Epithelial images

By Abdallah Al-Saraireh

The questions in the exam will be:

1- direct (identify)

2- indirect (image and features of the tissue from the theory slides)

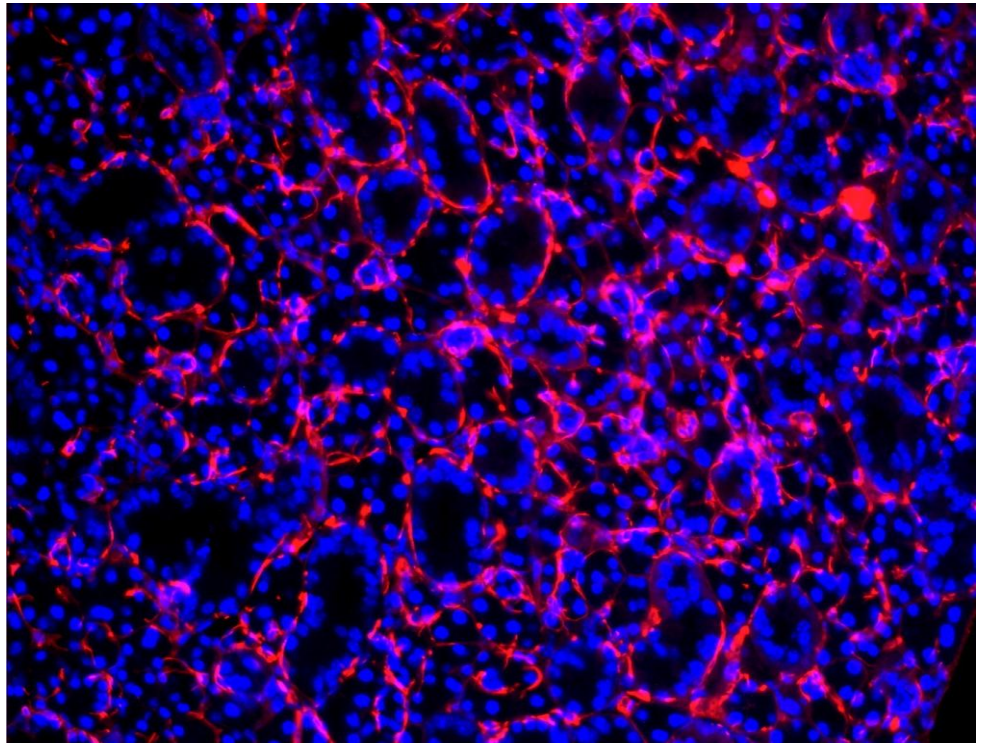
3- how many type of tissues? (main types)

*** The images in the exams may be (black & white), so convert this file to this type of images to see it**

Immunoflouresence Staining (Tissue)

A technique using fluorescent-labeled antibodies to detect specific antigens (proteins) in tissue , using UV light

The color	The structure
Blue (DAPI)	Nuclear counterstain (labels DNA in all cell nuclei)
Red	Indicates the specific target protein being studied
Black background	Provided the necessary contrast for fluorescent signals



Immunoflouresence Staining (cultured cells)

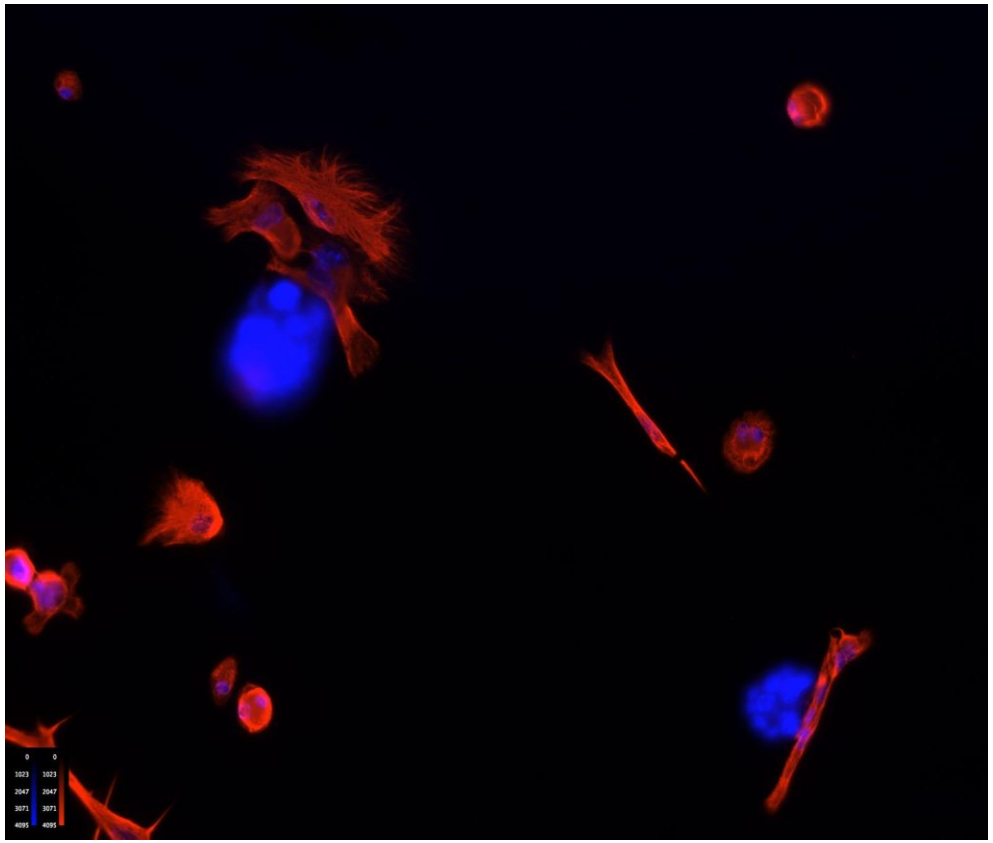
Involves UV excitation to make the fluorophores visible

Isolated cells grown in a lab, not a whole tissue

Application

Used to study cell behavior, protein localization, and drug effects at a cellular level

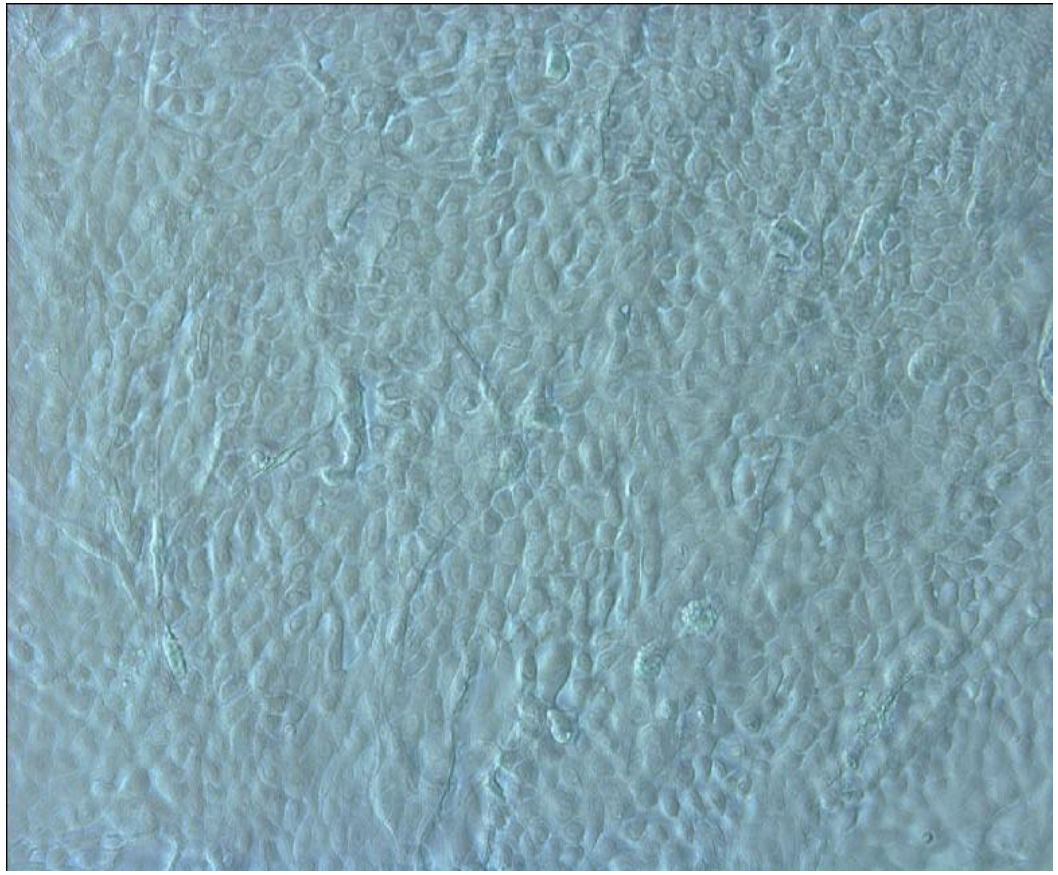
The color	The structure
Blue (DAPI)	Cell nuclei (DNA)
Red	Specific cytoplasmic protein or cytoskeleton
Black background	No fluorescence (Non-specific areas)



Phase-contrast Microscope

Main use: viewing living, unstained cells

- There are no dyes, this preserves the cells in their natural state.
- We use it primarily to observe cell division in a real-time.
- It works based on difference in density between the cell organelles and the surrounding medium.

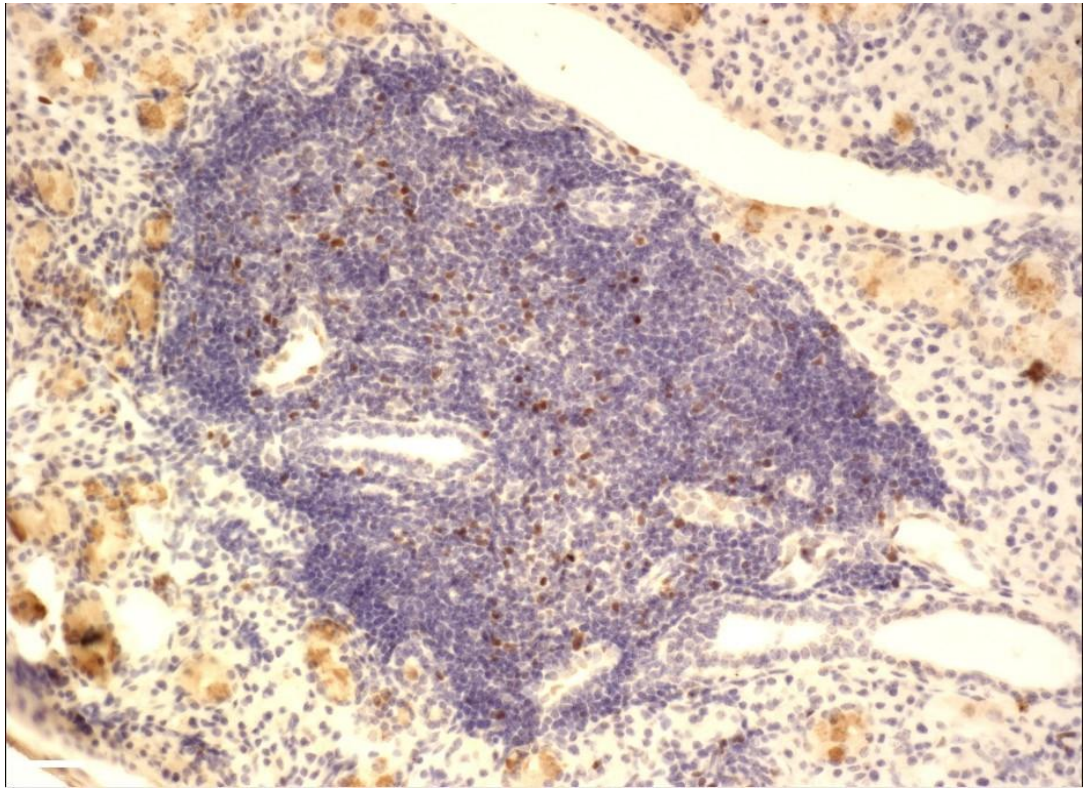


Immunohistochemical Staining (Tissue)

(IHC)

The color	The structure
Brown color	Represents the positive areas where the target antigen is located
Purple/ blue (Hematoxylin)	Counterstain used to show cell nuclei

- Standard Bright-field microscope (LM)
- Uses antibodies linked to an enzyme that reacts with a substrate to produce a brown color



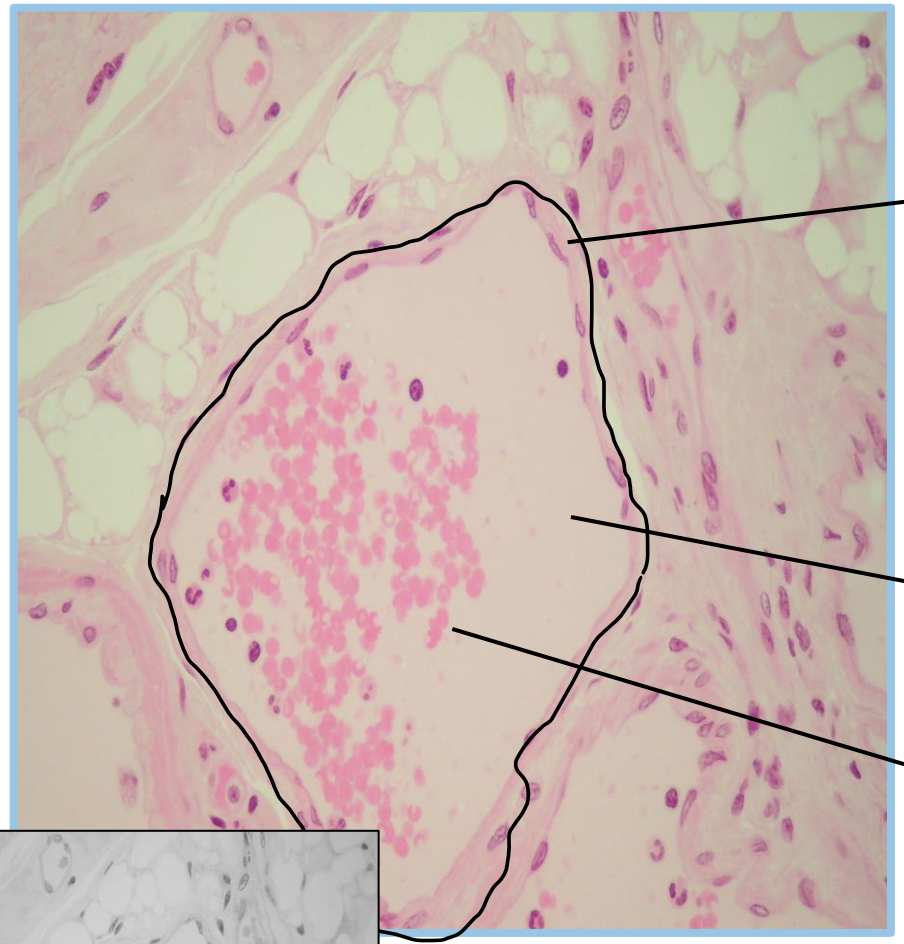
ENDOTHELIUM

(simple squamous epithelium)

- Lining the inner surface of Blood Vessels

- H&E stain
- Simple squamous epithelium
- Bright-field microscopy

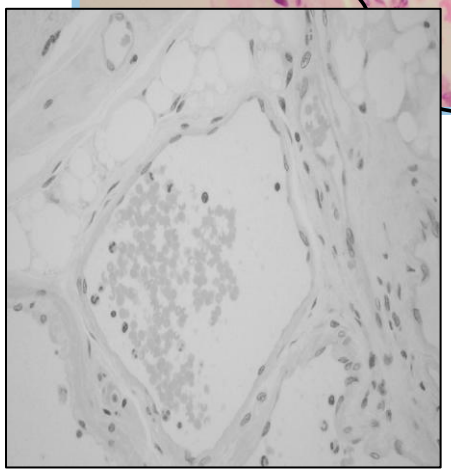
Cross section (transverse section)

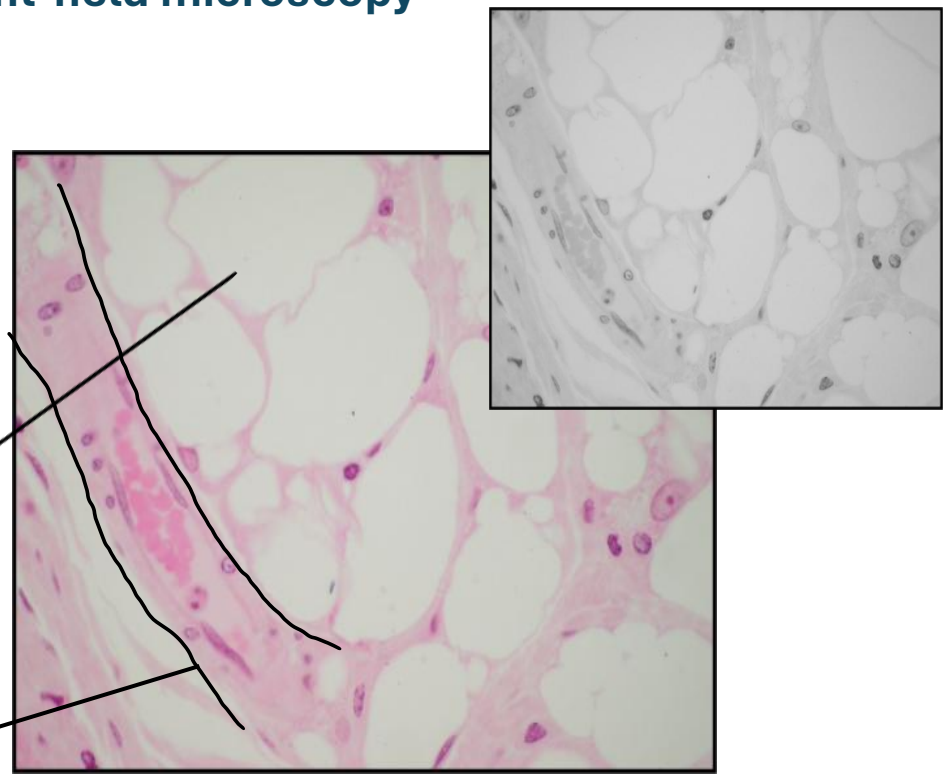


Flattened nucleus

Lumen

RBCs (red blood cells)





Adipocytes

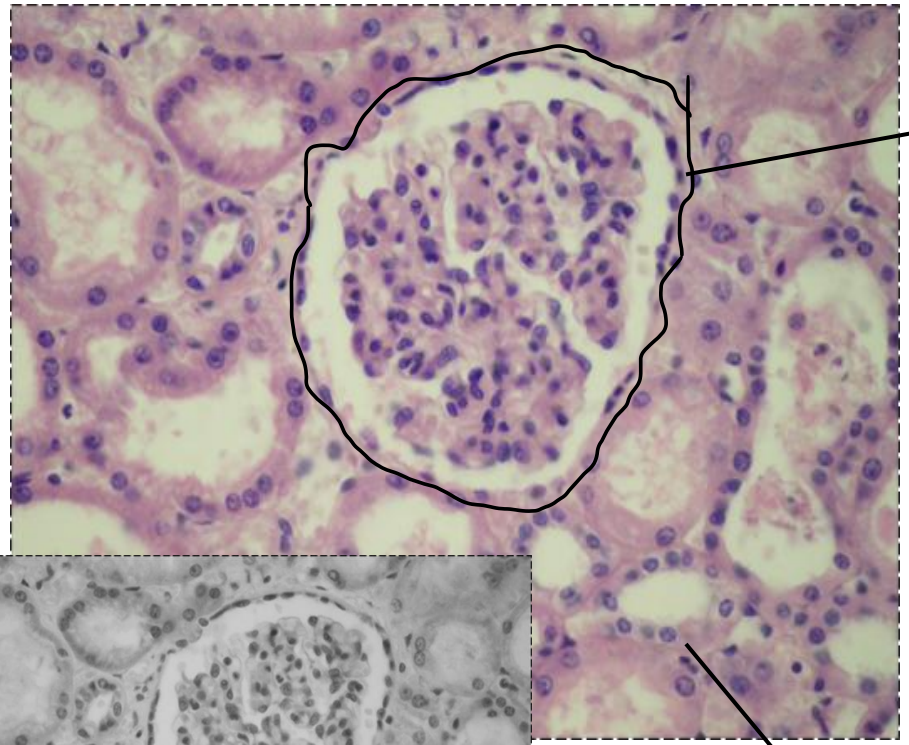
Fat cells (yellow) (surrounding the vessel)

The blood vessel

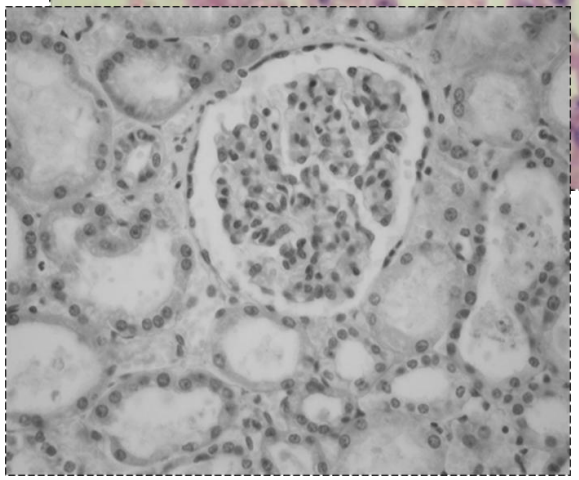
Longitudinal section

SIMPLE SQUAMOUS EPITHELIUM

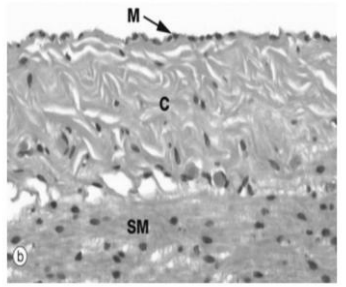
Kidney



Simple squamous epithelium

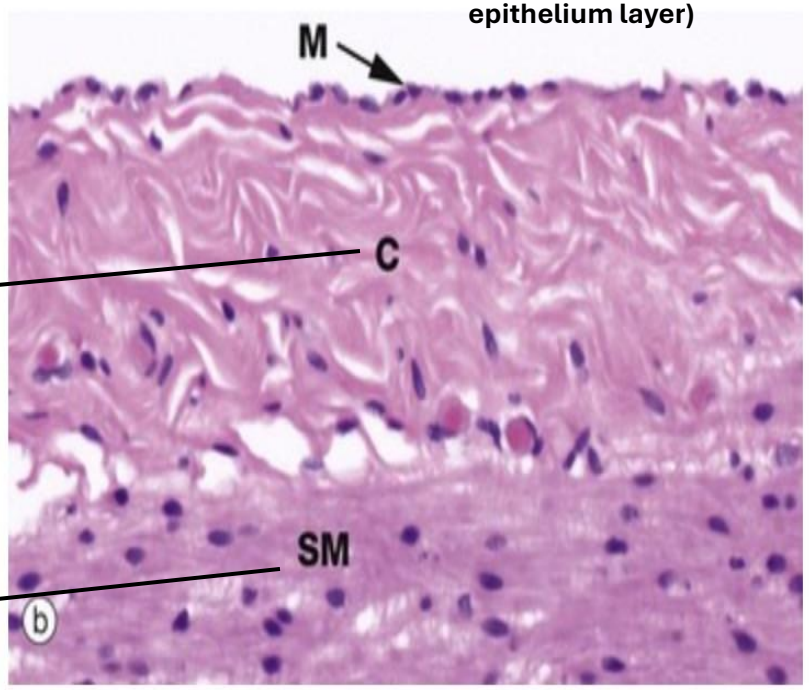


Simple cuboidal epithelium



GI tract

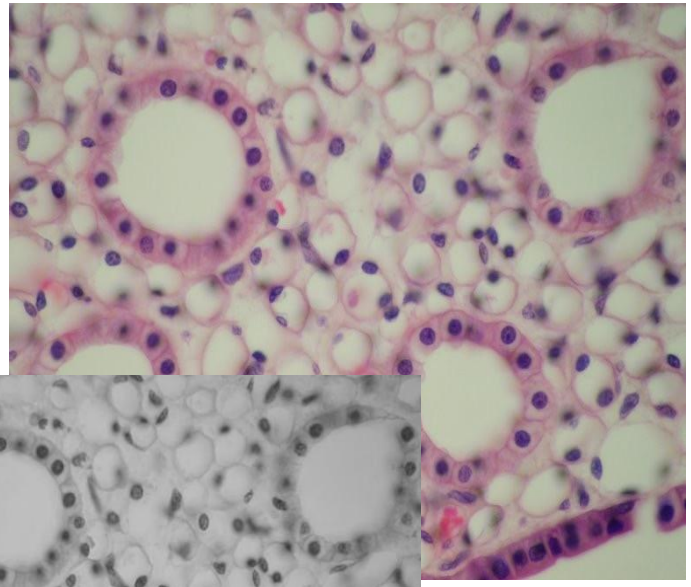
Mesothelium
(the simple squamous epithelium layer)

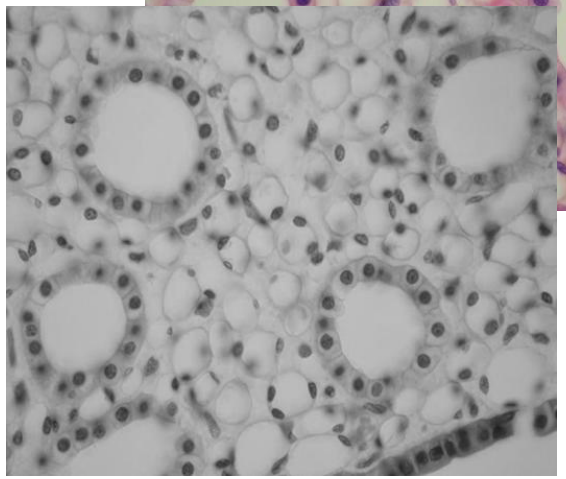


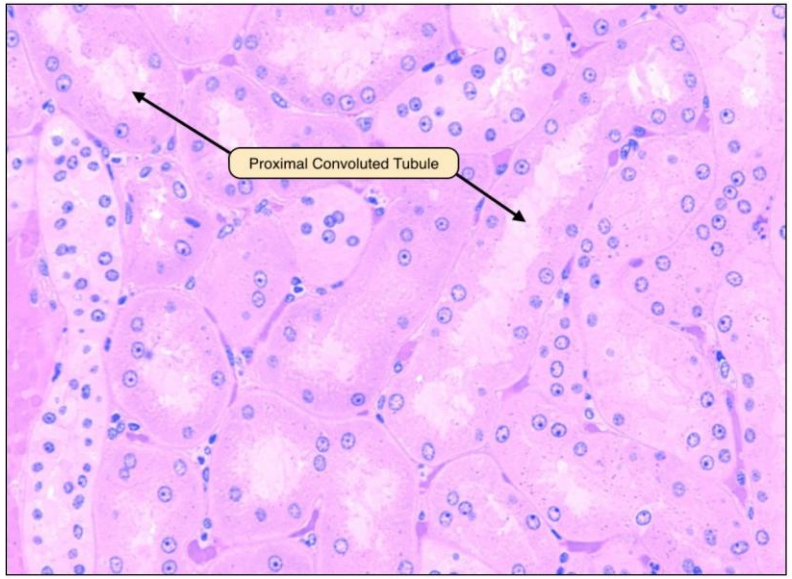
Connective tissue
(the supporting layer beneath the mesothelium)

Smooth muscle

SIMPLE CUBOIDAL EPITHELIUM



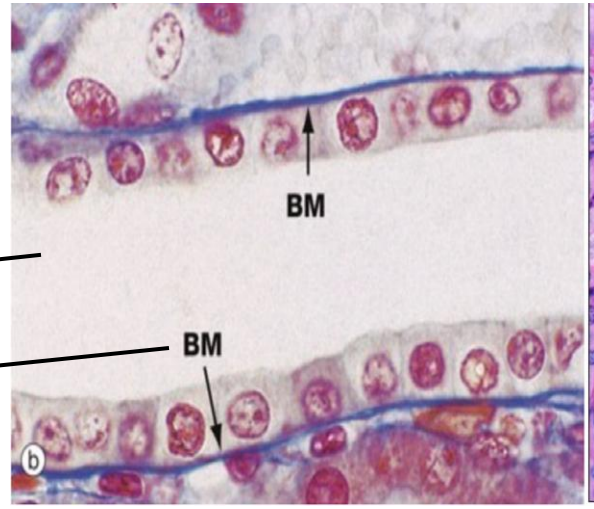


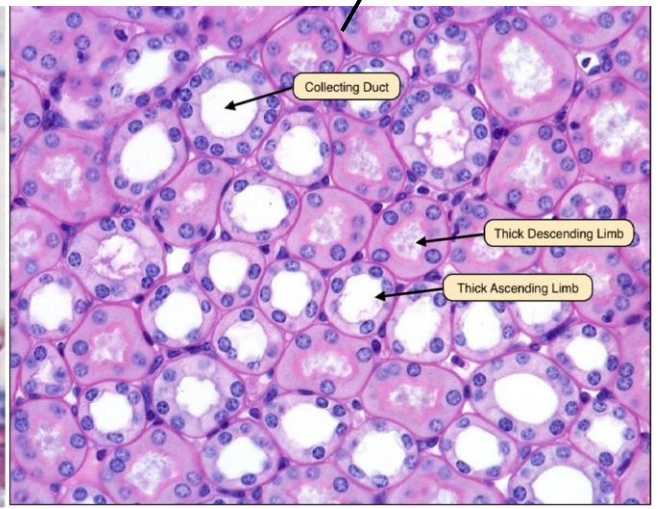


PAS stain (Magenta color, for the basement membrane)

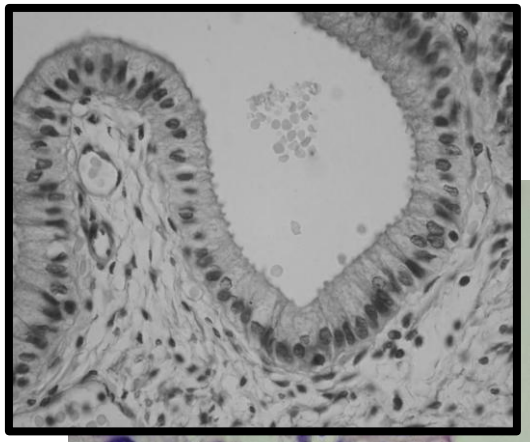
lumen

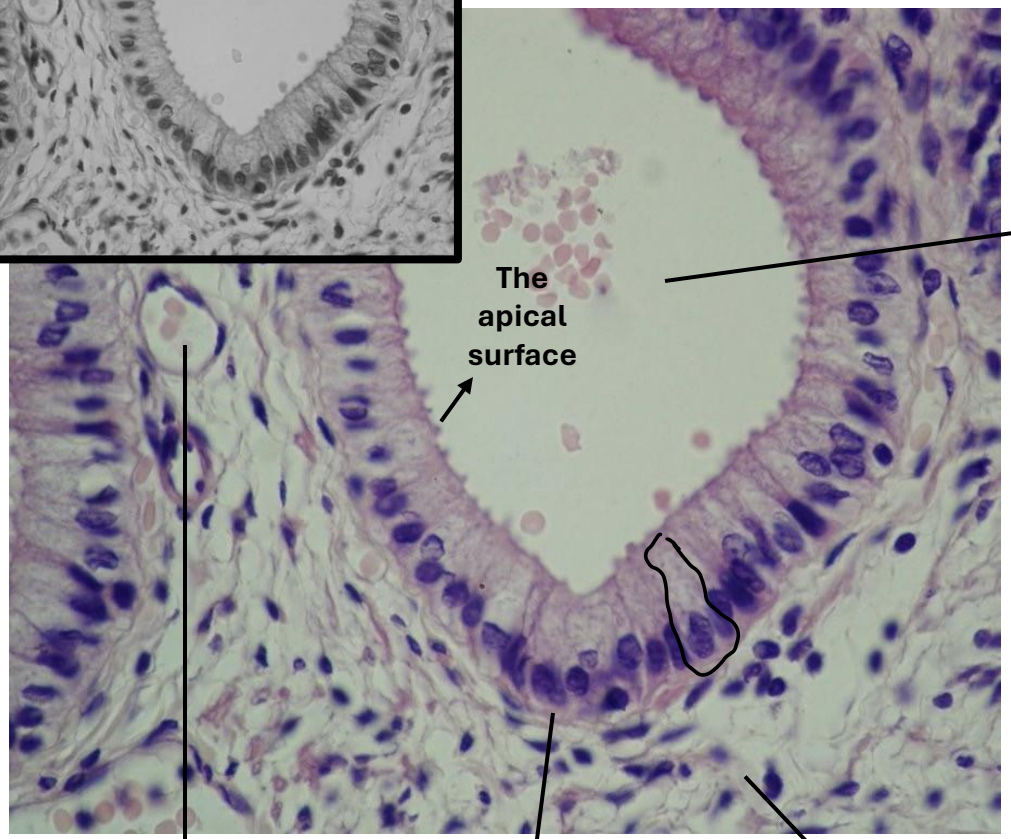
Basement membrane





SIMPLE COLUMNAR EPITHELIUM





The apical surface

lumen

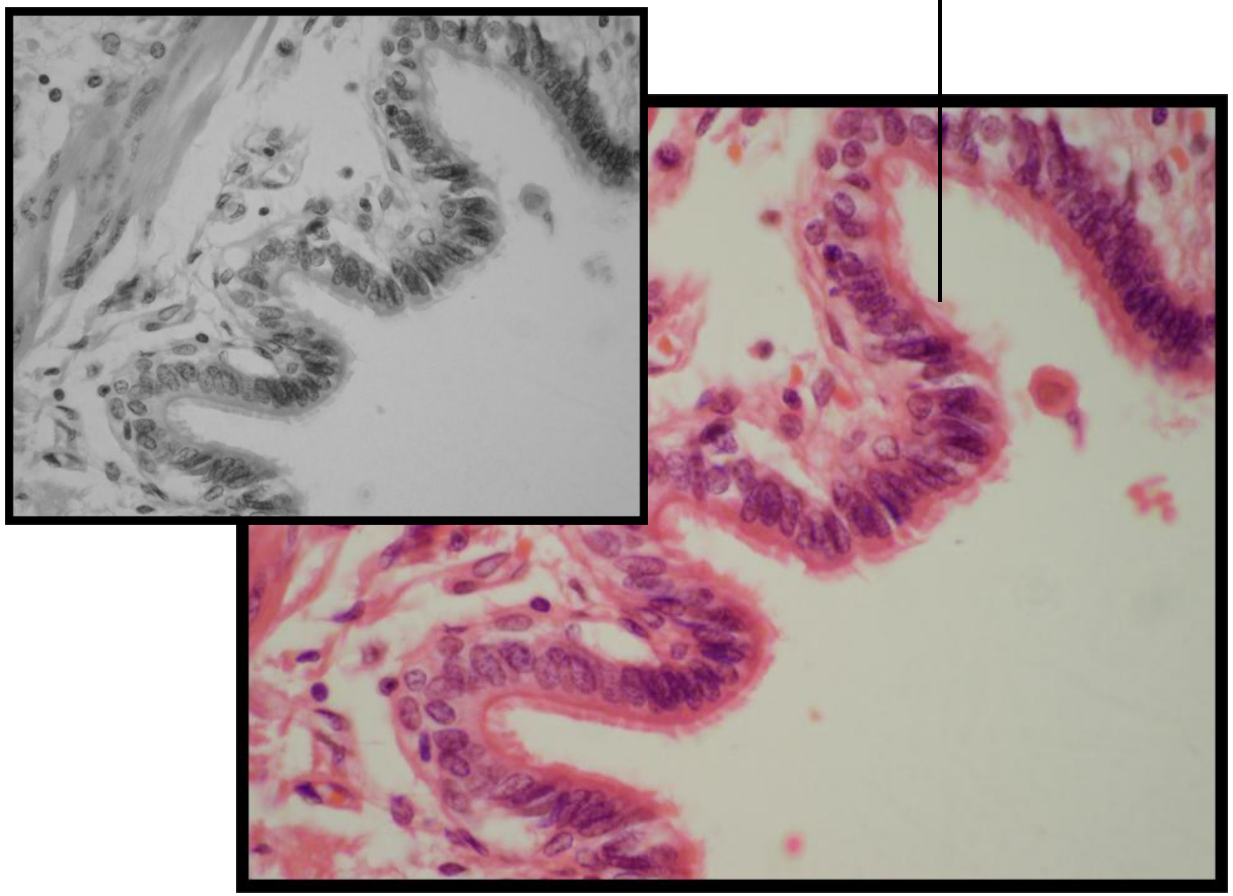
Endothelium (tiny blood vessel)

The basement membrane

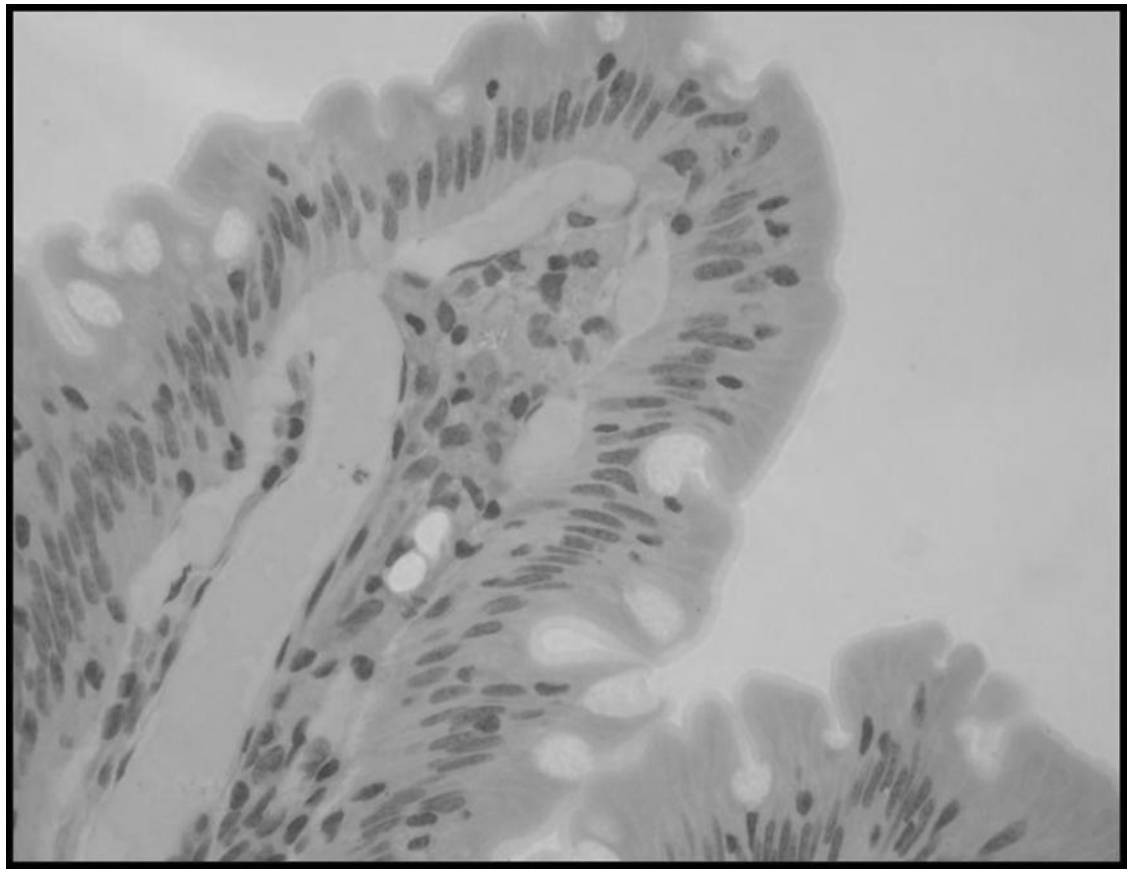
Connective tissue (lamina propria)

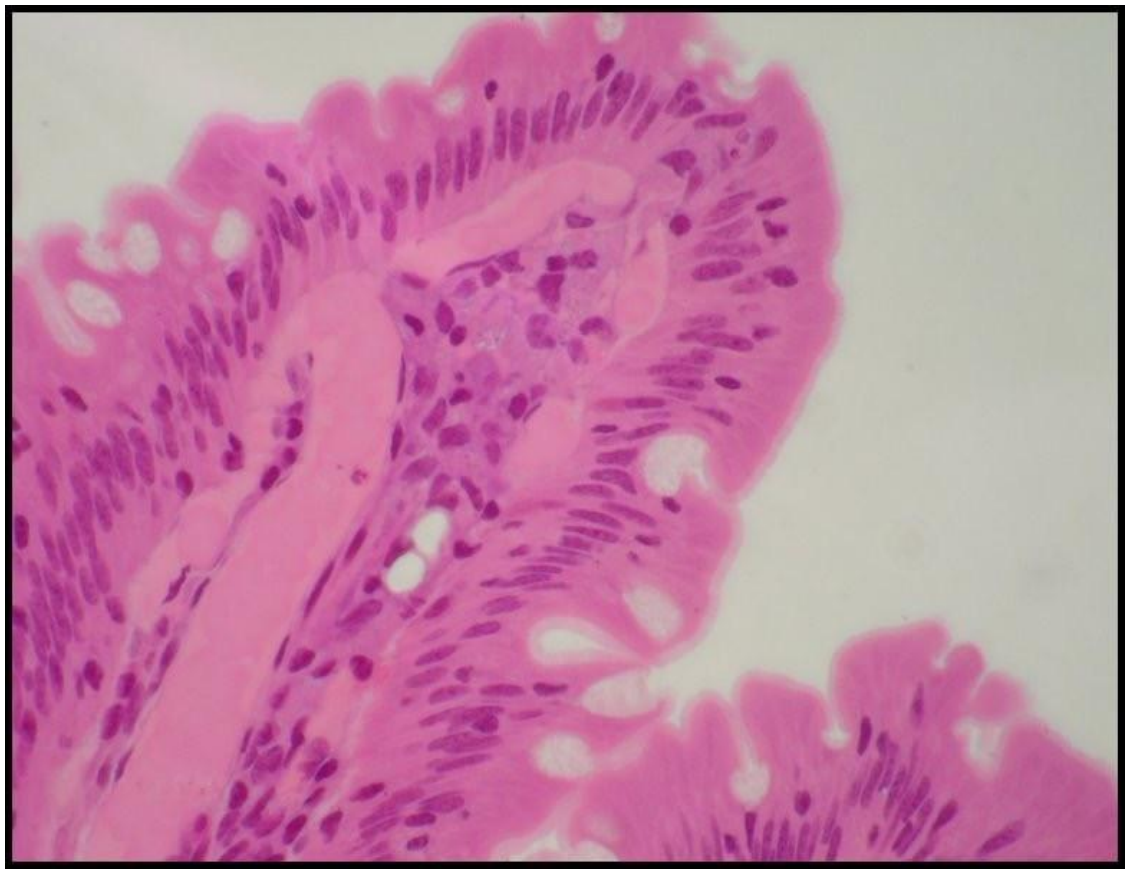
Cilia (motile, have some spaces)

But microvilli short and form one completely row)



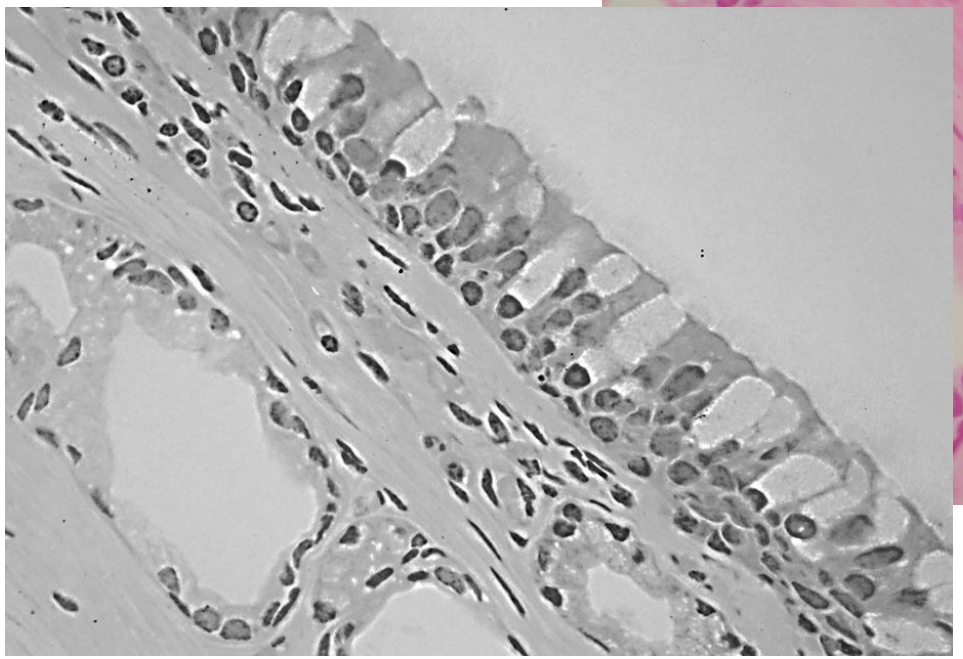
SIMPLE COLUMNAR EPITHELIUM

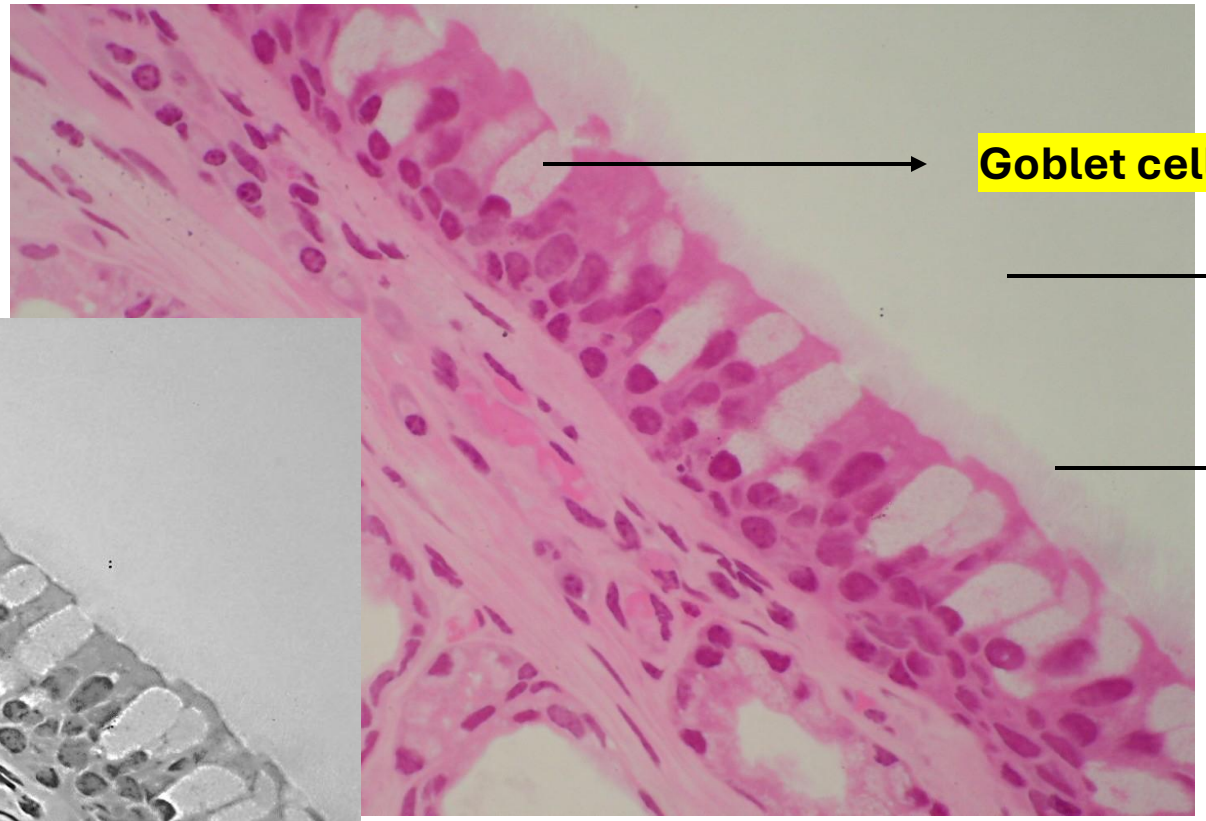




PSEUDOSTRATIFIED COLUMNAR EPITHELIUM

Ciliated (respiratory epithelium)





Goblet cell

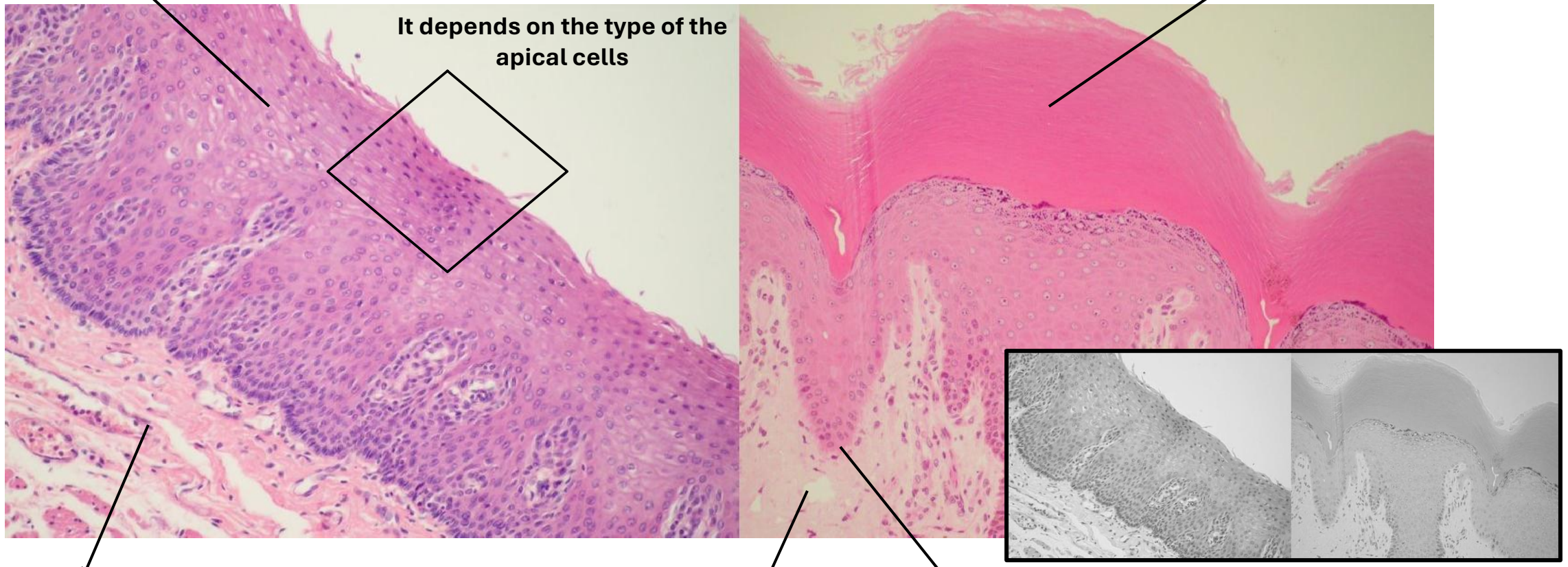
lumen

Cilia

STRATIFIED SQUAMOUS

- Filled with keratin
- No nucleus
- Dead
- Extra protection

Non-keratinized



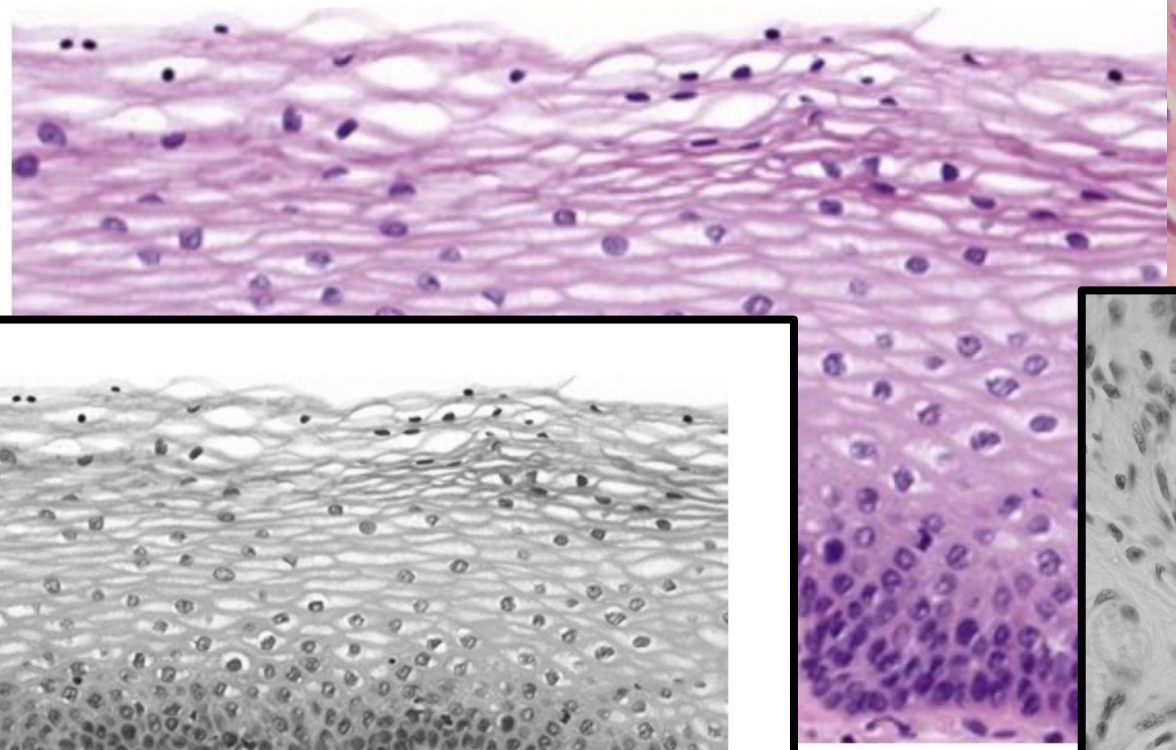
CT (connective tissue)

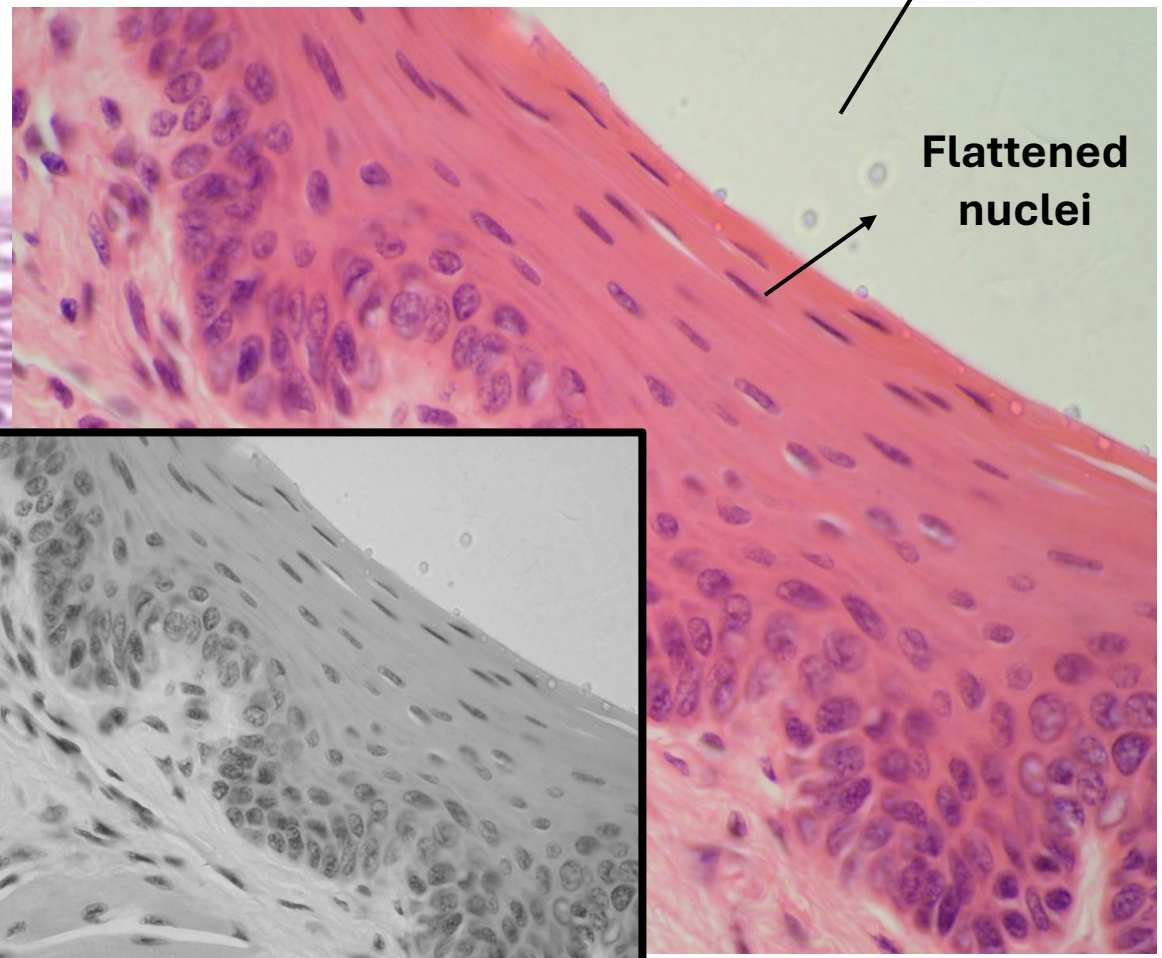
CT (connective tissue)

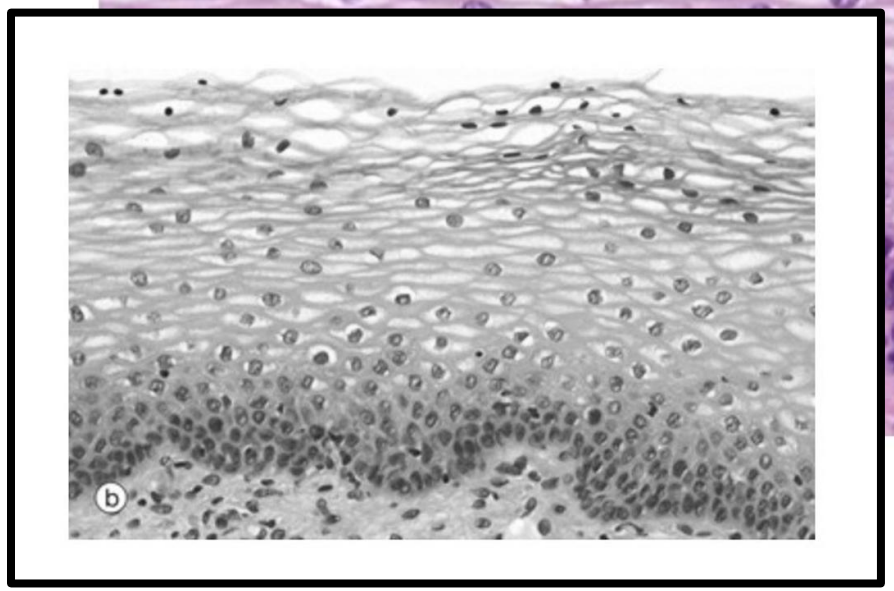
Basal cells (cuboidal / polyhedral)

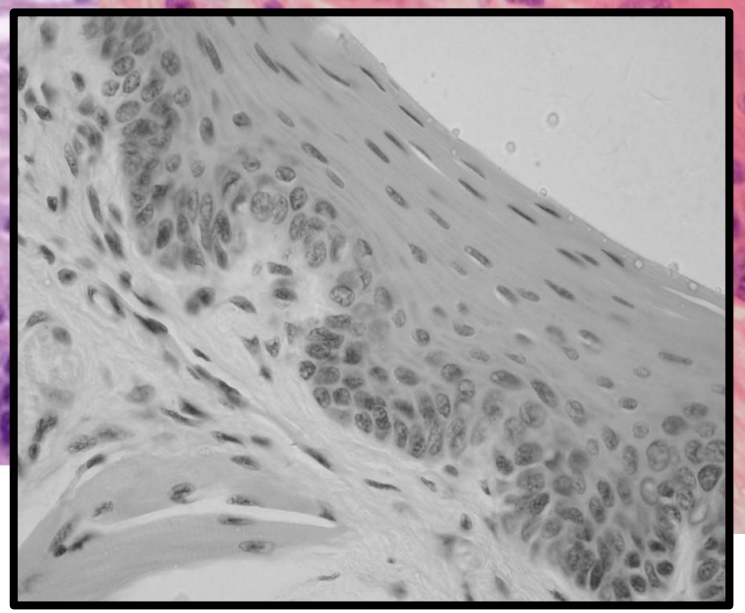
STRATIFIED SQUAMOUS

- The most protective type
- Found in cornea

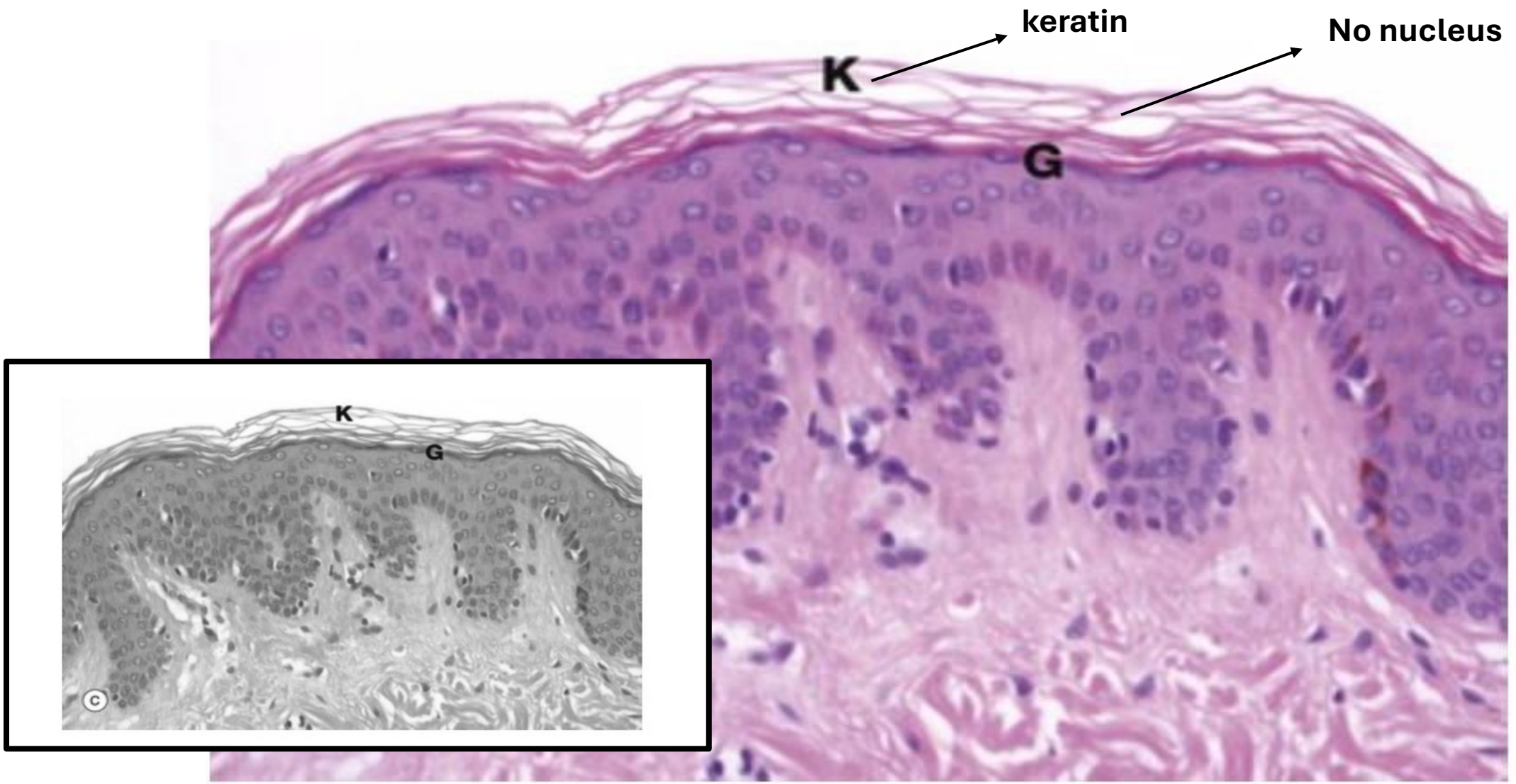


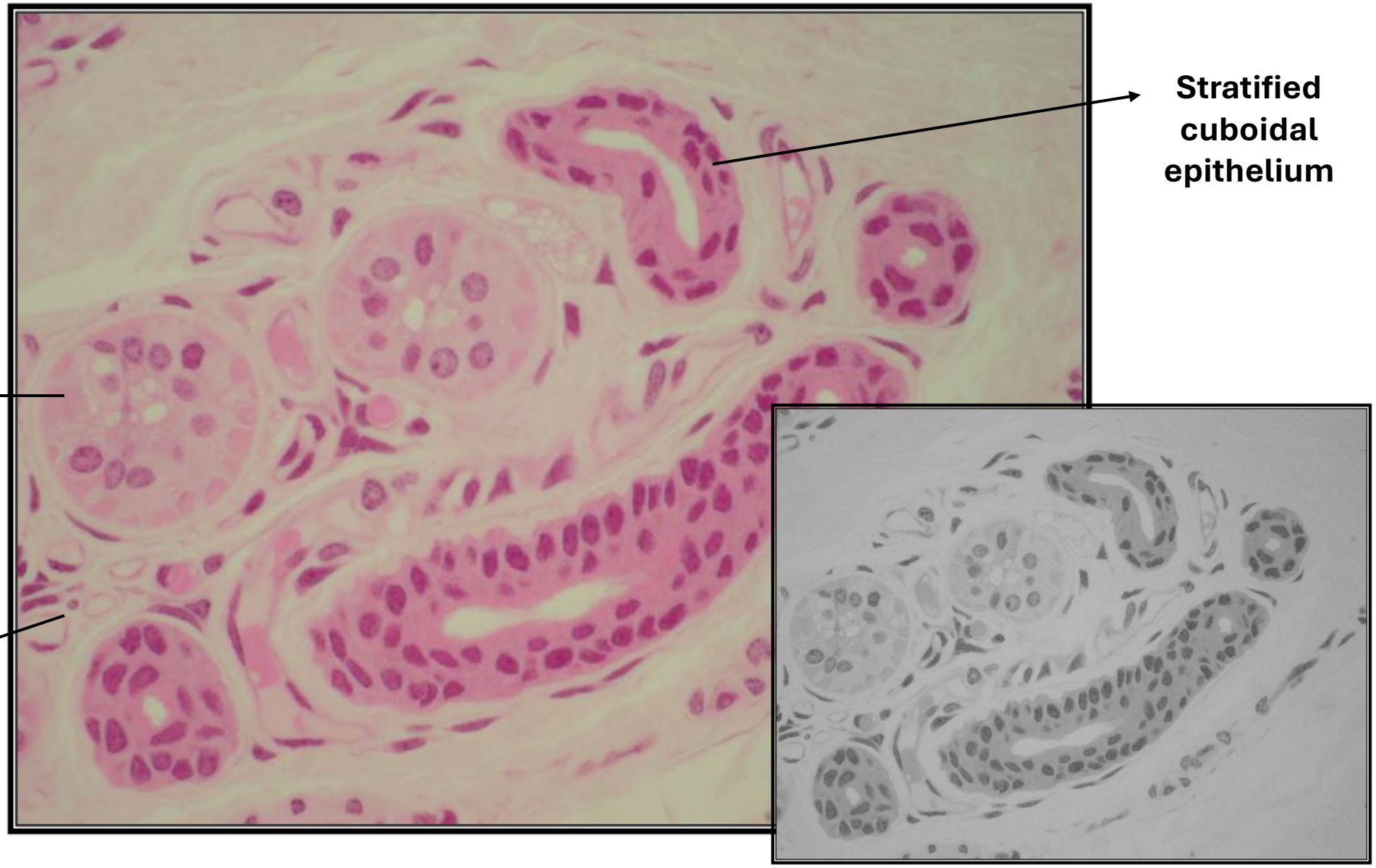






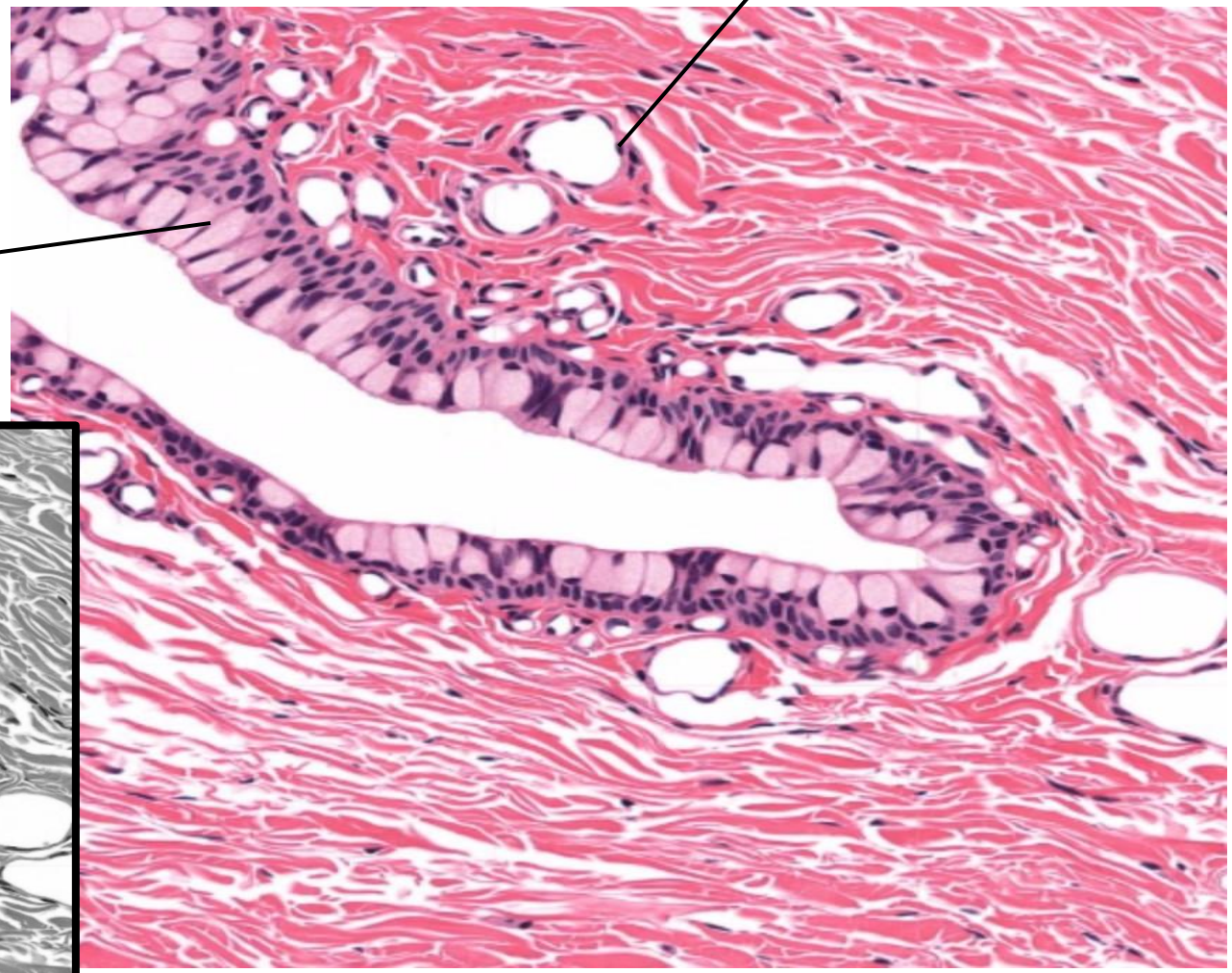
KERATINIZED-STRATIFIED SQUAMOUS

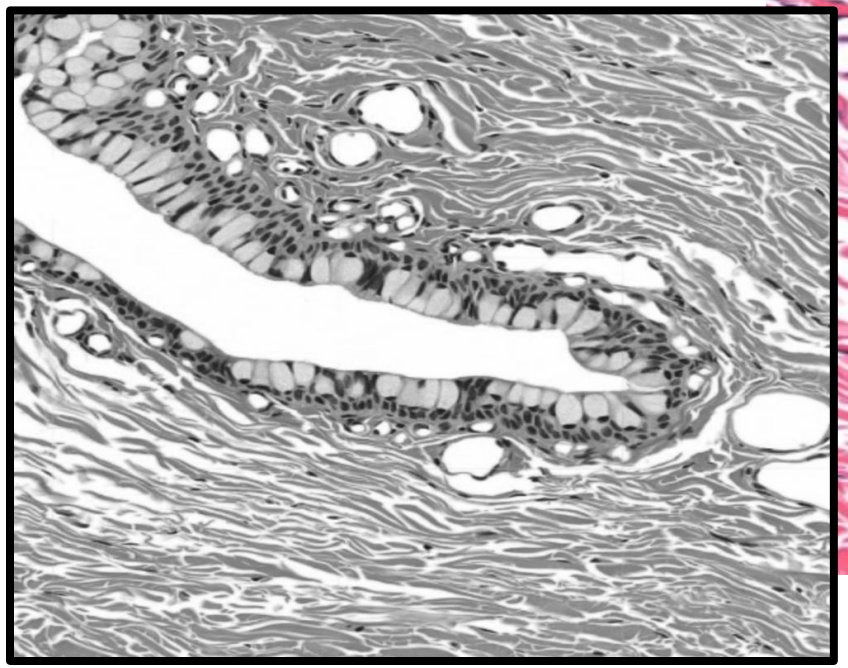



Stratified cuboidal epithelium
Simple cuboidal epithelium
Simple squamous epithelium

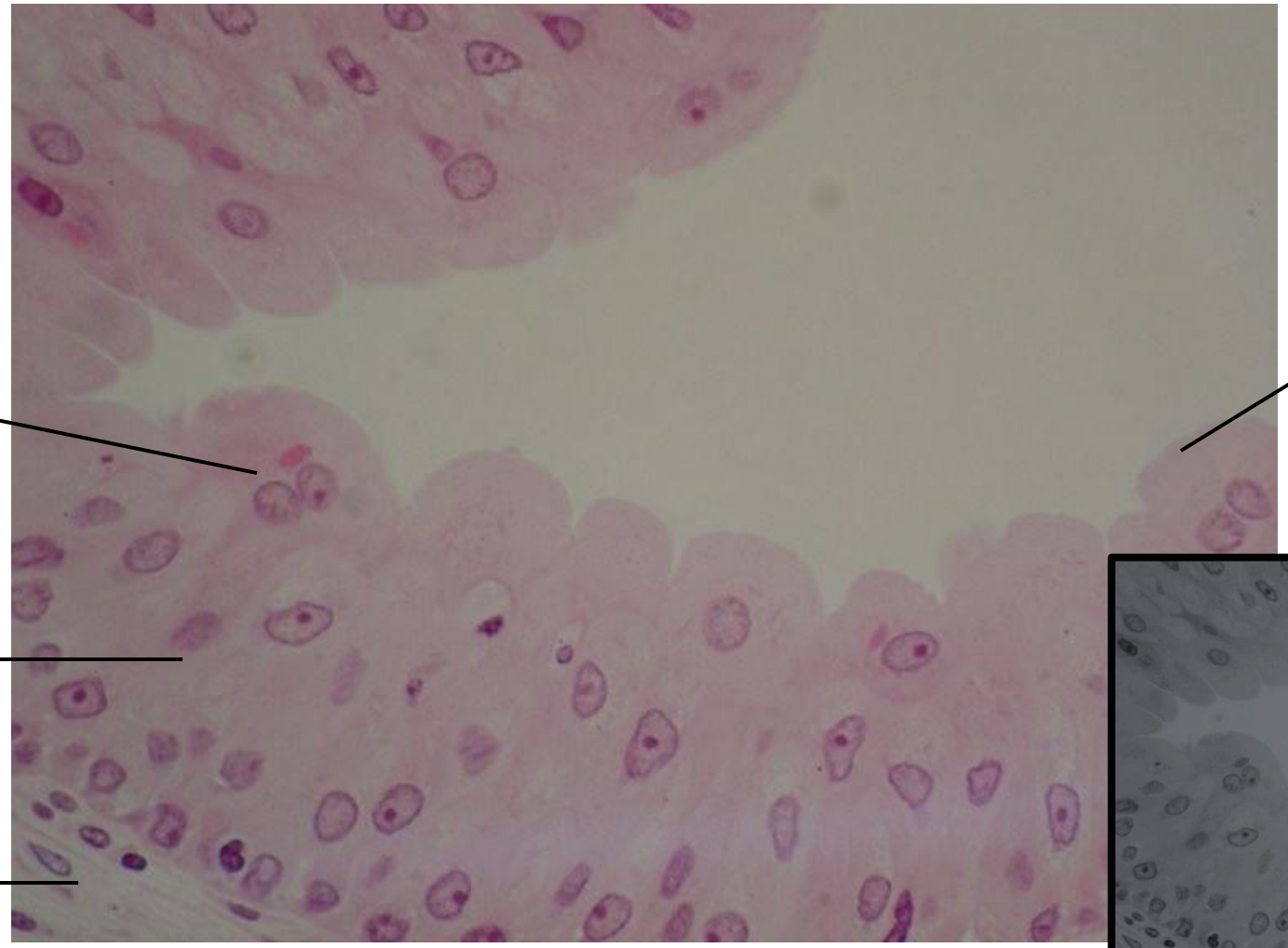
STRATIFIED COLUMNAR

- Rare type
- With goblet cells
- In conjunctiva
- Inner surface of the eyelids





TRANSITIONAL EPITHELIUM

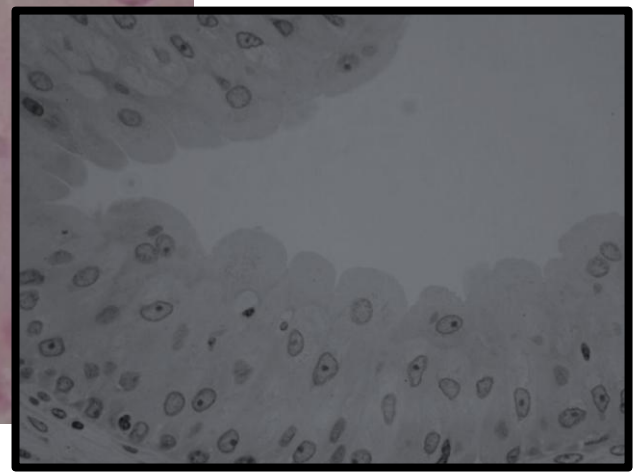


Binucleated

Epithelium tissue

Connective tissue

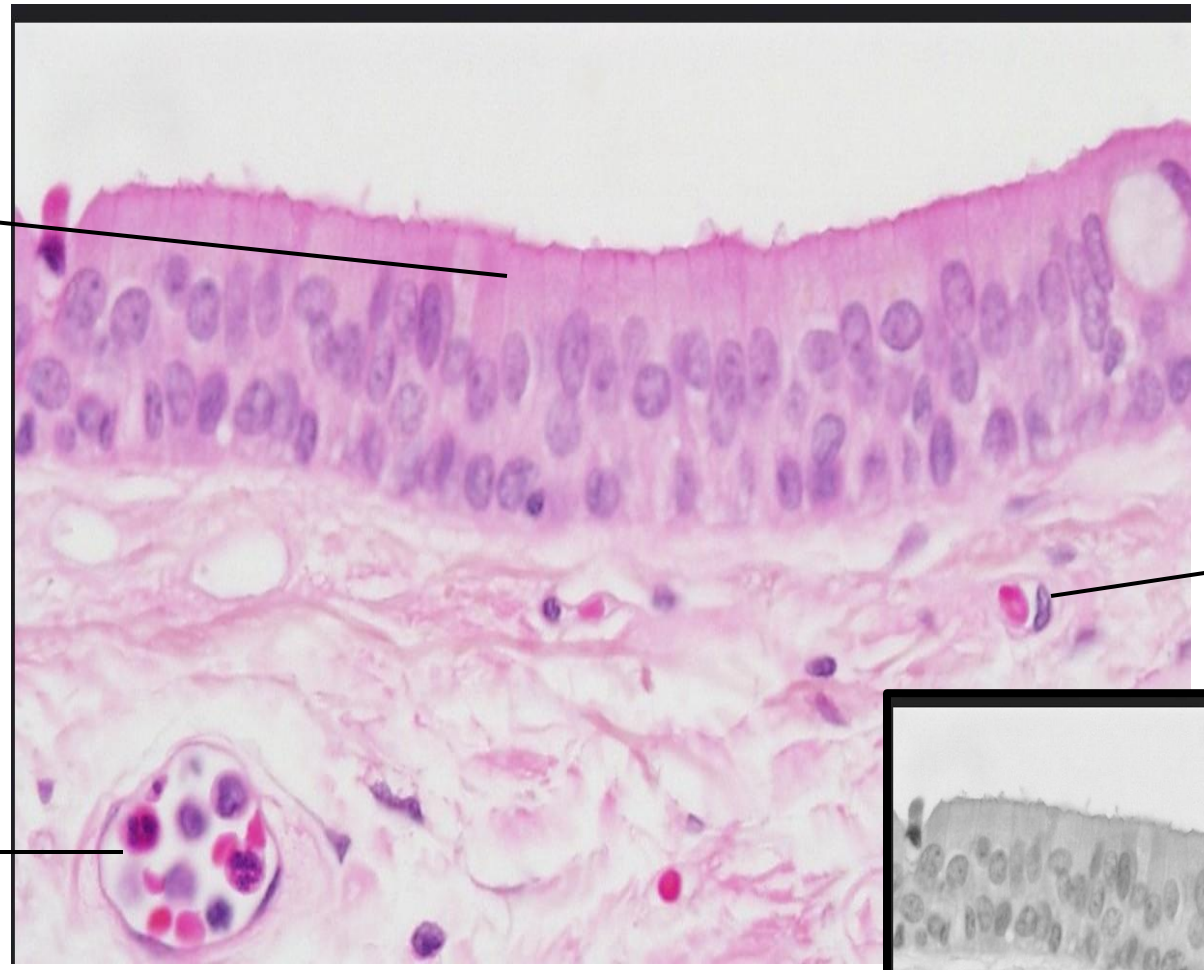
Umbrella cells when relaxed (dome-shaped)

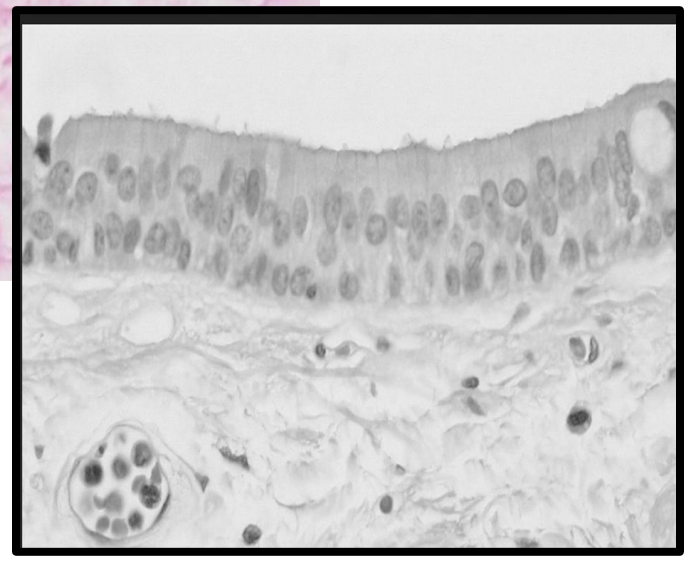


Stratified columnar epithelium

Endothelium (capillary)

Endothelium





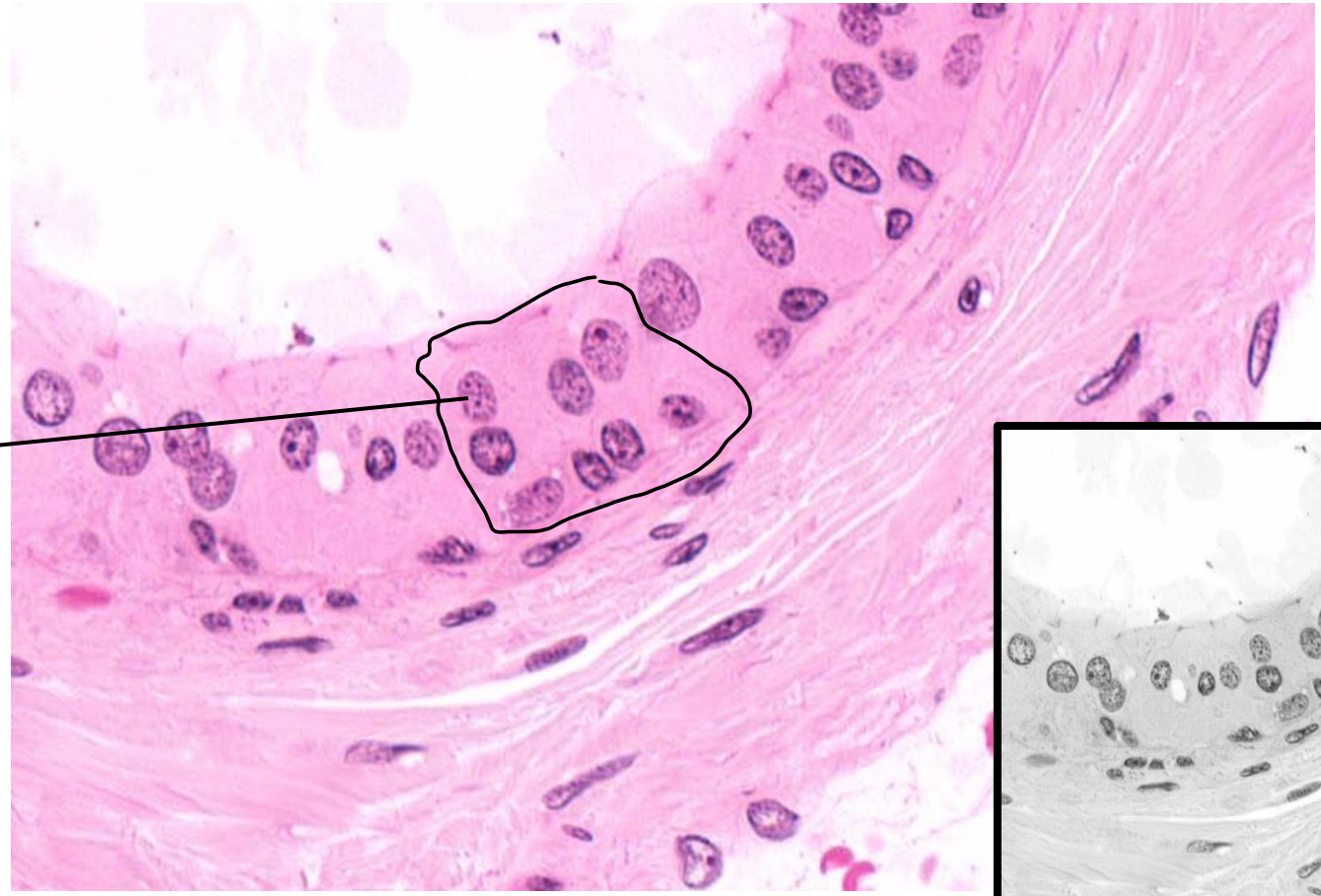
Simple columnar epithelium

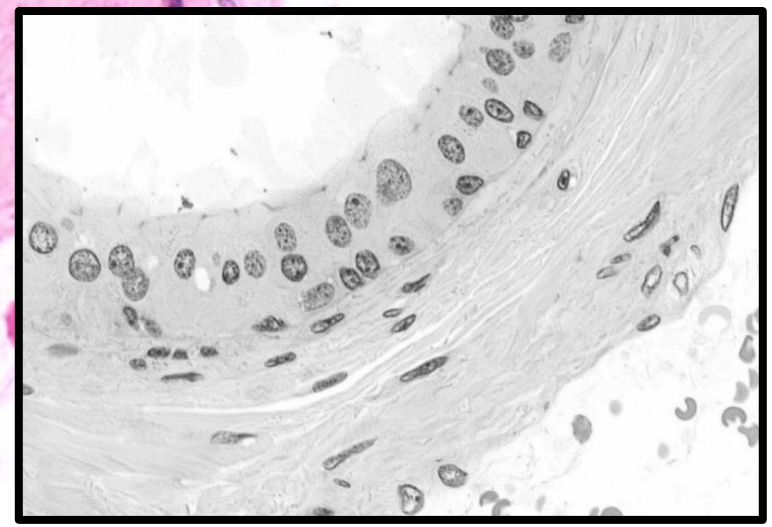
Lamina propria (connective tissue)

Endothelium
(simple squamous epithelium)

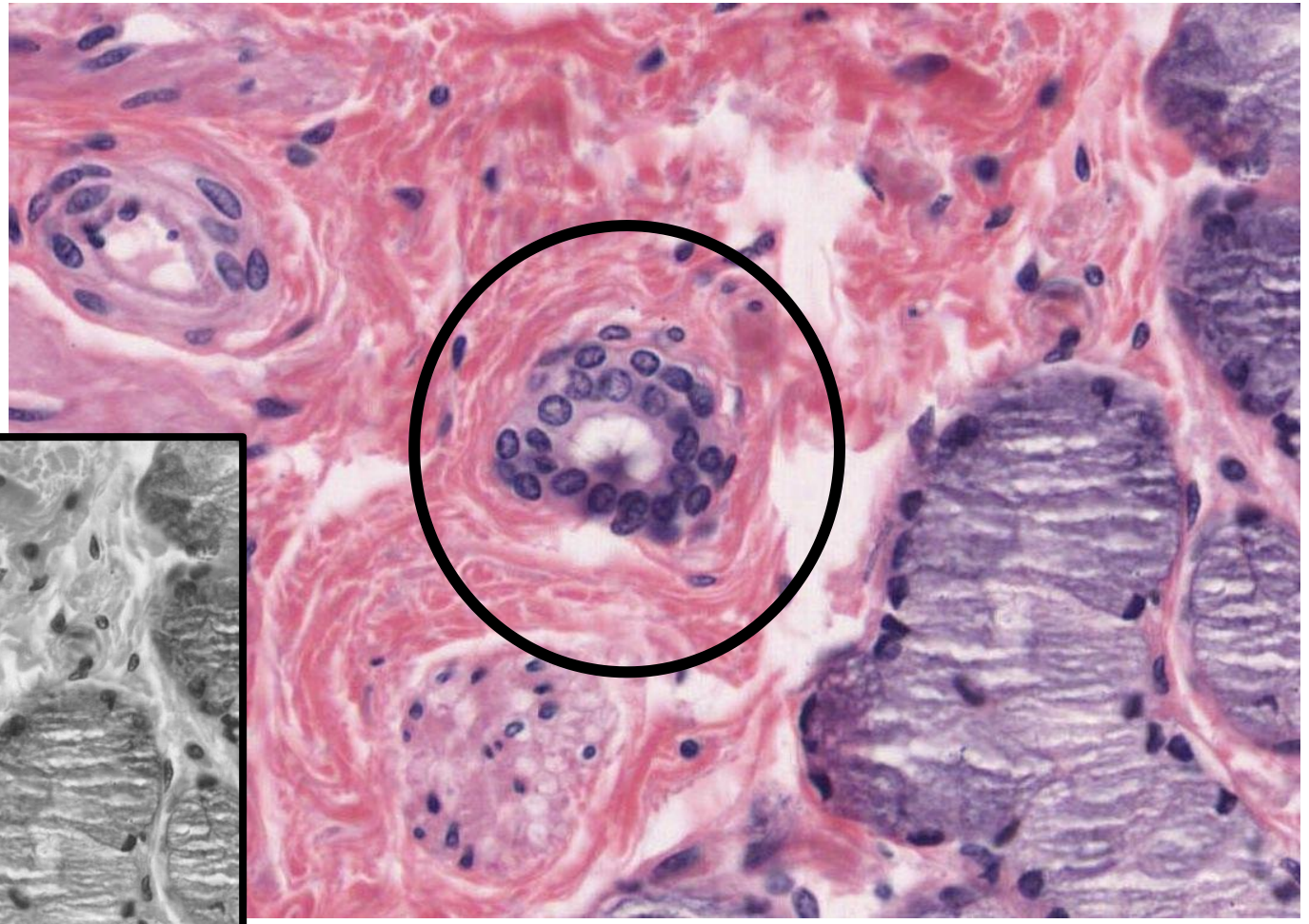
Stratified cuboidal epithelium

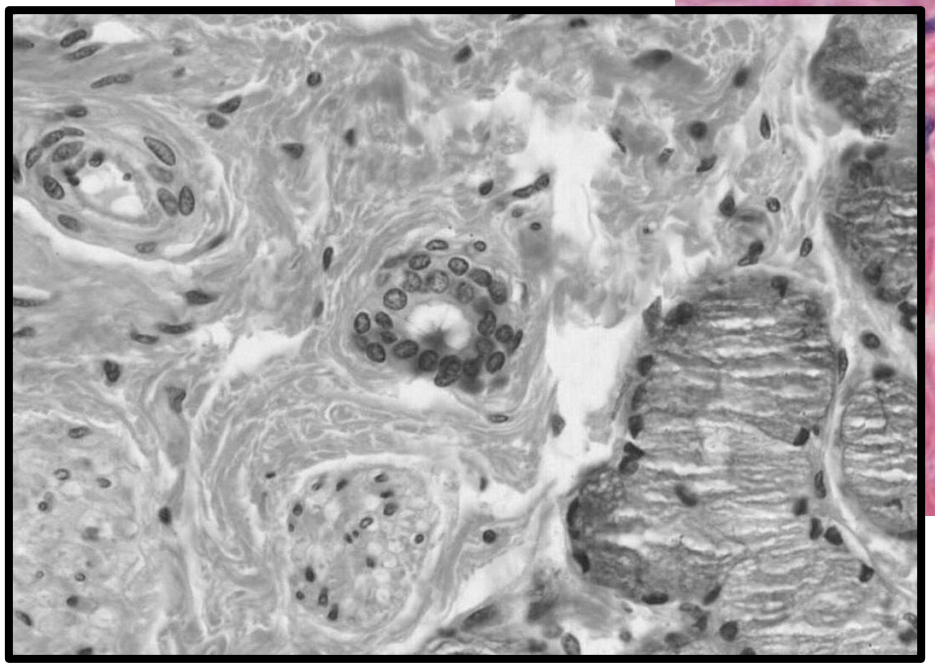
rounded

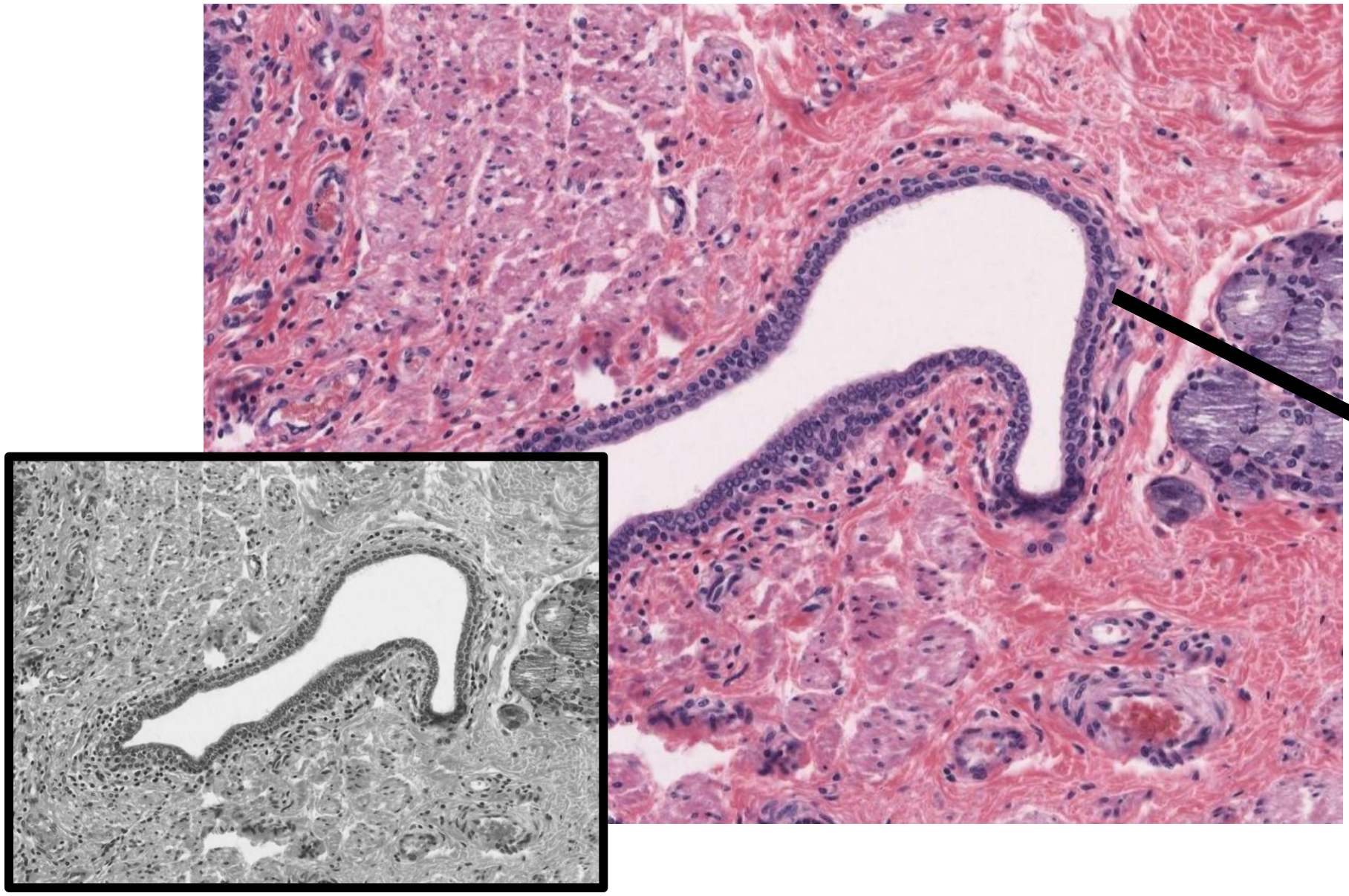




Stratified cuboidal epithelium

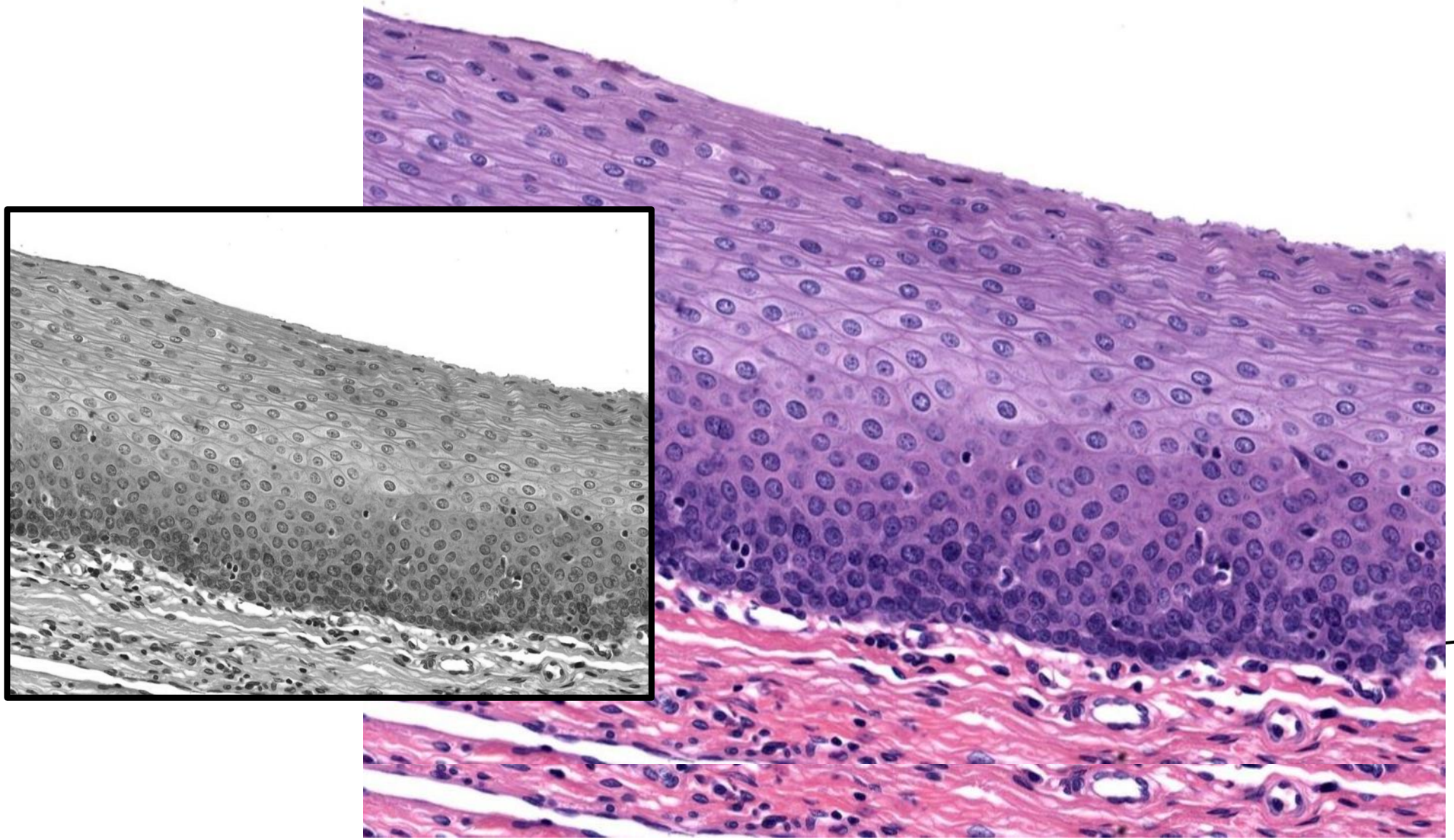






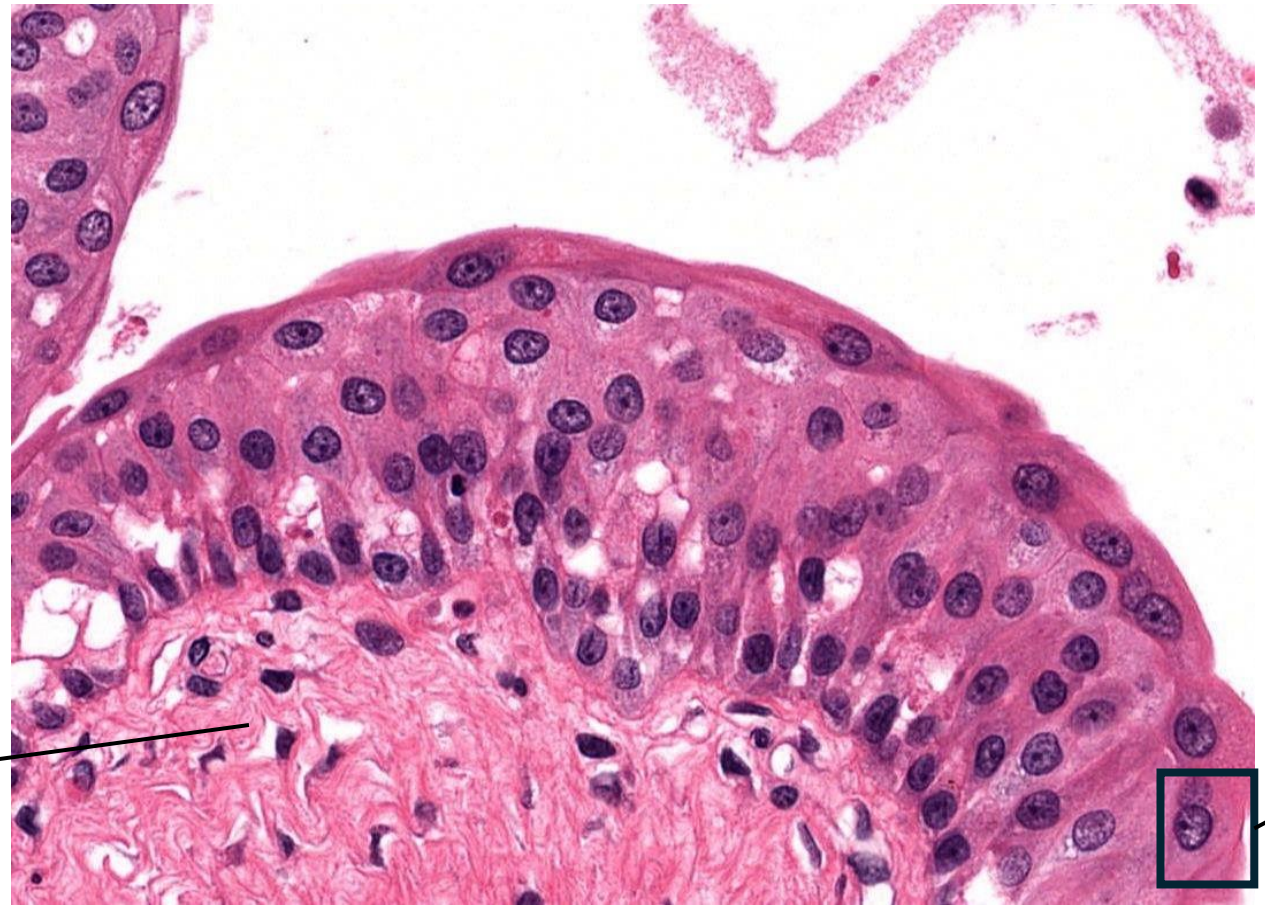
Stratified cuboidal epithelium

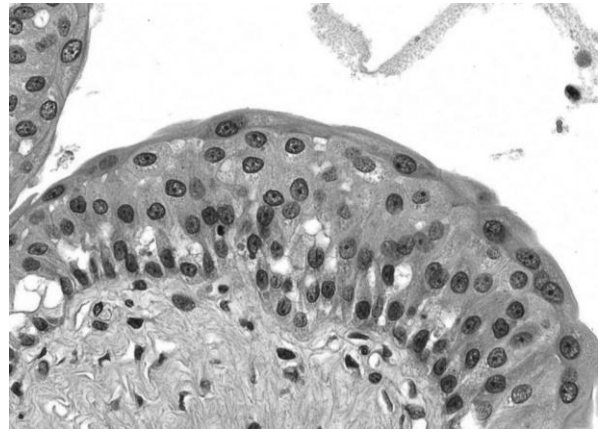
Stratified squamous Non-keratinized epithelium



Don’t say cuboidal ! Check the apical surface !

TRANSITIONAL EPITHELIUM

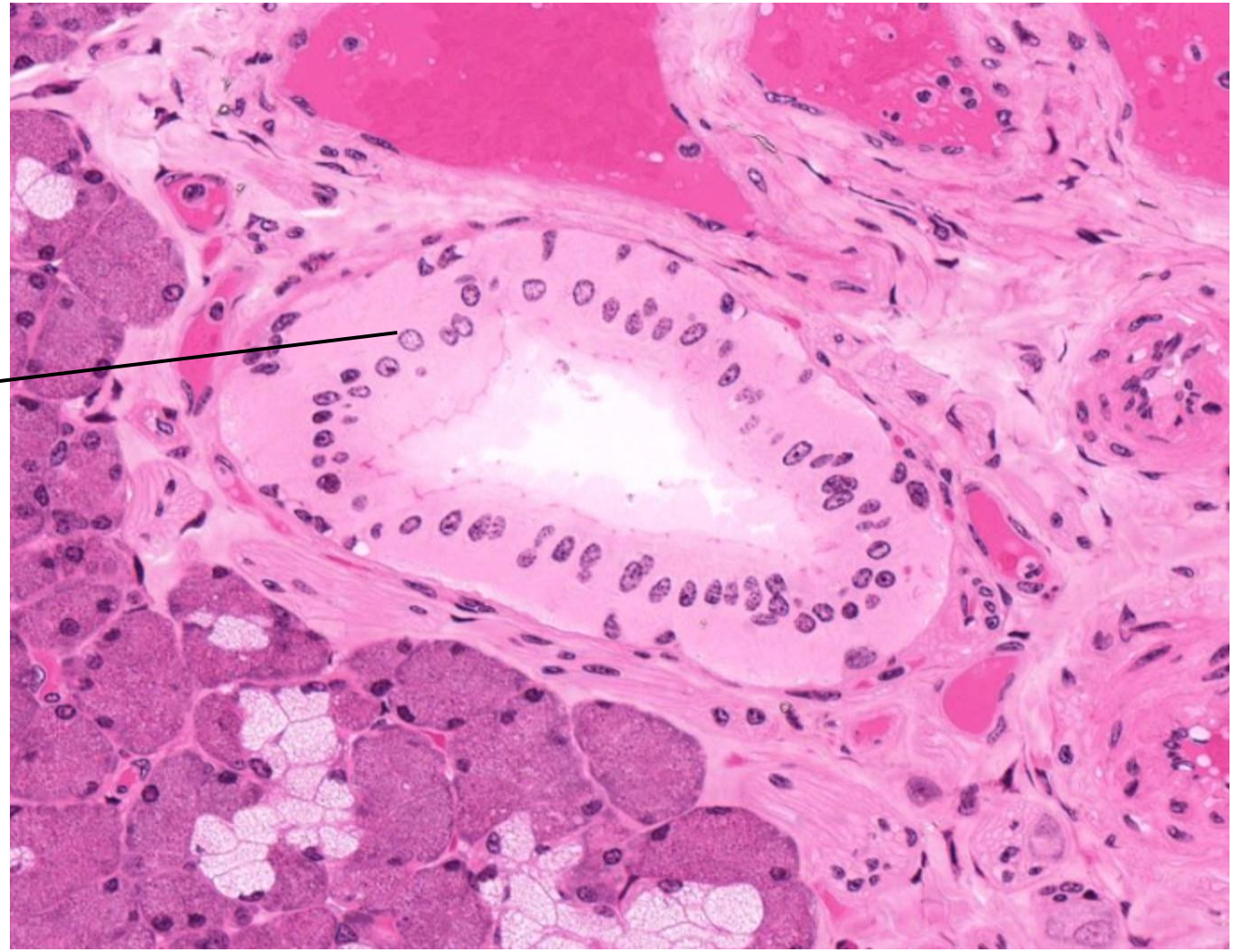


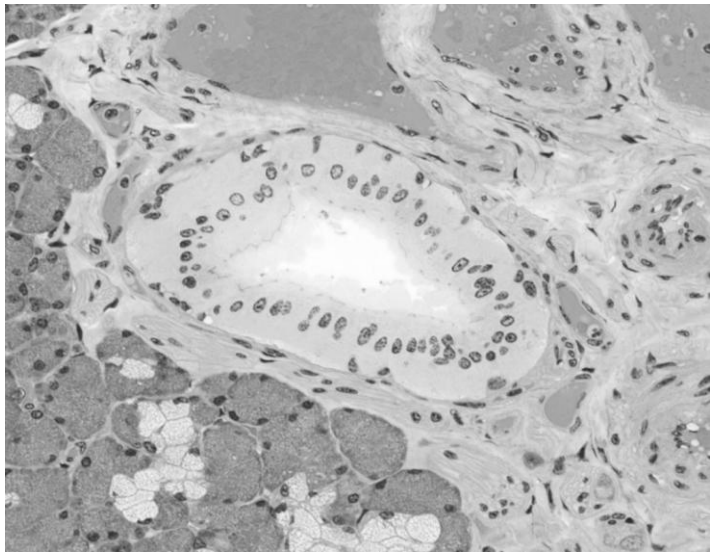


Lamina propria (connective tissue)

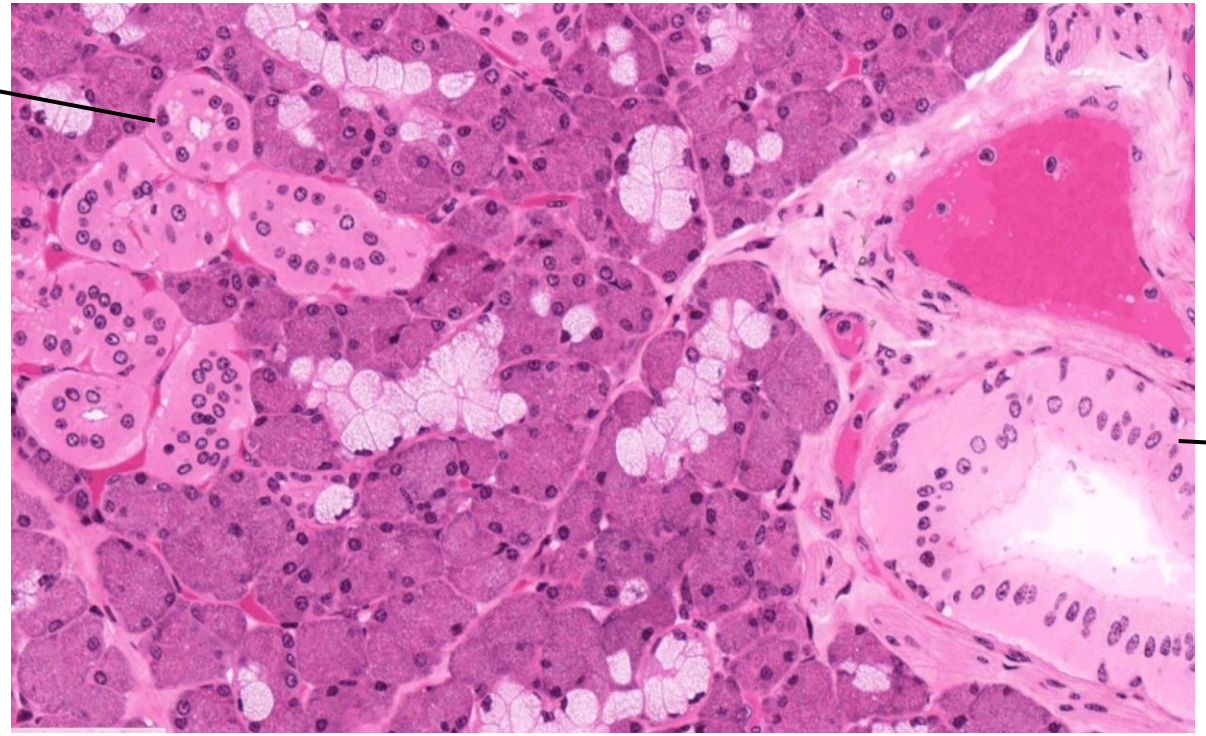
Binucleated

Stratified cuboidal epithelium

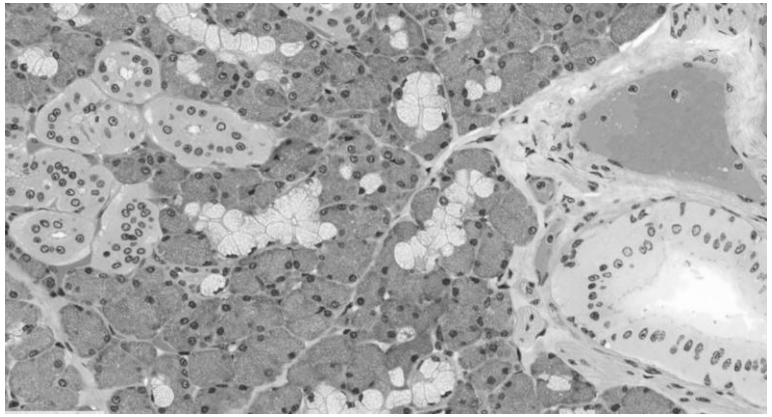




Simple cuboidal epithelium

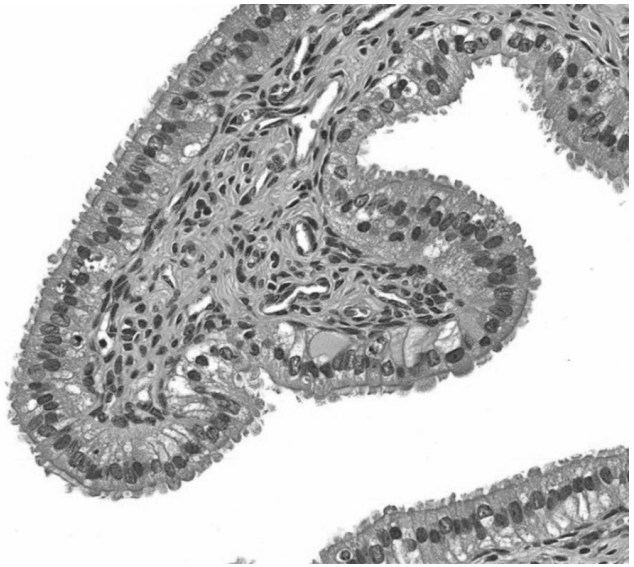


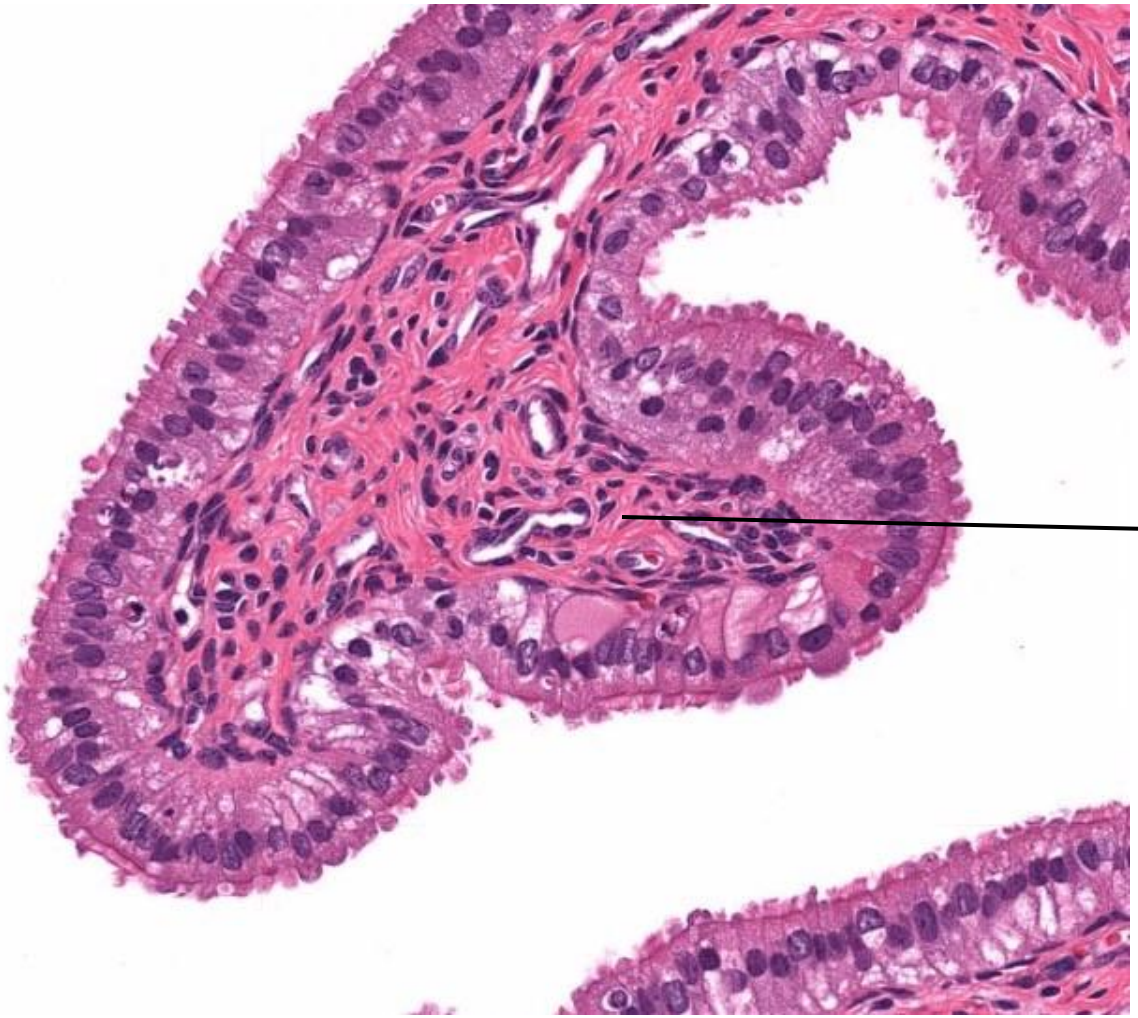
Stratified cuboidal epithelium



SIMPLE COLUMNAR EPITHELIUM

ciliated

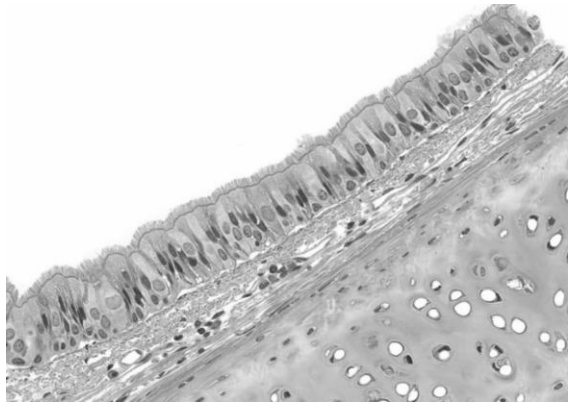




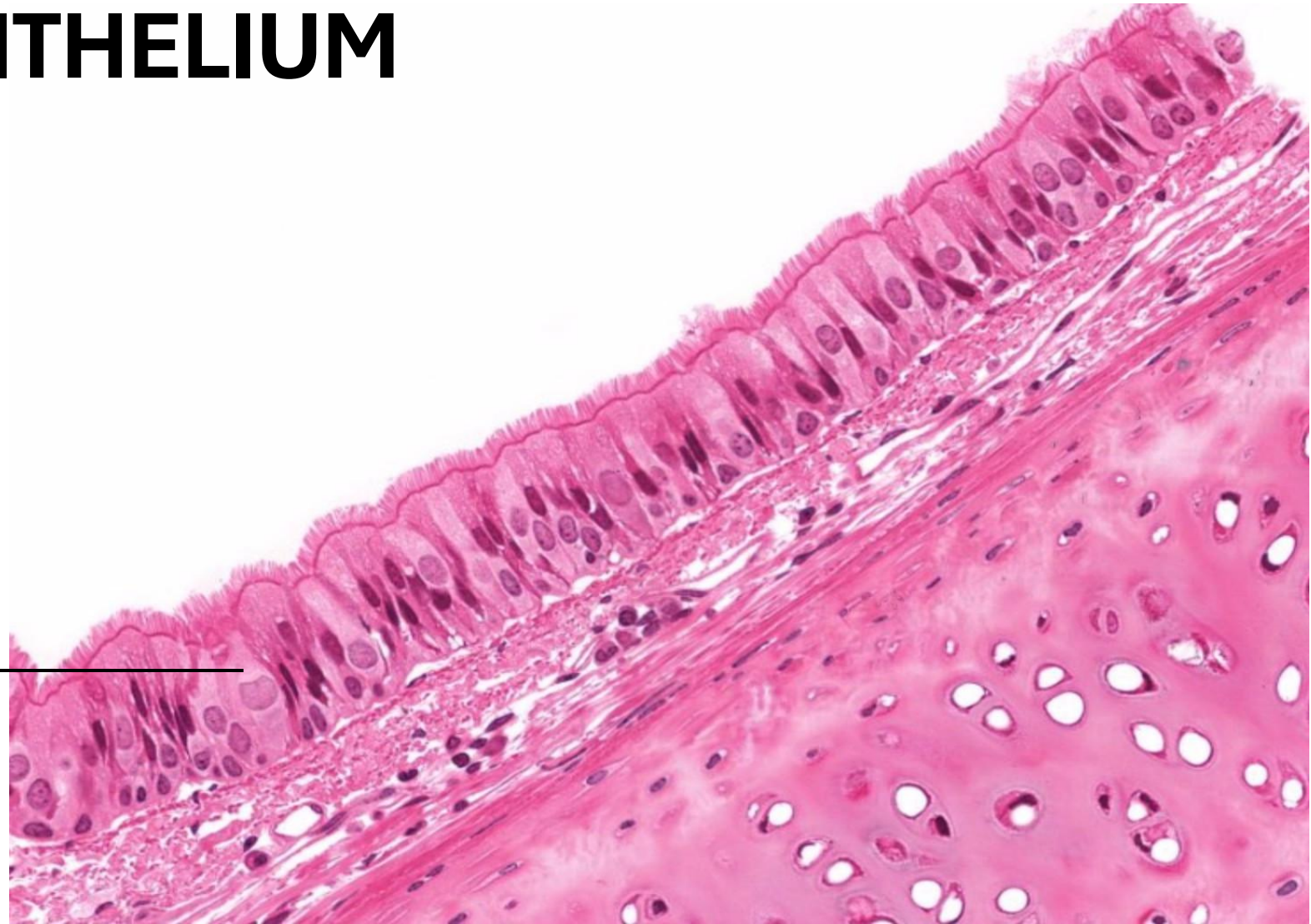
Lamina propria (connective tissue)

PSEUDOSTRATIFIED COLUMNAR EPITHELIUM

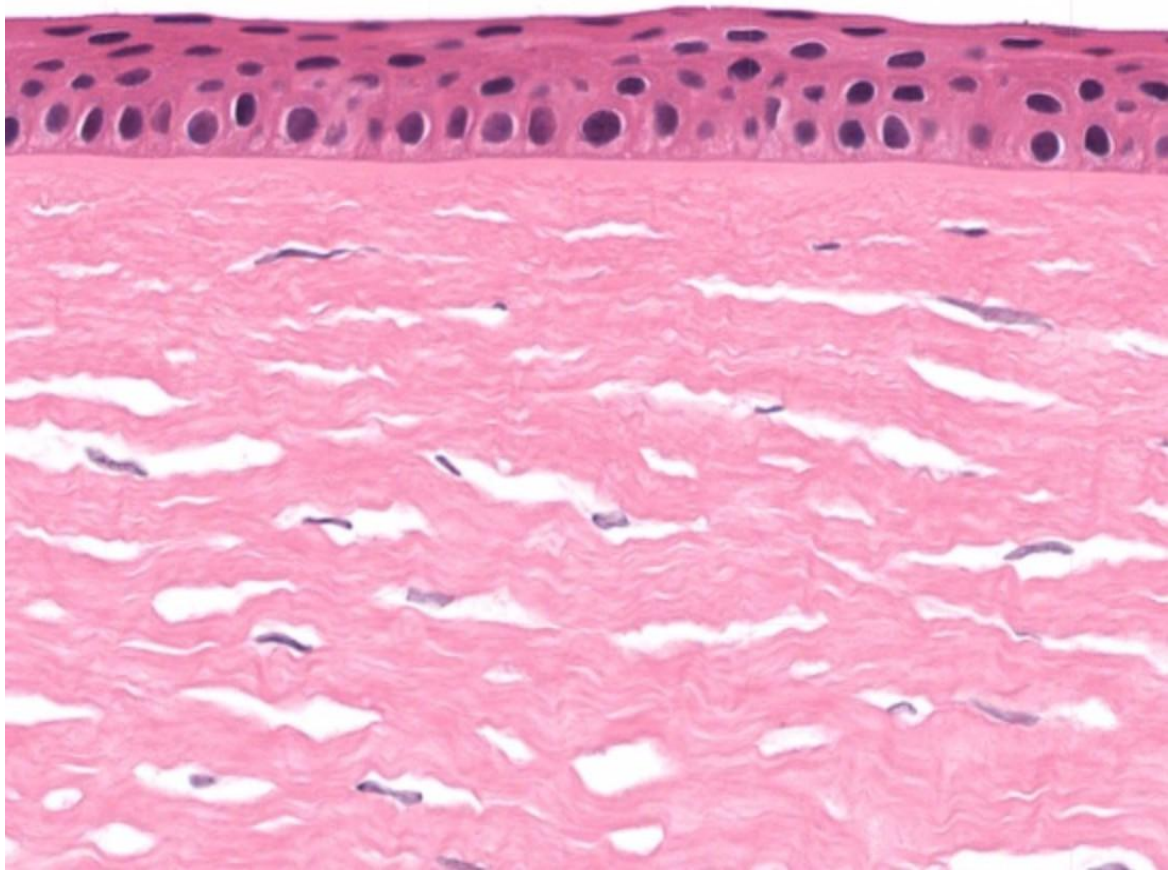
Ciliated with goblet cells (respiratory epithelium)

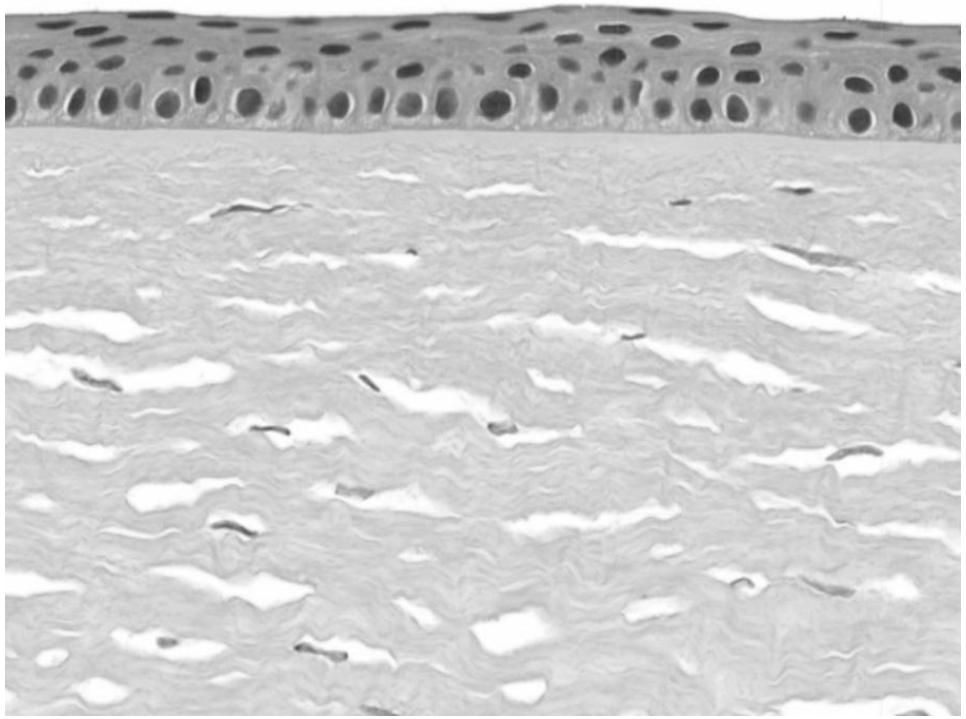


Goblet cell

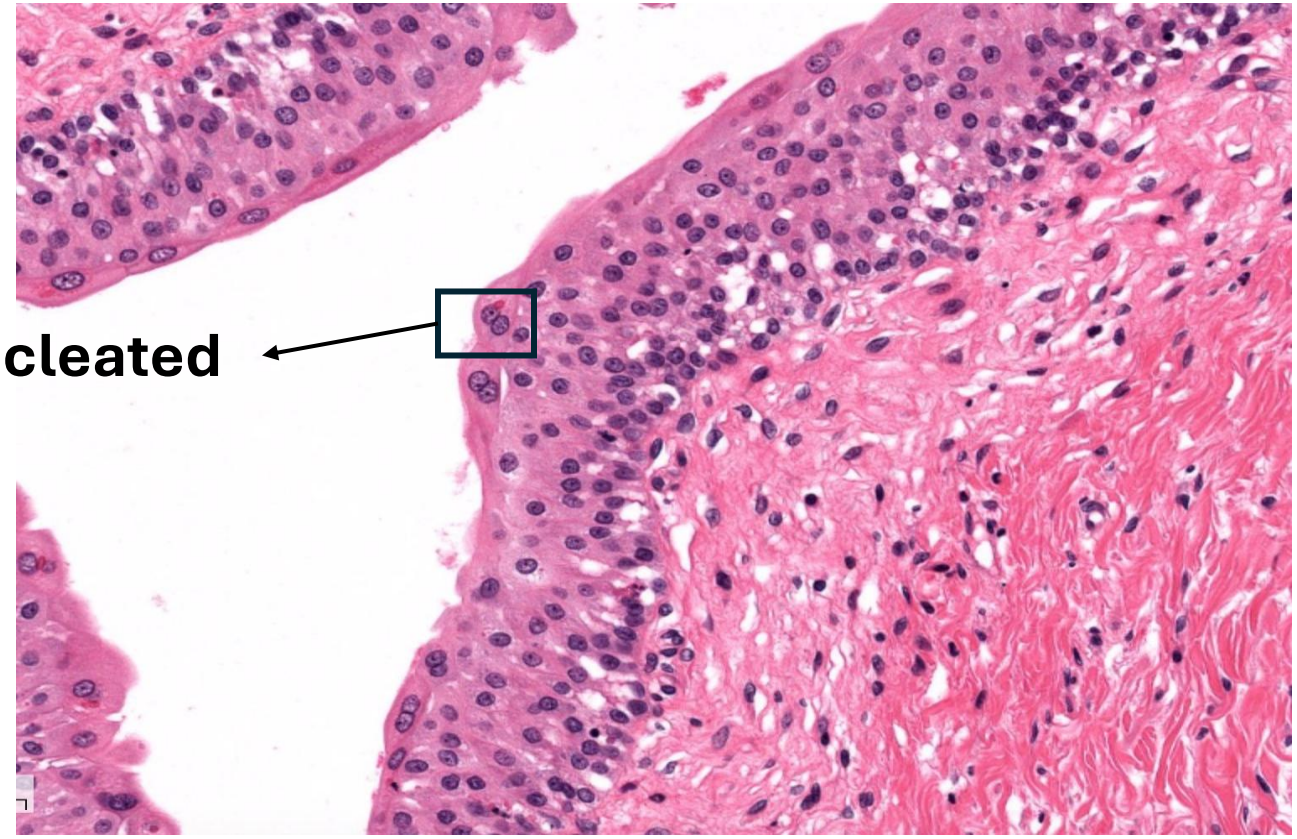


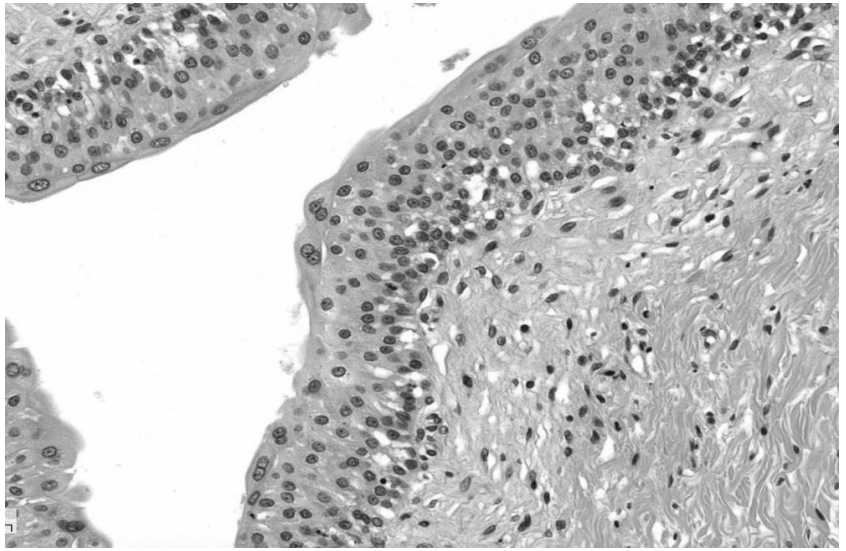
Stratified squamous Non-keratinized epithelium





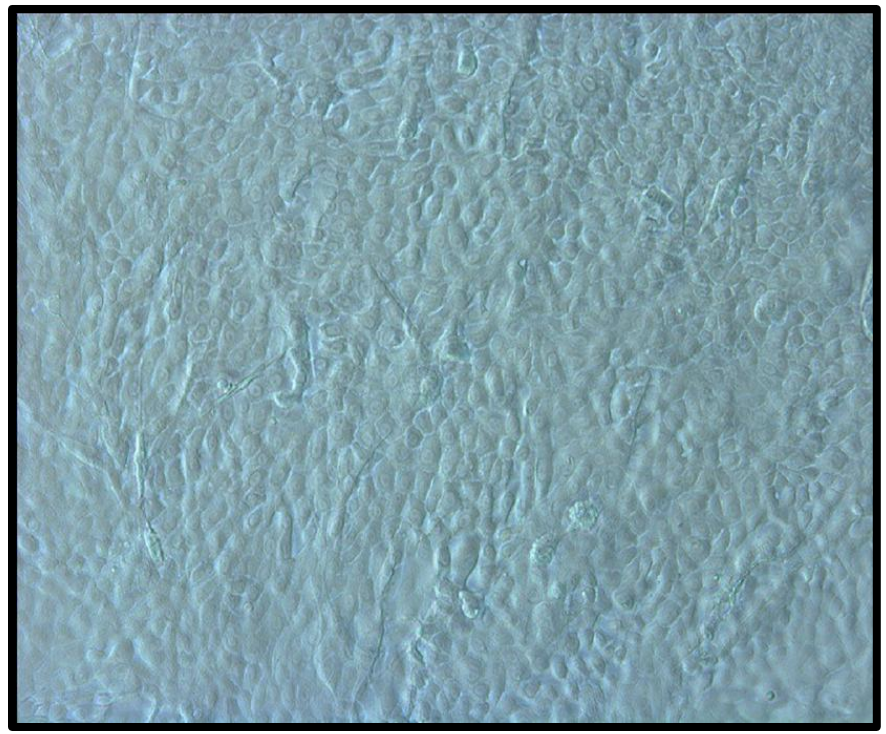
TRANSITIONAL EPITHELIUM





Question 1: This image was acquired using which type of microscope?

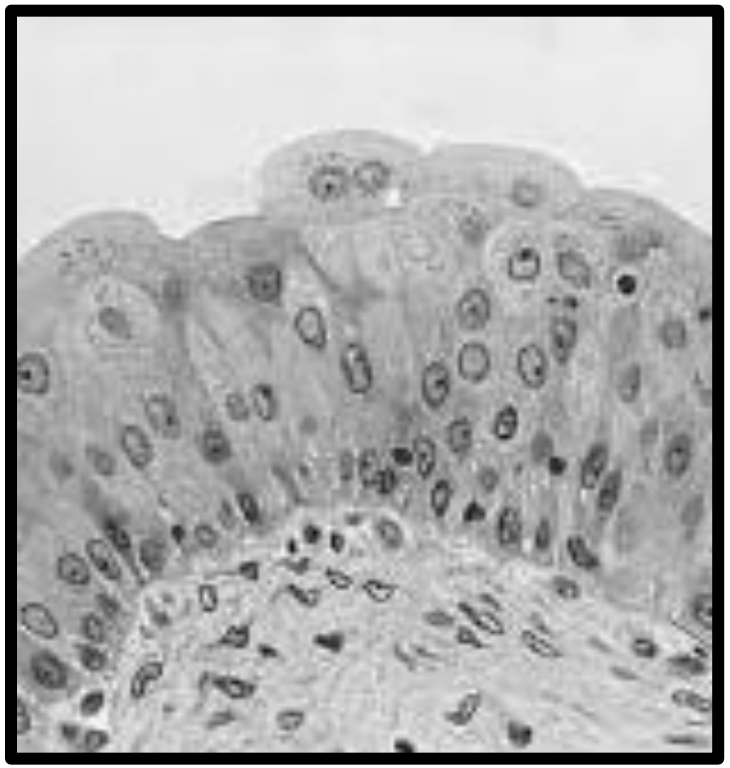
A) Phase-contrast microscope
B) TEM
C) SEM
D) Fluorescence microscope
E) Confocal microscope



(A)

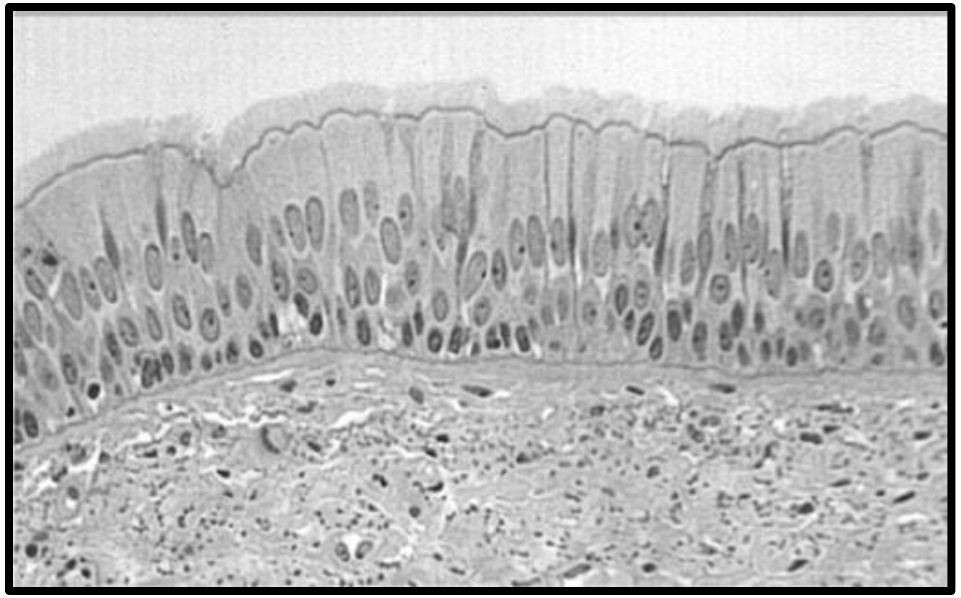
Question 2: Choose the incorrect statement about this tissue:

A) It lines the urinary bladder
B) It is called urothelium
C) The apical layer cells are called umbrella cells
D) Binucleation is seen in this type
E) It is a stratified cuboidal tissue



(E)

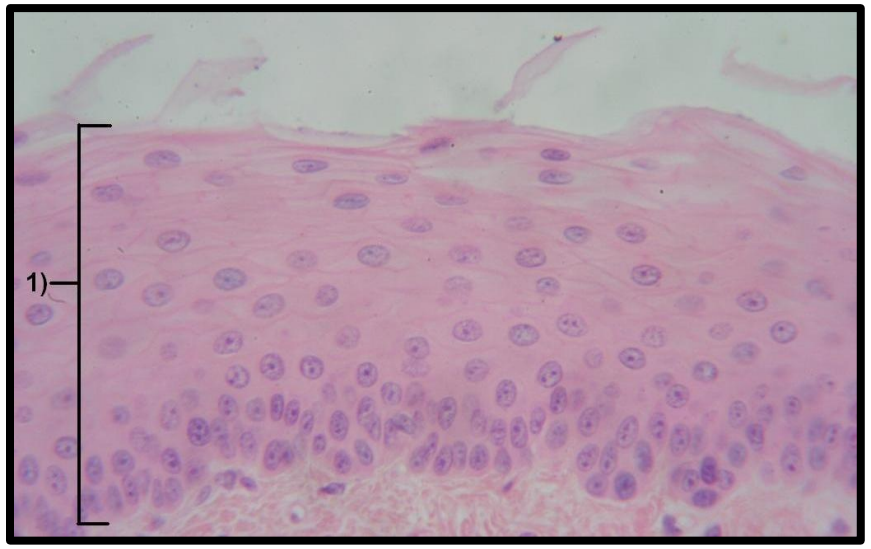
Question 3: identify the type of epithelium in this image:



A) stratified columnar with goblet cells
B) simple columnar with goblet cells
C) stratified cuboidal with goblet cells
D) ciliated pseudostratified columnar epithelium
E) ciliated pseudostratified columnar epithelium with goblet cells

(E)

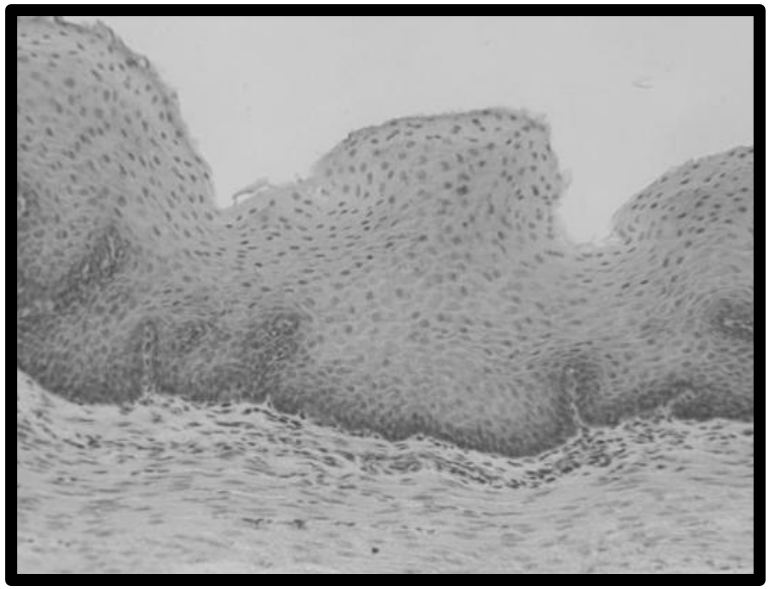
Question 4: identify the type of epithelium in this image:



A) stratified cuboidal epithelium
B) simple squamous epithelium
C) stratified squamous epithelium
D) Keratinized stratified squamous epithelium
E) ciliated pseudostratified columnar epithelium with goblet cells

(C)

Question 5: identify the type of epithelium in this image:

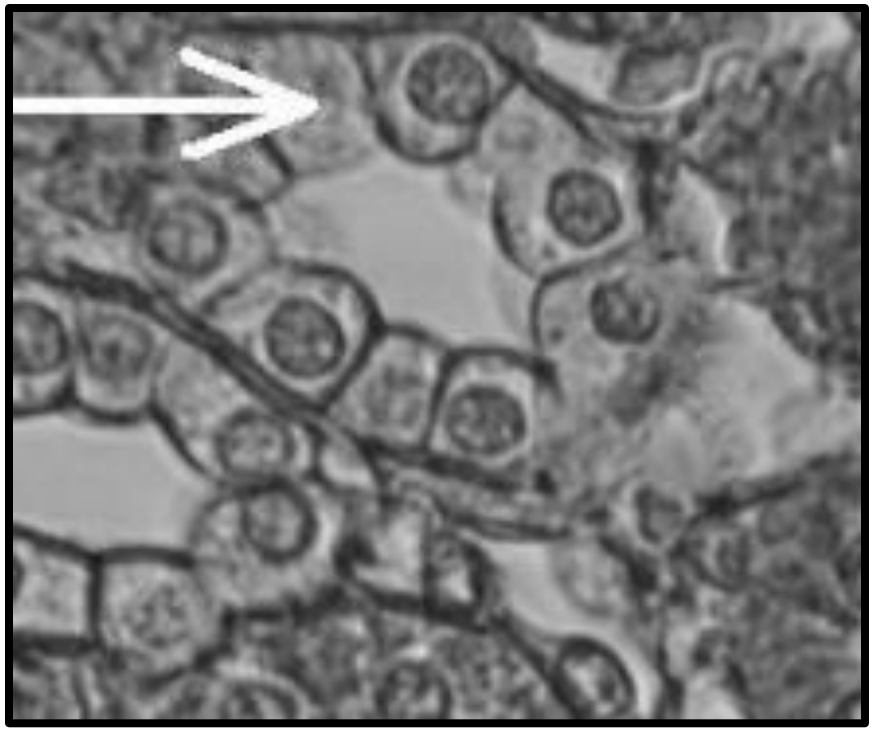


A) stratified cuboidal epithelium
B) simple squamous epithelium
C) stratified squamous epithelium
D) Keratinized stratified squamous epithelium
E) ciliated pseudostratified columnar epithelium with goblet cells

(C)

Question 6: identify the type of epithelium in this image:

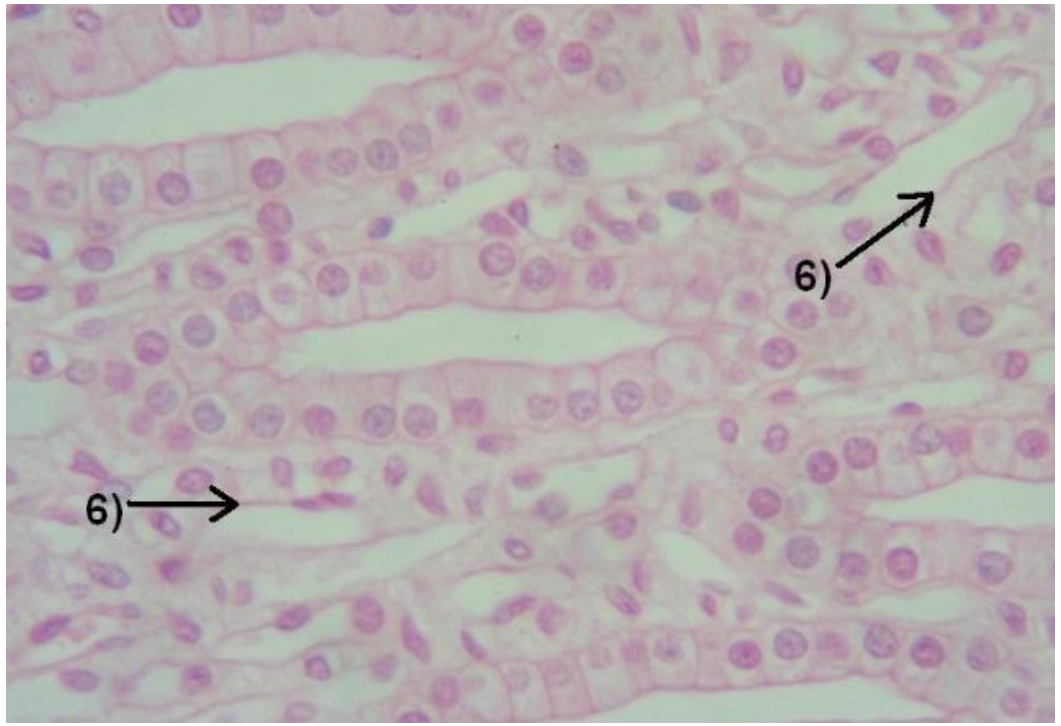
A) stratified cuboidal epithelium
B) simple squamous epithelium
C) stratified columnar epithelium
D) stratified squamous epithelium
E) simple cuboidal epithelium



(E)

Question 7: the number (6) refers to:

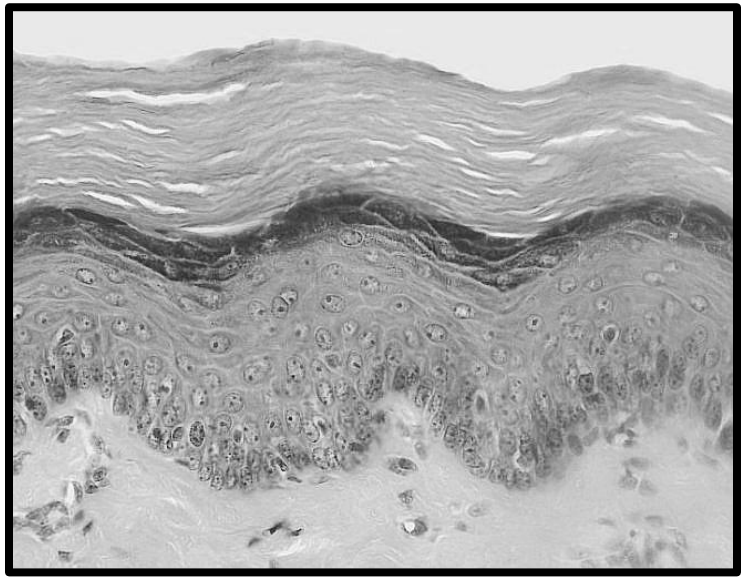
A) stratified cuboidal epithelium
B) simple squamous epithelium
C) stratified columnar epithelium
D) stratified squamous epithelium
E) simple cuboidal epithelium



(B)

Question 8: identify the type of epithelium in this image:

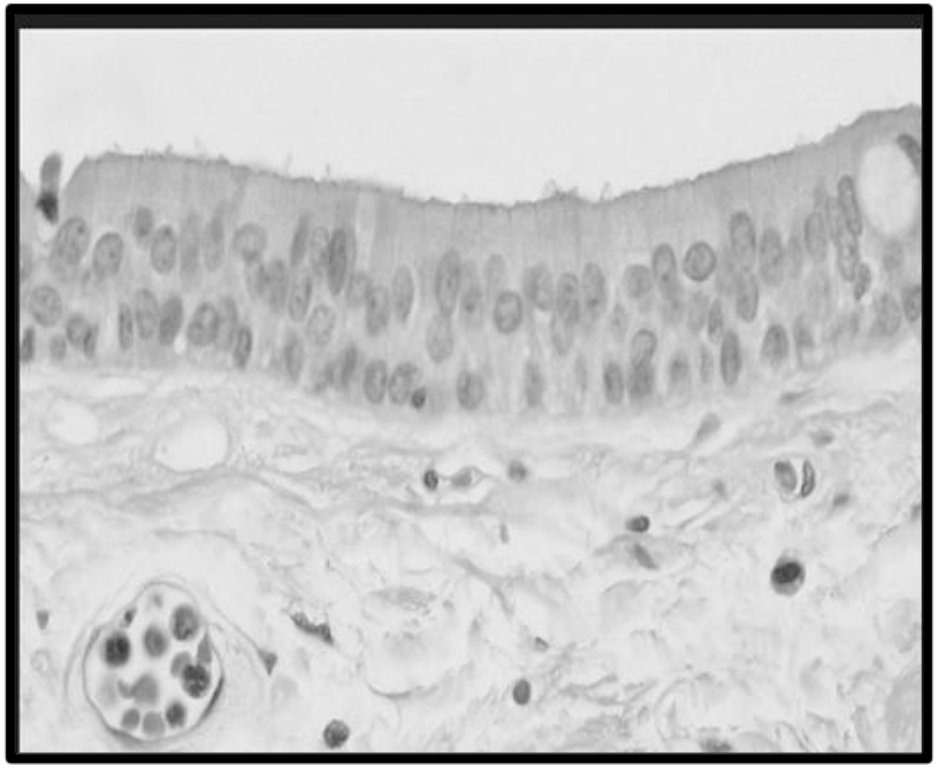
A) stratified cuboidal epithelium
B) simple squamous epithelium
C) non-keratinized stratified squamous epithelium
D) Keratinized stratified squamous epithelium
E) ciliated pseudostratified columnar epithelium with goblet cells



(D)

Question 9: this image is taken from:

A) Cornea
B) renal collecting ducts
C) uterus
D) conjunctiva
E) gall bladder



(D)