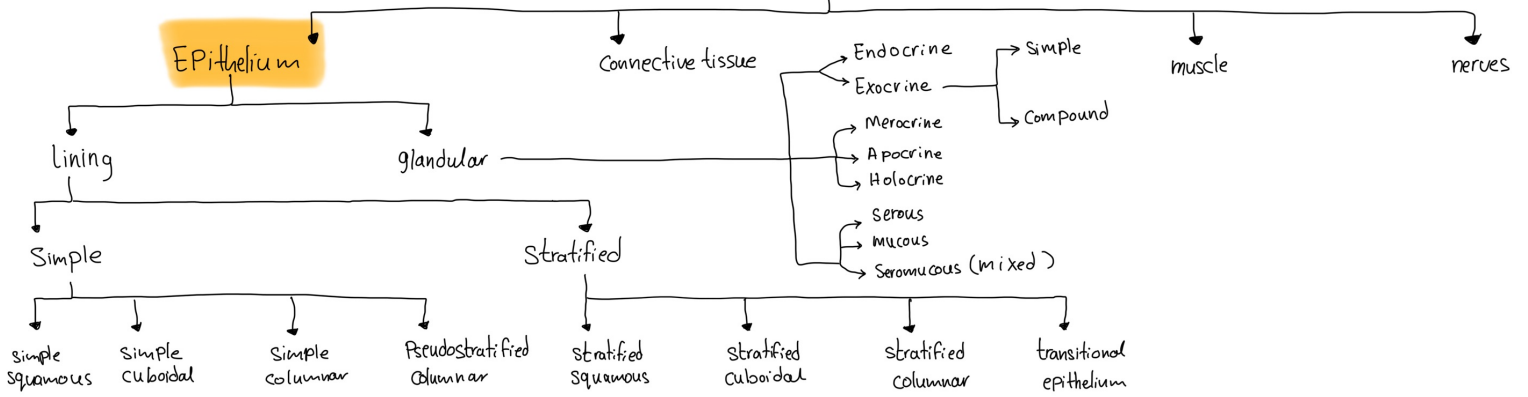
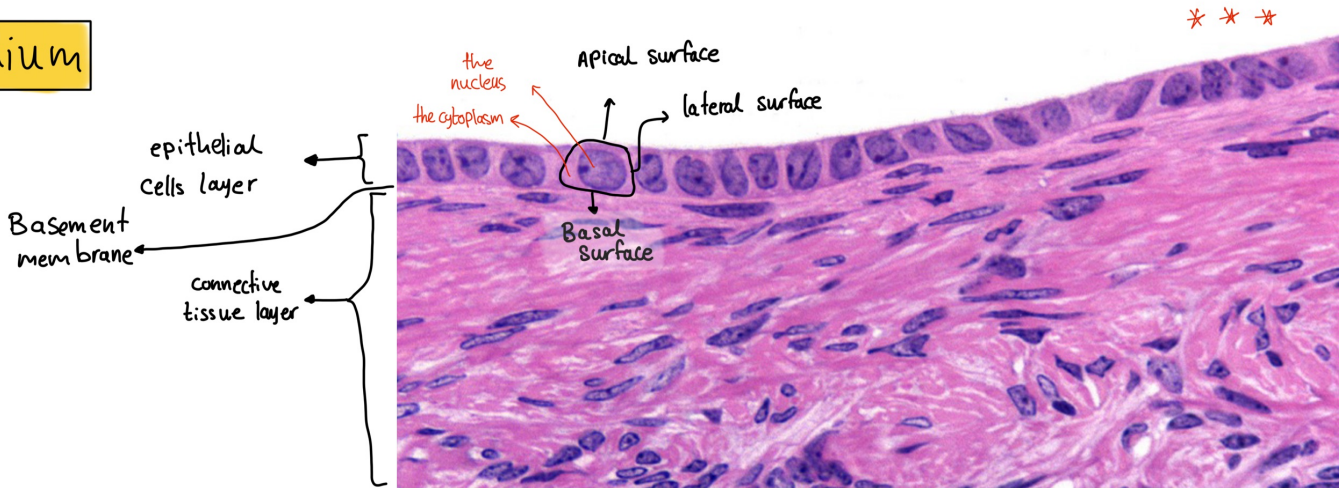


Main body Tissues



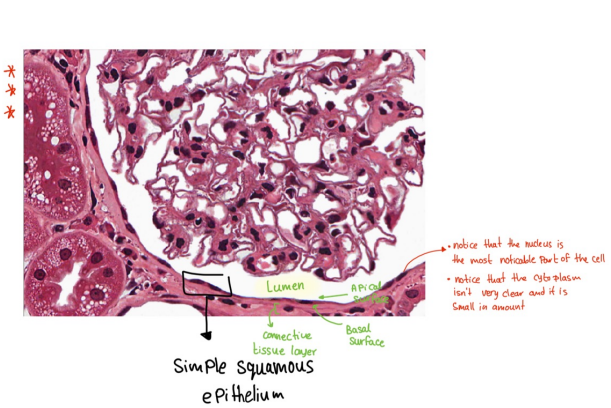
Epithelium



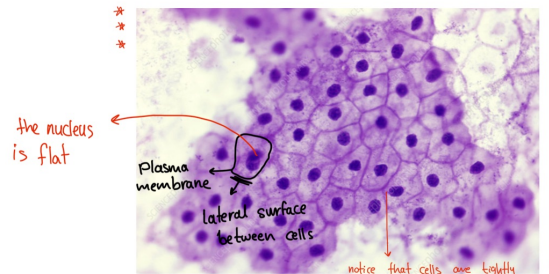
* Note

Plasma membrane isn't always clear or visible, and in this case we can identify a cell by its nucleus

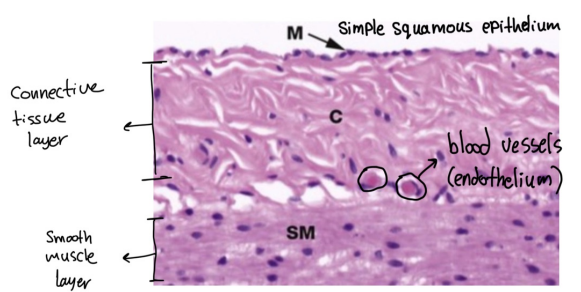
Simple squamous epithelium



looking at simple squamous from above

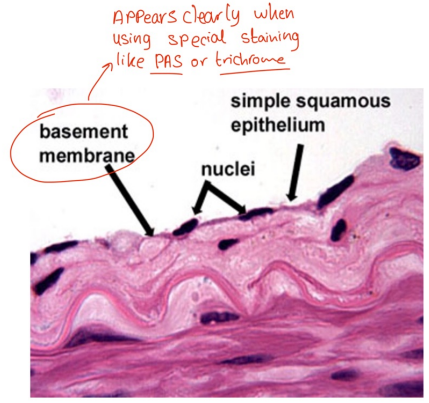
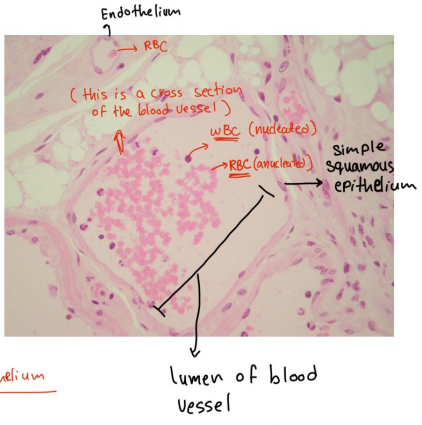
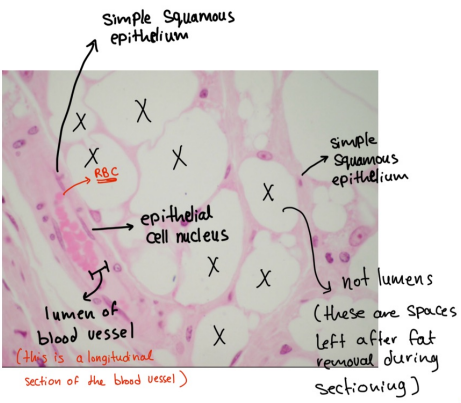


this is in almost all types of epithelium



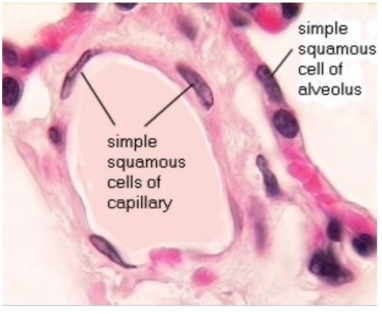
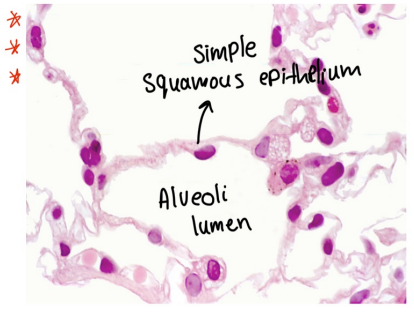
⇒ Places where we can find simple squamous epithelium

- 1** Endothelium → the inner layer of arteries and veins
 → the only layer of capillaries
 → the lining of lymphatic vessels
 → the inner cover of the heart



* lumens are lined with epithelium

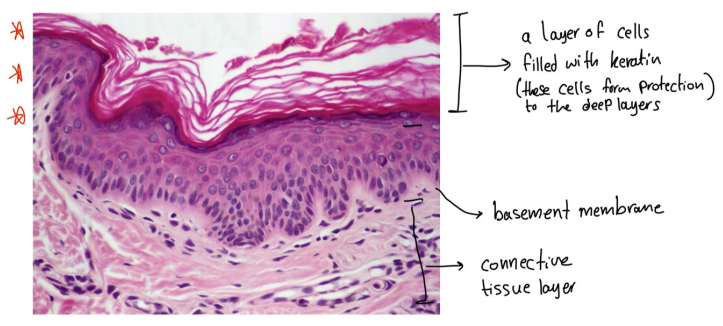
- 2** Lining of Alveoli [simple squamous is used were diffusion happens]



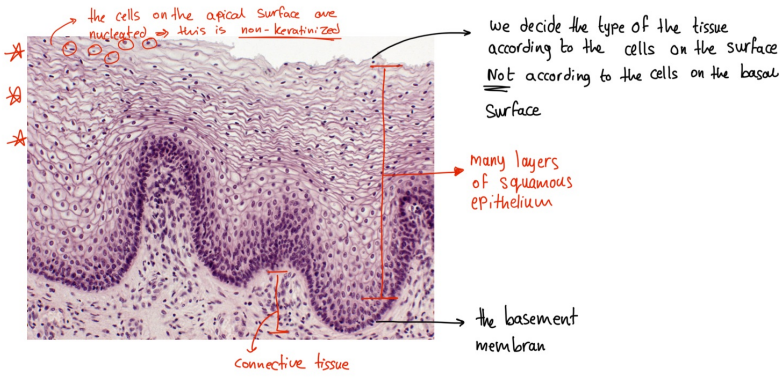
- 3** Mesothelium [lining body cavities] → Pleura
 → peritoneum
 → Pericardium
 → mediastinum

stratified squamous epithelium

- 1** stratified squamous keratinized epithelium ⇒ found in the epidermis of the skin



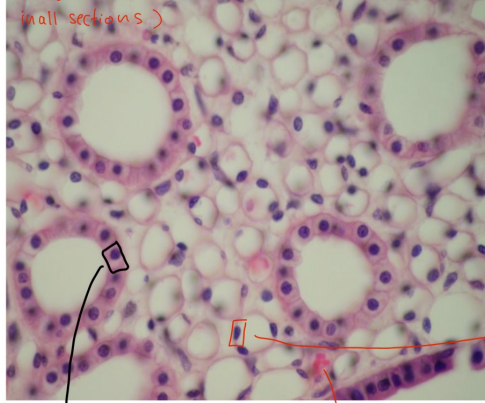
- 2** stratified squamous non-keratinized epithelium found in → oral cavity
 → Pharynx
 → esophagus
 → cornea
 → Anal canal
 → uterine cervix
 → vagina



Simple cuboidal epithelium

- Has high level of active transport
- the width and height are similar
- rich in organelles

* Keep in mind that the larger the cuboidal cells are the less nuclei visible → if the cell is relatively large, its nucleus will be on one side (which means it won't appear in all sections.)

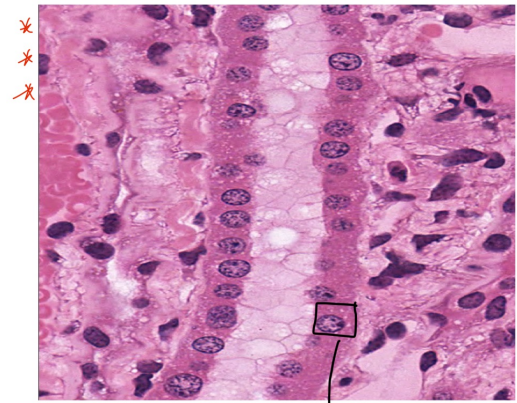


- the nucleus is spherical
- the width and height are almost the same

* Sometimes cuboidal cells aren't perfectly cuboidal, they are pyramidal, but we consider them cuboidal

note that around these smaller lumens we have simple squamous epithelium

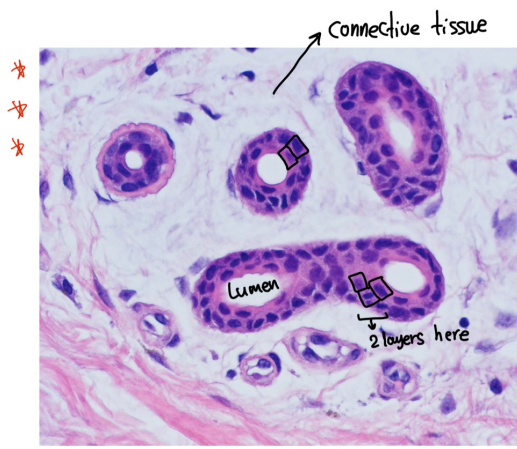
- ⇒ found in → Small collecting ducts of kidneys
- Glands and ducts → Pancreas, Salivary gland
- kidney tubules
- covering of the ovaries
- Thyroid glands



simple cuboidal epithelium

stratified cuboidal epithelium

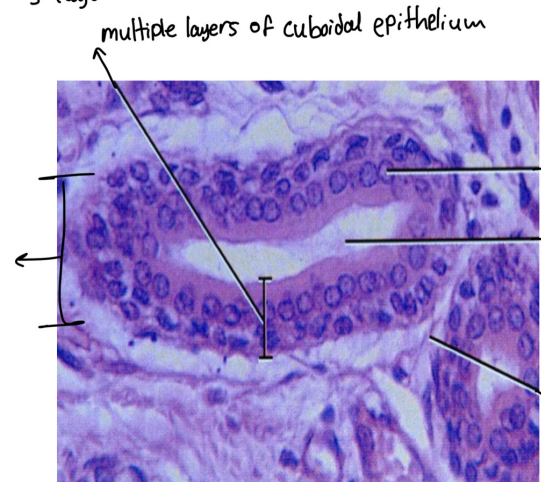
→ rare and isn't of more than 2 or 3 layers



*
*
*

Connective tissue
Lumen
2 layers here

the duct which is lined with stratified cuboidal here



multiple layers of cuboidal epithelium

nucleus of cuboidal epithelium
the lumen of the duct
connective tissue layers

* found in the large ducts of the exocrine glands

* Keep in mind that in smaller ducts we have simple cuboidal epithelium

Simple columnar epithelium

- large cells
- usually with cilia or microvilli

- ⇒ Found in → Small intestines
- Stomach
- Gall bladder
- oviduct lining
- Renal collecting ducts

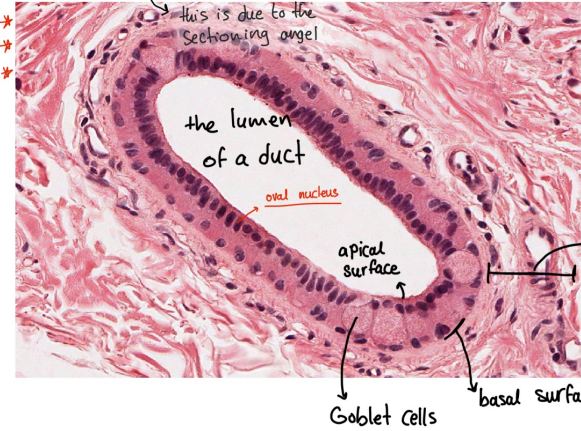


apical surface
basal surface
the nucleus of columnar cells is elliptic (oval) in shape
we have large amounts of cytoplasm
Basement membrane
lumen
Connective tissue

Stratified columnar epithelium → rare

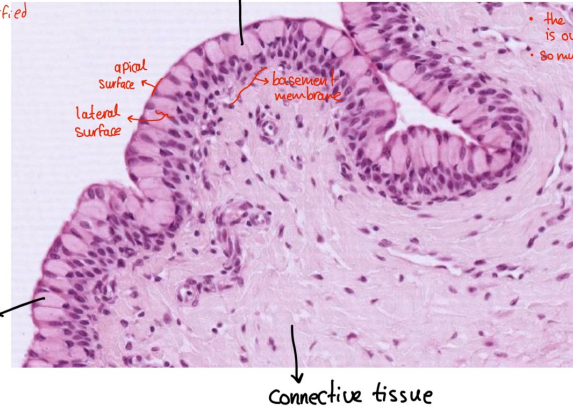
⇒ Found in → the conjunctiva with goblet cells
→ in large ducts of glands

* Sometimes 2 layers of cells are visible, and before deciding whether it is simple or stratified we have to look for a single-layer region



if there is it is simple
if there isn't it is stratified

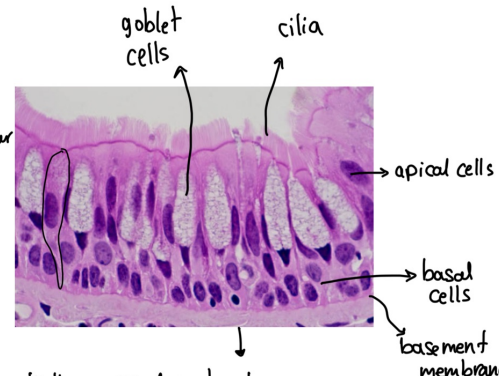
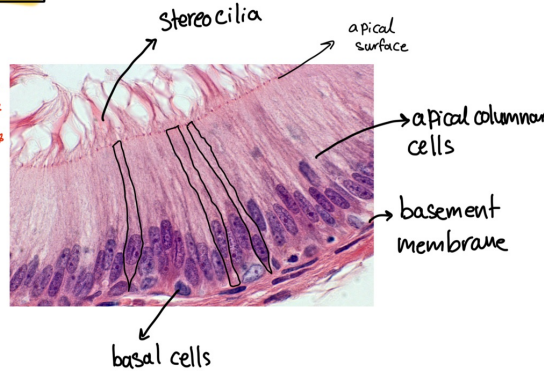
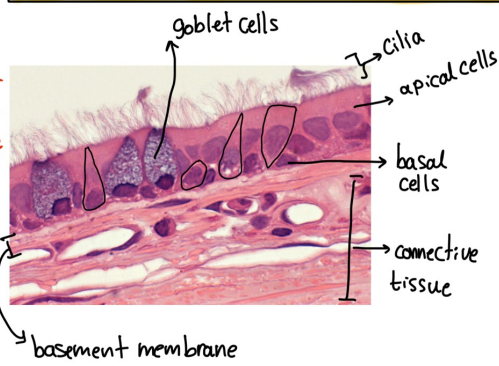
at first it may not look like stratified columnar but to decide: ① is the epithelium made of many layers?
② is the apical surface columnar?



• the nucleus is oval so much cytoplasm
if the answer is yes then it is stratified columnar epithelium

Pseudostratified columnar epithelium

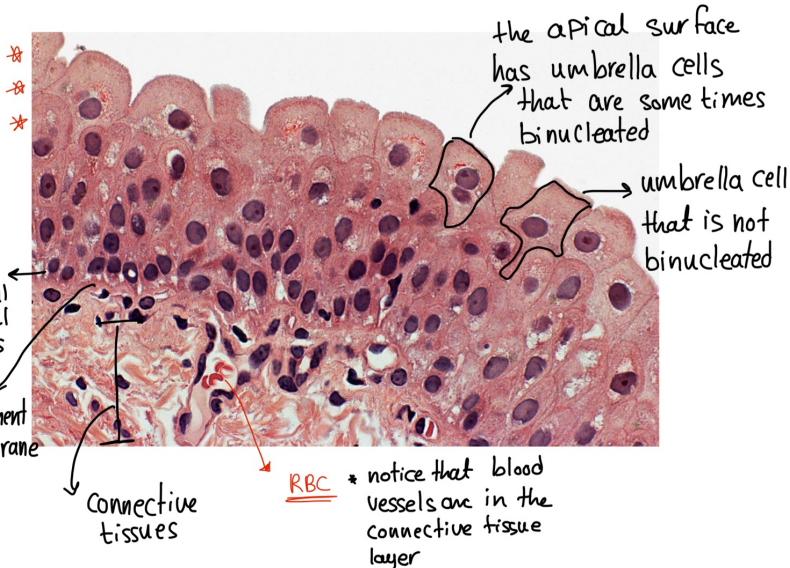
it is made of Apical cells } both connect to the basement membrane
Basal cells }



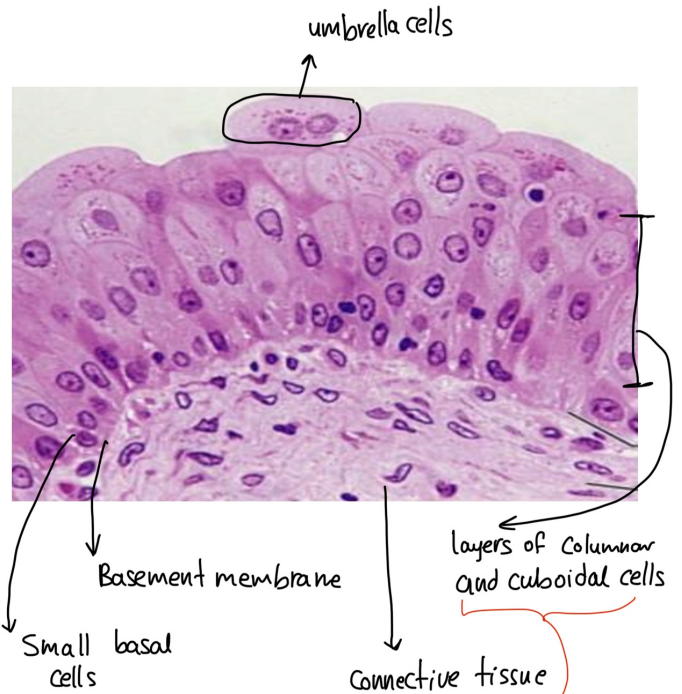
in the respiratory tract respiratory epithelium has the name (pseudostratified ciliated columnar epithelium)

⇒ found in → Respiratory tract
→ male genital tract

Transitional Epithelium → layers of many types of epithelial cells



⇒ Found in the urinary tract



why not considered stratified cuboidal or columnar?

because those 2 are found with 2 or 3 layers on 14

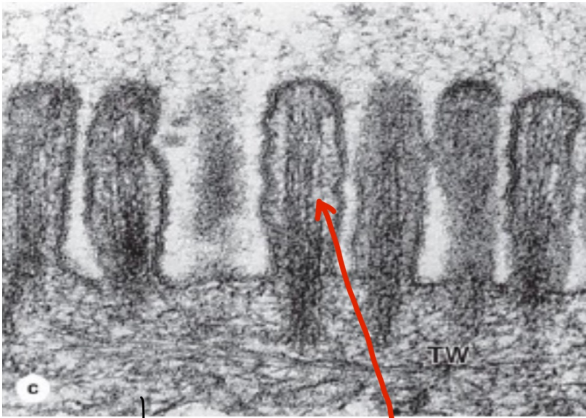
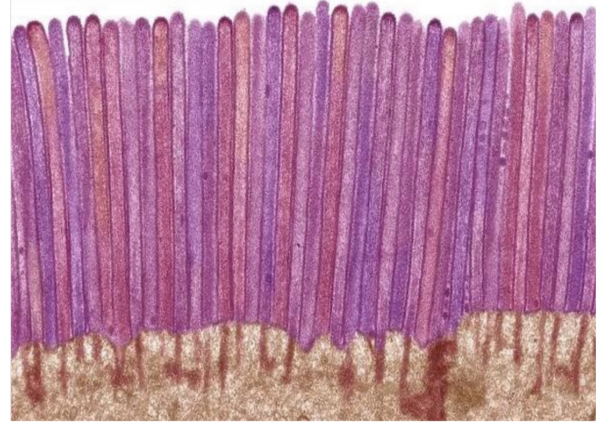
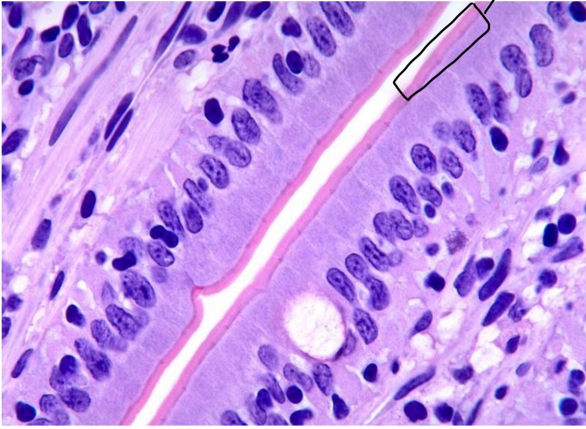
Specialized apical surfaces

1 Microvilli

to increase surface area

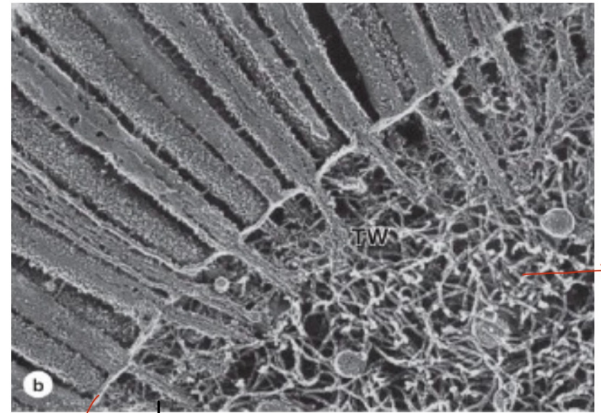
Packed tightly together
"looks like a matress"

it is denser and more pinkish than cilia



TEM

the inner structure of microvilli is visible here



Apical surface

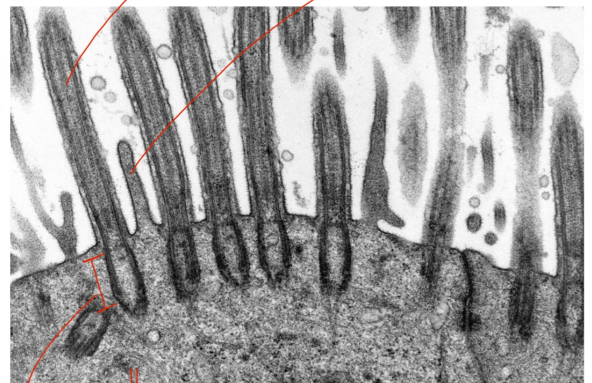
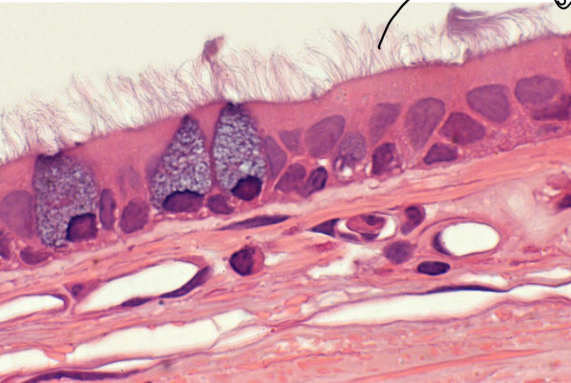
SEM

microfilament and intermediate filament fibers

2 cilia

to move things

- cilia ⇒
- ① taller than microvilli
 - ② less packed than microvilli
 - ③ look lighter than microvilli



TEM
Basal body of cilia

cilia

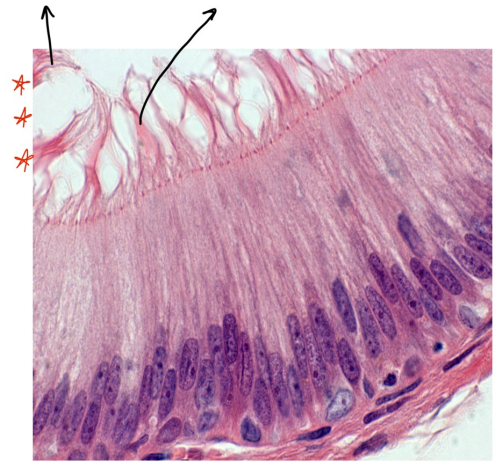
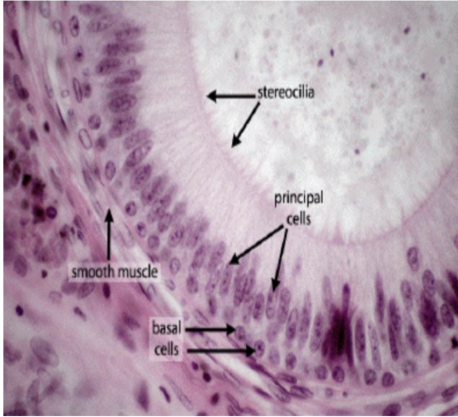
microvilli (shorter than cilia)

3 Stereocilia → they have sensory or absorptive functions

* they are branched

- branched
- tall

Stereocilia

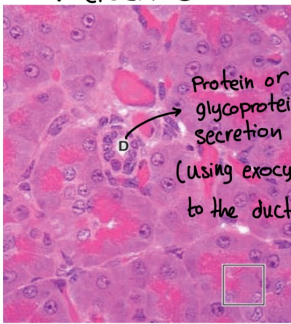


* * *

Glands

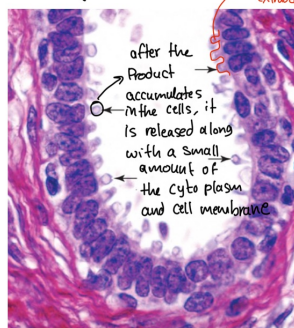
1 According to the type of secretion

Merocrine



⇒ in salivary glands

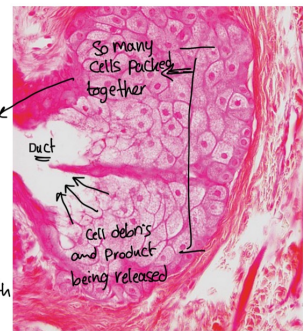
Apocrine



⇒ in mammary glands

look like part of the cell is going to be extruded

Holocrine



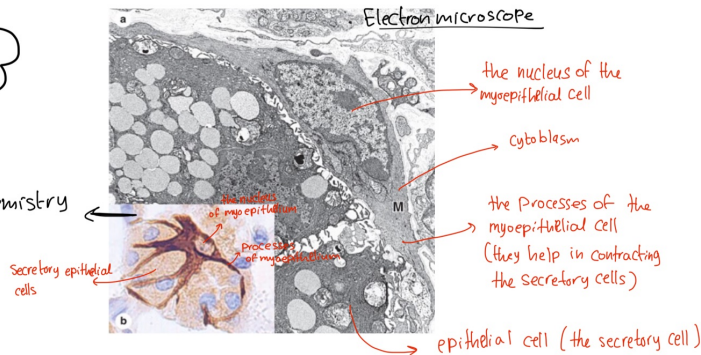
these cells accumulate the product until they disrupt and the product is released with cell debris

⇒ in sebaceous glands

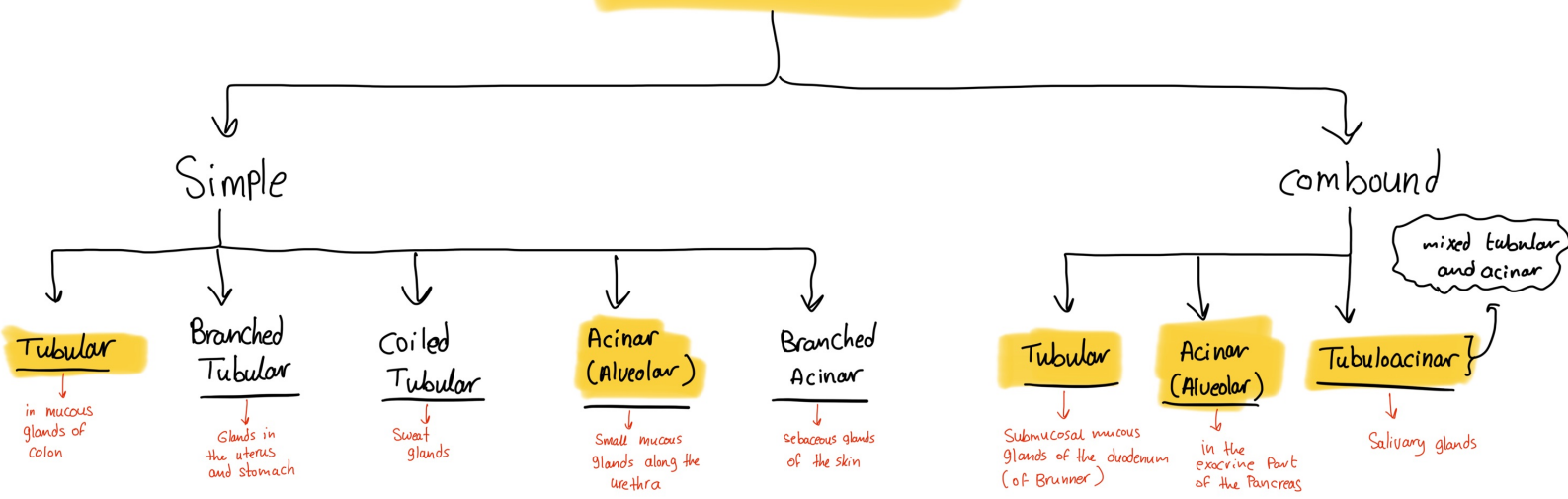
* * *

Myoepithelial cells

immunohistochemistry



Exocrine glands



* the terms → Simple refer to the duct of the gland
 → compound

* the terms → Tubular refer to the secretory portion of the gland
 → Alveolar (Acinus)

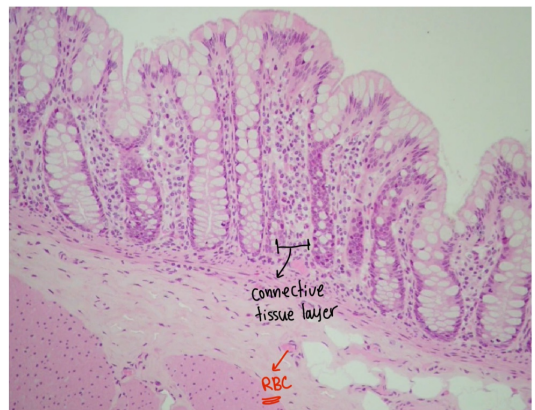
Simple Tubular glands



secretory cells look whitish because they had mucin which washes out during tissue processing

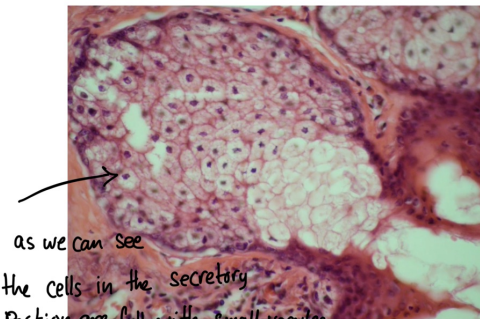
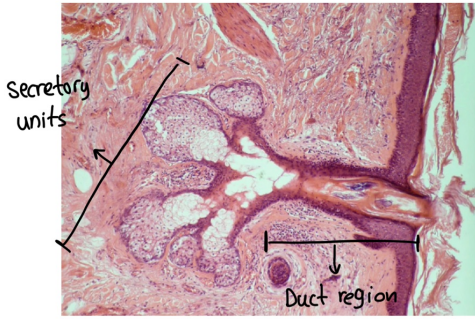
the secretory region

lamina propria (connective tissue)



Simple Alveolar glands

e.g. sebaceous glands which are holocrine

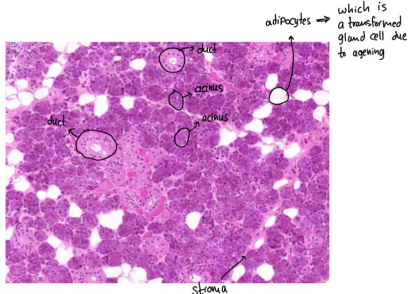
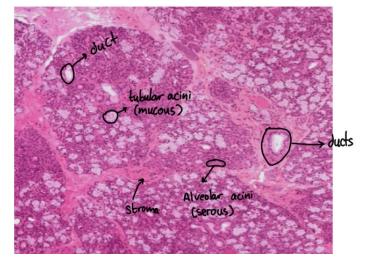
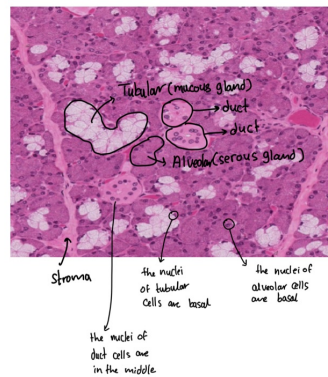
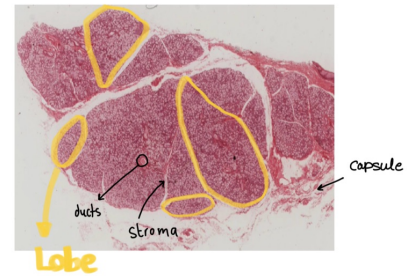
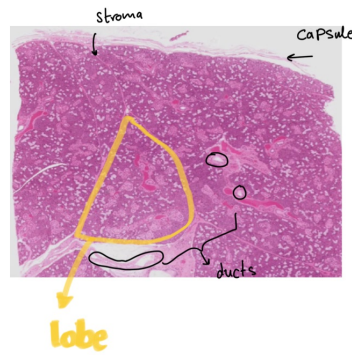
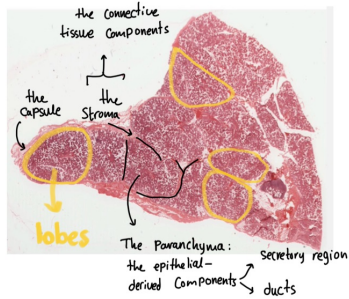


Salivary Glands

Parotid

Submandibular

Sublingual



Alveolar and tubular acini (Tubuloalveolar)

* note that the sublingual salivary gland has more tubular acini (it appears lighter) than the submandibular gland which has more alveolar acini (appears darker and more pinkish)

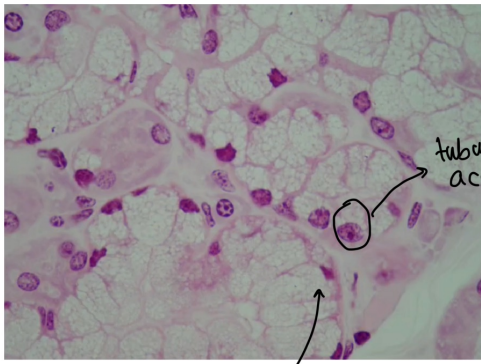


Alveolar and tubular acini (Tubulo-alveolar)

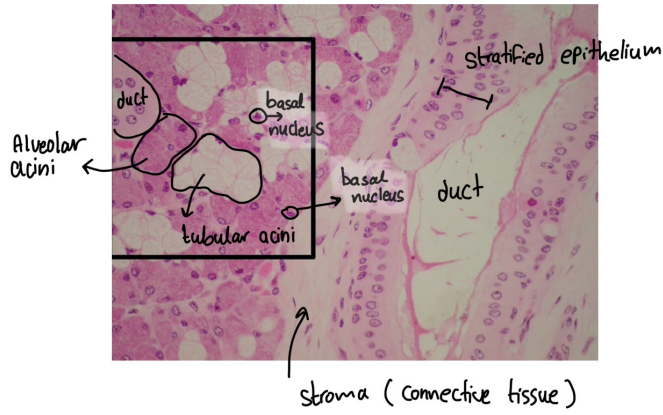
Alveolar acini only

Compound tubular glands

Compound Alveolar glands



as we can see tubular acini should have been filled with mucin



* One special thing found in Tubuloalveolar glands:-

* keep in mind that :-

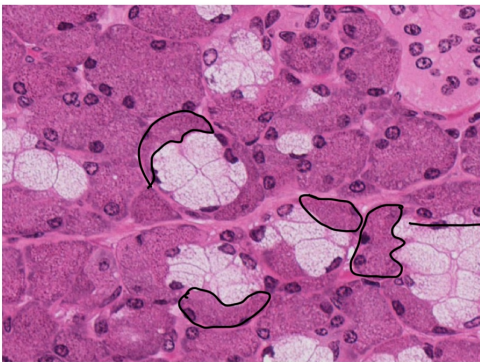
→ tubular acini have

mucus secretion
(look whitish)

→ Alveolar acini have

serous secretion

(look pinkish)

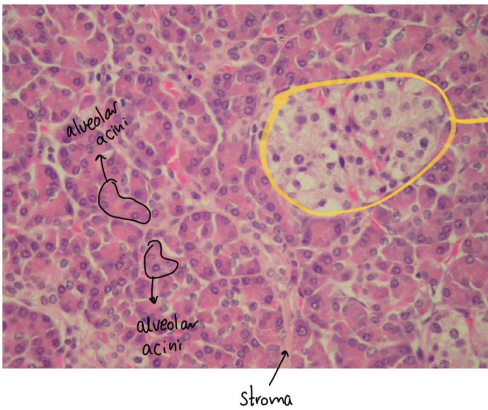


Serous Demilunes

they are Alveolar acini so close to tubular acini (they cover them)

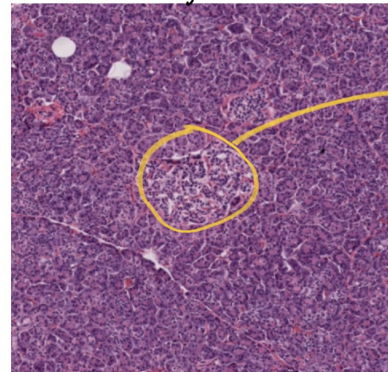
→ both serous demilunes and the tubular acini they cover secrete their products to the same ducts

Pancreas

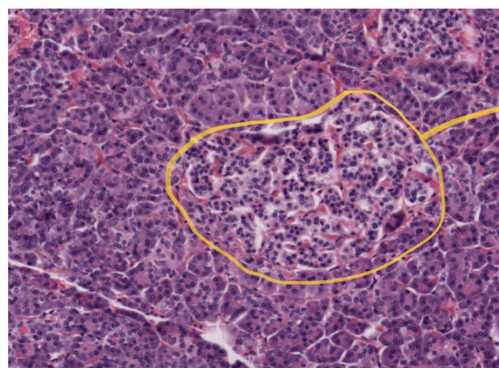


Islets of Langerhans

A low magnification image



the endocrine part of the Pancreas (the Islets of Langerhans)



Islets of Langerhans