

Cartilage

Functions of Cartilage Tissue

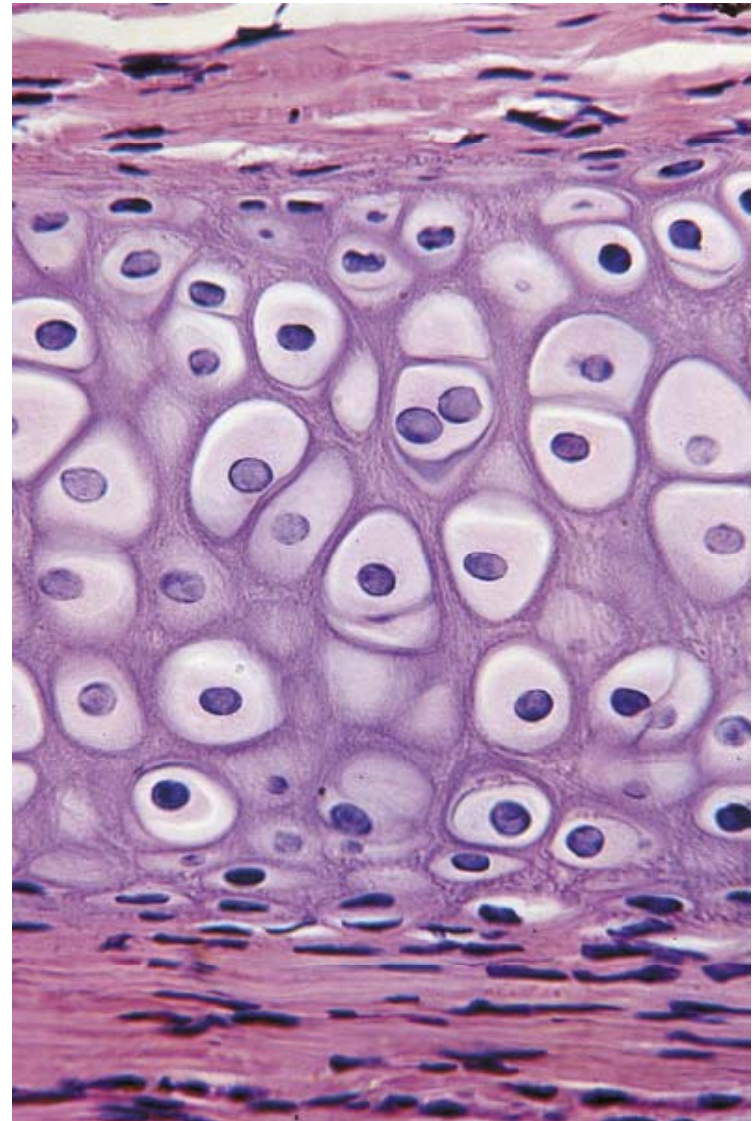
- Specialized CT in which the firm consistency of the extracellular matrix allows the tissue to bear mechanical stresses without permanent distortion
- Supports soft tissues.
- Shock-absorbing because it is resilient.
- Smooth surface allows sliding against it.
- Essential for growth, development of bone.

Characteristics

- Chondrocytes (-blasts)
 - Located in lacunae
- Extensive extra-cellular matrix
 - Fibers, ground substance
 - Collagen, hyaluronic acid, proteoglycans, glycoproteins, elastic (in elastic cartilage)
 - Macromolecules, water, fibers bind together and give firm, flexible properties to tissue.
- No blood, nerve supply
- Low metabolic rate.

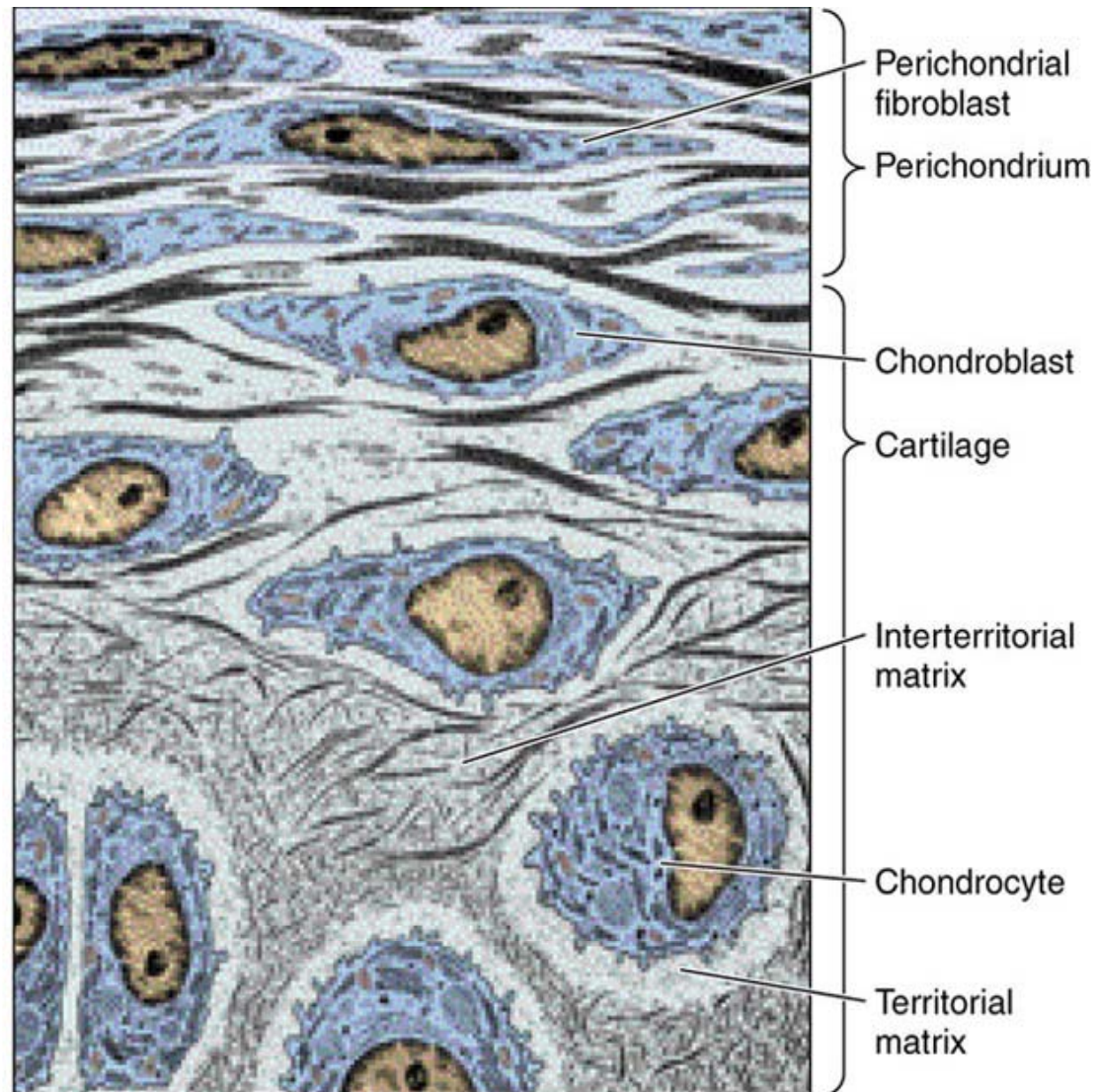
Perichondrium

- Dense CT that covers cartilage (except articular cartilage of joints.)
- Contains blood, nerve supply, lymphatics.
- Contains collagen fibers, fibroblasts

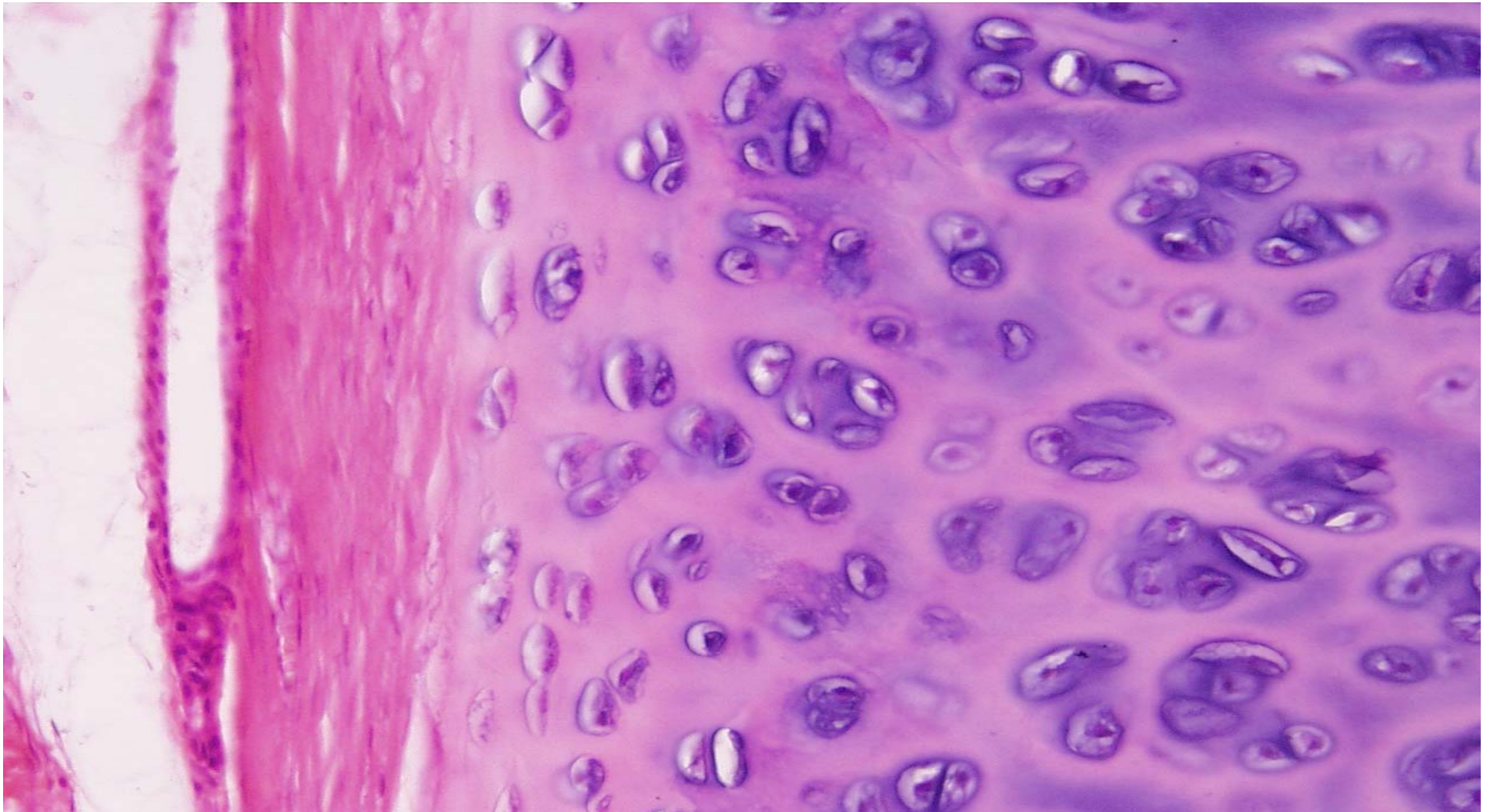


Hyaline cartilage

Transition Perichondrium / Cartilage



Hyaline Cartilage



Chondrocytes in Lacunae

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Histology Lab Part 9: Slide 32

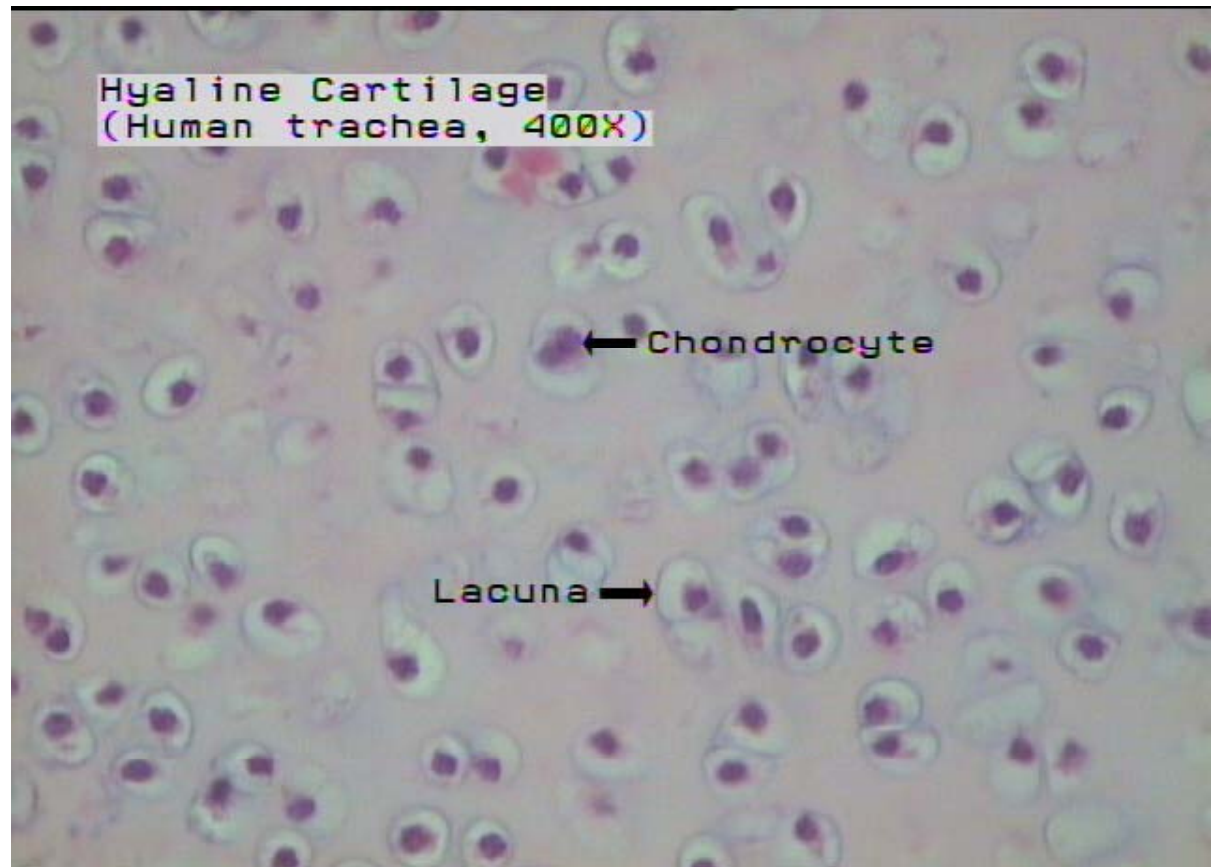


CARTILAGE (hyaline)

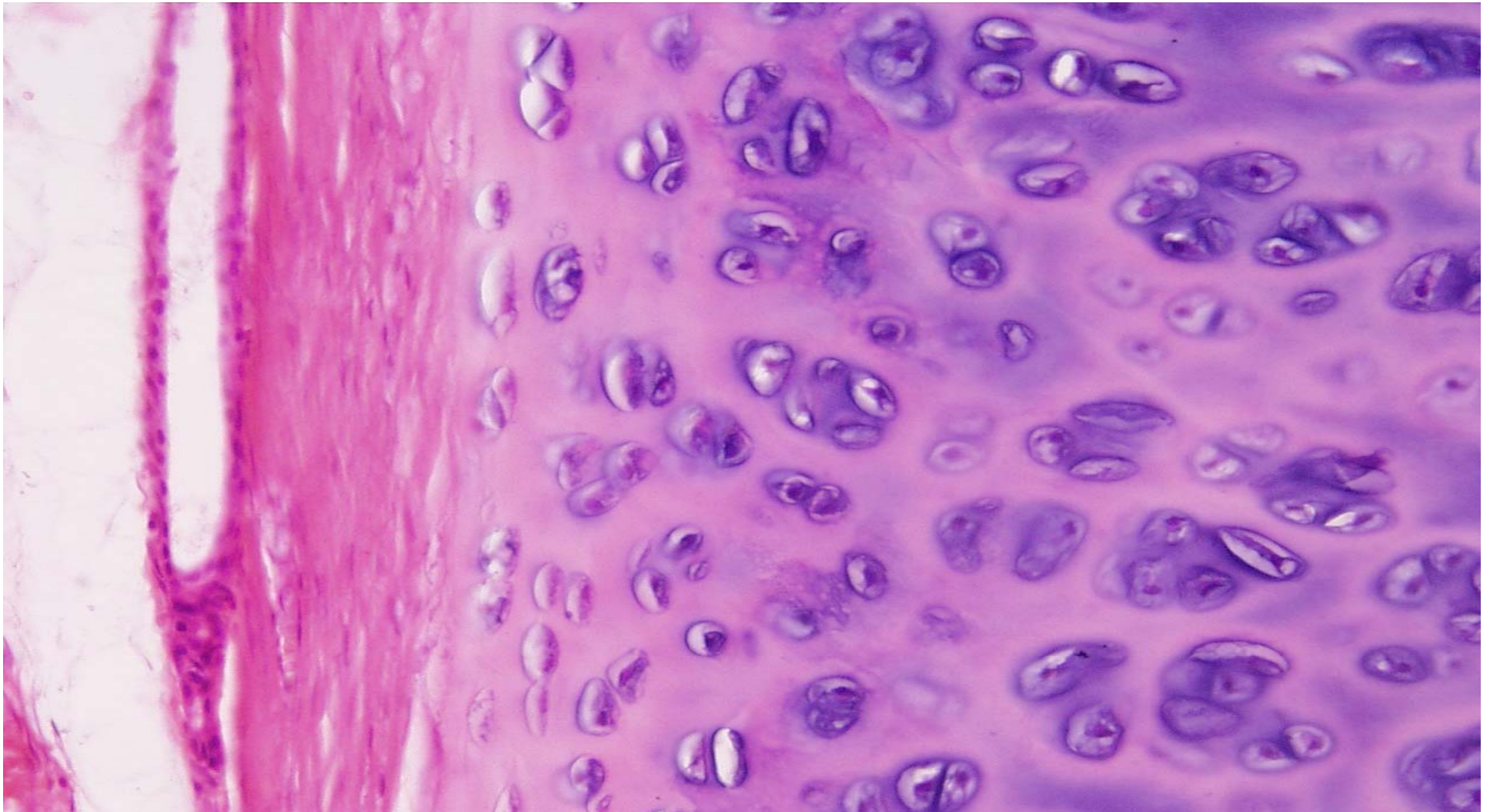
Found at ends of bones,
nose, trachea, larynx

Bluish white color.

Strong, rubbery,
flexible tissue.



Hyaline Cartilage



Influence of hormones

- GH, TH, testosterone accelerates synthesis of glycosaminoglycans.
- Cortisone, estradiol inhibits synthesis.
- Growth depends mainly on GH (somatotroopin)
 - Stimulates liver to produce somatomedin C
 - Somatomedin C acts on cartilage cell, stimulating growth

- <http://web.indstate.edu/thcme/mwking/glycans.html>

Growth of Cartilage

- Growth is attributable to two processes:
 - Interstitial growth
 - Mitotic division of preexisting chondrocytes
 - Synthesis of matrix
 - Expands cartilage matrix from within
 - Occurs in epiphyseal plates, articular cartilage
 - Appositional growth
 - Differentiation of perichondrial cells → chondroblasts
 - Synthesis of matrix
 - Increase in girth

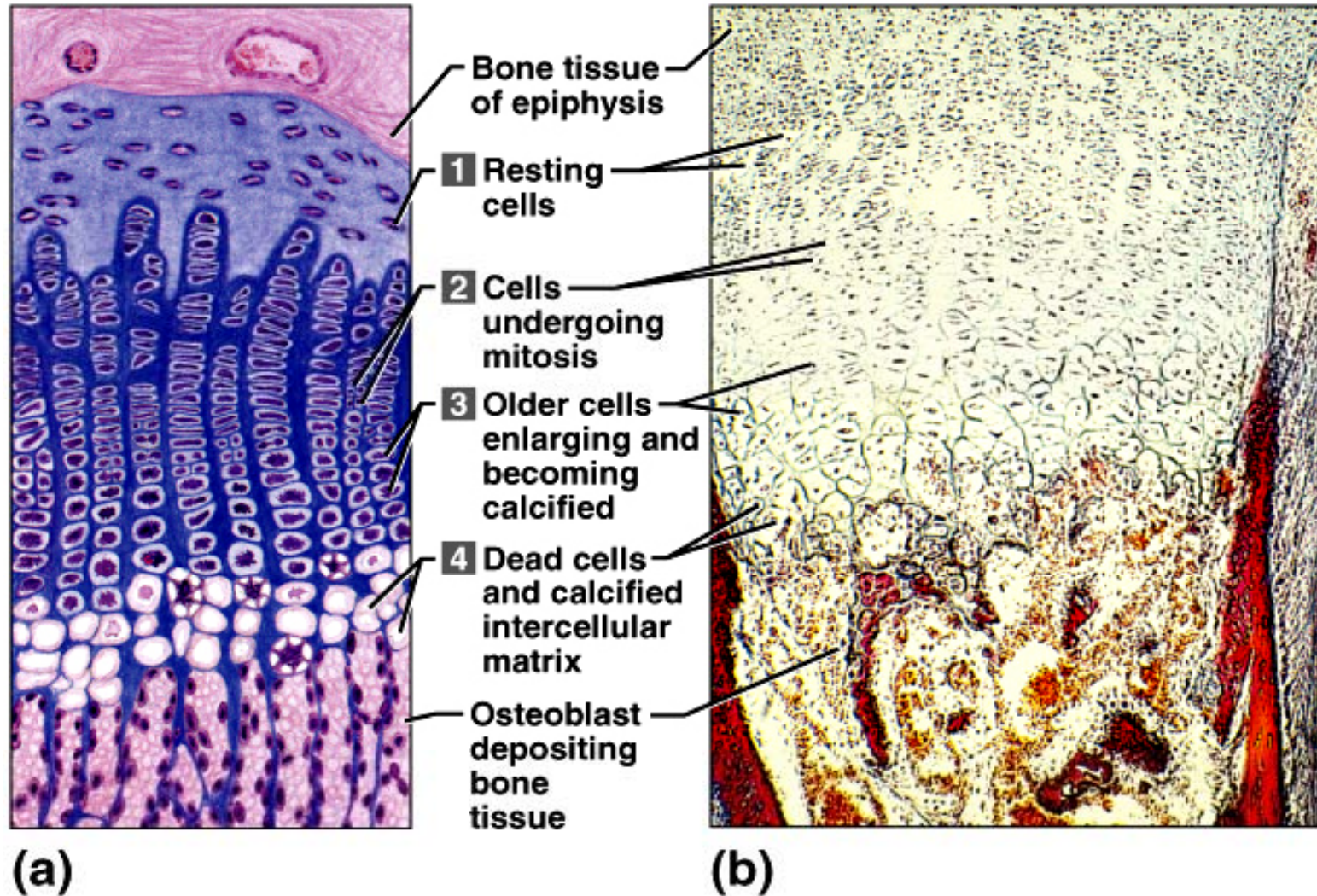
Growth in the Epiphyseal Plate

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Epiphyseal Plate (Interstitial Growth)

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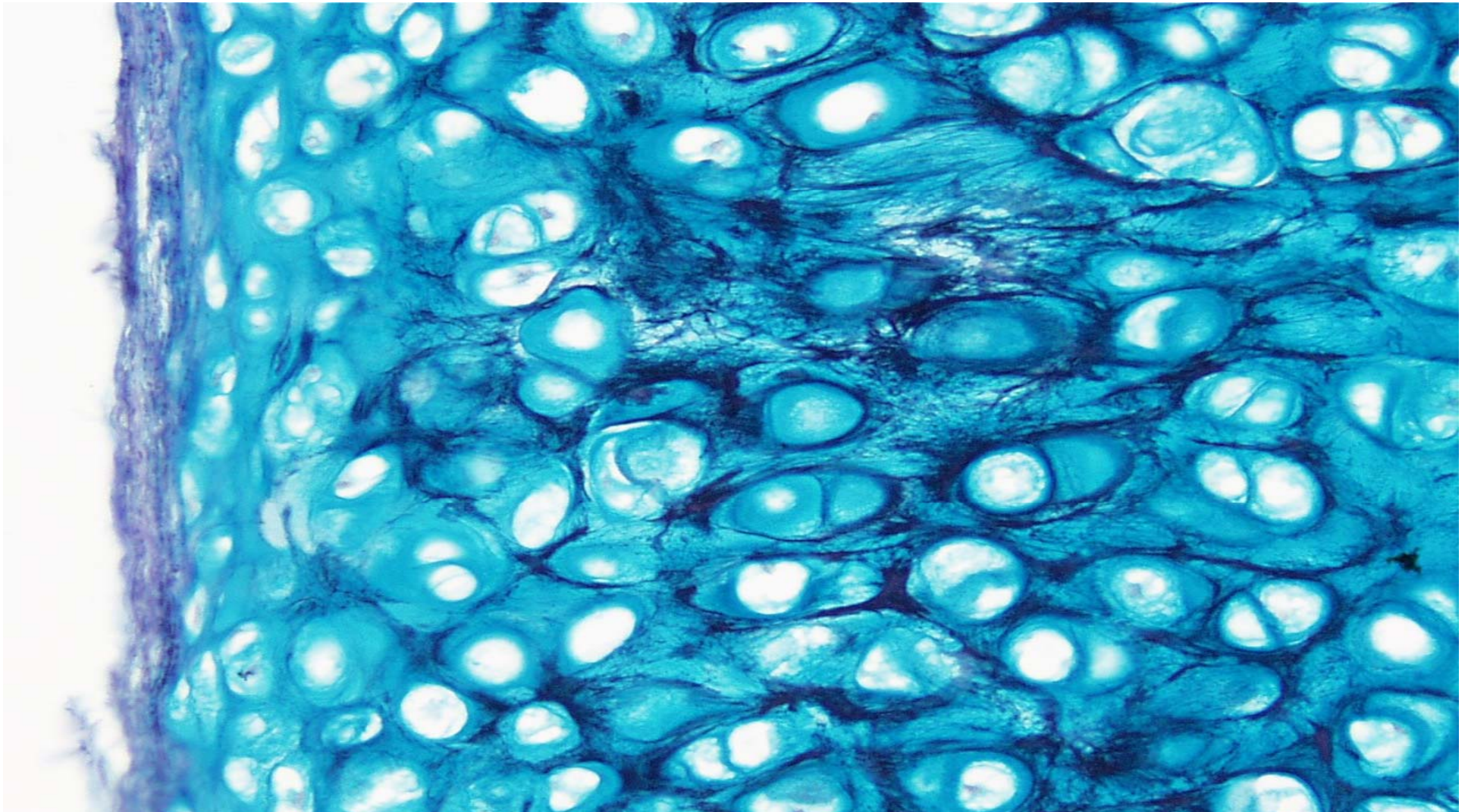


Appositional Growth

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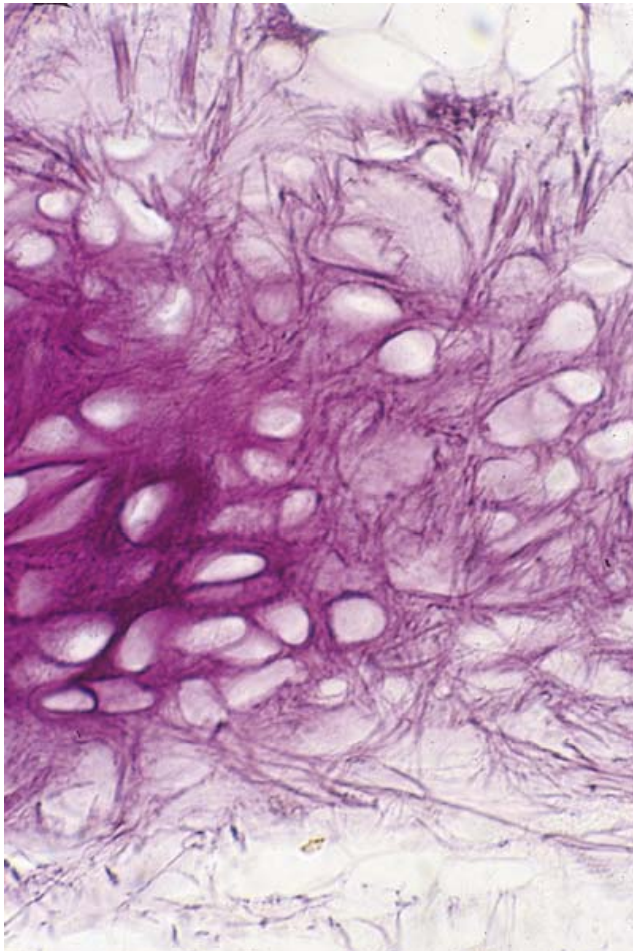
ELASTIC CARTILAGE



ELASTIC CARTILAGE

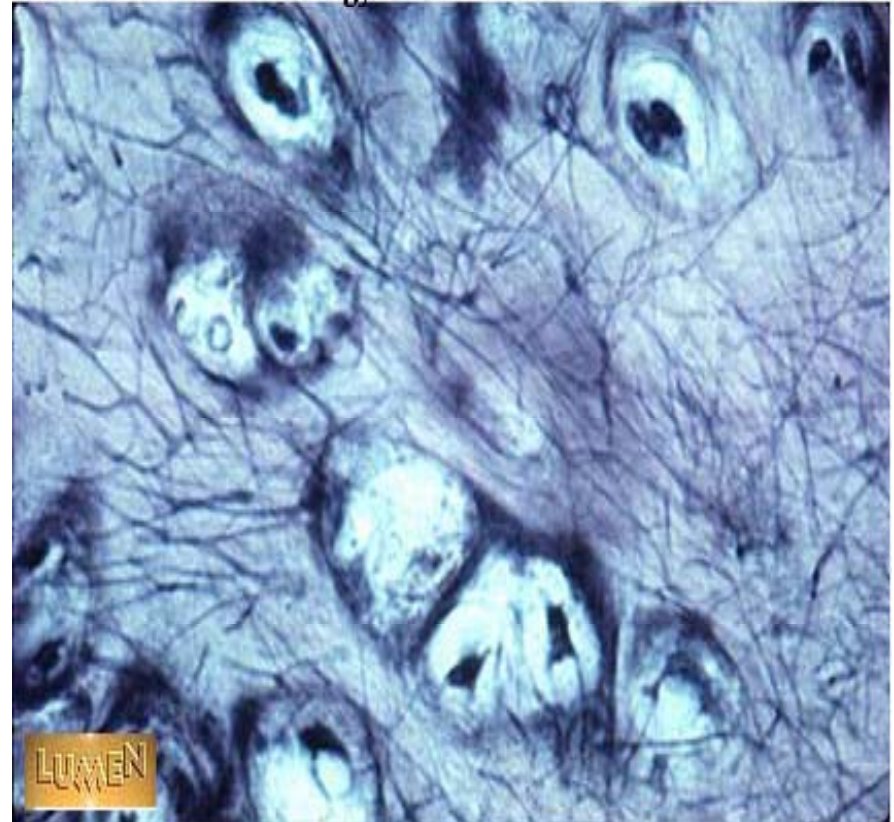
- Similar to hyaline cartilage but has elastic fibers running in all directions in addition to collagen.
- Found in auricle of ear, walls of external auditory canals, eustachian tubes, epiglottis, larynx
- Maintains shape, deforms but returns to shape; flexibility of organ; strengths and supports structures.

Elastic Cartilage

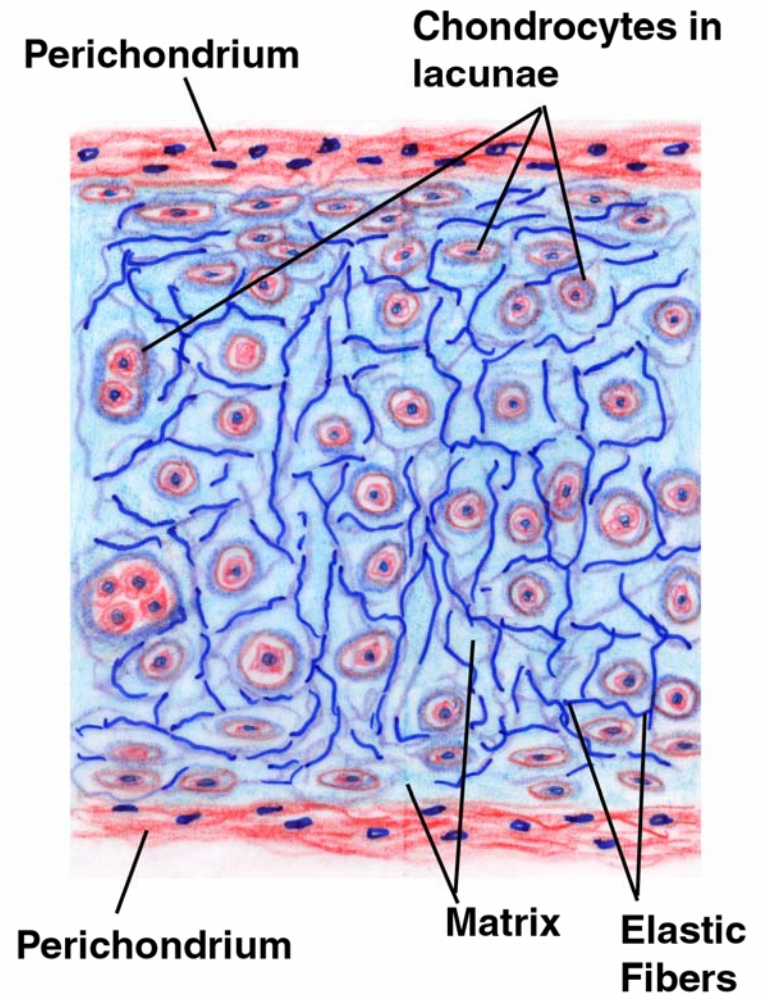
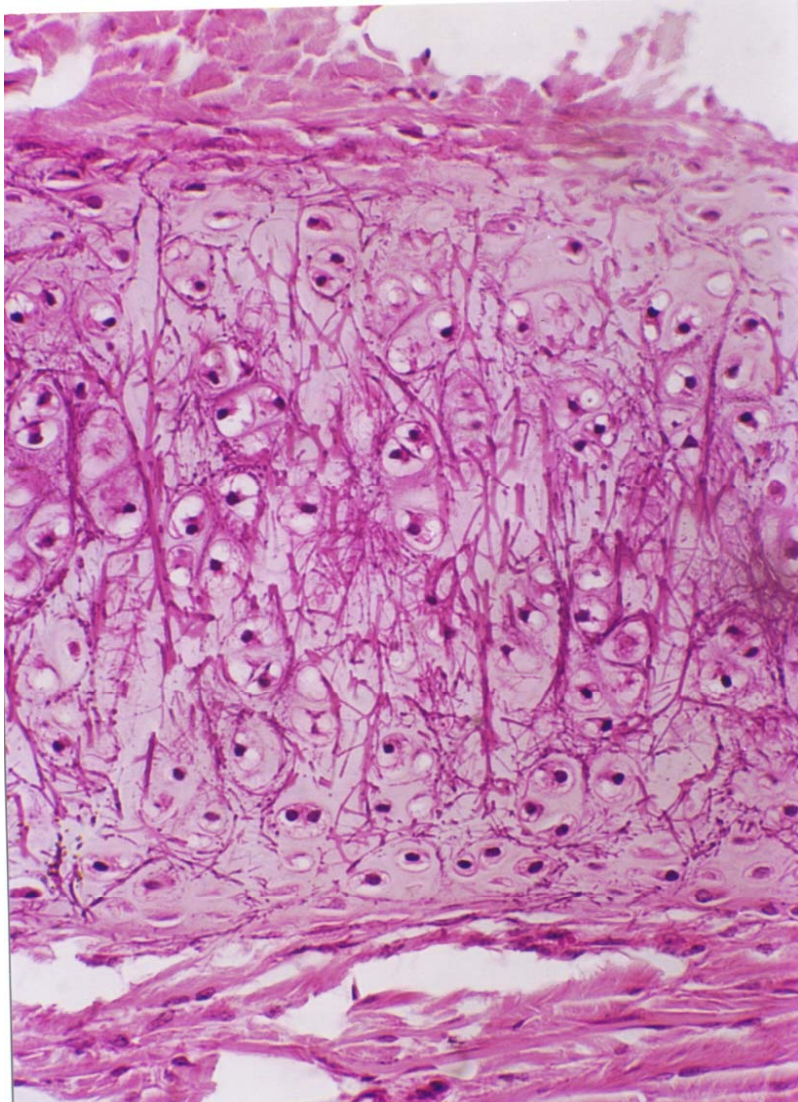


Elastic fibers (elastin)
Yellow color

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Elastic Cartilage (Epiglottis)

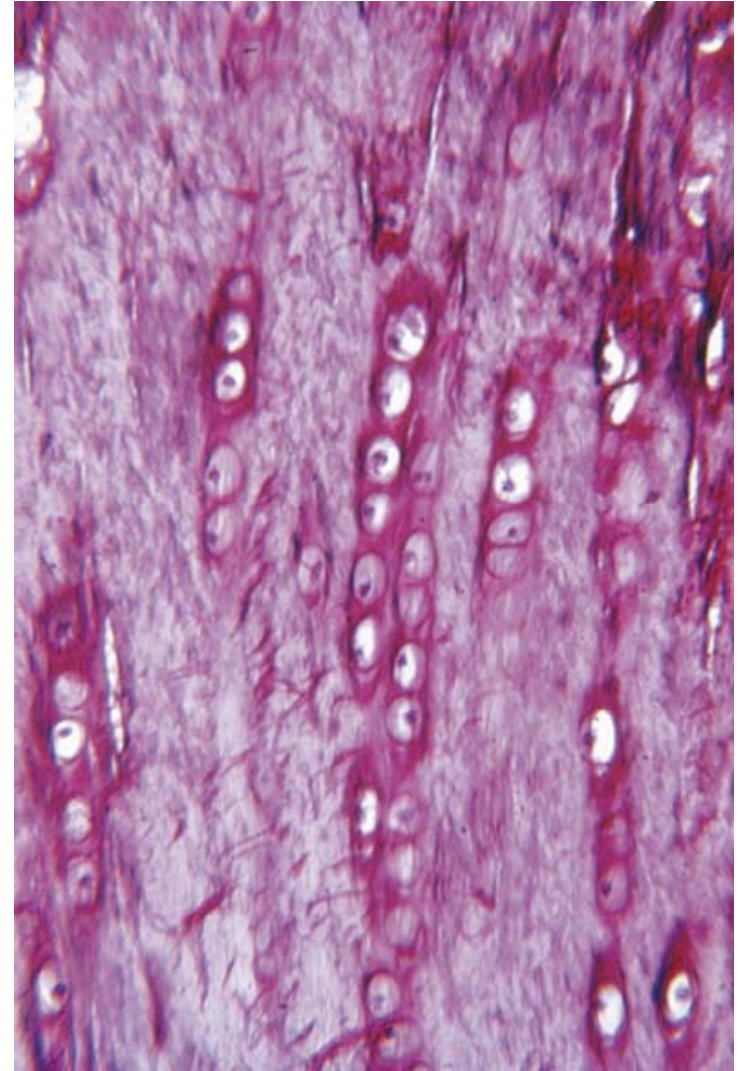


Fibrocartilage

- **Fibrous Cartilage**
- *is a form of connective tissue transitional between dense connective tissue and hyaline cartilage.* Chondrocytes may lie singly or in pairs, but most often they form short rows between dense bundles of collagen fibres. In contrast to other cartilage types, *collagen type I is dominant in fibrous cartilage.*
- is typically found in relation to joints (forming intra-articular lips, disks and menisci) and is the main component of the intervertebral disks, symphysis pubis.
- merges imperceptibly into the neighbouring tissues, typically tendons or articular hyaline cartilage. It is difficult to define the perichondrium because of the fibrous appearance of the cartilage and the gradual transition to surrounding tissue types.

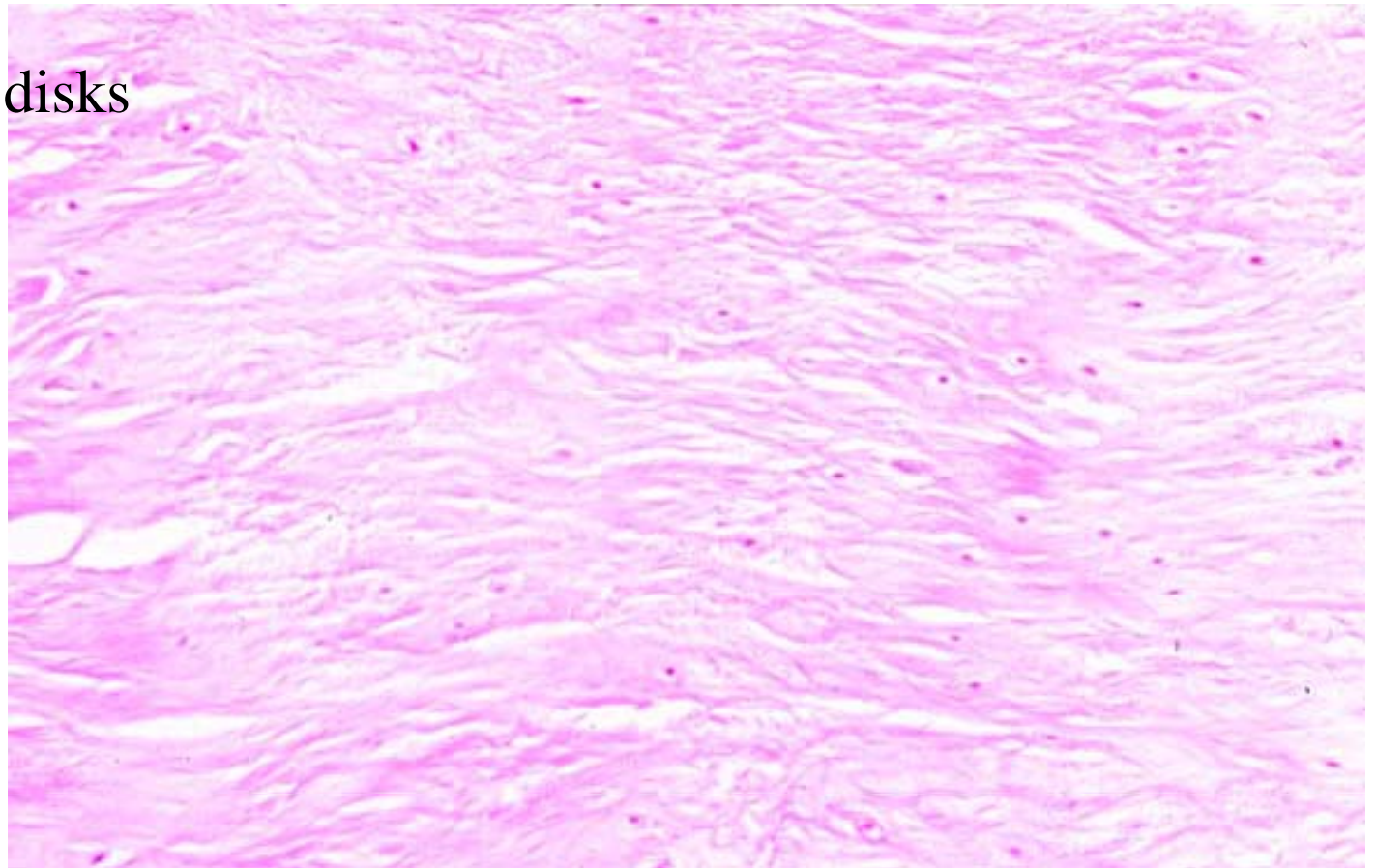
Fibrocartilage

Note the rows of chondrocytes separated by collagen fibers. Fibrocartilage is frequently found in the insertion of tendons on the epiphyseal hyaline cartilage. Picrosirius-hematoxylin stain. Medium magnification.



FIBROCARILAGE

Intervertebral disks



Fibrocartilage

