



Histology lab : 7

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In this lab, we will study the three types of muscular tissue

Skeletal

- Voluntary, attached to the skeleton [bones]

Features of skeletal :

- ↳ Cross-striation
- ↳ multi-peripheral nuclei
- ↳ loose areolar connective tissue, called:
endomysium [connective tissue between muscle fibers] between the spaces of skeletal muscles

نسيج ليفي يربط بين
ألياف العضلات
المسماة بـ
endomysium
وهو موجود في
الفضاءات بين
ألياف العضلات
الهيكلية

Cardiac

- found in 1 place only \Rightarrow heart, involuntary

Features of Cardiac :

- ↳ Branching of cells
- ↳ Branched cells meet through an intercalated disc.
- ↳ Have 1 or 2 central nuclei.
- ↳ Striated

Smooth

- found in the viscera [internal organs except heart] + skin, involuntary

Features of Smooth :

- ↳ Lack of striation
- ↳ 1 central nucleus
- ↳ $\uparrow\uparrow$ number of nuclei compared to other types of muscles.

All are \Rightarrow acidophilic

Part 4: Muscular Tissue

In general, the muscular tissue is characterized by:

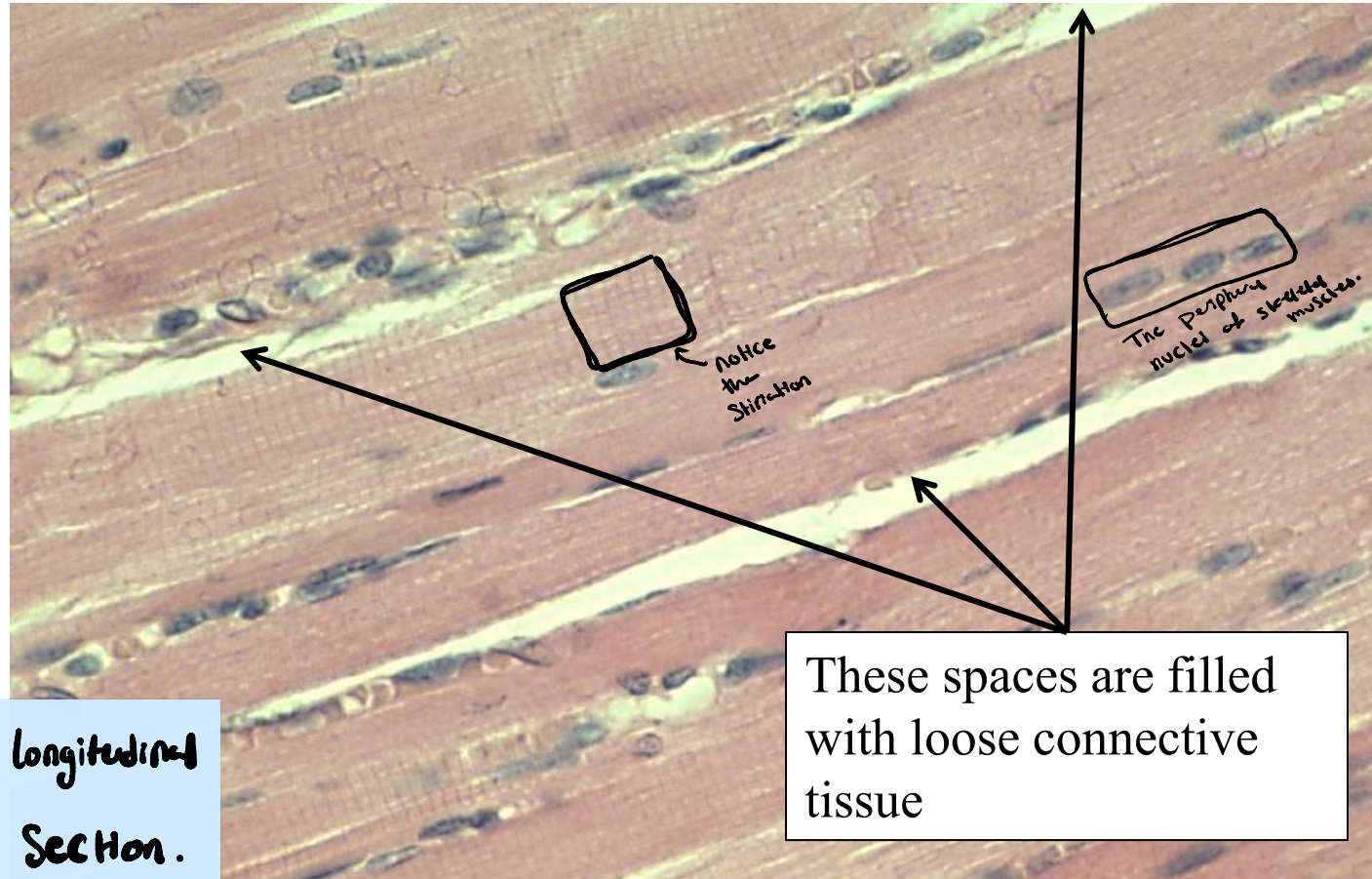
- ① Abundance of myoglobin (protein, similar to hemoglobin)
- ② Rich in mitochondria (this explains the acidophilic feature of the muscular tissue)

(1) Skeletal Muscles

→ Cross-Striation; alternating light & dark lines

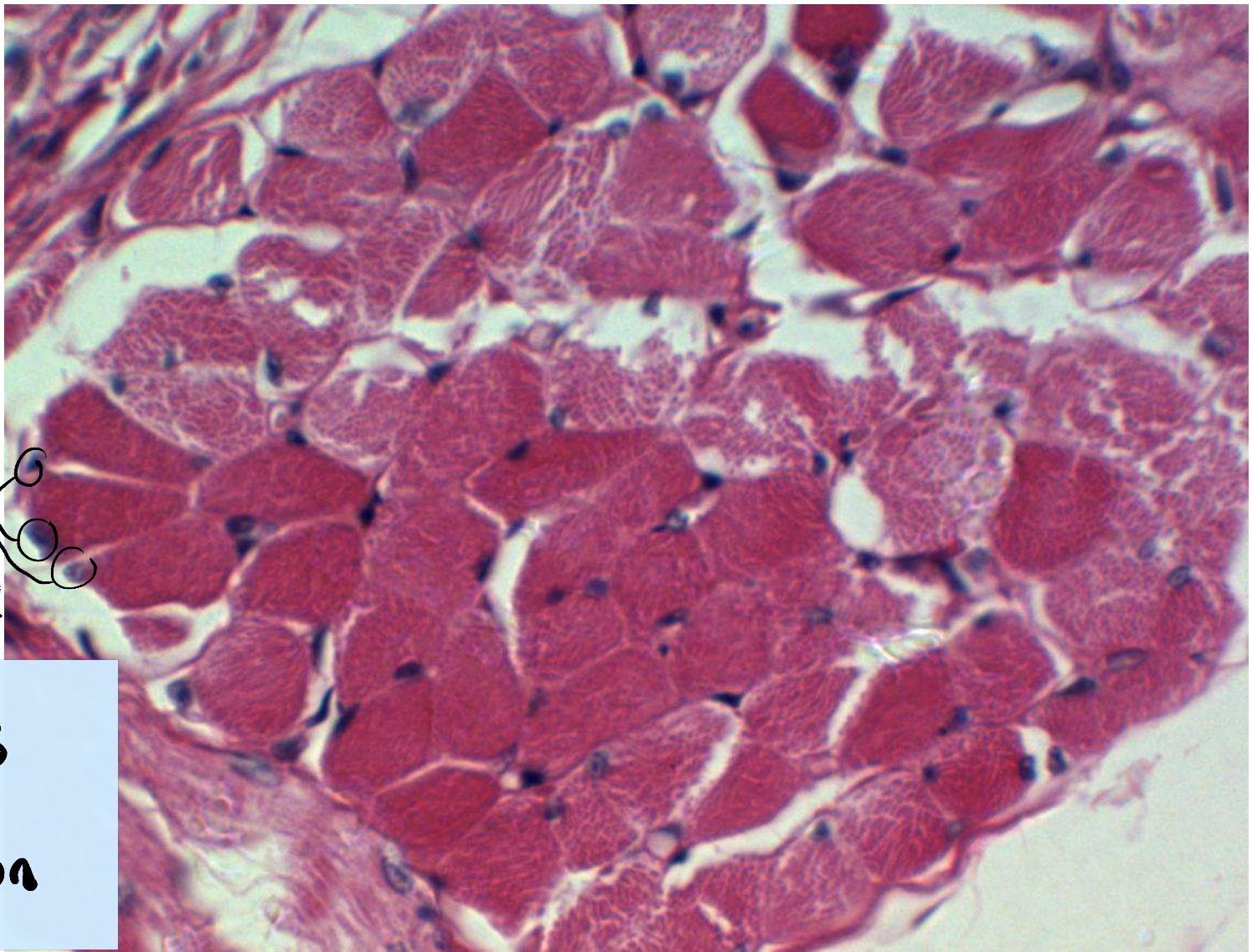
*Why cross??
Because when taking a longitudinal section, striation appears horizontal.*

Longitudinal section through skeletal muscles. Note the striation and the peripheral location of the numerous nuclei.

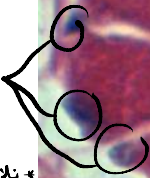


Longitudinal
Section.

These spaces are filled with loose connective tissue



The peripheral nuclei

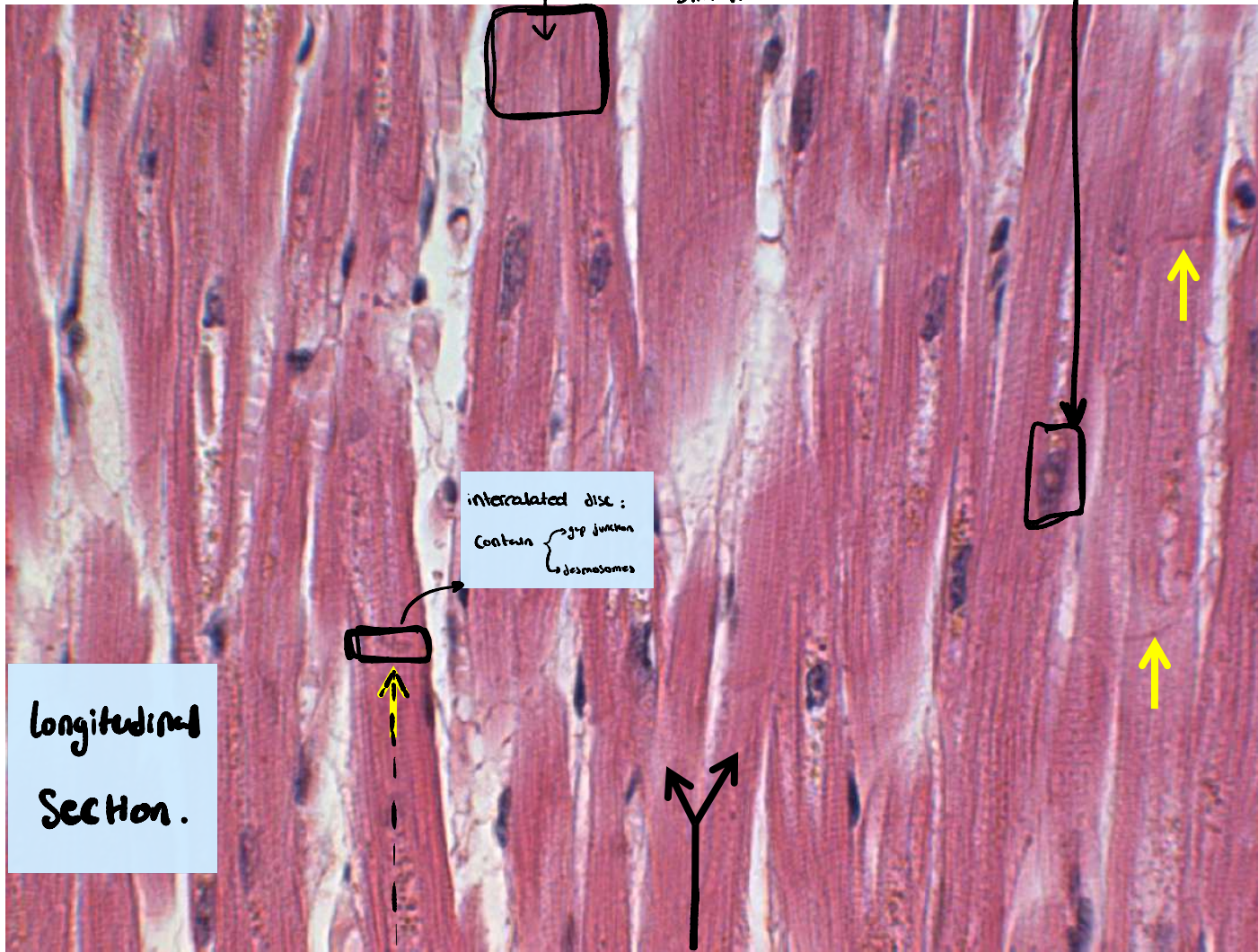


• نلاحظ فيه الألياف "الأسطوانية" ليست داخل الخلايا • إنما على الأضراس.

Cross Section

Cross section through skeletal muscle fibers. Note the peripheral location of the nuclei.

(2) Cardiac Muscles



Section through cardiac muscles. Note the striation, the central location of nuclei, the branching of the cell and the intercalated disc (yellow arrows).

Longitudinal
Section.

The dark lines where 2 cardiac cells meet, is called: intercalated disc

A special feature for Cardiac muscles is Branching of cells

(3) Smooth Muscles

Single, centrally located nucleus →

← Notice the lack of Striation

← High number of nuclei compared of other muscle types, why?
Because smooth muscles are relatively small cells.

Longitudinal
Section.

Section through smooth muscles. Note the lack of striation. The large number of nuclei in the section is because the cells are small.

Cross-section :

Skeletal



Cardiac



Smooth



بنلا حفظ التثابه في ال Cardiac و ال Smooth
في ال Cross section ء كيف نفرق؟؟

We do not need to distinguish between
those 2 types, as smooth + Cardiac
are never present in the same
place in the body :)

However, distinguishing Smooth from Skeletal

muscles is important, as both types may be present

in the same organ [يعني ممكن نلقاهم بجوز في الجزء و ليه كالم]

ex: esophagus , upper part : skeletal (voluntary) , lower part : smooth (involuntary)

Important Final Notes

1. It's advisable to study images of microscopic slides from other sources (textbooks, atlases, internet, etc...).
 2. Test yourself by using other images to see if you can recognize the tissue.
- ***Remember:***
 - ***Classification of exocrine glands according to morphology of duct and secretory portion and the various parts of the sarcomere are also included in the practical exam.***

لبيك بنكون خلدنا آخر Histology lab لهذا الفصل!

- بالتوفيق للجميع -

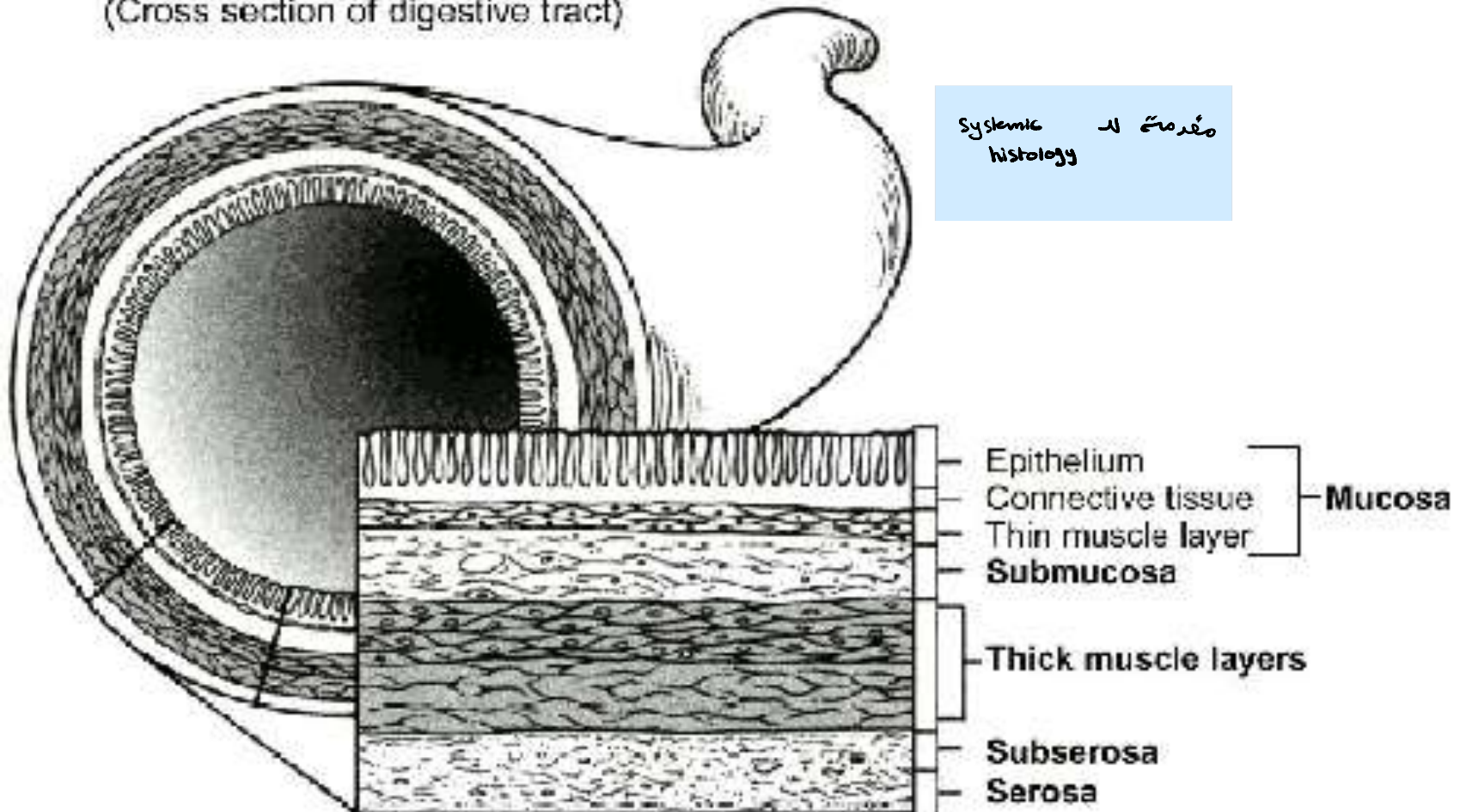
* كل ار Slides التاليت من داخل معنا

بس الدكتور جب يشرح كقدمة لـ Systemic histology

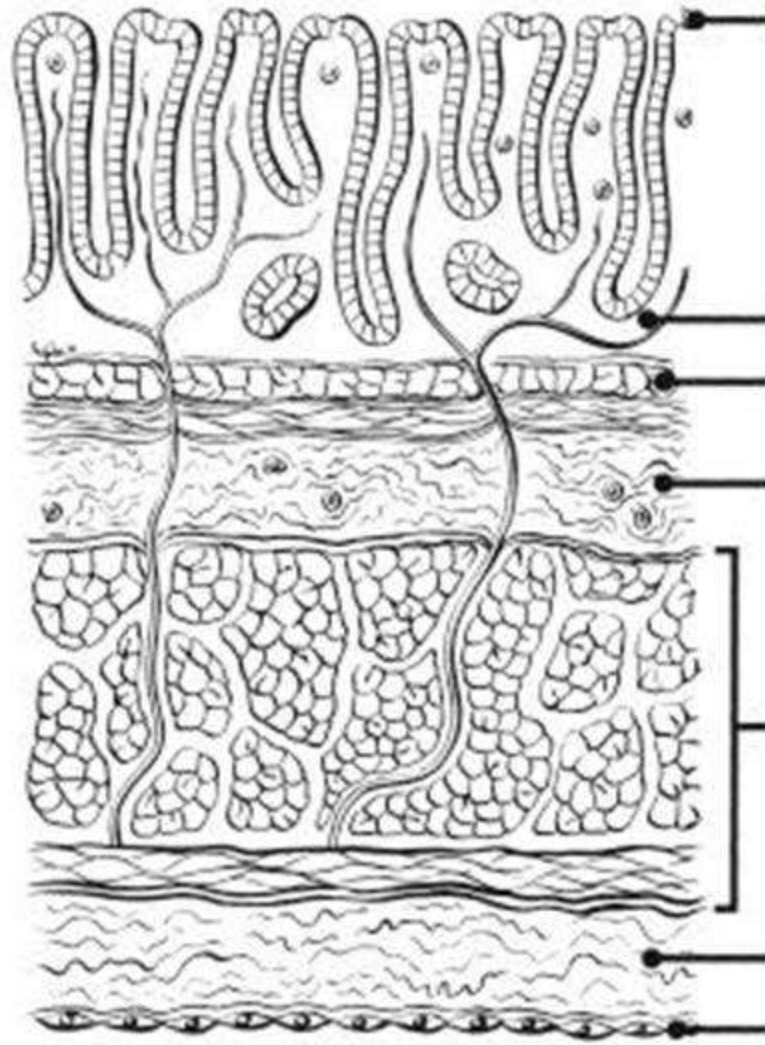
Typical Structure of Hollow Organs

Have lumen, ex: stomach

Normal Intestinal Tissue
(Cross section of digestive tract)



Lumen of organ



Epithelium

- ↳ Direct contact with lumen
- ↳ might be ciliated ... depending on organ.

Lamina propria

Muscularis mucosa

Submucosa

- ↳ Another layer of connective tissue directly under the mucosa, usually dense collagenous irregular tissue.

Muscularis propria

- ↳ Sometimes called: muscularis OR muscularis externa
- ↳ One to three layers of muscles, could be smooth or skeletal, OR a mixture of both.

Subserosa

Serosa

The outer most layer

- ↳ could be serosa OR adventitia
- ↳ connective tissue only

Mucosa

الذاتية حكي نزيعة مع
 epithelium with an underlying tissue

The mucosa is the first layer in hollow organs [closest to lumen]

The name of connective tissue that is under the epithelium, in 90% of the times, this is loose areolar connective tissue.

- ↳ The mucosa, only in the digestive system, contains a third layer called muscularis mucosa [ex: esophagus + stomach].

- ↳ It is a layer of smooth muscles.

- 1- pleura
- 2- pericardium
- 3- peritoneum

SS Serosa membrane → أظلا نينو لبي الأظلا لبي مازاظة

If organ was covered by a serous membrane.
 • Serosa is made of

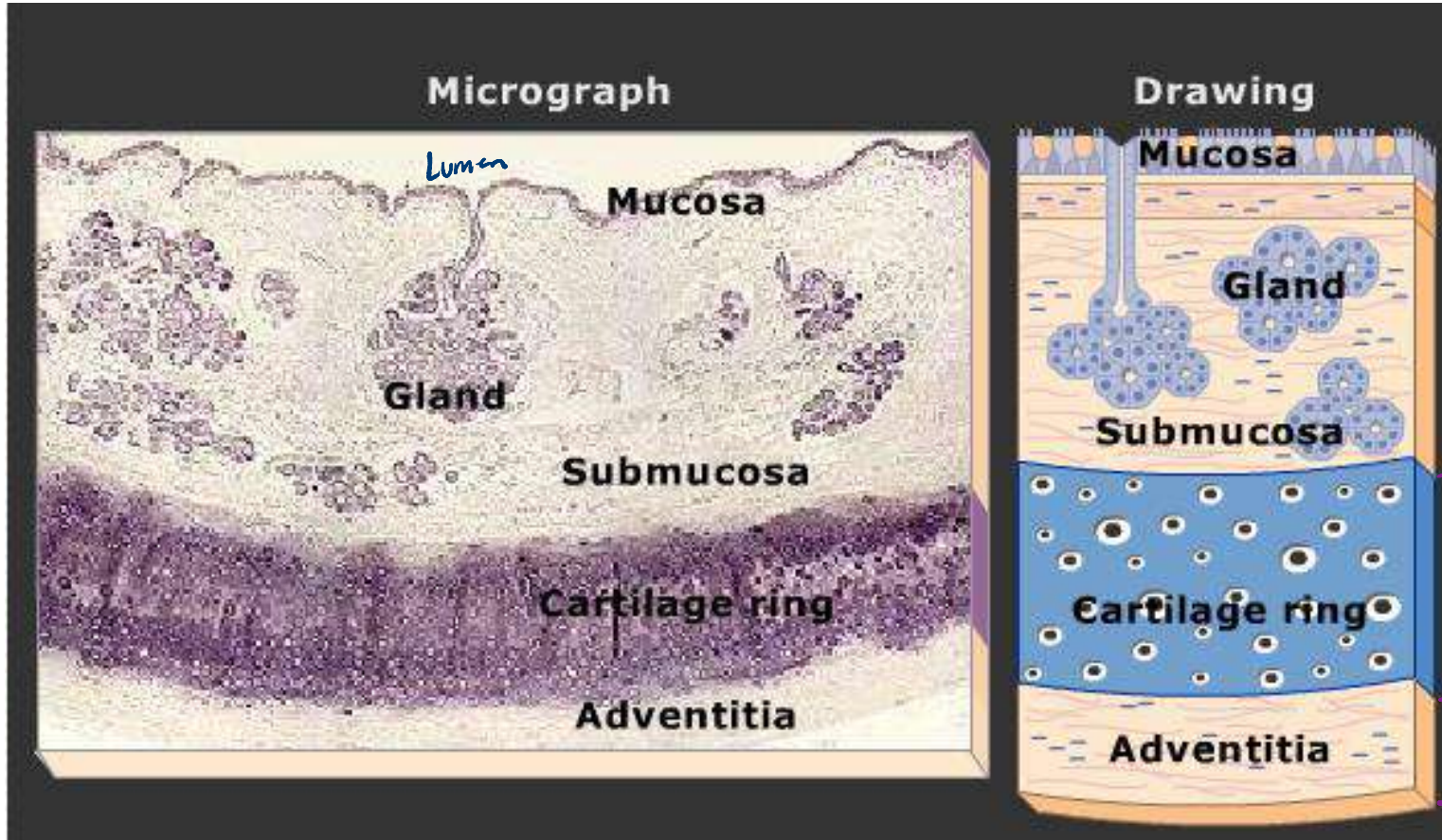
- epithelium: Simple Squamous mesothelium
- connective tissue: underlying connective tissue. could be loose areolar connective tissue.

Stomach Wall



Tracheal Wall

digestive System
 * نلاحظ! انه بال Trachea لا يوجد mucosa ، ليس؟ لأنه حكيما من قبل! انه موجود فقط في ال digestive System



* أنه ليس له
 instead of muscularis
 is cartilage
 Since trachea is
 not covered by a
 serous membrane,
 so it has adventitia
 [connective tissue only]