

# CARTILAGE

**KEY IDEA: cartilage is a connective tissue composed of chondrocytes (cells) that produce long proteins called fibers, and smaller molecules such as glycoproteins that are collectively referred to as ground substance.**

- A fetal skeleton begins entirely as cartilage. During pregnancy and early childhood, much of the skeleton ossifies, or is converted into bone tissue.
- Cartilage can be very flexible, or be very firm.
  - The external ear is composed of elastic cartilage and is extremely flexible
  - Fibrocartilage is hard and strong, but gives enough to act as a very efficient shock absorber
  - Hyaline cartilage is the most common cartilage type in the body, and its form is less flexible than elastic, but more flexible than fibrocartilage.

## **Elastic Cartilage:**

- Found in the ear and the epiglottis. As its name implies, it has the highest composition of elastic fibers compared to the other types of cartilage.
- The epiglottis' purpose is to cover the trachea during swallowing to prevent choking.

**Fibrocartilage:** Has a higher proportion of collagen fibers than hyaline or elastic cartilage.

- **Intervertebral discs** (pads between vertebrae that act as shock absorbers)
  - tough collagen fibers in a ring (called the annulus fibrosus) and a soft center (nucleus pulposus).
  - The nucleus pulposus is filled with glycoproteins and water
  - Over the course of a day, the pads compress slightly. They spring back to normal by the next morning. In little children, the pads are the most spongy.
  - As we age, the nucleus pulposus becomes less able to hold water, and doesn't provide as much cushion.
  - A **herniated disc (or ruptured/blown/slipped)** is when the nucleus pulposus has broken through the collagen fibers of the annulus fibrosus. Symptoms may include: pain, numbness, and weakness in the muscles innervated by the compressed spinal nerve.
  - A **bulging disc** has thinned collagen fibers in one area.
- **Pubic symphysis** (connects the left and right halves of the pelvis)
  - provides shock absorption during walking; widens slightly during delivery of a baby.
- **Menisci:** shock absorption in highly moveable joints
  - knee (medial and lateral meniscus)
  - shoulder (acromioclavicular joint)
  - sternoclavicular joint
  - jaw (temporomandibular joints).

**Hyaline cartilage:** Forms the following structures:

1. Baby's developing skeleton in the womb
2. Nasal cartilages
3. Xiphoid process of the sternum (usually ossified by adulthood)
4. costal cartilages that connect the ribs to the sternum
5. articular cartilage—lines the end of bones where they meet with another bone to form a joint.