EPITHELIAL TISSUE

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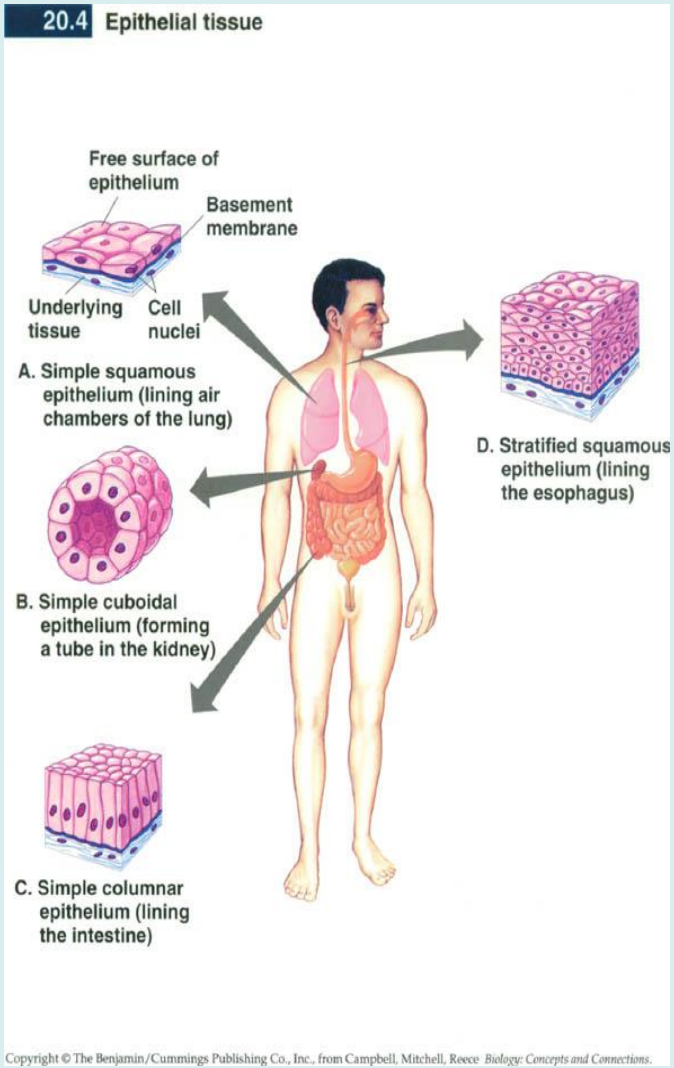
1. **Epithelia**
2. **Glands**

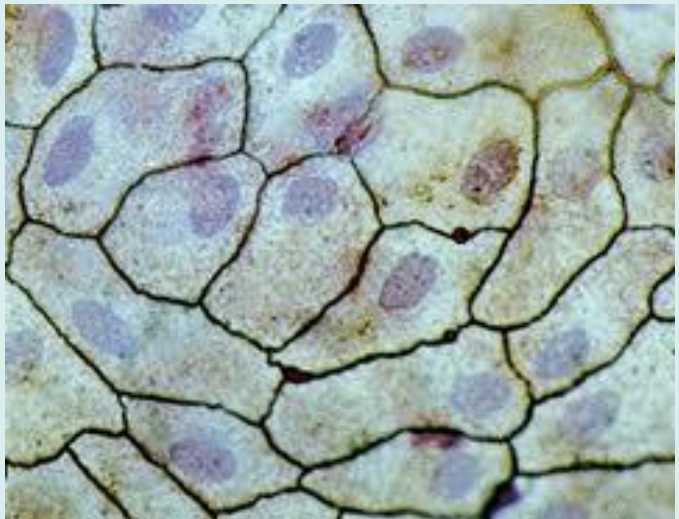
Basic characteristic of epithelia

- cells are tightly bound
- small amount of extracellular martix
- basal lamina.



Functions of epithelial tissue

- **Protection**
- **Transcellular transport**
- **Secretion**
- **Absorption**
- **Detection of sensations**



Classification of epithelia

According to;

✓ the number of cell layers

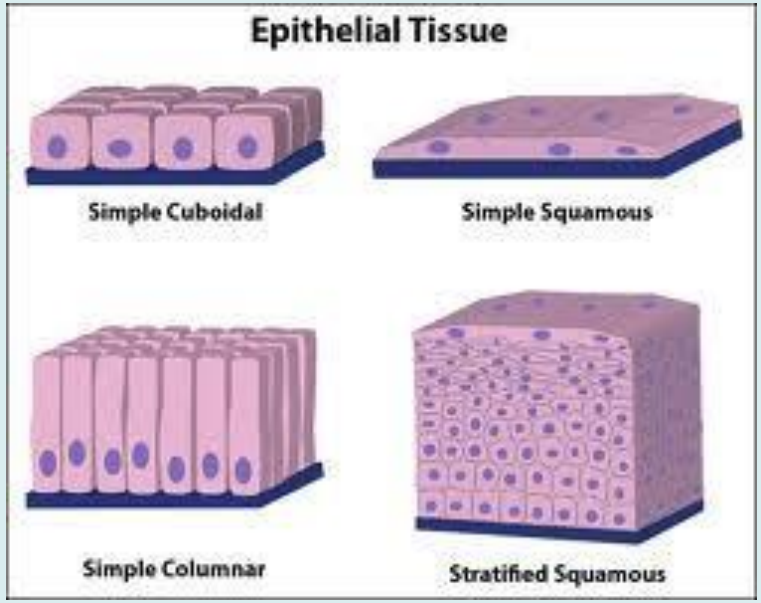
✓the morphology (shape) of the epithelial cells (mostly nucleus)

-simple epithelium – is composed of a single layer of cells

- stratified epithelium – is composed of more than one cell layer

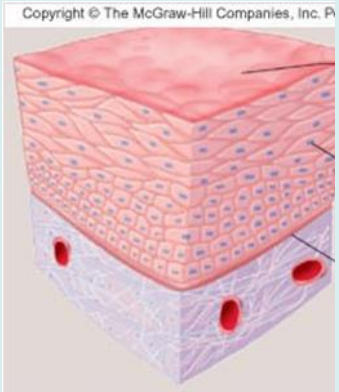
Morphology of cells

- **squamous (flat)**
- **cuboidal**
- **columnar**



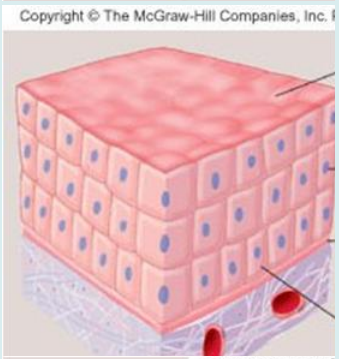
Stratified epithelia – classification

- by the morphology of the cells in superficial layer



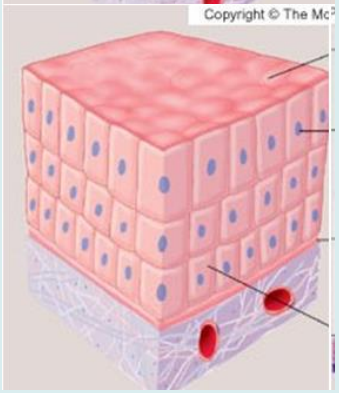
stratified squamous epithelium

epidermis of skin
esophagus

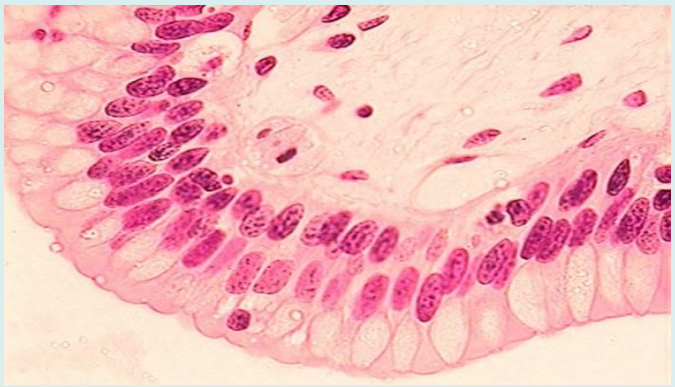


stratified cuboidal epithelium

ducts of sweat glands
usually two layers



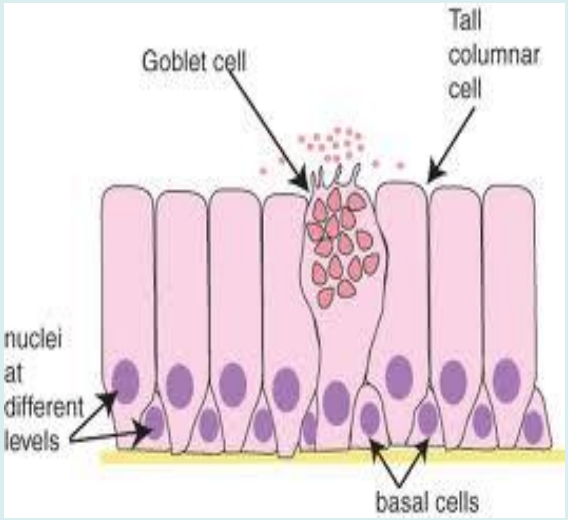
stratified columnar epithelium

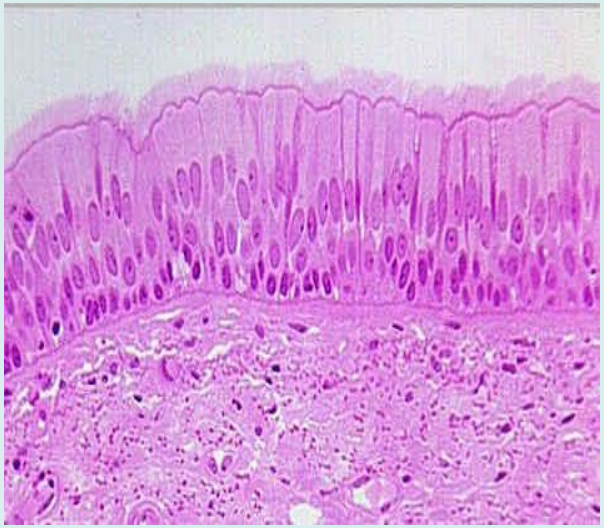


male urethra

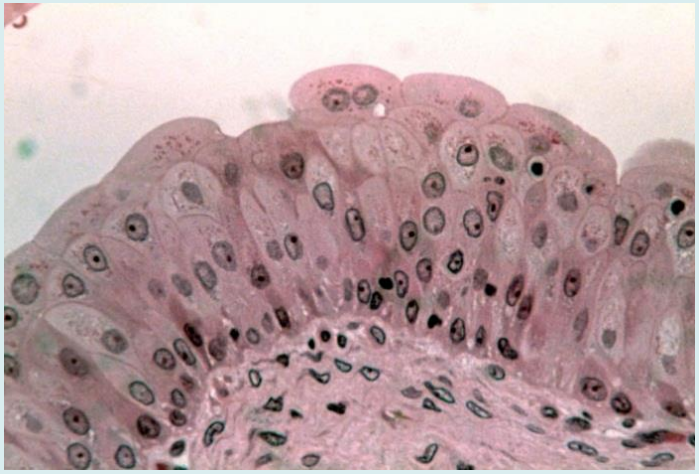
Distinct types of epithelium

- **pseudostratified**
- **transitional**

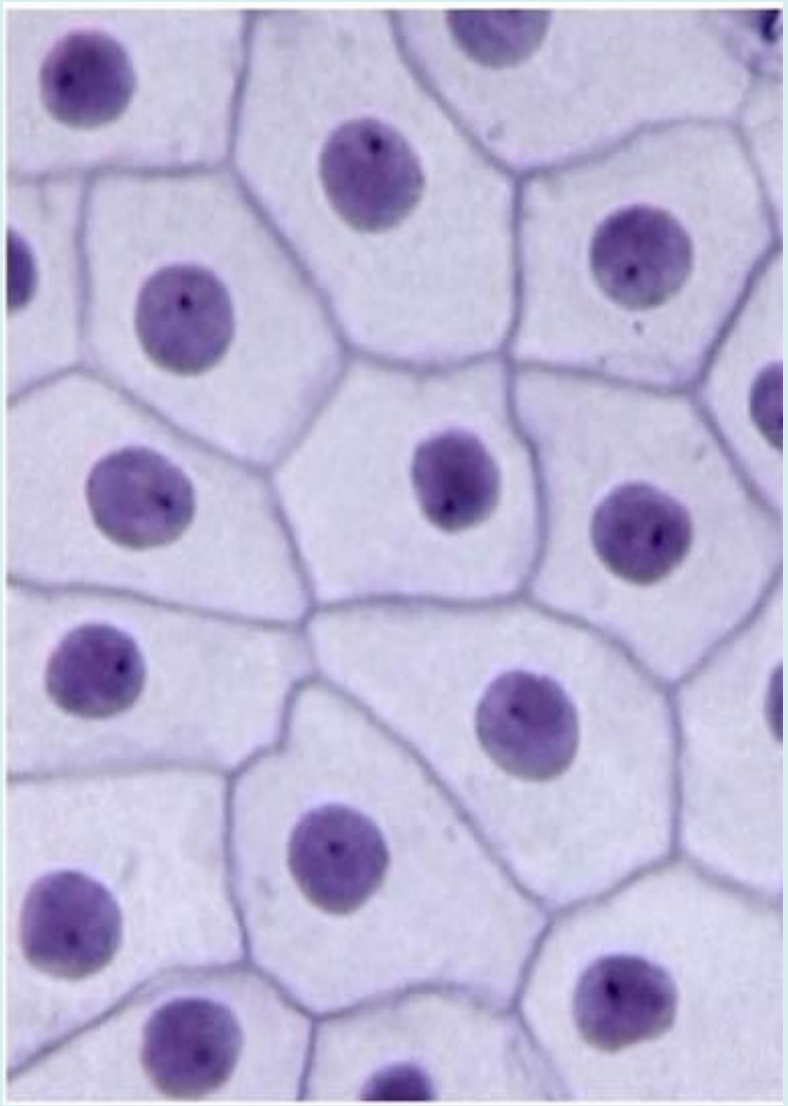




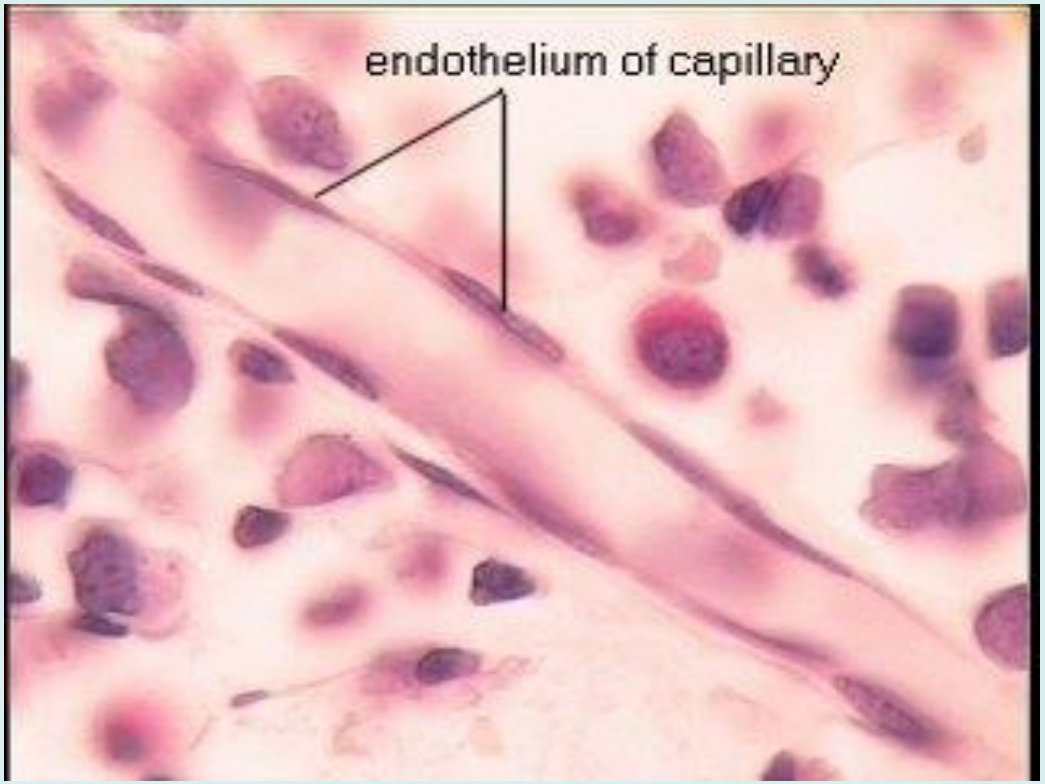
Pseudostratified
- trachea and primary bronchi



Transitional epithelium
- urinary tract

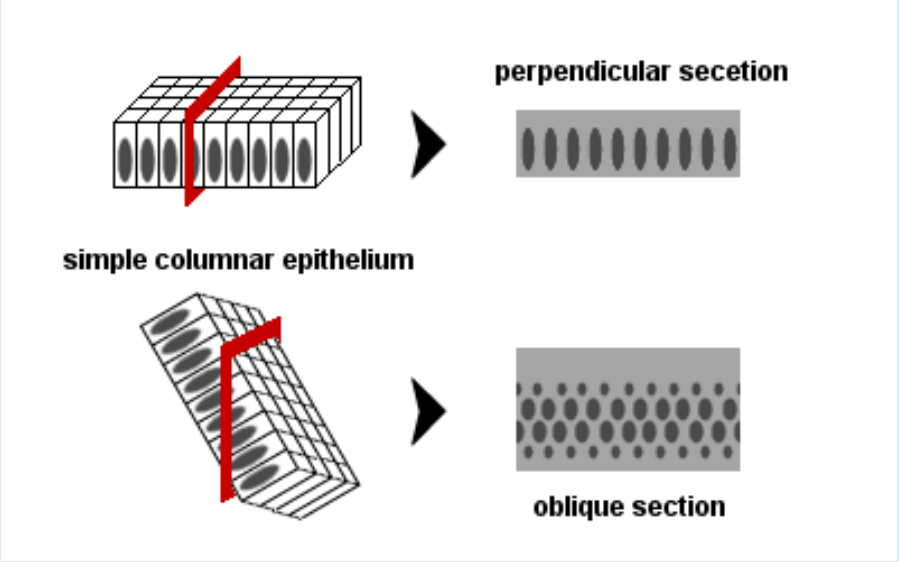


Simple Squamous

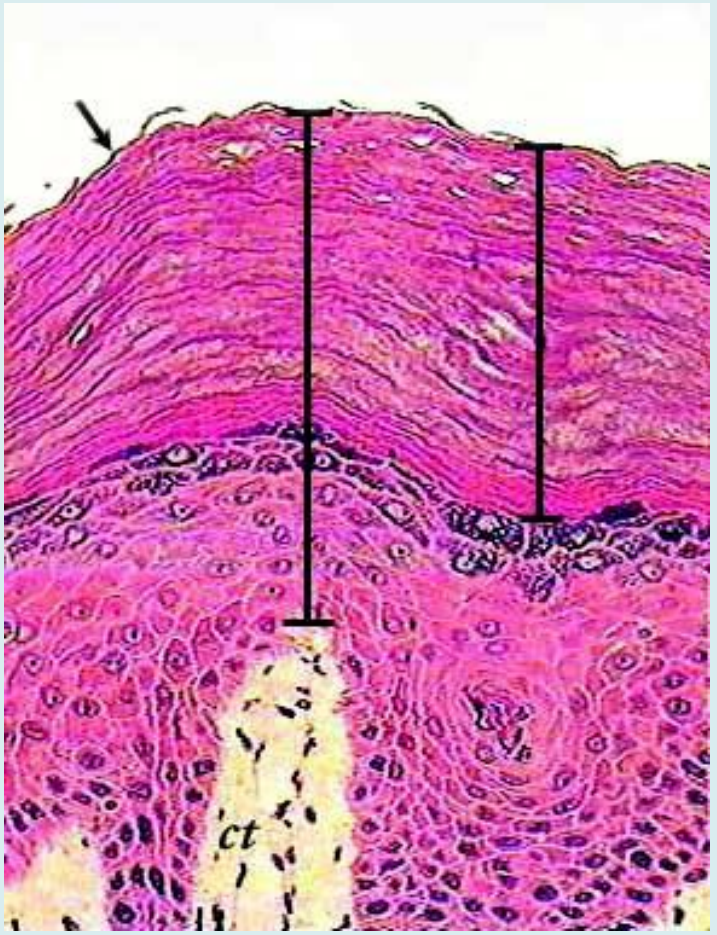


Simple Cuboidal

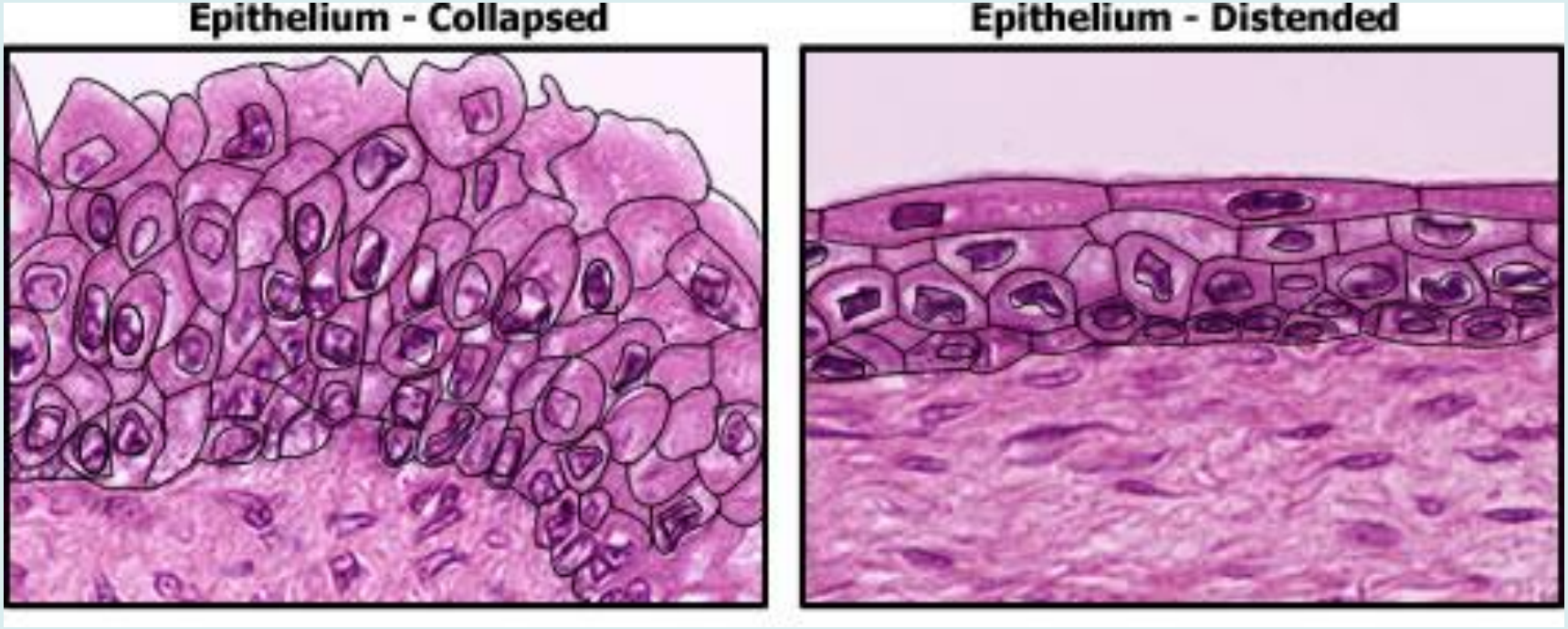
Simple Columnar



Stratified Squamous



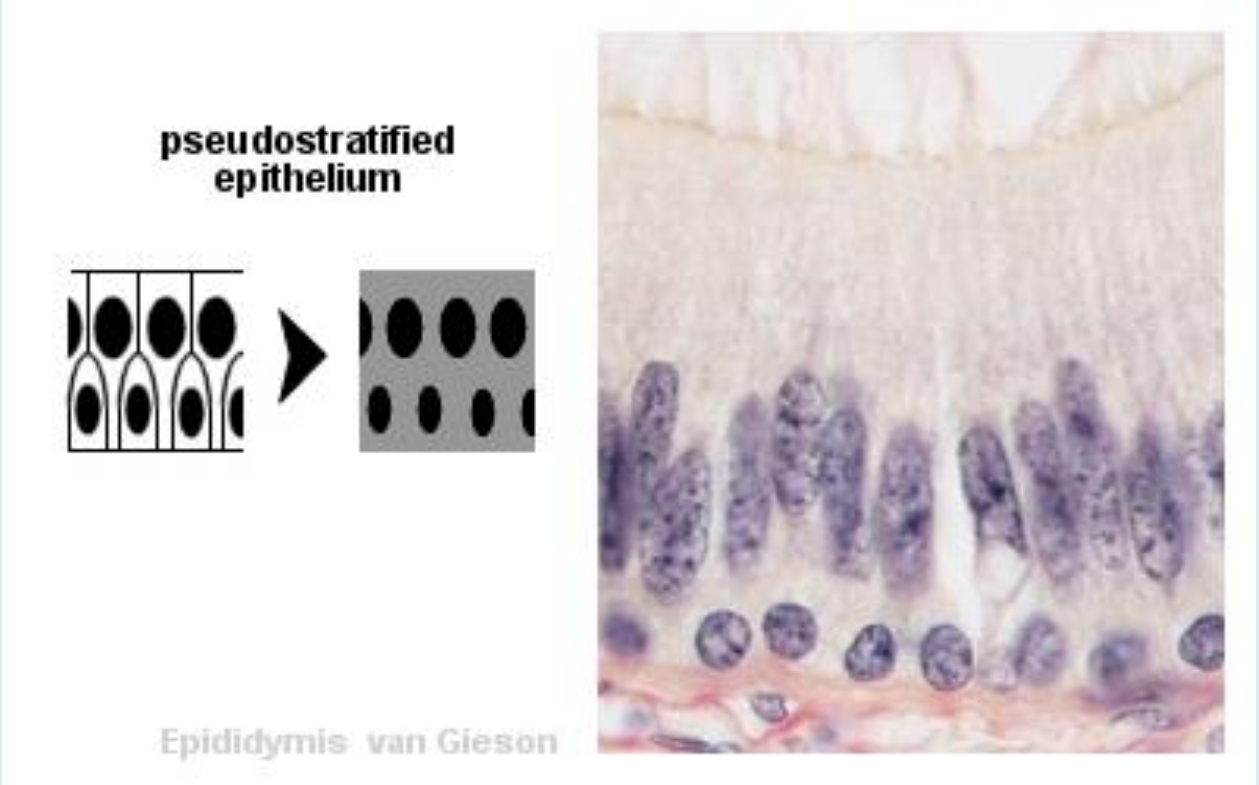
Transitional epithelium



Empty bladder – superficial cells are large and dome-shaped

When the bladder is distended superficial cells become flattened

Pseudostratified Columnar

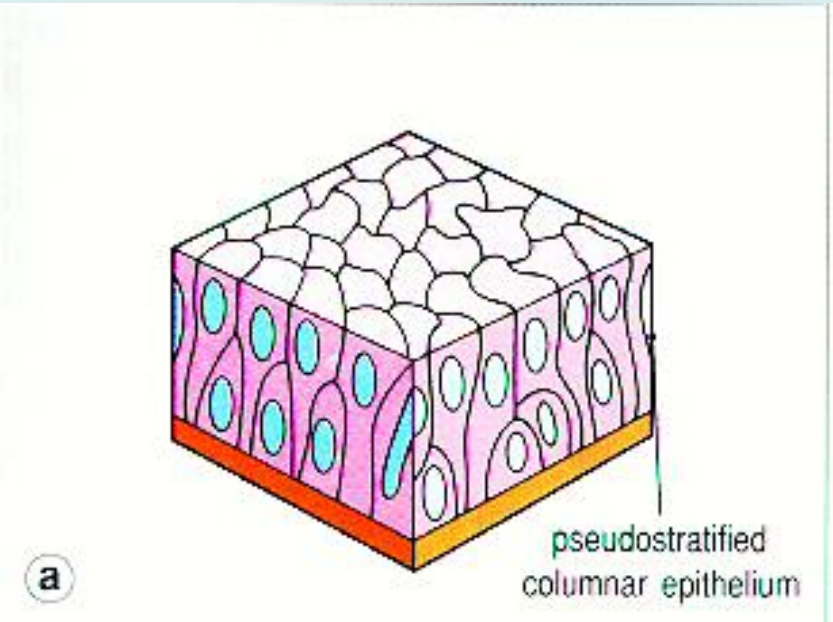


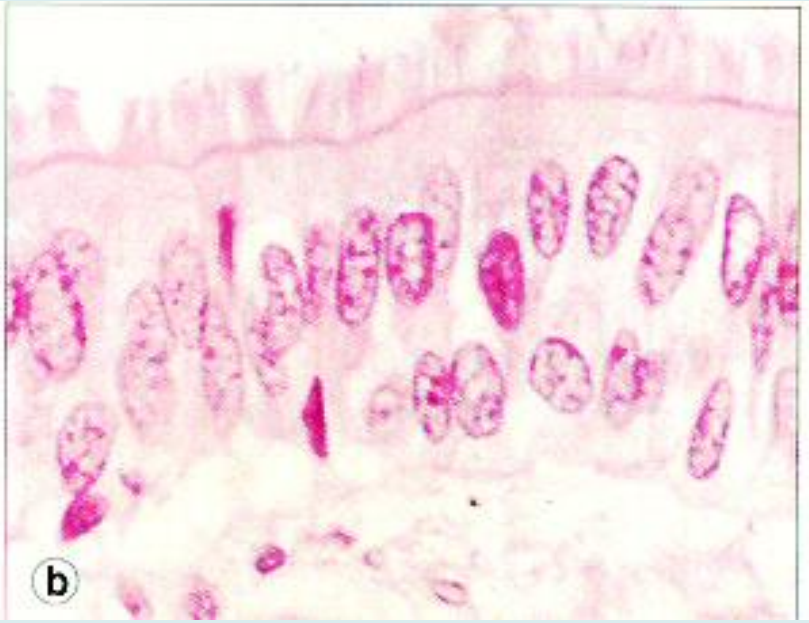
Pseudostratified columnar epithelium

- is composed of a single layer of cells
- is found in the male urethra and epididymis

Pseudostratified ciliated columnar epithelium

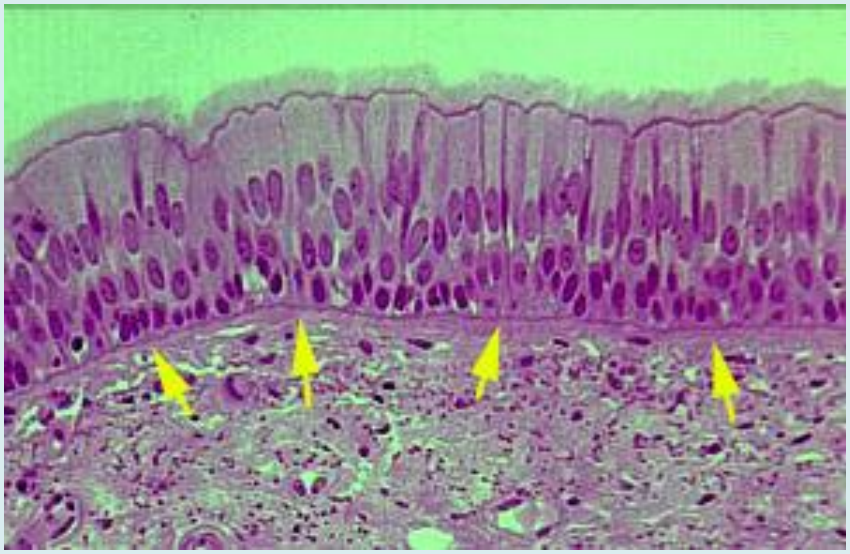
- cells possess cilia on the apical surface
- is found in trachea, primary bronchi and nasal cavity

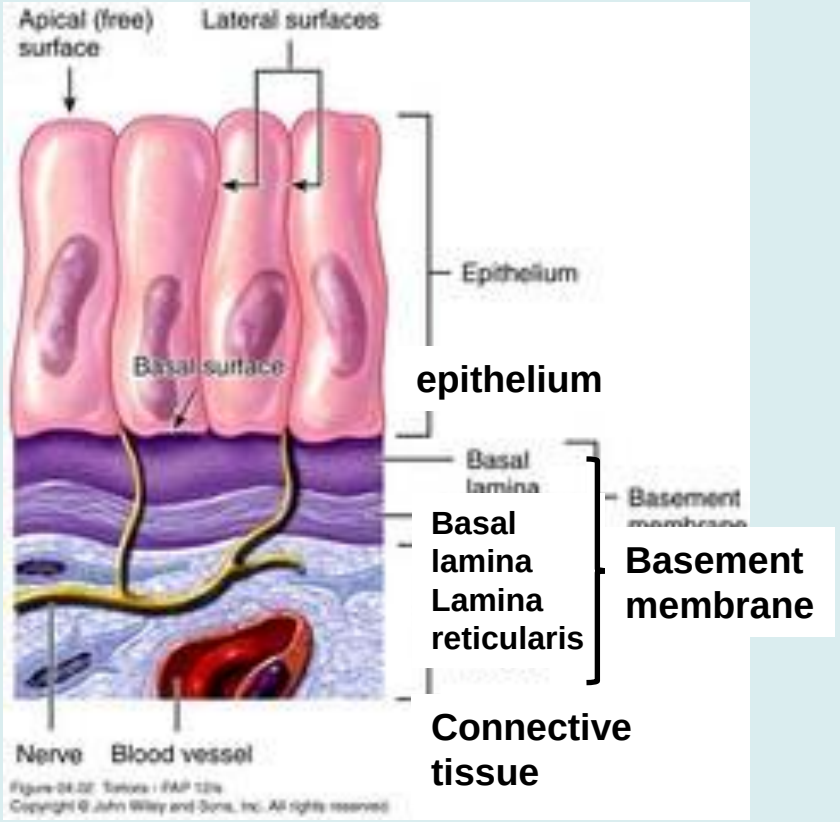




Basement membrane

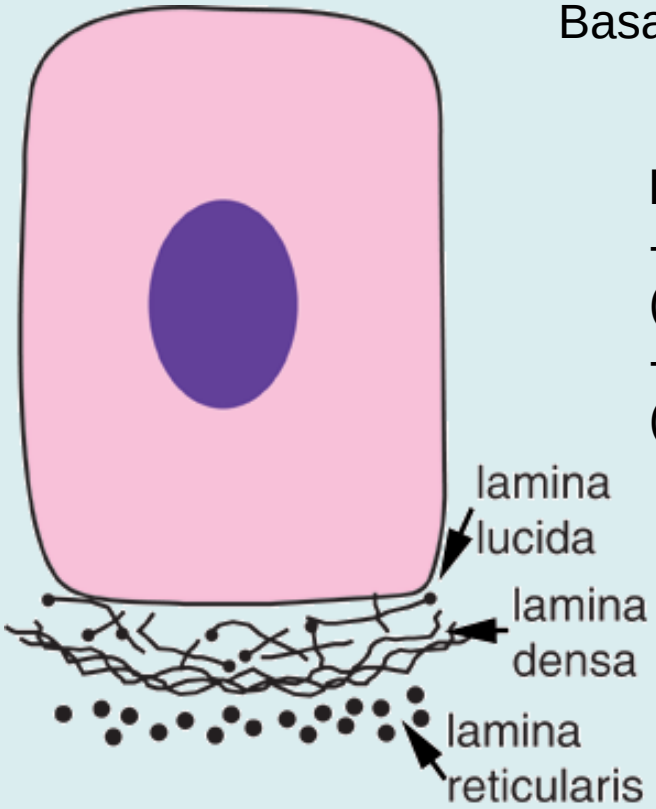
1. basal lamina - manufactured by epithelial cells
2. lamina reticularis - manufactured by cells of connective tissue





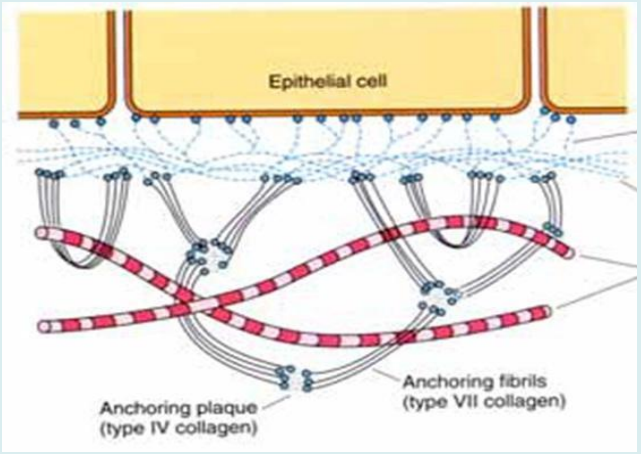
Basal lamina

Basal lamina (lamina densa + lamina lucida or rara)



lamina lucida
- glycoproteins
(laminin, entactin),
- integrins and dystroglycans
(laminin recptors)

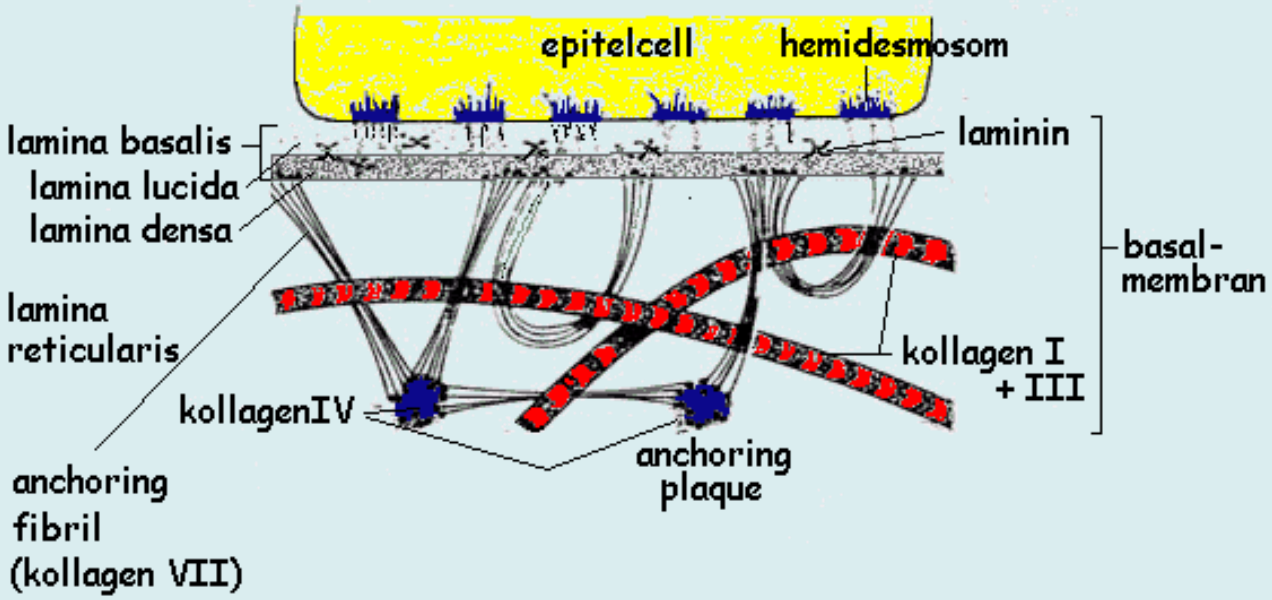
lamina densa
- type IV collagen,
- proteoglycans (perlecan, heparan sulfate)
and fibronectin



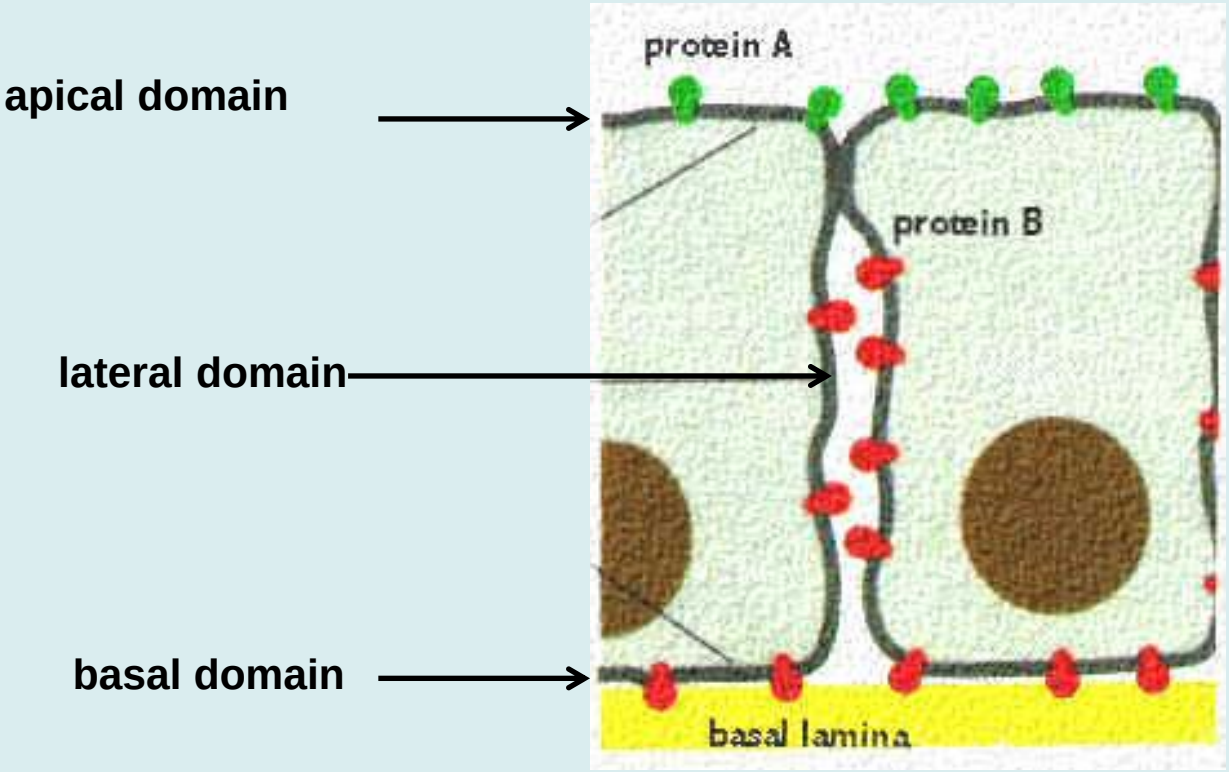
Basal lamina is attach to the lamina reticularis by fibers composed of collagen type VII

Lamina reticularis

- is manufactured by fibroblasts (cells of connective tissue)
- is composed of type I and III collagen
- is responsible for affixing the basal lamina to the connective tissue

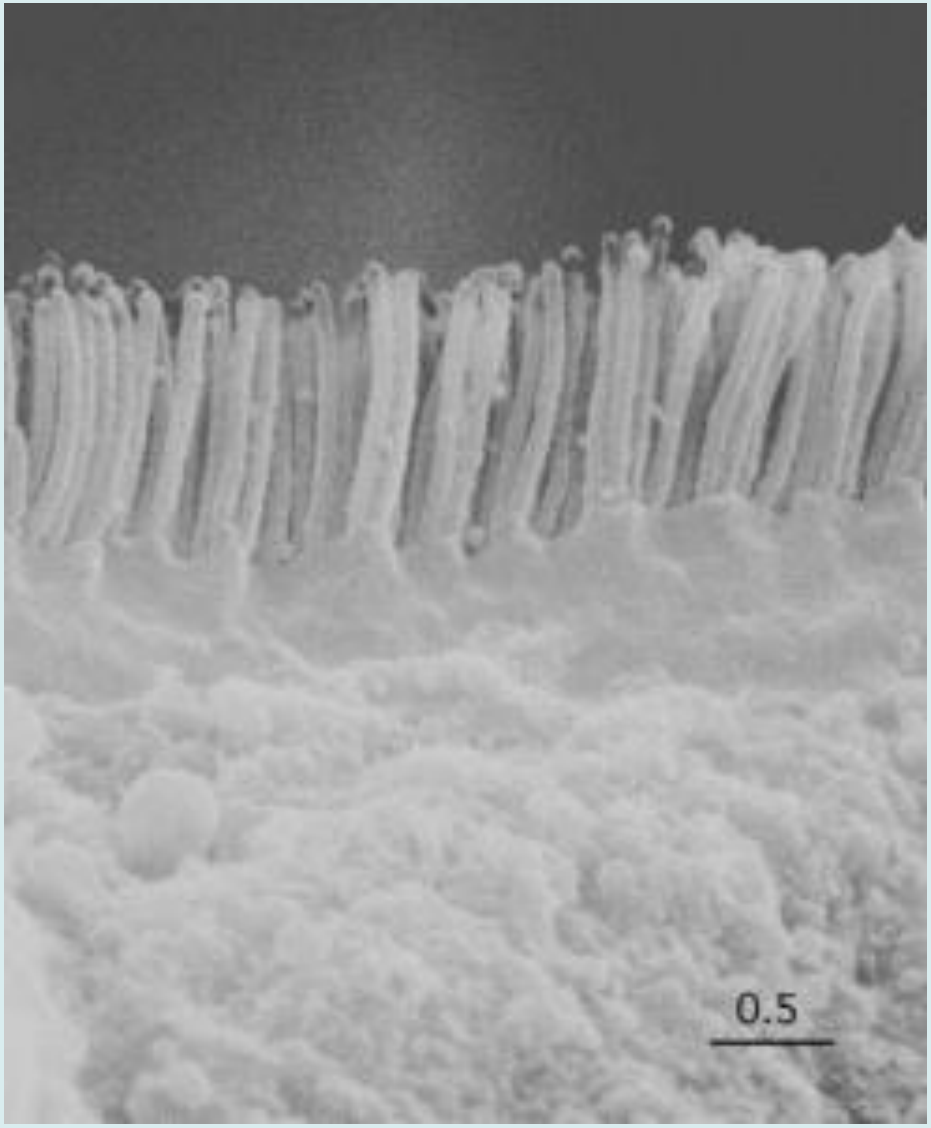


Polarity of the cell

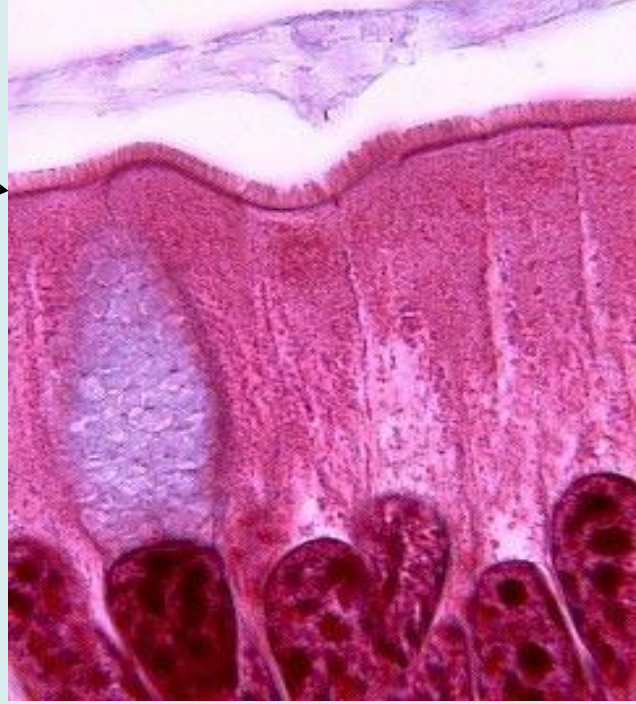


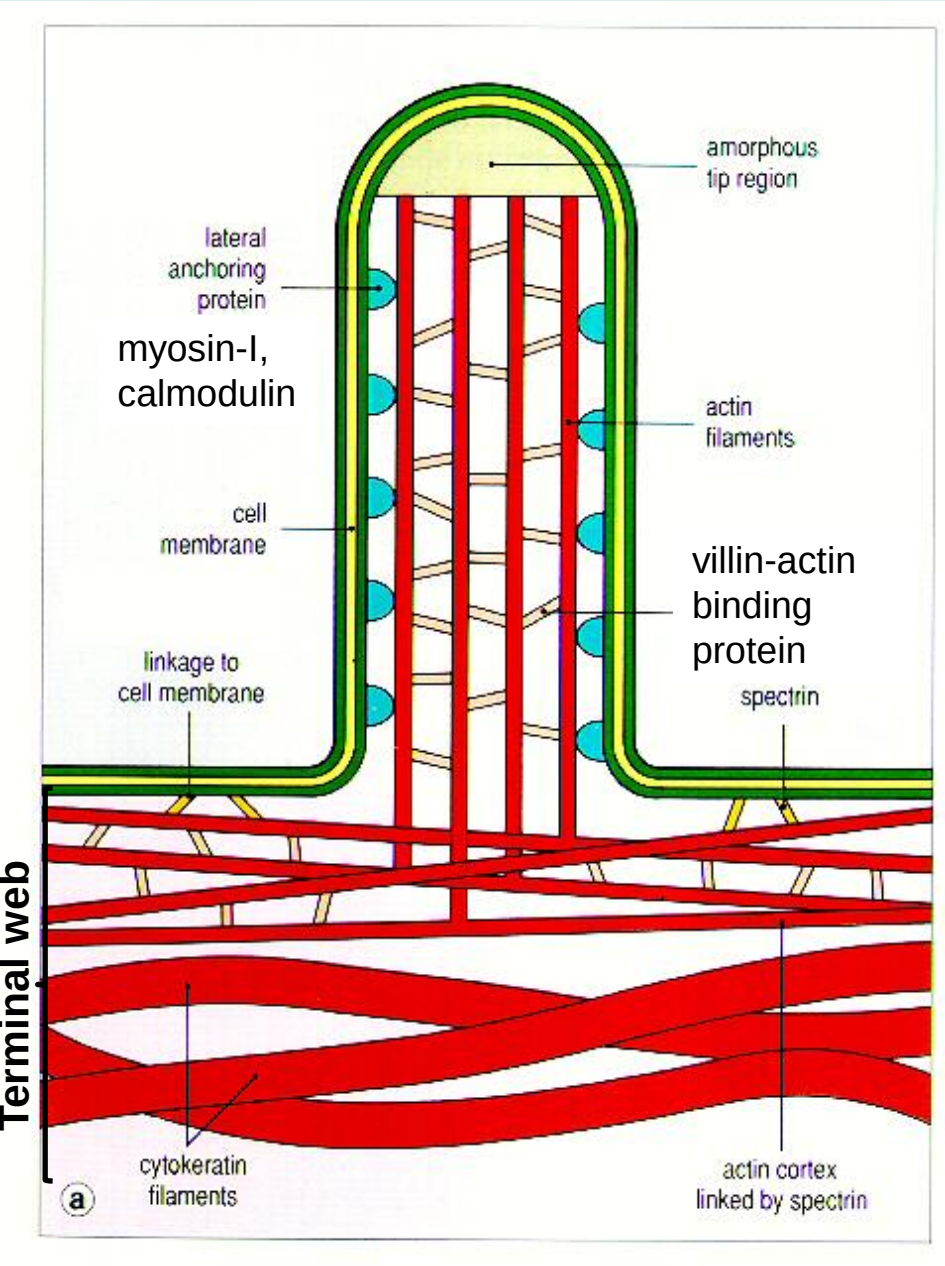
Specializations of the apical surface

Microvilli and **stereocilia**



Microvilli – striated (brush) border





Microvillus

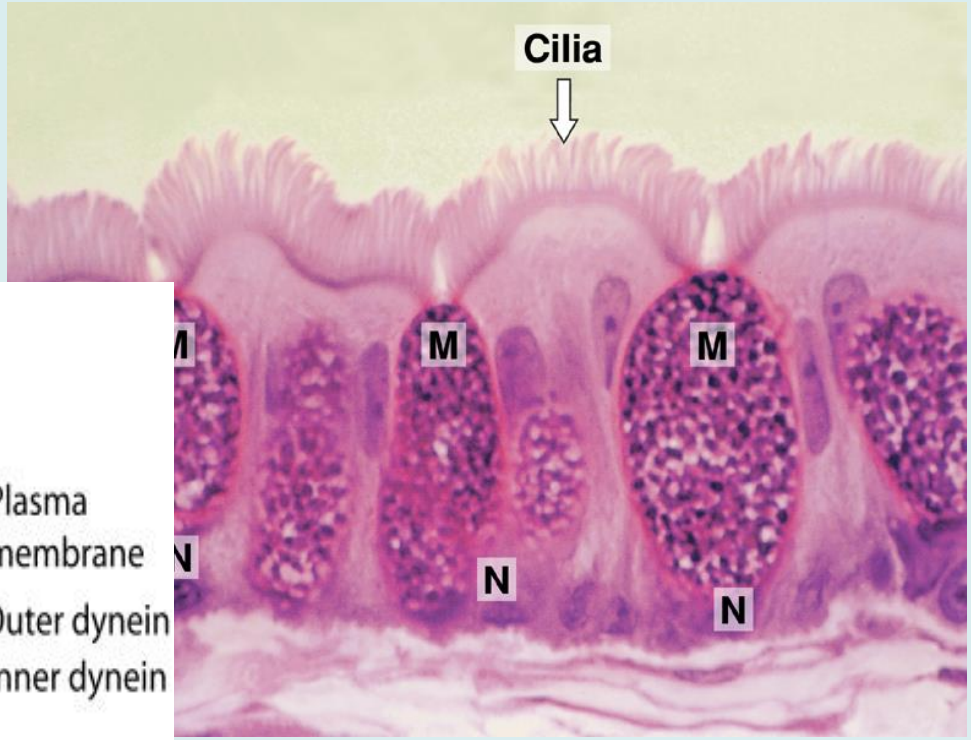
- contains a core of actin filaments

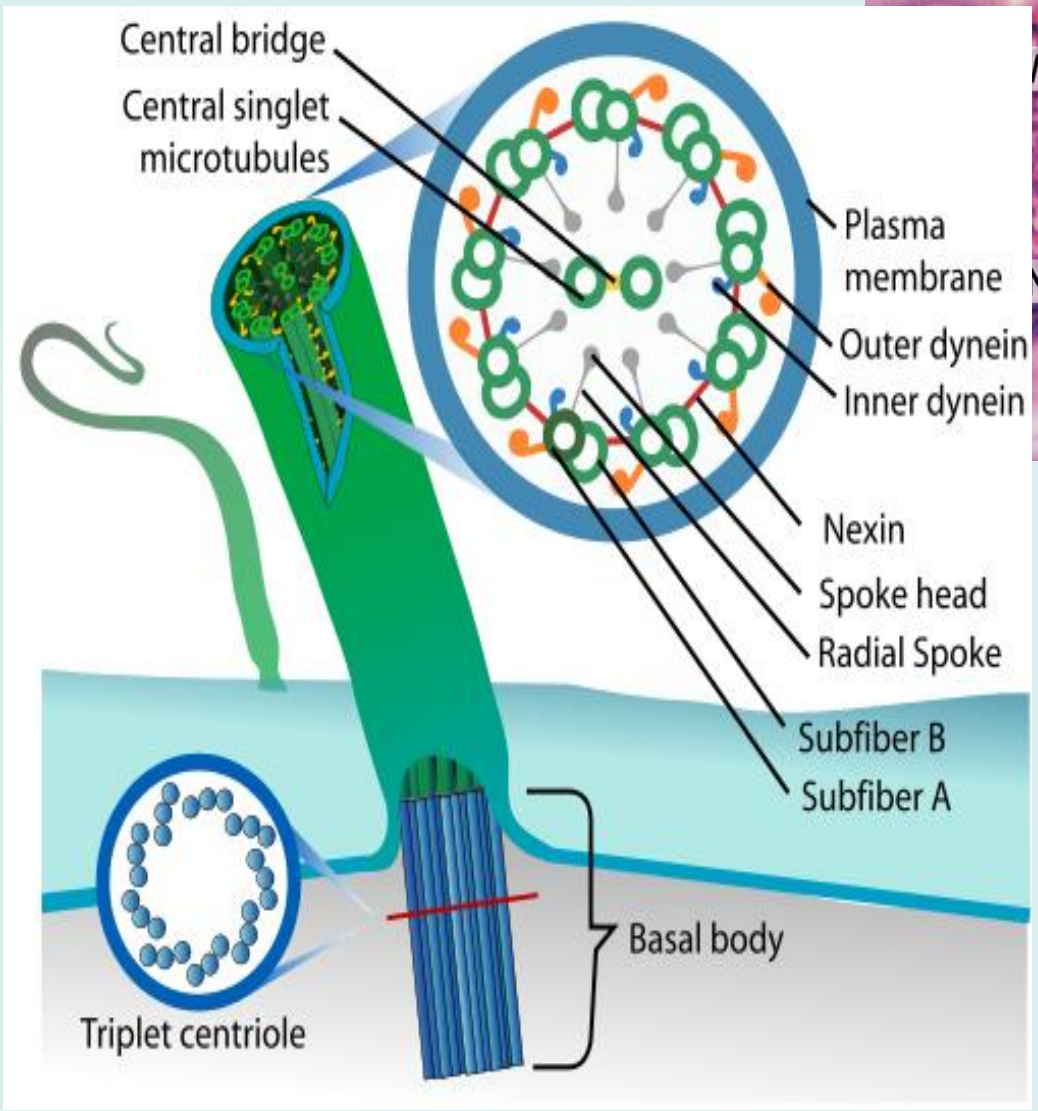
Stereocilium

– longer, more rigid microvillus

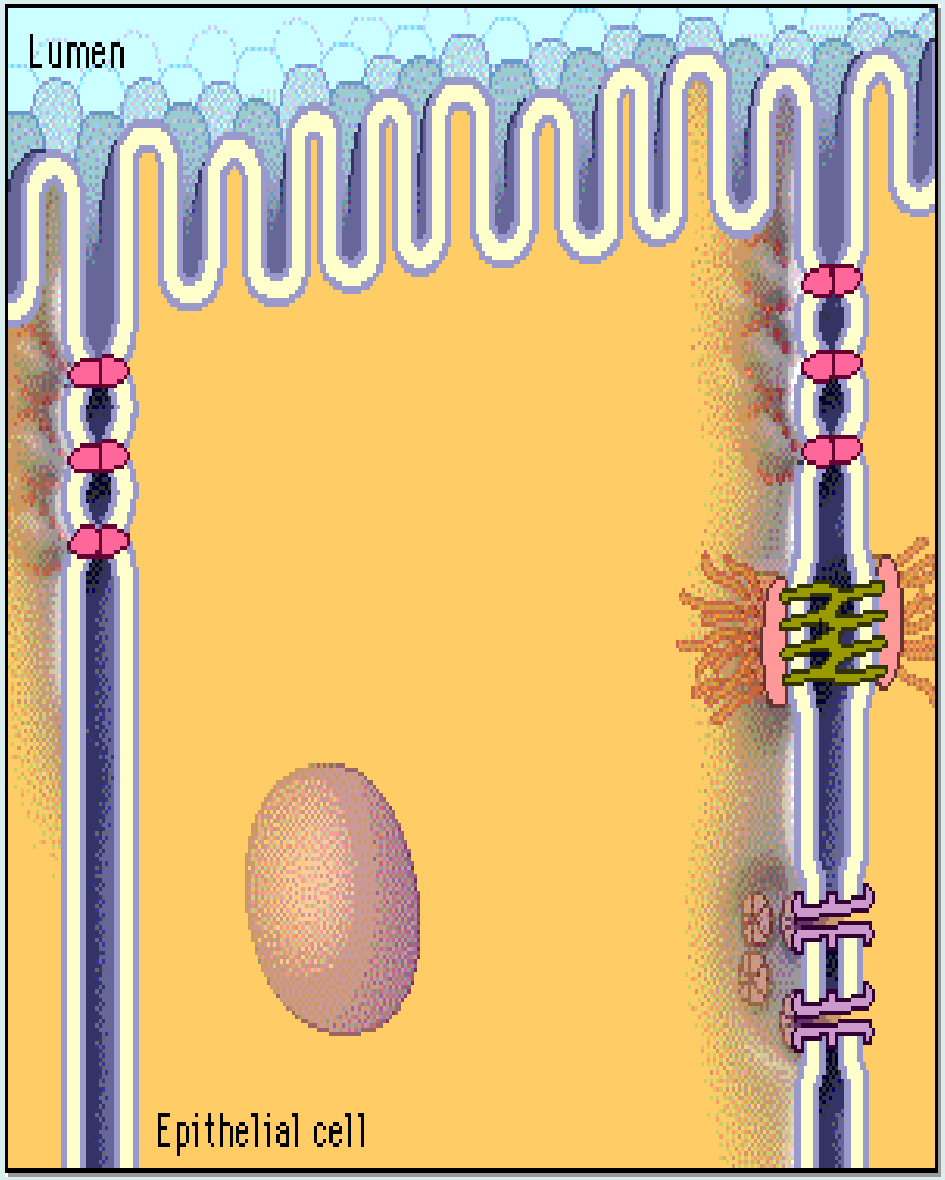
Cilia – Long, motile,

hair-like structures





Intercellular junctions (lateral domain)



Occluding junctions

seal cells together

Anchoring junctions

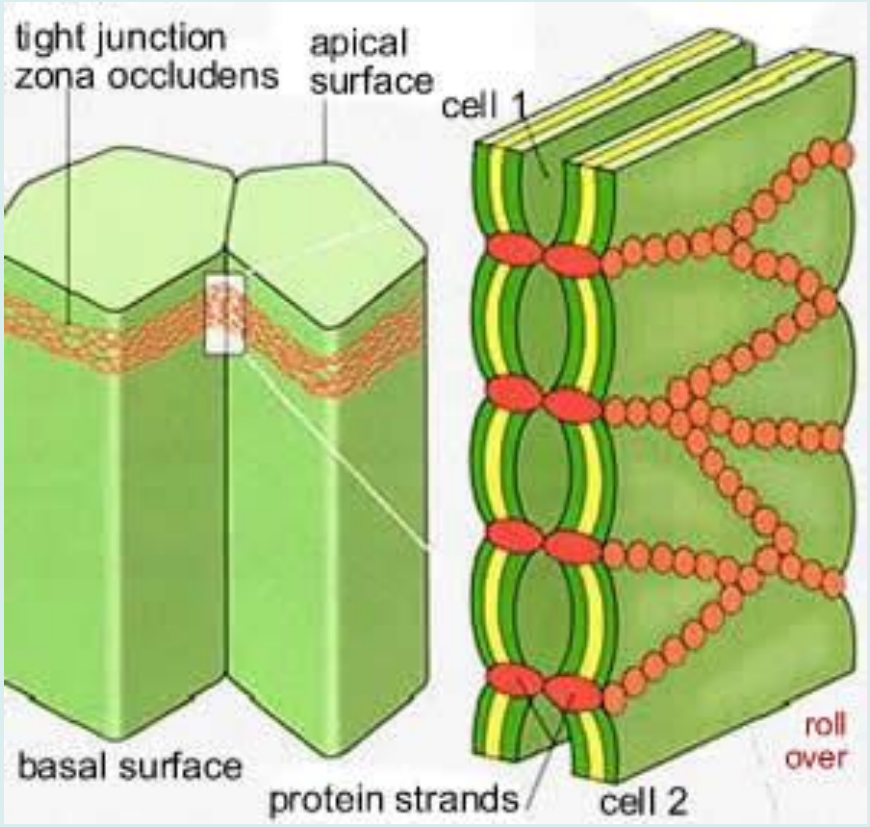
mechanically attach cells

Communicating junctions

mediate the passage of chemical or electrical signals

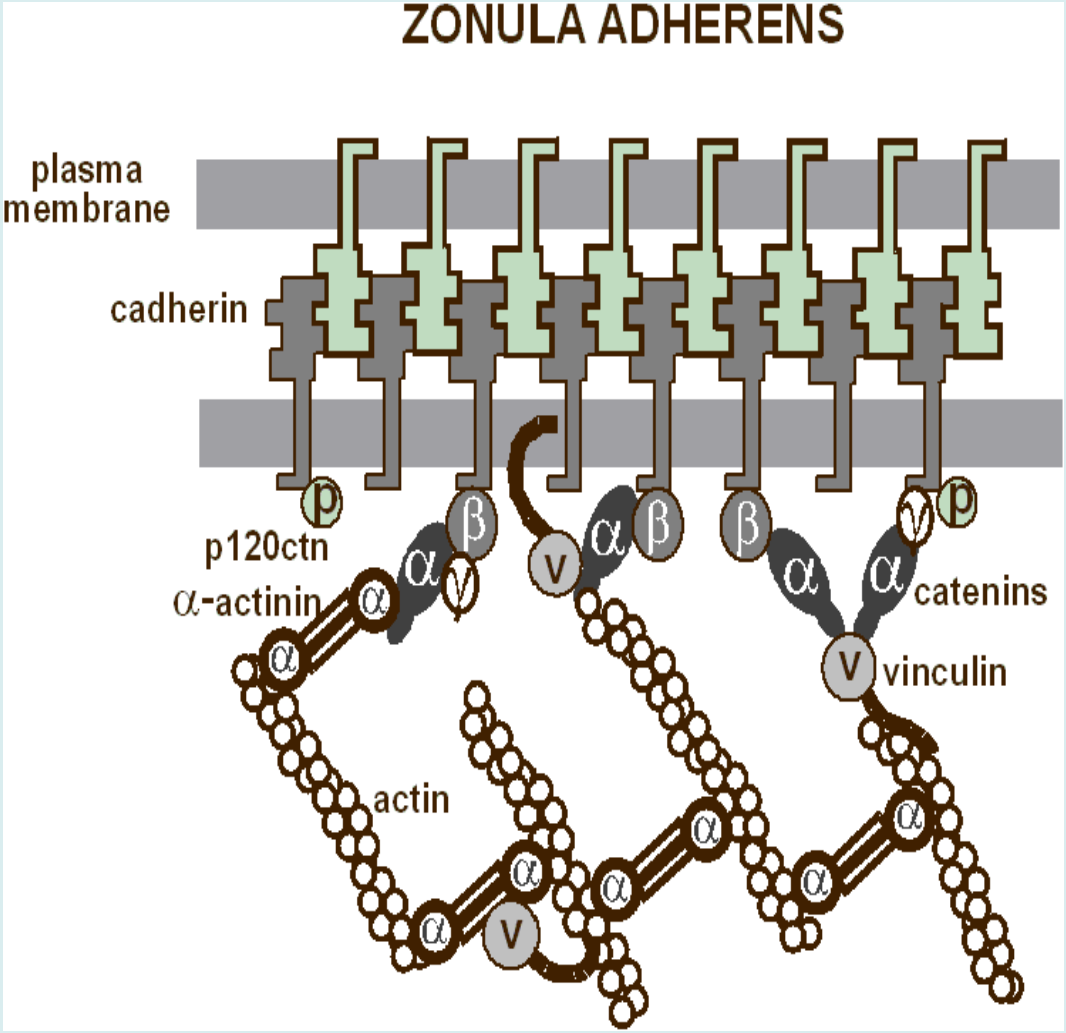
Zonulae Occludentes or Tight junctions (Occluding junction)

„belt-like” junction that encircles the entire circumference of the cell

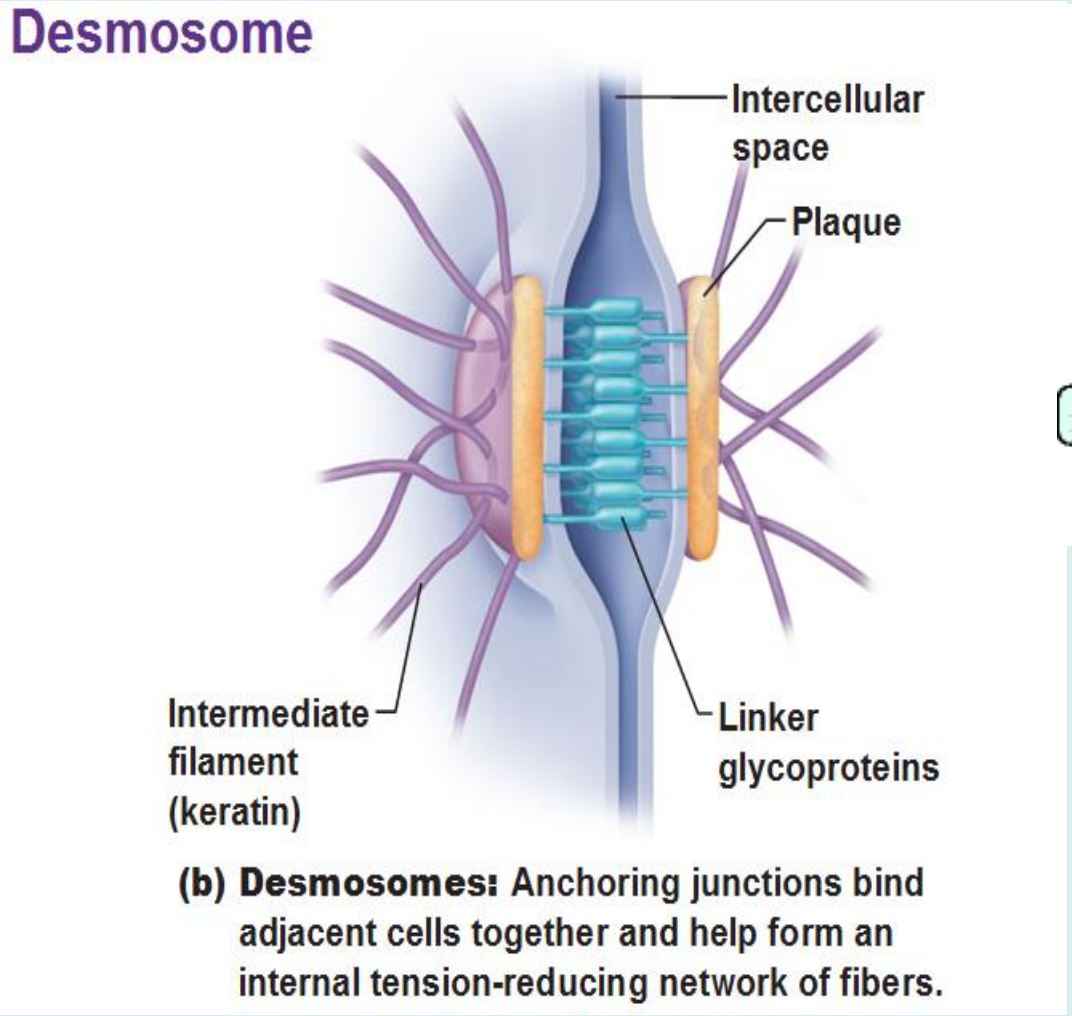


- **claudins** and **occludins**

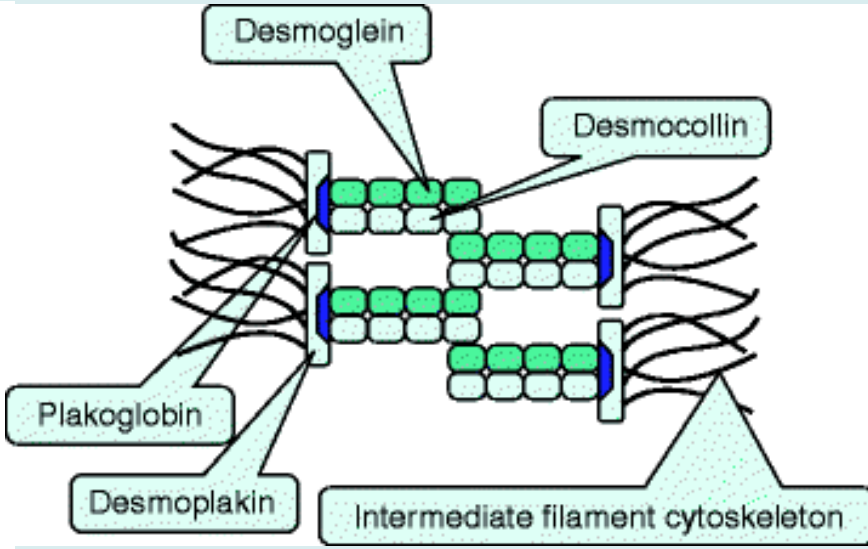
Zonulae Adherentes (anchoring junction)



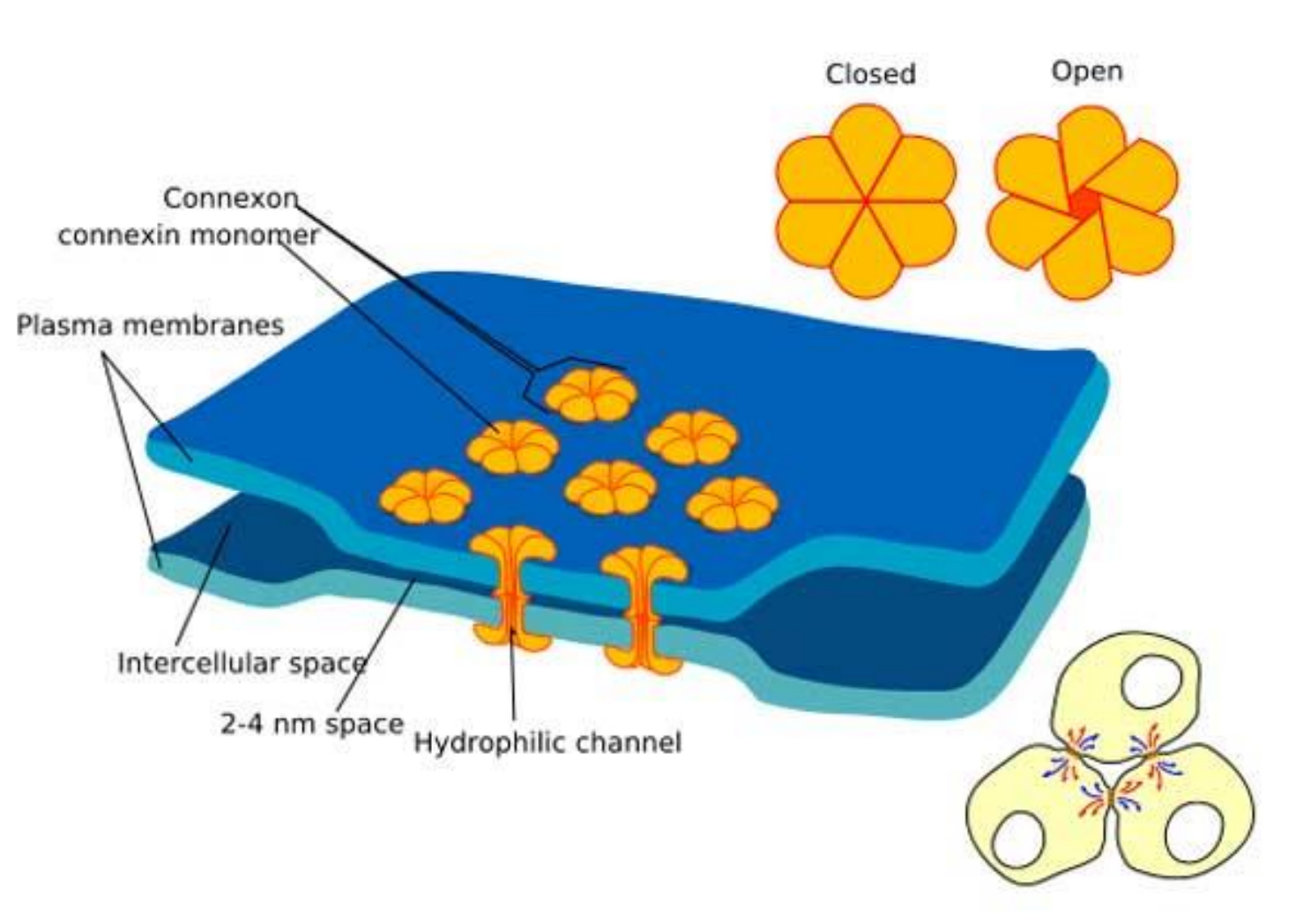
DESMOSOMES (anchoring junction)



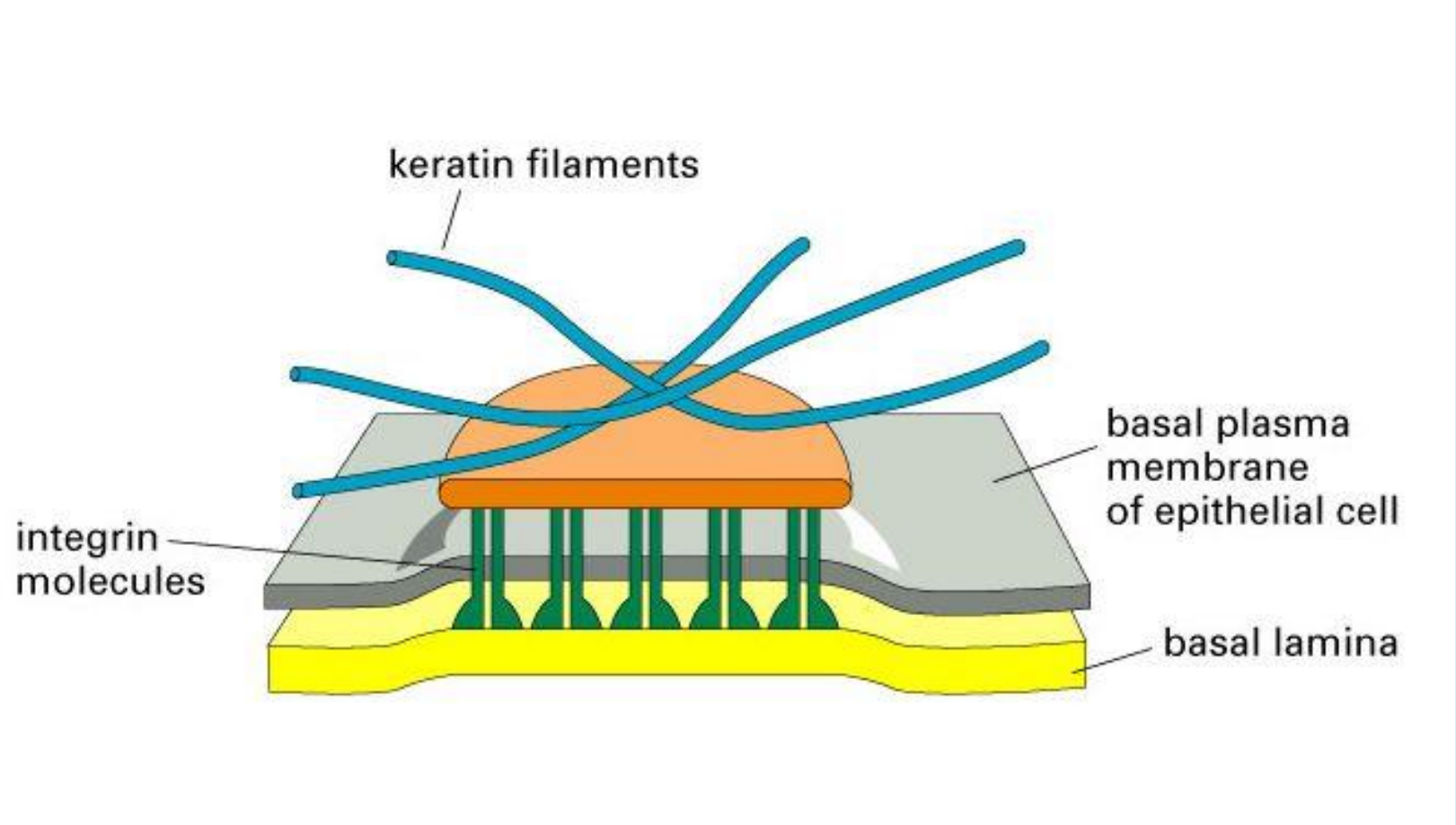
(b) Desmosomes: Anchoring junctions bind adjacent cells together and help form an internal tension-reducing network of fibers.



Gap junctions (communicating junction)

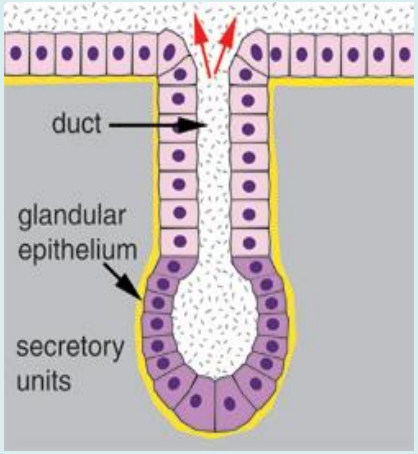


Hemidesmosome

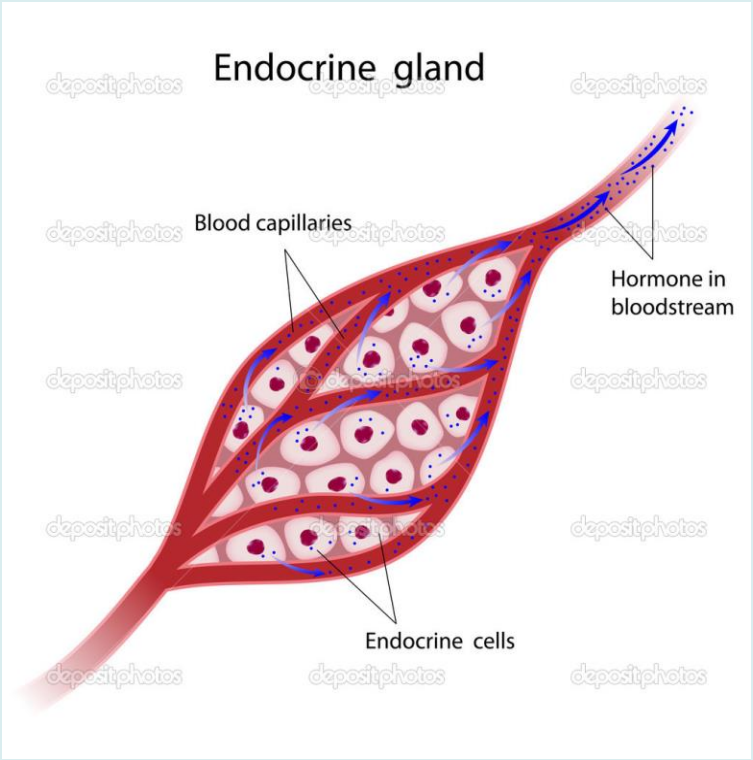


GLANDS

Exocrine



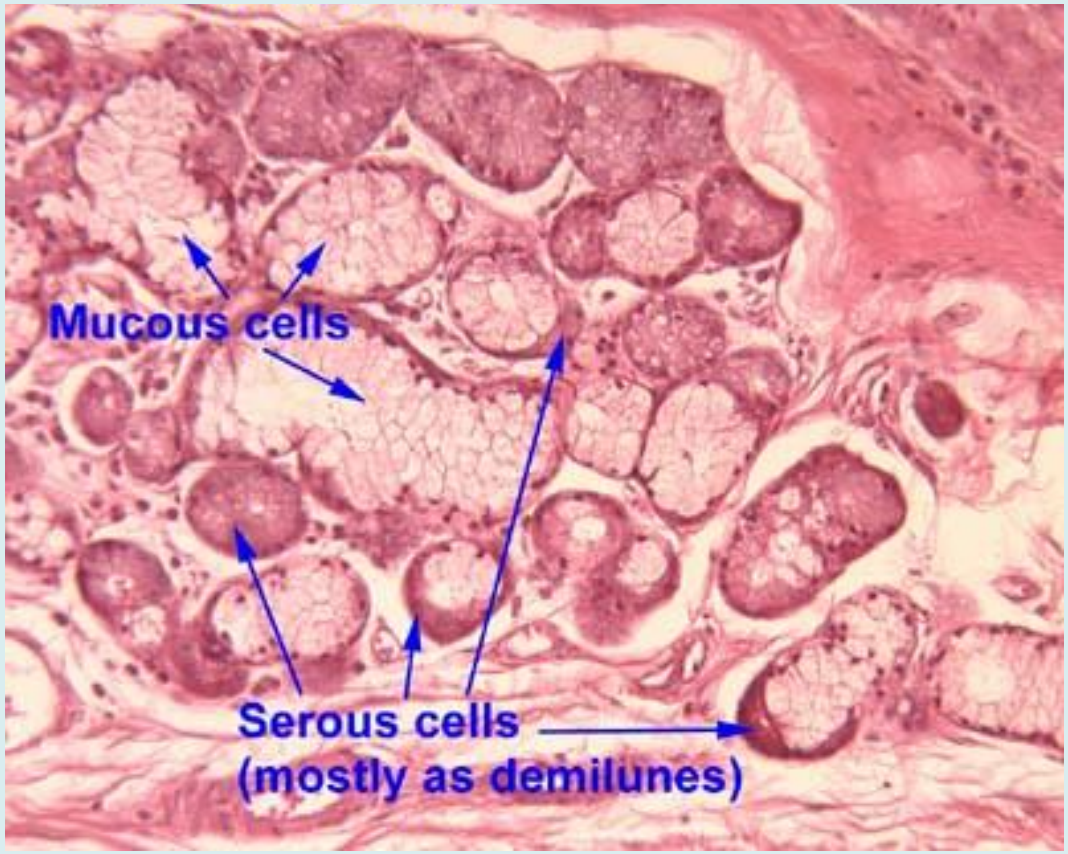
Endocrine



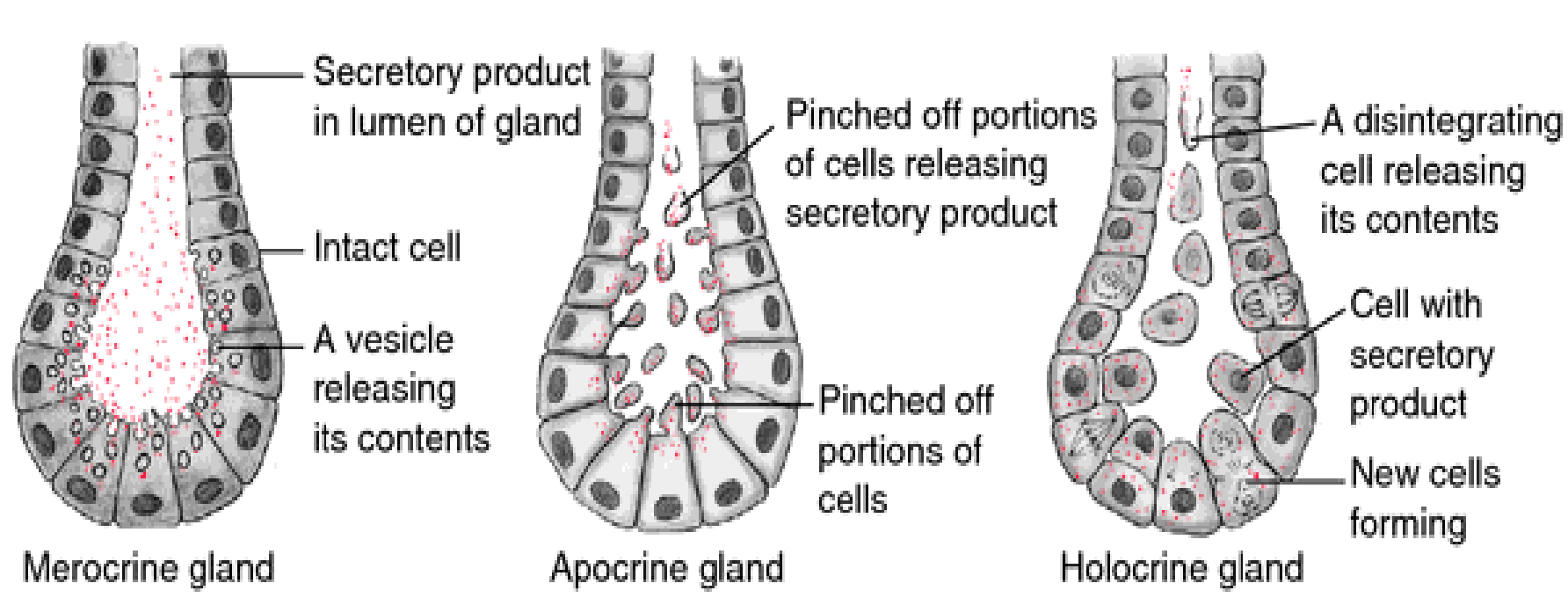
Classification of exocrine glands

According to:

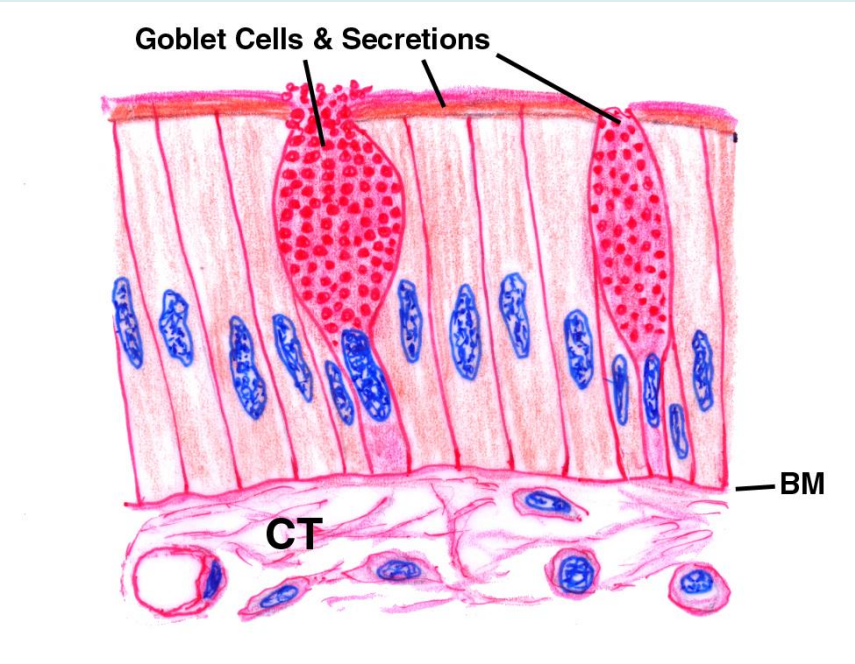
- **nature of secretion**
  - mucous glands
  - serous glands
  - mixed glands
- **mode of secretion**
  - merocrine glands
  - apocrine glands
  - holocrine glands
- **number of cells**
  - unicellular
  - multicellular



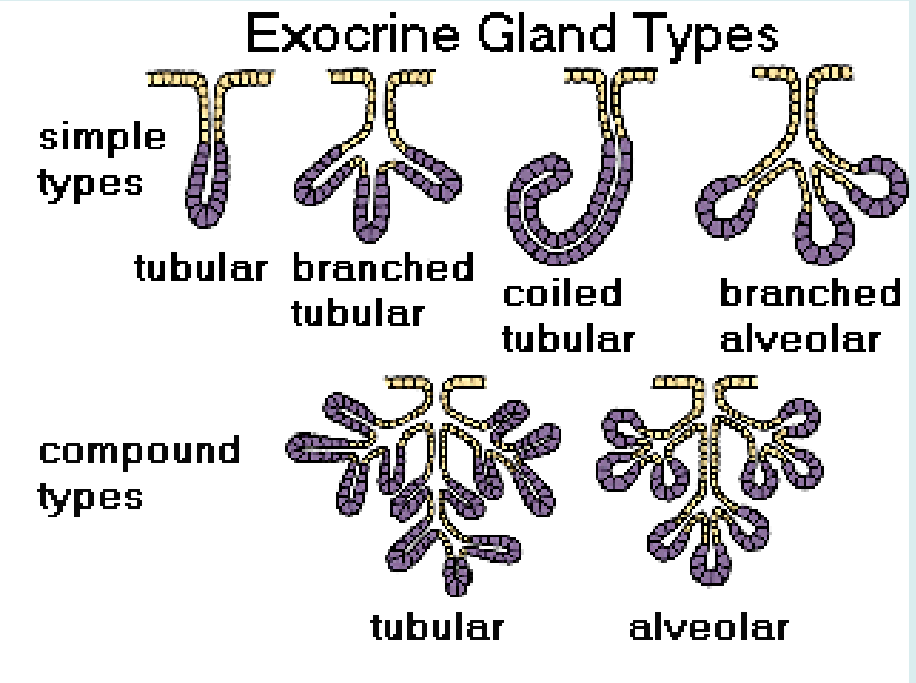
Mechanisms of secretion of exocrine glands

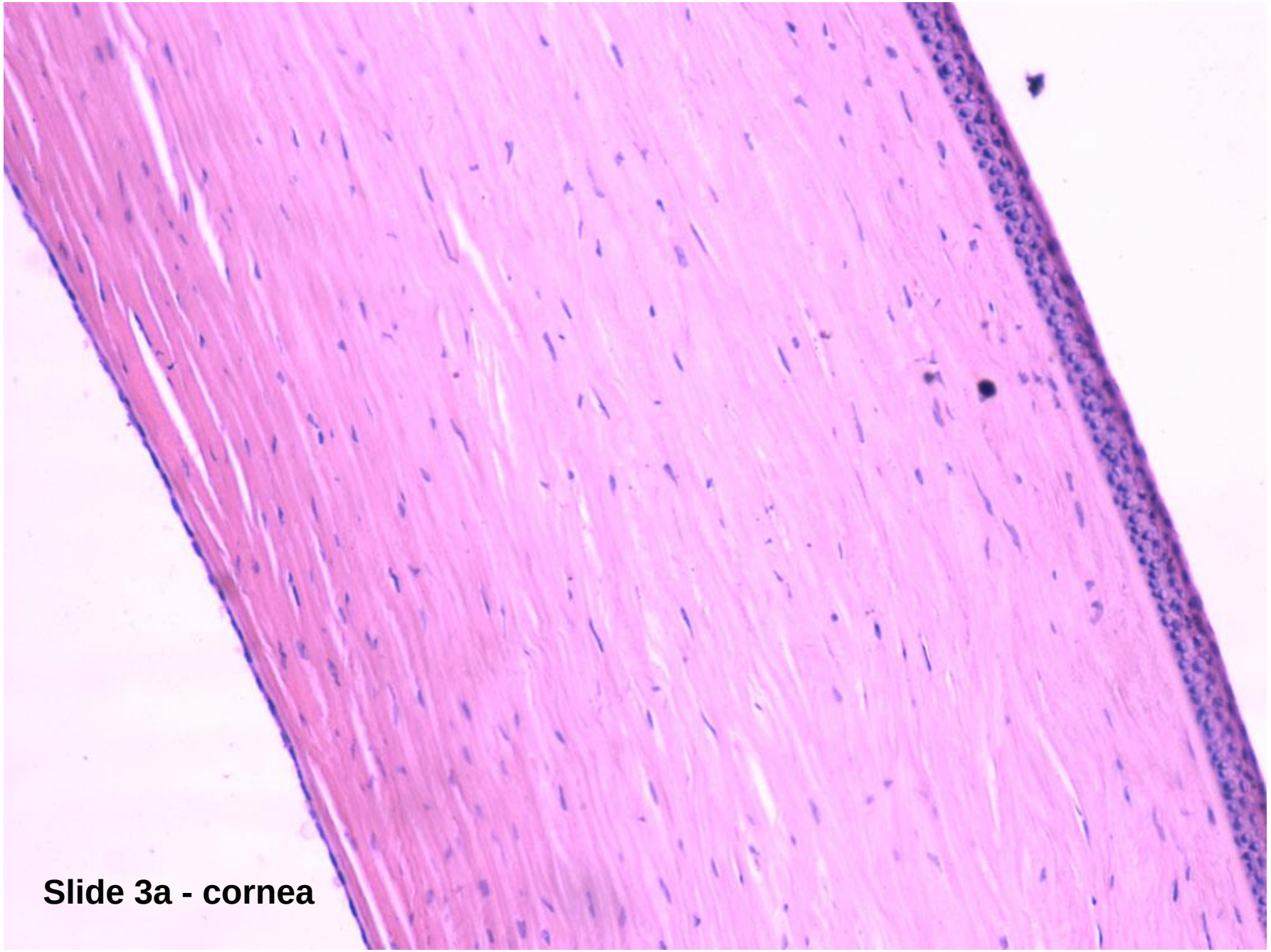


Unicellular glands

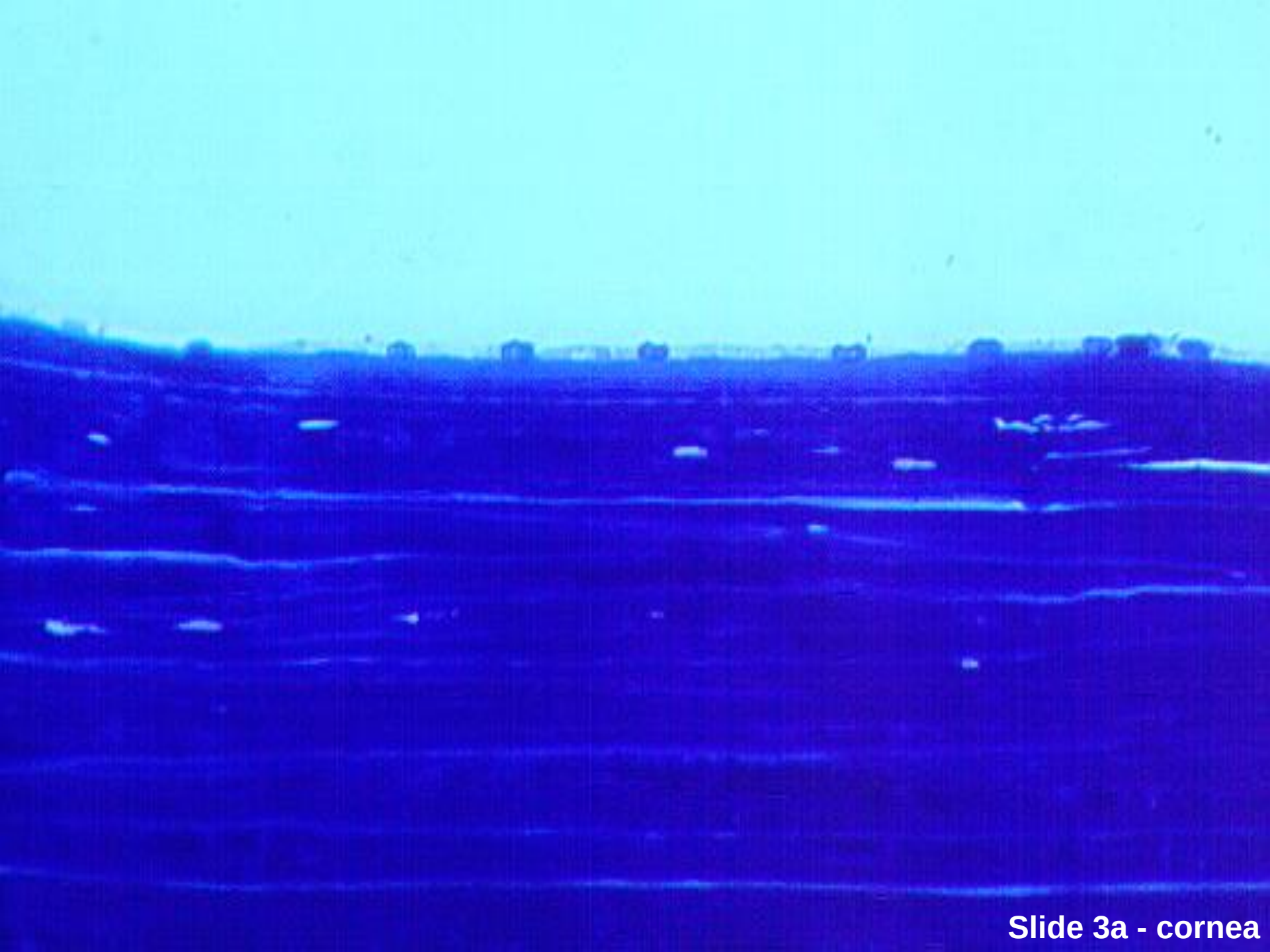


Multicellular exocrine glands

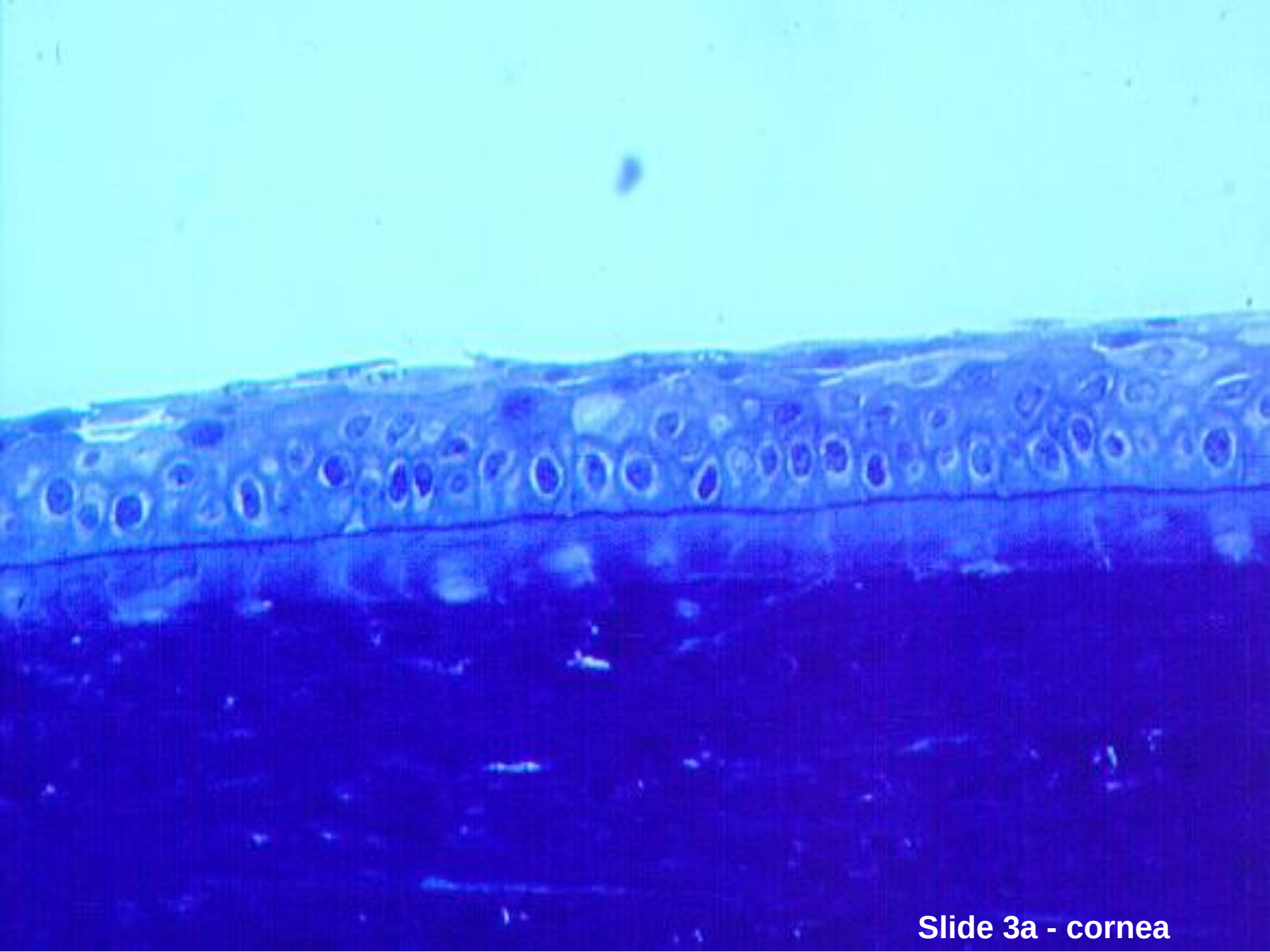




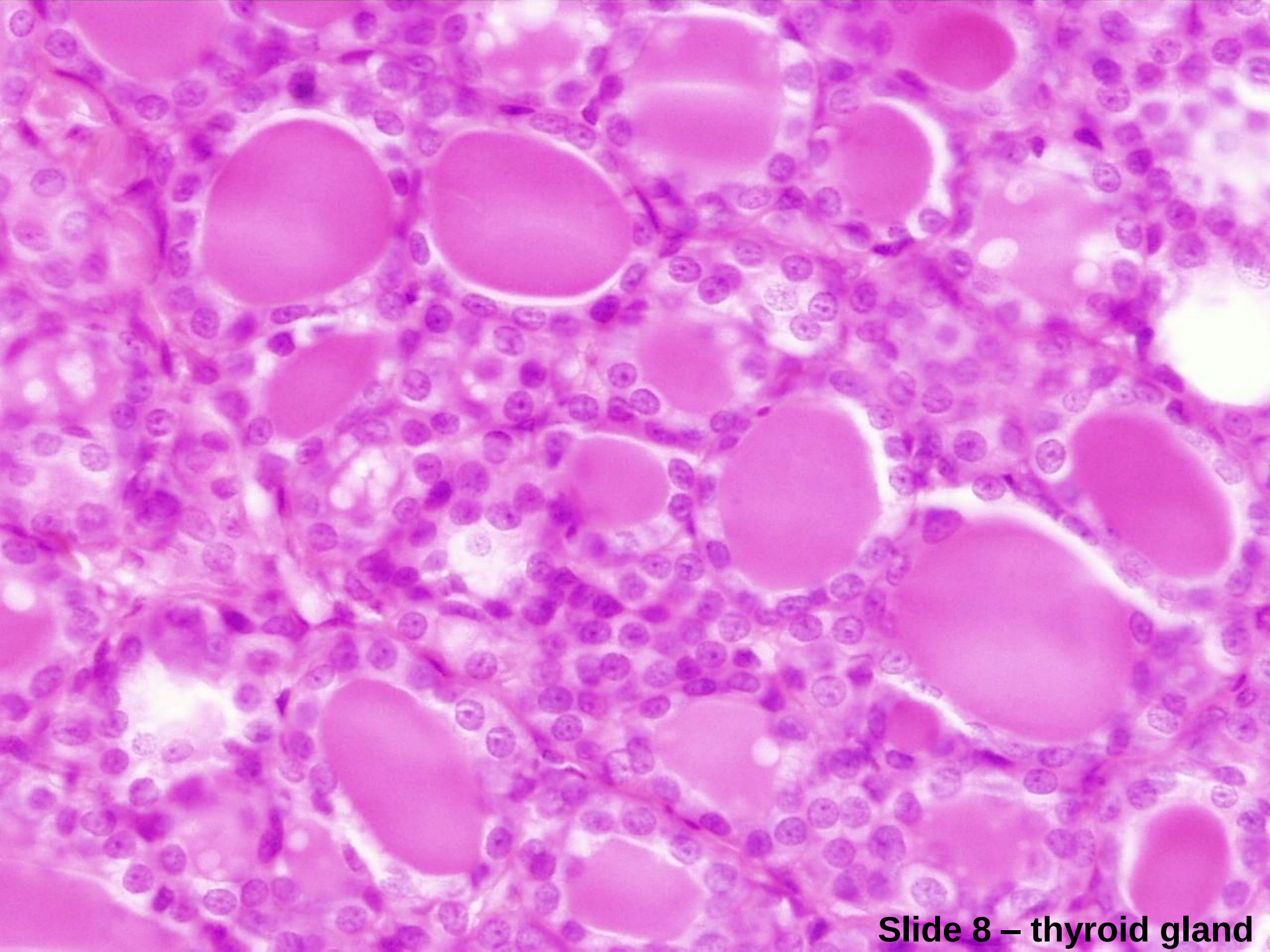
Slide 3a - cornea



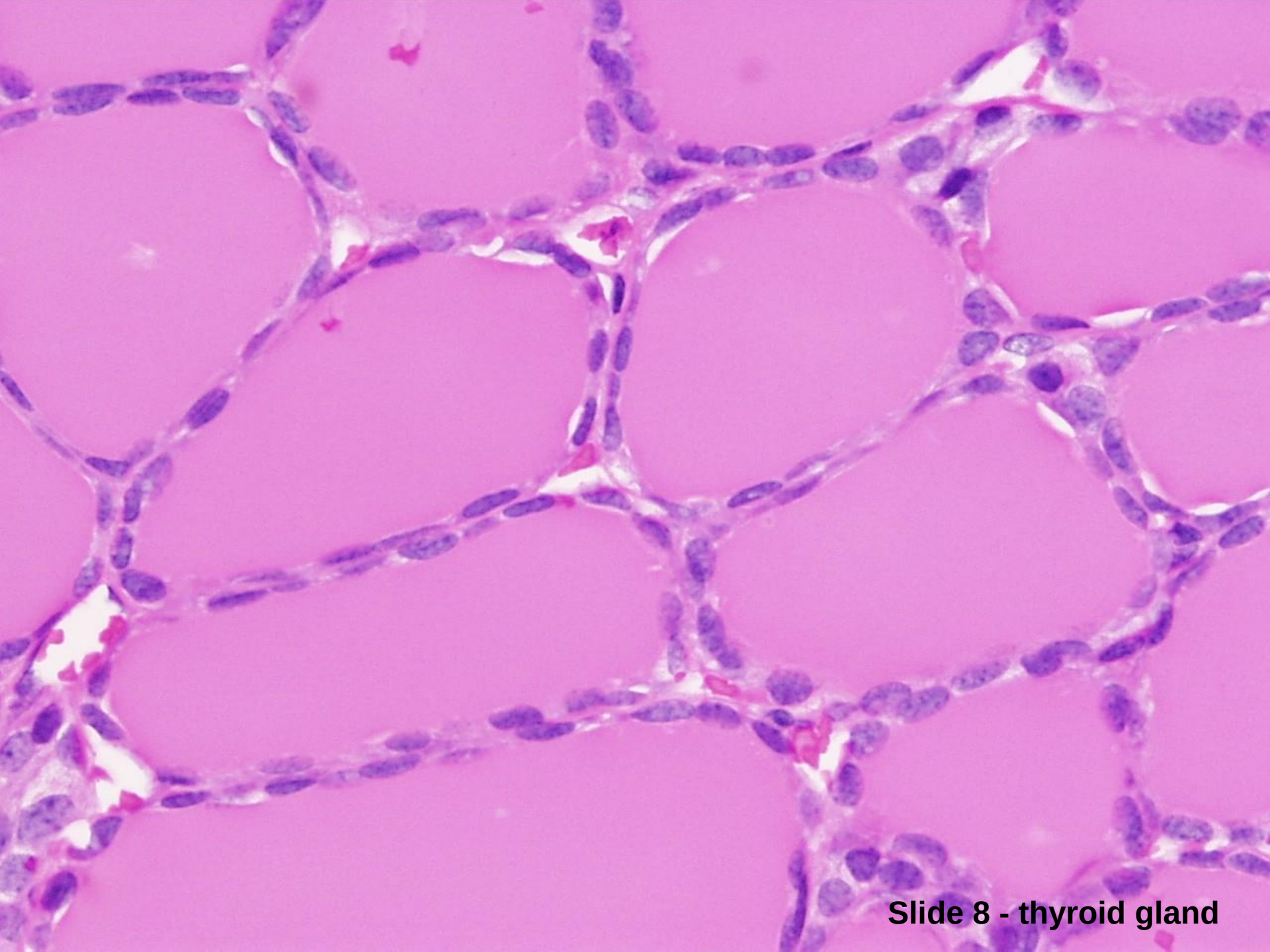
Slide 3a - cornea

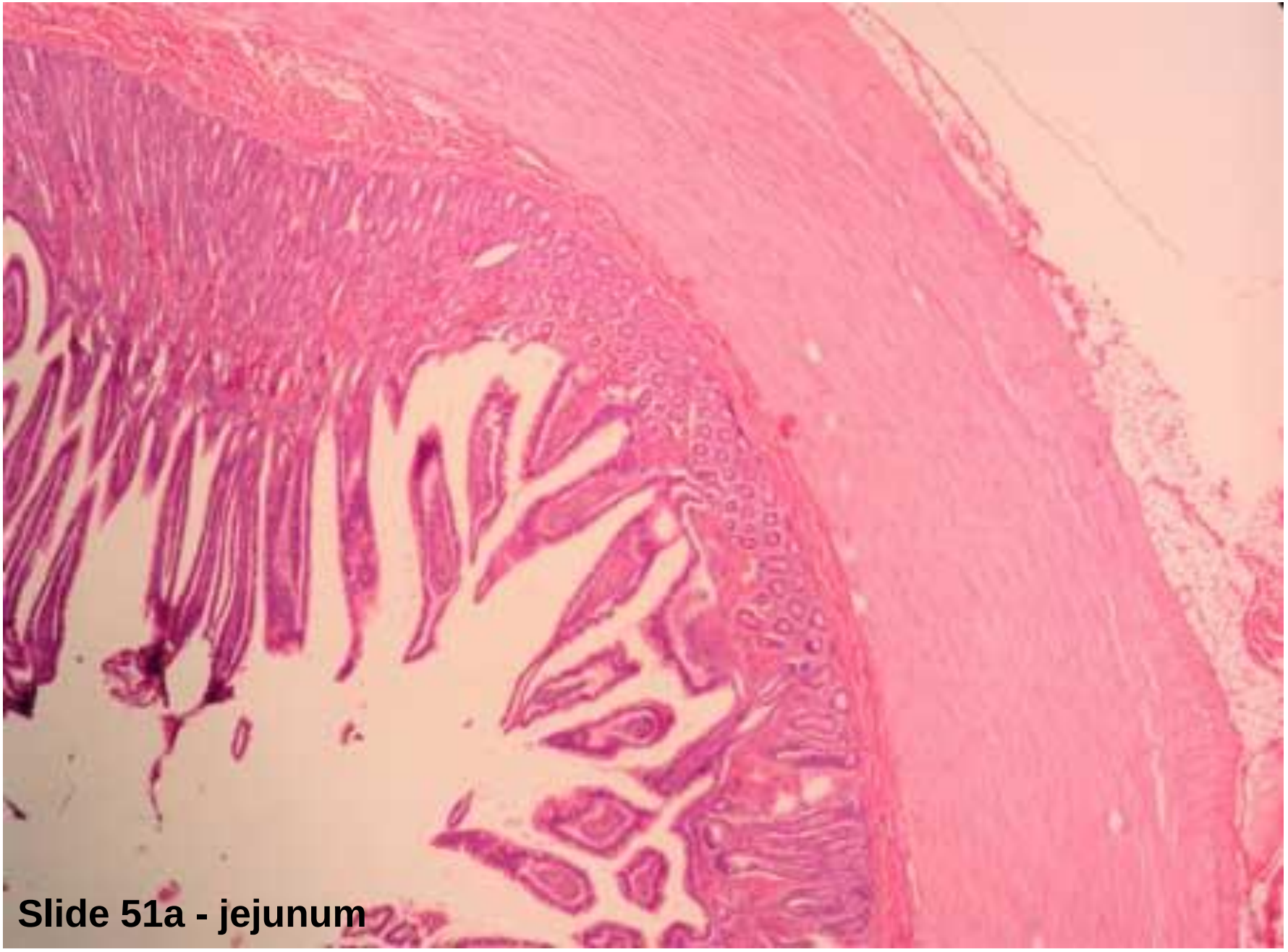

Slide 3a - cornea


Slide 8 – thyroid gland
200 µm

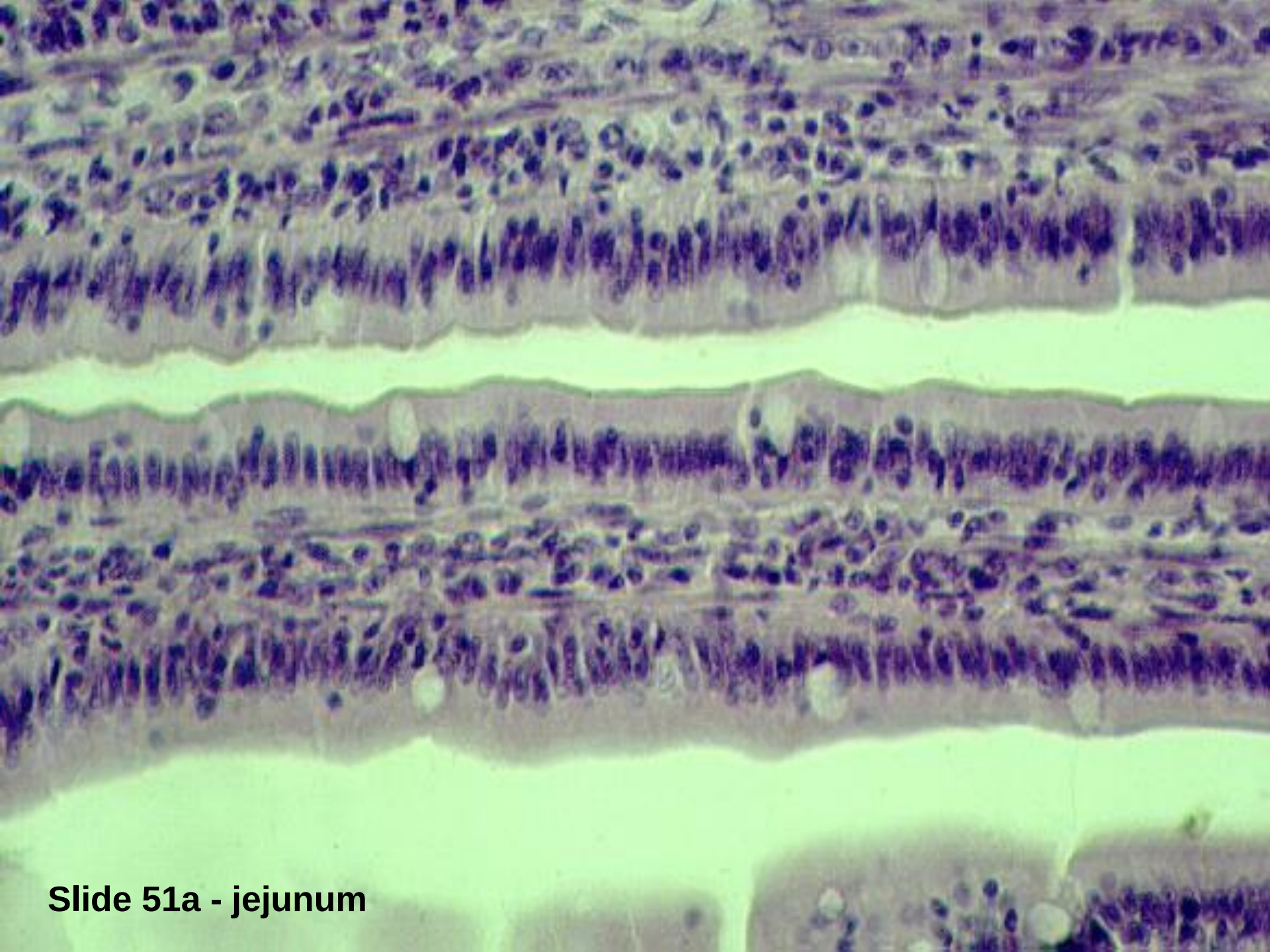


Slide 8 – thyroid gland

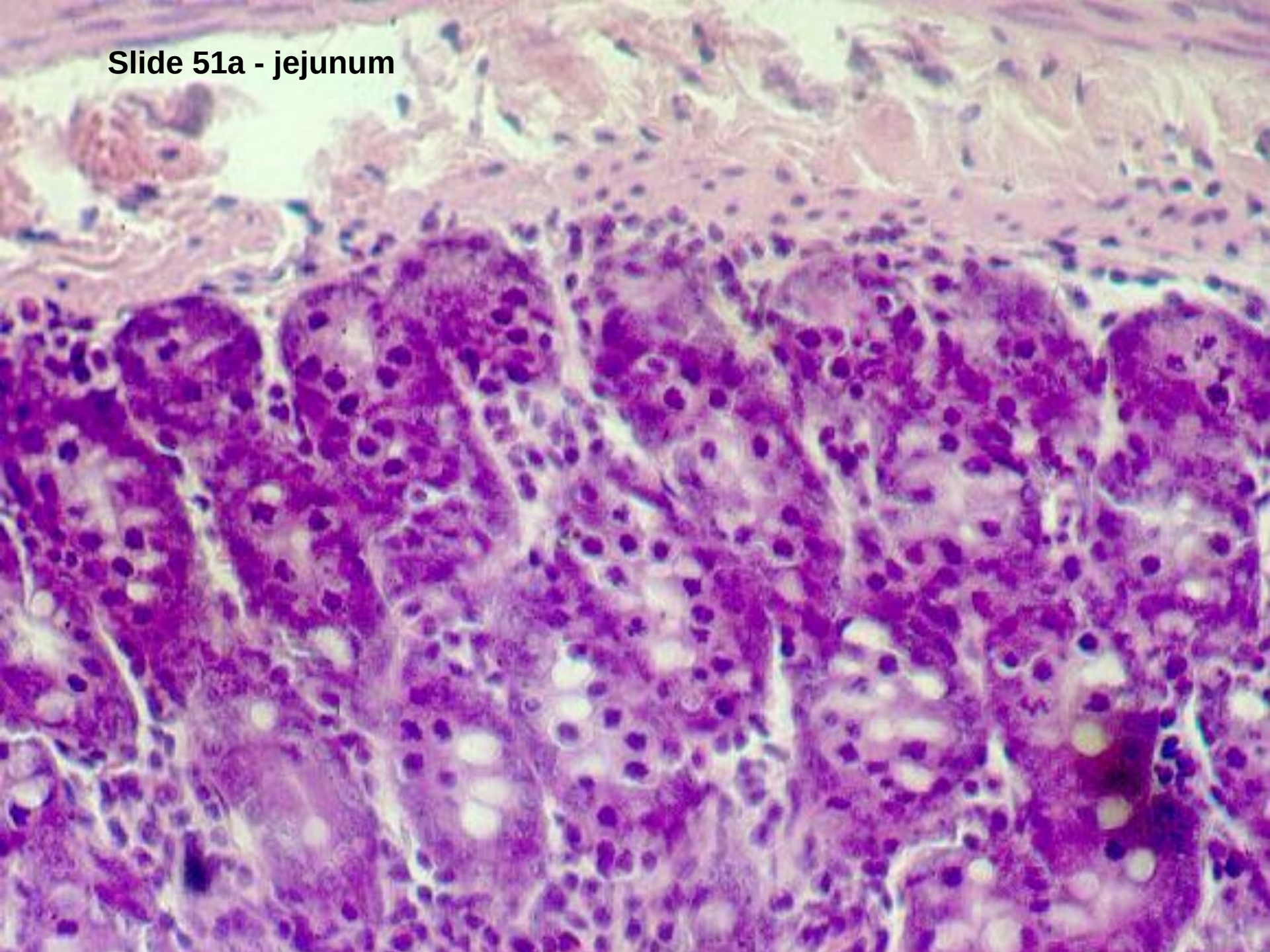

Slide 8 - thyroid gland



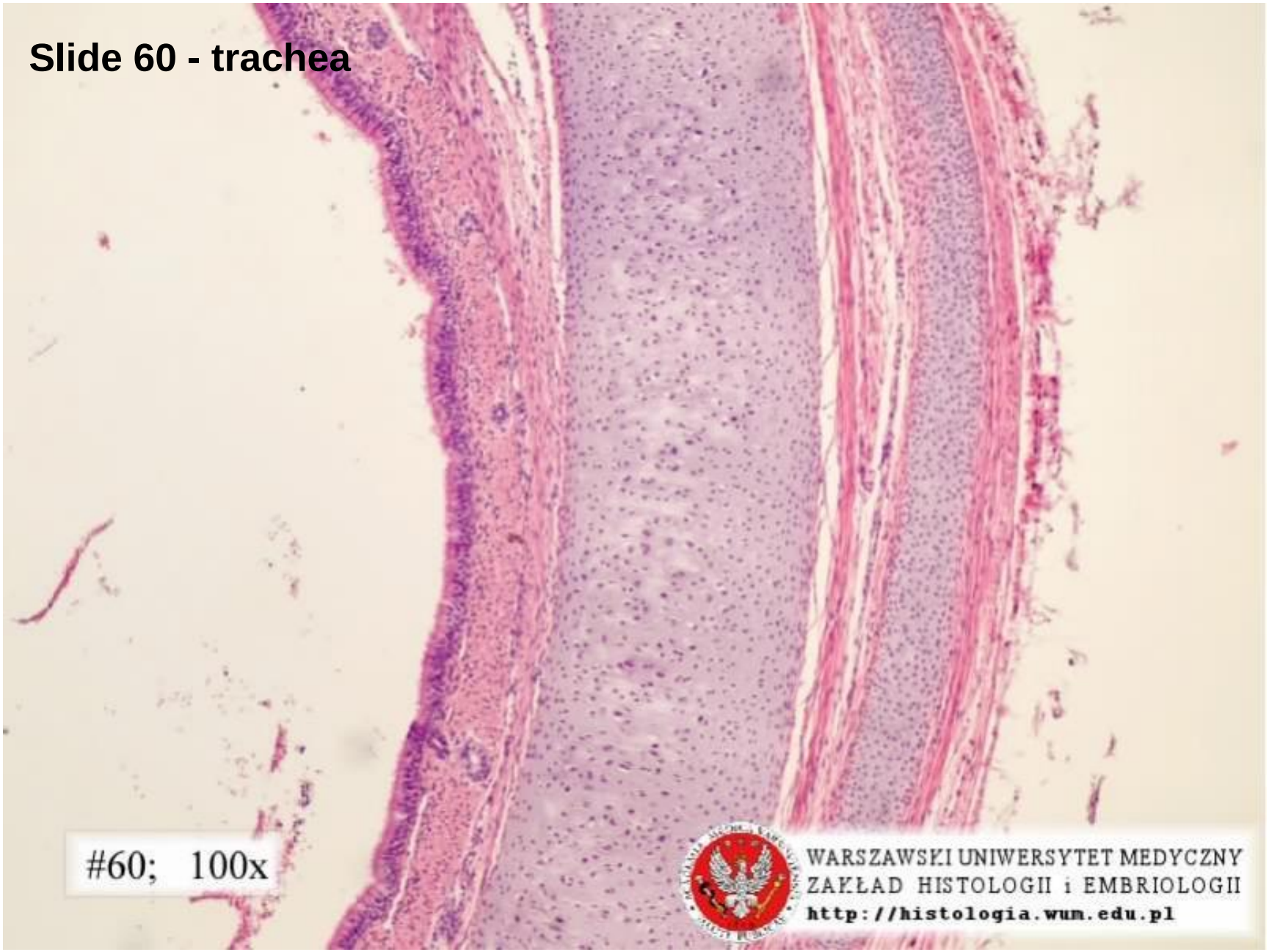
Slide 51a - jejunum

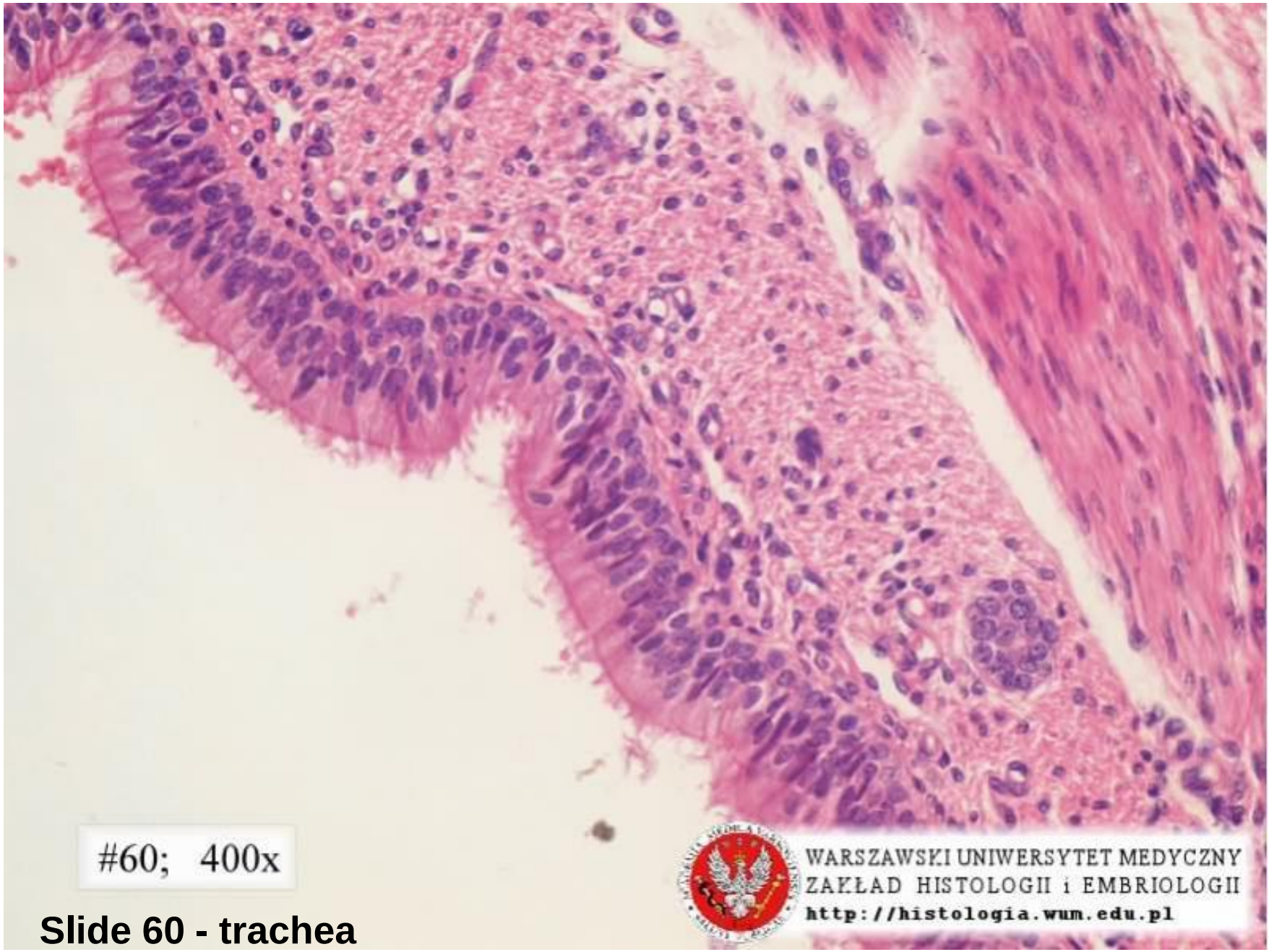


Slide 51a - jejunum

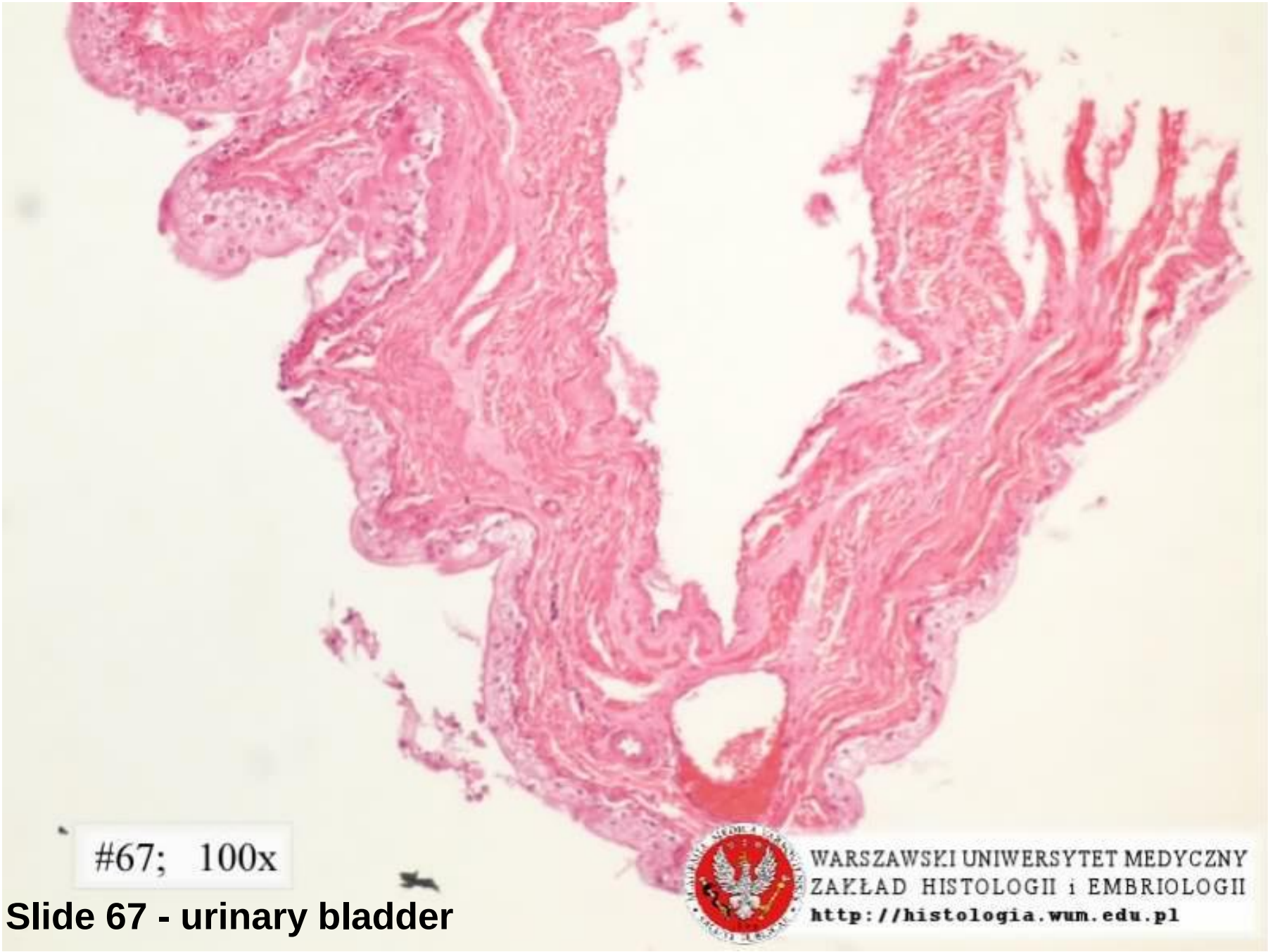

Slide 51a - jejunum

Slide 60 - trachea

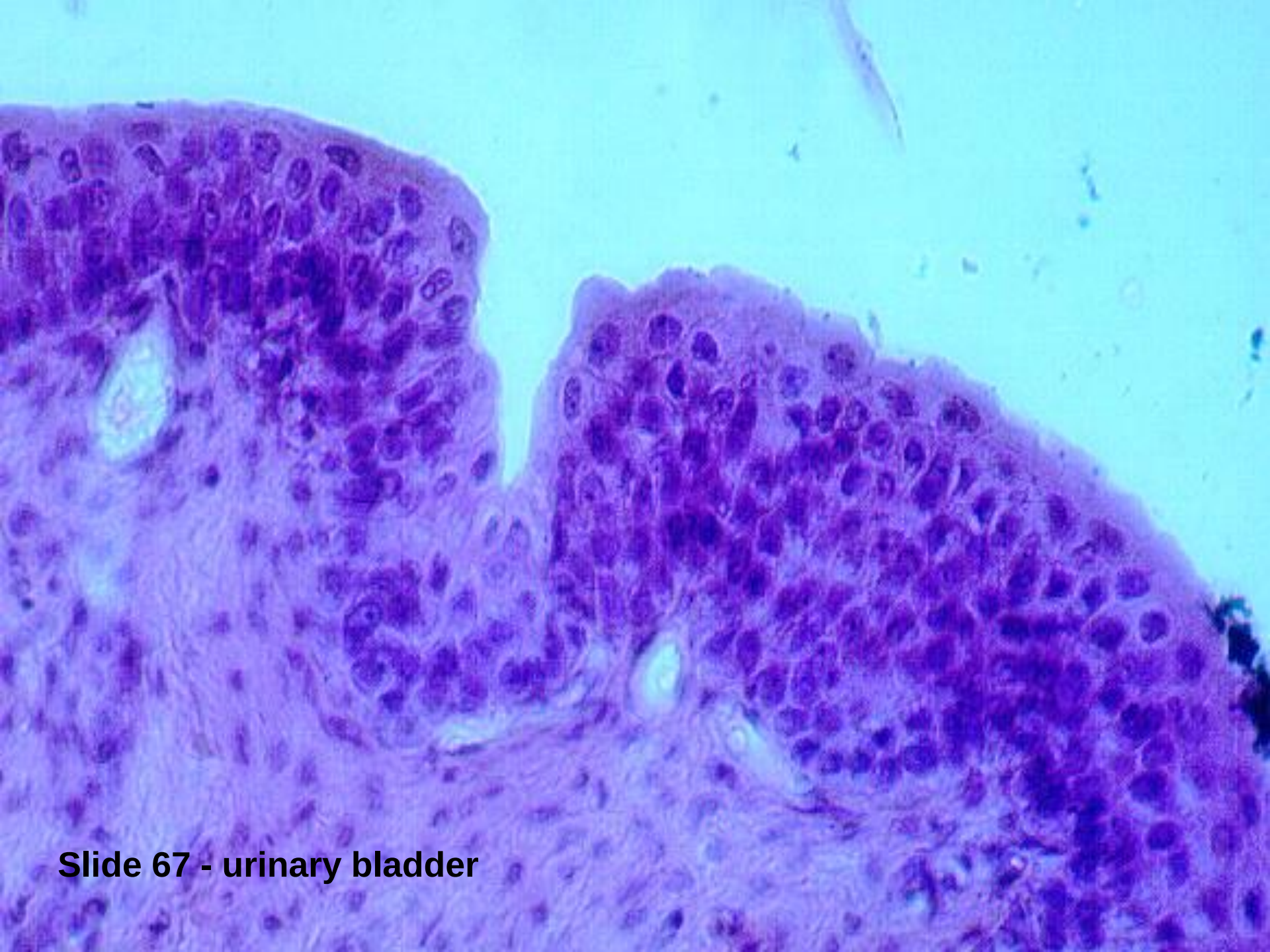




Slide 60 - trachea



Slide 67 - urinary bladder


Slide 67 - urinary bladder