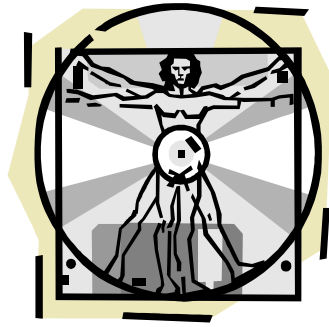


Bio& 241

Unit 1 / Lecture 4



Connective Tissue

Consists of two basic elements:

Cells

and

Extra-cellular matrix

True Connective Tissue Cells

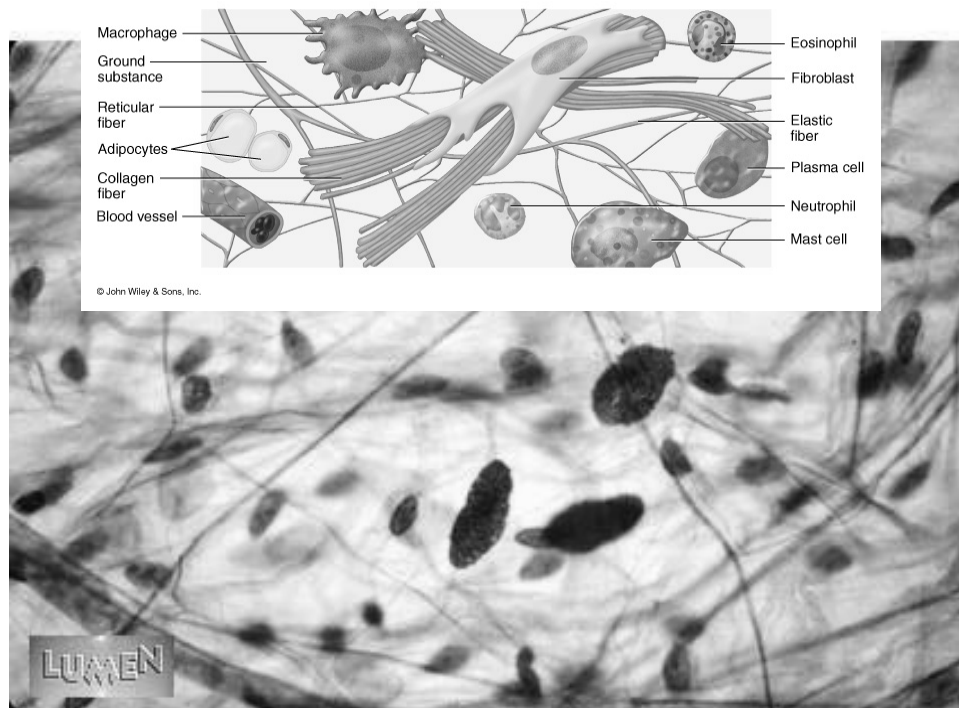
Fibroblasts: Secrete both fibers and ground substance of the matrix (wandering)

Macrophages: Phagocytes that develop from Monocytes (wandering or fixed)

Plasma Cells: Antibody secreting cells that develop from B Lymphocytes (wandering)

Mast Cells: Produce histamine that help dilate small blood vessels in reaction to injury (wandering)

Adipocytes: Fat cells that store triglycerides, support, protect and insulate (fixed)

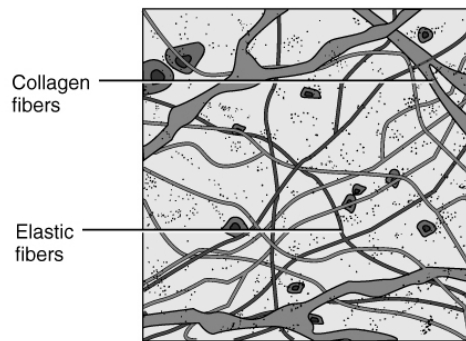


Matrix Fibers

Collagen Fibers: Large fibers made of the protein collagen and are typically the most abundant fibers. Promote tissue flexibility.

Elastic Fibers: Intermediate fibers made of the protein elastin. Branching fibers that allow for stretch and recoil

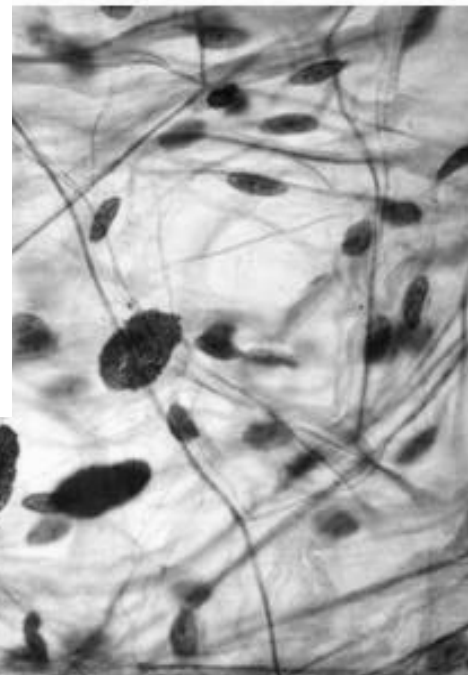
Reticular Fibers: Small delicate, branched fibers that have same chemical composition of collagen. Forms structural framework for organs such as spleen and lymph nodes.



Areolar connective tissue

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art 4: Slide 28



Matrix Ground Substance

Hyaluronic Acid: Complex combination of polysaccharides and proteins found in “true” or proper connective tissue.

Chondroitin sulfate: Jellylike ground substance of cartilage, bone, skin and blood vessels.

Other ground Substances:

Dermatin sulfate, keratin sulfate, and adhesion proteins

TYPES OF CONNECTIVE TISSUE

1. True Connective Tissue
 - a. Loose Connective Tissue
 - b. Dense Connective Tissue
2. Supportive Connective Tissue
 - a. Cartilage
 - b. Bone
5. Liquid Connective Tissue
 - a. Blood

True or Proper Connective Tissue

1. Loose Connective Tissue:

a. Areolar tissue

Widely distributed under
epithelia

b. Adipose tissue

Hypodermis, within abdomen, breasts

c. Reticular connective tissue

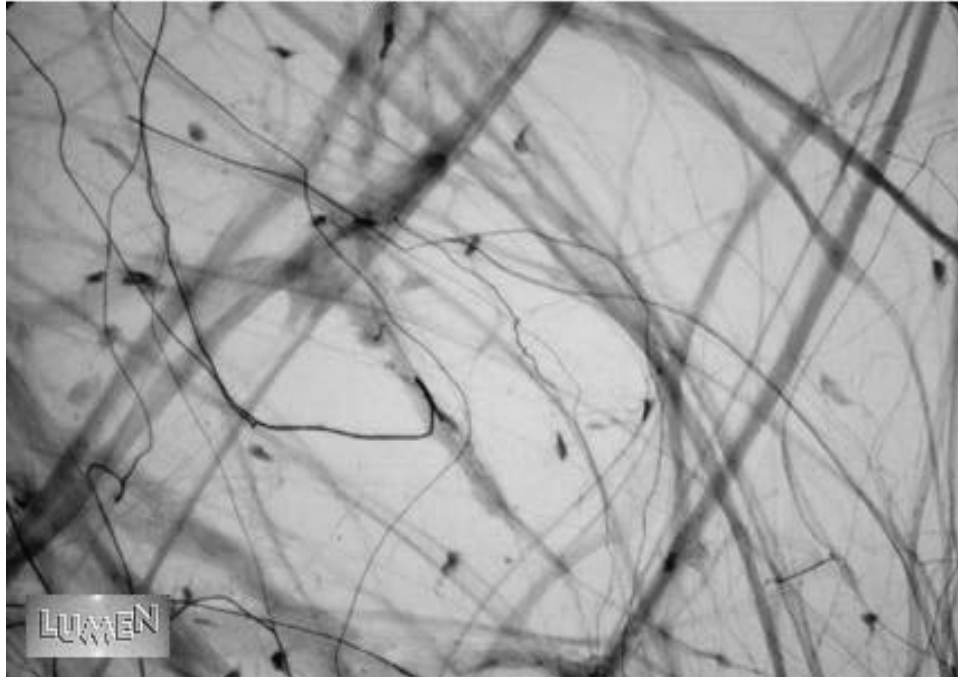
Lymphoid organs such as lymph nodes

LOOSE Connective Tissue:

1. Areolar CT

- consists of all 3 types of fibers, several types of cells, and semi-fluid ground substance
- found in subcutaneous layer and mucous membranes, and around blood vessels, nerves and organs
- function = strength, support and elasticity

Histology Lab Part 3: Slide 8

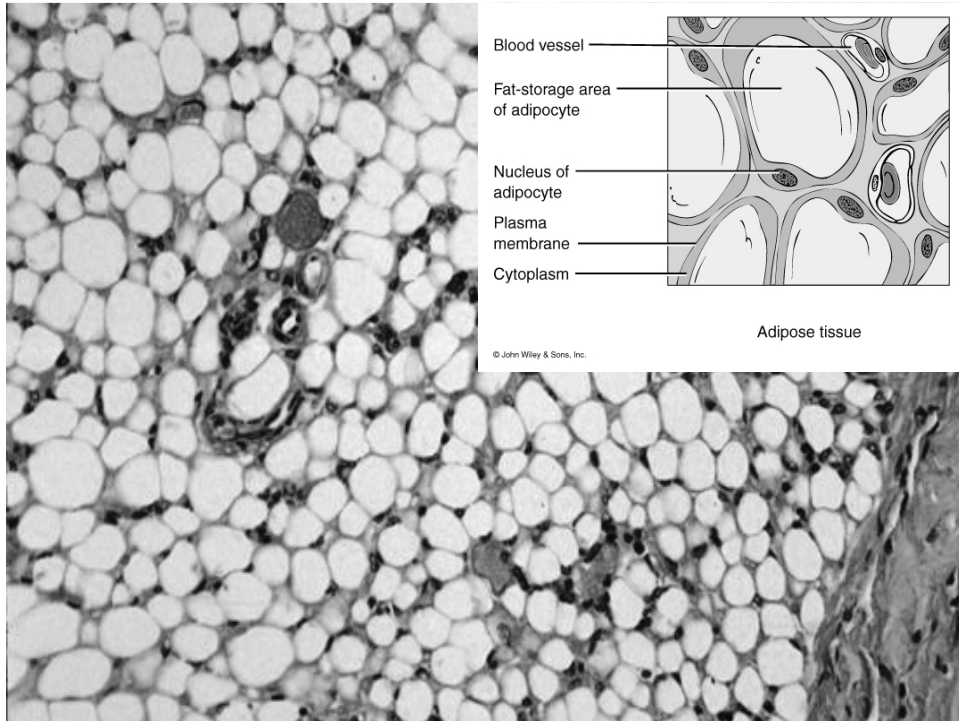


LOOSE Connective Tissue:

2. Adipose tissue

- consists of adipocytes; "signet ring" appearing fat cells. They store energy in the form of triglycerides (lipids).
- found in subcutaneous layer, around organs and in the yellow marrow of long bones
- function = supports, protects and insulates, and serves as an energy reserve

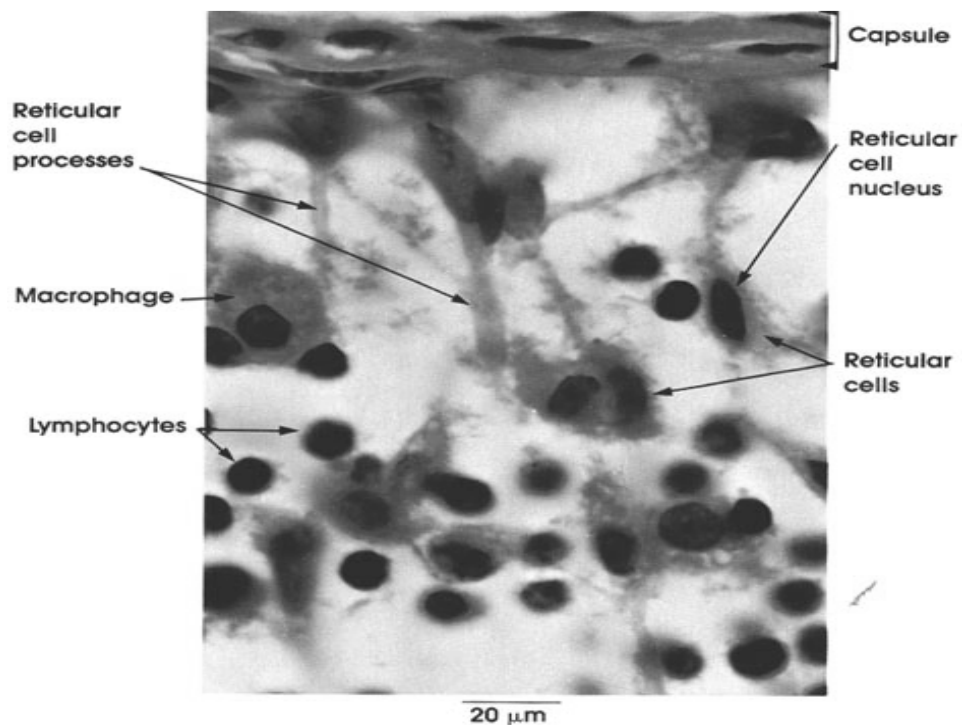
Histology Lab Part 3: Slide 11

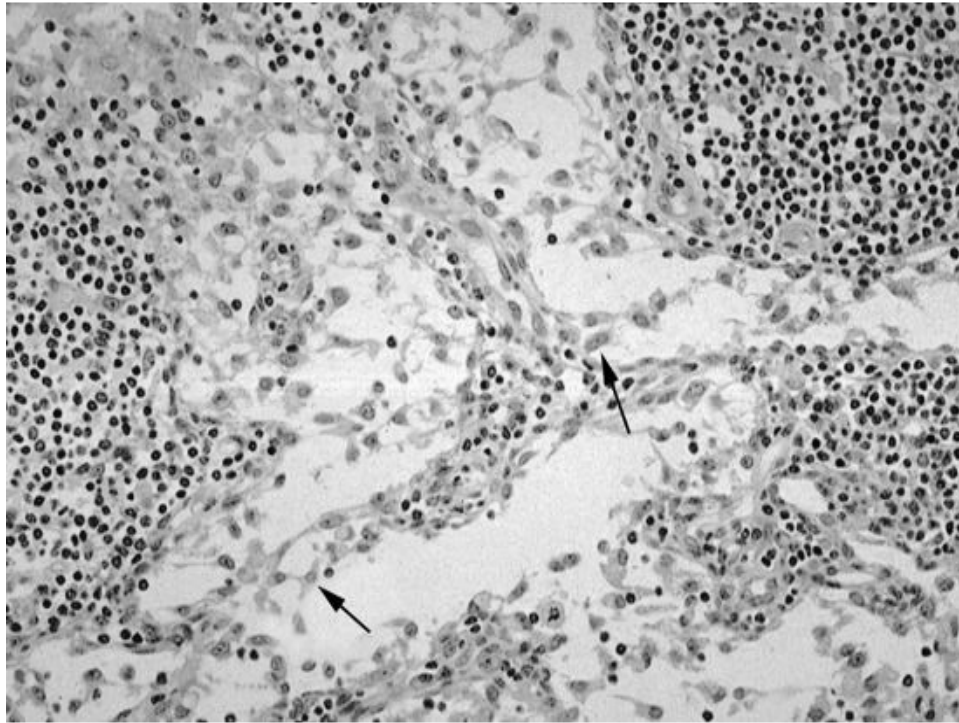


LOOSE Connective Tissue:

3. Reticular CT

- Consists of fine interlacing reticular fibers and reticular cells
- Found in liver, spleen and lymph nodes
- Function = forms the framework (stroma) of organs and binds together smooth muscle tissue cells





True or Proper Connective Tissue

2. Dense Connective Tissue:

a. Dense regular connective tissue

Tendons and ligaments

b. Dense irregular connective tissue

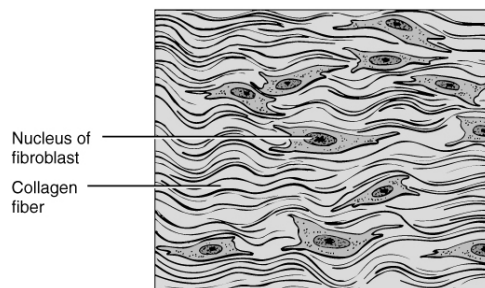
Dermis of skin, submucosa of digestive tract

Dense Connective Tissue:

- **contains more numerous and thicker fibers and far fewer cells than loose CT**

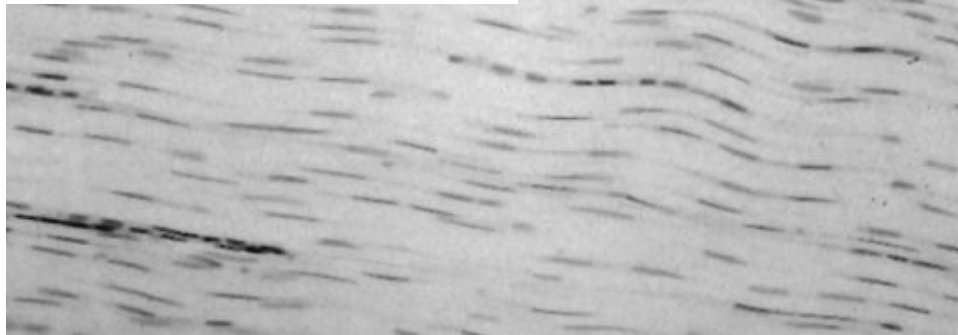
1. dense regular Connective Tissue

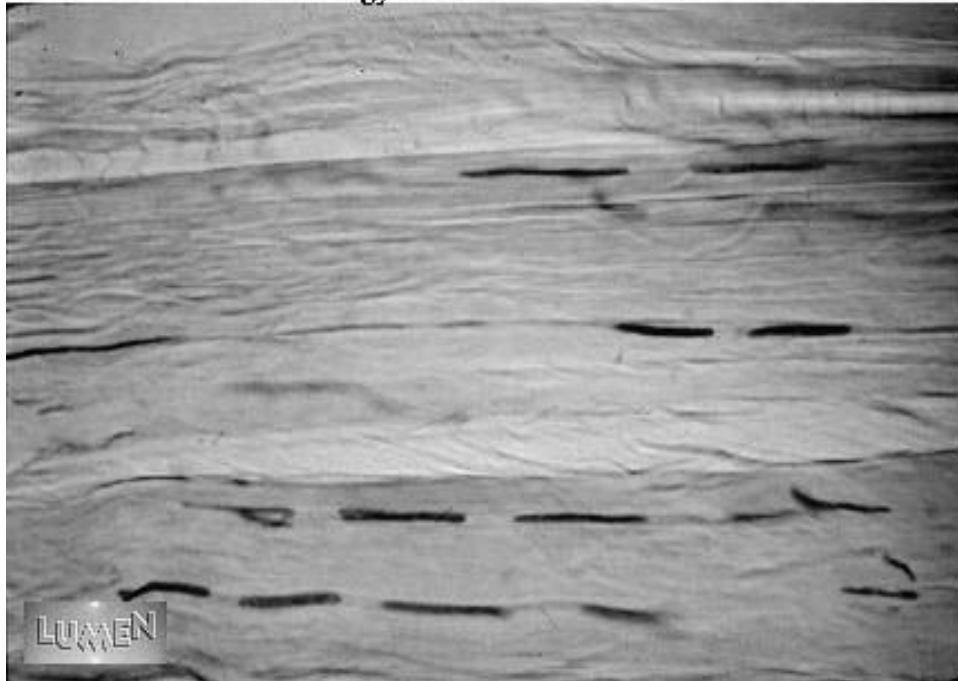
- consists of bundles of collagen fibers and fibroblasts
- forms tendons, ligaments and aponeuroses
- Function = provide strong attachment between various structures



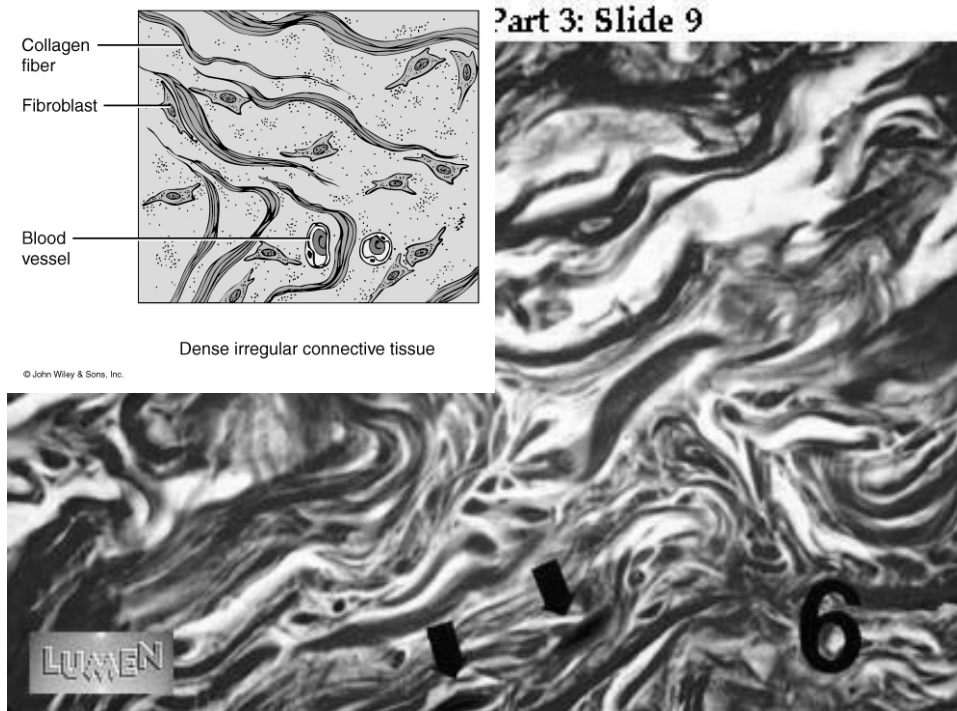
Dense regular connective tissue

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Histology Lab Part 3: Slide 15**Dense Connective Tissue:****2. Dense Irregular CT**

- consists of randomly-arranged collagen fibers and a few fibroblasts
- Found in fasciae, dermis of skin, joint capsules, and heart valves
- Function = provide strength



Supportive Connective Tissue:

CARTILAGE:

- Jelly-like matrix (chondroitin sulfate) containing collagen and elastic fibers and chondrocytes surrounded by a membrane called the perichondrium.
- Unlike other CT, cartilage has NO blood vessels or nerves except in the perichondrium.
- The strength of cartilage is due to collagen fibers and the resilience is due to the presence of chondroitin sulfate.
- Chondrocytes occur within spaces in the matrix called lacunae.

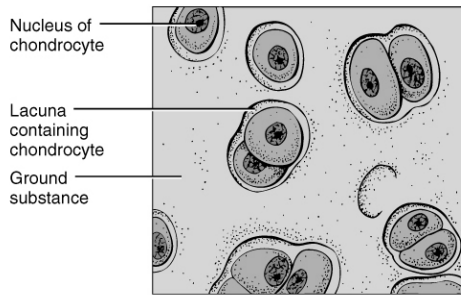
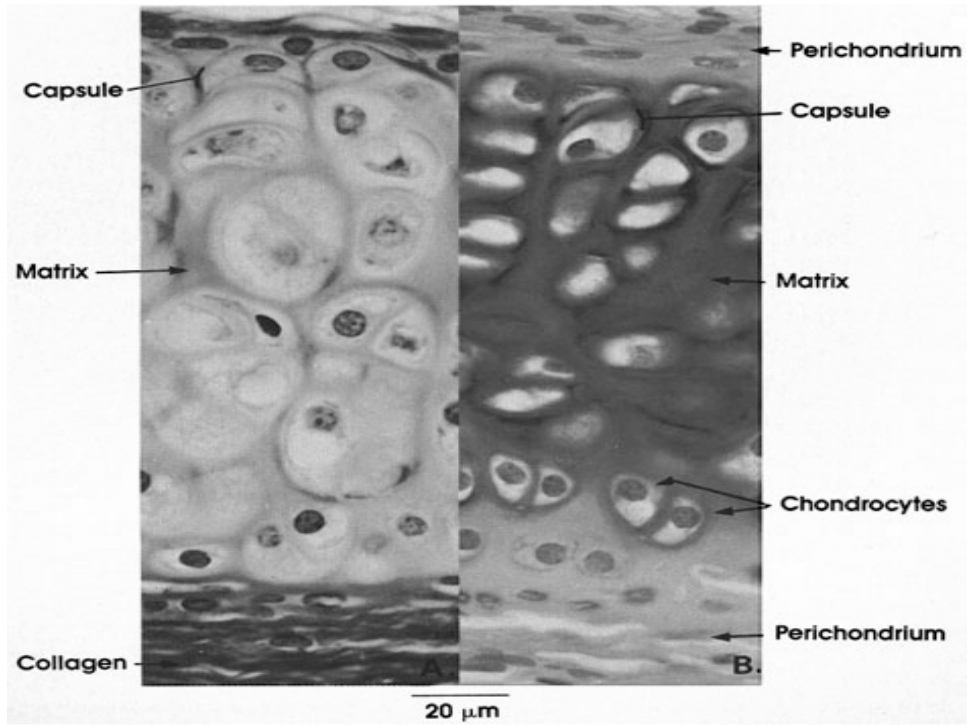
Supportive Connective Tissue

1. **Hyaline cartilage**
2. **Fibrocartilage**
3. **Elastic cartilage**

Supportive Connective Tissue:

1. **Hyaline Cartilage (most abundant type)**

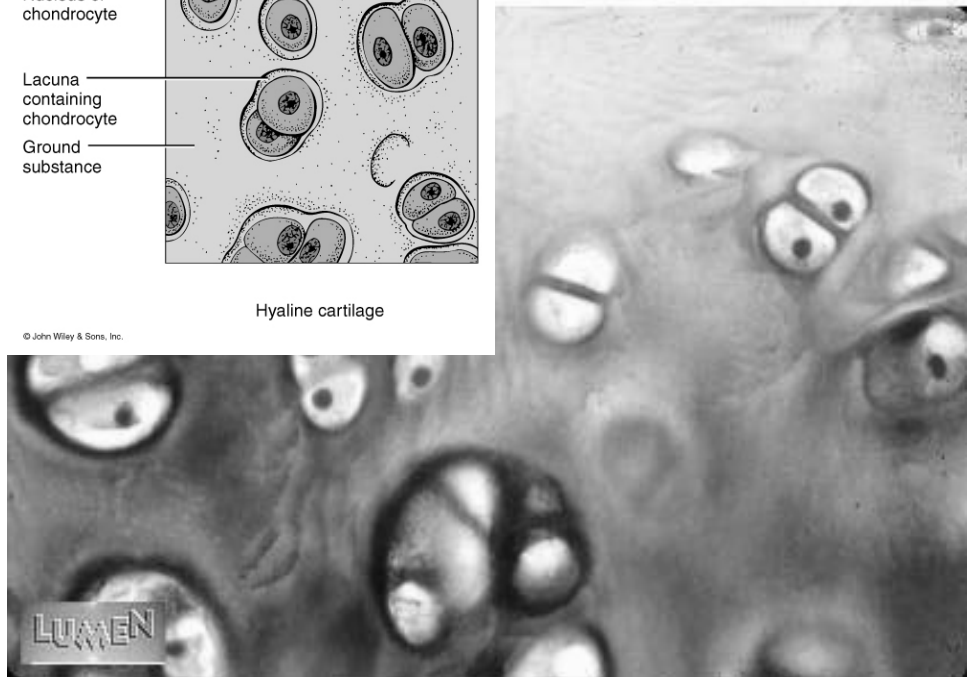
- fine collagen fibers embedded in a gel-type matrix. Occasional chondrocytes inside lacunae.
- Found in embryonic skeleton, at the ends of long bones, in the nose and in respiratory structures.
- Function= flexible, provides support, allows movement at joints



Hyaline cartilage

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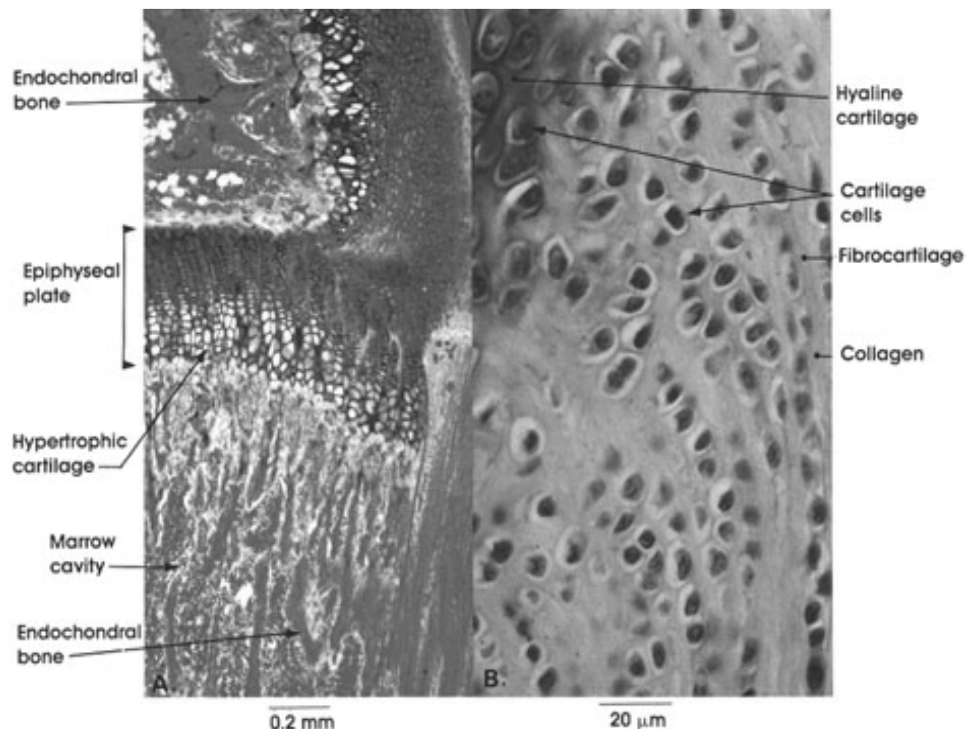
Part 9: Slide 35

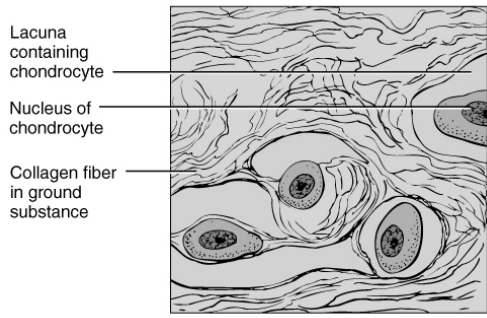


Supportive Connective Tissue:

2. Fibrocartilage

- contains bundles of collagen in the matrix that are usually more visible under microscopy.
- Found in the pubic symphysis, intervertebral discs, and menisci of the knee.
- Function = support and fusion, and absorbs shocks.

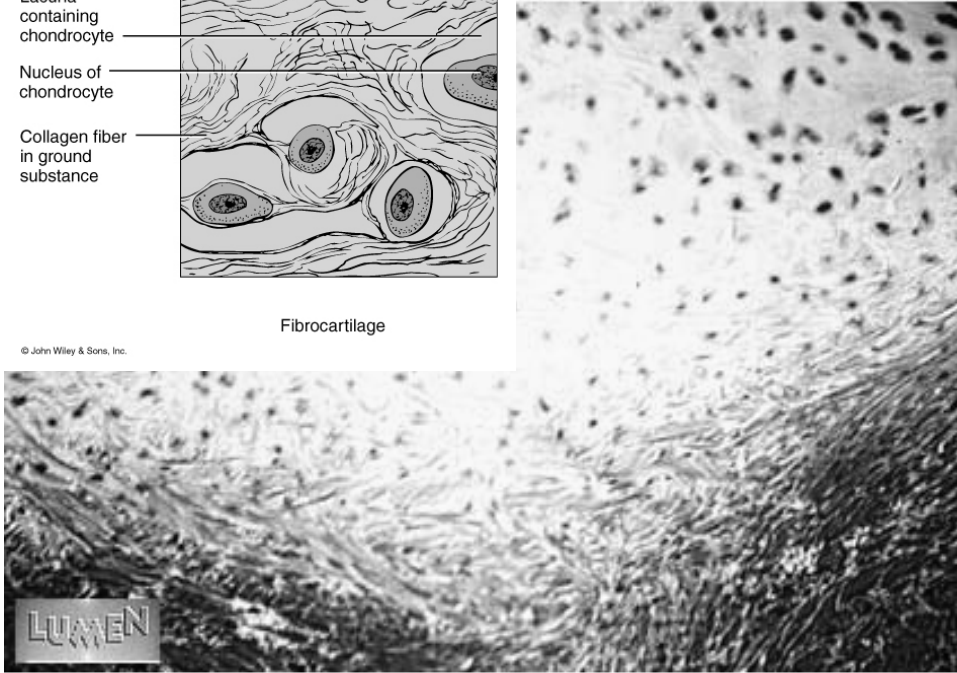




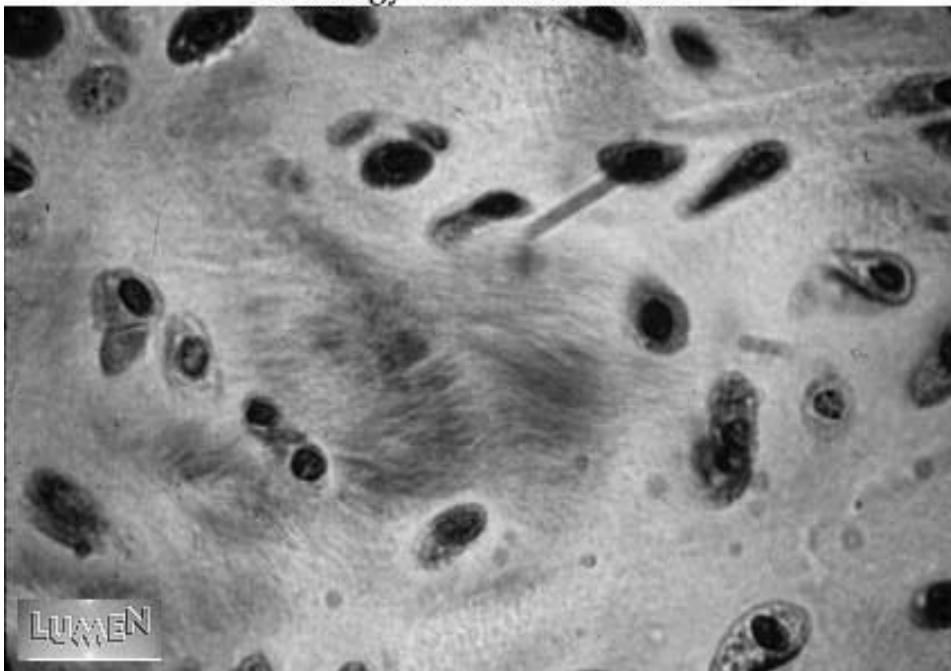
Fibrocartilage

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Part 9: Slide 39



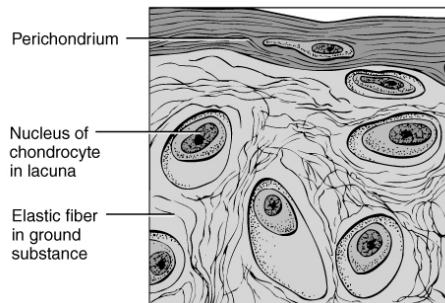
Histology Lab Part 9: Slide 38



Supportive Connective Tissue:

3. Elastic Cartilage

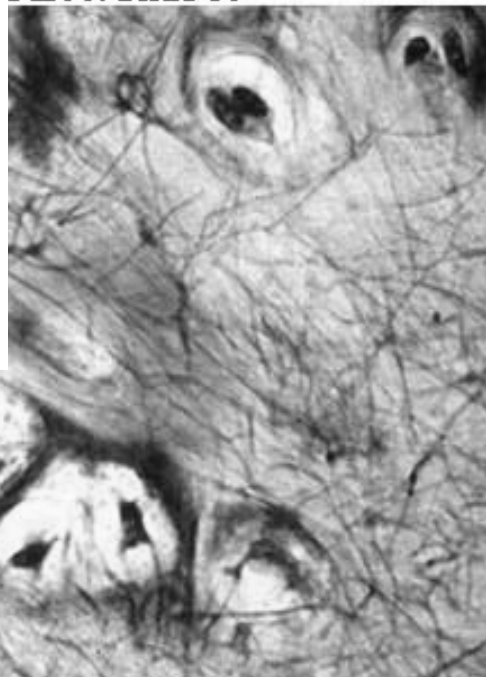
- threadlike network of elastic fibers within the matrix.
- found in external ear, auditory tubes, epiglottis.
- function = gives support, maintains shape, allows flexibility

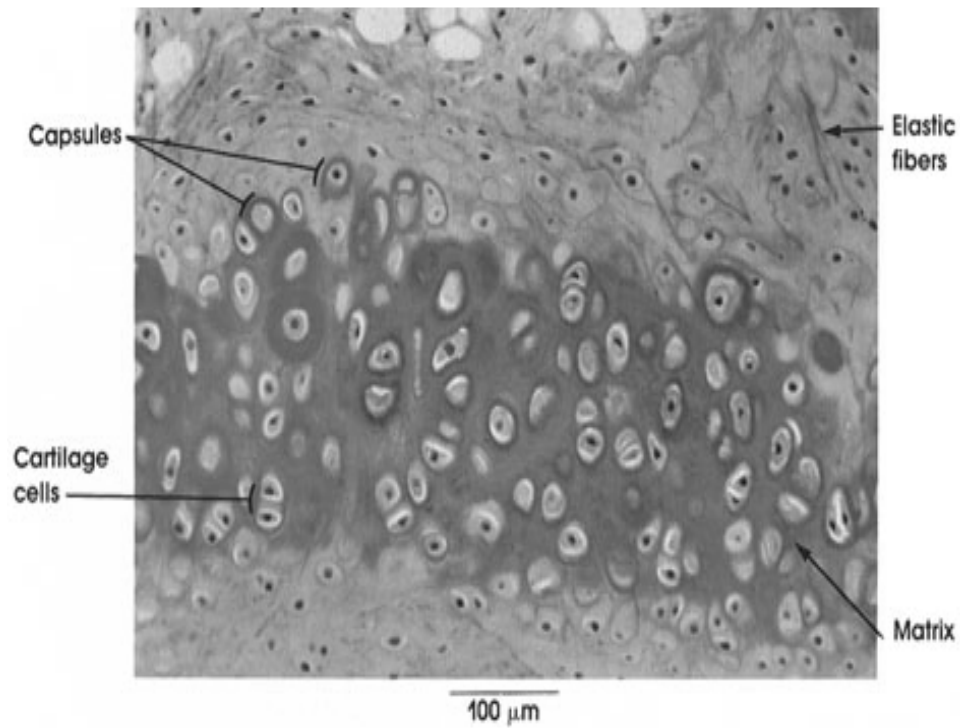


Elastic cartilage

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Part 9: Slide 36





BODY MEMBRANES

- Epithelial Membranes = epithelial layer of cells plus the underlying connective tissue.

Three Types:

1. Mucous membranes
2. Serous membranes
3. Cutaneous membranes

BODY MEMBRANES

1. Mucous membrane = mucosa; it lines cavities that open to the exterior, such as the GI tract.
 - The epithelial layer of the mucous membrane acts as a barrier to disease organisms.
 - The connective tissue layer of the mucous membrane is called the lamina propria.
 - Found as the lining of the mouth, vagina, and nasal passage.

BODY MEMBRANES

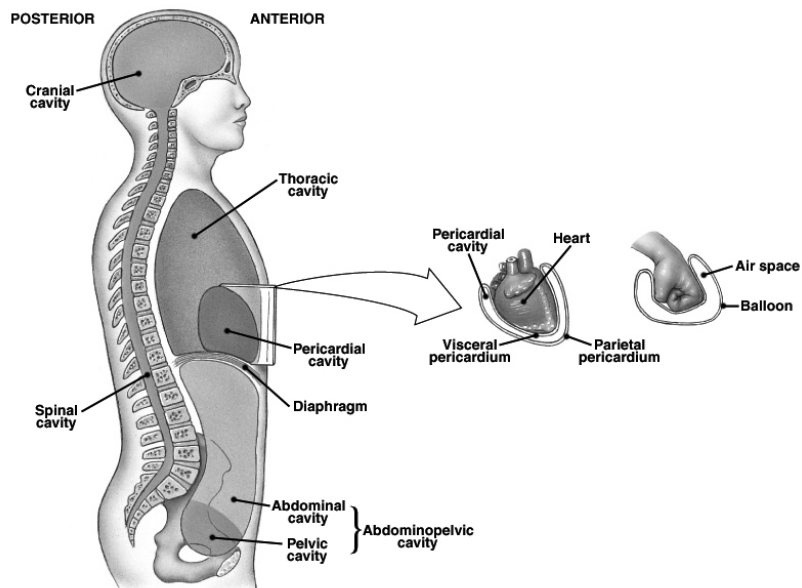
2. **Serous membrane = serosa, membrane lines a body cavity that does NOT open to the exterior and it covers the organs that lie within the cavity.**
 - a. pleura = lungs
 - b. pericardium = heart
 - c. peritoneum = abdomen
 - The serous membrane has two portions:
 1. parietal portion = lining outside the cavity.
 2. visceral portion = covers the organ.

BODY MEMBRANES

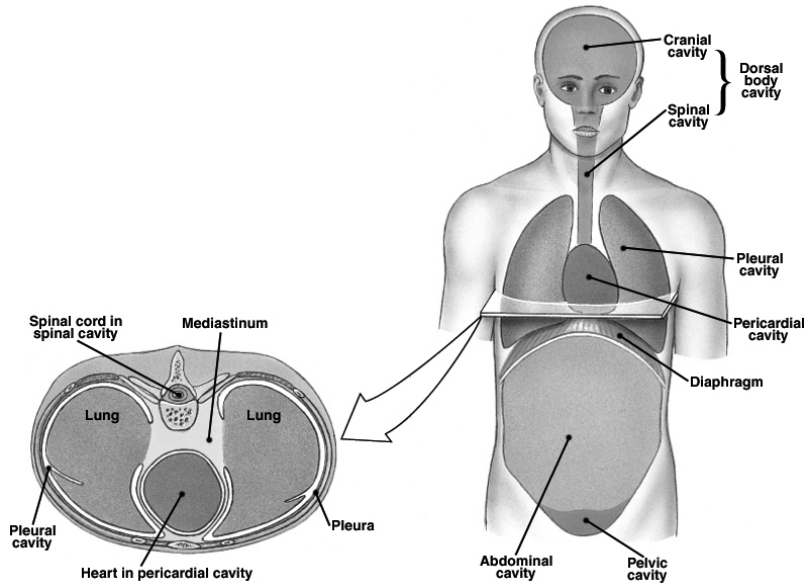
Serous membranes epithelial layer secretes a lubricating SEROUS FLUID, that reduces friction between organs and the walls of the cavities in which they are located.

- The serous fluid is named by location:
- Pleural fluid is found between the parietal and visceral pleura of the lungs.
- Pericardial fluid is found between the parietal and visceral pericardium of the heart.
- Peritoneal fluid is found between the parietal and visceral peritoneum of the abdomen.

BODY MEMBRANES



BODY MEMBRANES



BODY MEMBRANES

