Cartilage

Cartilage is a supporting connective tissue consisting of a dense matrix of collagen fibers and elastic fibers embedded in a rubbery ground substance. The matrix is produced by cells called **chondroblasts**, which become embedded in the matrix that is, mature cartilage cells are called **chondrocytes**. They occur, either singly or in groups, within spaces isolated in spaces/chambers called **lacunae** (sing. *lacuna*) in the matrix.

A membrane of dense irregular connective tissue called **perichondrium** surrounds the surface of most of the cartilage in the body. This is important to remember especially because, unlike other connective tissues, cartilage contains no blood vessels or nerves *except in the perichondrium*. Nutrition supplied to the chondrocytes by diffusion. Cartilage has limited repair capabilities: Because chondrocytes bound in lacunae, they cannot migrate to damaged areas. Therefore, cartilage damage is difficult to heal. In addition, because hyaline cartilage does not have a blood supply, the deposition of new matrix is slow. Damaged hyaline cartilage usually replaced by fibrocartilage scar tissue. Three different types (structures) of cartilage have slightly different structures and functions. They are **hyaline cartilage**, **elastic cartilage** and **fibrocartilage**.

- **Hyaline Cartilage:**

Obtain a trachea slide .The hyaline cartilage will have a smooth (Note lack of fibrous appearance, instead an overall glassy appearance. Color varies. **Matrix** that secreted by chondroblasts with cells suspended within it. The matrix is compact fibrils of collagen and the cells producing the matrix called **chondrocytes**. They are contained within tiny chambers called **lacunae** (Lacunae often are paired and distinctive).

Hyaline cartilage **found in** articulating ends of long bones, nose, trachea, ends of ribs.

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

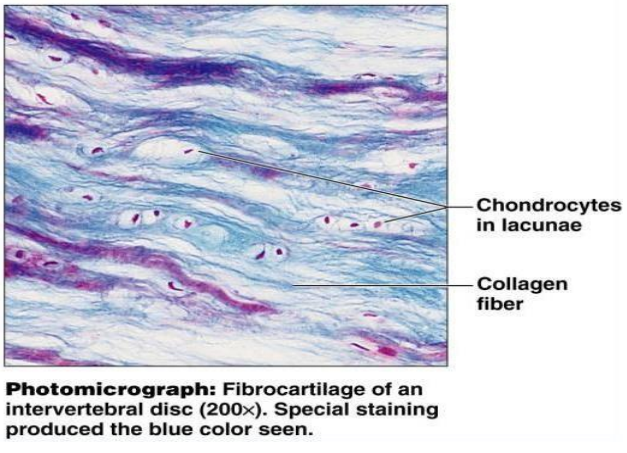
- **Elastic Cartilage:**

Obtain a slide of ear pinna. Notice the large chondrocytes located in the lacunae
(Often paired lacunae (similar to hyaline cartilage), but note extensive dark elastic fibers.), also the presence of **elastic fibers** (collagen fibers are also present but not visible) within the matrix of the tissue. While the tissue is similar in composition to hyaline cartilage, the addition of more elastic fibers allows it to stretch and maintain its shape. This type of tissue is **found** forming most of the structure of the external ear.

Photomicrograph: Elastic cartilage from the human ear pinna; forms the flexible skeleton of the ear (640×).

- **Fibrocartilage:**

Obtain a slide of intervertebral discs in the spinal column. The **pubis symphysis**, and in the discs of the knee. While its composition is similar to that of hyaline cartilage, but possesses more noticeable **collagen fibers**. (Distinguished from dense regular connective tissue by the distinct lacunae. Usually blue in color).
Fibrocartilage resists compressive forces.



Photomicrograph: Fibrocartilage of an intervertebral disc (200×). Special staining produced the blue color seen.