derived from mesoderm layer.
- It consists of cell immersed in large amount of intercellular substance, which is formed by cells.
- Can replicate (healing and repair)

Connective Tissue

- Connective tissues can be rigid (bone), flexible (adipose), or fluid (blood).

- Unlike the tightly packed Epithelial tissues, living cells in connective tissues are separated by a non-living **extracellular matrix** (Ground Substance and Fibers).

- Due to the matrix, connective tissues are able to bear weight, withstand tension, and endure abuses that no other tissues could tolerate.

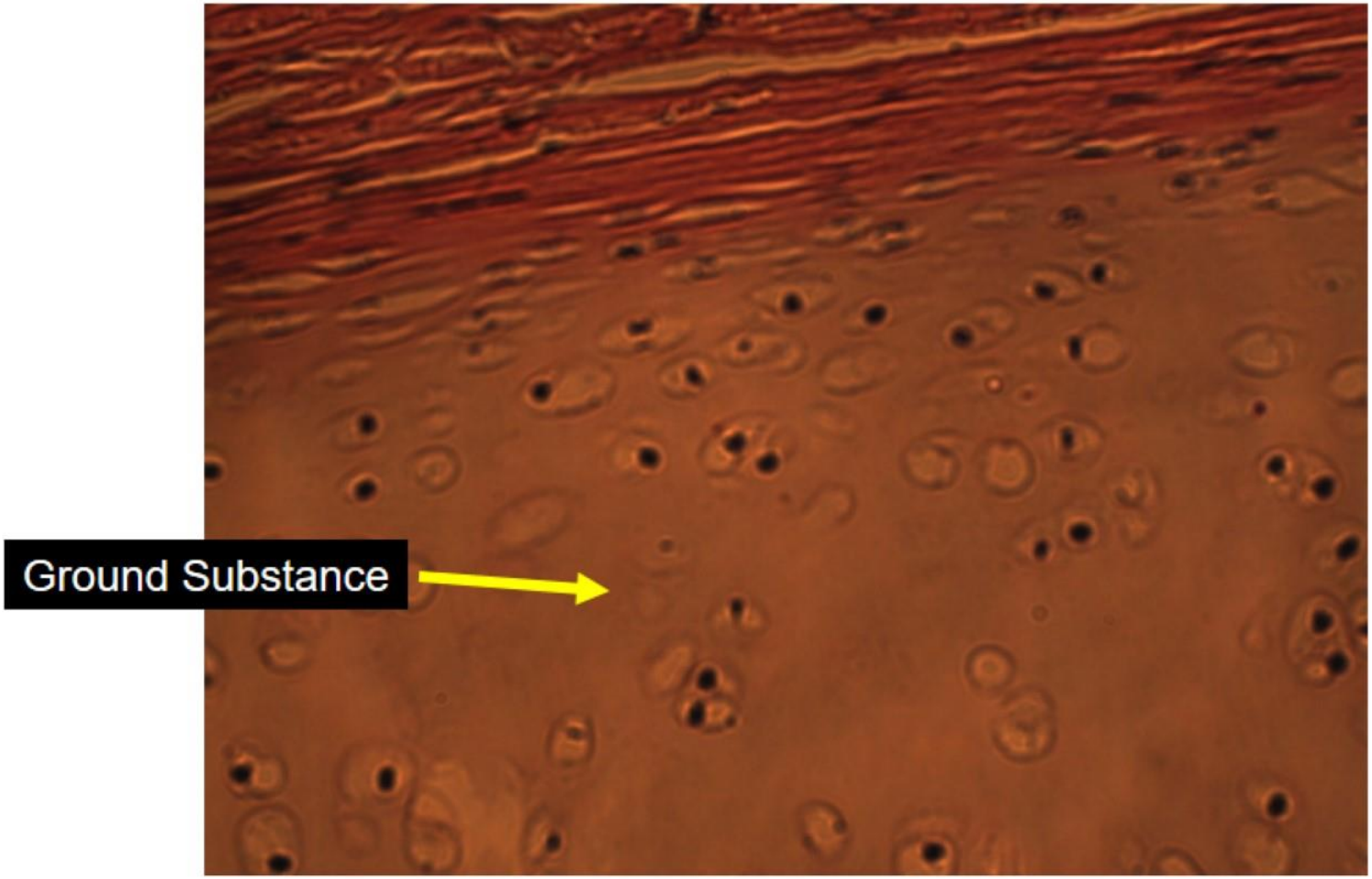
- Connective Tissues are made of three main components:
  1. Ground Substance
  2. Fibers
  3. Cells
- Connective Tissues have many specific functions. Its major functions include
  1. Binding and support
  2. Protection
  3. Insulation
  4. Transportation of substances.

Connective Tissue Facts – Ground Substance

- The ground substance is the unstructured material between cells that contains the fibers.

- The ground substance holds large amounts of fluid and serves as a medium through which nutrients and other substances can diffuse between blood vessels and the cells.

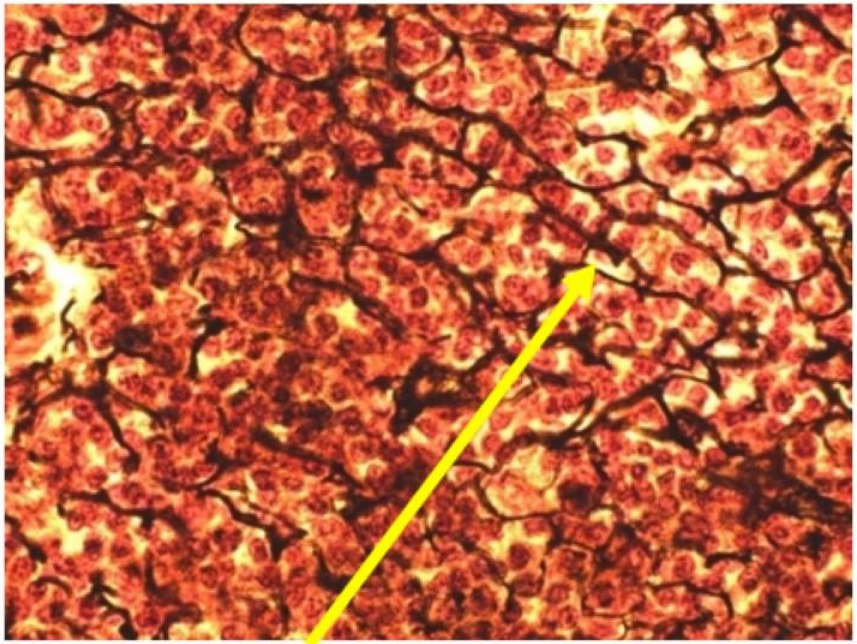
Ground Substance



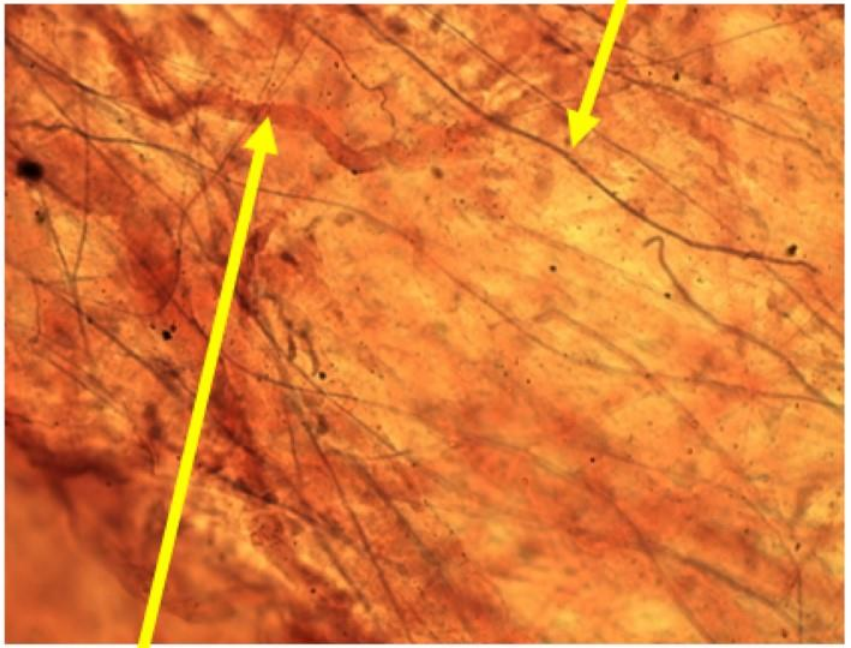
Co. T. Facts – (1) Fibers

- There are three types of fibers prevalent in Connective tissues
  - A.) **collagen fibers** – are wide and wavy in appearance and generally stain pink. 79% of the protein in the body is collagen.
  - B.) **elastic fibers** – are thin flexible fibers made from the protein elastin, that generally stain black.
  - C.) **reticular fibers** – are actually thin collagen fibers. They have a spider web appearance and appear black under stain.

Fiber Types



Reticular Fibers



Elastic Fiber

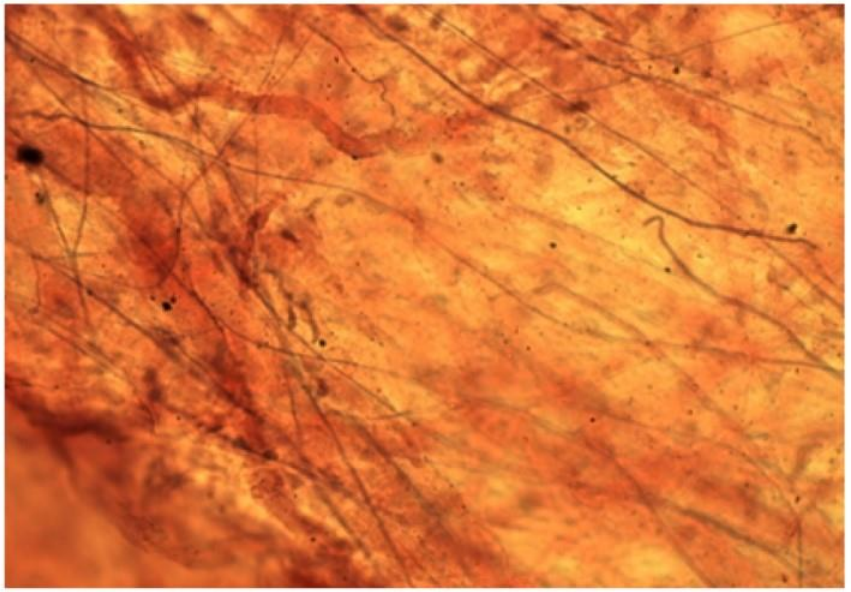
Collagen Fiber

Areolar Connective Tissue

Each major type of connective tissue has its own fundamental cell type in both immature and mature forms

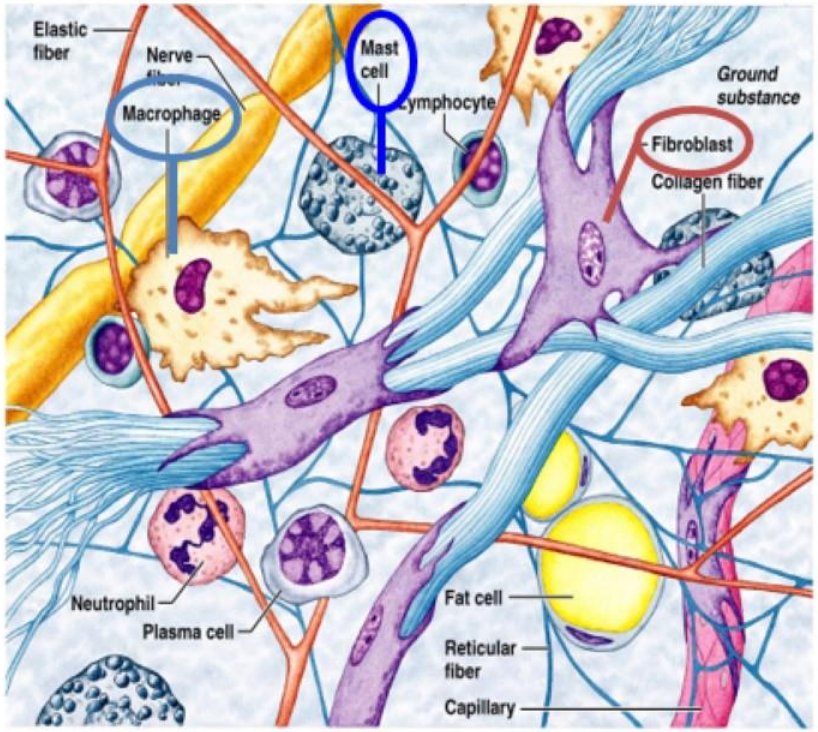
Structure-

- gel like matrix with all
- three fiber types present.
- Three cell types present
  1. Mast cells
  2. Macrophages
  3. fibroblasts



Connective Tissue Proper - Areolar Connective Tissue

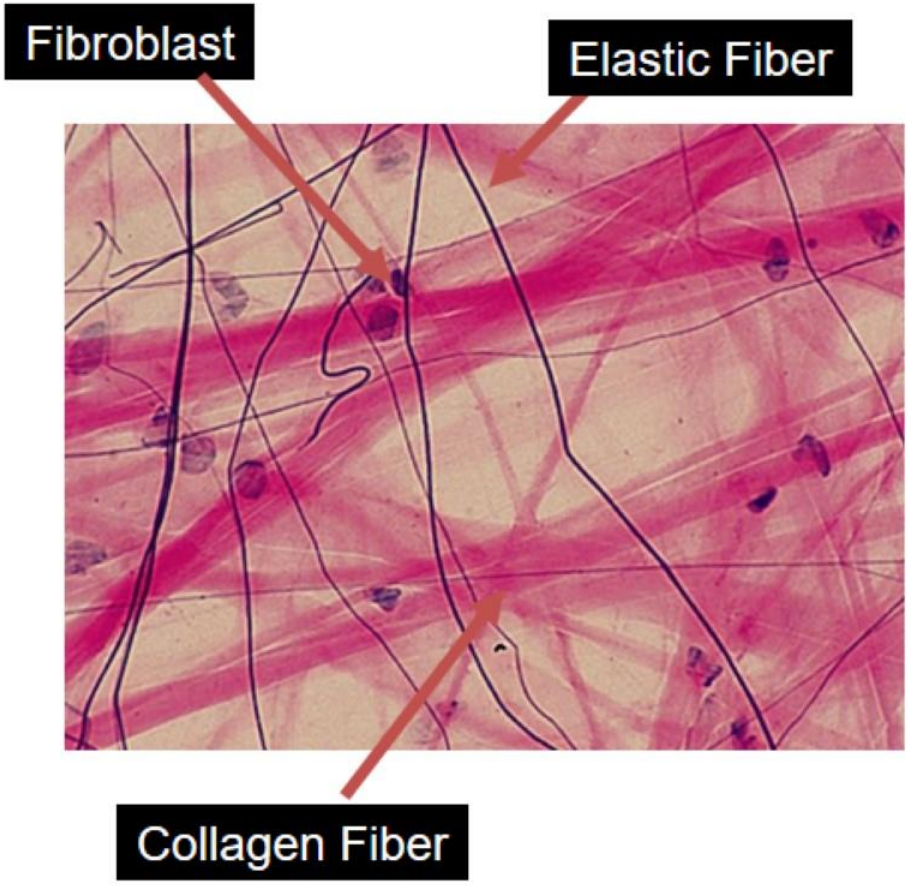
1. **Mast Cells** – produce heparin and histamine.
2. **Macrophages** - are "big eaters". They eat bacteria and dead or dying cells.
3. **Fibroblasts** – fiber builders.



Co. T. Proper - Areolar Connective Tissue

Location –

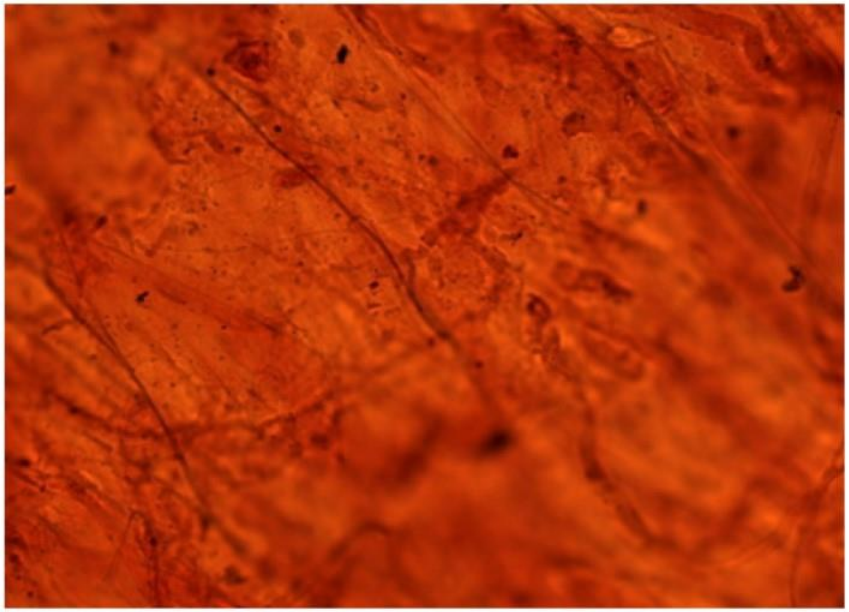
- Found between the skin and muscle.
- Also found between muscles
- Packages organs
- Surrounds Capillaries.
- Areolar Connective Tissue is the most widely distributed connective tissue in the body. It serves as a kind of packaging material between other tissues.



Connective Tissue Proper - Areolar Connective Tissue

Function –

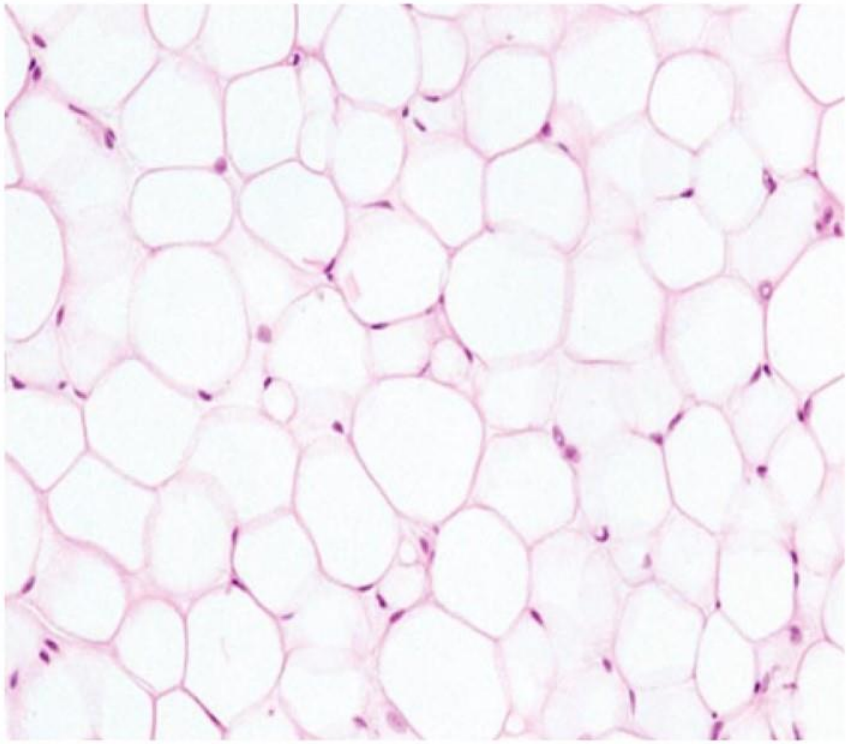
1. Wraps and cushions organs.
2. Macrophages phagocytize bacteria
3. Holds and conveys tissue fluid.



Connective Tissue Proper – Adipose Tissue

Location –

- Found around organs, joints, surrounding the eyeball, within the abdomen.



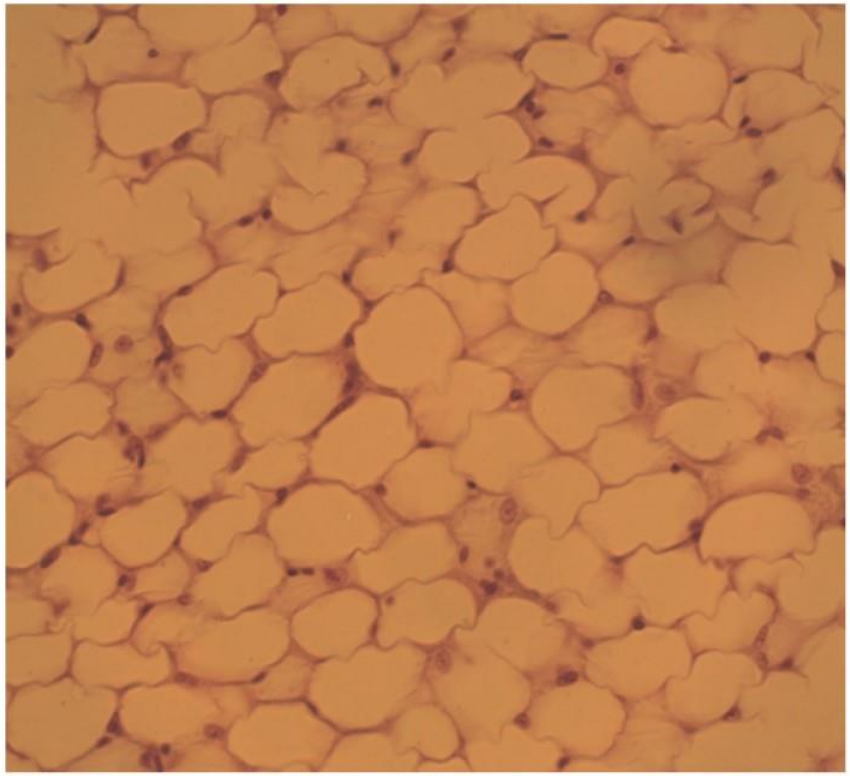
Structure –

- Adipocytes (fat filled cells) are ring shaped cells filled with tryglycerides.
- Has a chicken wire appearance.

Connective Tissue Proper – Adipose Tissue

Function –

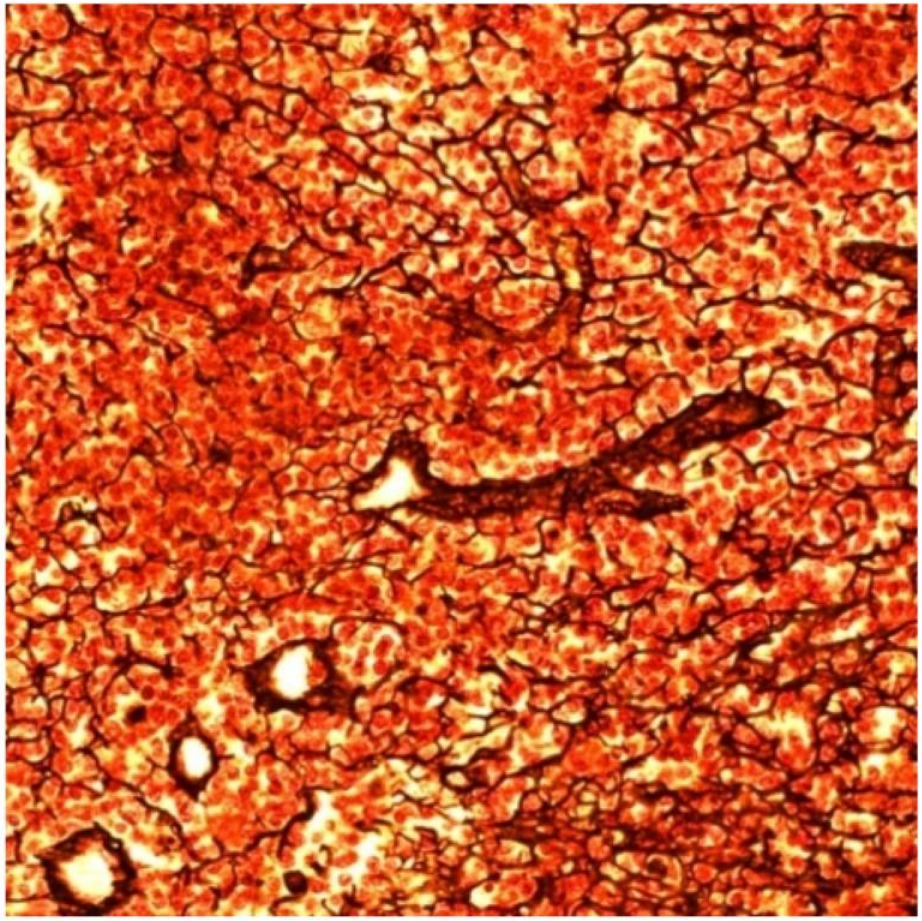
- Shock absorption
- Energy Storage
- Protection
- Insulation

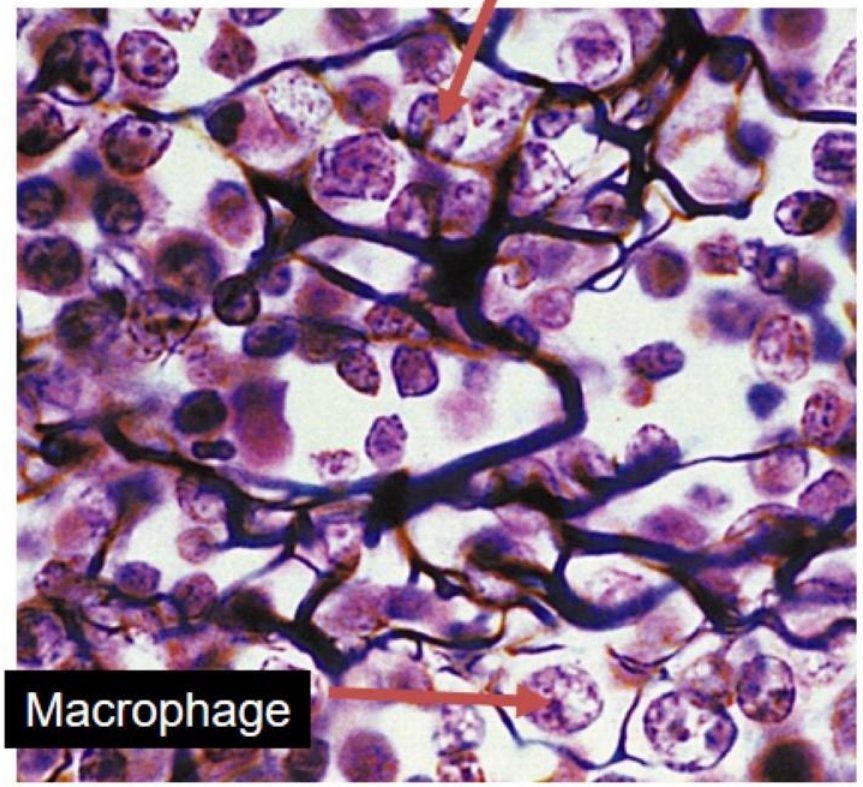


Co.T. Proper -Reticular Tissue

Structure : A network of reticular fibers with macrophages interspersed.

Location: Spleen; Lymph nodes and liver

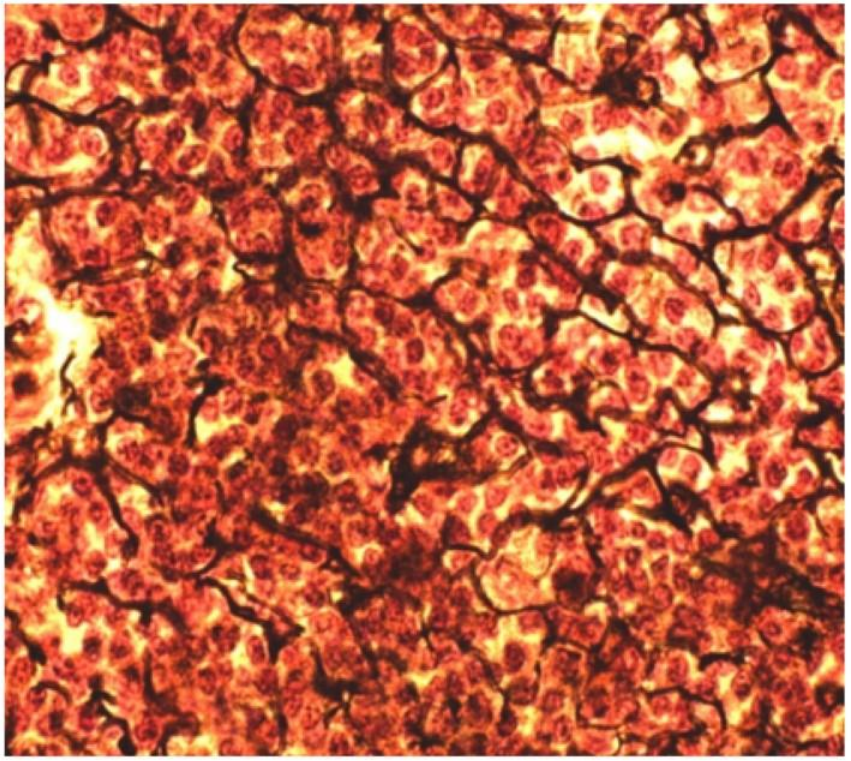




Co. T. Proper- Reticular Tissue

Function

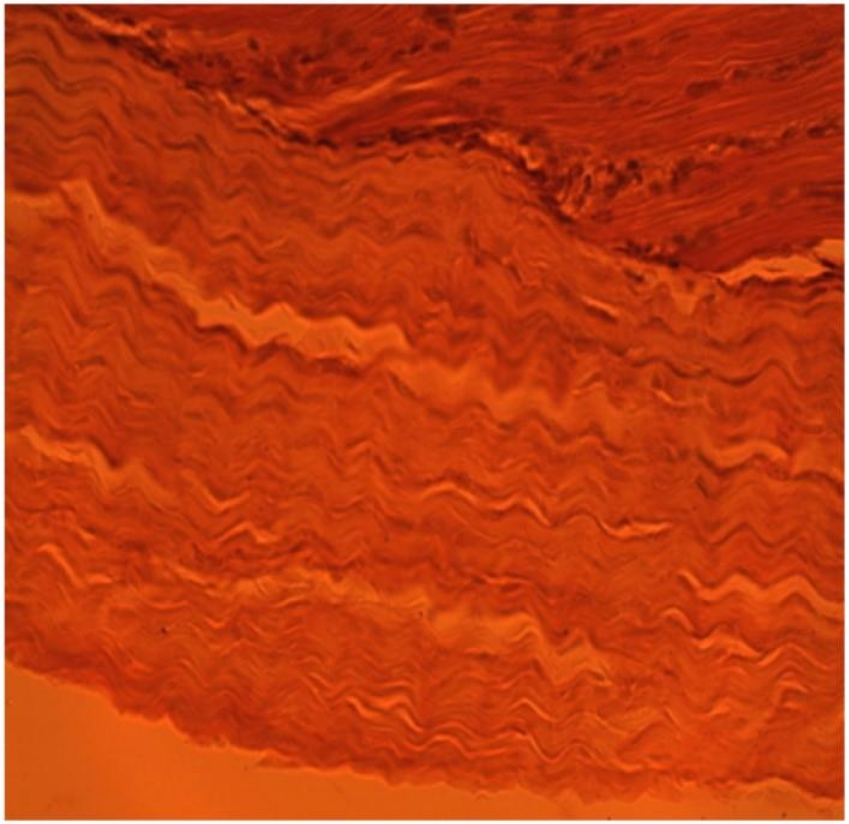
- **In Lymph Nodes** – macrophages devour bacteria, viruses and cancer cells.
- **In Spleen** – macrophages break down dying RBC's.
- **In Liver** – macrophages (Kupffer cells) devour bacteria.
- This tissue forms a soft internal skeleton that supports other cell types.



Connective Tissue Proper – Dense Regular Connective Tissue

Structure –

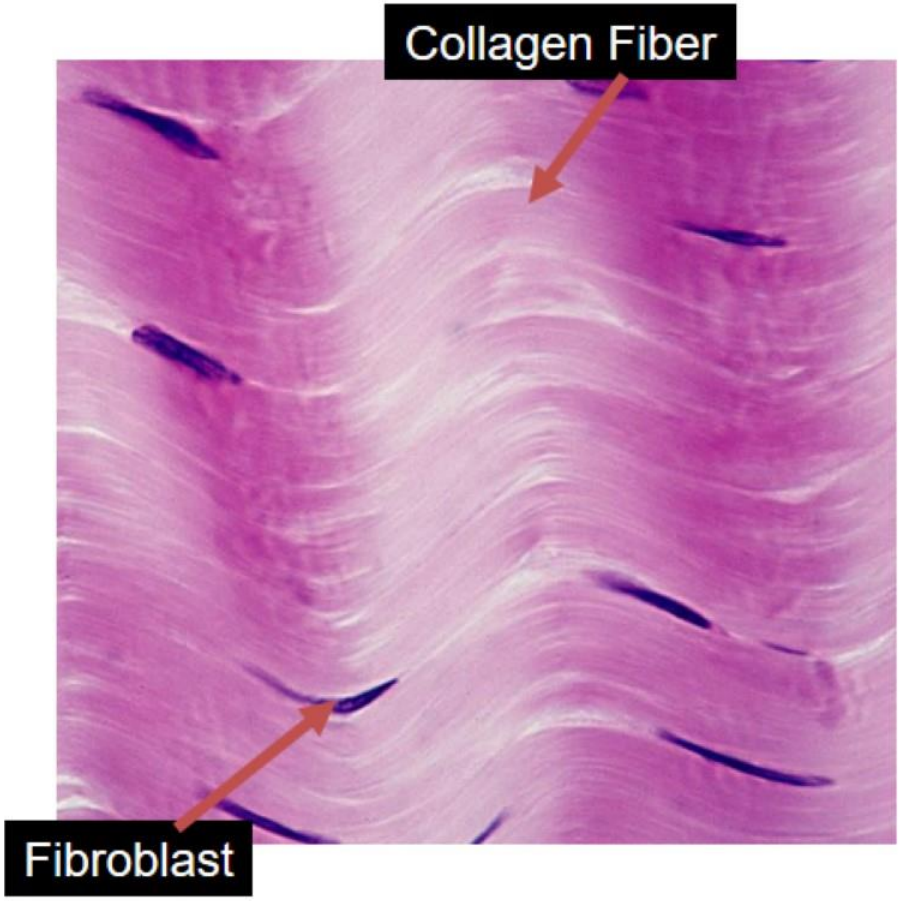
- Parallel collagen fibers.
- Dark colored fibroblasts interspersed.



Co. T. Dense Regular

Location –

- In tendons and ligaments.
- In scar tissue
- aponeuroses



Connective Tissue Proper – Dense Regular Connective Tissue

Function –

- Provide high tensile strength in one direction.
- Attached muscles to bone, bone to bone