



Histology lab : 2

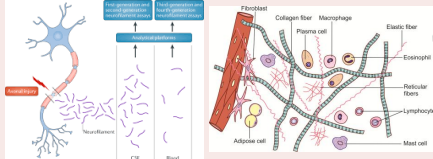
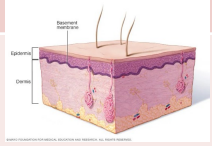


Done by Majd Ald3ja



حكيانا من قبل عن طرق تحضير الslides كان في اكثر من step منهم انه لازم اصبغ الslide و عندي options كثير

Stain	Characteristic	Color
<p>① Hemtoxylin -eosin</p> <p>هاي عبارة عن صبغة مزدوجة و احنا قلنا انه احنا بالعادة بنستخدم combination of stains وحده تكون Acidic dye و وحدة Basic dye تكون</p>	<p>Hematoxylin is a <u>basic dye</u> that binds to <u>negatively charged structures</u>:</p> <ul style="list-style-type: none"> DNA in nucleus RNA in cytoplasm <small>رح يكون موجود في أماكن مختلفة</small> ↓ • Rough endoplasmic reticulum ← Ⓜ • Ribosomes ← 	<p>أزرق</p> <p>Blue / violet</p> <p>بنفسجي</p>
	<p>Eosin is an <u>acidic dye</u> that binds to <u>positively charged structures</u>:</p> <ul style="list-style-type: none"> Cell membrane Mitochondria Actin Collagen Red blood cells 	<p>وردي</p> <p>Pink / red</p> <p>أحمر</p>

Stain	Characteristic	Color
Gomori's stain	Stains <u>elastic fibers</u>	Dark violet
Silver	<p>Silver nitrate used to stain:</p> <ul style="list-style-type: none"> Reticular fibers Neurofilaments 	Black
Periodic Acid Schiff (PAS)	<p>Used to stain structures with high amount of sugar groups:</p> <ul style="list-style-type: none"> Mucin (goblet cells) هي المادة الكيميائية الرئيسية للمخاط in mucas Basement membrane 	Dark red
Osmium tetroxide	<ul style="list-style-type: none"> Used to stain lipids <p>ال lipids مادة تختفي أثناء التحضير</p>	Black

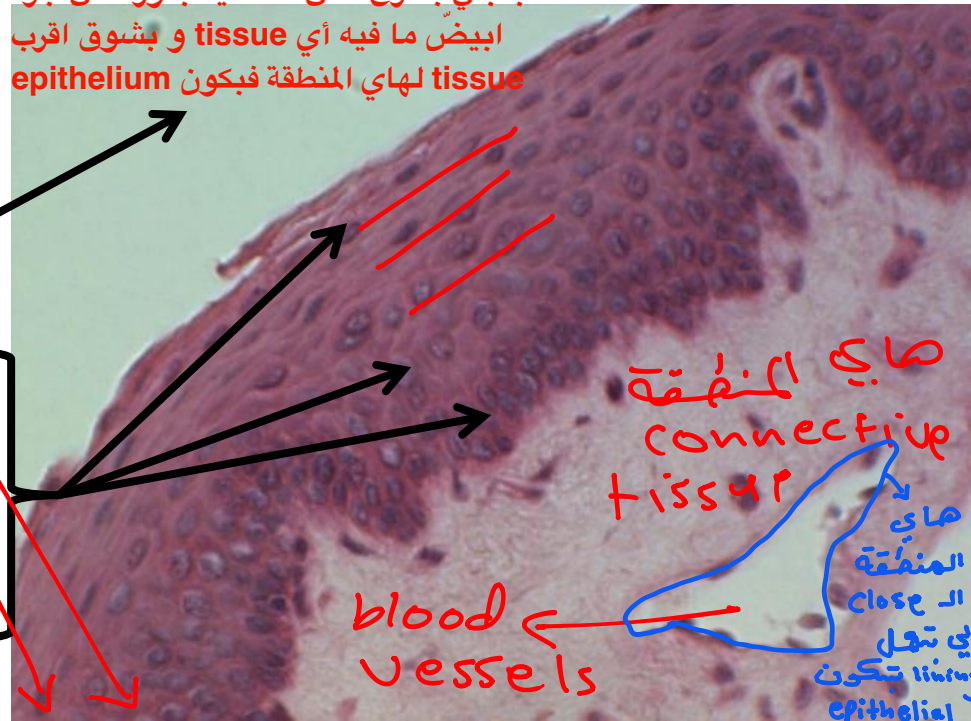
هي المادة المخاطية تختفي أثناء طرق التحضير الاعتيادية ف خلية ال goblet cell تظهر باللون الأبيض لكن في بعض الأحيان أنا بدى اظهر هاي المادة عن طريق هذه الصبغة

Part 1: Epithelial Tissue

- To identify epithelial tissue in a slide, **keep in mind the following points:** بعض الخصائص المهمة :

- Epithelial tissues line cavities or cover organs → A white area should be adjacent to the epithelium
- Epithelial cells are arranged in sheets
- Epithelial cells are closely packed
- No blood vessels are seen in the epithelium

باجي بتفرج على السلايد بدور على جزء ابيض ما فيه أي tissue و بشوق اقرب epithelium tissue لهاي المنطقة فبكون



ننتبه كيف الأنوية ملزقة ببعض كثير و طبعاً مصبوغين بالصبغة الأكثر استخداماً لهيك لونهم بنفسجي و الأنوية مترتبة على شكل طبقات

معظم الأوقات تحت المايكروسكوب في بعض الحالات ما بشوف ال cell membrane و لذلك ما بقدر أتعرف على ال cell ف اعتمادي يكون على الأنوية يكون في بعض الحالات ممكن أشوف ال cell membrane

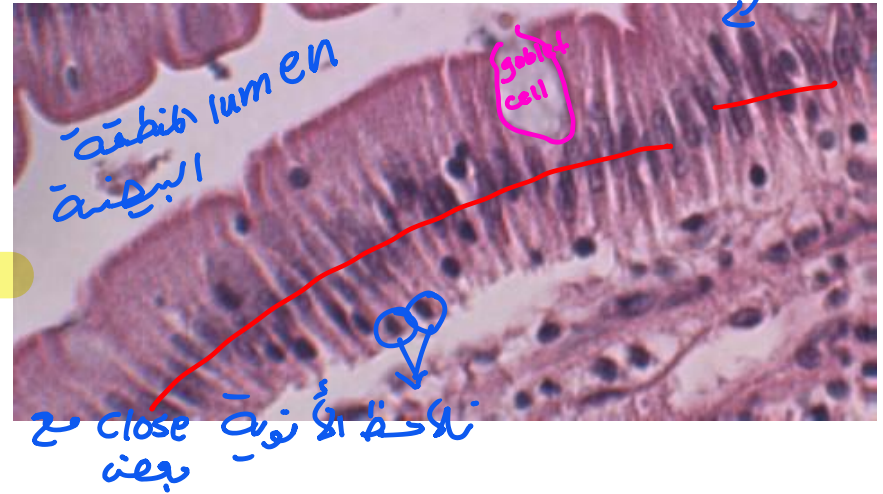
طبيب احنا هيك عرفنا انه epithelial tissue ، الآن بدى اعمل classification و احنا عنا نوعين عنا simple و stratified

- Once you have identified the tissue as epithelium, classify it by the following method:

كيف بدى اعرف اذا الأنوية موجودين بنفس الطبقة أو بطبقات مختلفة؟
 بروح برسم خط بمرق بالنواة و بشوف هل الانوية تقع على نفس الخط الي رسمته و ننتبهه مو ضروري كل الأنوية تكون على نفس الخط لكن هل الأغلب موجود على الخط ، طبيب ليه الأغلب ليه مو كلهم؟ هاد حكيناه من قبل اسمه ال Artifacts لأنه العينة ممكن تتحرك بس لو فعلا نشوف بكونوا كلهم على خط واحد

1. Identify the number of layers

- All nuclei arranged in a single row → 1 layer → Simple



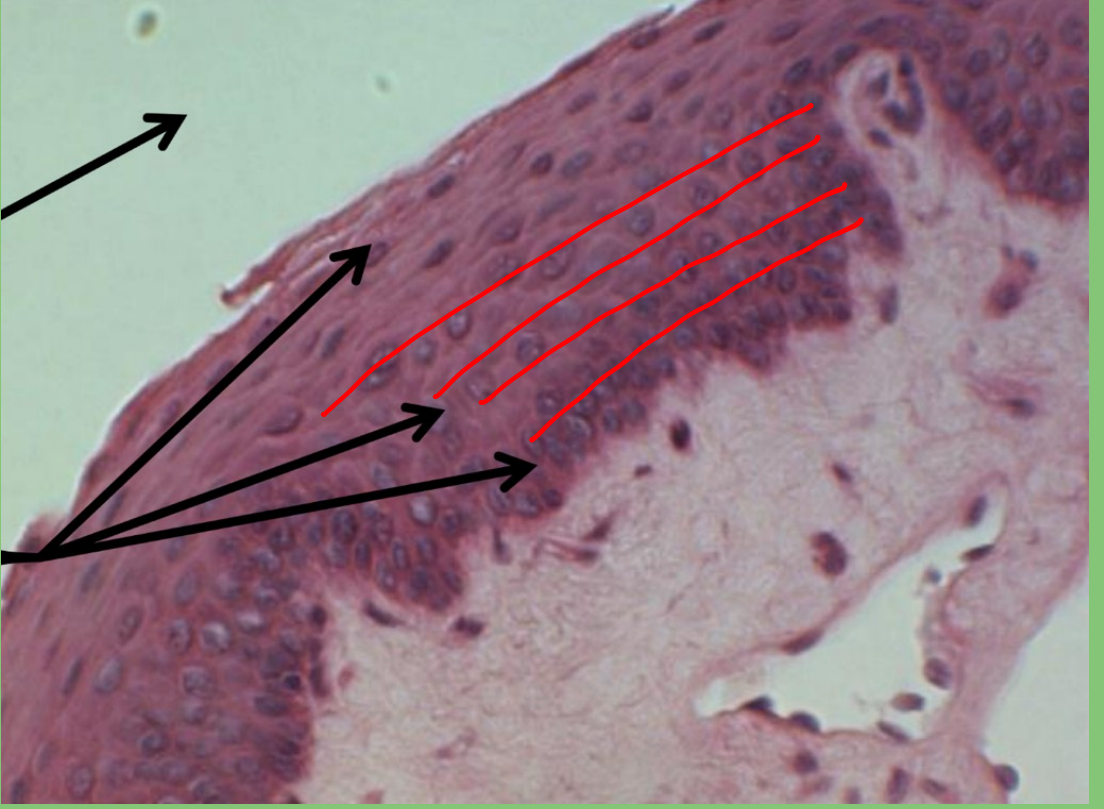
- Nuclei arranged in different layers → Multiple layers → Stratified

رسمت خط بس لسا في أنوية أنا ما خلصت نسبة كبيرة ف بعمل كمان خط هاد بكون

- Keep in mind the Pseudostratified epithelium



لح في ١٨٥٣



نشوف مثلا هاد السلايد لازم ارسم عدة خطوط على الانوية معناها
are located at different levels الانوية



2. Identify the type of cell in the simple epithelium and the type of cells in the topmost layer of the stratified epithelium

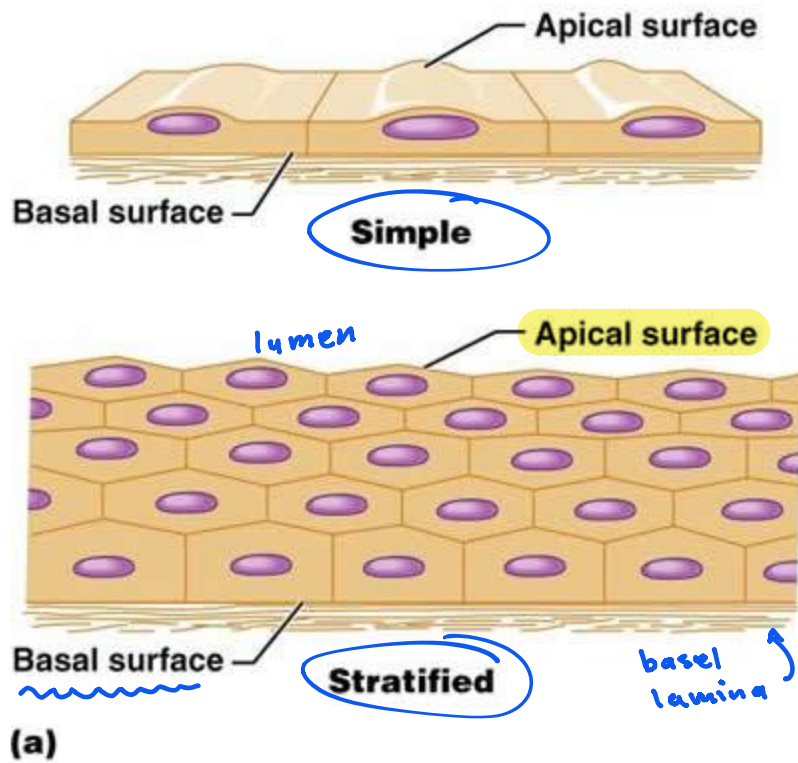
أنا بس رح اهتمّ بالطبقة top most

- *Remember:*

- The cell membrane is usually not clearly seen under the light microscope. Therefore, the shape of a cell is identified by the appearance of its nucleus.
- Topmost = Apical part = Luminal part of the epithelium is the part closest to the lumen of the organ; similarly, it's the part farthest away from the basal lamina. The Basal part is the part lying on the basement membrane.

Quick Review

رح أشوف الخلايا هون نفس الشيء



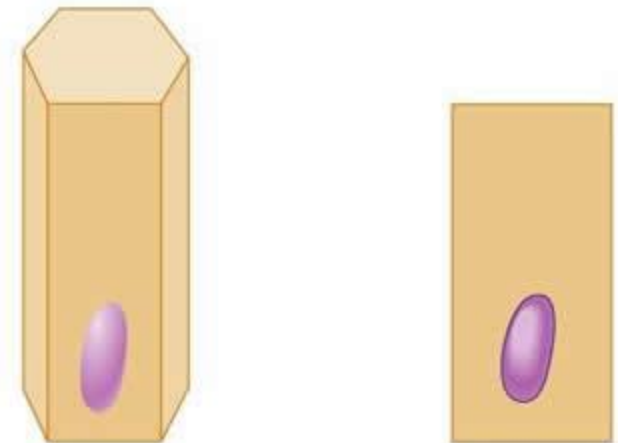
(a)



Squamous

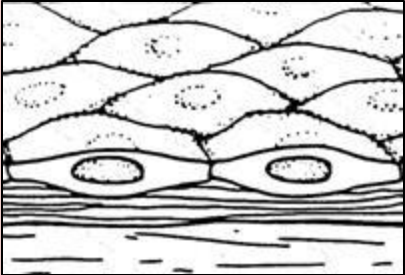




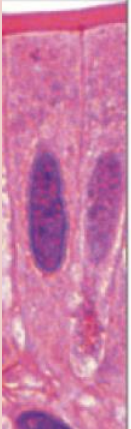


Cuboidal



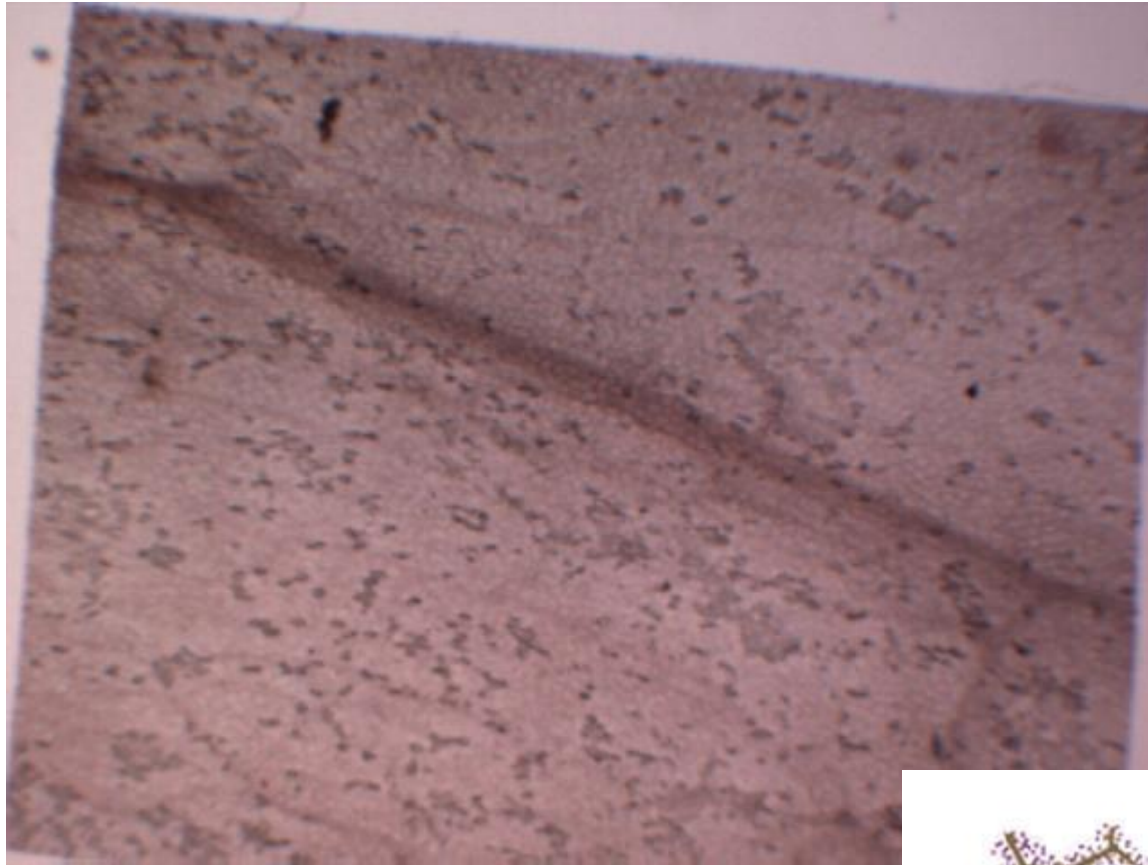
Columnar

(b)

Cell	Shape	Appearance under LM	What we look for
<p>رقيق cytoplasm</p> <p>مسطح Squamous</p>	<p>نوى بولبية nucleus دعوى جيبها</p> 		<p>Flattened nucleus with thin cytoplasm</p>
<p>مكعب Cuboidal</p> <p>الأبعاد متساوية (الطول و العرض نفس الشيء) النواة بالمركز و بتكون round</p>		<p>مكون واضح ال cell membrane طيب لو ما شففته ؟ يعتمد على شكل النواة الدائري</p> 	<p>Round nucleus</p>
<p>عمودي Columnar</p> <p>الارتفاع اكثر من العرض</p>	<p>النواة بتكون بيضاوية الشكل و موجودة في lower part of the cell</p> 		<p>Tall oval nucleus</p>

(1) Simple Squamous Epithelium

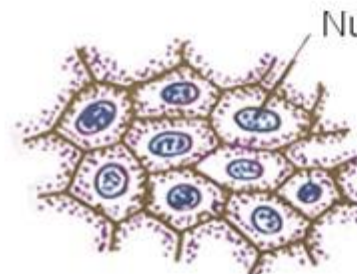
أنا ما رح اقدر اعرف هون إذا بطلع من فوق ما رح اقدر أفرق إذا هو simple أو stratified بس همه عارفين من وين أخذوها عارفين المصدر



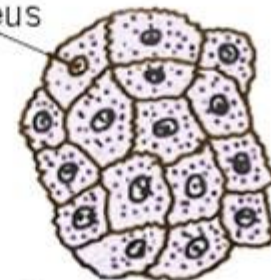
Top view of
Mesothelium

نتذكر هاي عبارة عن epithelial tissue بس بتغير اسمها حسب مكانها ف ال mesothelium بتغطي ال body cavities

Note: This is the only slide in which the epithelium is seen from a top view.



Squamous Epithelium



Simple squamous epithelium

طيب احنا قلنا لازم نعرف ال source حتى نميز إذا كان simple أو stratified

وهون كتب انه العينة انأخذت من ال Top view of mesothelium ومعناها لازم نكون عارفين إنها عبارة عن simple squamous epithelium

لازم نكون عارفين أماكن وجودها

Pericardial cavity (heart) , pleural cavity (lungs) , peritoneum (abdomen)

طيب دام لازم نكون عارفين ال source نراجع الباقيين

Endothelium tissue > capillaries

Pneumocytes > lining alveoli

نتذكر بس أنهم يساعدوا على انتقال المواد السريع عبر الأغشية اما ال mesothelium بتعطي lubricating fluid



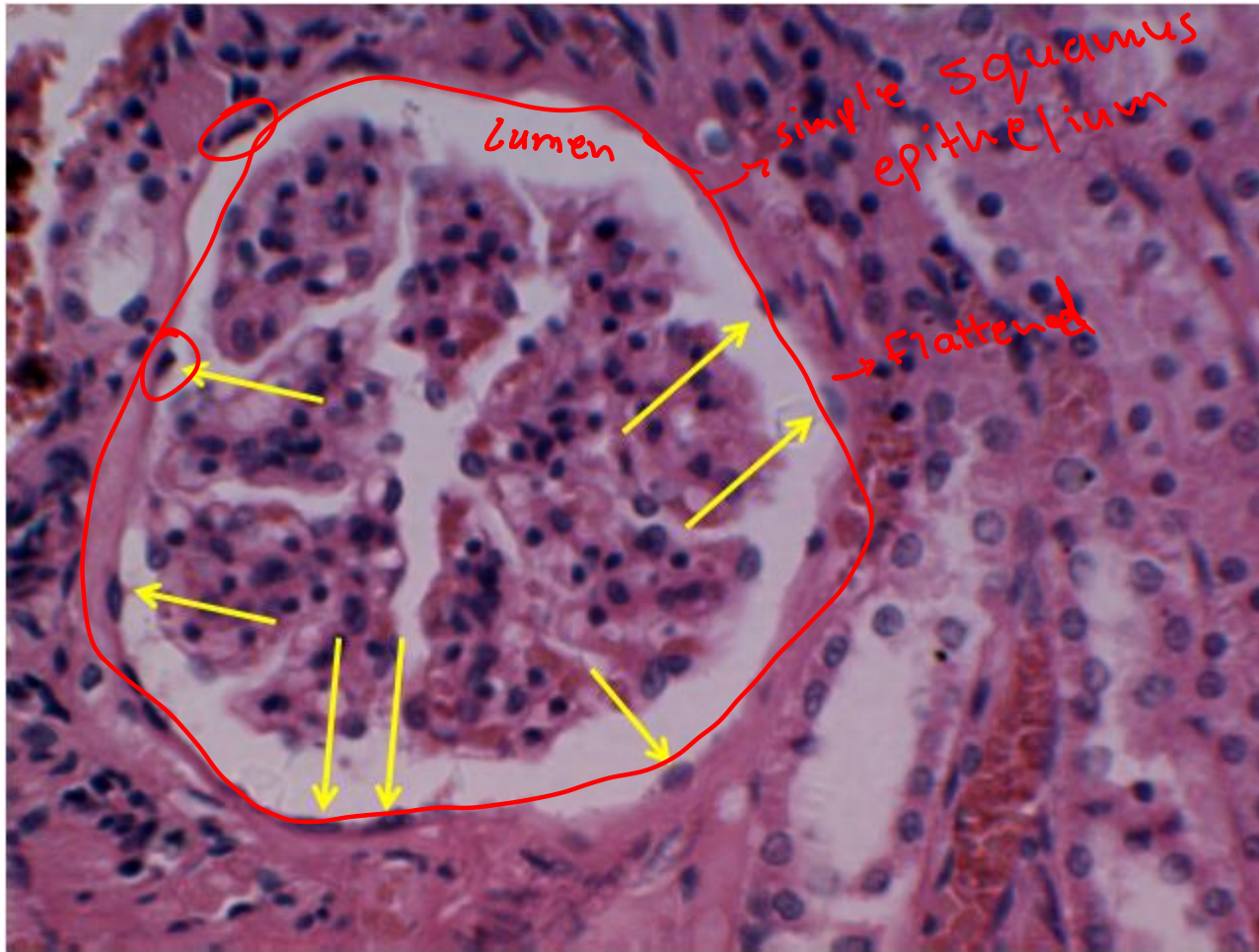
هاد السلايد الوحيد الي رح نشوفه top view الباقي رح يكون side view عشان اعرف عدد الطبقات



Artifacts
تج غير
طبيعي من الصبغات

The same slide as before but under higher magnification. The faint boundaries between the cells can be seen.

نلاحظ في خطوط رفيعة بتمثل ال cell boundaries و نلاحظ كمان الانوية قرييين من بعض فهاي ميزة لل epithelial tissue



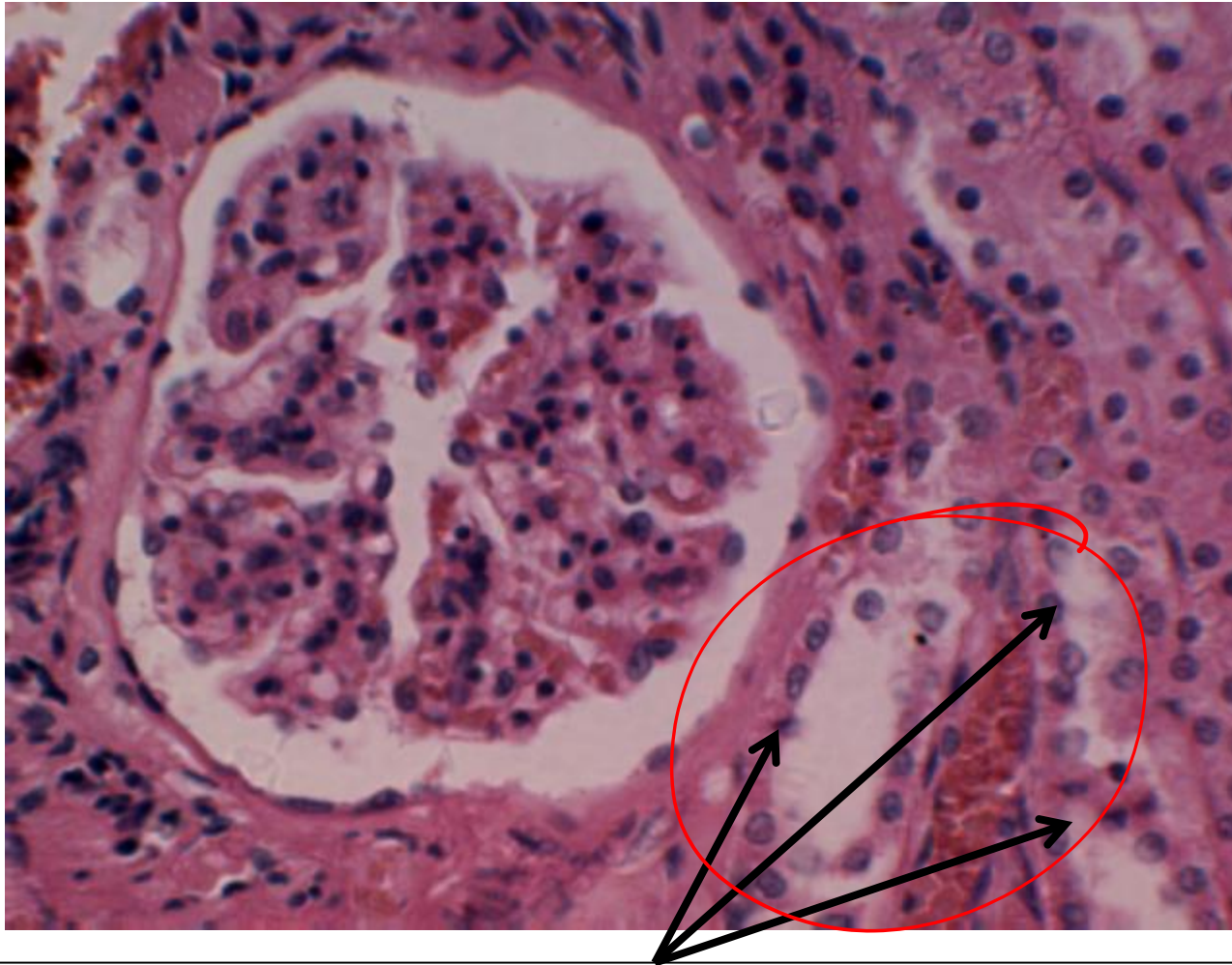
Section through kidney showing simple squamous epithelium. Arrows indicate the nuclei of the squamous cells.

هون بالحقيقة رح أشوف نوعين من ال **epithelial tissue** لأنه هون عنا **organ** بشوف فيهم أنواع مختلفة من ال **tissue**

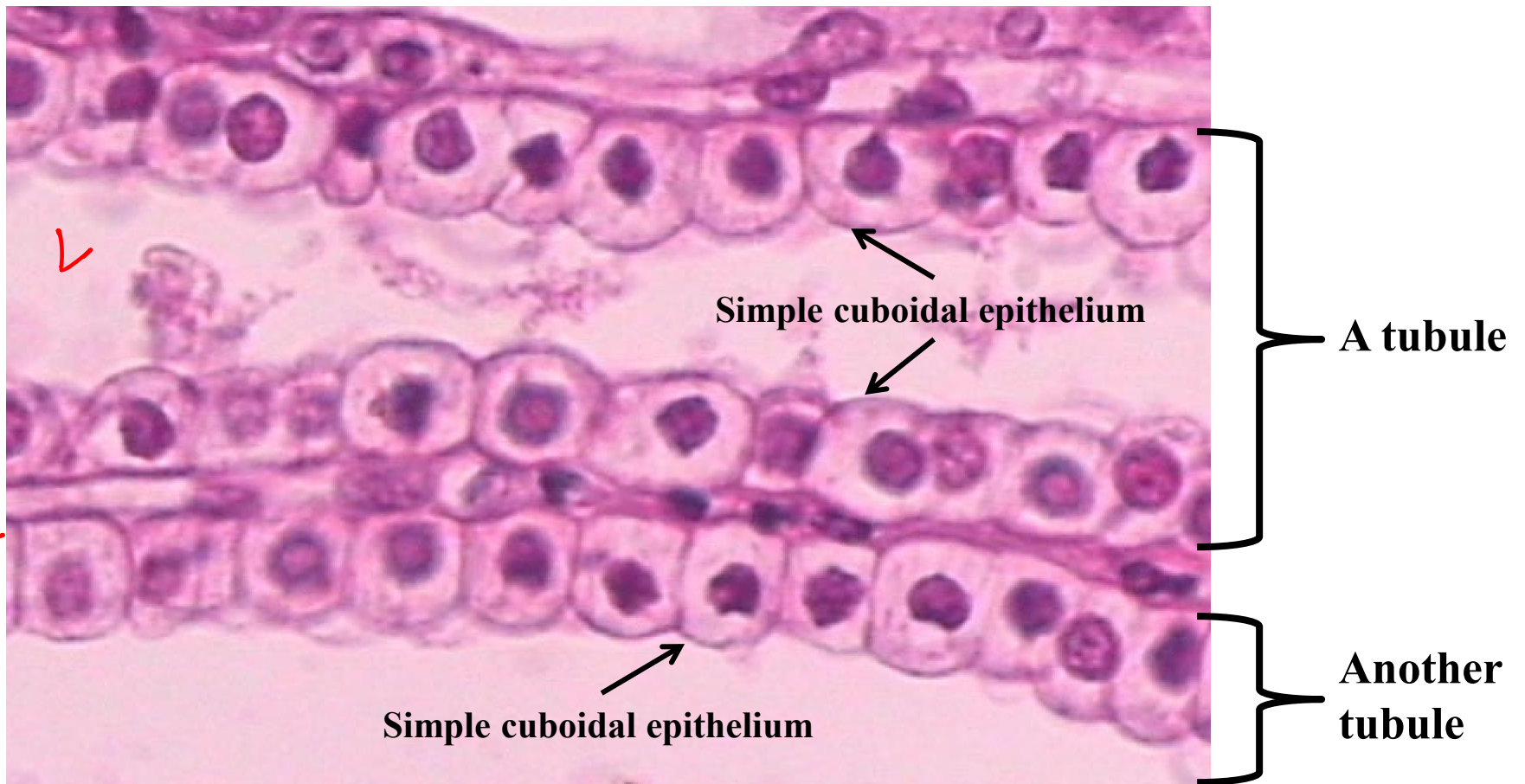
(2) Simple Cuboidal Epithelium

نتذكر أنني بلاقيهم في
renal tubules
Covering the ovary
Thyroid

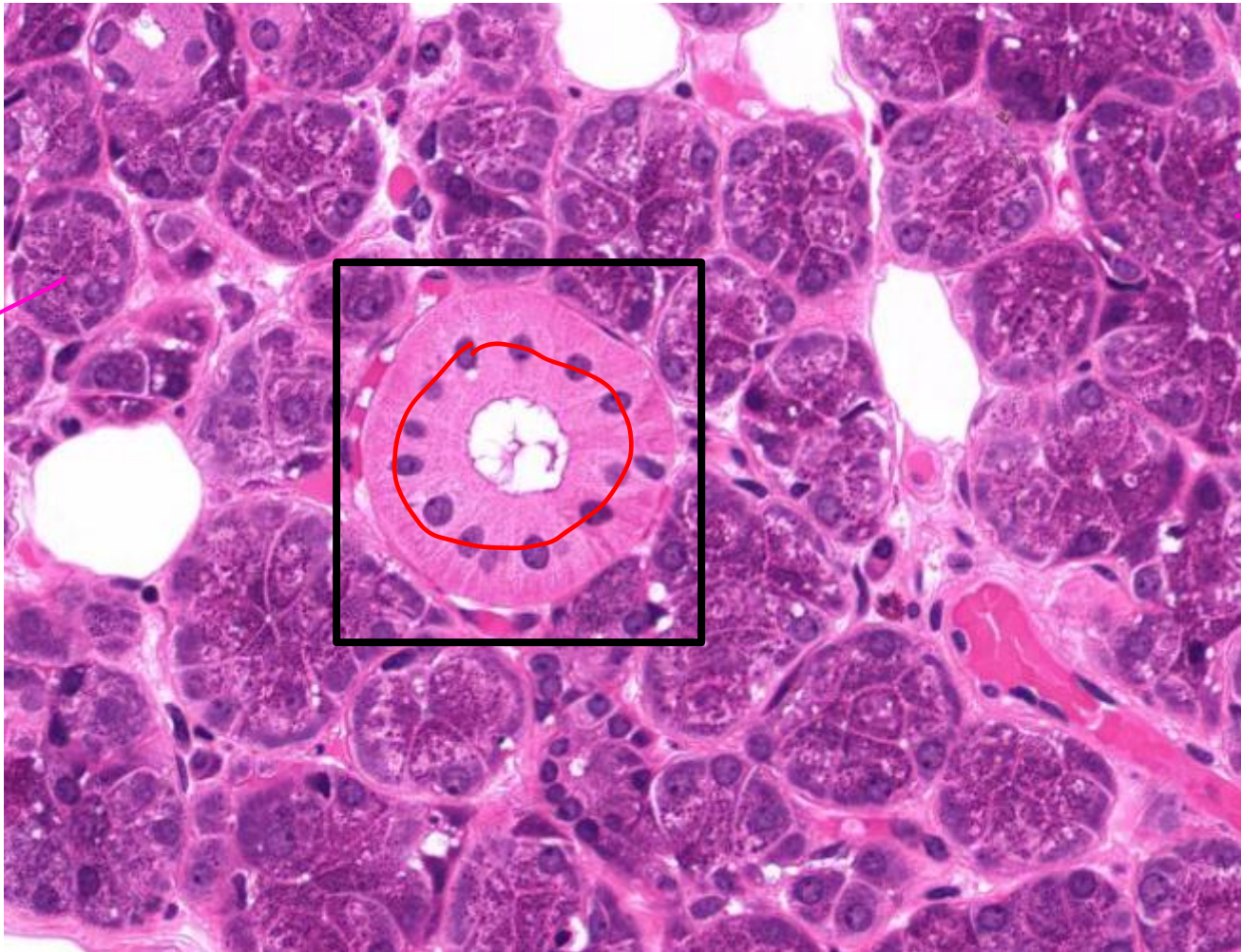
كمان ال
function
المهم هو
active
transport



Section through kidney showing simple cuboidal epithelium.
The round nuclei are those of cuboidal cells.



Simple cuboidal epithelium of the renal tubules.



خط ولف ①
round ②
nucleus

secretory
portion
of the
gland

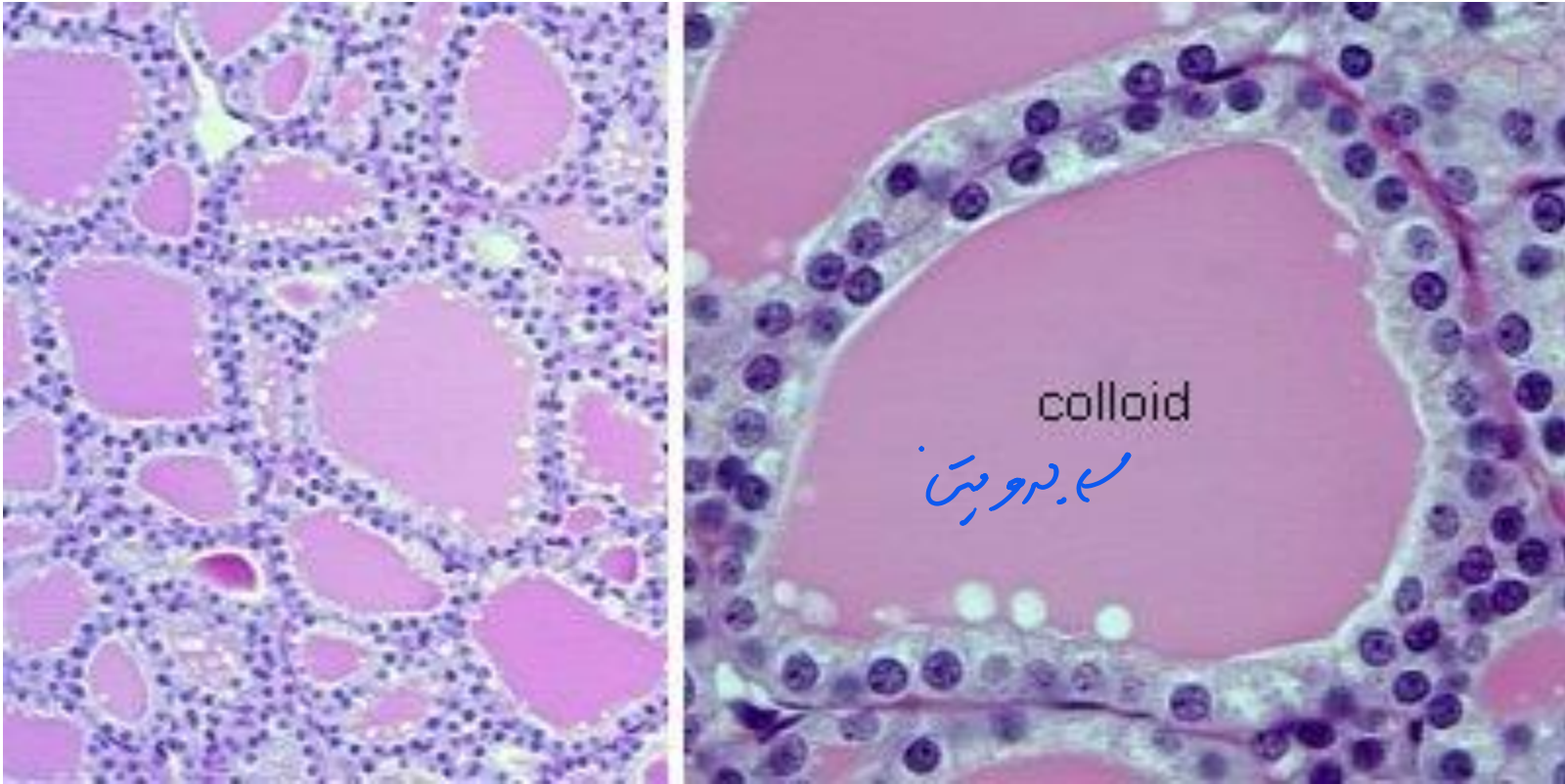
Small duct of a salivary gland lined by simple cuboidal epithelium.



فولكلر

Thyroid follicles are lined by simple cuboidal epithelium.

- 1 simple
- 2 round nuclei



Another image showing thyroid follicles. The colloid inside the follicles is made up mostly of protein.

نتذكر انو معها goblet cell و غالبا لونهم ابيض

بلاقيها في
إذا كانت

(3) Simple Columnar Epithelium

Ciliated : uterine tube

Not ciliated : GI tract



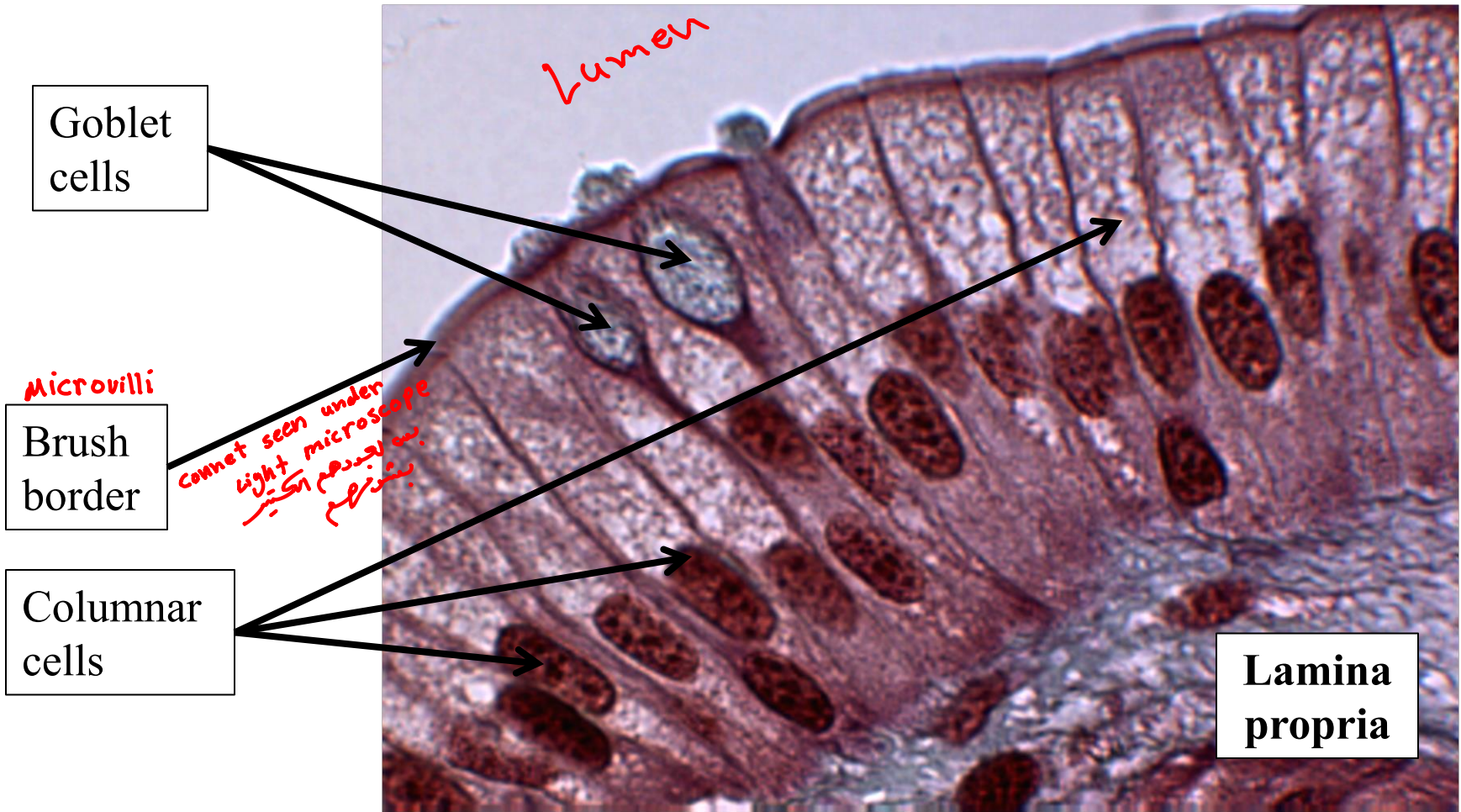
Simple columnar epithelium of the duodenum. Note the several lightly stained cells – these are Goblet cells

②
شکل
انواع
مکعب



Goblet
cell

The same slide as before but under higher magnification. The oval nuclei of the columnar cells are easily seen. Note how the several Goblet cells seen are not stained.

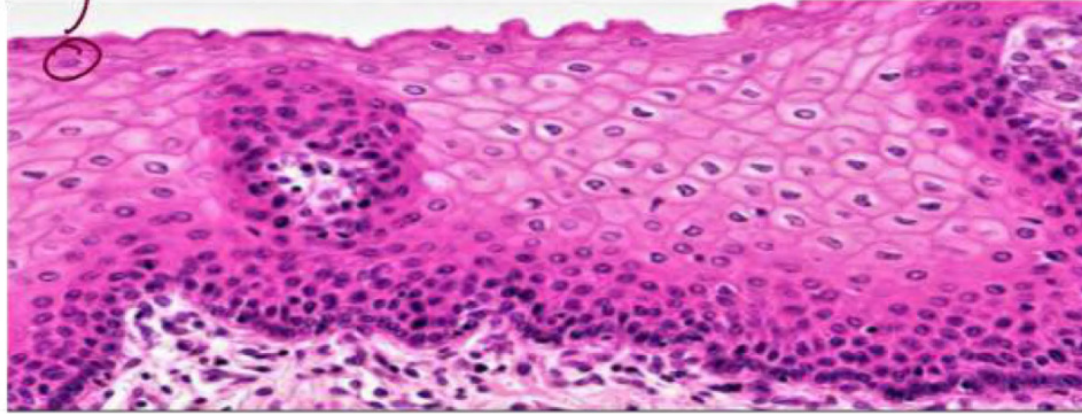


Simple columnar epithelium of the small intestine. The cell membrane and the oval nuclei of the columnar cells are clearly seen. Goblet cells are present. The brush border (formed of numerous microvilli) is at the top of the epithelium.

معلومة سريعة عن ال squamous اذا بطلع عليها رح نشوفها زي خليه كانت زي الكره وضغطت عليها بس زي ما حكينا قبل خلايا epithelium الها صفة انها الها اضلاع مش جايبين round فعشان هيك لما اطلع عليها من الاعلى رح نشوفها زي خلية النحل لكن لو طلعت عليها من الجنب رح تشوفها زي flatten مسطحة بالنسبة لل nucleus مش رح تكون flatten زي الخط لأ الفكرة انه لما تطلع من الأعلى رح تجدها round بس flattened cell على كل حال هاد بعتمد على sections حيث لو اخدت مقطع من ال skin من ناحية ال vertical رح تبين الخلايا انهم squamous بينما لو اخدت horizontal section رح تبين الخلايا زي خلايا النحل

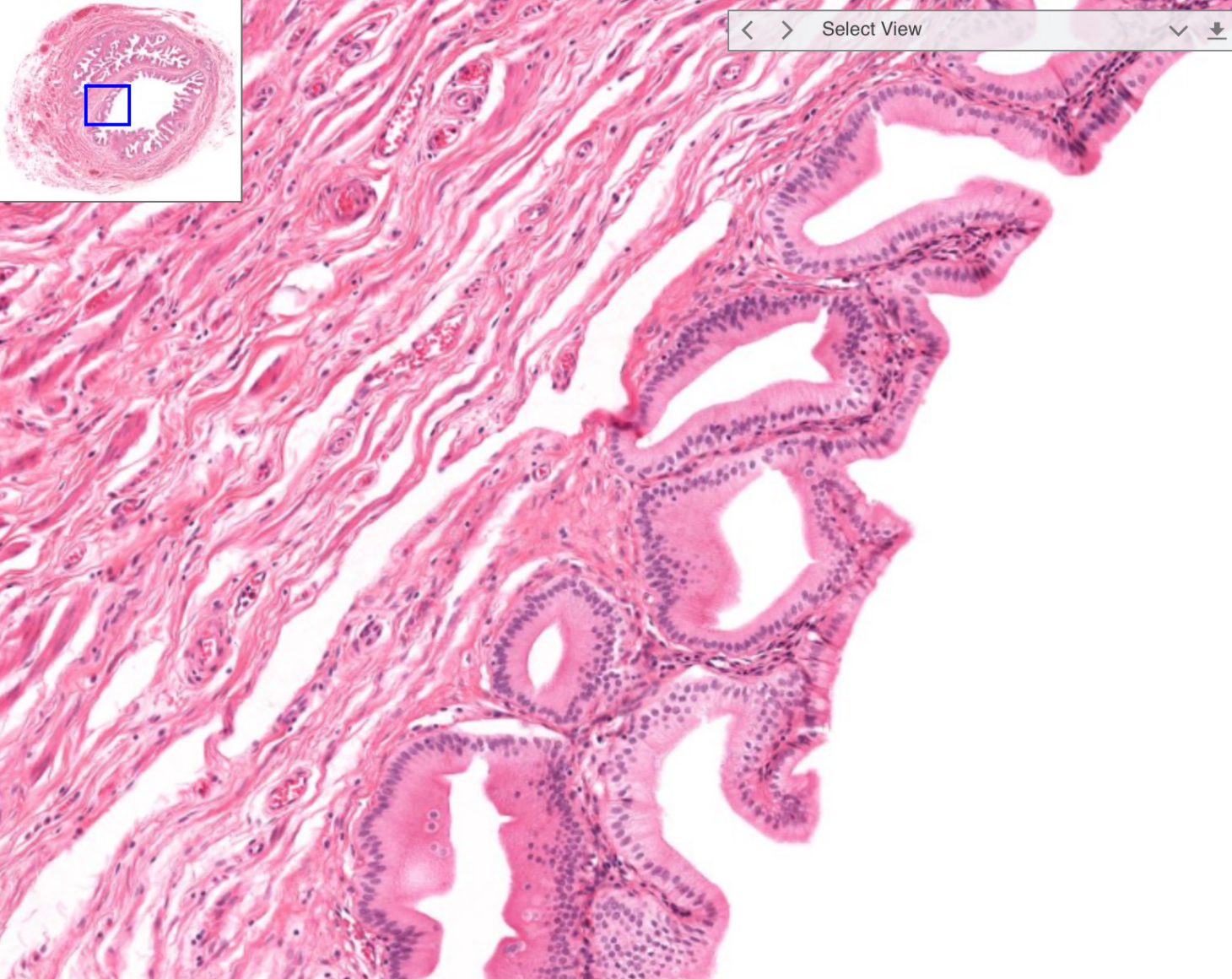
شفتوا هاد يلي انحكى رح تشوفوه باللاب

ملحوظة أخرى رح نلاحظ اشي انه بال skin كل ما اتجهنا للأعلى يعني كل ما ابتعدنا للأعلى الخلايا بتصير squamous



لاحظوا كيف شكل نucleus

بالنسبة لأنواع ال epithelium فالمطلوب منا نعرف كل نوع والامثلة يلي معنا بالاضافة الوظيفة بالنسبة لموضوع ال function من الان اذا كان simple اكيد رح يكون اما ، absorption ، exchanging material ، secretion ، طبعا هاي الوظائف عنده لانه طبقة واحدة بينما ال stratified اكيد ما رح يعمل مثلا secretion لانه عدة طبقات متى بده يلحق ينتج ويفرز لهيك رح تكون وظيفته بشكل أساسي protection

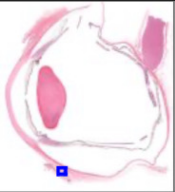


Simple Squamous Epithelium

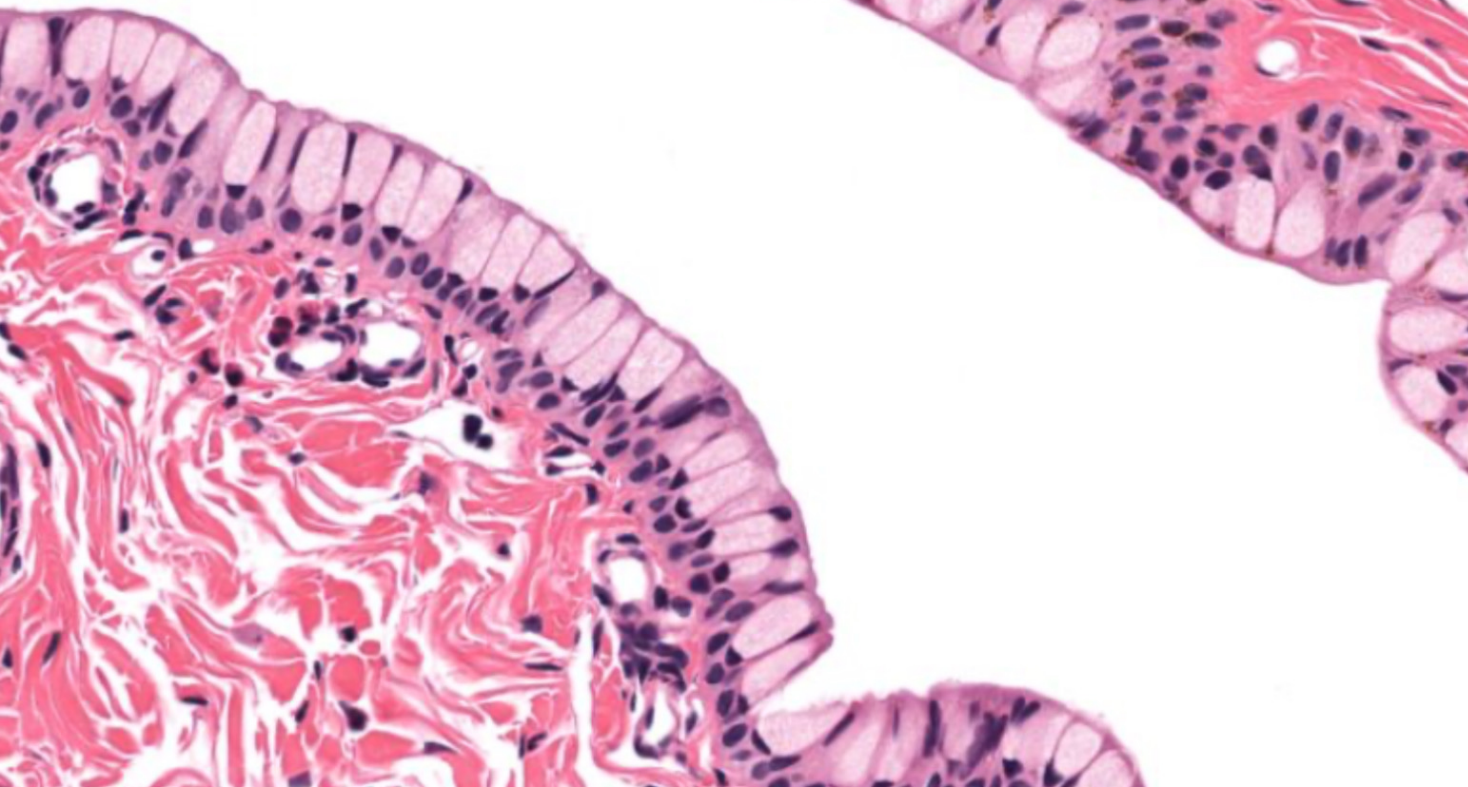
This cross section of the **bile duct** contains many blood vessels in the surrounding connective tissue.

Blood vessels are lined with a simple squamous epithelium. The only part of these cells that can be seen are their flattened nuclei.

Epithelium that line blood vessels, the heart, and lymphatic vessels is also known as an **endothelium**.



Select View



MHS 227a Eye



Simple Squamous Epithelium

The cornea is the transparent front part of the eye that covers the iris, pupil, and anterior chamber.

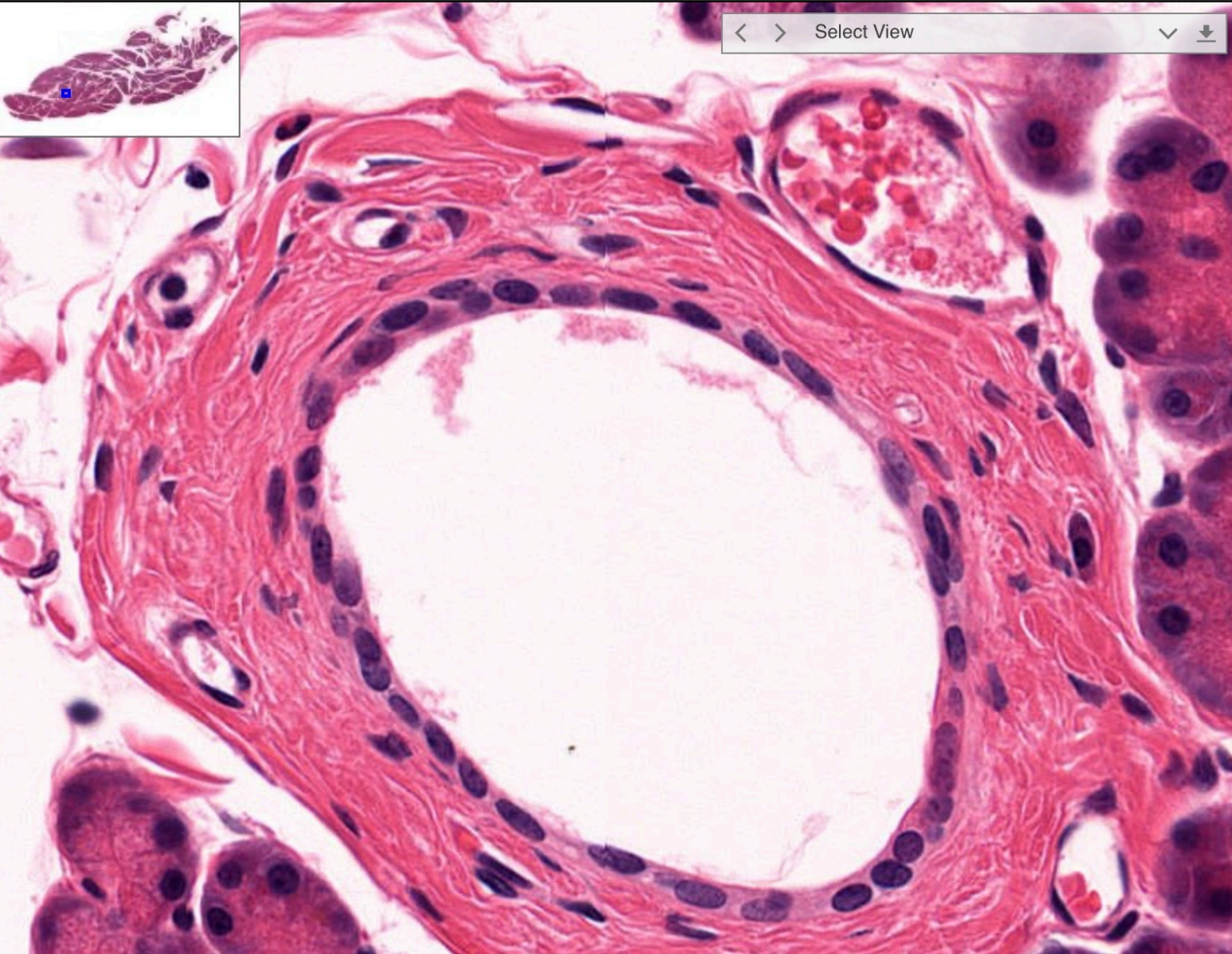
The posterior surface of the [cornea](#) is covered by a [simple squamous epithelium](#). Note the thick basement membrane supporting the epithelium.

These squamous cells are unusual in that they are thicker (approximately $5\ \mu\text{m}$) than the typical flattened squamous cells. This makes their cytoplasm easy to see in cross-section.

بس نشوفها بنحسها زي خليه النحل



Select View



MHS 211 Pancreas



Simple Cuboidal Epithelium

This pancreas section contains the profiles of many ducts.

The ducts usually have a simple cuboidal epithelium as seen in these examples:

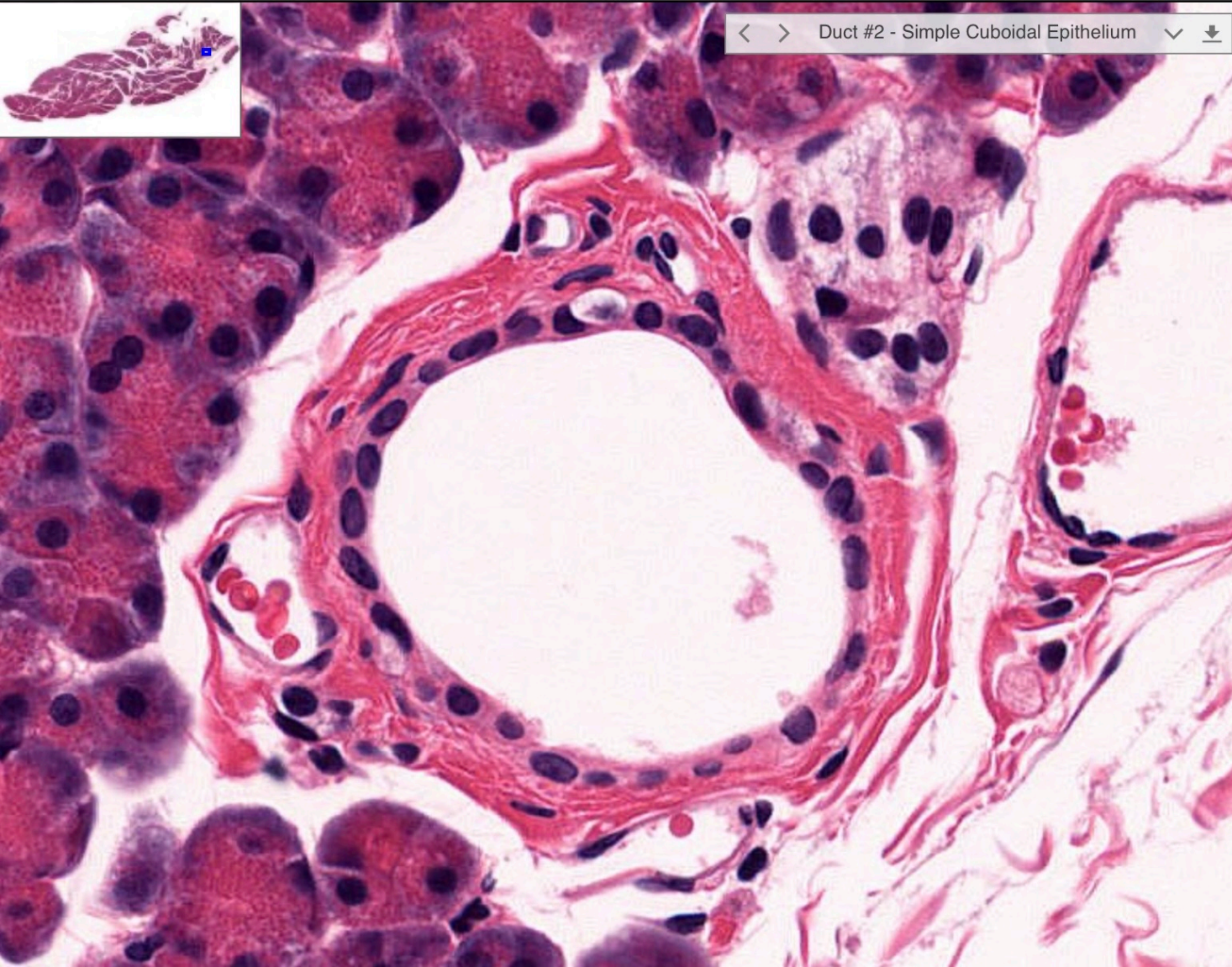
- [Duct #1](#)
- [Duct #2](#)
- [Duct #3](#)

The height of the epithelial cells can increase in [larger ducts](#). The epithelium can vary from [cuboidal](#) to [columnar](#).

The ultrastructure of these epithelial cells can be seen in [EM 074 Intralobular Duct](#) by transmission electron microscopy.



< > Duct #2 - Simple Cuboidal Epithelium ▾ ⏴



MHS 211 Pancreas



Simple Cuboidal Epithelium

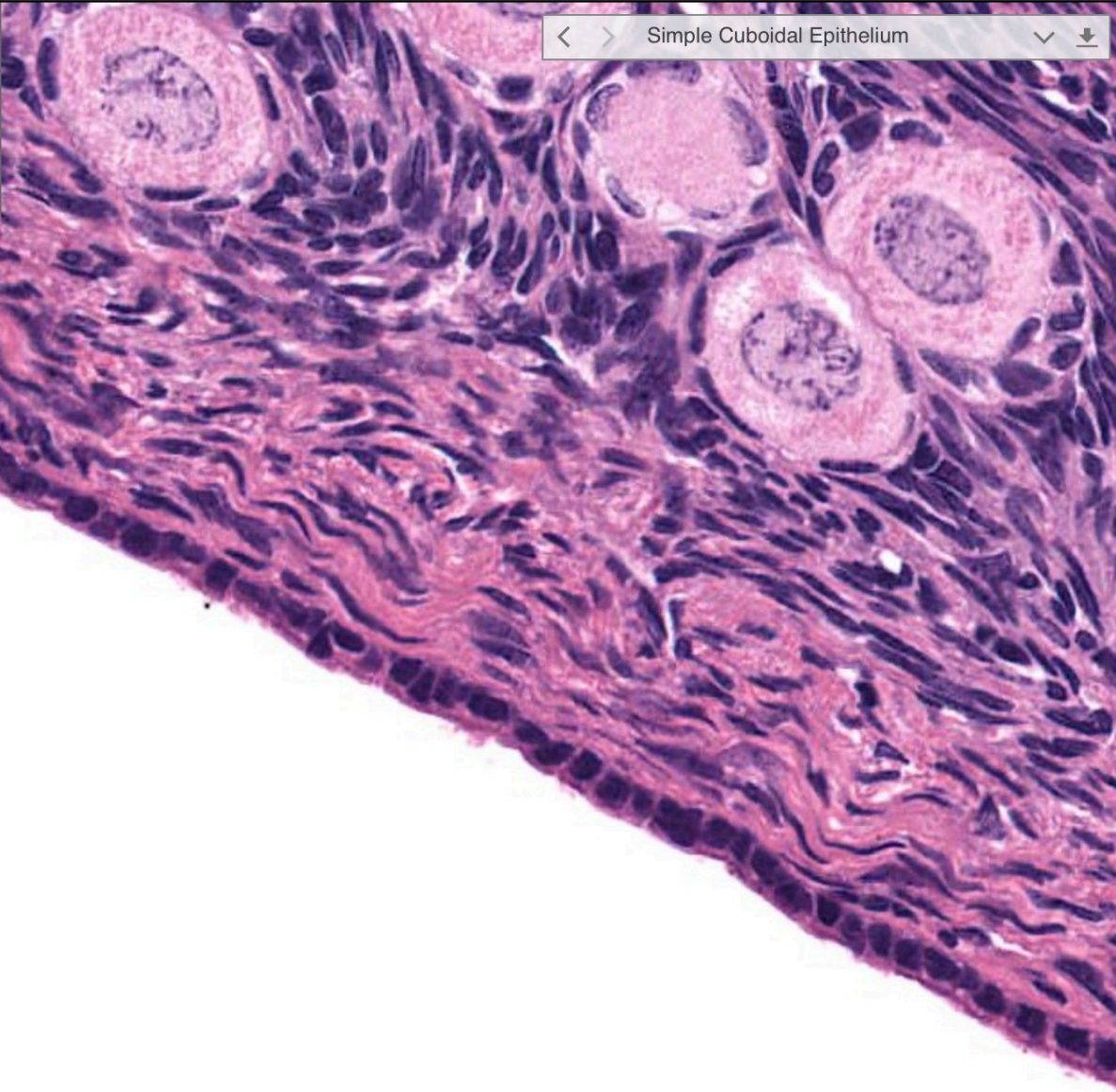
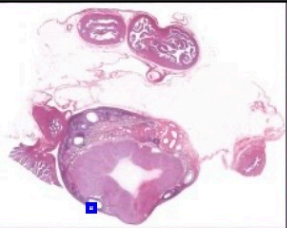
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- [Duct #1](#)
- [Duct #2](#)
- [Duct #3](#)

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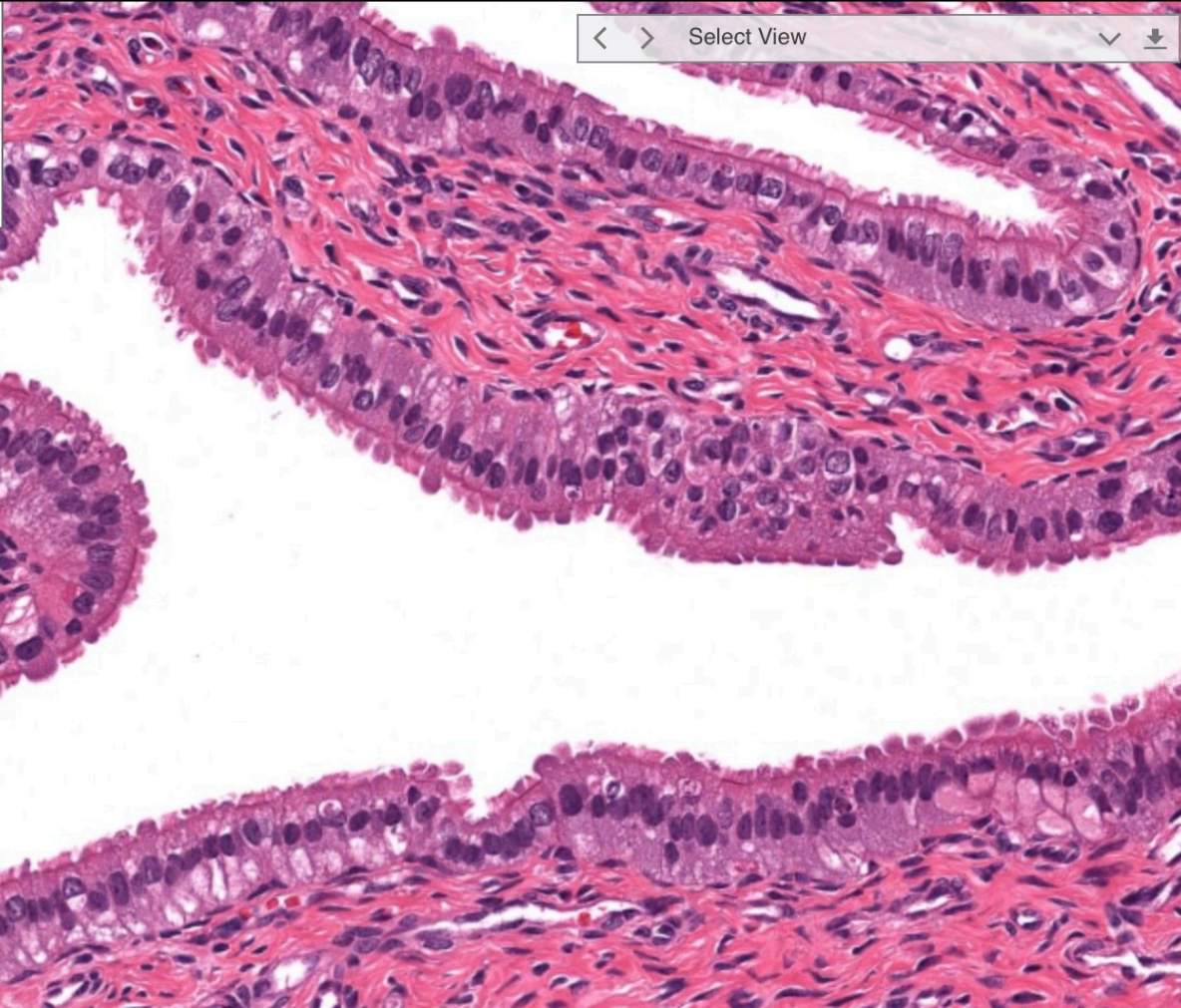
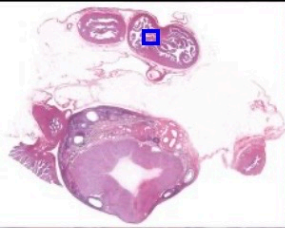
< > Simple Cuboidal Epithelium



MHS 224 Ovary and Oviduct



Simple Cuboidal Epithelium

The outer surface of the [ovary](#) is covered by a [simple cuboidal epithelium](#). There is some variation in shape of the cells ranging from low cuboidal to tall cuboidal.



< > Select View  

MHS 224 Ovary and Oviduct



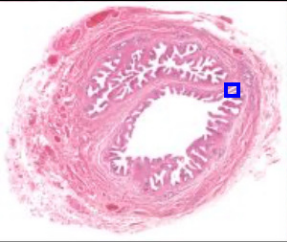
Simple Columnar Epithelium

The lumen of the [oviduct](#) is lined by a [simple columnar epithelium](#).

This epithelium contains [two types of cells](#) - some have cilia while others are dome shaped. In the cells with cilia, the dark line underneath them is due to the presence of basal bodies.

These two types of cells are easily distinguished on the surface of the epithelium in [EM 277 Oviduct](#) by scanning electron microscopy.

انتبهوا انه النواة بتكون بالآخر



Simple Columnar Epithelium - Tang...

MHS 261 Common Bile Duct



Simple Columnar Epithelium

The lumen of [bile duct](#) has many folds lined with a simple columnar epithelium.

This epithelium is relatively uniform in height, but appears otherwise depending on the angle the section cut through it.

- Where the section is cut [orthogonal](#) to the surface of the epithelium, a single row of cells is seen.
- Where the section is cut [tangential](#) to the surface of the epithelium, it passes through adjacent cells resulting in multiple nuclei and extra tall cells. This can be easily confused with a pseudostratified columnar epithelium.

50 μ m



< > Simple Columnar Epithelium - Cros...

MHS 261 Common Bile Duct



Simple Columnar Epithelium

The lumen of **bile duct** has many folds lined with a simple columnar epithelium.

This epithelium is relatively uniform in height, but appears otherwise depending on the angle the section cut through it.

- Where the section is cut **orthogonal** to the surface of the epithelium, a single row of cells is seen.
- Where the section is cut **tangential** to the surface of the epithelium, it passes through adjacent cells resulting in multiple nuclei and extra tall cells. This can be easily confused with a pseudostratified columnar epithelium.

<https://youtu.be/reoEVXvoUml?si=Tgl3T2RWDwWZONYw>

شوفوا الجزء الأول من الفيديو حتى تتأكدوا من التمييز و
كملوا باقي الأجزاء لما تدرسوا باقي اللابات 🍷💖

50 μ m

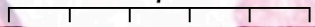
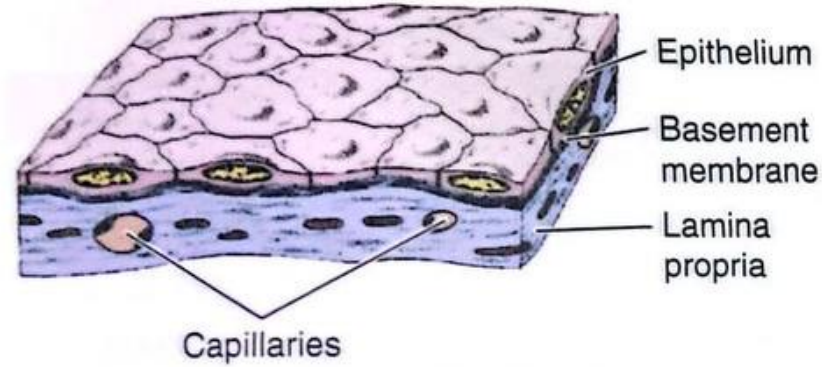
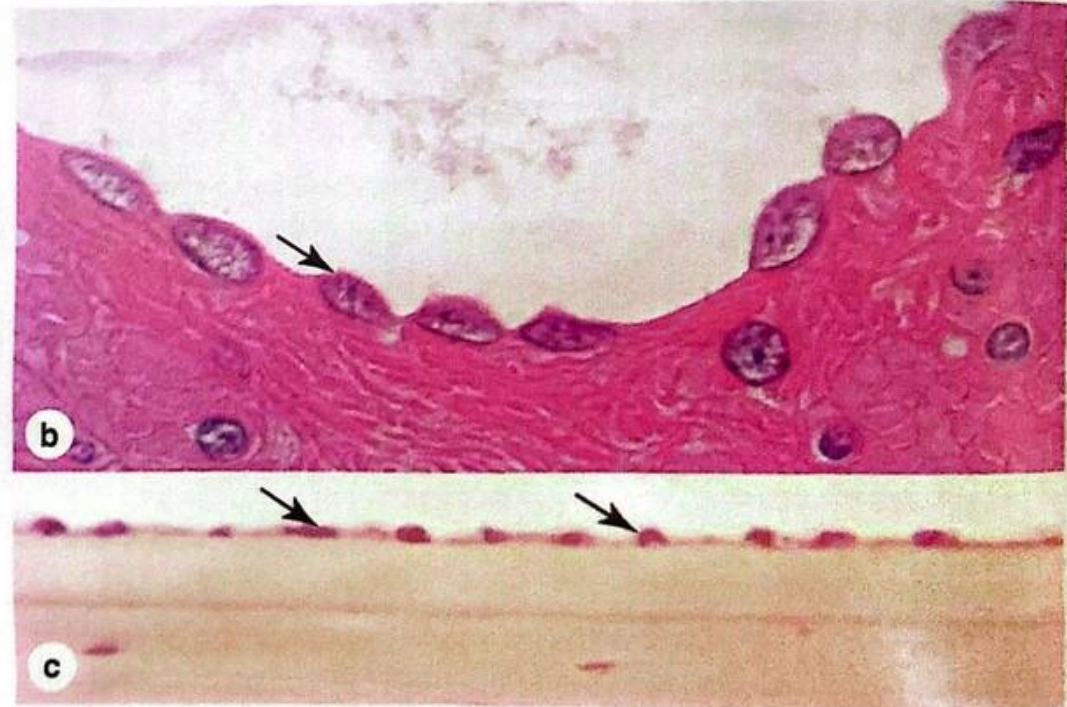
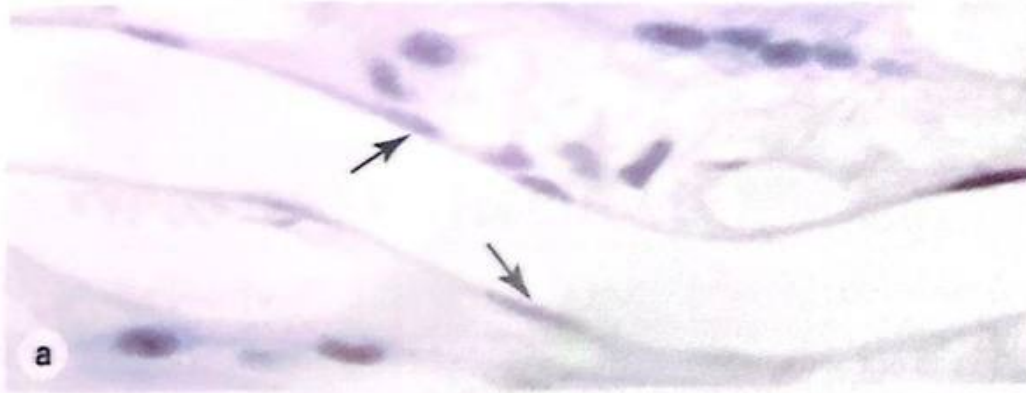


FIGURE 4-12 Simple squamous epithelium.



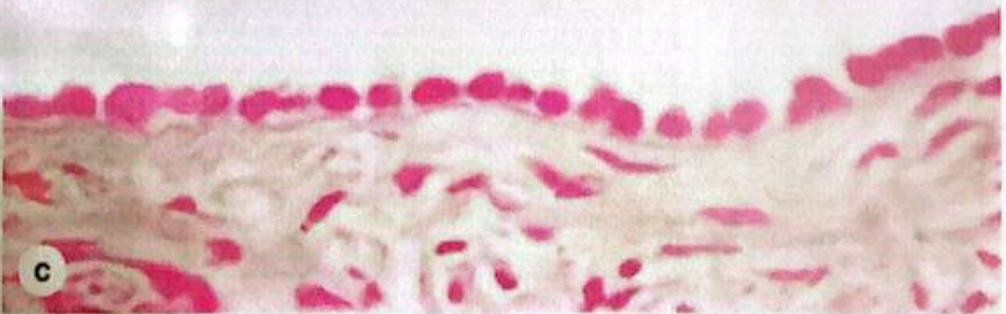
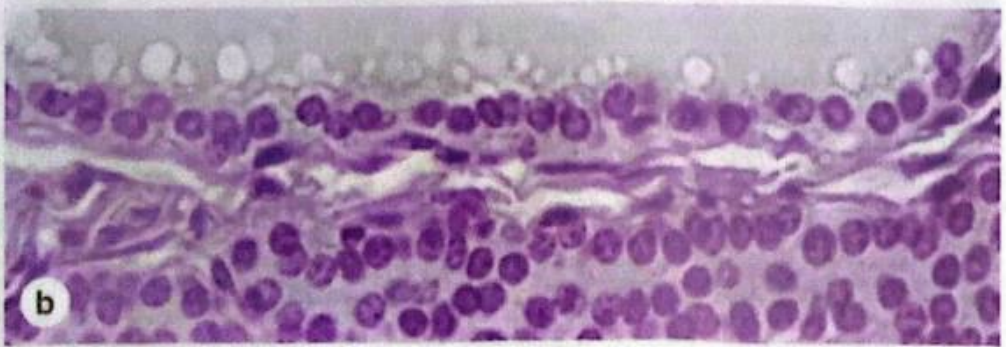
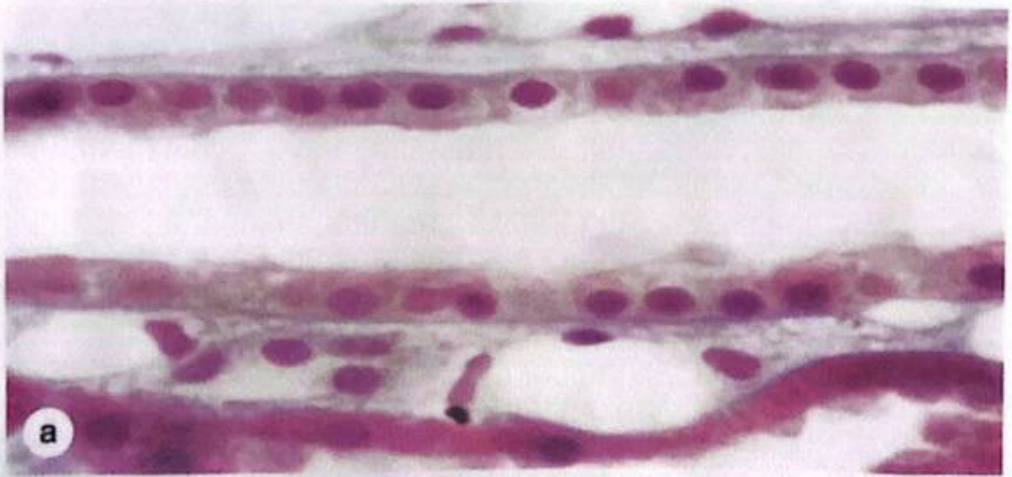
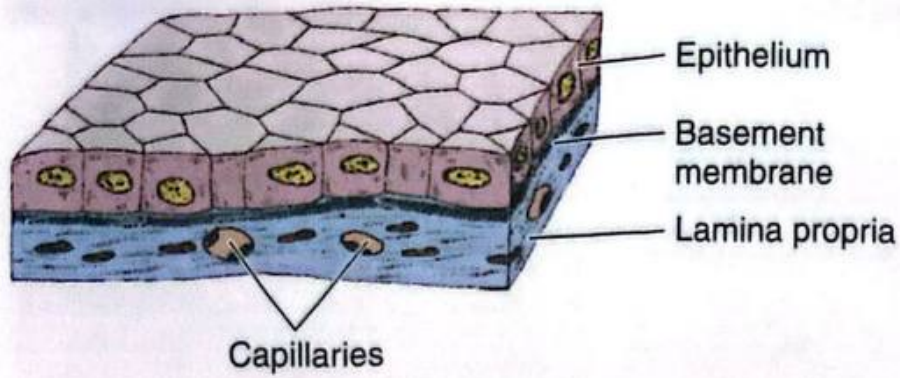
صور من الكتاب



This is a single layer of thin cells, in which the **cell nuclei** (arrows) are the thickest and most visible structures. Simple epithelia are typically specialized as lining of vessels and cavities, where they regulate passage of substances into the underlying tissue. The thin

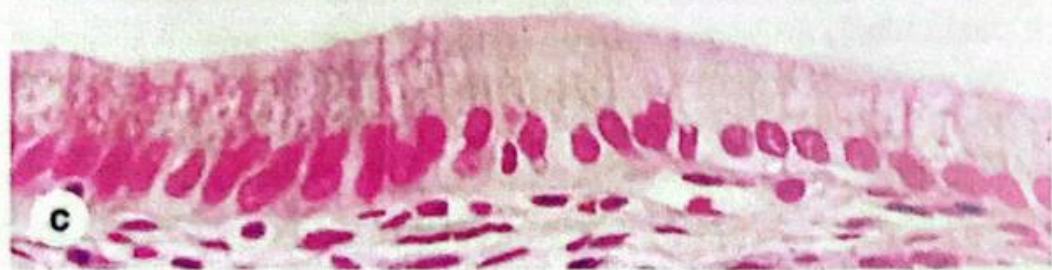
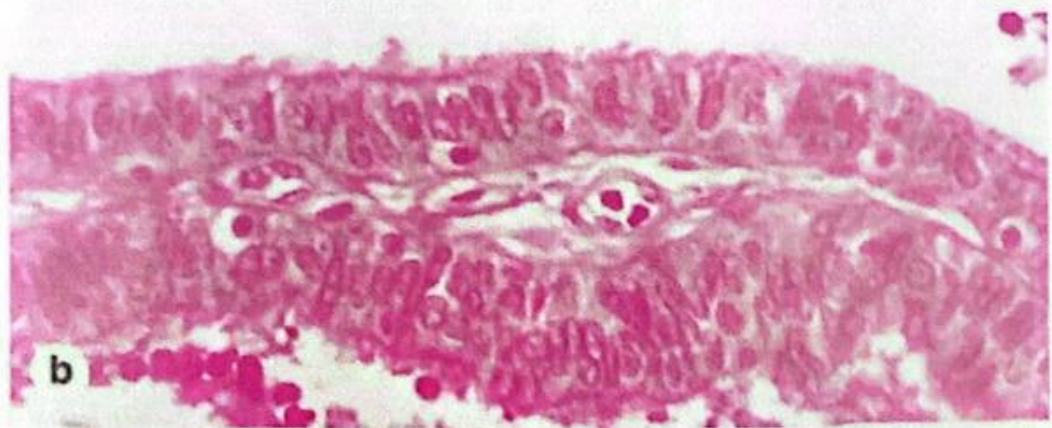
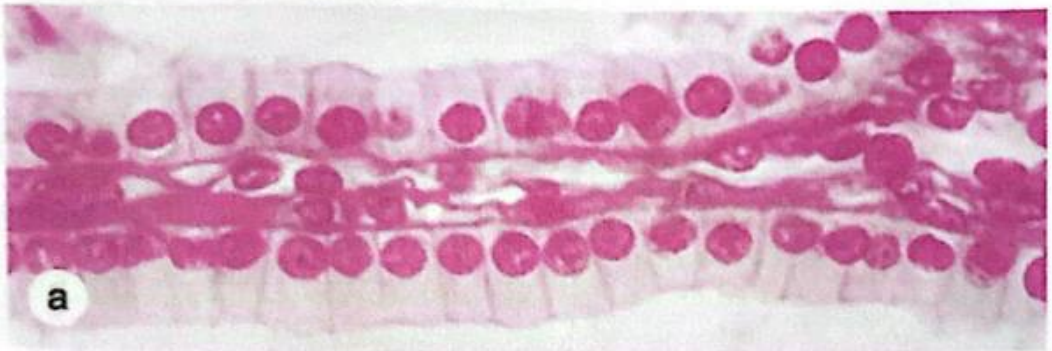
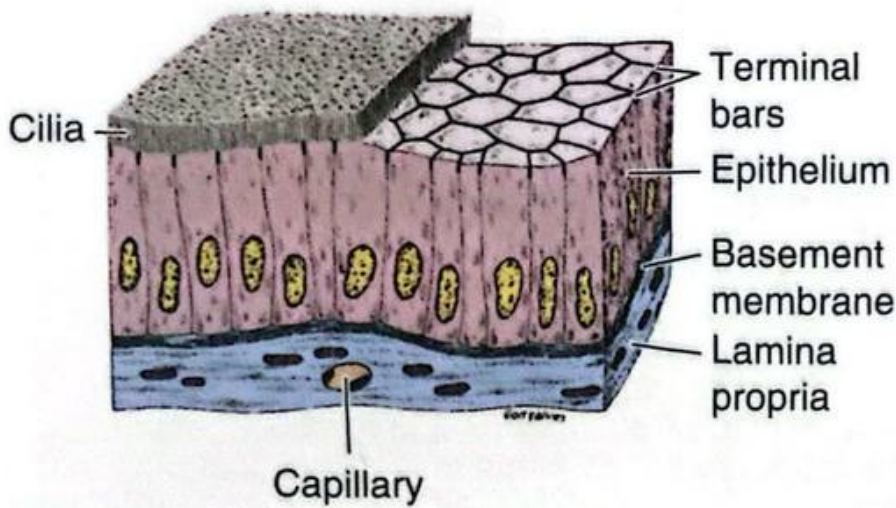
cells often exhibit transcytosis. Examples shown here are those lining the thin renal loops of Henle (a), covering the outer wall of the intestine (b), and lining the inner surface of the cornea (c). (a, c X400; b X600; H&E)

FIGURE 4-13 Simple cuboidal epithelium.



Cells here are roughly as tall as they are wide. Their greater thickness allows cytoplasm to be rich in mitochondria and other organelles for a high level of active transport across the epithelium and other functions. Examples shown here are from a renal collecting tubule (a), a large thyroid follicle (b), and the thick mesothelium covering an ovary (c). (All X400; H&E)

FIGURE 4-14 Simple columnar epithelium.



Cells here are always taller than they are wide, with apical cilia or microvilli, and are often specialized for absorption. Complexes of tight and adherent junctions, sometimes called "terminal bars" in light microscopic images, are present at the apical ends of cells. The examples shown here are from a renal collecting duct (a), the oviduct lining, with both secretory and ciliated cells (b), and the lining of the gallbladder (c). (All X400; H&E)