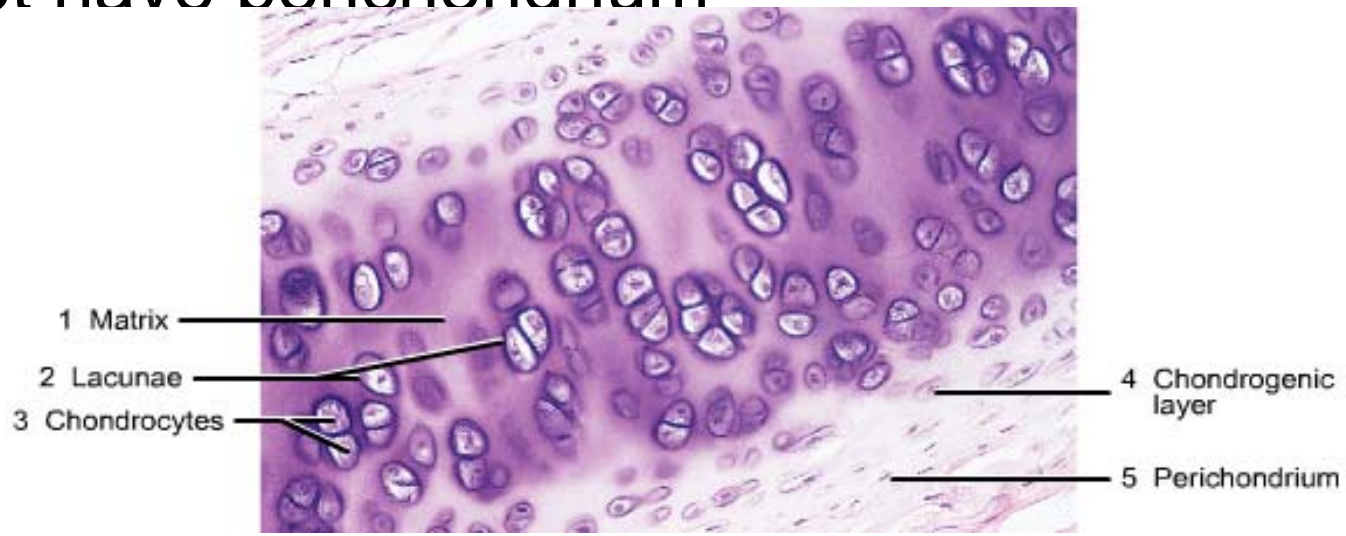
CARTILAGE

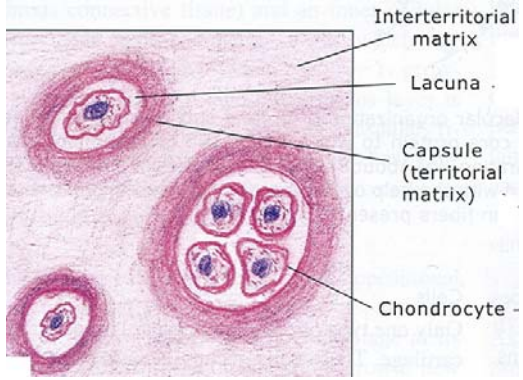
- Specialized connective tissue
- Exhibit tensile strength, provides firm support, allows flexibility without distortion & is resilient to compression

Components of cartilage

- Perichondrium- surrounds most of the hyaline & elastic cartilage
- Made up of peripheral vascularized, dense irregular connective tissue
- Made up of outer fibrous & inner chondrogenic layer
- Chondrogenic layer gives rise to chondroblast that secrete cartilage matrix.
- Articulating cartilage (hyaline cartilage), fibrous cartilage do not have perichondrium



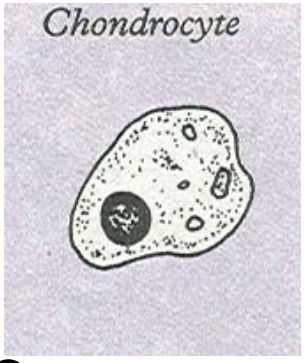
- **Cartilage matrix:** homogenous, basophilic has cartilage cells in the spaces called lacunae
- Ground substance is stiff **gelatinous**, permeated by fine collagen fibers.
- Contains chondroitin sulphate, glycosaminoglycans & hyaluronic acid which is closely associated with elastic & collagen (Type ii) fibers. Matrix is highly hydrated.
- Cartilage also contains chondronectin which binds to glycosaminoglycans & collagen fibers thereby providing adherence to chondrocyte & chondroblasts.
- Most recently formed ground sub. surrounds the lacunae & it takes the deepest basic stain to form impression of a **capsule**



Cartilage cells-

Mesenchymal cell →chondroblast→ chondrocytes

Chondrocytes- are large(40micron) encapsulated cells lying in space in matrix known as **lacunae**.



When occuring singly they are spherical in shape, but usually occur in a groups of two, four or eight cells in which case they become compressed at the apposing site. The group so formed are the result of division of the parent cell into daughter cells which tend to remain together. Such groups of cells are called **cell nest**. The nuclei of the cells are large, nucleoli are one or more & the cytoplasm is **basophilic**

- **Chondroblast-** Young cartilage cells of relatively small size, irregular in shape having branched processes
- **Nutrition**-Lacks blood vessels, lymphatics, nerves.

  Nutrition is taken up by diffusion, thru synovial fluid which bathes it.
- Growth- Interstitial

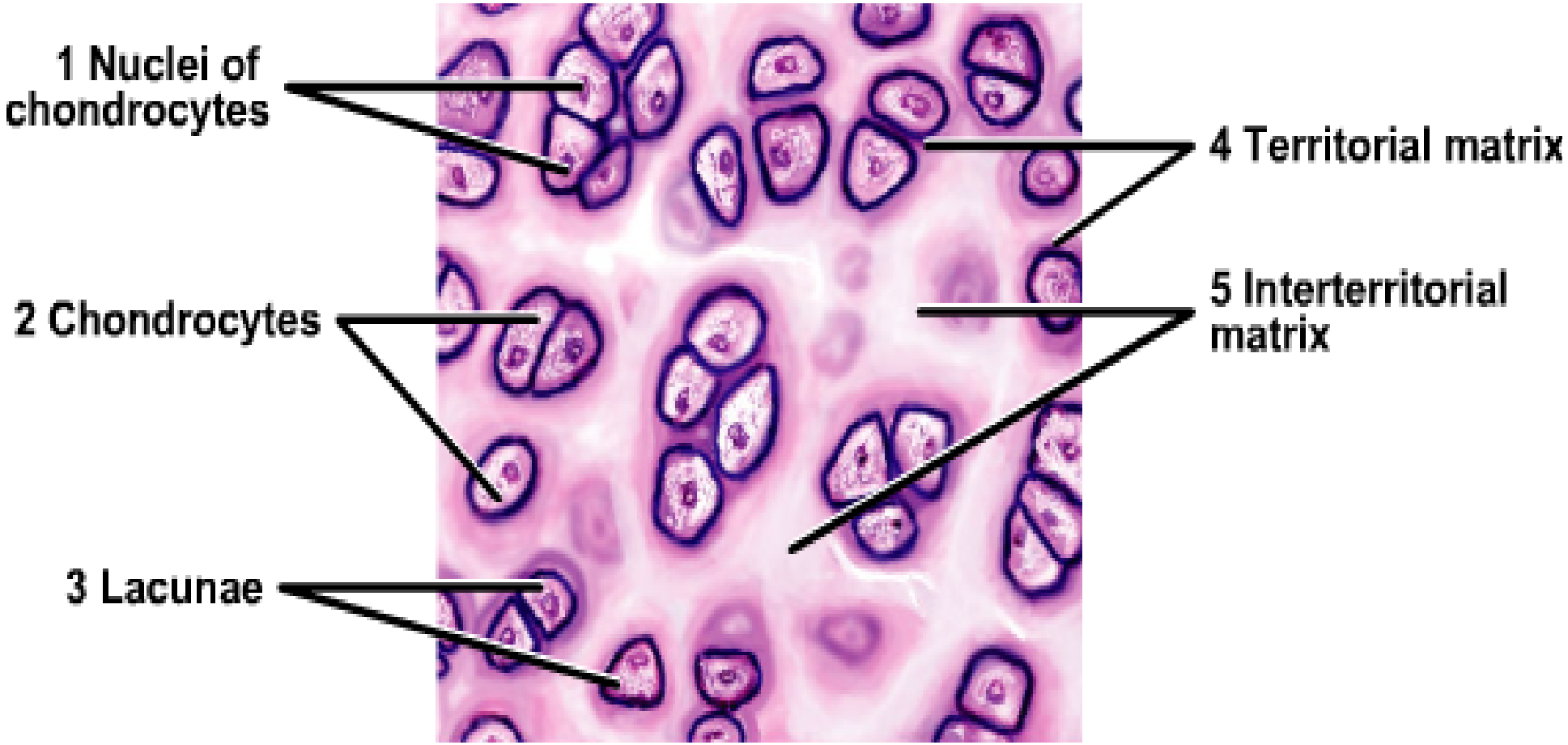
  Appositional

Hyaline cartilage

- Presence of cell nests
- Ground substance appears homogenous & takes blue stain.

- Collagen fibers in ground substance have same refractive index as that of ground substance
- Perichondrium is present in all except in articular cartilage
- Present in trachea, bronchial tree, nasal , costal articular & epiphyseal cartilage, thyroid cricoid & basal part of arytenoid cartilage

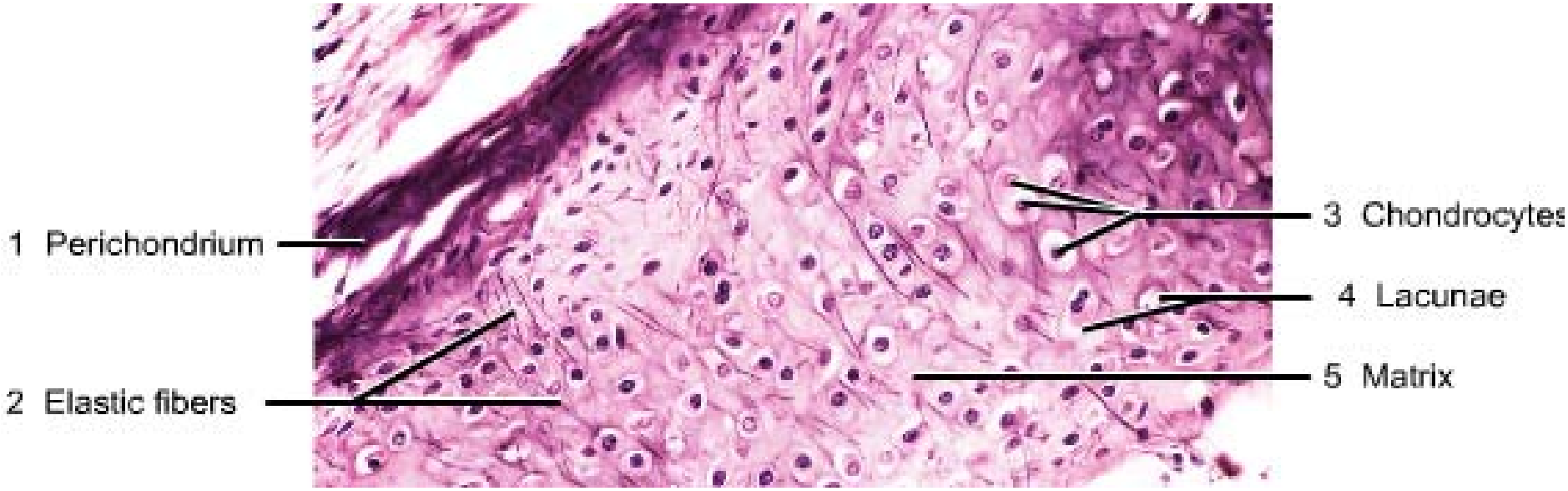
Cells & matrix of mature hyaline cartilage



Elastic cartilage

- The ground substance contains a network of branching and anastomosing elastic fibers
- Perichondrium & cartilage cells are present
- Found in epiglottis ,cartilages of pinna, ext. acoustic meatus, auditory tube ,basal portion of arytenoid, corniculate, cuneiform cartilage

Elastic cartilage: epiglottis



Fibrous cartilage

- Cartilage cells are smaller in number & occur singly
- Intercellular substance contains bundles of collagen fibers which run parallel to one another& are separated by narrow area of nonfibrous matrix n which cartilage cells are lodged.
- Perichondrium is absent
- Found in intervertebral disc, articular discs, pubic symphysis & labrum of ball & socket joint