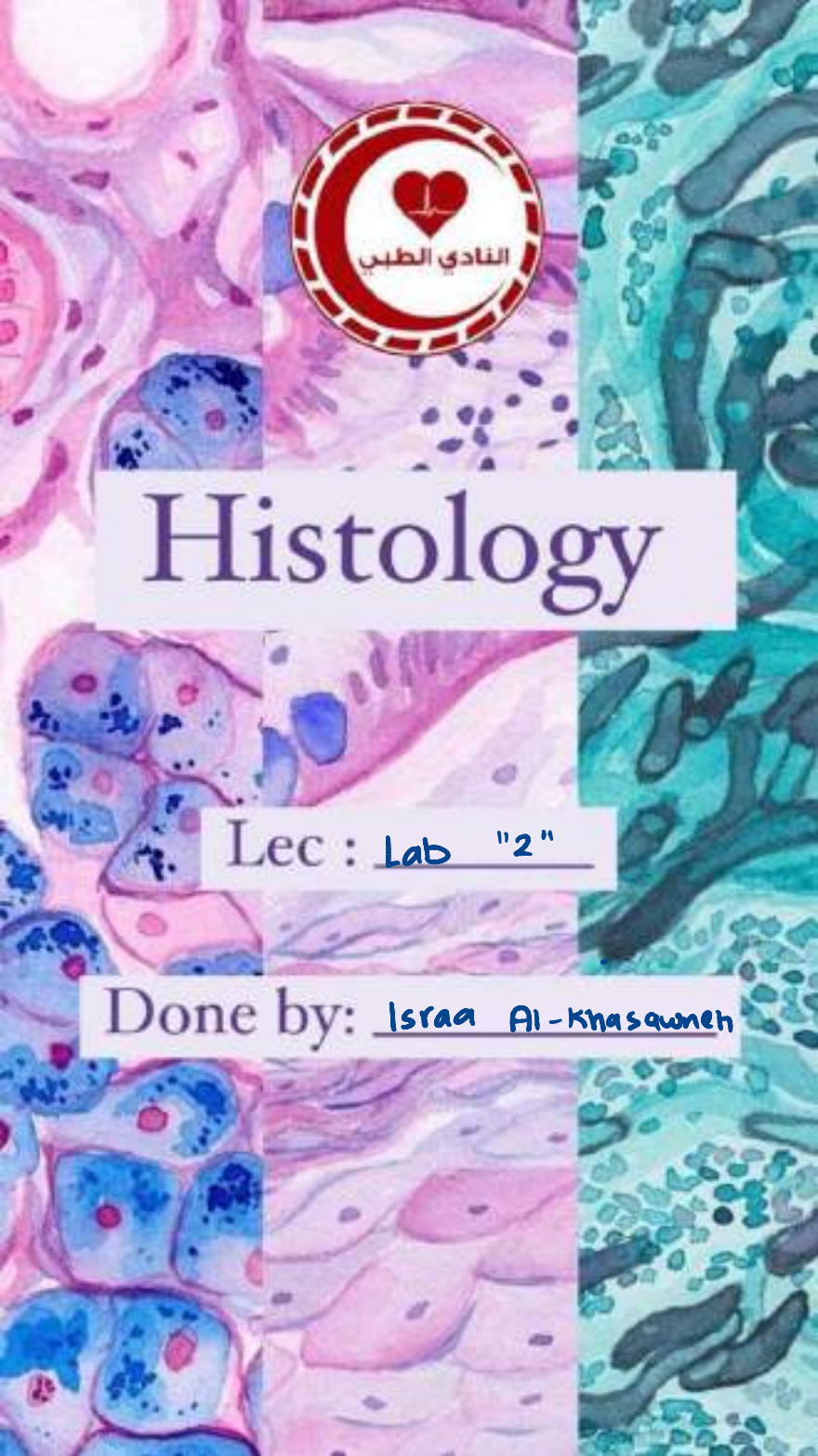


Histology

Lec : Lab "2"

Done by: Israa Al-Khasawneh

* I can use combination of these stains

Stain	Characteristic	Color

اكثر صبغة مستخدمة بالهستولوجي
صبغة مزدوجة
Hemtoxylin -eosin
	Hematoxylin is a basic dye that binds to negatively charged structures:
	• DNA in nucleus
	• RNA in cytoplasm
	  • Rough endoplasmic reticulum
	  • Ribosomes
	it will stain these various structures
		لون غامق
		Blue / violet

	Eosin is an acidic dye that binds to positively charged structures: • Cell membrane • Mitochondria • Actin • Collagen • Red blood cells الي بميز هذول الـ structures احتوائهم على positively charged molecules ex: proteins	لون فاتح Pink / red

* المادة المخاطية تختفي أثناء طرق التحضير الاعتيادية فال goblet cell تظهر باللون الأبيض white in color بعض الاحيان انابي الظهر لكنه
مادة الـ mucin بهاي الحالة ما بتخدم الصبغة الاعتيادية واغا أستخدم الـ PAS stain

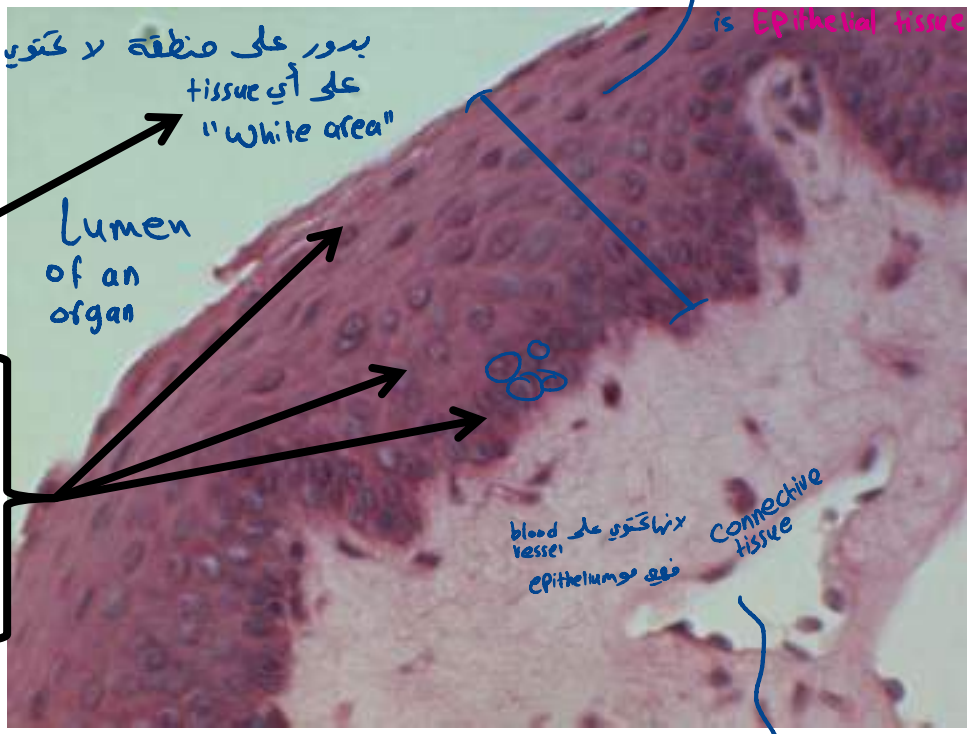
Stain	Characteristic	Color
Gomori's stain	Stains elastic fibers	Dark violet
Silver	Silver nitrate used to stain: • Reticular fibers → elastic fibers, collagen fibers • Neurofilaments: intermediate filaments that are found in the nerve cells → neurons	Black
Periodic Acid Schiff (PAS)	Used to stain structures with high amount of sugar groups: • Mucin (goblet cells) — mucus تفرز مادة • Basement membrane اذا كان عندي structure يحتوي على sugar groups بكميات كبيرة ممكن نستخدم صبغة الـ PAS ونستخدم المادة الكيماوية الرئيسية في المخاط mucus	Dark red
Osmium tetraoxide	• Used to stain lipids بعض تختفي أثناء التحضير فالخلايا التي تحتوي على lipids تظهر باللون الأبيض تأثنا empty * لو بدي أشوف الـ lipid بستخدم osmium tetra oxide الي رح تلطخ الـ lipid باللون الأسود	Black

Part 1: Epithelial Tissue

معظم الأوقات under the microscope, most of the cases, I don't see the cell membranes, therefor I can't identify the cells, so I depend on the nuclei ← closely packed to each other / located at different layers

- To identify epithelial tissue in a slide, keep in mind the following points: مميزات Epithelial tissue

1. Epithelial tissues line cavities or cover organs → A white area should be adjacent to the epithelium
2. Epithelial cells are arranged in sheets (layers)
3. Epithelial cells are closely packed
4. No blood vessels are seen in the epithelium



Hematoxylin اكلا يا عادة تنطبخ بصبغة فكل structure لونه بنفسجي حبارة حتة أنوية فلذا
⇐ they are closely packed to each other + they are found in layers

بـ simple epithelium المفروض يكون كل nuclei في نفس الطبقة
ليش تحت المجهر بشوف بعض nuclei صاعدة للأعلى أو نازلة للأسفل؟ artifact
- in the living person all the cells are on the same layer exactly
this is an artifact - تحريك السلايد وممكن يتمزق فتظهر بعض الخلايا اعلى او اسفل الخط

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

to know if the nuclei located in the same layer or different layer : nuclei بركز بموضع

simple / stratified

It isn't necessary that all the nuclei will fall on the same line
But, Do Most of the nuclei موجودة على الخط؟ أو لا؟ → yes simple epithelium

Btw this is a goblet cell

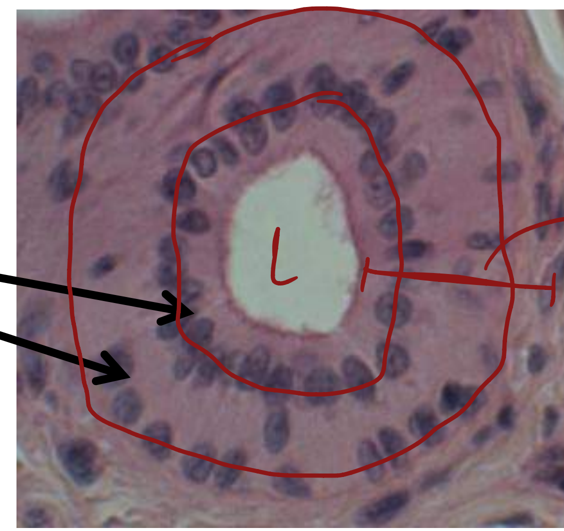
1. Identify the number of layers

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

If most the nuclei are on the same line → simple epithelium

- Nuclei arranged in different layers → Multiple layers → Stratified

→ the nuclei are located in 2 different lines
يعني أكثر من 2



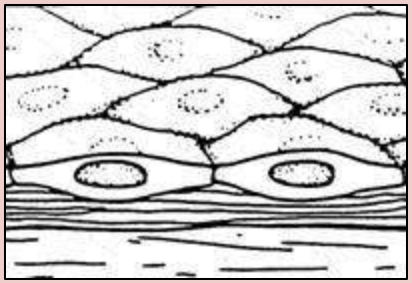
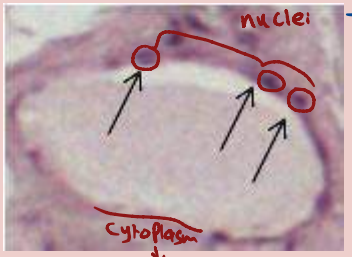
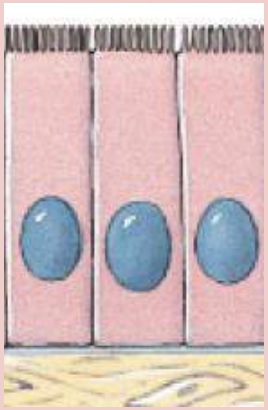
- ***Keep in mind the Pseudostratified epithelium***

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

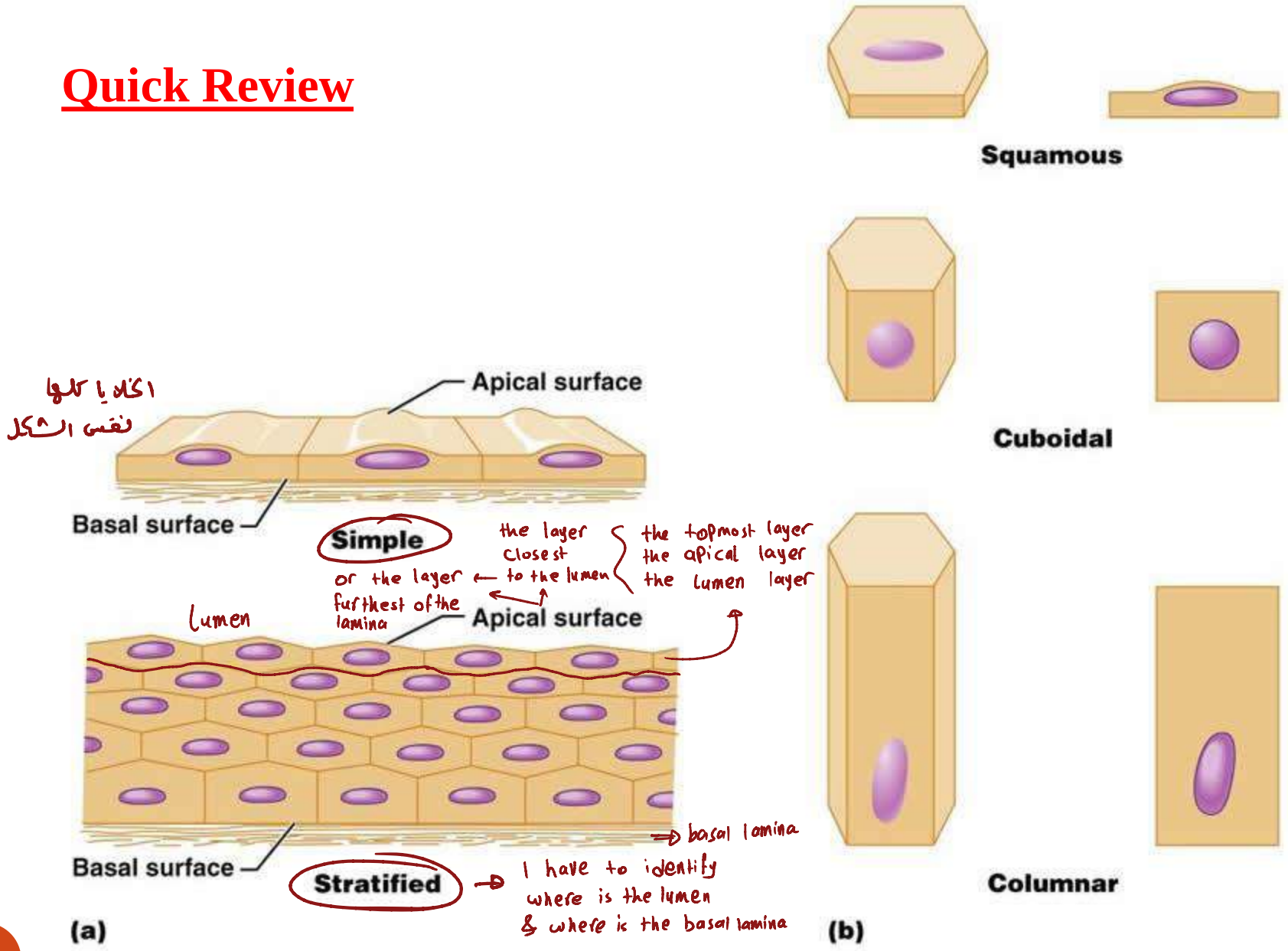
In stratified epithelium I only care about the topmost layer

- *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.

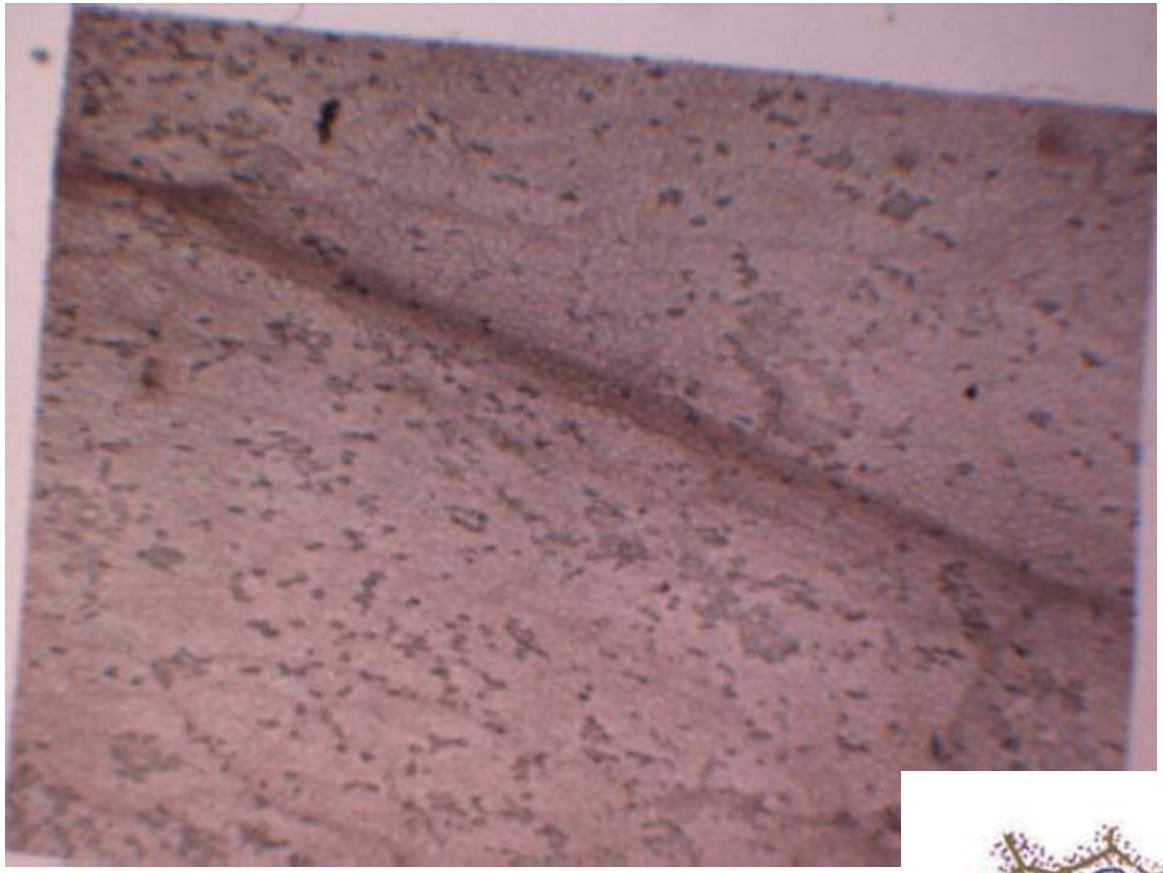
Cell	Shape	Appearance under LM	What we look for
Squamous thin layers with thin cytoplasm & a bulging nucleus		لونها غامق لونها تاخذ صبغة hematoxylin القاعدية  يكون لونه أحمر لأنه يأخذ صبغة eosin الحامضية	Flattened nucleus with thin cytoplasm
 the dimensions of it are almost equal Cuboidal height & Width are almost equal like a square		Cytoplasm is red 	Round nucleus dark centrally located & round nucleus
 عامودية height > width Columnar		 لونها غامق	Tall oval nucleus in the lower part of the cell

Quick Review

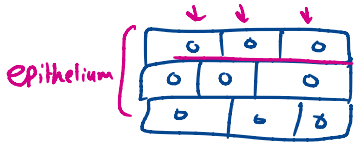


(1) Simple Squamous Epithelium

↳ we already know the source of the sample.



What is the meaning of top view?
I'm looking at the epithelium from this direction

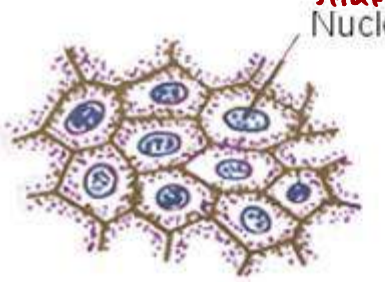


Top view of Mesothelium → simple squamous epithelium

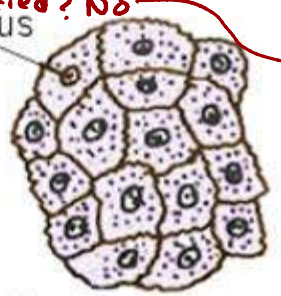
I'm actually going to see the surface of the cells only.

if it was stratified epithelium I will see the surface of the cells in the topmost layer.

If I look at the epithelium from the top can I identify if this epithelium is simple or stratified? No



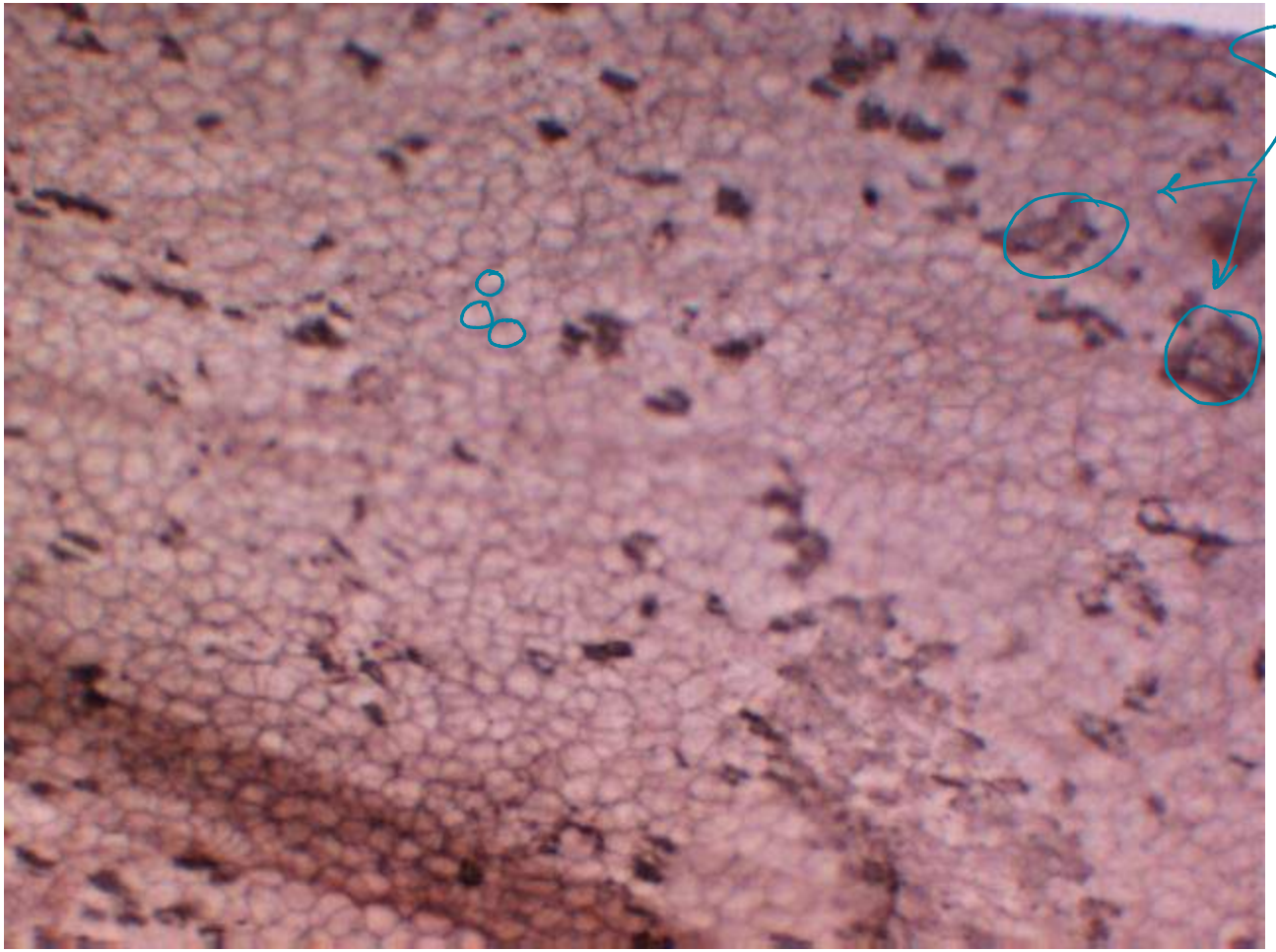
Squamous Epithelium



they have almost the same appearance from the top

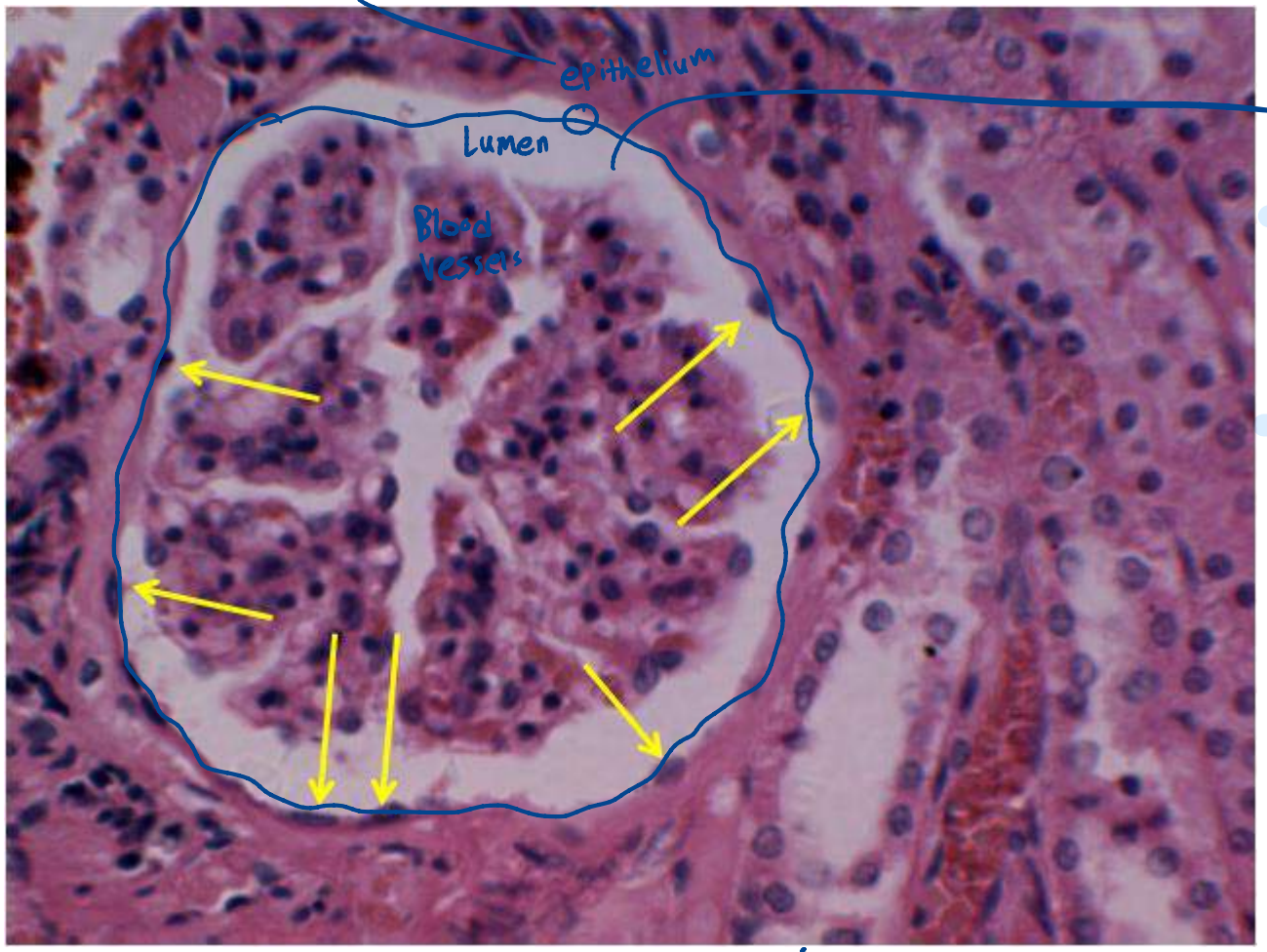
Simple squamous epithelium

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



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

2 types of epithelium :



خط أحمر رفيع

ال Structure الكبير الدائري جزء من Kidney

renal corpuscle في داخله مجموعة من blood vessels بنسميها glomerulus وال capsule lined by epithelium

organ

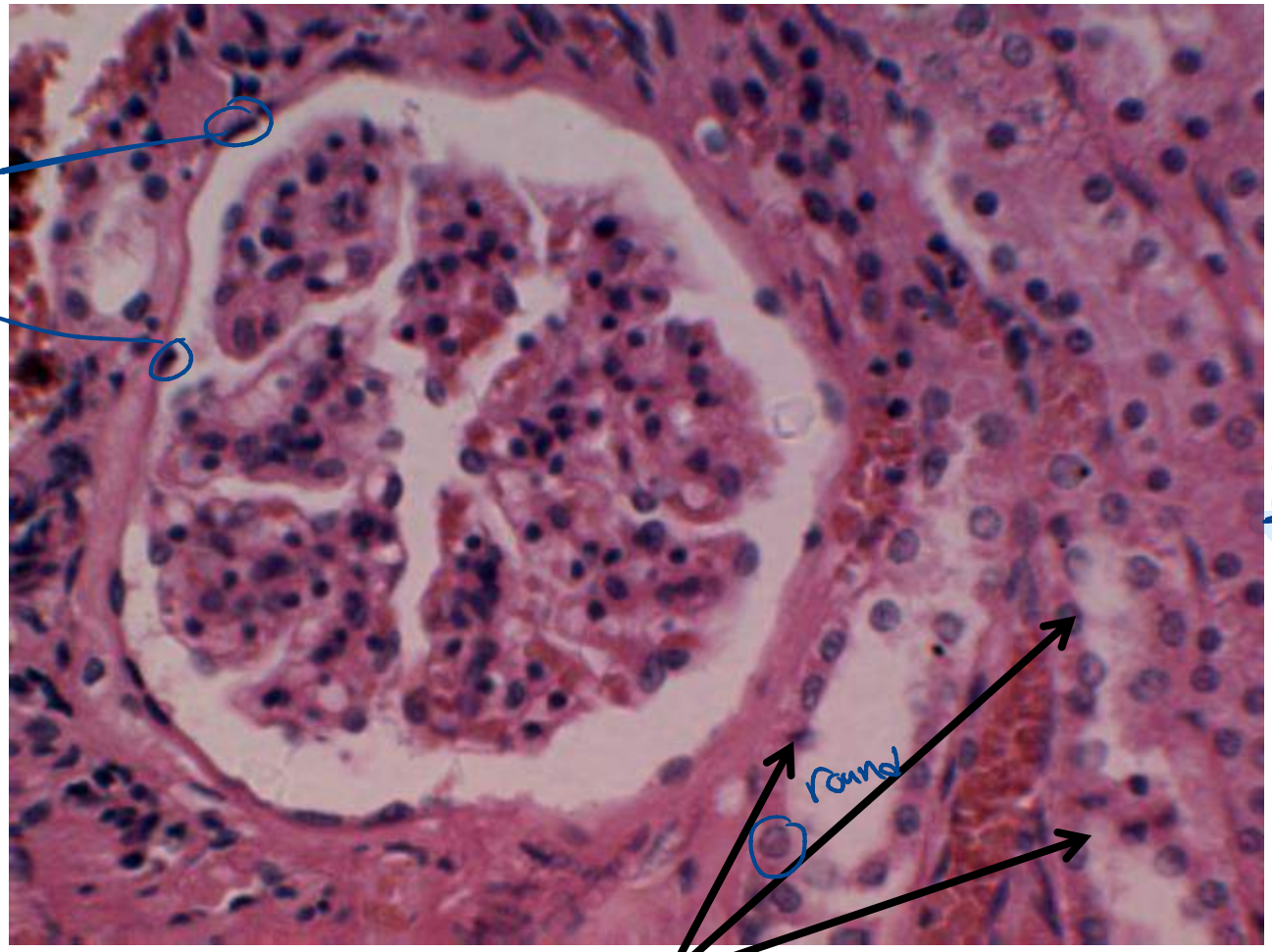
عدة أنواع من epithelium

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

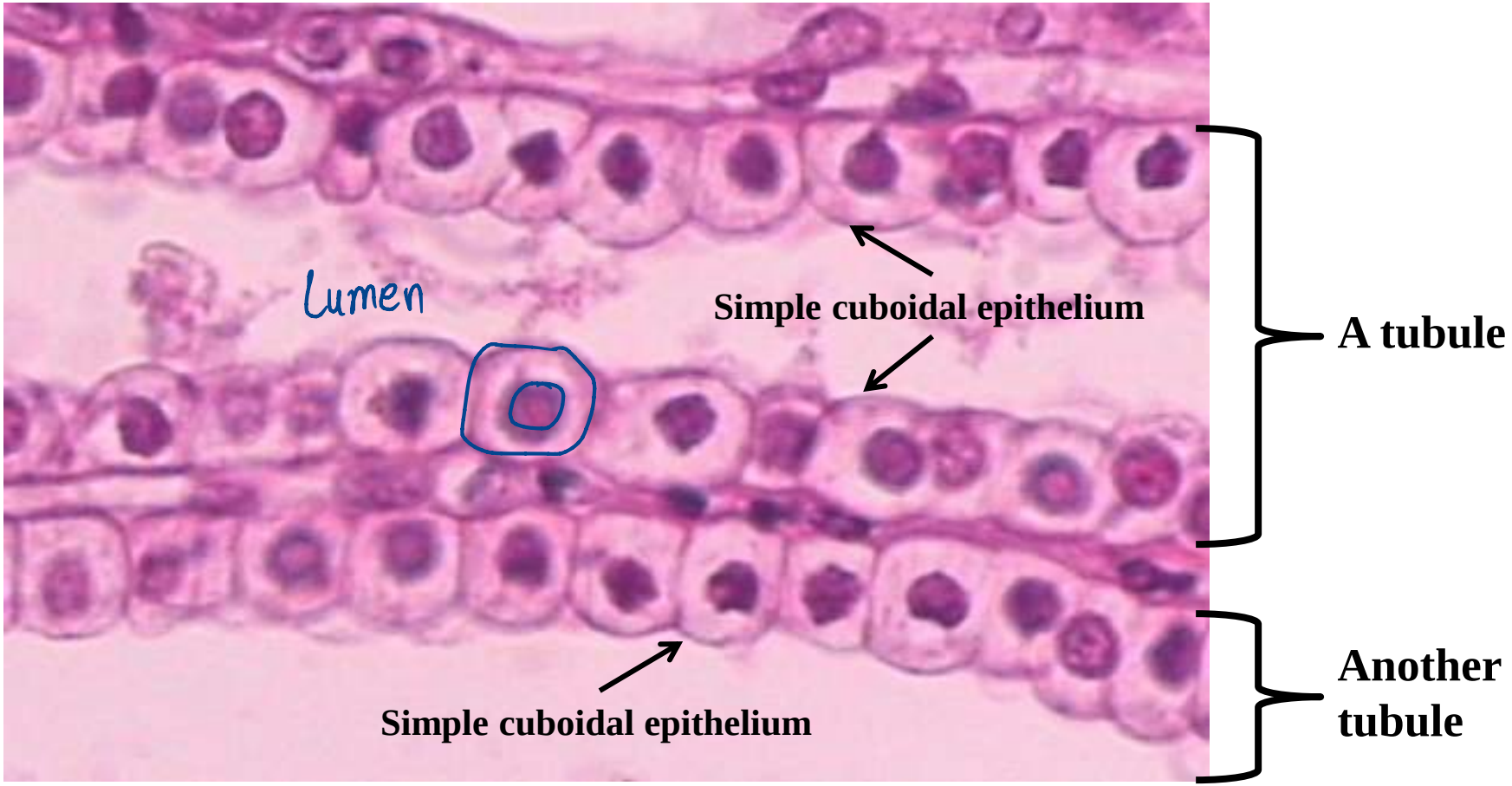
ال organs تحتوي على انواع مختلفة من tissues

وكثير من organs تحتوي على عدة انواع من نفس tissue

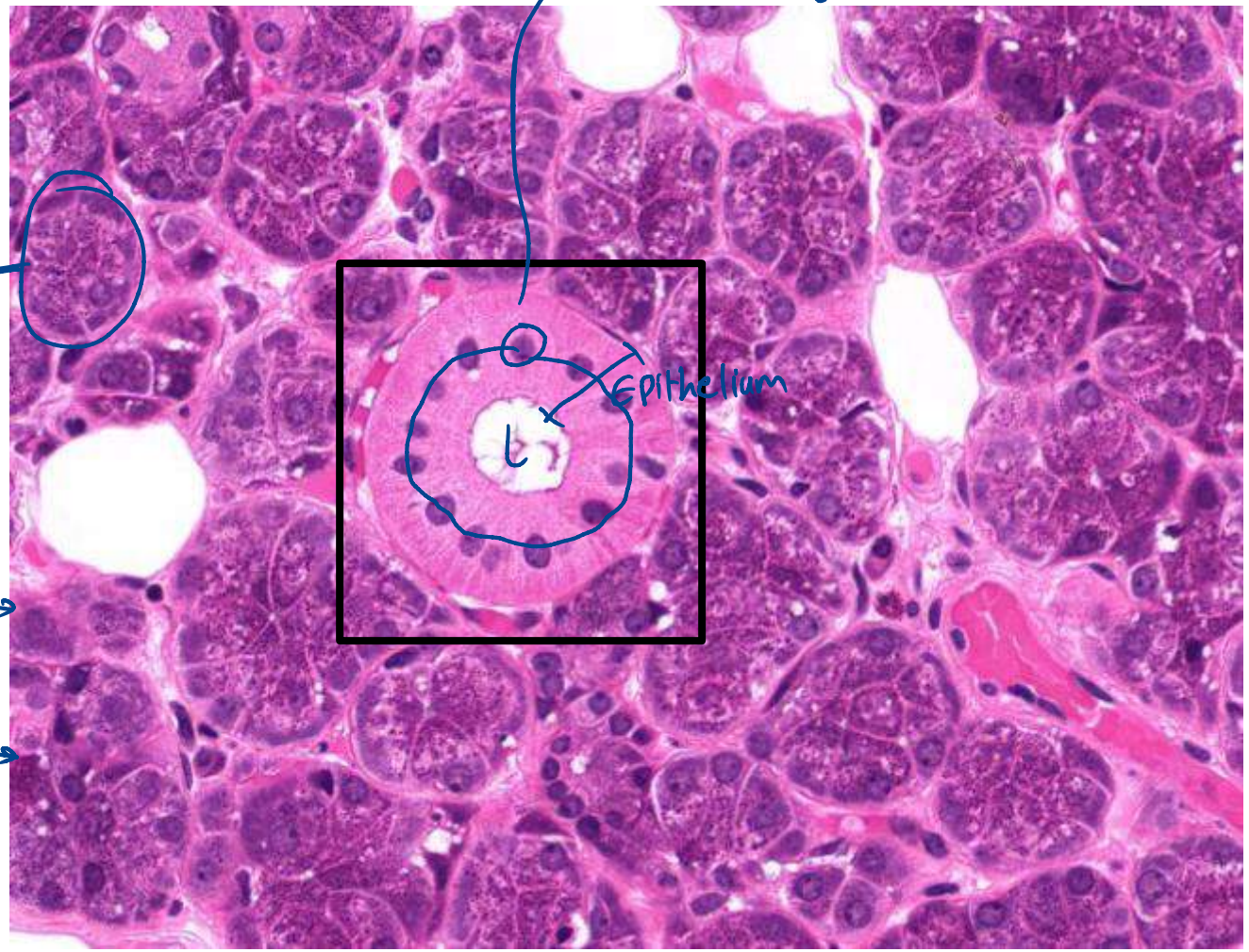
(2) Simple Cuboidal Epithelium



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

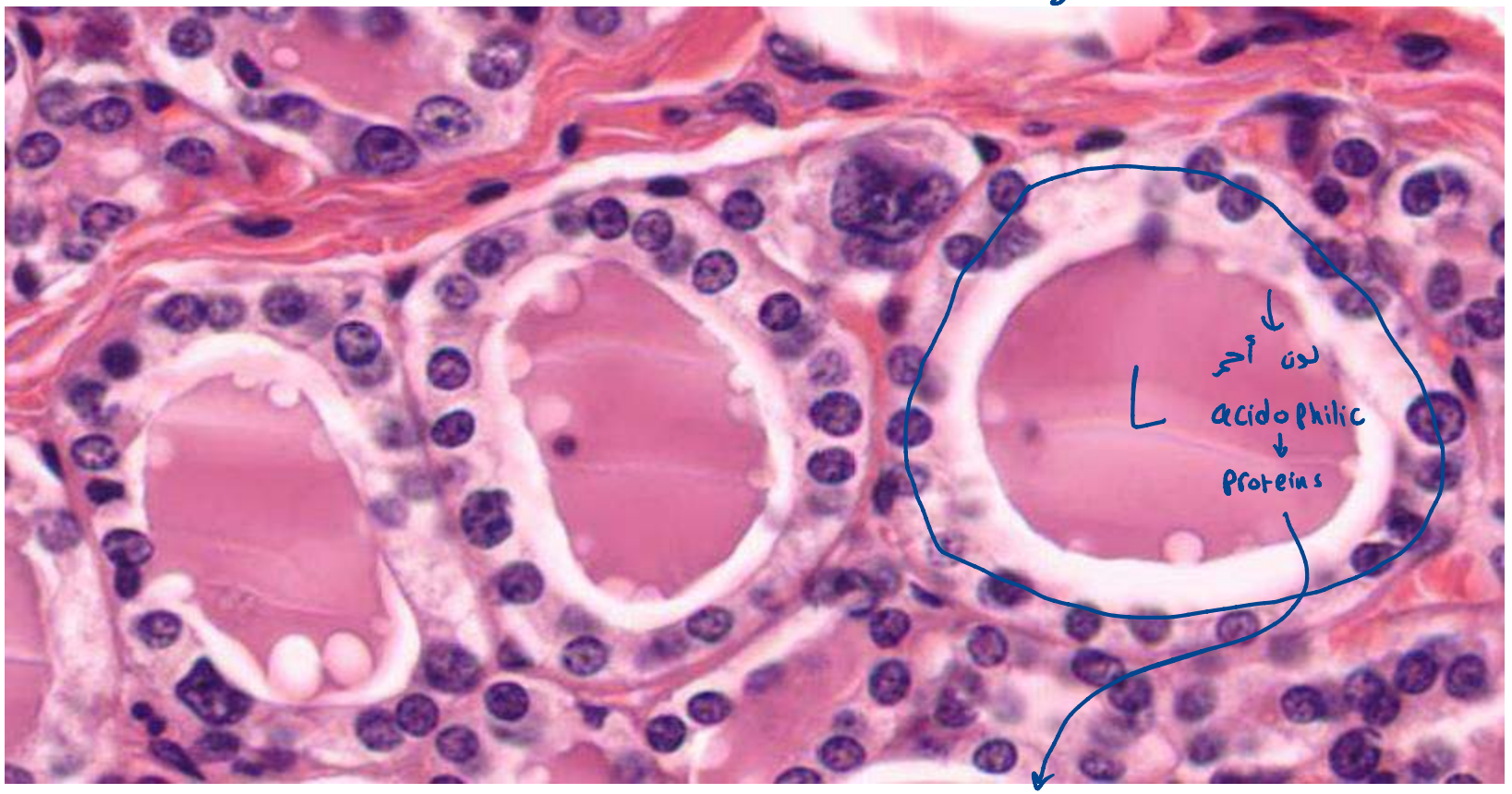


Simple cuboidal epithelium of the renal tubules.



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

follicles بتكون فكرات اسمها

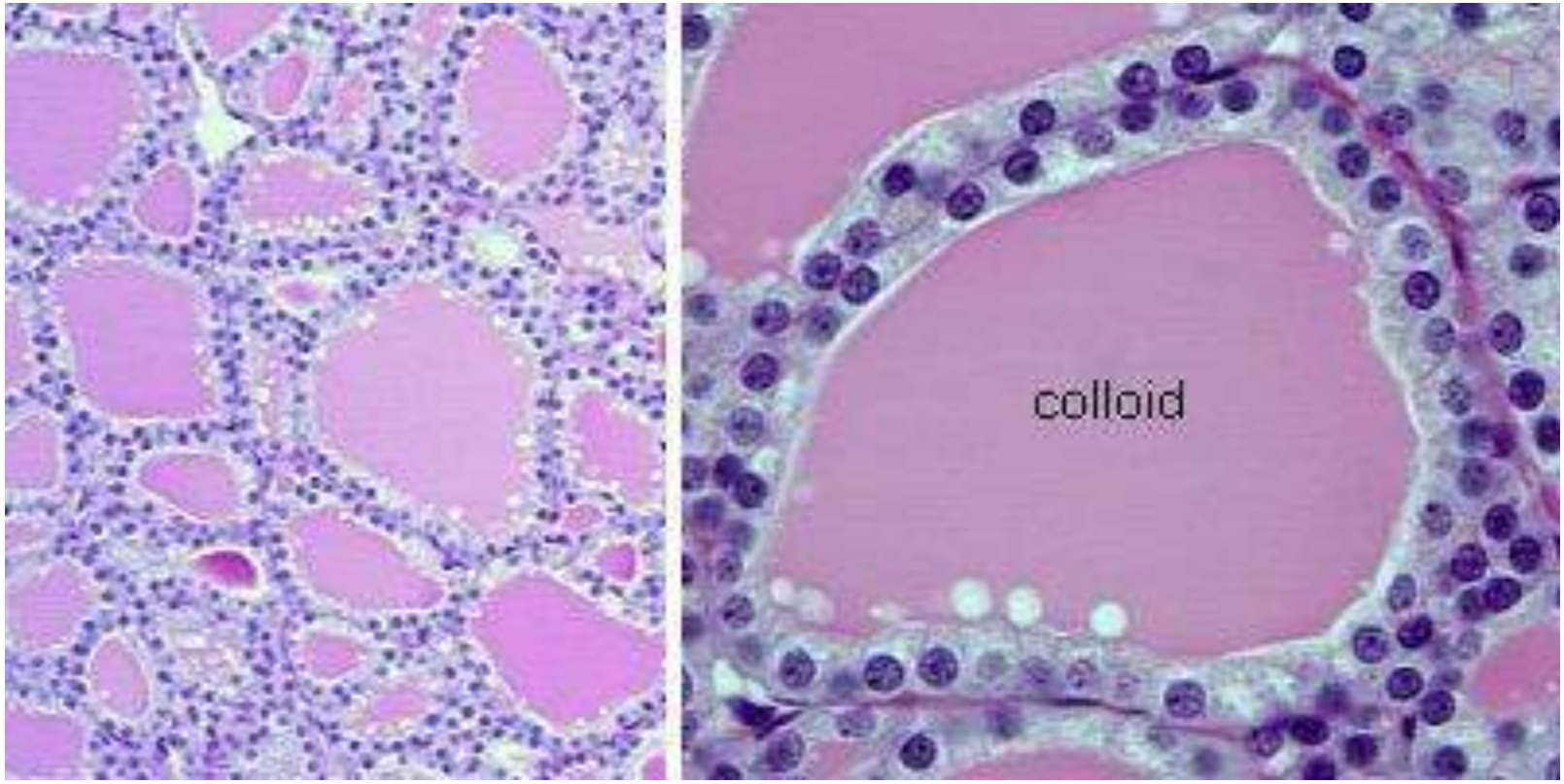


link between function & appearance

Thyroid follicles are lined by simple cuboidal epithelium.

what is the function of cuboidal epithelium?
↳ Active transport

بالنشط
active transport



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

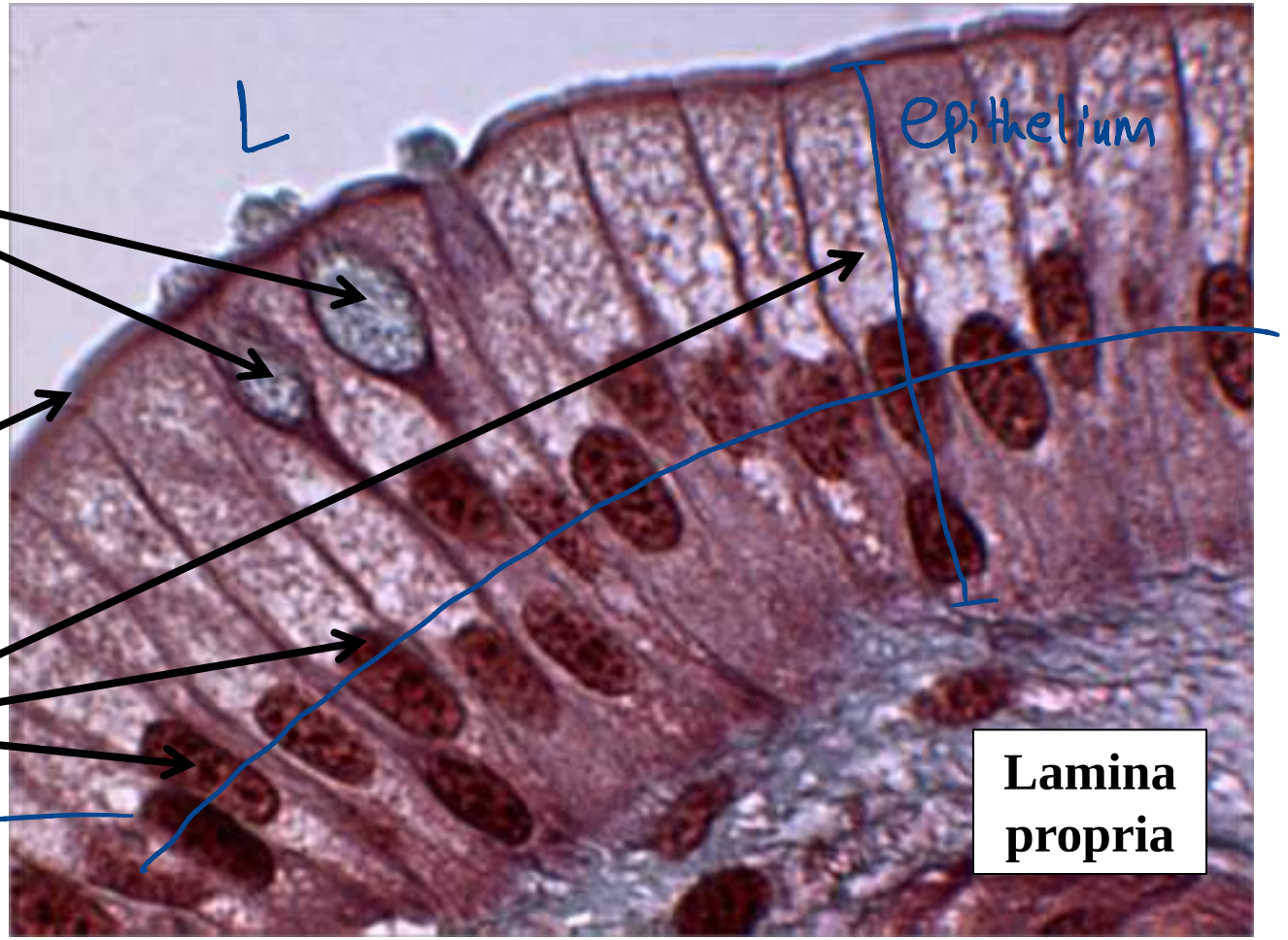
Protein

(3) Simple Columnar Epithelium

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

Simple Columnar Epithelium

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.

↳ small structures can not be seen in the light microscope ← بسبب وجود عدد فخم صغيرا ظهرت على شكل خط رفيع