

Specialization of Epithelia

Lec . 3

Second year
Histology
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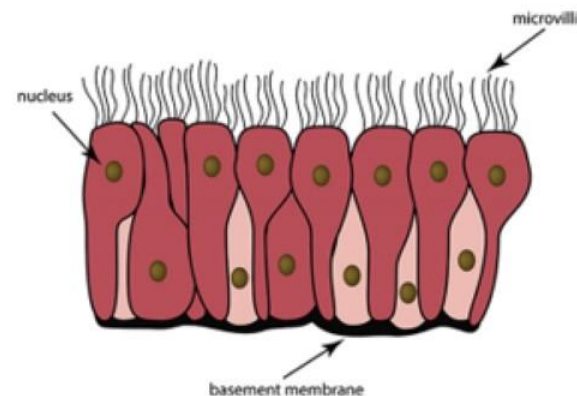
Membrane Specialization of Epithelia

These specialized structures are

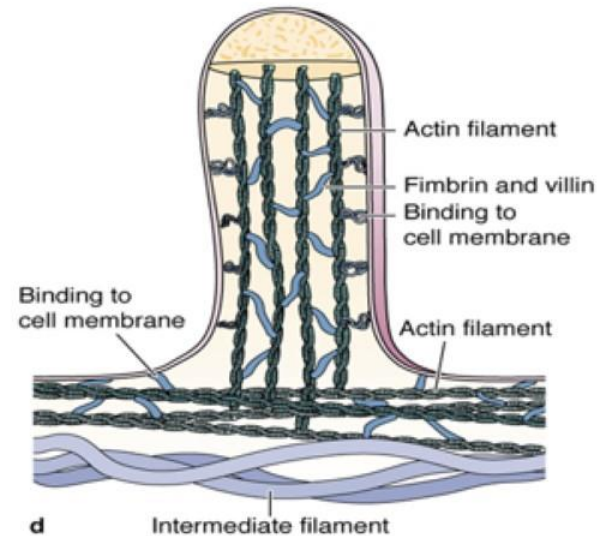
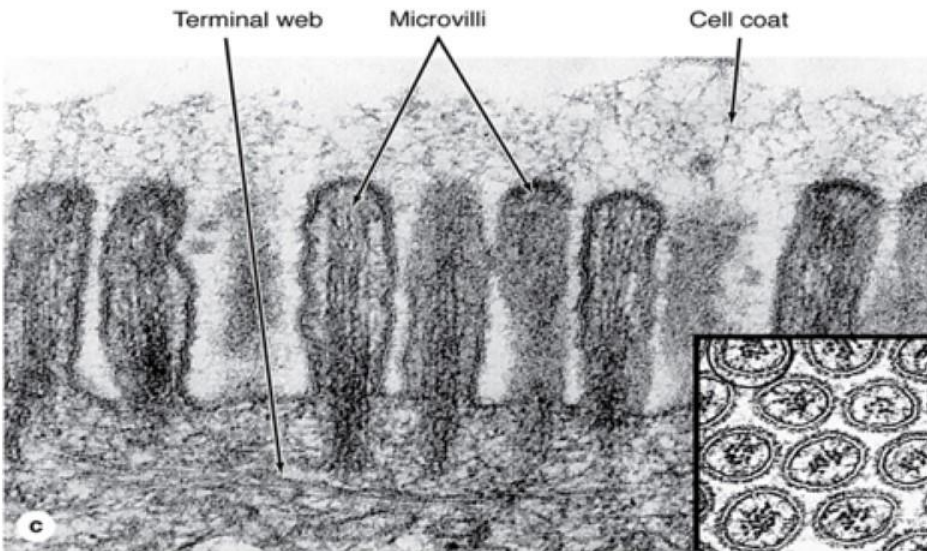
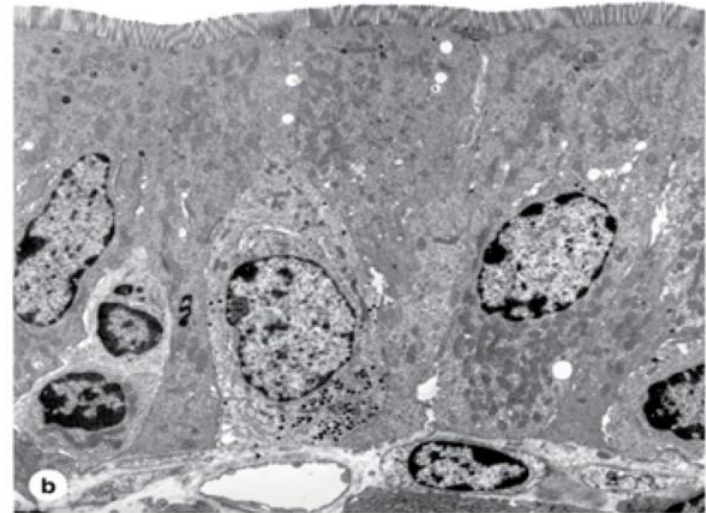
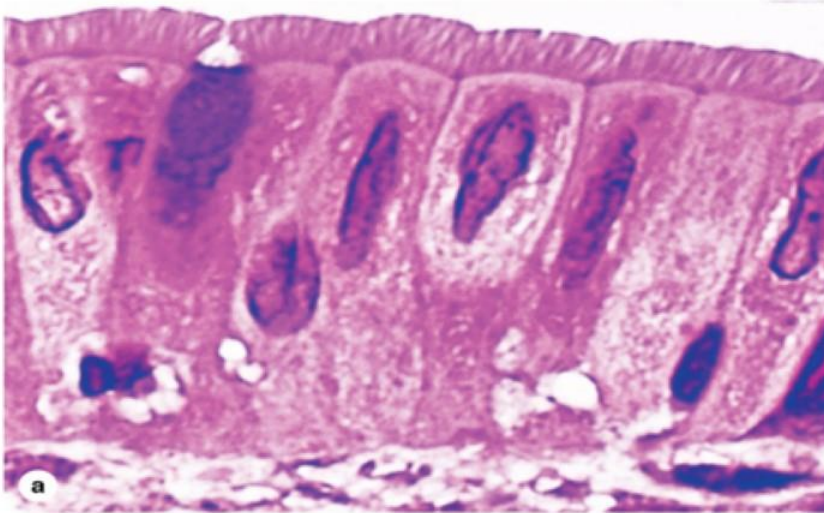
- 1. Microvilli**
- 2. Stereocilia**
- 3. Cilia**

1. Microvilli

1. Absorptive surfaces lining small intestine (Absorption, protection barrier)
2. Absorptive surface lining the proximal convoluted tubules (in the kidney)
3. Efferent ductules (of the testes); microvilli absorb excess fluid produced in the seminiferous tubules .



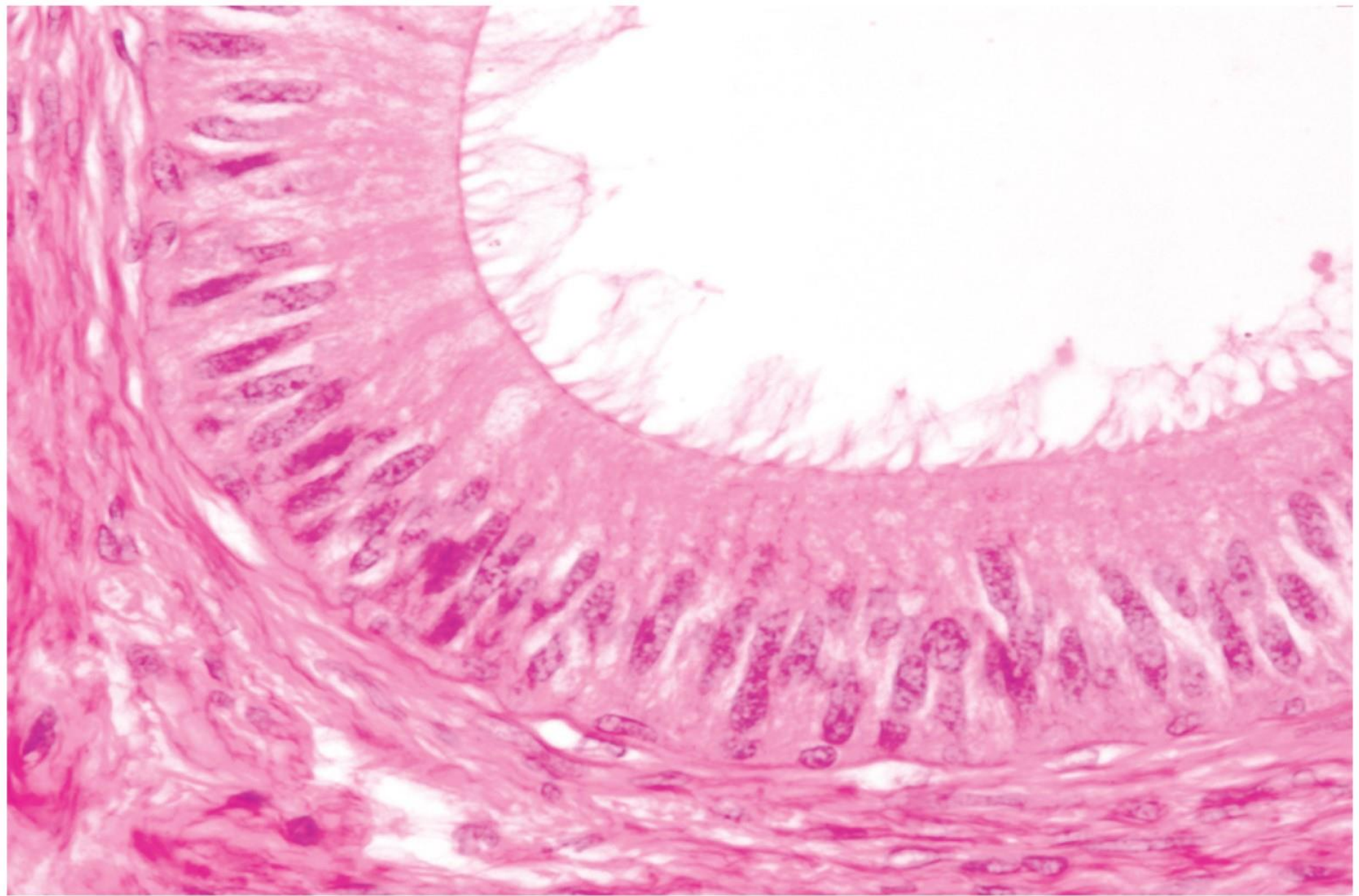
Microvilli



2 . Stereo cilia

Are long apical processes of cells in other absorptive epithelia [**pseudostratified columnar epithelium with stereocilia**] such as that lining of epididymis and vas (ductus) deferens.

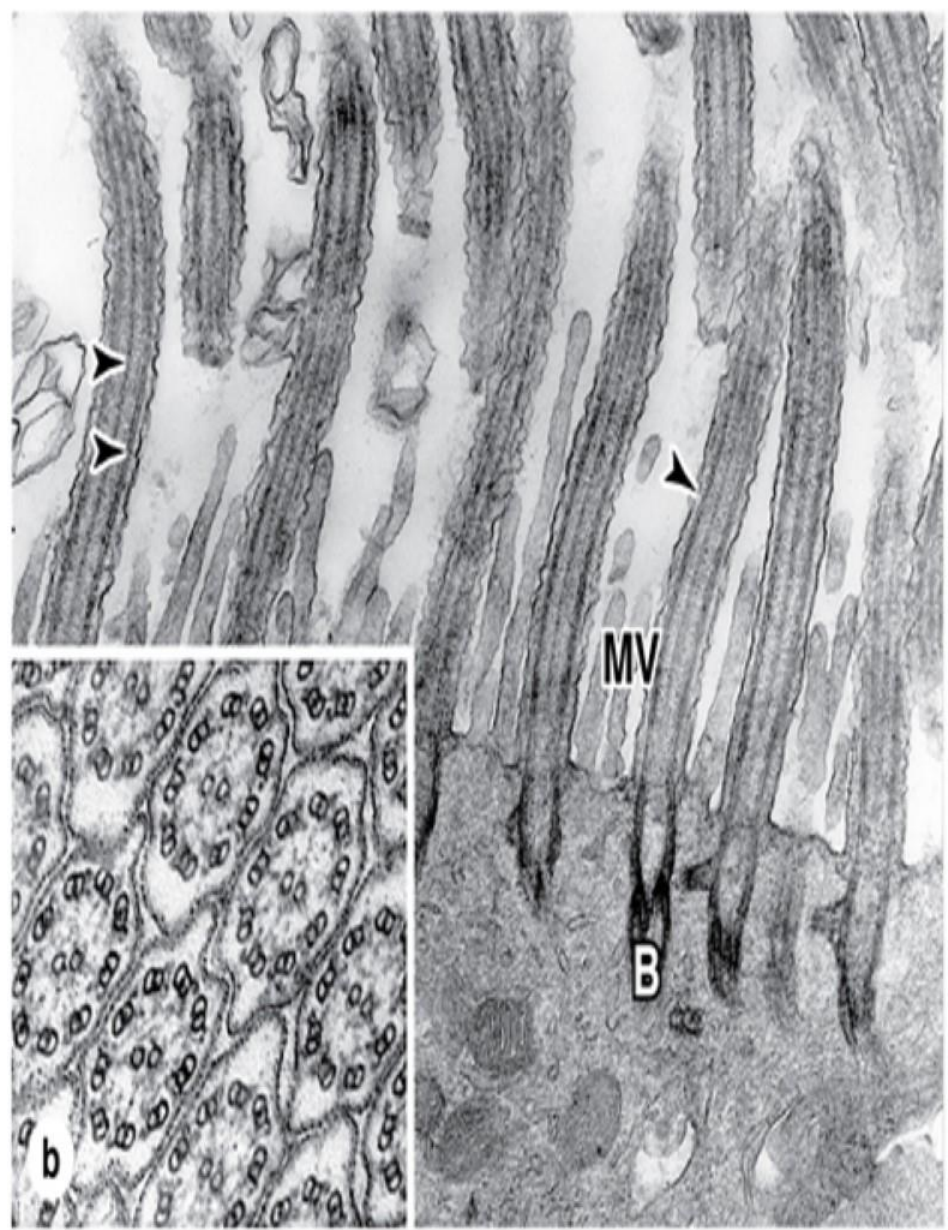
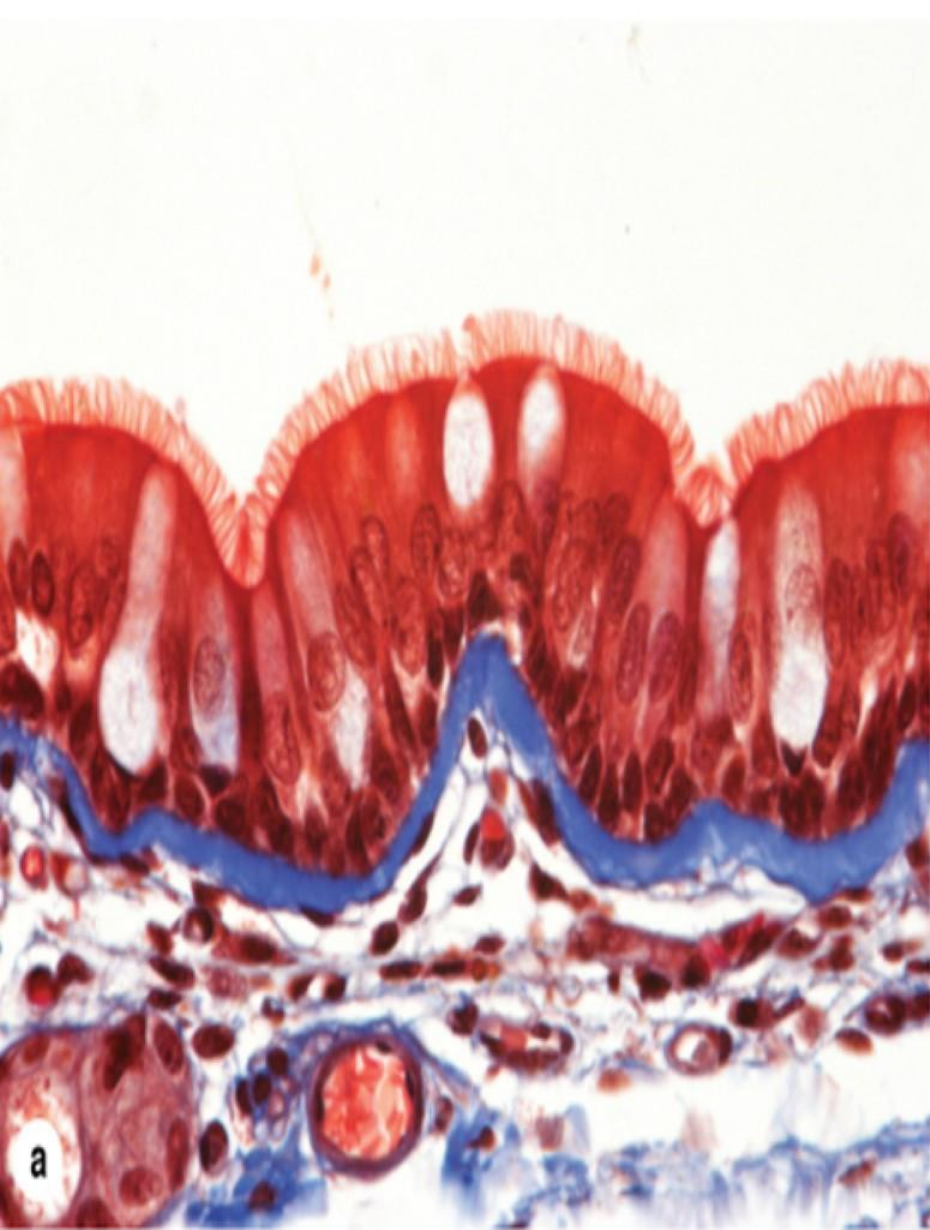
These structures are much longer and less motile than microvilli, and they are branched and should not be confused with true cilia. Like microvilli they increase the cell surface area.



Stereocilia

2. Cilia

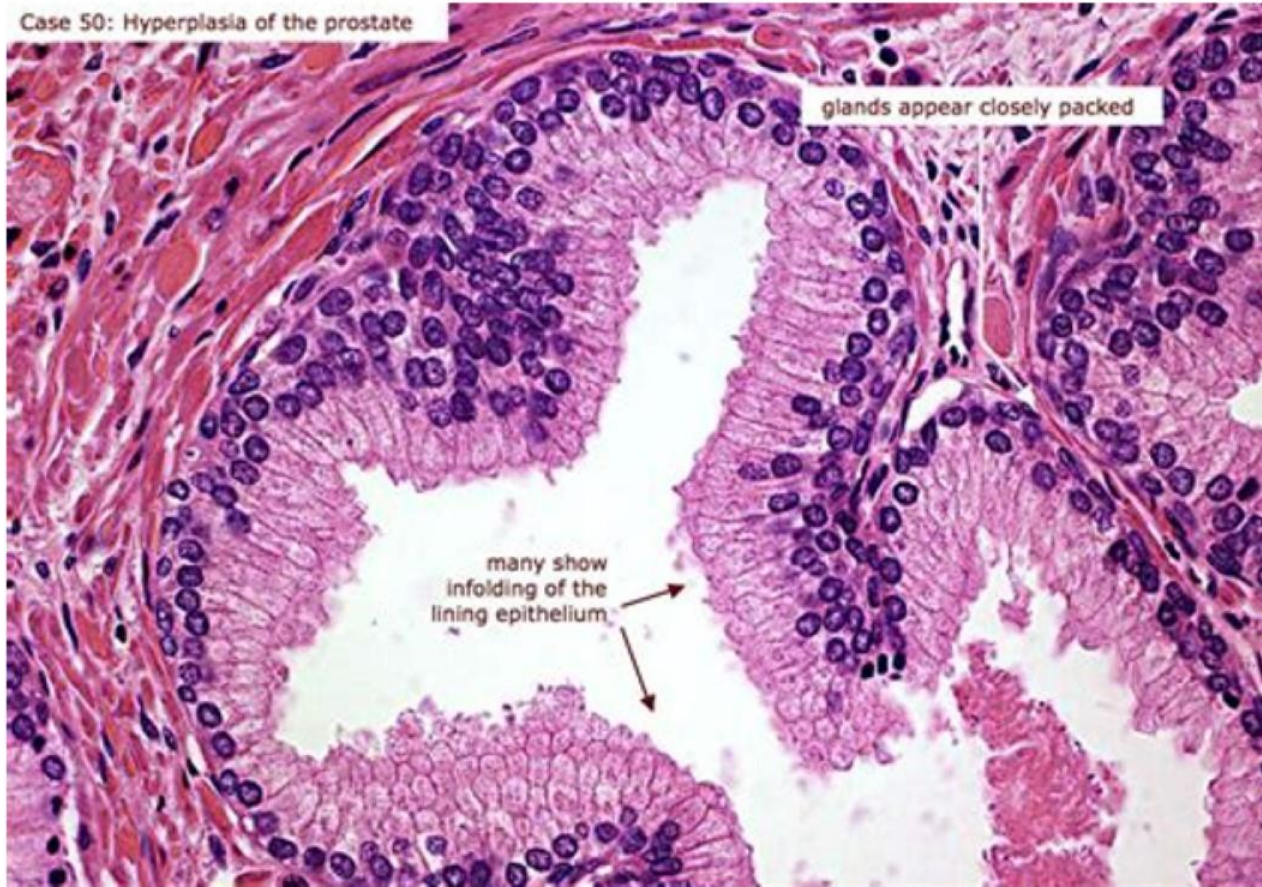
1. Pseudostratified columnar ciliated epithelium lining tracheobronchial tree .
Functions as cleaning role, sweeping mucus and entrapped particulate matter towards the pharynx.
2. Ciliated simple columnar epithelium present in the oviduct (uterine tube) facilitate the conduction of oocyst and sperms across their surface.
3. Ciliated simple columnar epithelium in the efferent ductules of the testes assist in transporting sperms out of the testes into the ducts of epididymis.
4. Flagela present in human body only in spermatozoa; are similar to cilium but is much more longer and is normally limited to one flagellum per cell.



Cilia

Glandular Epithelium

Case 50: Hyperplasia of the prostate



Glandular Epithelium

- A gland is one or more cells that produce and secrete a specific product. The product is always a water-based fluid (aqueous) and usually contains proteins (the product is referred to as a secretion). Glandular cells obtain substances needed from blood and transform them (chemically) into a product that's discharged from the cell. Glands include two types: 1. Endocrine Glands 2. Exocrine Glands

- **There are of two types:**
- **Exocrine glands** : retain their connection with the surface epithelium, the connection taking the form of tubular ducts lined with epithelial cells through which the secretion passes to the surface.
- **Endocrine glands:** have lost their connection with the surface from which they originated during development. These glands are therefore **ductless** and their secretions are picked up and transported to their sites of action by blood stream rather than by a duct system.

Exocrine Glands

Classification according to number of cells

Exocrine glands are divided into:

1. Unicellular Exocrine Glands and
2. Multicellular exocrine glands

- **Unicellular Exocrine Glands**

- Consist of large isolated secretory cells. The classical example is **goblet cell** (so called for their resemblance to drinking goblets).
- **Goblet cells** are modified columnar epithelial cells which synthesize and secrete mucus.
- Goblet cells are scattered amongst the cells of many simple epithelial linings, particularly those of respiratory and gastrointestinal tract.
- The secretion when released by exocytosis combine with water to form viscid secretion called **mucus**.

Unicellular Exocrine Glands

Trachea H&E

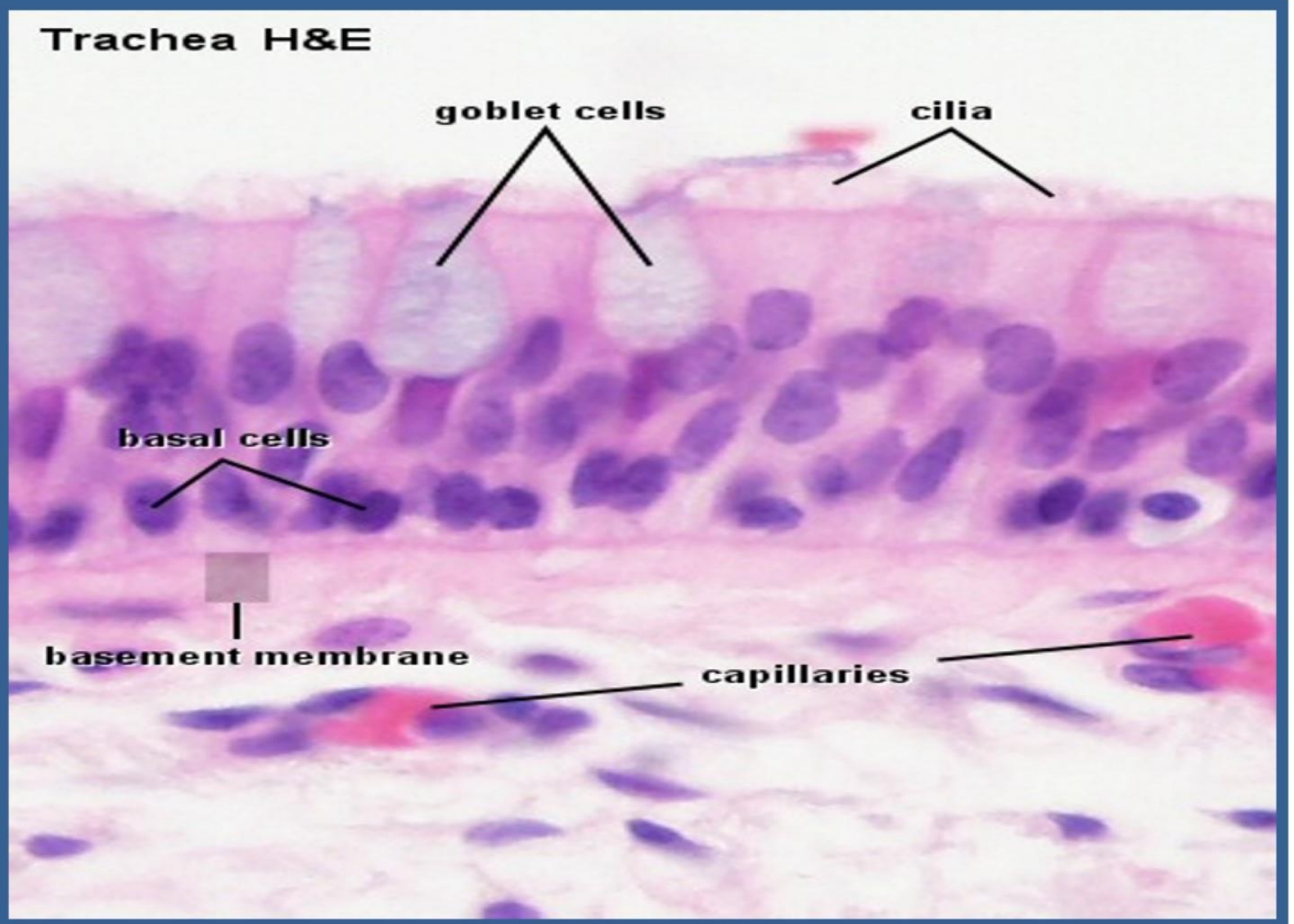
goblet cells

cilia

basal cells

basement membrane

capillaries



- **Multicellular Exocrine Glands**

- Have cluster of cells, or large aggregates of secretory epithelial cells (e.g. salivary gland).

They have connective tissues in a surrounding capsule, and septa that divide the gland into lobules; these lobules then subdivide, and in this way connective tissue separates and binds the glandular tissue components together.

- **Classification of multi cellular exocrine glands**

- A. According to ductal portion into

1. Simple (unbranched)
2. Compound (branched; with two or more branches).

- B. According to secretory portion

1. Tubular
 - a. Short straight
 - b. Long coiled
2. Acinar (alveolar)
3. Tubuloacinar (tubuloalveolar)

Multicellular : divided in to 2.



Simple tubular



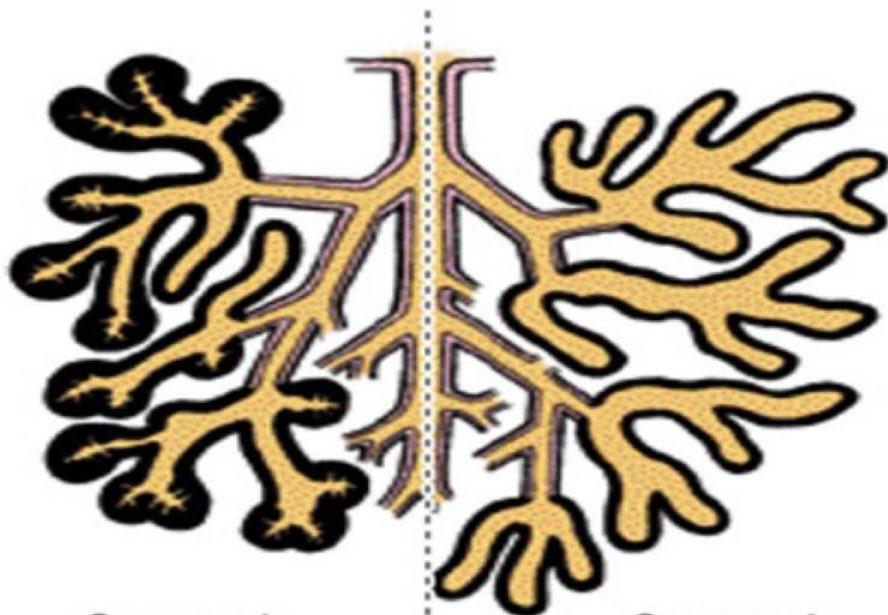
Simple coiled tubular



Simple branched tubular

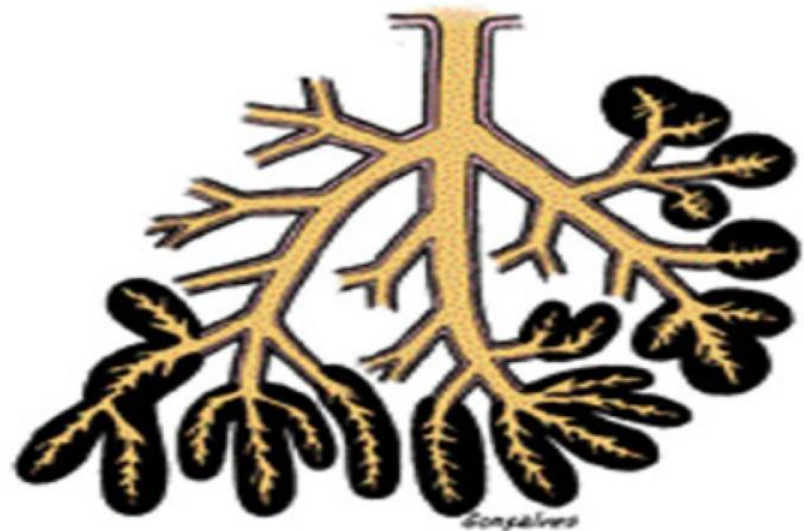


Simple branched acinar



Compound tubuloacinar

Compound tubular

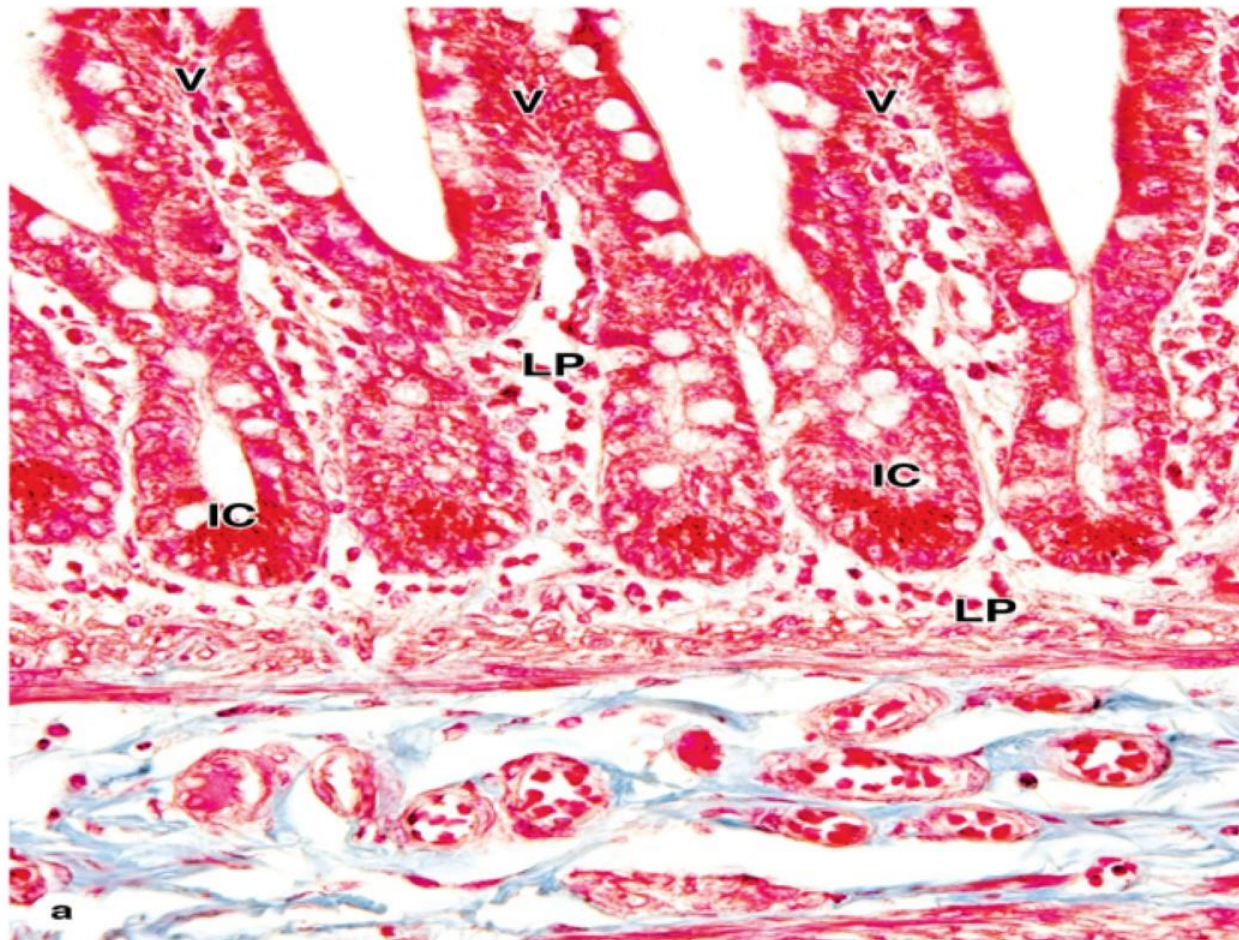


Compound acinar

Simple (unbranched) Exocrine Gland

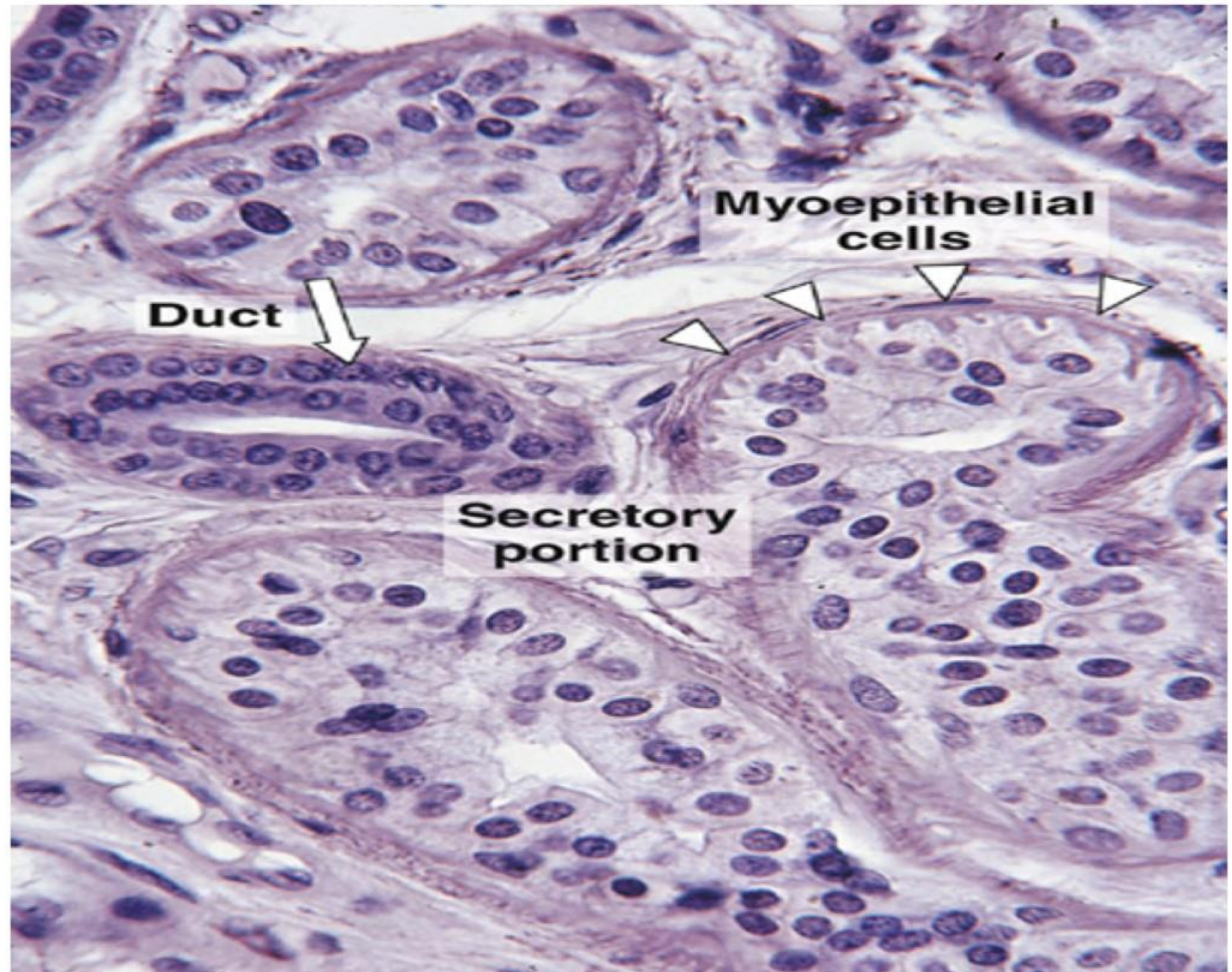
1. Simple tubular

(example intestinal gland and in large intestine.)



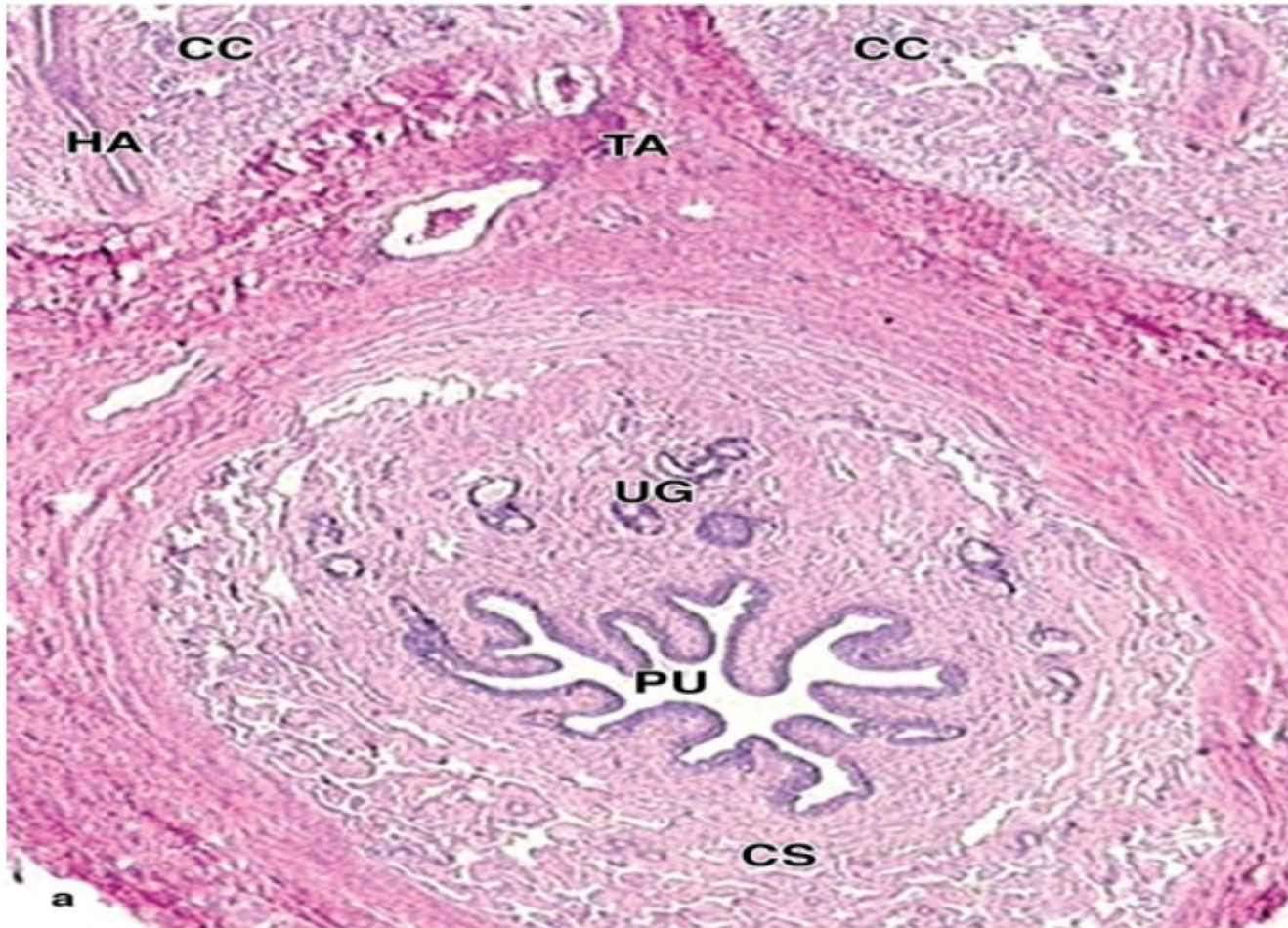
2. Simple long coiled tubular (example sweat glands)

Section of sweat gland.
Note // the duct lined by
stratified cuboidal
epithelium.

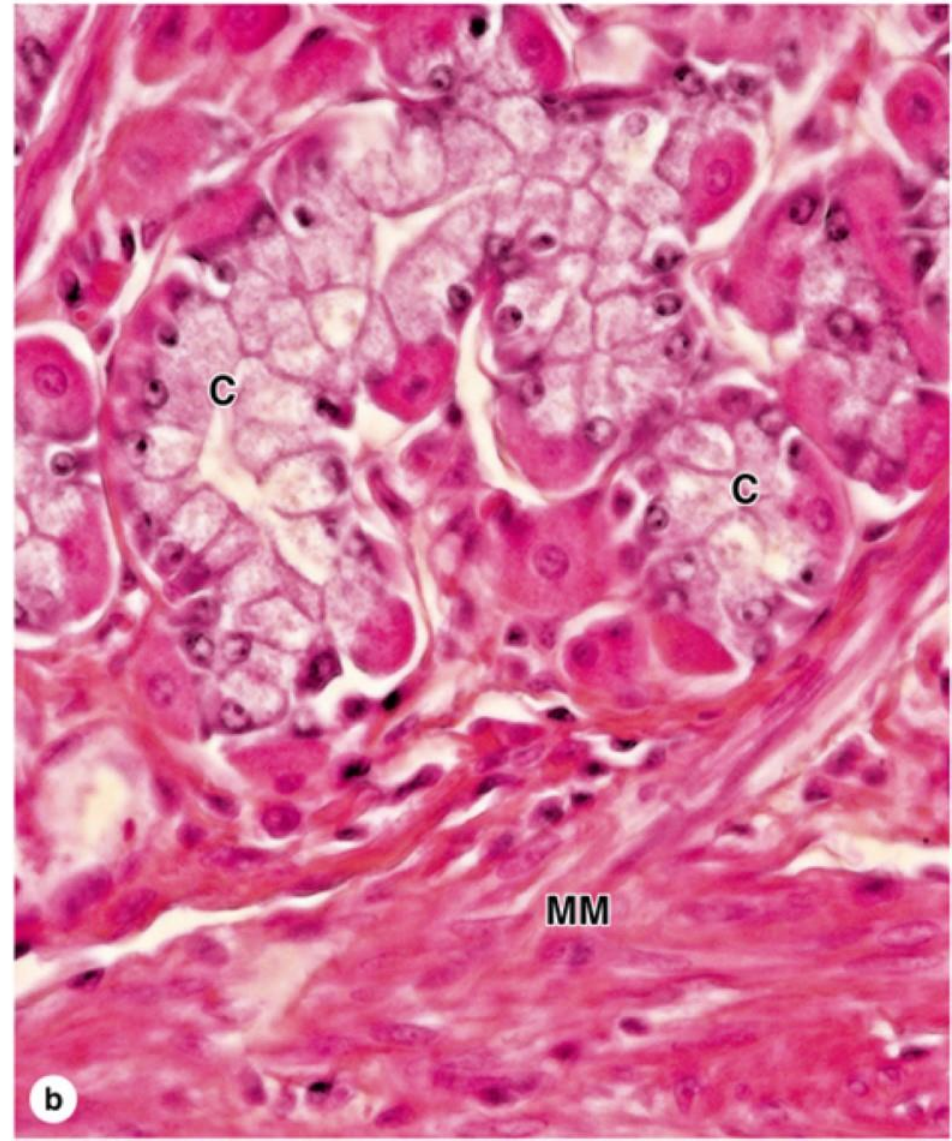
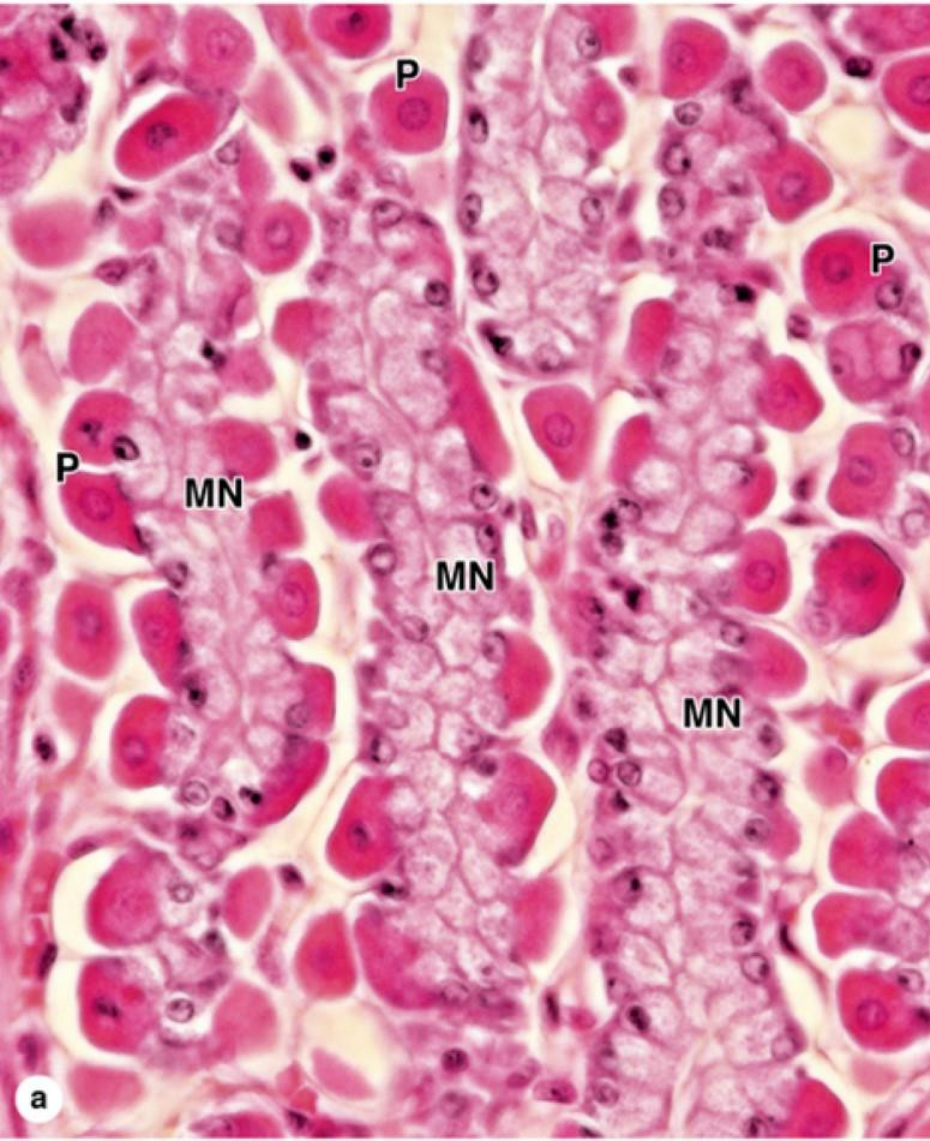


3 . Simple acinar(Alveolar)

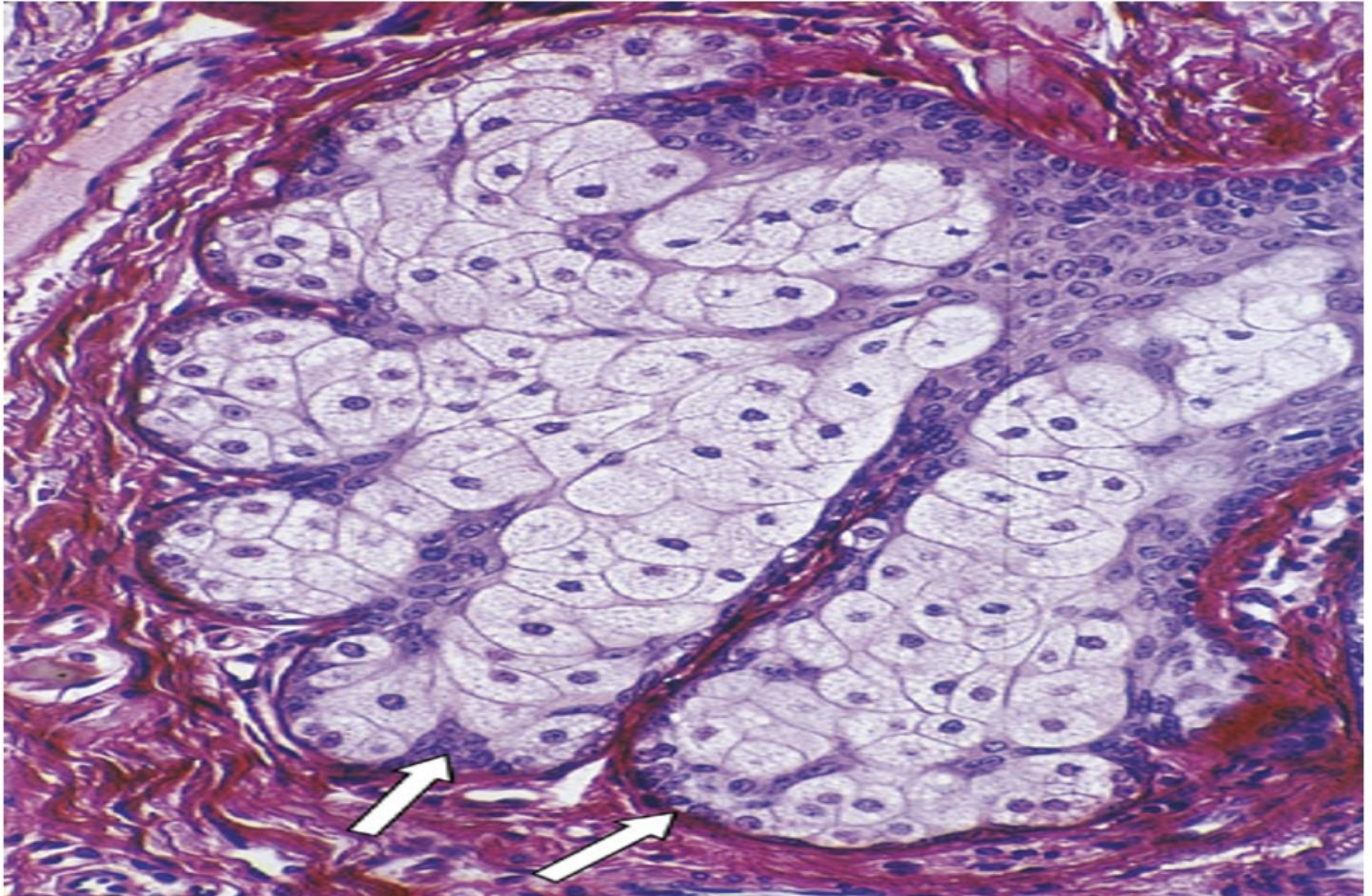
(example mucus-secreting glands of the penile urethra)



4 . Simple branched tubular (example: gastric glands)



5 . Simple branched Acinar(Alveolar) (example sebaceous gland)

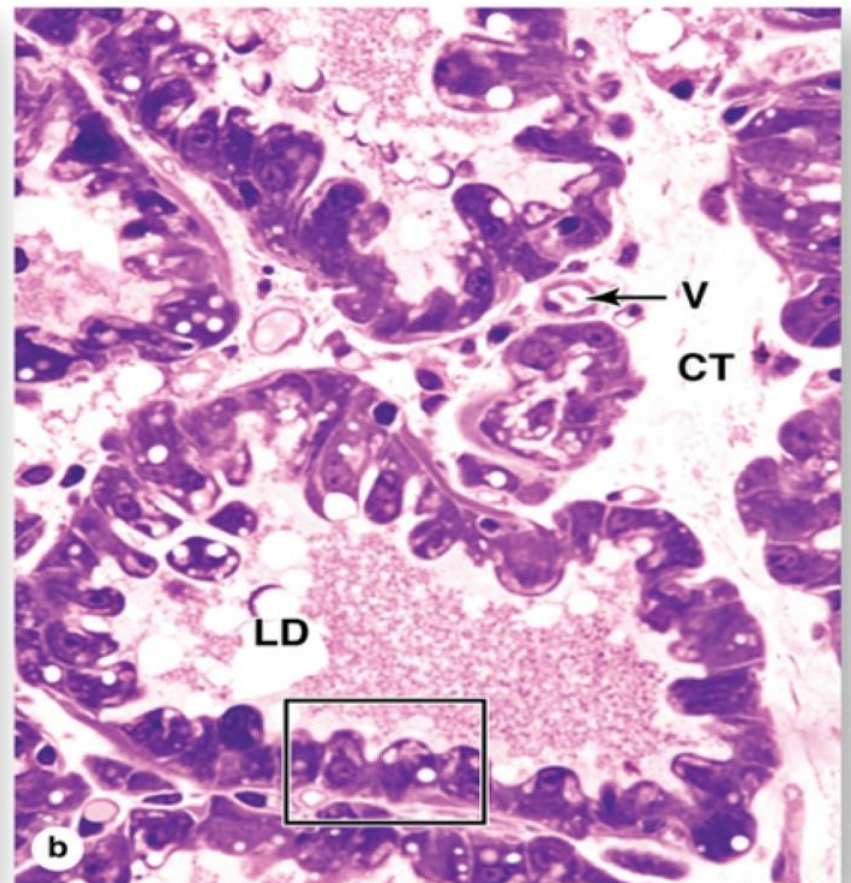
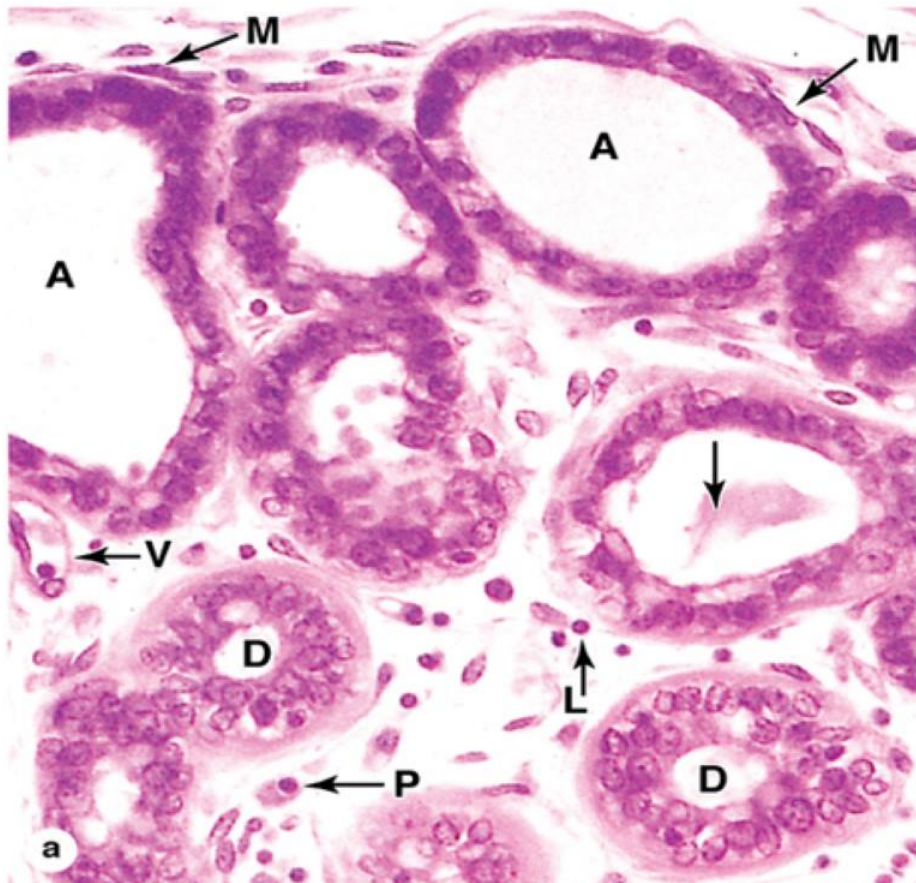


Compound Exocrine Gland

1. Compound branched tubular exocrine glands (ex: Brunners glands of duodenum)

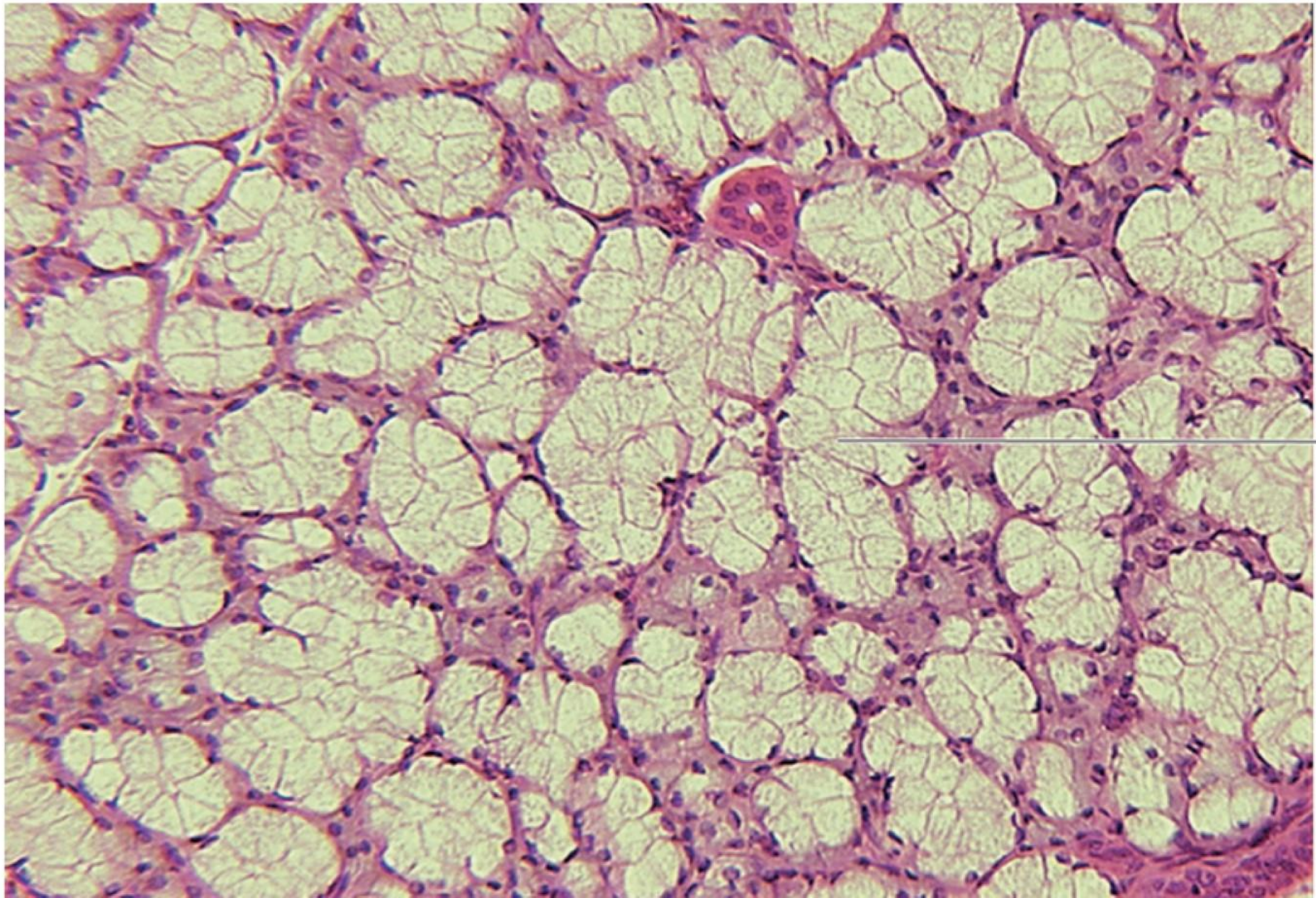


2. Compound branched acinar (Alveolar) exocrine gland (ex. mammary glands and parotid salivary glands).



3. Compound branched tubuloacinar exocrine gland

(ex; submandibular and sublingual salivary glands)



Mucous
tubule

4. Compound acinar exocrine gland (ex. the exocrine part of the pancreas)

