Cartilage

Lec. 5

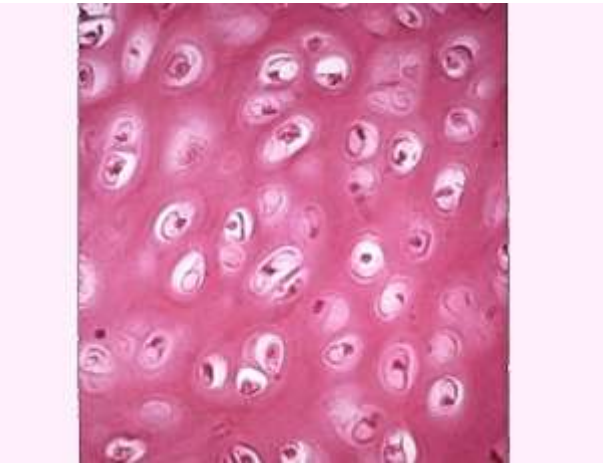
Histology

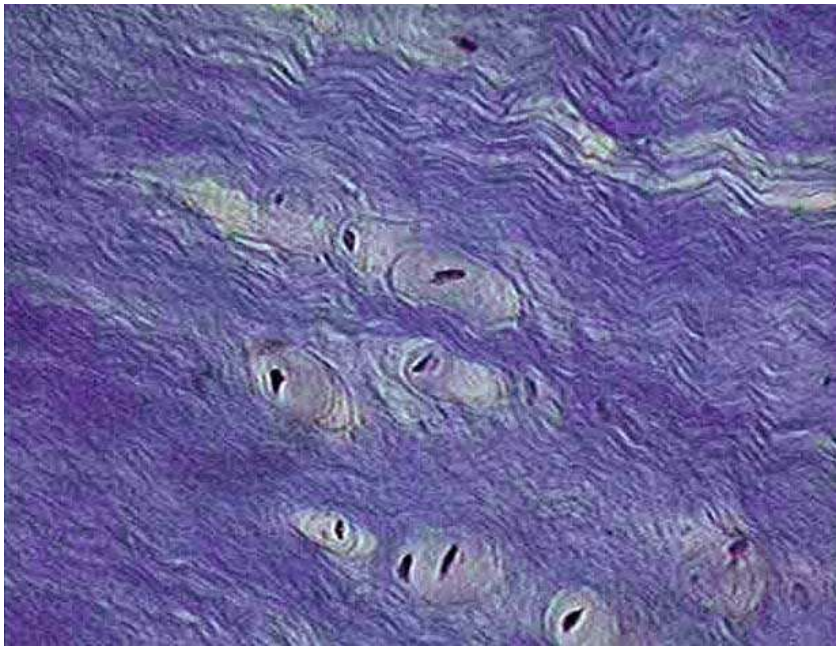
Functions: cartilage

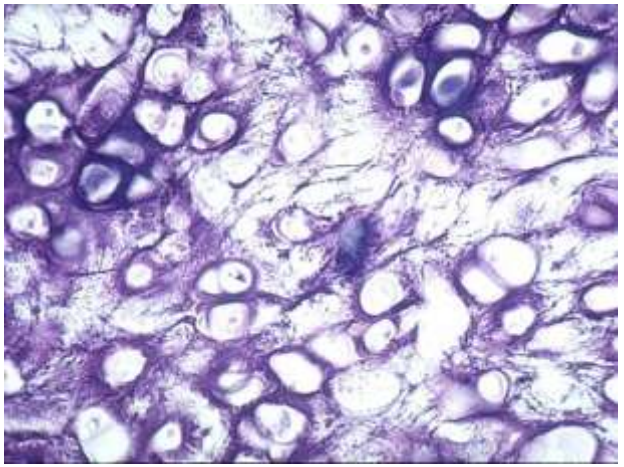
1. Rigid, yet more flexible than bone; more elastic than bone
2. Support and protection
3. Abundant in the fetus and embryo
4. Site of skeletal growth
5. Covers joints
6. Supports nose, ears, trachea, ribs.

Cartilage

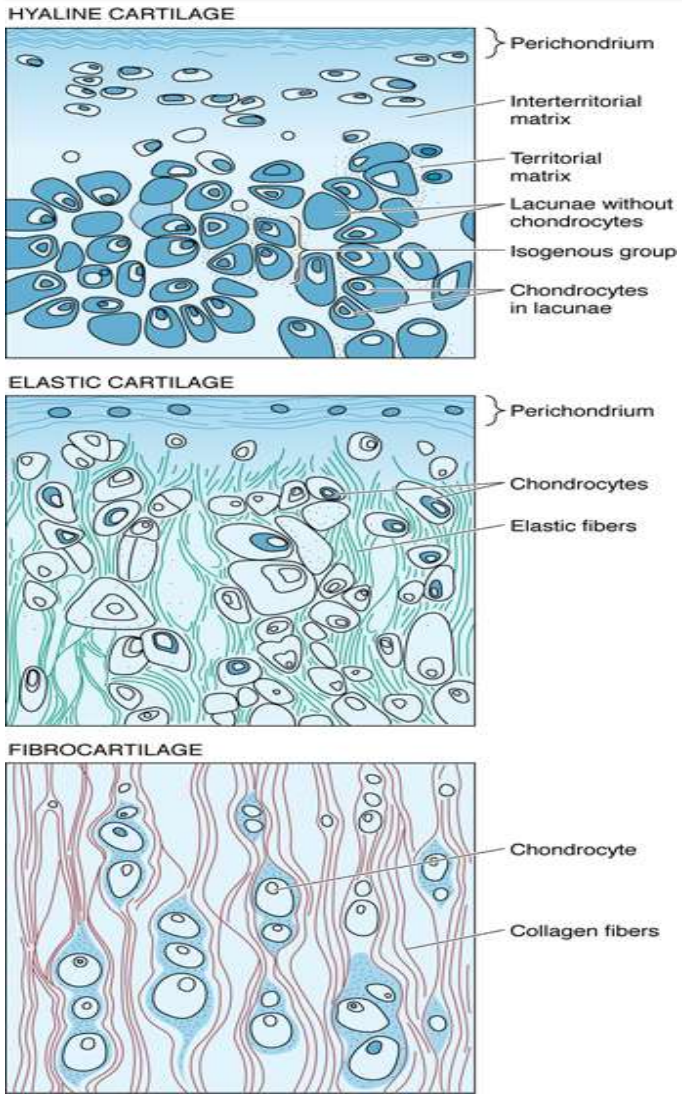
- Hyaline
- Fibrocartilage
- Elastic







Cartilage



- **Cartilage possesses cells called chondrocytes, which occupy small cavities called lacunae within the extracellular matrix they secreted. The substance of cartilage is neither vascularized nor supplied with nerves or lymphatic vessels; however, the cells receive their nourishment from blood vessels of surrounding connective tissues by diffusion through the matrix. The extracellular matrix is composed of glycosaminoglycans and proteoglycans, which are intimately associated with the collagen and elastic fibers embedded in the matrix. The flexibility and resistance of cartilage to compression permit it to function as a shock absorber, and its smooth surface permits almost friction-free movement of the joints of the body as it covers the articulating surfaces of the bones.**
- **There are three types of cartilage according to the fibers present in the matrix:**
- **Hyaline cartilage contains type II collagen in its matrix; it is the most abundant cartilage in the body and serves many functions.**
- **Elastic cartilage contains type II collagen and abundant elastic fibers scattered throughout its matrix, giving it more pliability.**
- **Fibrocartilage possesses dense, coarse type I collagen fibers in its matrix, allowing it to withstand strong tensile forces.**

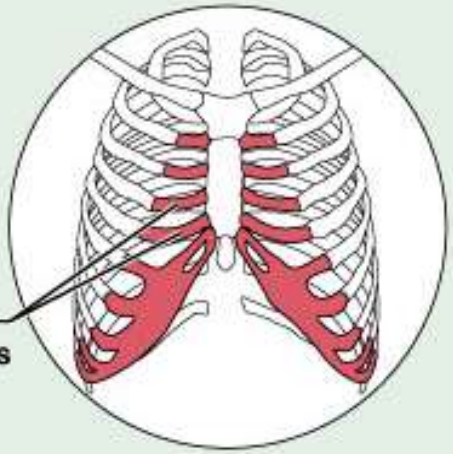
Hyaline Cartilage

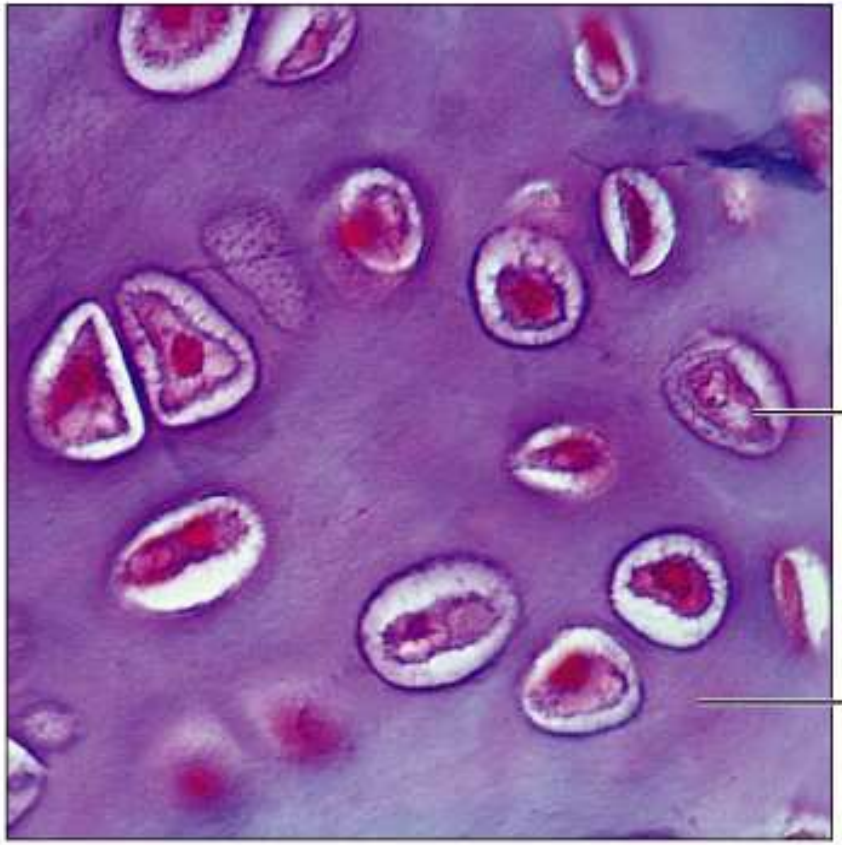
(g) Cartilage: hyaline

Description: Amorphous but firm matrix; collagen fibers form an imperceptible network; chondroblasts produce the matrix and when mature (chondrocytes) lie in lacunae.

Function: Supports and reinforces; has resilient cushioning properties; resists compressive stress.

Location: Forms most of the embryonic skeleton; covers the ends of long bones in joint cavities; forms costal cartilages of the ribs; cartilages of the nose, trachea, and larynx.

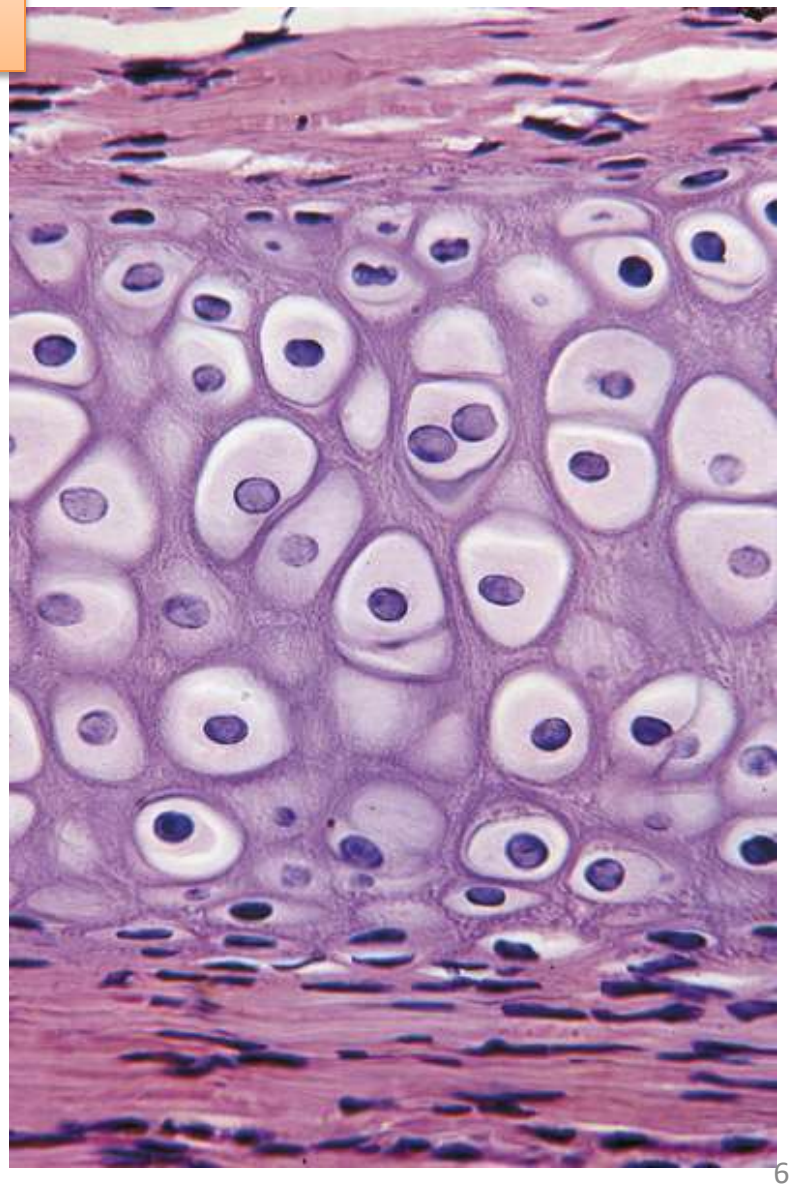




Photomicrograph: Hyaline cartilage from the trachea (300×).

Hyaline Cartilage

Photomicrograph of hyaline cartilage. Chondrocytes are located in matrix lacunae, and most belong to isogenous groups. The upper and lower parts of the figure show the perichondrium stained pink. Note the gradual differentiation of cells from the perichondrium into chondrocytes. H&E stain. Low magnification.



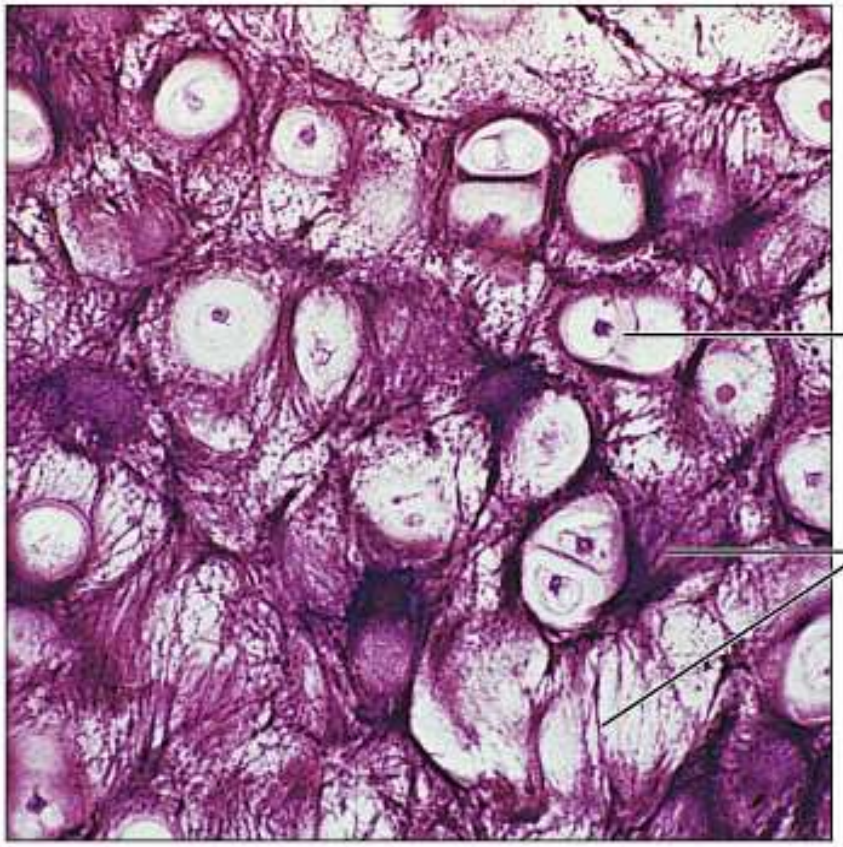
Elastic Cartilage

(h) Cartilage: elastic

Description: Similar to hyaline cartilage, but more elastic fibers in matrix.

Function: Maintains the shape of a structure while allowing great flexibility.

Location: Supports the external ear (pinna); epiglottis.



Photomicrograph: Elastic cartilage from the human ear pinna; forms the flexible skeleton of the ear (400×).

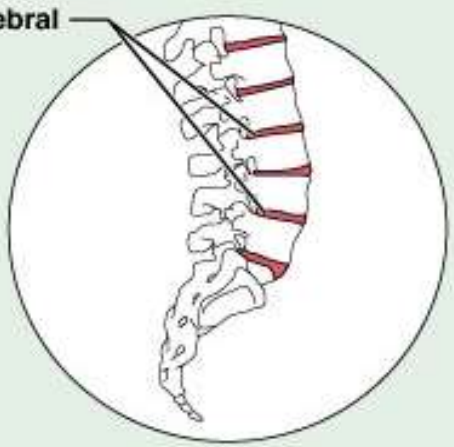
Fibrocartilage

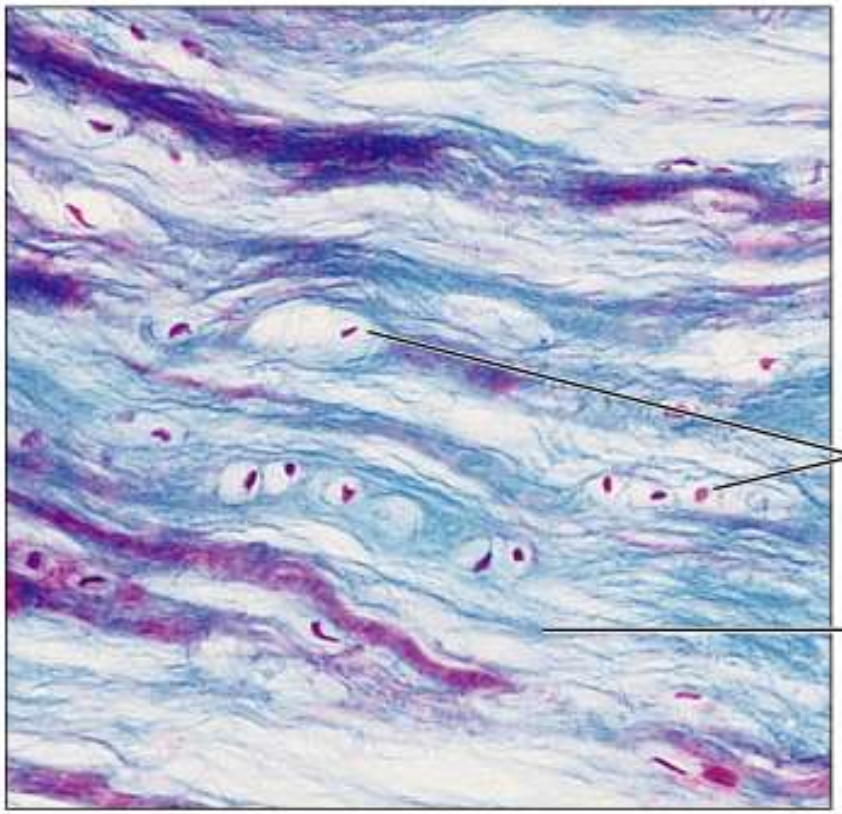
(i) Cartilage: fibrocartilage

Description: Matrix similar to but less firm than that in hyaline cartilage; thick collagen fibers predominate.

Function: Tensile strength with the ability to absorb compressive shock.

Location: Intervertebral discs; pubic symphysis; discs of knee joint.





Photomicrograph: Fibrocartilage of an intervertebral disc (200×).