

Connective Tissue part 2

Descriptive Histology 222

Fibers of connective tissue

- ▶ **Collagen fibers** present main tensile strength, and are the stuff of scars.
- ▶ **Elastic fibers** present elasticity.
- ▶ **Reticular fibers** (really, a special form of collagen) provide a delicate supporting framework for loose cells.



Collagen fibers

- ▶ Collagen types I, II and III are the major fibrous collagens
- ▶ Type I collagen is the most abundant structural component of skin, tendons and bones. It represents 90 % of the total collagen content.
- ▶ Type II makes the structural framework of cartilage and intervertebral disks.



Collagen fibers

- ▶ Type III is present in many tissues: 1 to 2 % in tendons, 10 % in the skin and even 50 % in the vascular system
- ▶ Type IV is the structural framework of the non-fibrous basement membranes which act as an underlying support for epithelial and endothelial cells, a protective sheath for myofibrils and the filtration membrane of the glomeruli



Elastic fibers

- ▶ **Elastin** is another fibrous protein.
- ▶ As the name suggests, elastin is elastic.
- ▶ In ordinary connective tissue, elastic fibers help restore normal shape after distortion.
- ▶ Elastic fibers can deteriorate with age and exposure to sun



Reticular fibers

- ▶ Made from type III collagen, provide a very delicate network (hence the name) supporting individual cells in certain organs (lymph nodes, spleen, liver).
- ▶ Reticular fibers do not show up in routine H&E stained specimens, but they can be demonstrated with silver salts.



Supportive Connective Tissue

CARTILAGE

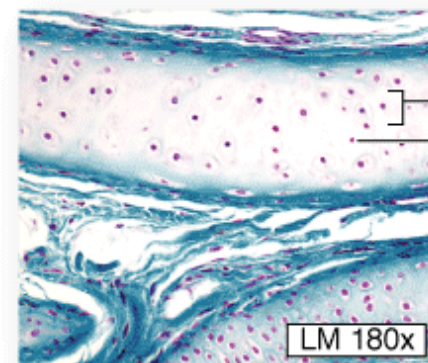
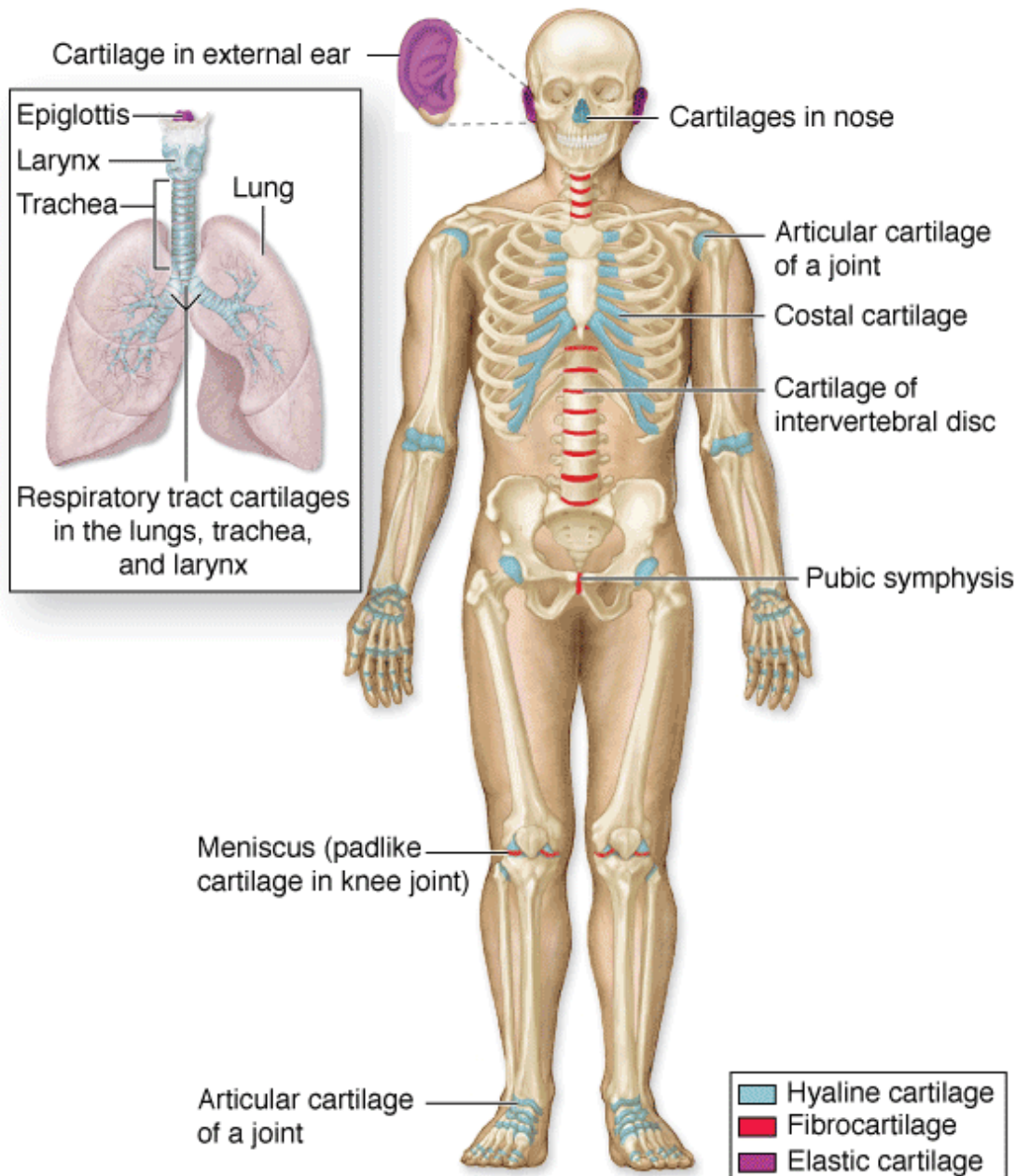
- ▶ Jelly-like matrix (chondroitin sulfate) containing collagen and elastic fibers and chondrocytes surrounded by a membrane called the perichondrium.
- ▶ Unlike other CT, cartilage avascular (has NO blood vessels) or nerves except in the perichondrium.
- ▶ The strength of cartilage is due to collagen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



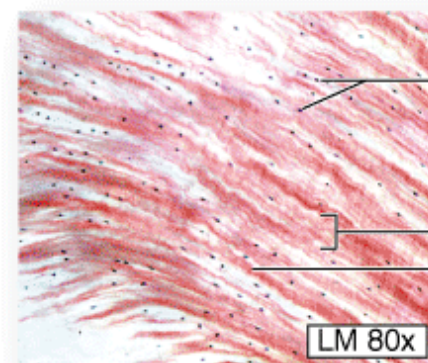
Supportive Connective Tissue

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

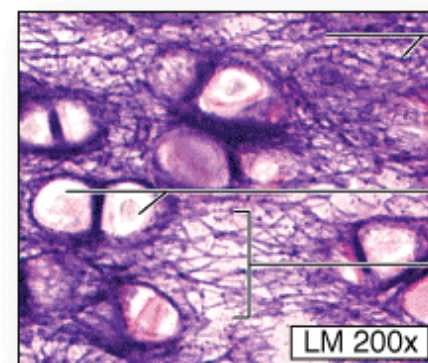




b Hyaline cartilage



c Fibrocartilage



d Elastic cartilage

Extracellular matrix
Lacuna
(with chondrocyte)

Lacunae
(with chondrocytes)

Extracellular matrix
Collagen fibers

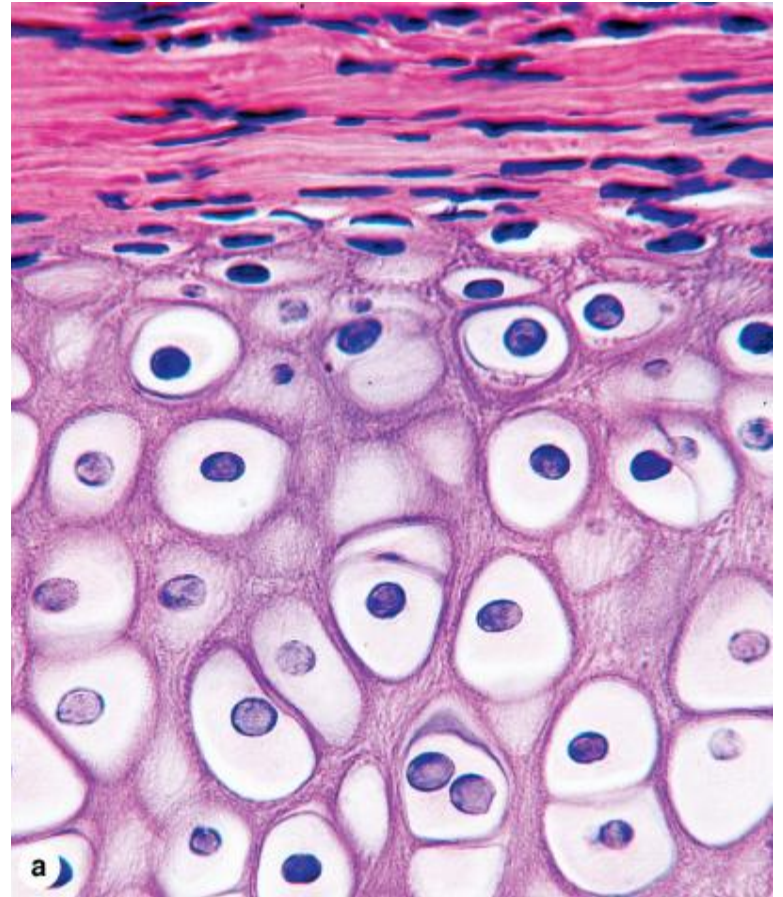
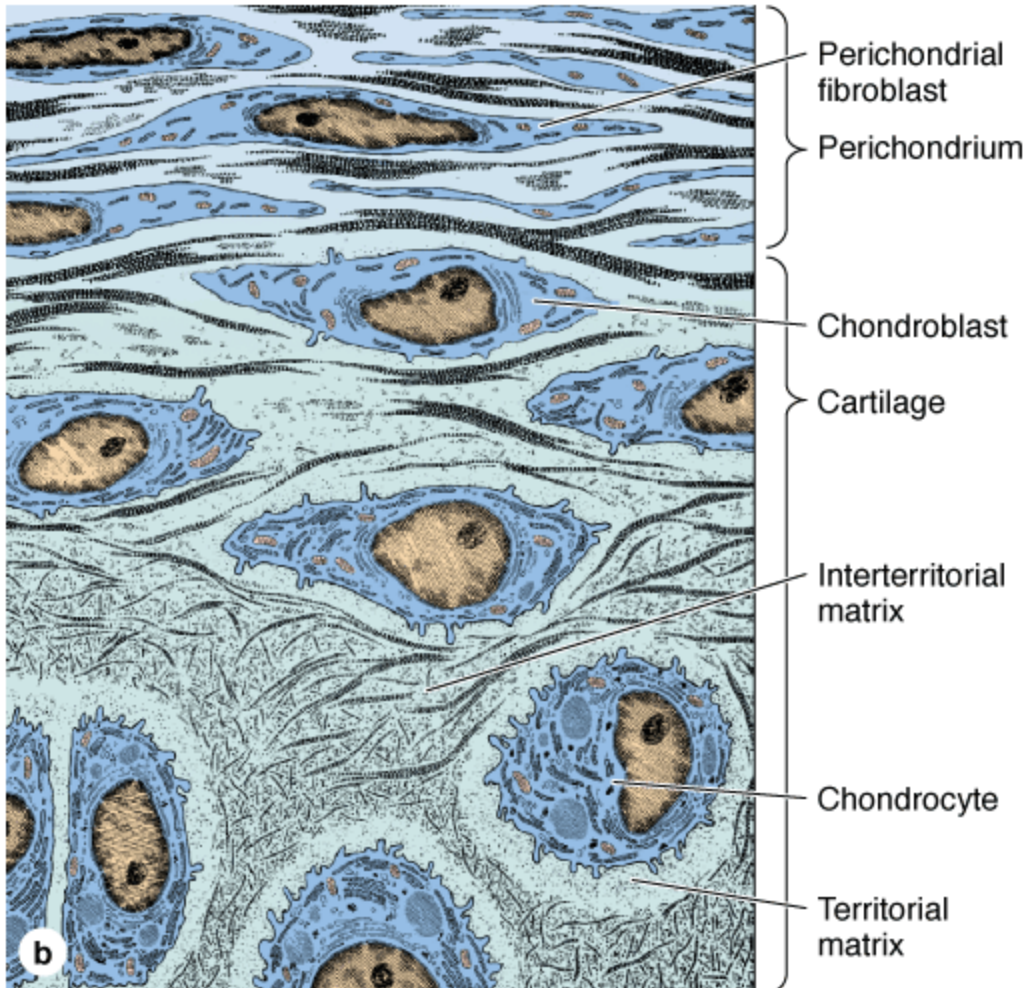
Elastic fibers

Lacunae
(with chondrocytes)
Extracellular matrix

Supportive Connective Tissue:

- I. **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**



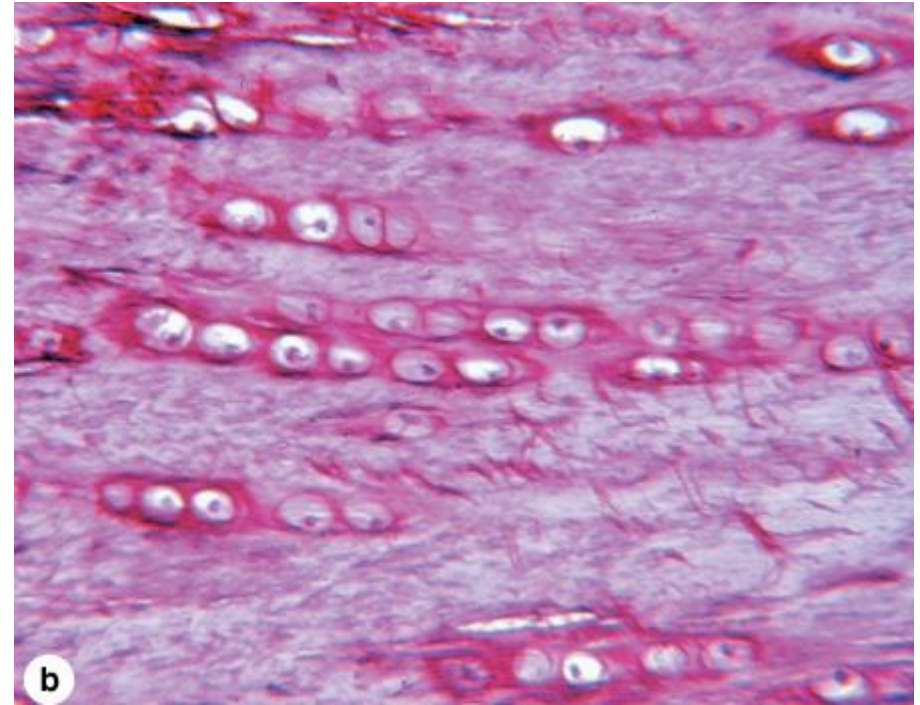
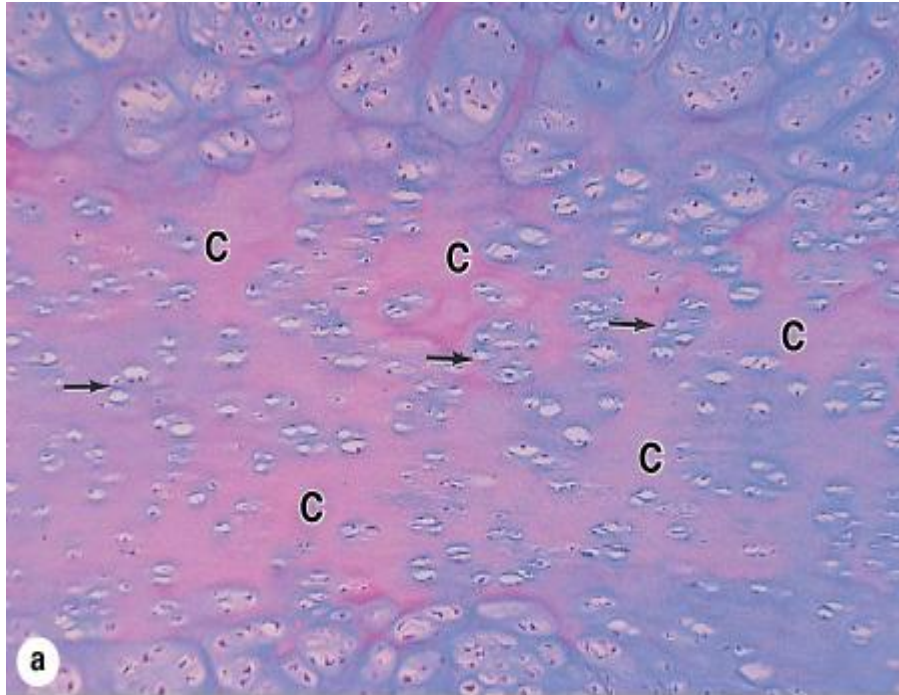


Supportive Connective Tissue:

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.**



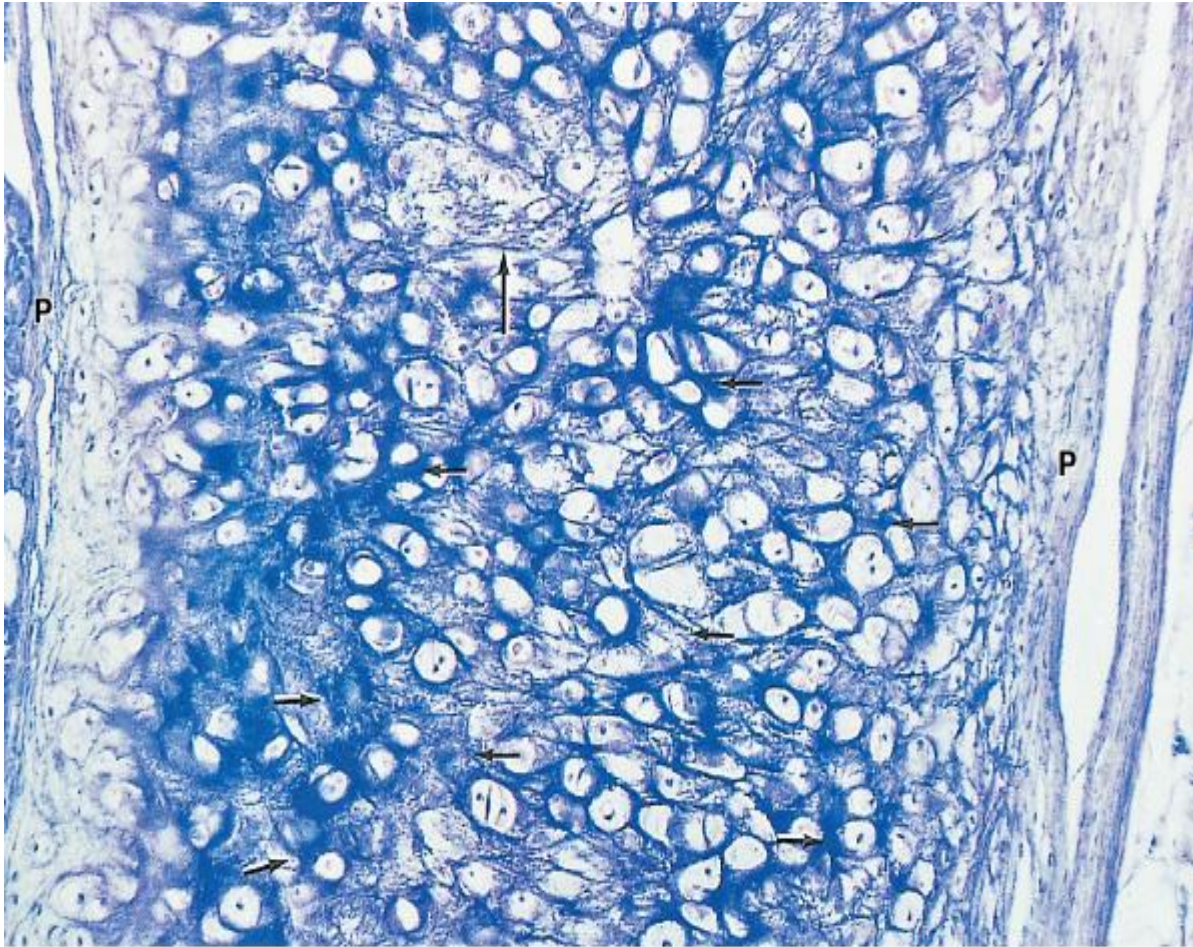


Supportive Connective Tissue:

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**





perichondrium (P)



Bone

- ▶ **Osteocytes** (Gr. *osteon*, bone + *kytos*, cell), which are found in cavities (**lacunae**) between layers (lamellae) of bone matrix
- ▶ **Osteoblasts** (*osteon* + Gr. *blastos*, germ), which synthesize the organic components of the matrix
- ▶ **Osteoclasts** (*osteon* + Gr. *klastos*, broken), which are multi-nucleated giant cells involved in the resorption and remodeling of bone tissue.



