



Anatomy and **Physiology.**

LECTURE ANNOTATION

Introduction By: Gabe Oliver, RN

A. ANATOMY (Greek "ana" = UP ; "tome" = cutting

1. scientific study of body structure (morphology) and development

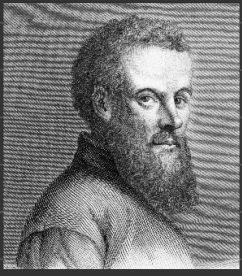
2. Andreas Vesalius (1514-1564)

a. 16th century

FATHER OF ANATOMY

Book: De Humani
Corporis Fabrica

"The workings of the Human Body"



tome = to cut

E.g.

1. Appendec TOMY

2. Tonsilec TOMY



3. International Congress of Anatomist

- They agree on the official names
of the body parts
(scientific names)

E.g.

FEMUR (thigh bone)

is internationally agreed
upon. It is used all
over the world



B. PHYSIOLOGY

- scientific study of how the body functions
(biochemical processes)

— SUBDISCIPLINES OF ANATOMY —

A. LEVELS OF ORGANIZATION WITHIN THE HUMAN BODY

The Human Body

✓ Gross Anatomy

✓ Surface Anatomy

✓ Regional Anatomy

✓ Radiological Anatomy

Organ Systems

✓ Systemic Anatomy

✓ Neuroanatomy

Organs

Tissues

Histology

Epithelial

Connective

Muscle

Nerve

60 Trillion Tissue Cell Cytology

B. ALL LIVING THINGS BEGIN LIFE AS A SINGLE CELL

Embryology
(pre-natal development)

Zygote → Birth → Adult

Developmental Anatomy

✓ Comparative Anatomy

✓ Pathological Anatomy

III. Describing Anatomic Relations

A. Anatomic Position Reference position

1. Body erect with arms at sides
2. Face and palms turned FORWARD

B. Terms

1. SUPERIOR (cranial)

- a. Toward the head
- b. ex: The heart is superior to the liver

2. INFERIOR (caudal)

- a. Toward the tail-end of body
- b. ex: The stomach is inferior to the lungs

3. ANTERIOR (ventral)

- a. Toward the front of the body
- b. ex: The trachea is anterior to the esophagus

4. POSTERIOR (dorsal)

- a. Toward the back of body
- b. ex: The rectum is posterior to the urinary bladder

5. MEDIAL

- a. near the mid-line of body
- b. ex: The heart is medial to the lungs

6. LATERAL

- a. Away from the mid-line of body
- b. ex: The kidneys are lateral to the spine

7. PROXIMAL

- a. Nearer to the torso
- b. ex: The arm is proximal to the hand

8. DISTAL

- a. Farther from the torso
- b. ex: The fingers are distal to the elbow

9. SUPERFICIAL (external)

- a. Toward the surface of the body
- b. ex: The skin is superficial to the muscles

10. DEEP (internal)

- a. Deep within the body
- b. ex: The heart is deep to the rib cage

11. PARIETAL

- a. The walls of a cavity
- b. ex: The parietal peritoneum

12. VISCERAL

- a. covering of an organ
- b. ex: The visceral peritoneum

Q:

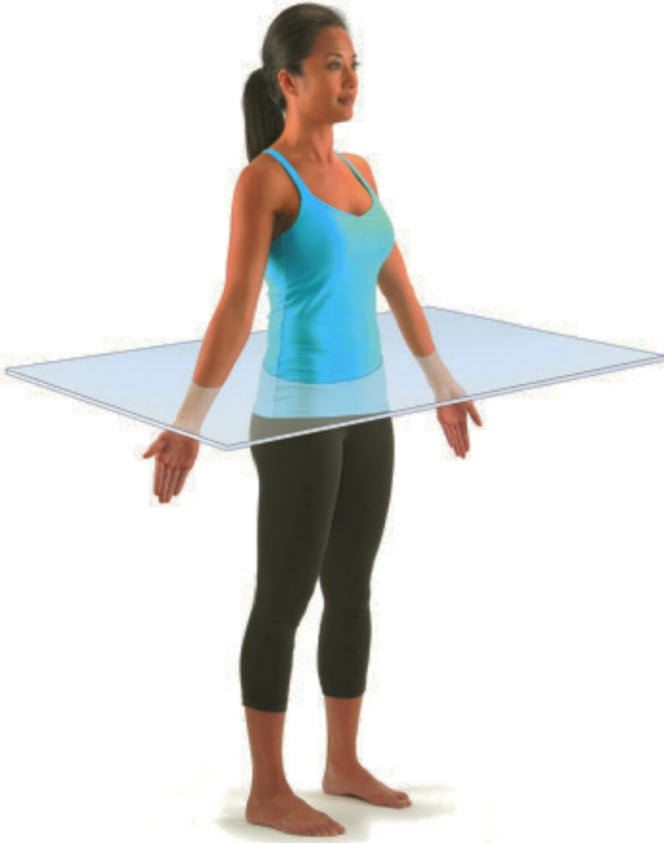
Which section type would separate the two eyes?



(a) Median (midsagittal)



(b) Frontal (coronal) plane



(c) Transverse plane

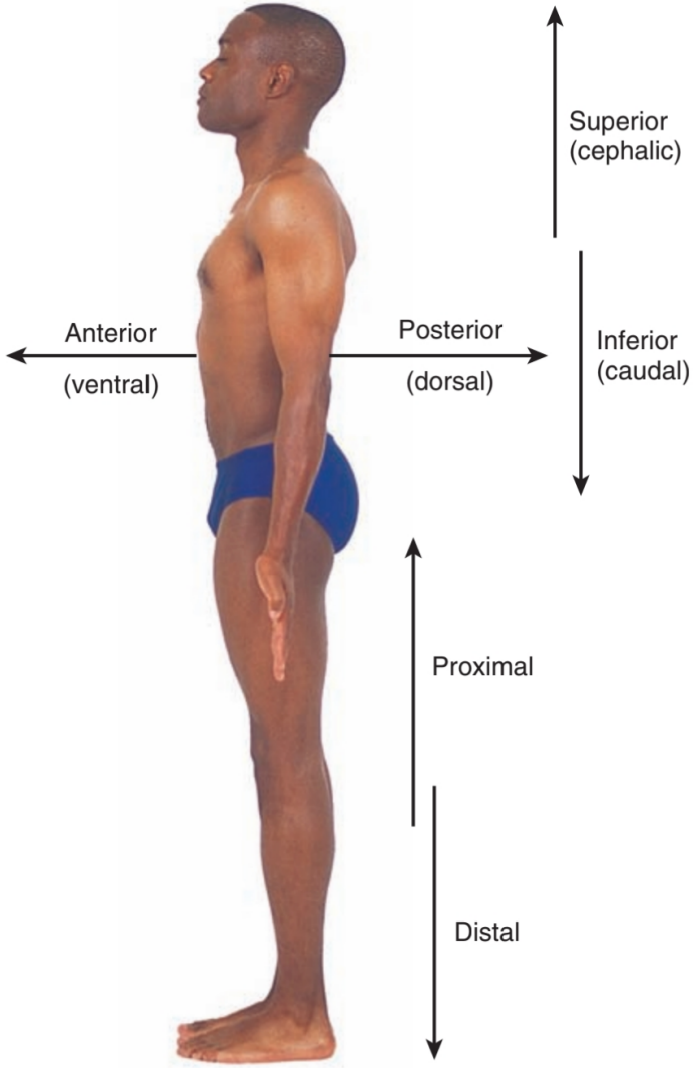
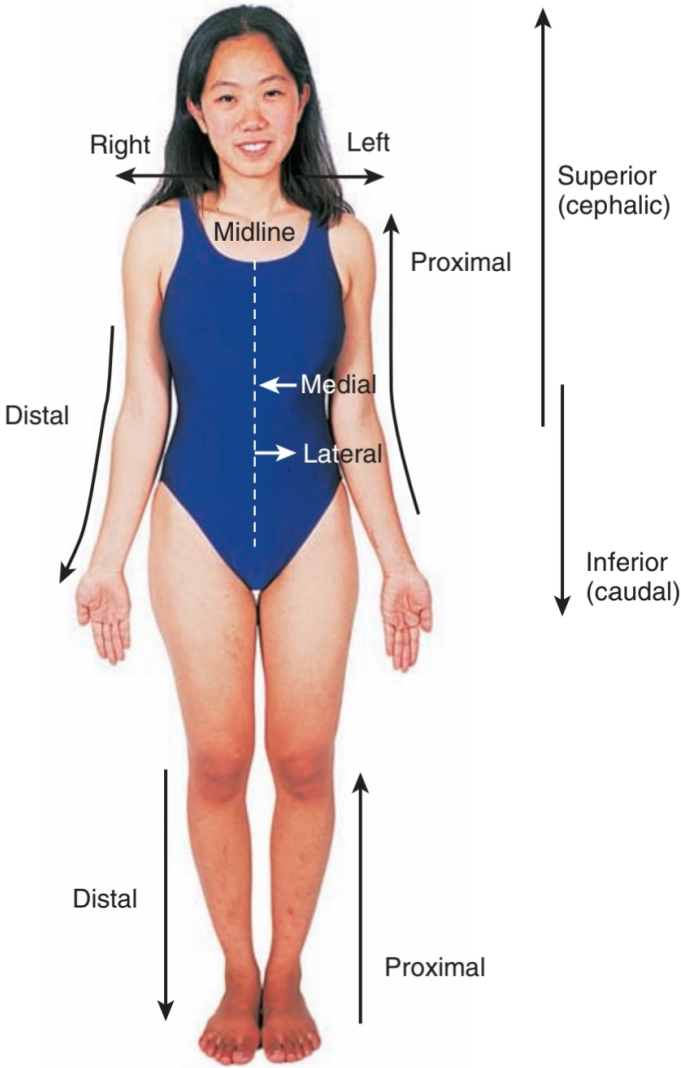


FIGURE 1.9 Directional Terms

All directional terms are in relation to the body in the anatomical position: a person standing erect with the face directed forward, the arms hanging to the sides, and the palms of the hands facing forward.



IV. Describing Sectional Planes (Views) Through the body

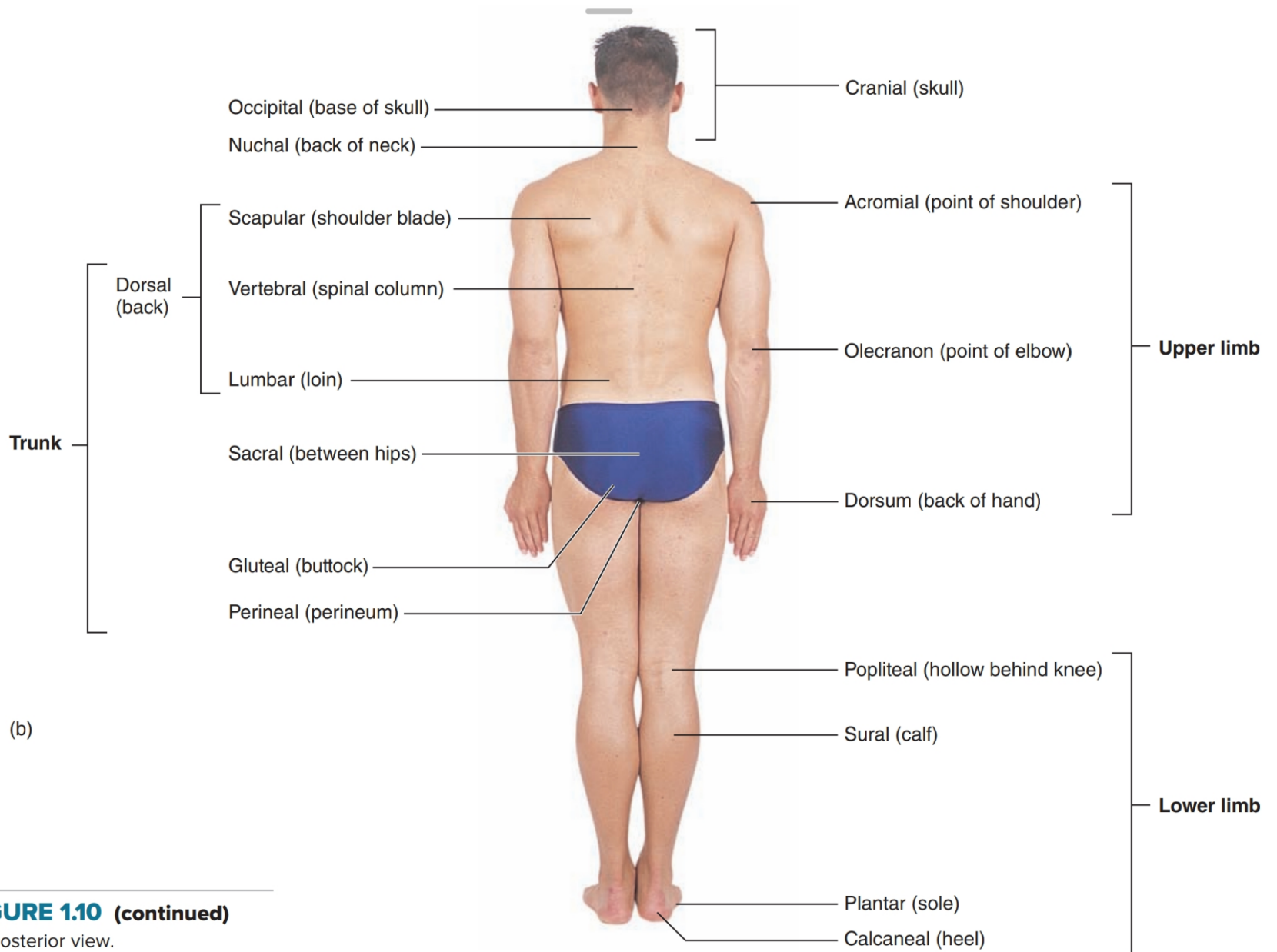
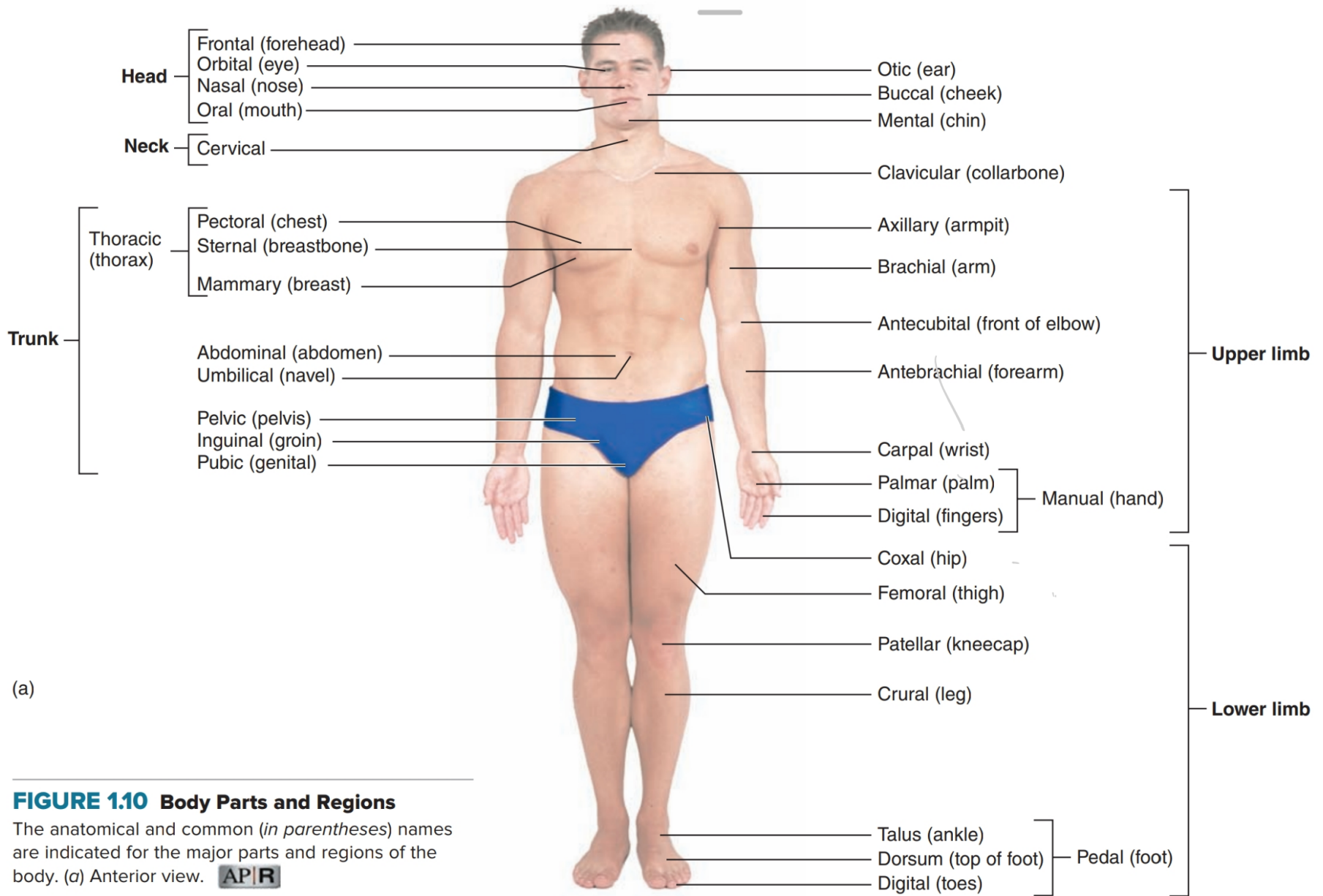
- A. MIDSAGITTAL SECTION
 - Divides body into Right and Left halves
- B. FRONTAL (coronal) SECTION
 - Divides body into anterior (front) and posterior (back) portions
- C. TRANSVERSE (cross-) SECTION
 - Divides the body into superior (top) and inferior (bottom) portions

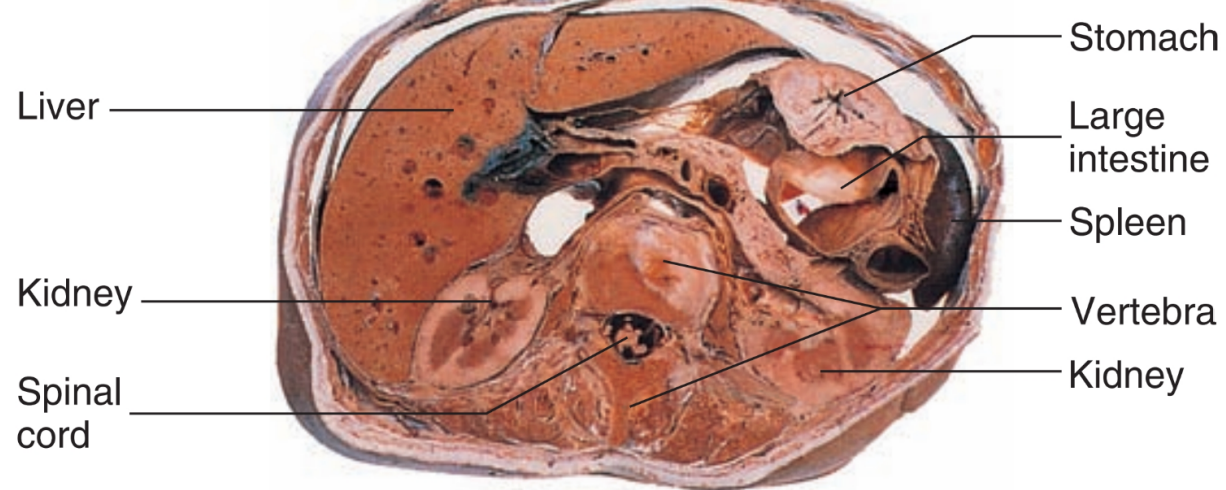
V. Major Body Cavities

- A. DORSAL BODY CAVITY
 - a. Cranial cavity
 - b. Vertebral (spinal) cavity
- B. VENTRAL BODY CAVITY
 - contains visceral organs
 - a. Thoracic (Pleural) Cavity
 - Diaphragm
 - b. Abdominal (Peritoneum) Cavity
 - c. Pelvic Cavity

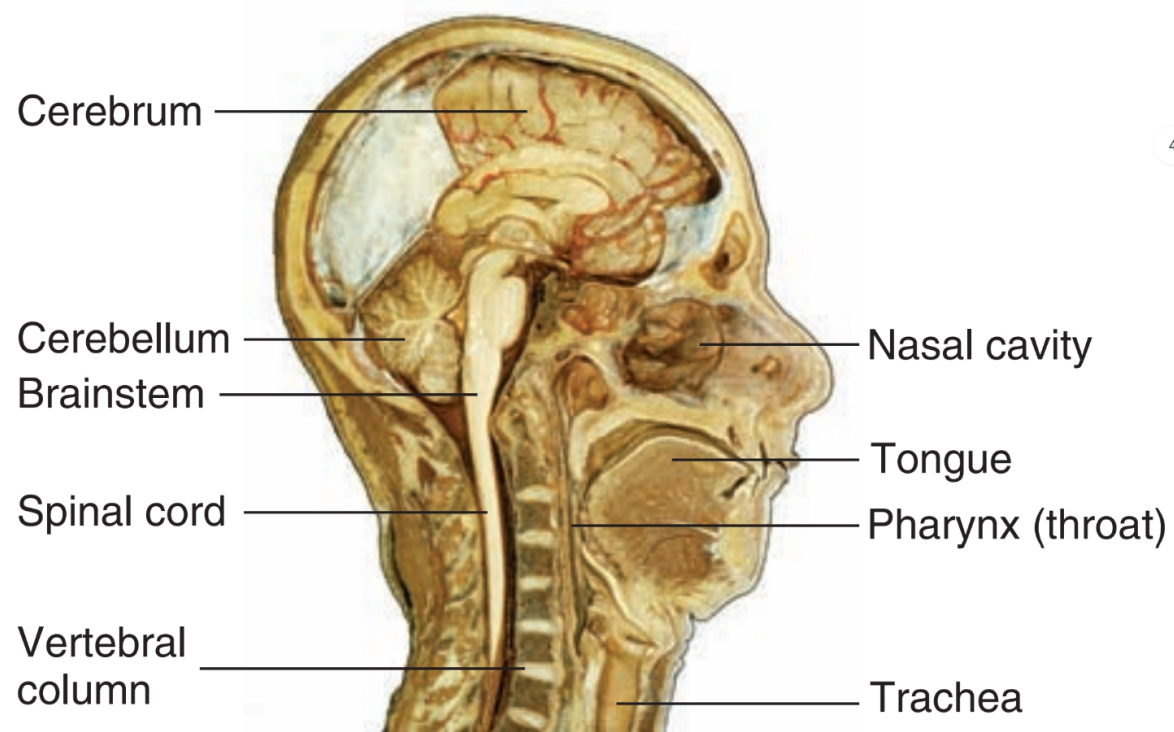
PREFIX	MEANING
abdomin/o	abdomen
acr/o	extremity
aden/o	gland
angi/o	vessel
arthr/o	joint
cardi/o	heart
chondr/o	cartilage
cyst/o	bladder
cyt/o	cell
dent/o	tooth
dermat/o	skin
gastr/o	stomach
hepat/o	liver
laryn/go	larynx
my/o	muscle
nephr/o	kidney
neur/o	nerve
path/o	disease

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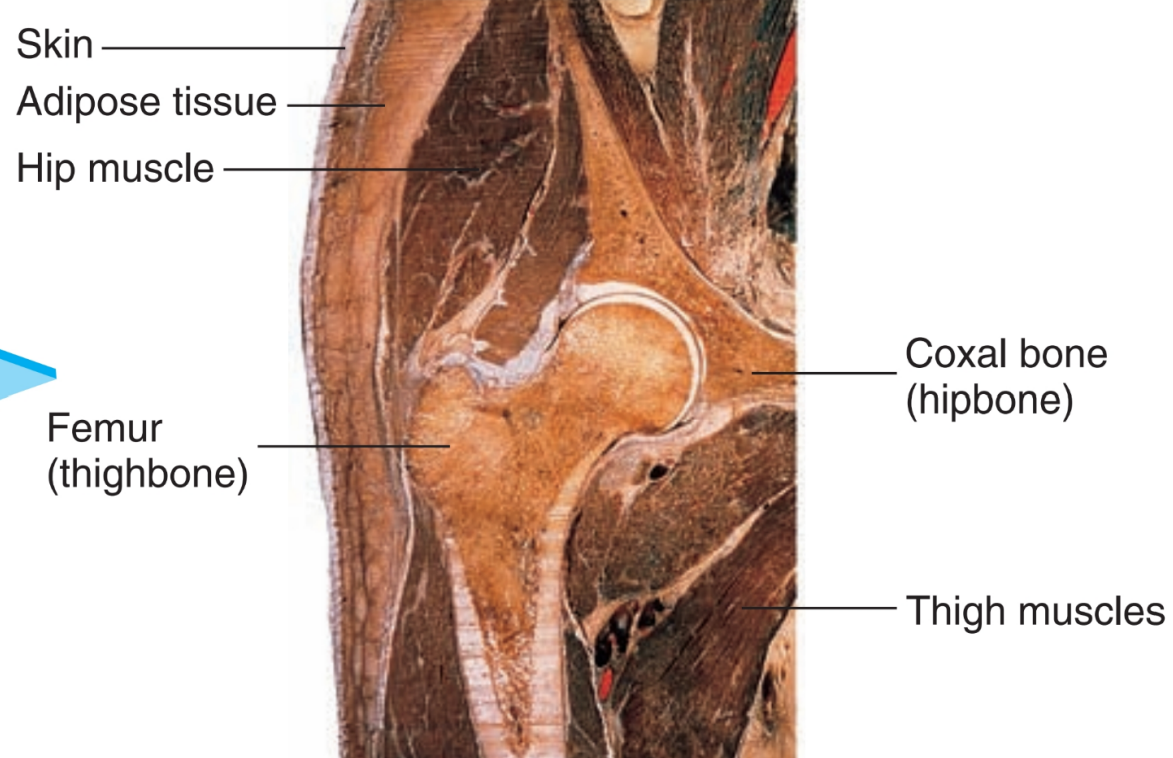




(c) Transverse section through the abdomen

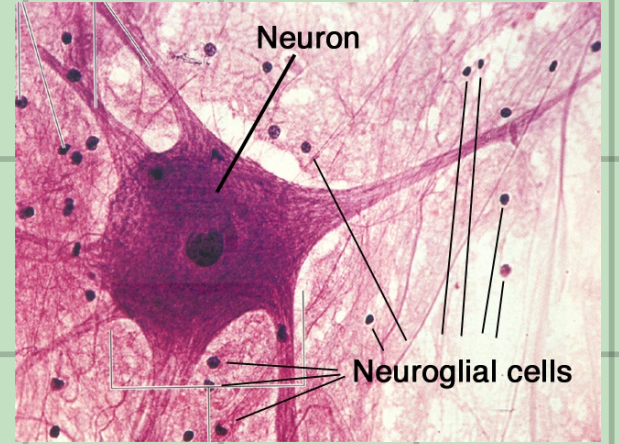
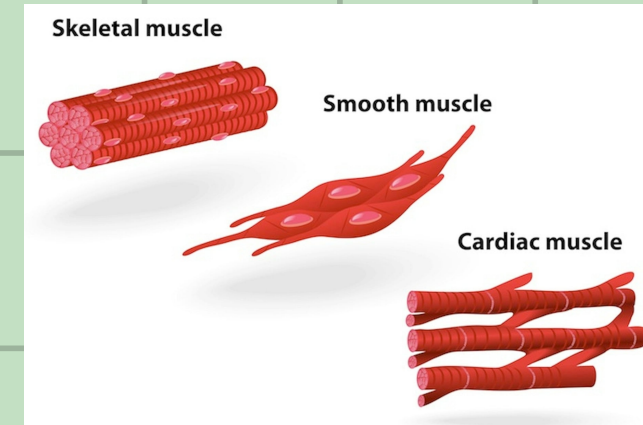
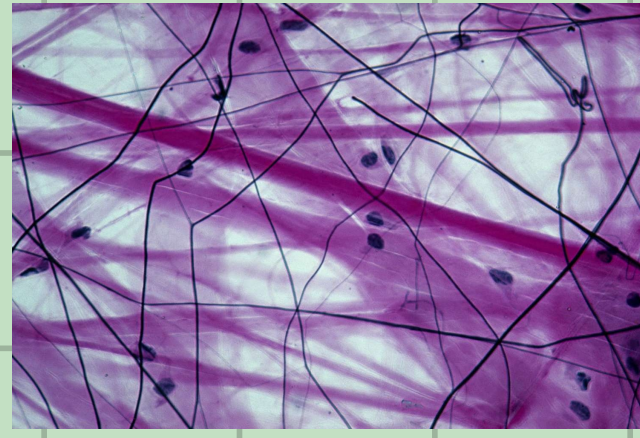
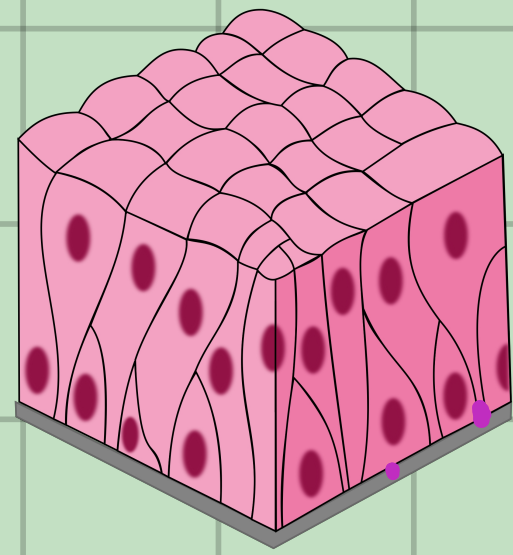


(b) Sagittal section of the head



(d) Frontal section through the right hip

Tissues



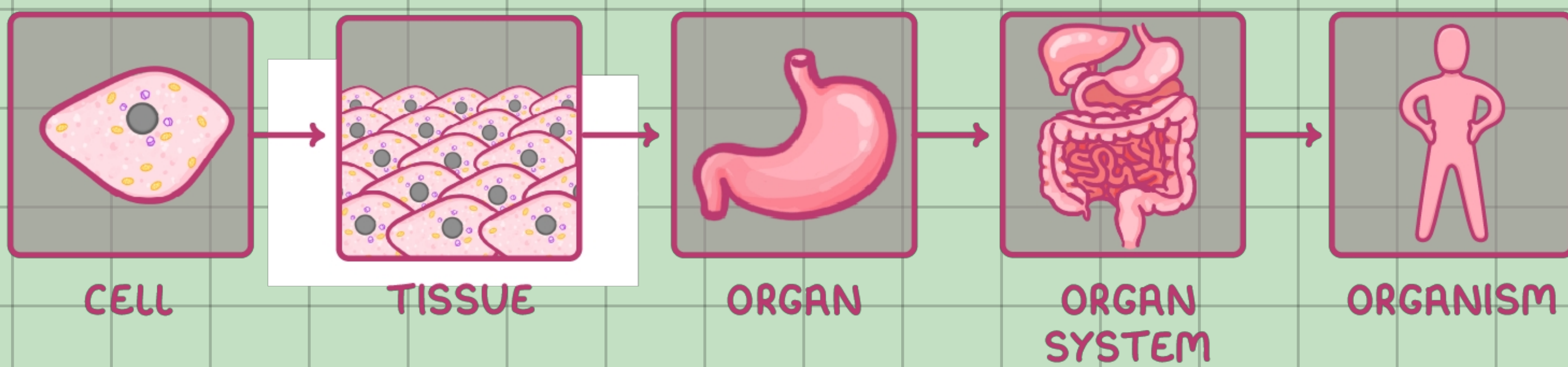
WHAT ARE TISSUES?

Group of cells that have similar structure and function are called tissues

TANDAAN CLASS, KAPAG PINAGSAMA-SAMA ANG **CELLS** MABUBO AY **TISSUES**

ON THE OTHER HAND, KAPAG PINAGSAMA-SAMA NAMAN ANG **TISSUES** ANG MABUBUO AY **ORGAN**

cells → tissues → organ



4 MAJOR TYPES OF TISSUES

1. Epithelial tissues
2. Connective tissues
3. muscle tissues
4. nerve tissues

1. EPITHELIAL TISSUES

- epithelial cells adhere closely to one another
- epithelial cells contain no blood vessels (non-vascular)
(hindi nadugo, kasi walang ugat)
- often found covering a body surface or lining body cavities
(makikita ere usually sa skin mo or pwede rin sa balot ng mga organs)

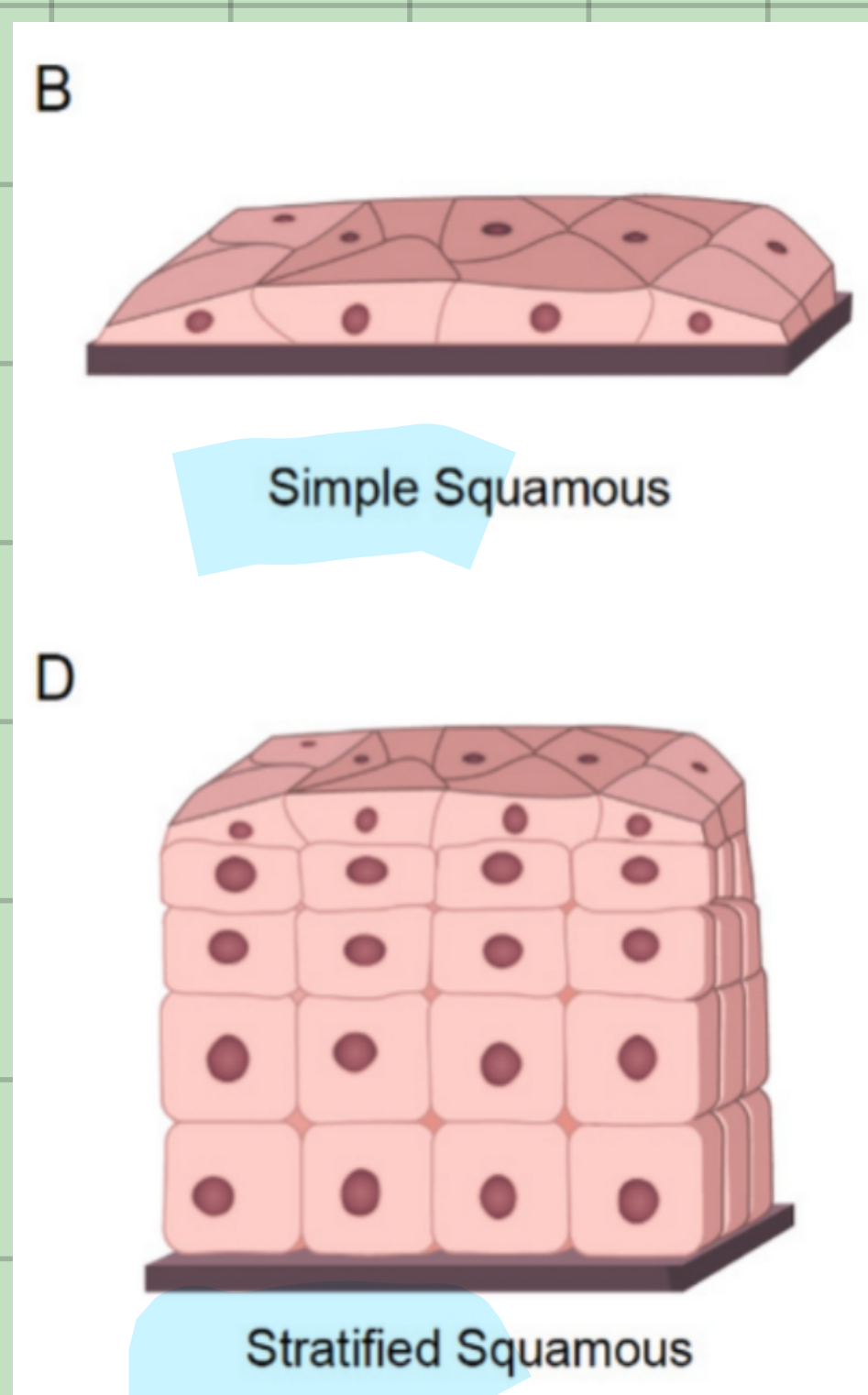
Classifications of Epithelial Tissues

(many ways on how to classify an epithelial tissues one of which is based on layers)

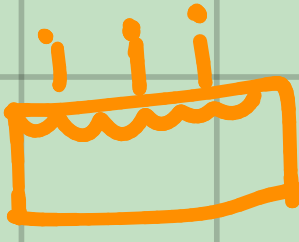
1. Based on the arrangement (layering) of the cells

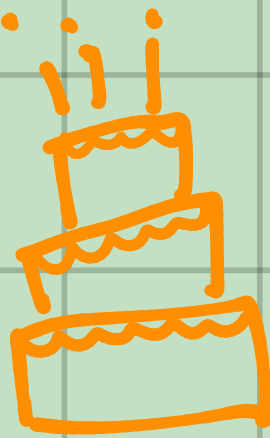
a. **SIMPLE** - single layer of cells

b. **STRATIFIED** - multiple layers of cells



Isipin mo parang layers of cake
pa simple (one layer lang)

 - yan simple, tignan mo 1 layer lang
pag stratified (multiple layers)

 - yan stratified, maraming layers!

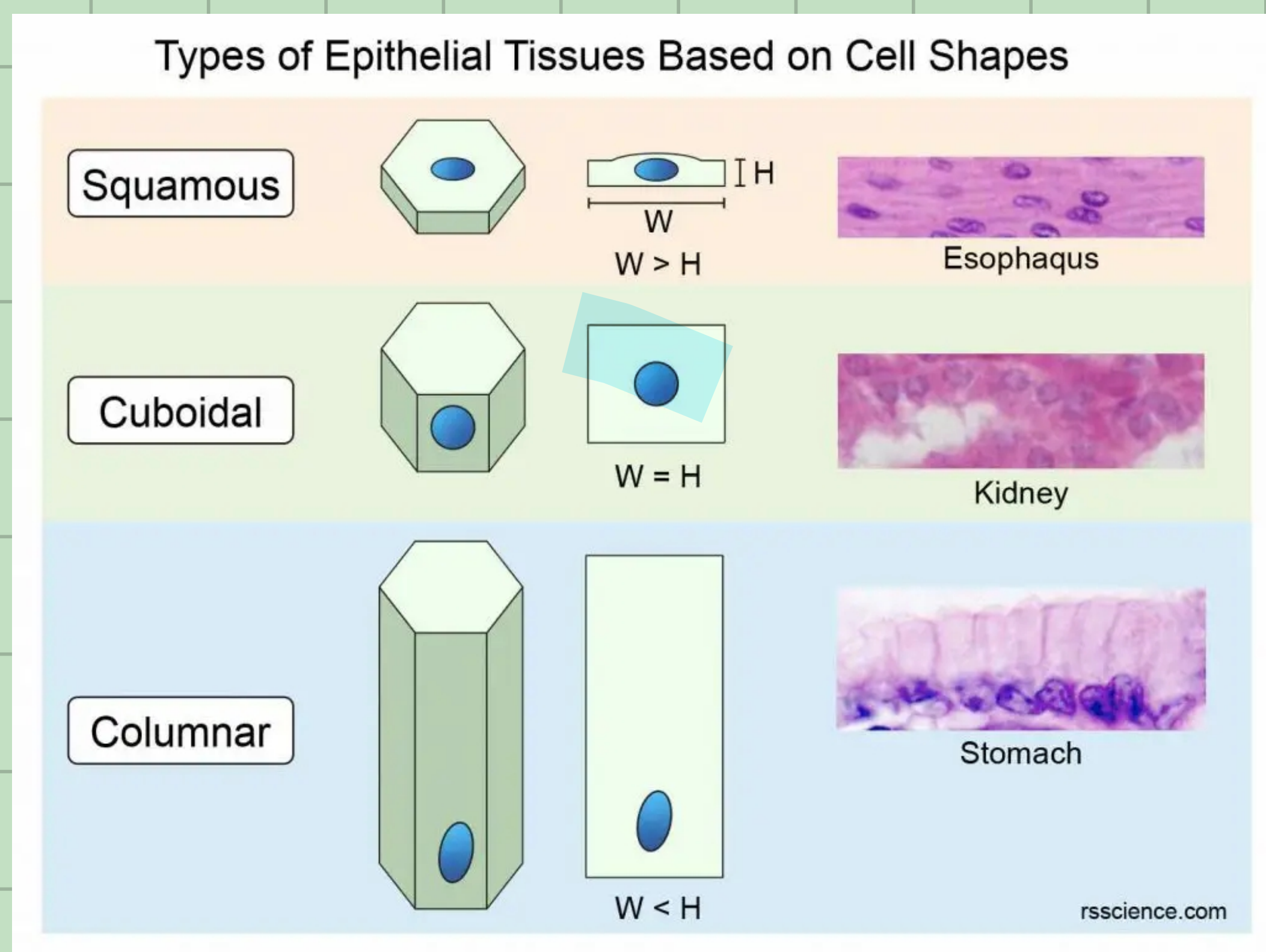
Next... based naman sa shape (hugis)

2. Based on the shape of the cells

a. **Squamous** (flat)

b. **Cuboidal**

c. **Columnar**



Crc tignan mo yung shape
pag Squamous tandaan mo
FLAT

Pag cuboidal - square shape

Pag columnar - rectangle

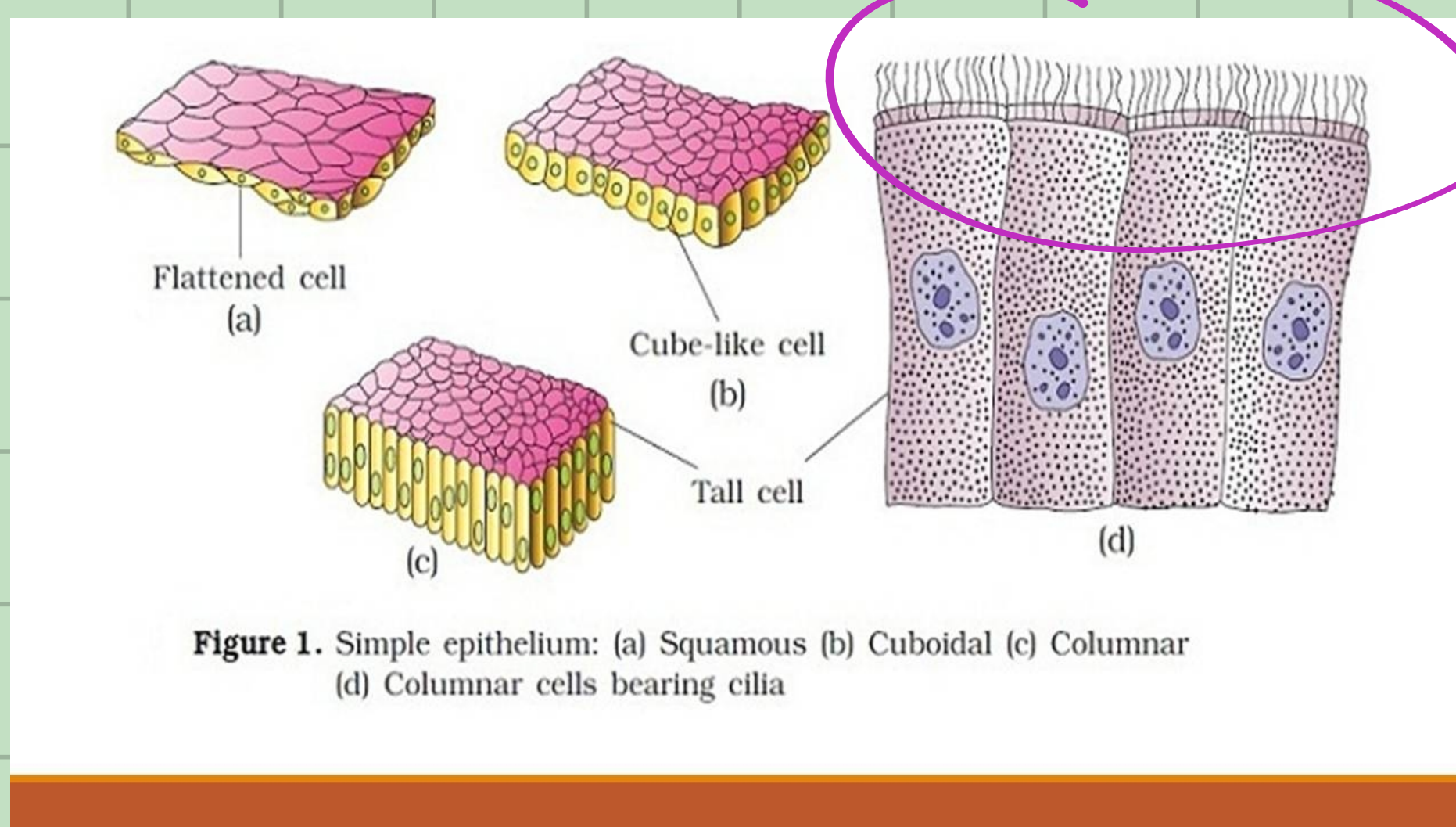
Upo yan kita mo yan, ganyan
shape lang yan. kinder kaya yan

Next naman based on modification (maam di ko alam ano yung modification 😊)

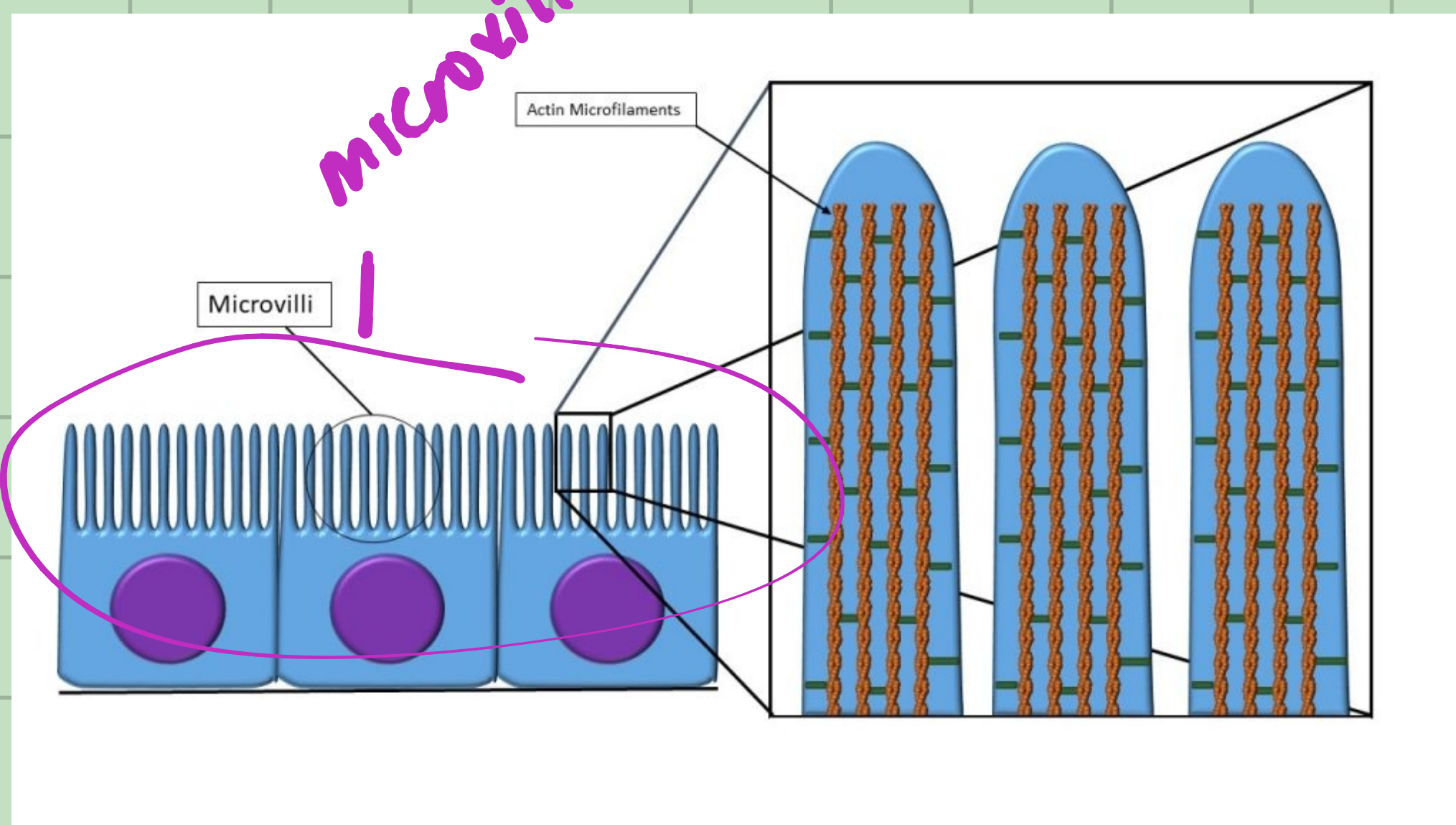
ere na nga intindi hng mabuti

3. Based on cellular modifications (usually present only in columnar epithelial cells)

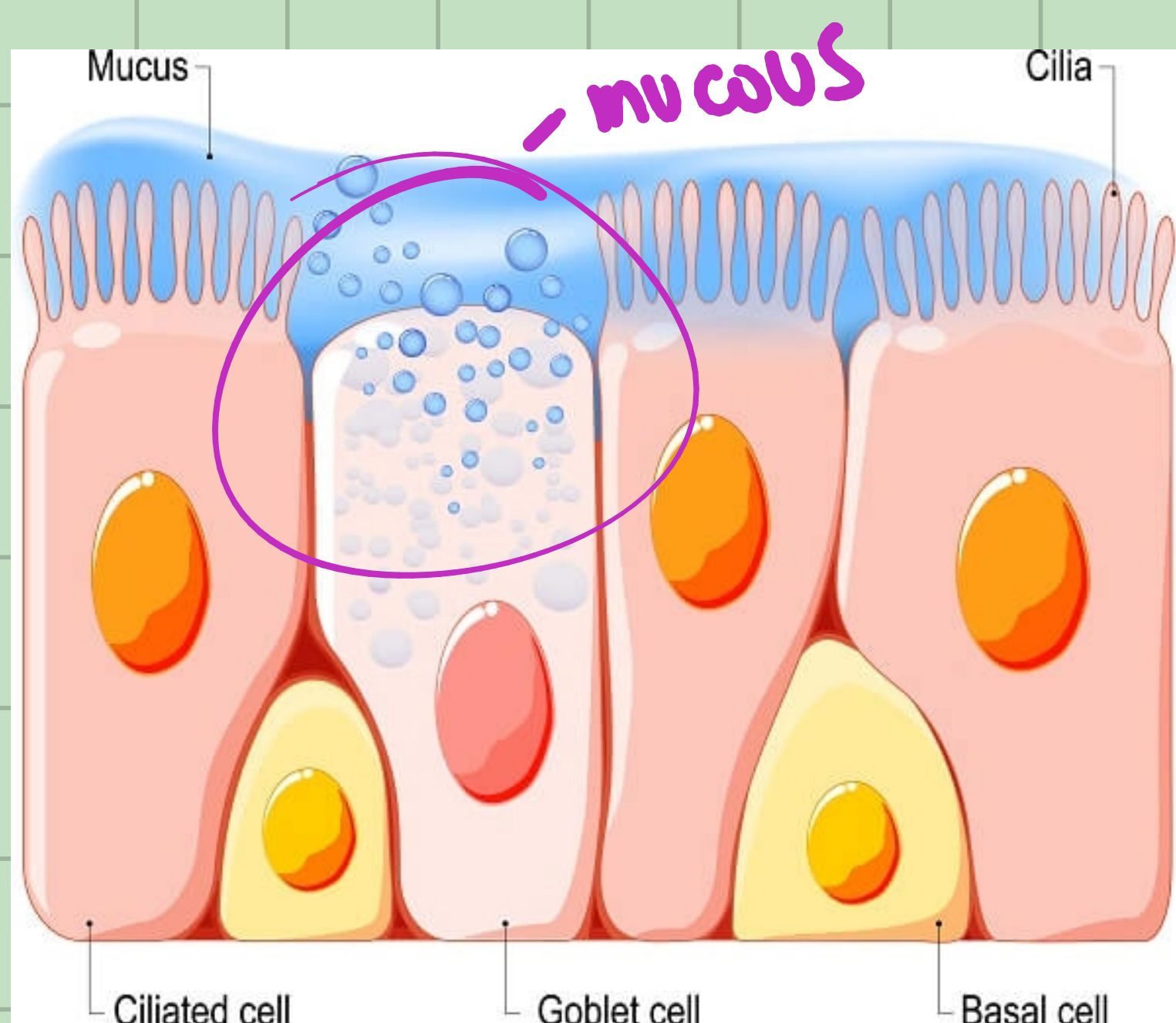
- cilia - fine motile hairs
- microvilli - finger-like extensions of the cell
 - ↑ increase the surface area of the cell
- mucus-secreting - Goblet cells



cilia - ibang tissues may cilia for movement



microvilli - ere di nagalaw, more on for absorption



mucous-secreting
ibang tissues naman
nag secrete ng mucous

Fre nasa TYPES na tayo (maam, ang dami po!!
wala kang choice baka lumabas
sa exam.)

TYPES OF EPITHELIAL TISSUES

1. Simple Squamous Epithelium

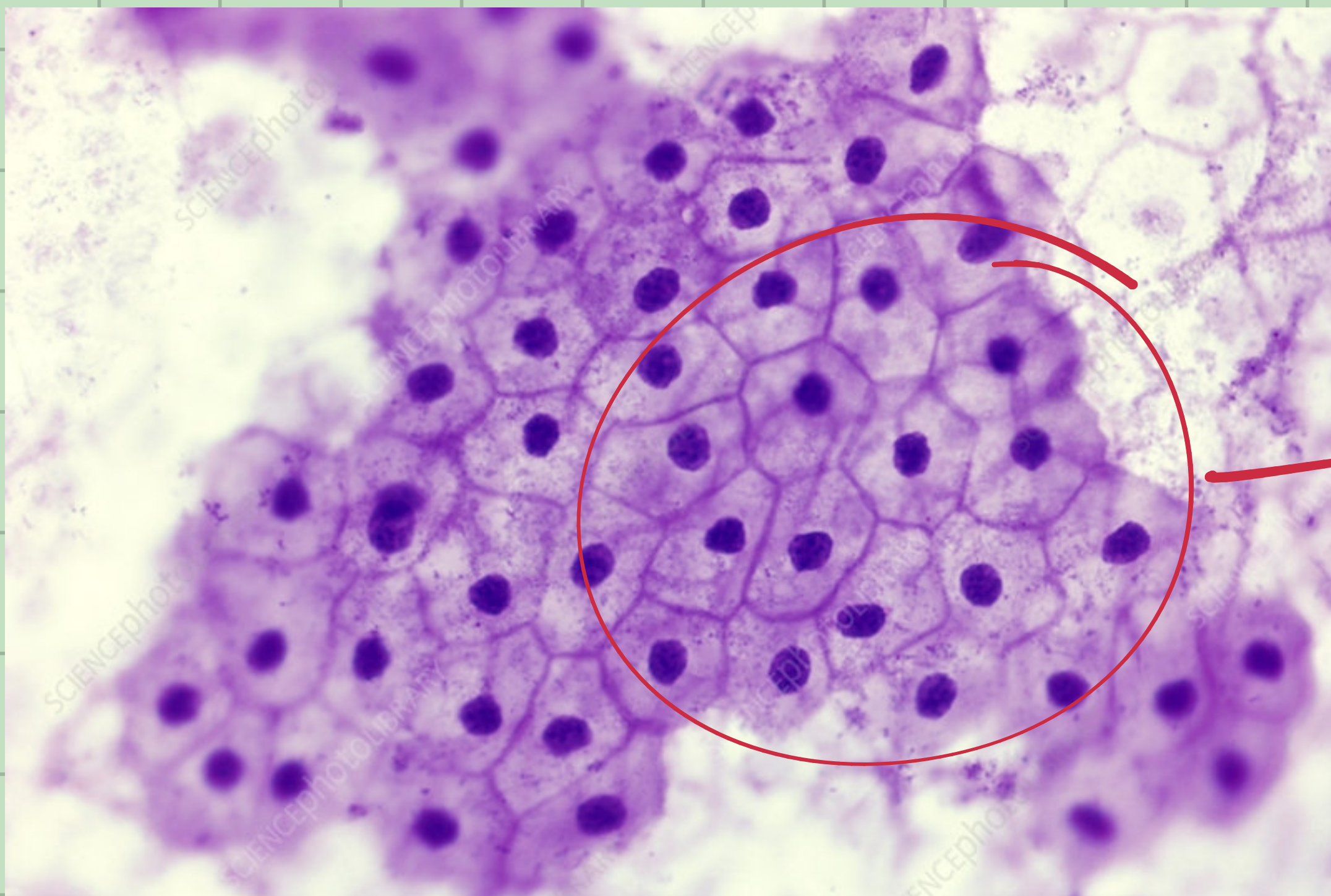
1 layer

Flat

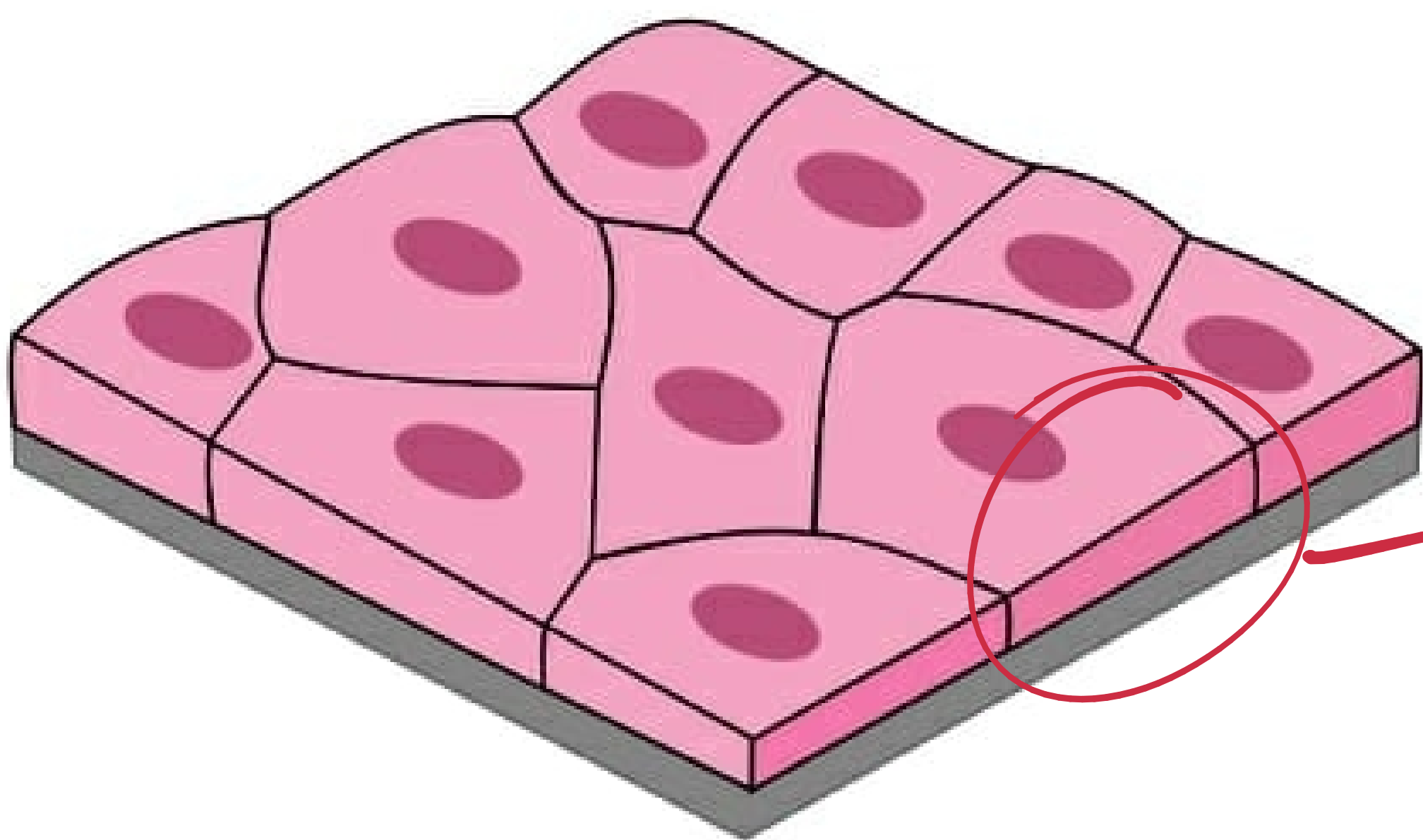
maam anong organ po may ganyang tissues?

makikita yan class sa alveoli mo sa lungs (baga)

makikita rin sa lining ng blood vessels (ogot)
at sa ibang membranes sa katwan



Simple squamous
epithelium yan
under microscope



yan o flat
saka 1 layer
lang

Sunod ..

2. Simple Cuboidal Epithelium

1 layer

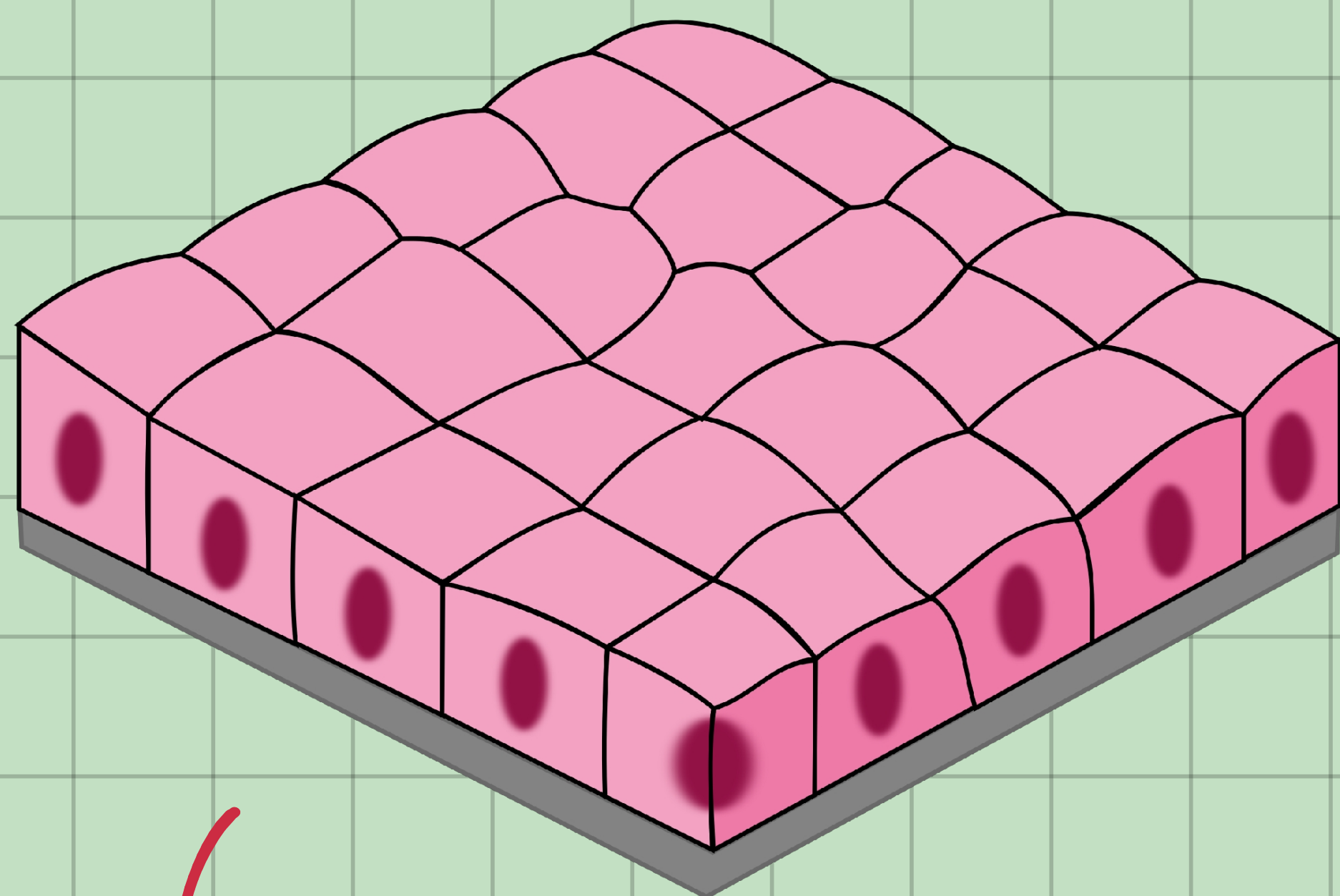
square

maam saang organs po makikita yung ganyang tissues?

Usually sa urinary track (daanan ng ihi)
pati na rin sa liver, pancreas, thyroid and other glands



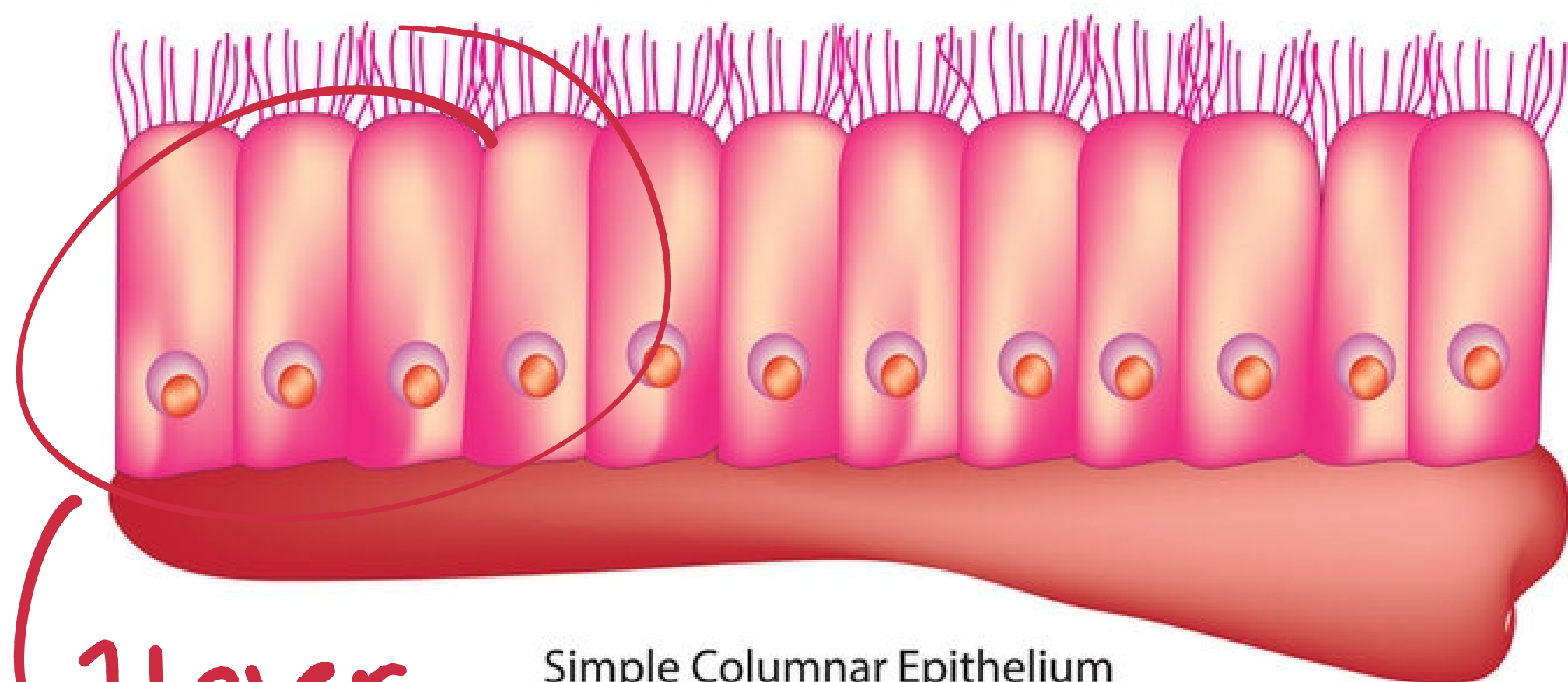
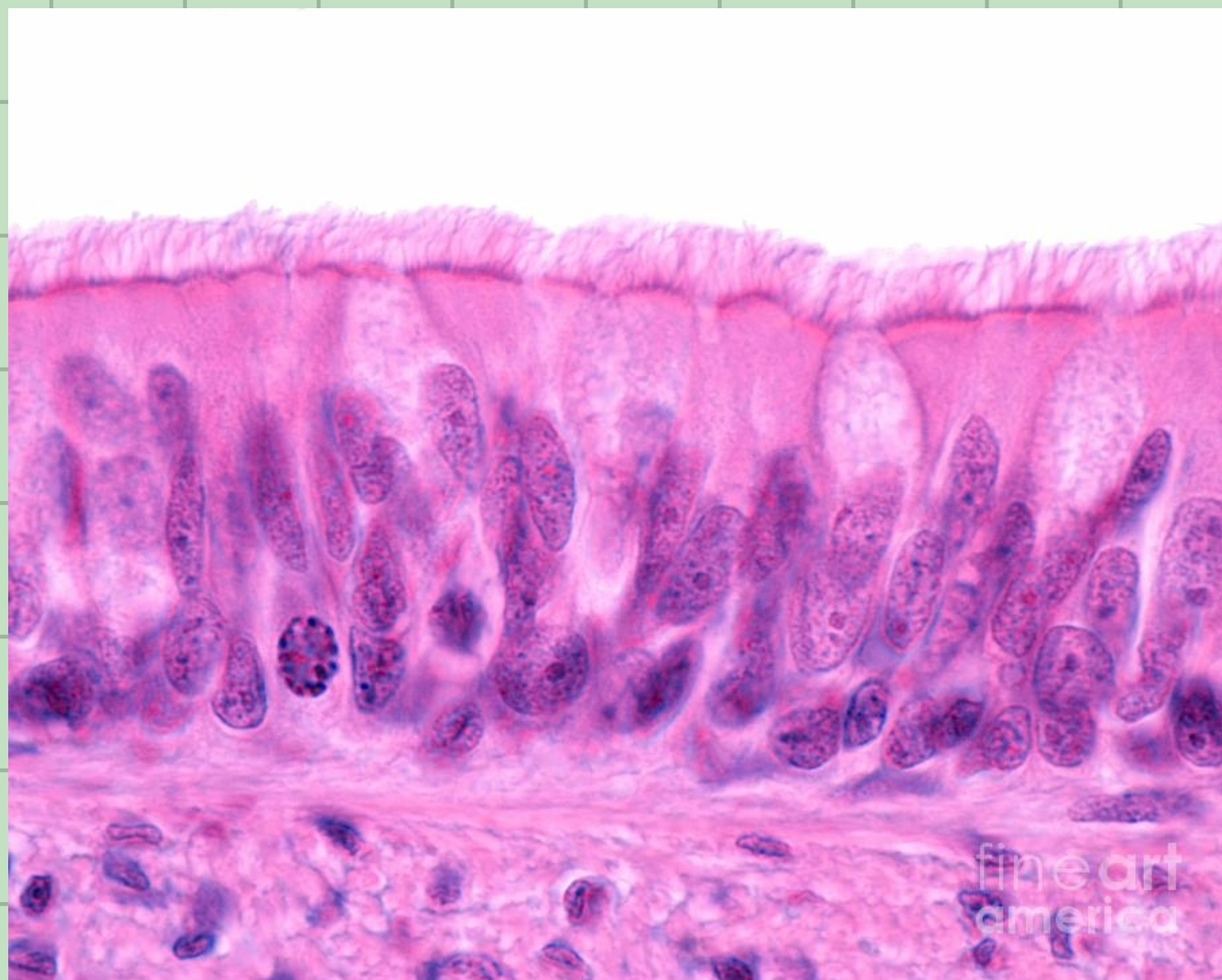
Yan it suva under
microscope



simple - 1 layer
tapos square shape

3. Simple Columnar Ciliated Epithelium

makikita ere sa fallopian tube, na sabi ko na dati ere
may cilia sa fallopian tube for movement of egg cell

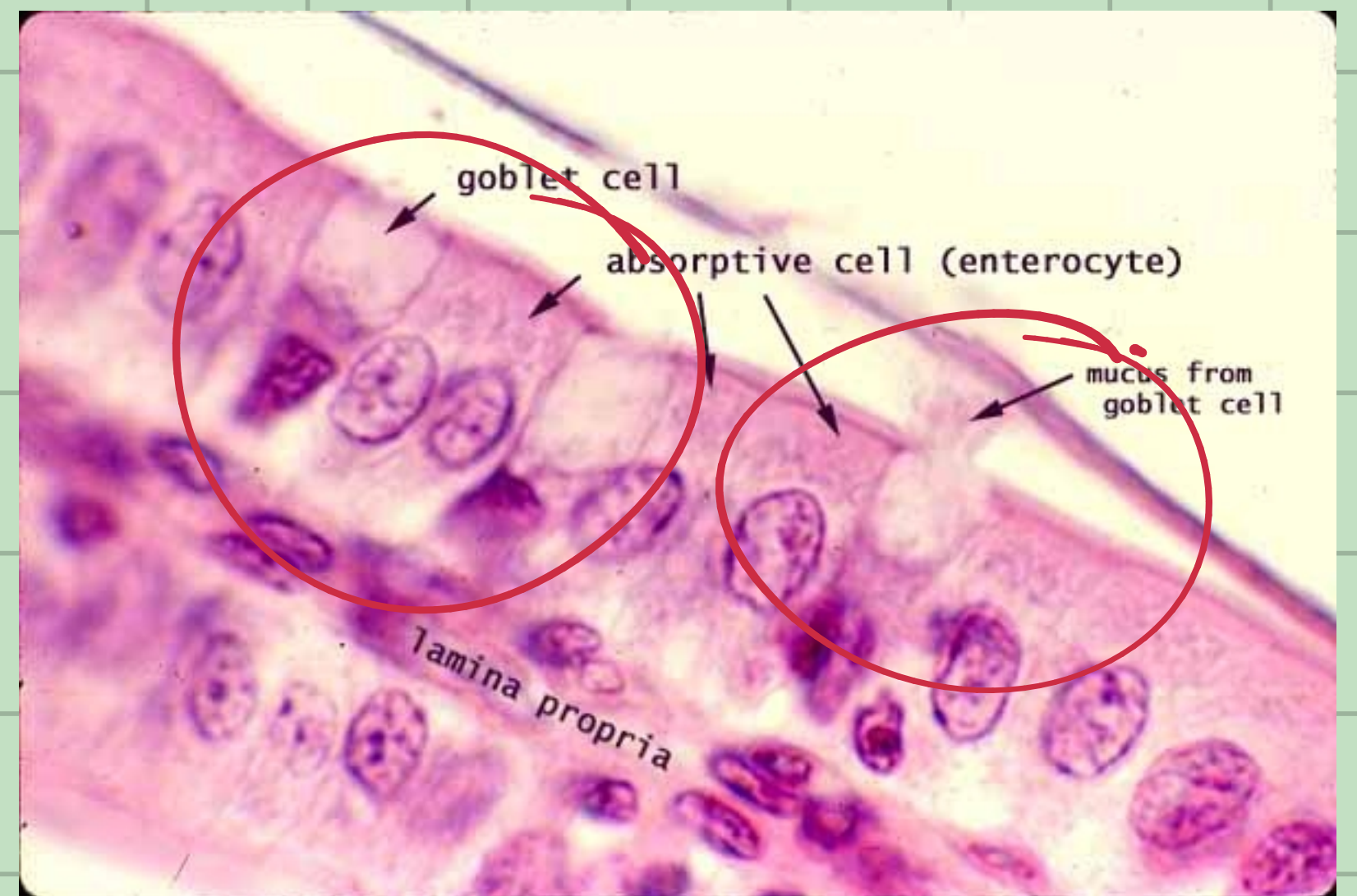
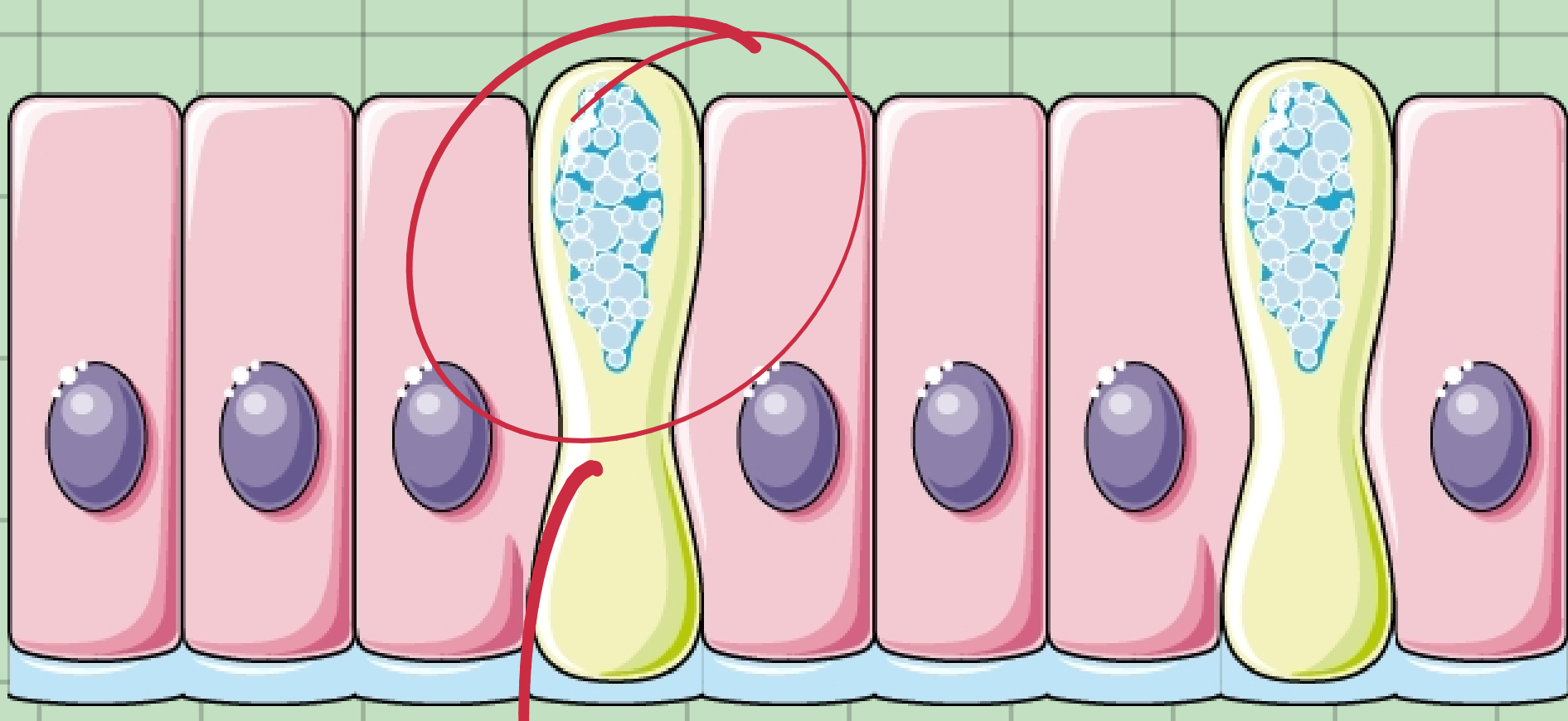


1 layer

Simple Columnar Epithelium

rectangle tapos may cilia

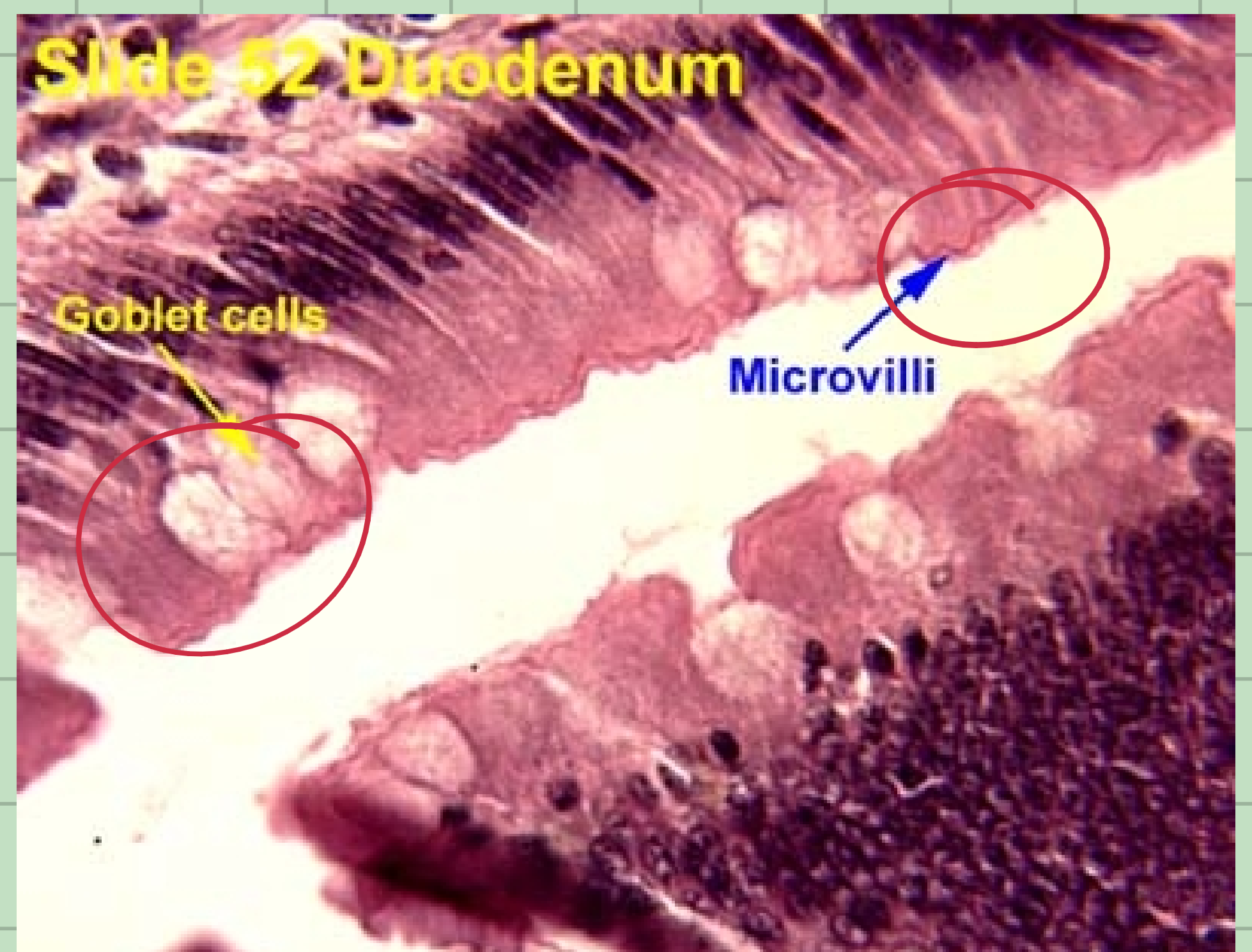
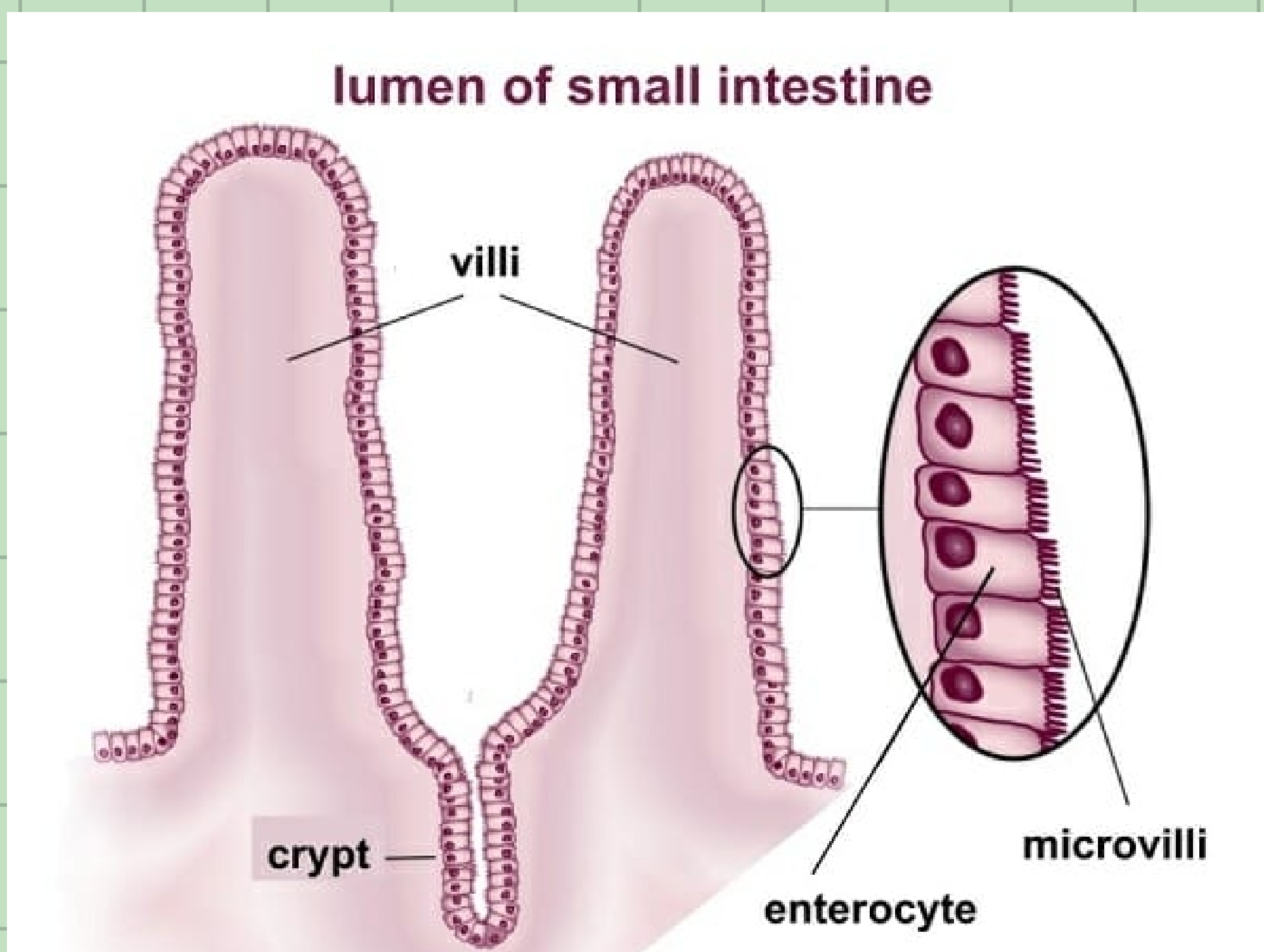
4. Simple Columnar Epithelium with Goblet cells make-up the lining of stomach



5. Simple Columnar microvilli epithelium with Goblet cells

1 layer, rectangle shape may microvilli saka goblet cells (haha na sa kanya na lahat!)

nakikita ere usually sa intestines (site of absorption)
kaya sya may microvilli para maabsorb lahat ng kinain mo.



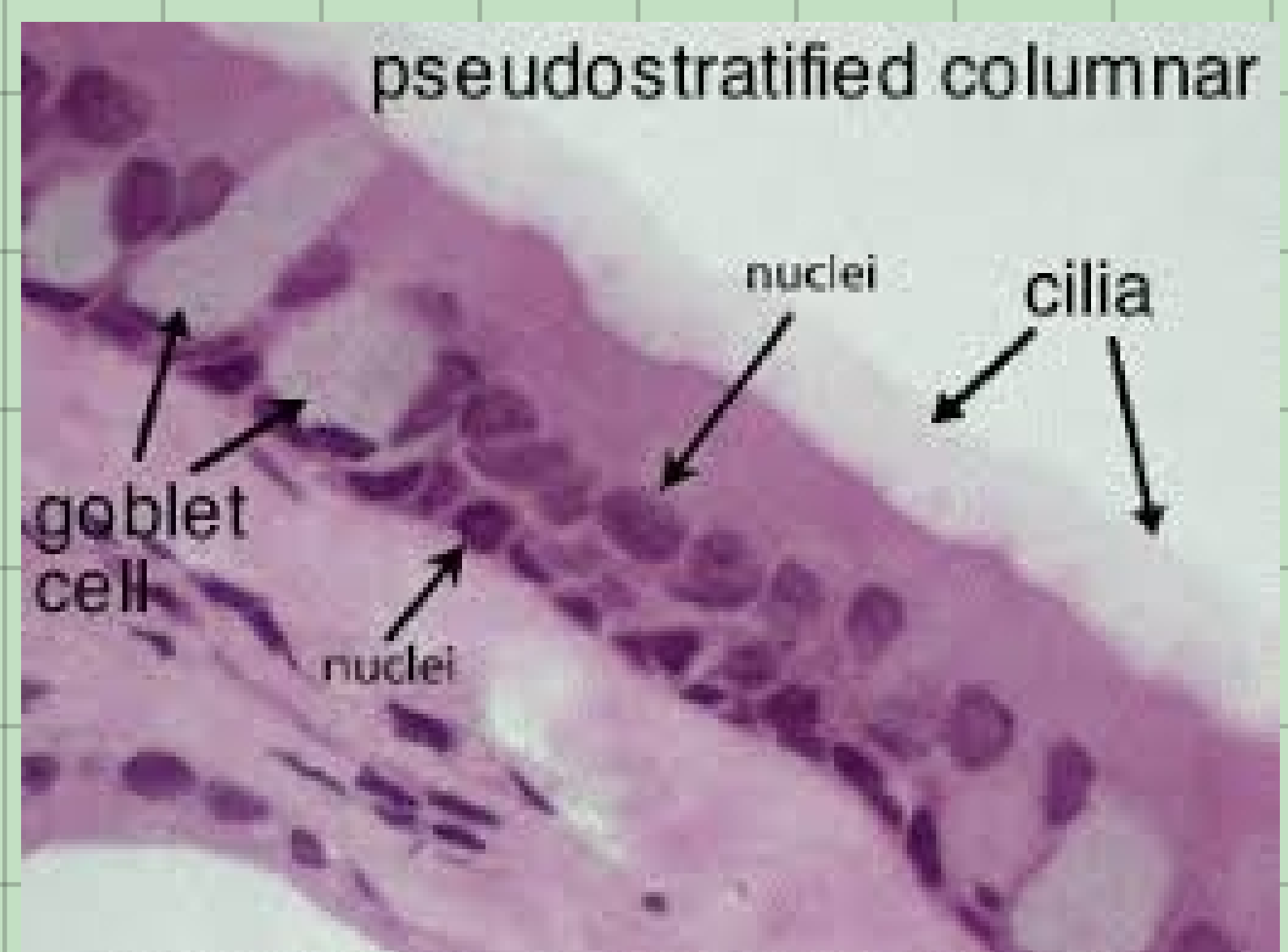
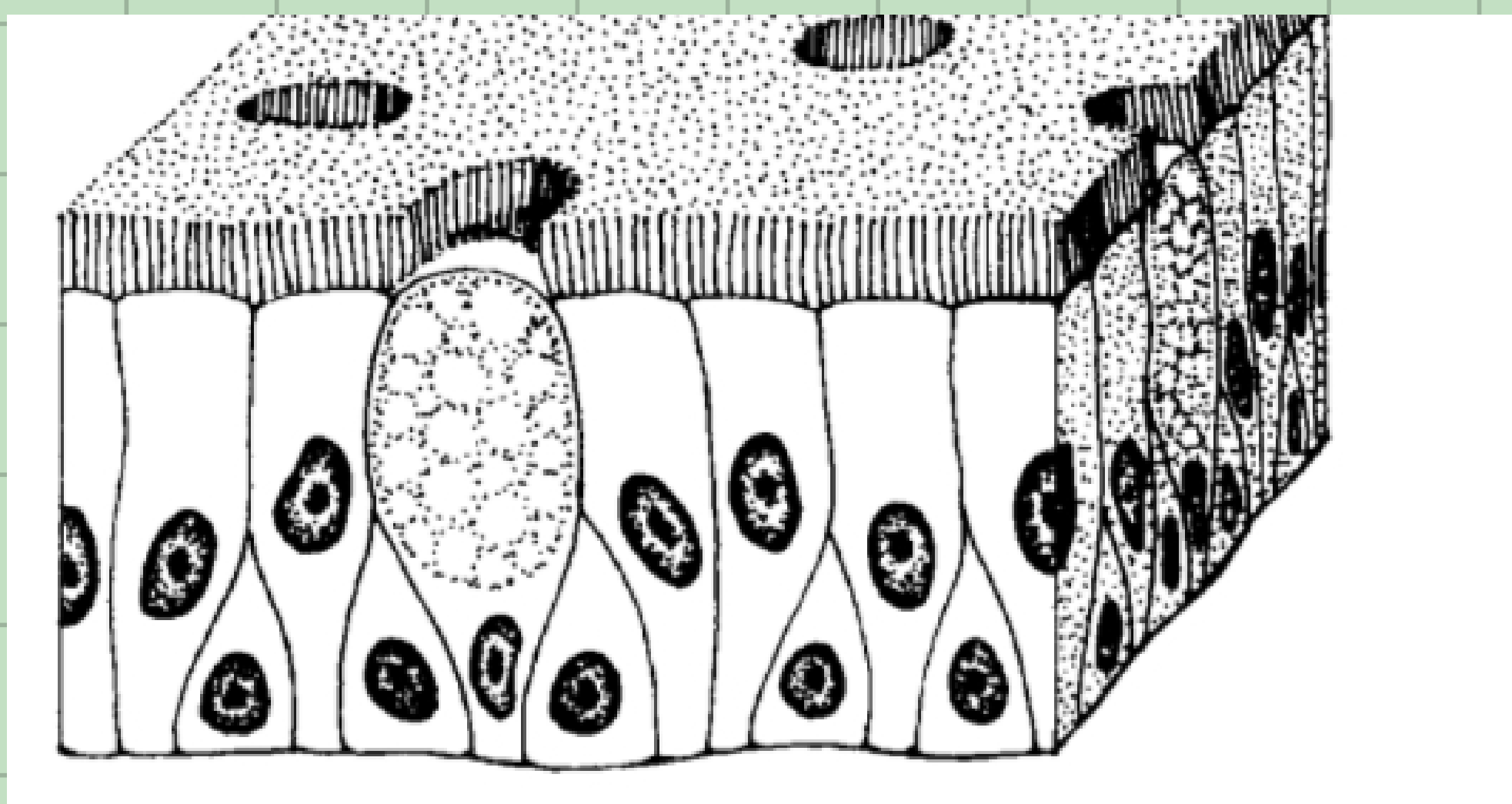
For absorption ere, class!

6. Pseudostratified Columnar Ciliated Epithelium with Goblet Cells (ciliated mucous membrane)

- makes up the lining of the respiratory track (daanan ng hangin)

Maam!! ano yung pseudo?
pseudo - means fake (feyk)

not equally tall ang mga cells, iba-iba ng height ng cells, nagmumukha siyang maraming layers pero iisa lang talaga.

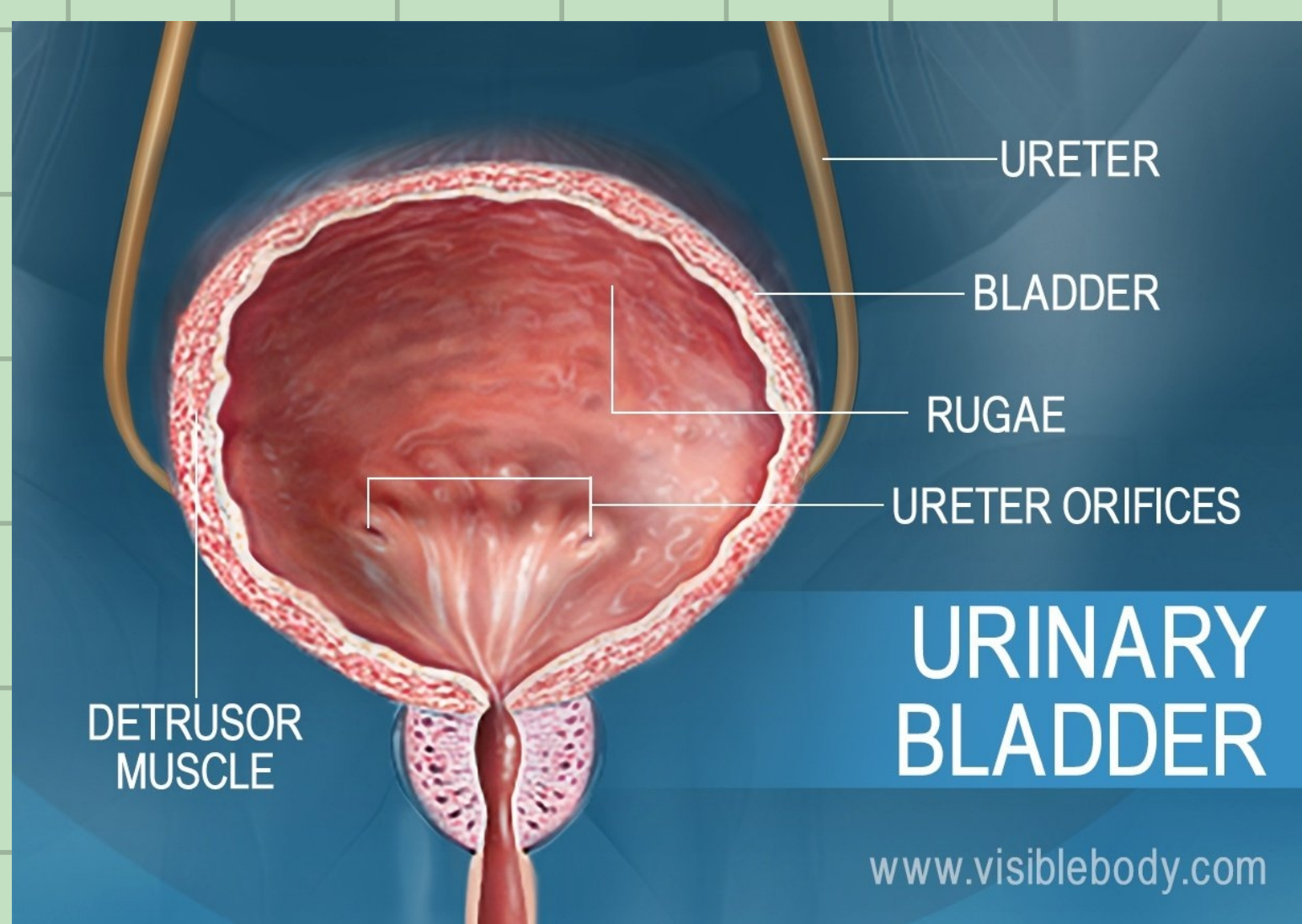


7. Transitional Epithelium

- makes up the lining of the urinary bladder (lagayan ng ihi)

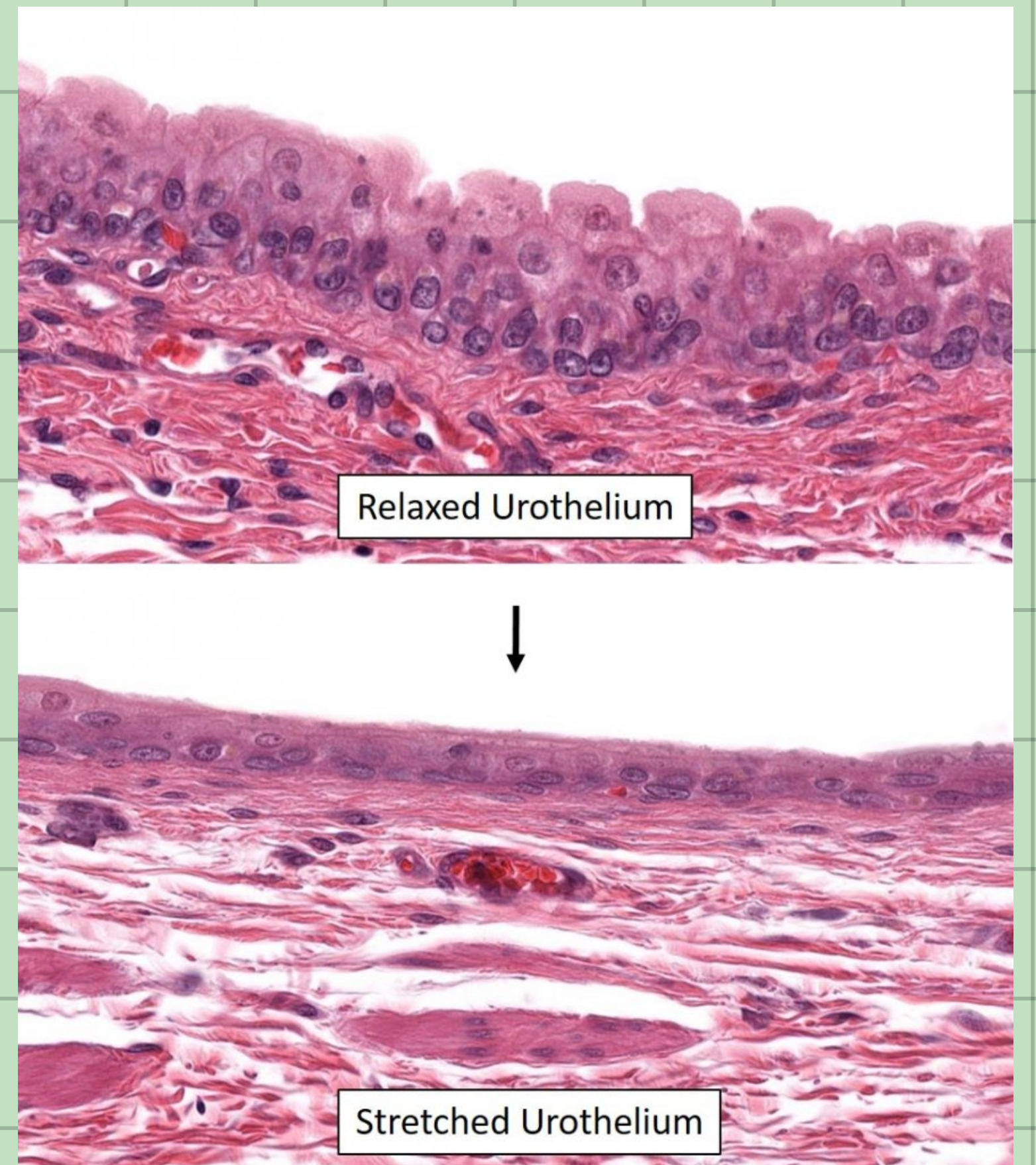
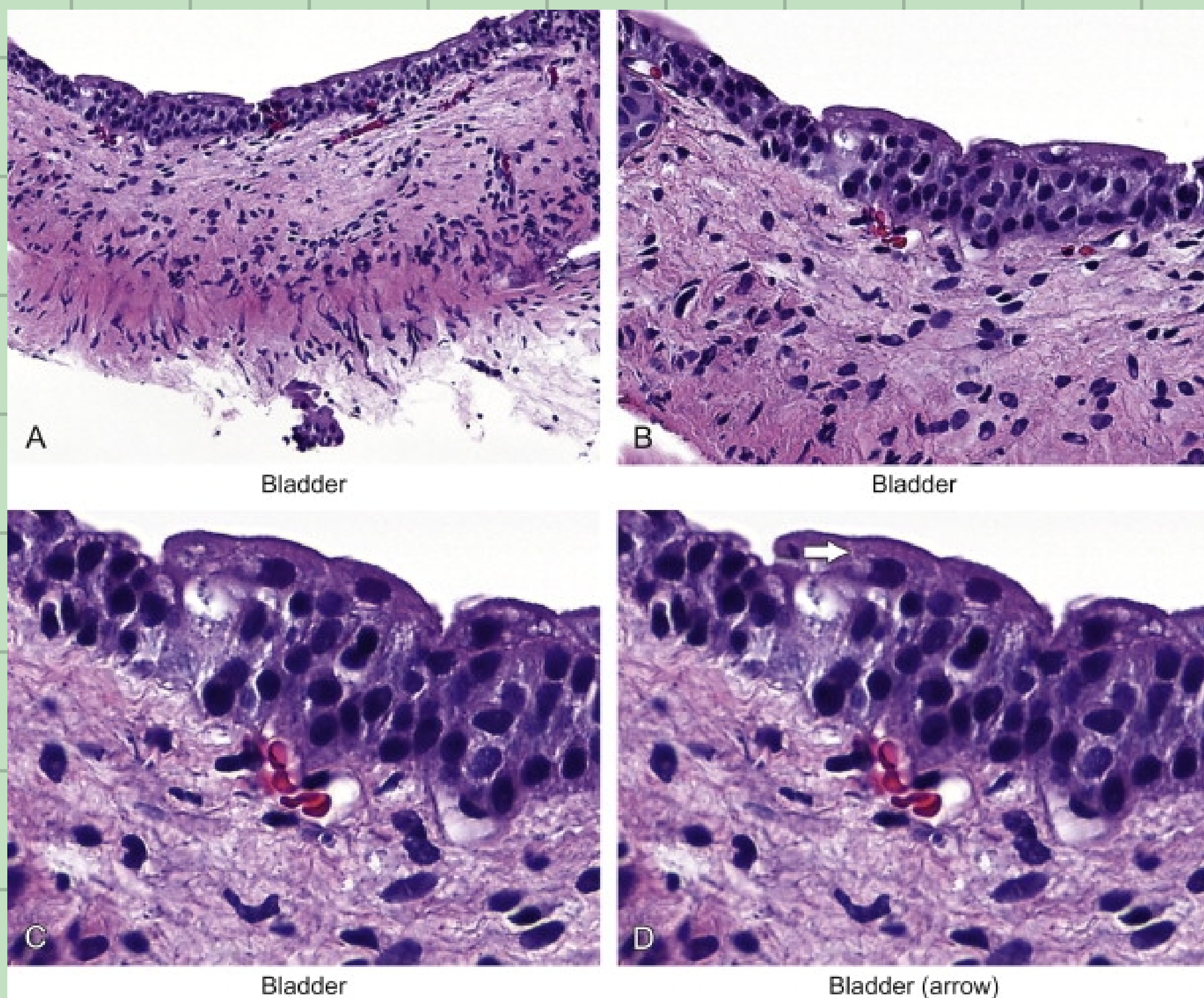
- Transitional tawag dyan kasi may ability silang magiba ng shape by means of stretching out.

maam ano? - tandaan mo sa urinary bladder or pantog mo naiipon ang ihi, kailangan magstretch yan para sa ihi na maiimbak sa loob



ere pantog mo, made out of transitional epithelium

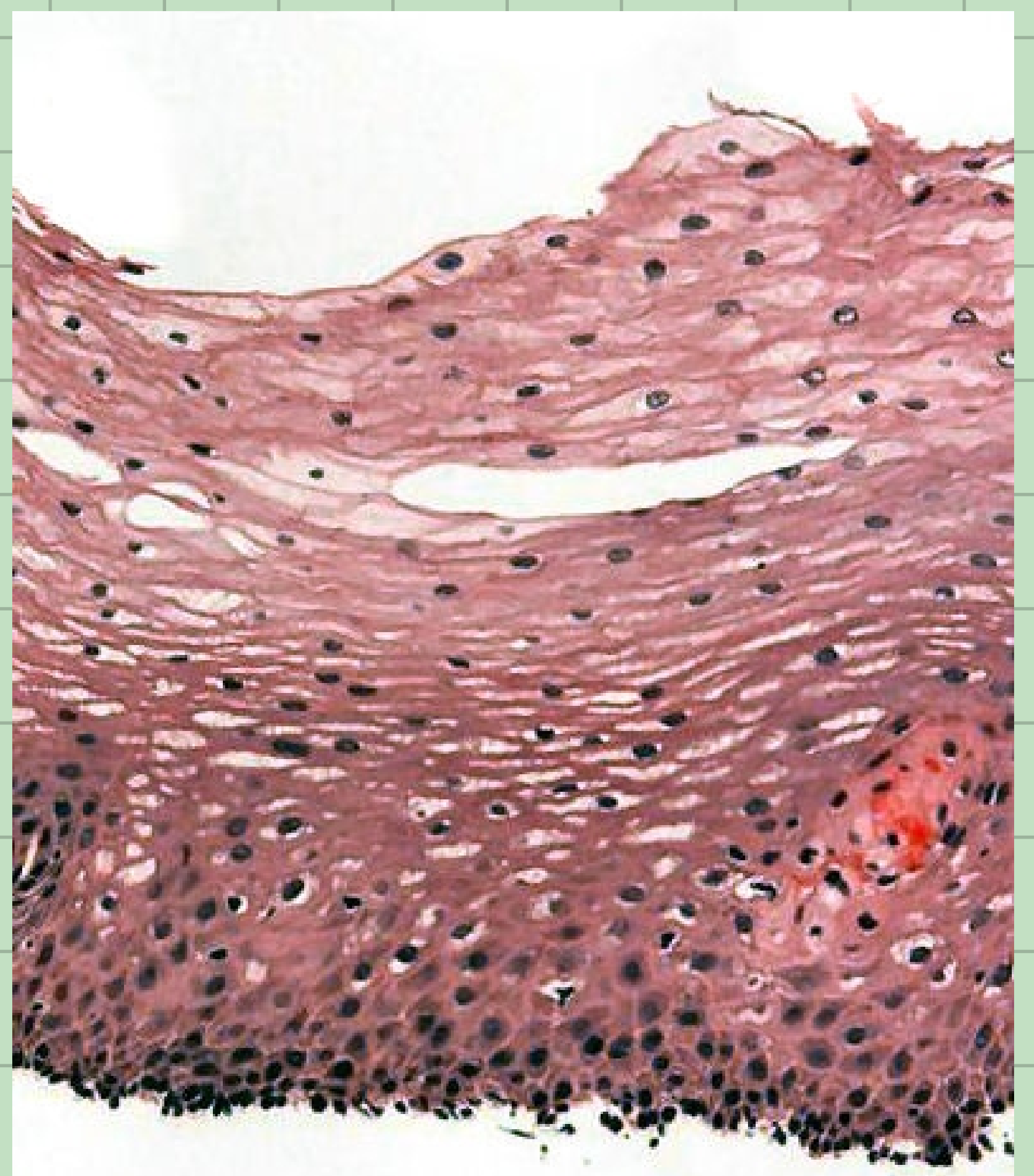
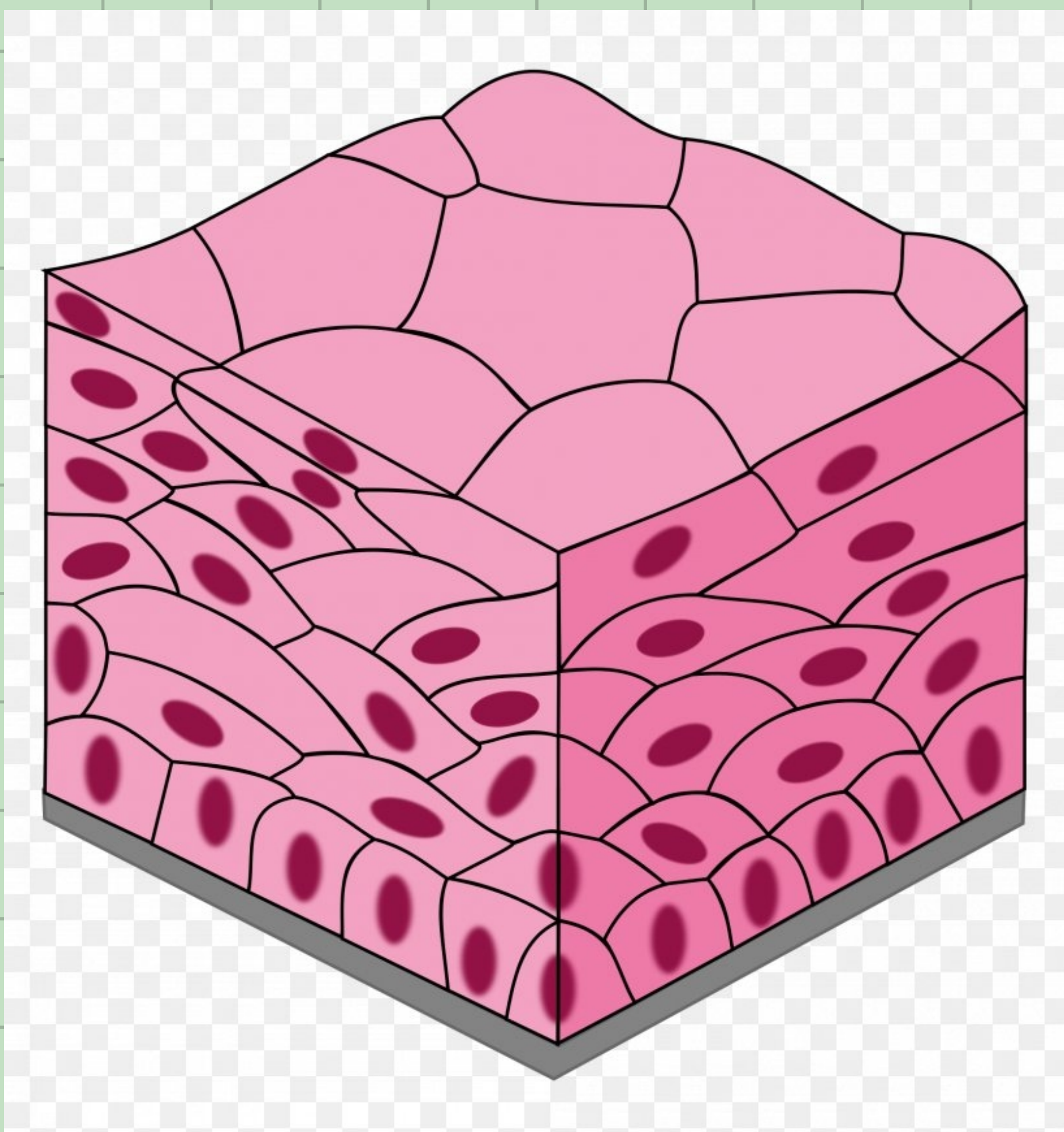
imagine mo parang balloon yung pantog mo , kapag napuno ng tubo, lumalaki na stretch out.



8. Stratified Squamous Epithelium

multiple layers flat

- located in areas of the body subject to abrasion (madaling magrugat)
- skin, oral cavity, anal canal, vaginal canal



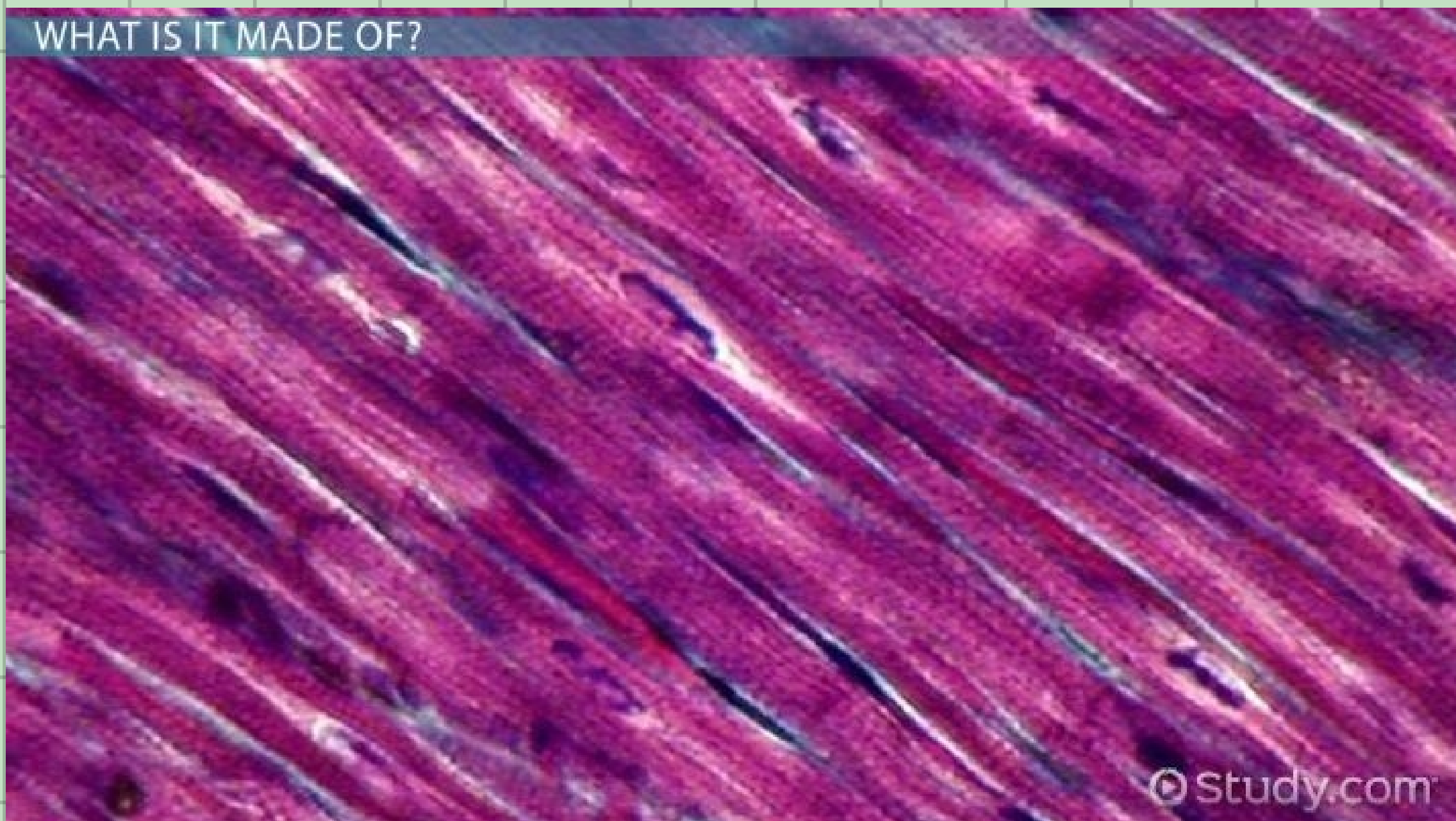
Sunod na type na class, kanina epithelial, ere naman ay connective tissues

2. CONNECTIVE TISSUES

- generally function to connect and support the other tissues of the body
- connective tissues are highly vascularized (lots of blood vessels madugo ere class)

1. Classifications of Connective tissues

- Regularly arranged dense fibrous connective tissue (oo mahaba yung name)
 - makikita ere sa tendons, ligaments, fascia, duramater



Dense regular connective tissue

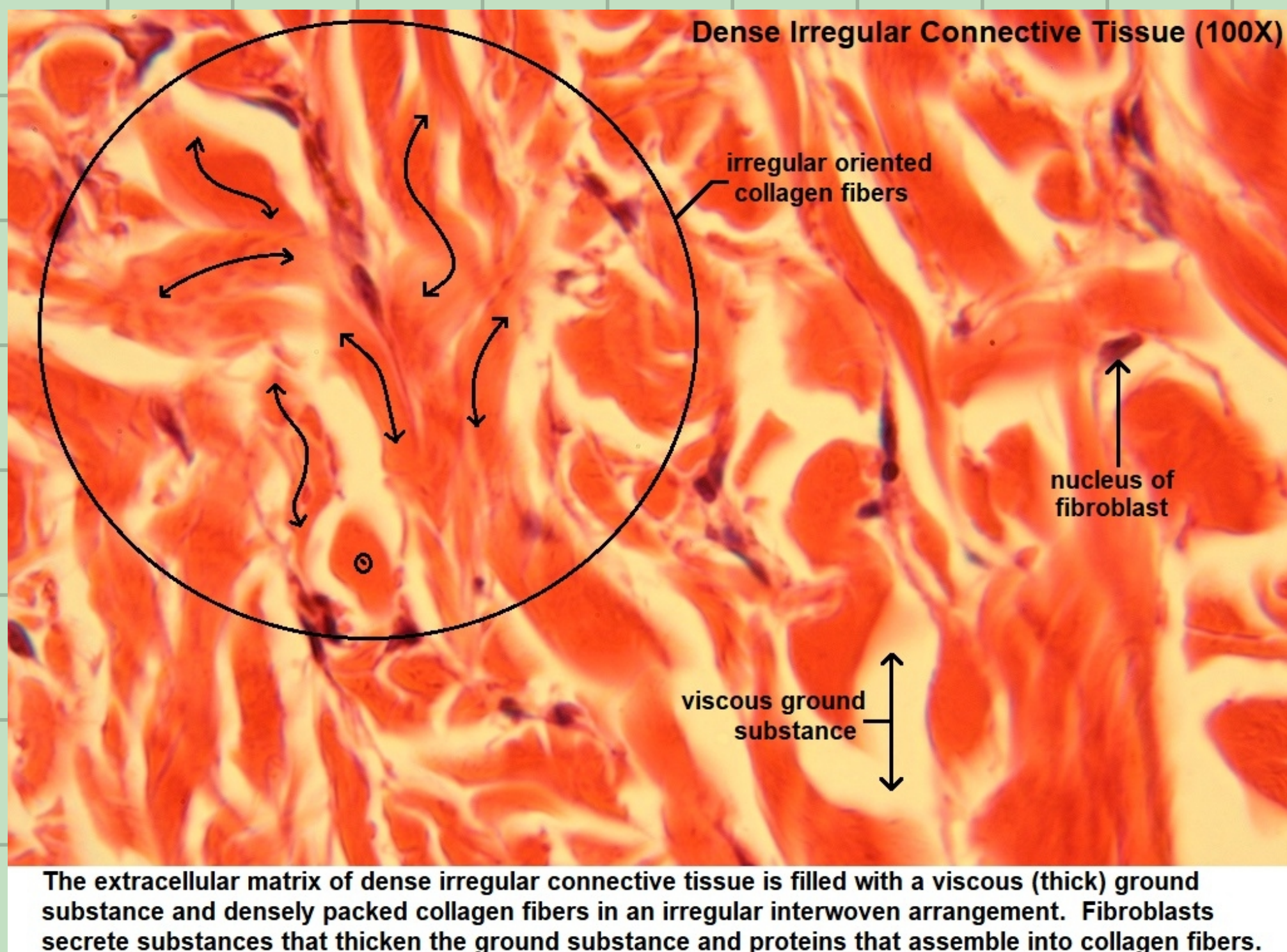
Dense regular connective tissue is a dense connective tissue characterized by extracellular fibers (collagen fibers) arranged in parallel bundles.

COLLAGEN →



b. Irregularly Arranged dense fibrous connective tissue

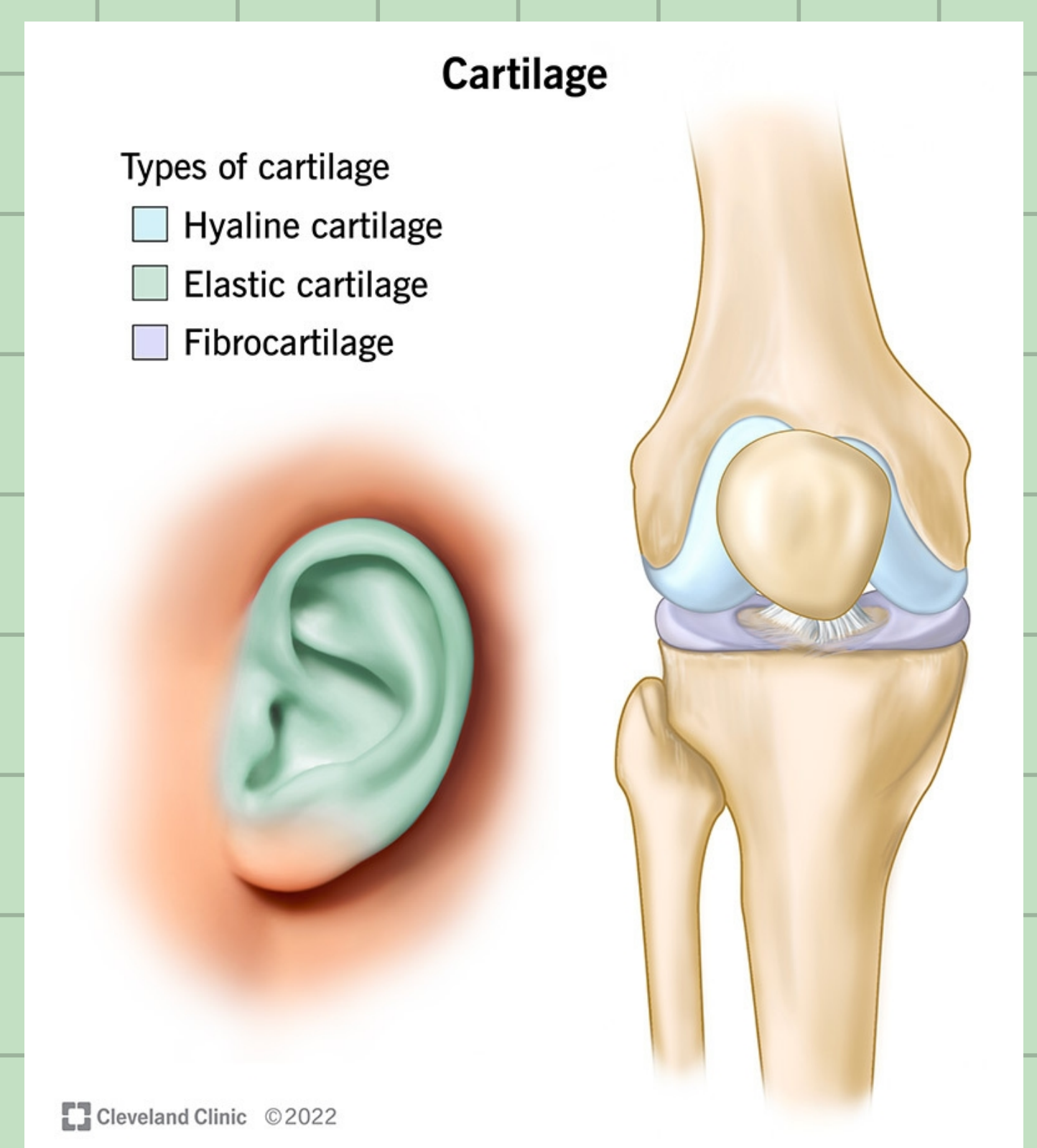
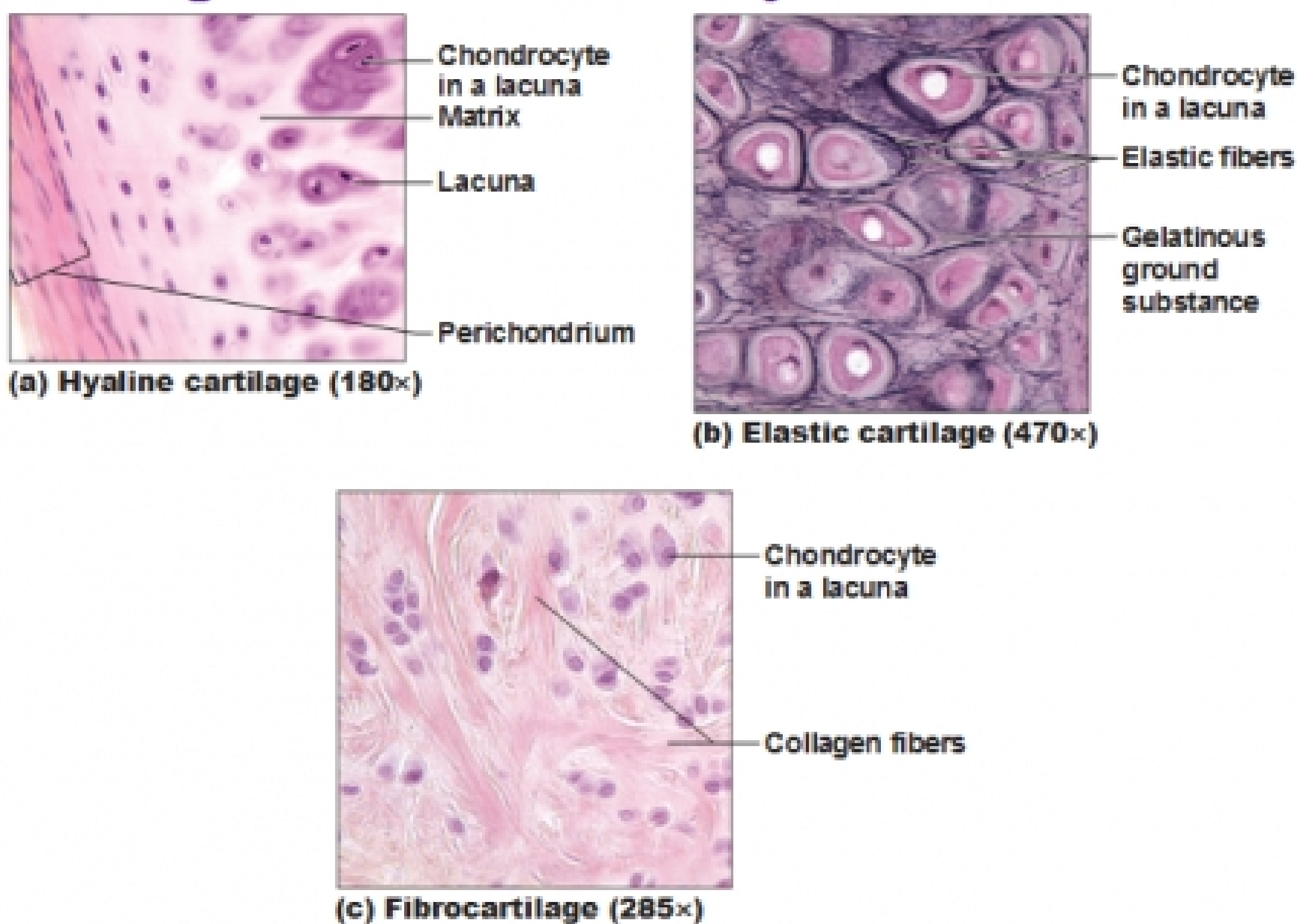
- the protein fibers are interwoven, running in all directions
- makikita sa dermis layer ng skin or sa scar tissues



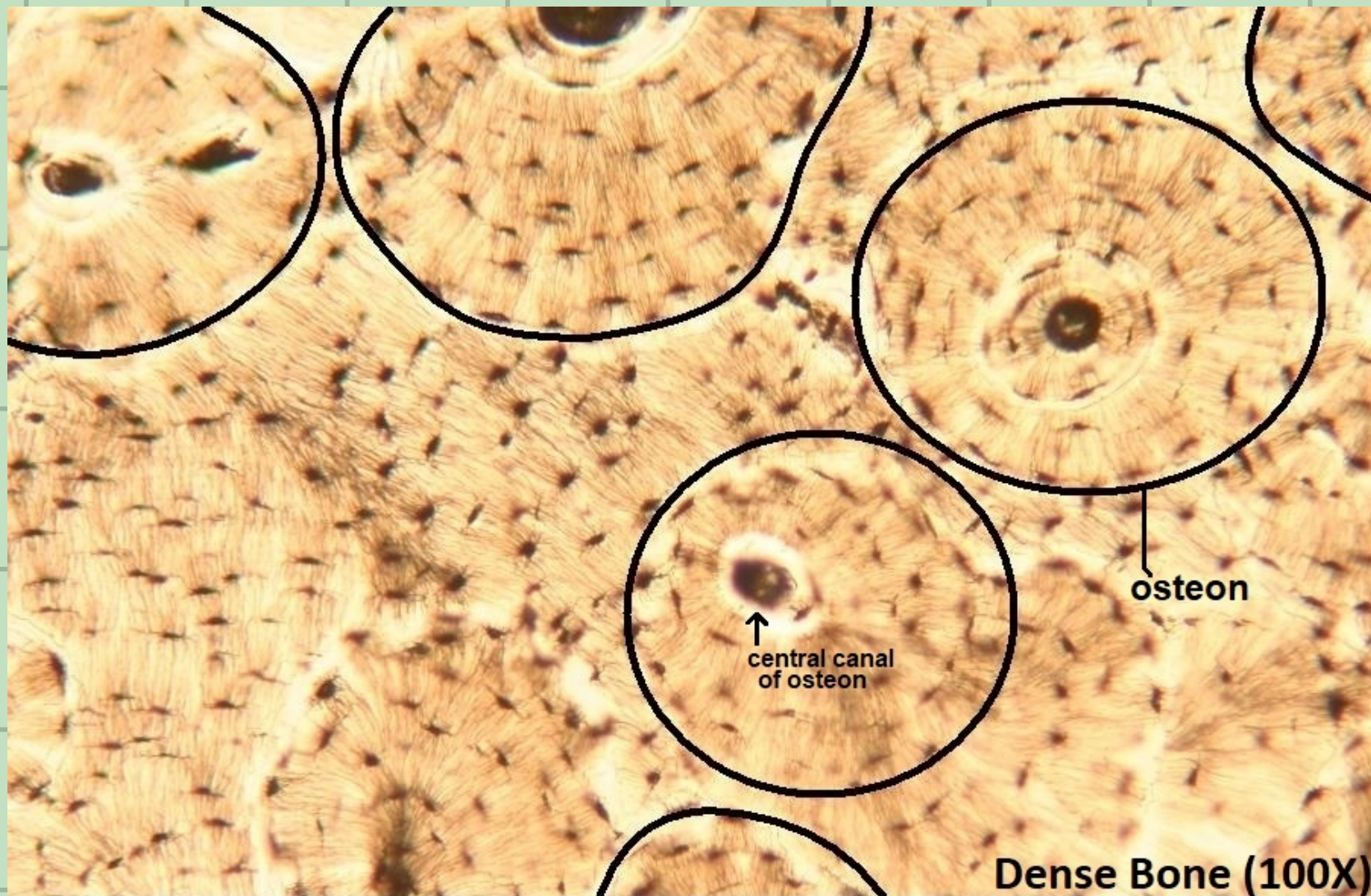
tignan mo yung orientation nya iba-iba ng route magulo parang utak nyo class hehehe.

- ## c. Cartilage
- does not contain blood vessels (non-vascularized)
 - an exception to the general pattern of connective tissues
 - cartilage tissue is capable of growing both length and width

Cartilages in the Adult Body



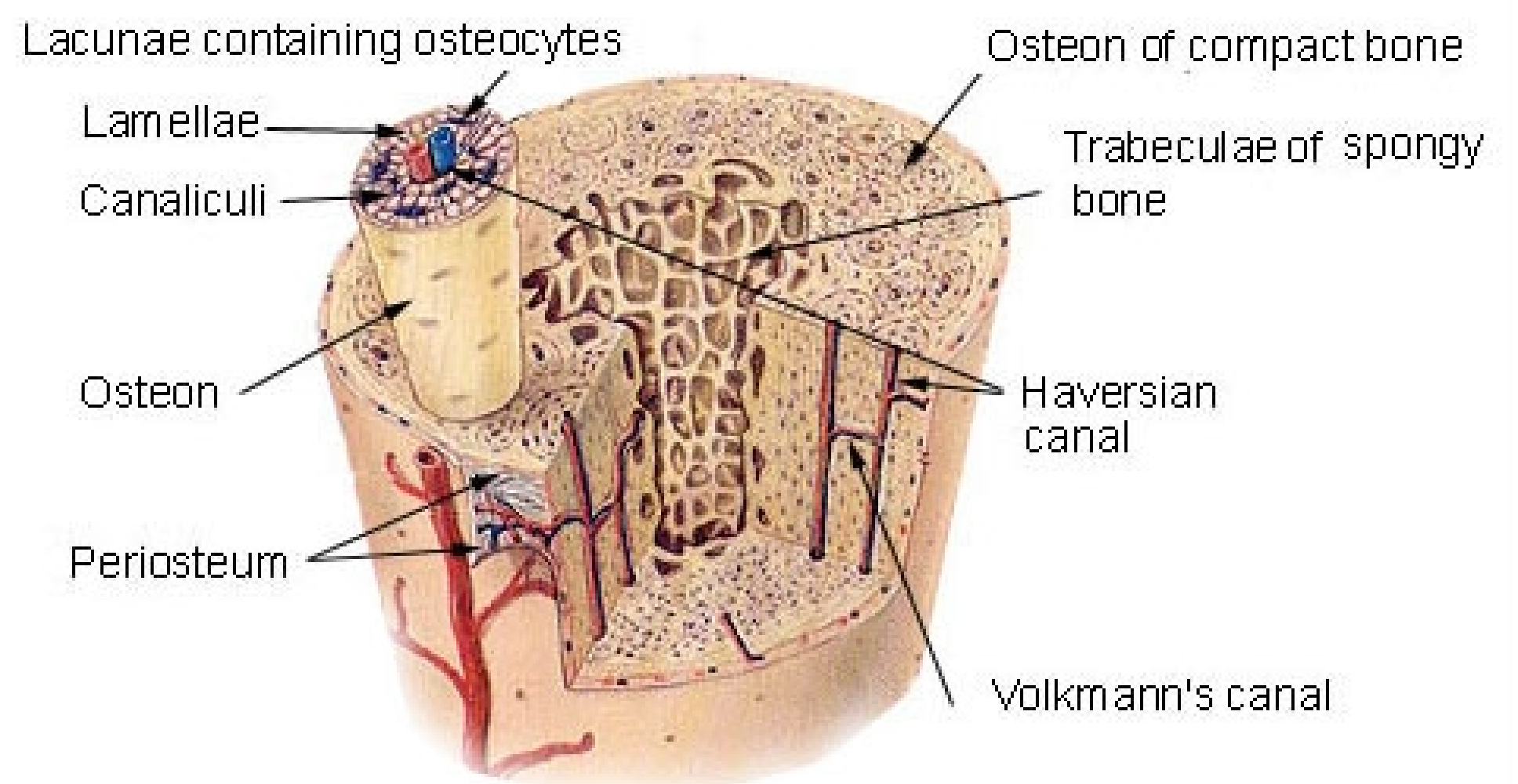
- d. Bone tissues - highly vascularized (madugo)
- bone tissue is only capable of growing in width



Dense Bone (100X)

Dense bone is organized into many columns of bone tissue called osteons which run parallel to the long axis of bones. At the center of each osteon is a central canal which contains blood vessels carrying blood to and from the osteon. Layers of matrix known as lamella form around the central canal giving the osteon a target-like appearance.

Compact Bone & Spongy (Cancellous Bone)



Pangatlo class, muscle tissues

3. MUSCLE TISSUES

- tatlong klase ang muscle tissues natin

a. Visceral (smooth) muscle tissues

Location: walls of internal organs

✓ blood vessels

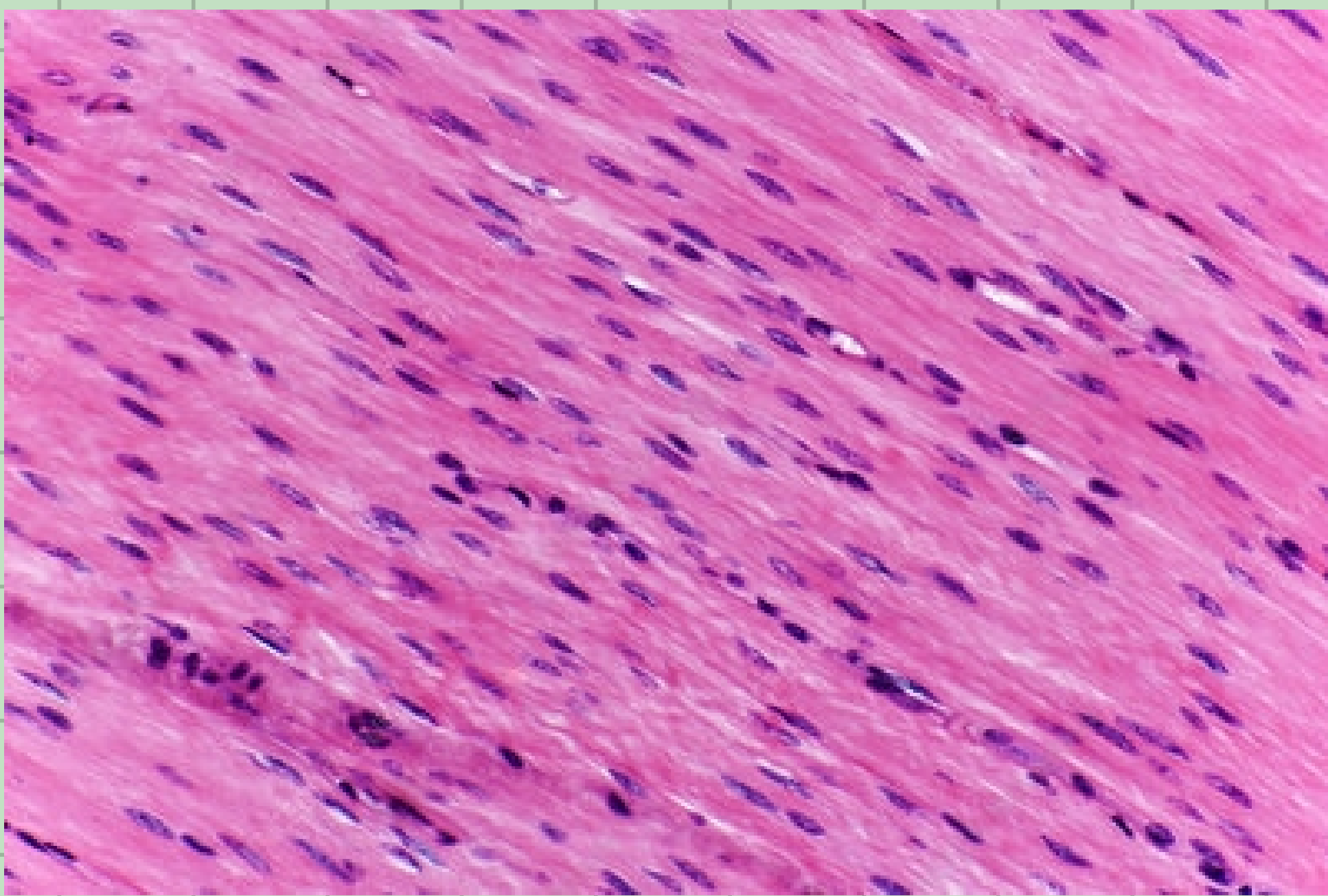
✓ bronchioles

✓ uterus

✓ alimentary canal (daanan ng kinain mo)

✓ iris (mata)

- no striation apparent within the cells
- the cells are electrically joined by gap junctions
- innervated by autonomic nervous system



maam di ko po gets !!
alam ko, hayysss

tandaan mo smooth
muscle tissue, based on
appearance wala silang
striation, smooth ngae

tapos ano pa,
innervated ng autonomic
nervous system, ano yung innervated maam?

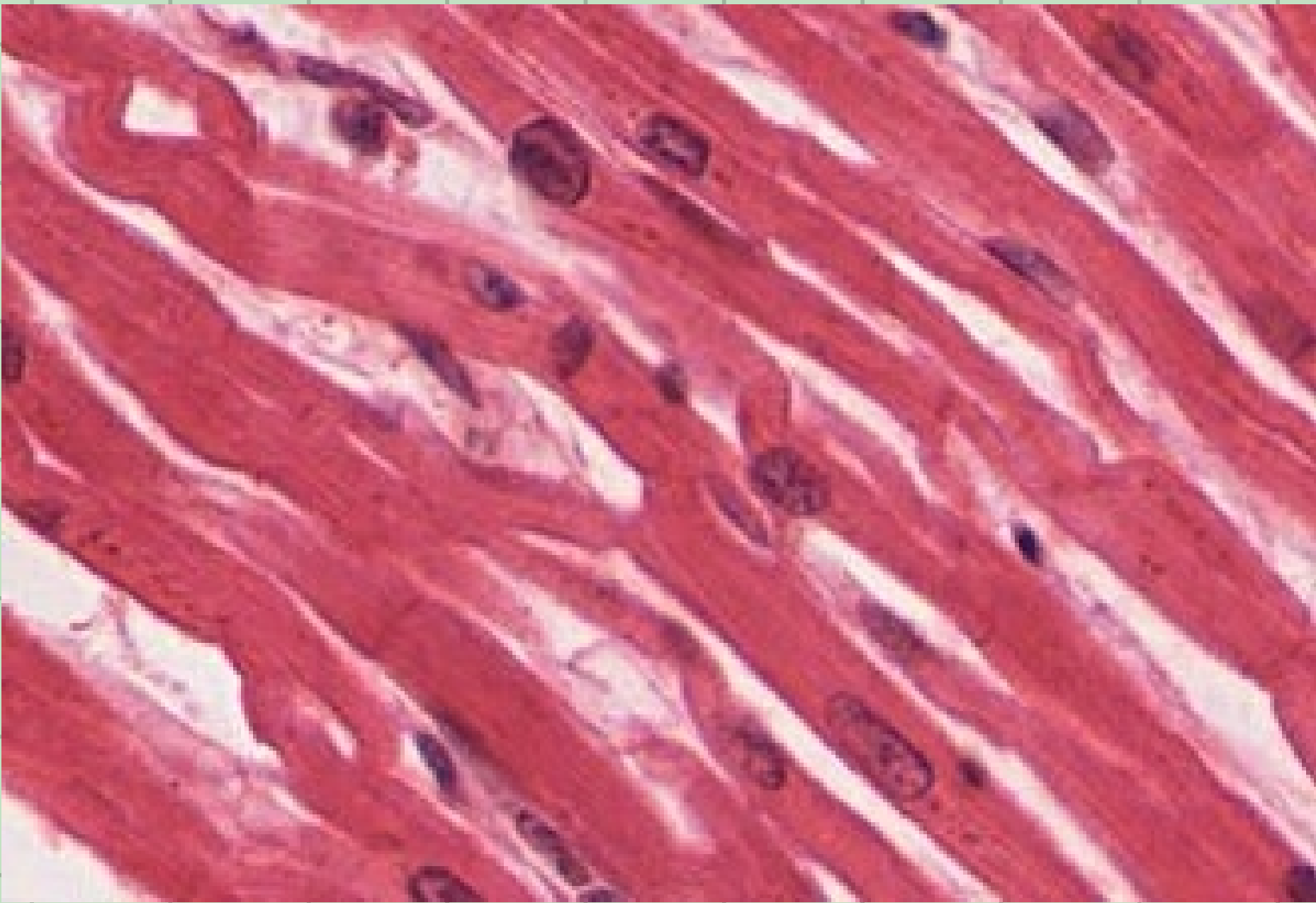
Innervation - supply of nerve cells in an organ.

tandaan mo muna yen sa susunod ko
i further explain.

b. Cardiac (Heart) Muscle tissues

- Faint Striation
- cells are electrically joined together by gap junction (intercalated discs)
- innervated by autonomic nervous system

↓
automatic na gumagalaw
kahit di mo utusan
katulad ng smooth muscle
tissues

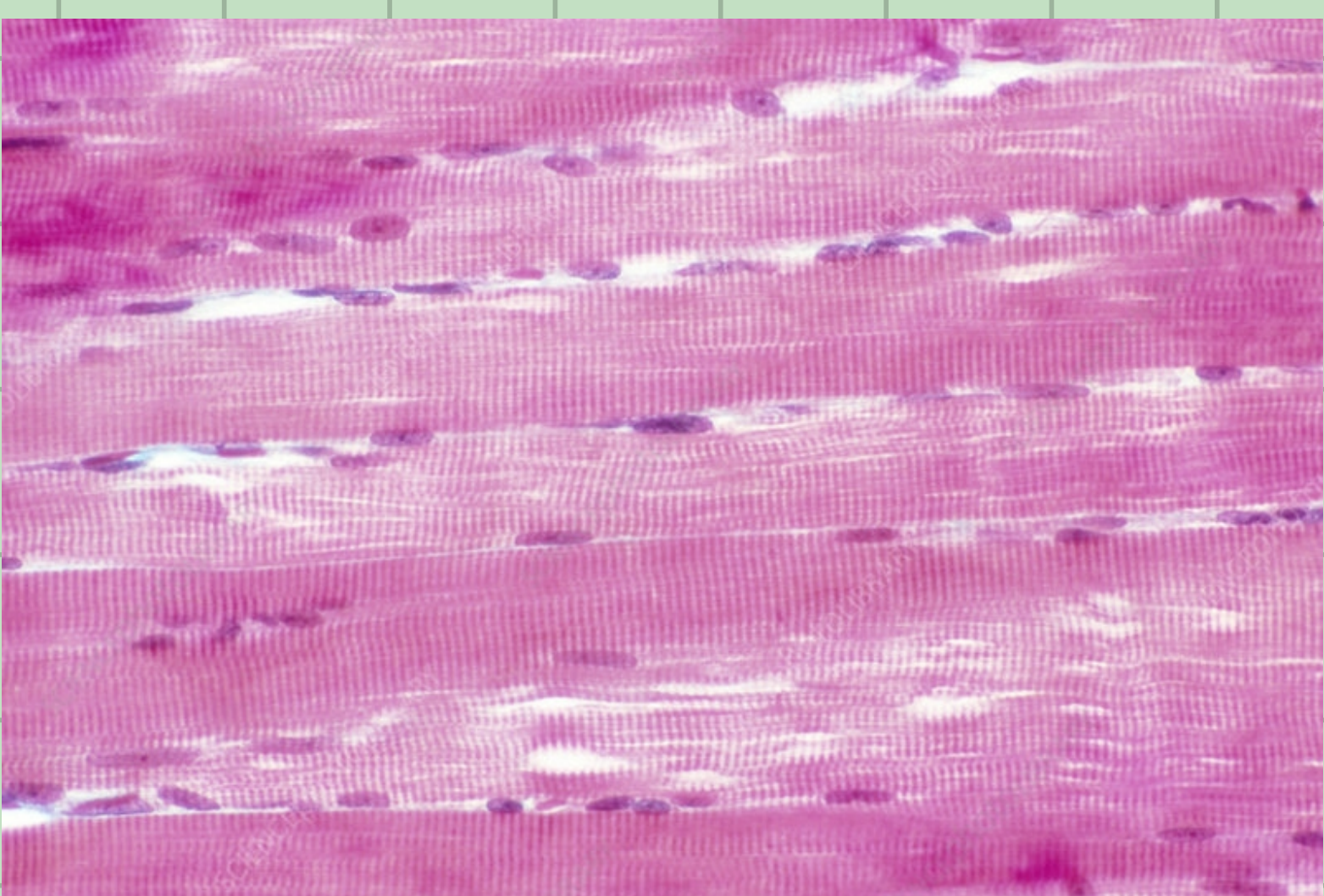


tissue are specific
sa puso mo (heart)

automatic na gumagalaw
puso mo class ha....

c. Skeletal muscle tissue

- multinucleated (maraming nucleus)
- Striation (may guhit-guhit)
- numerous mitochondria - ATP production



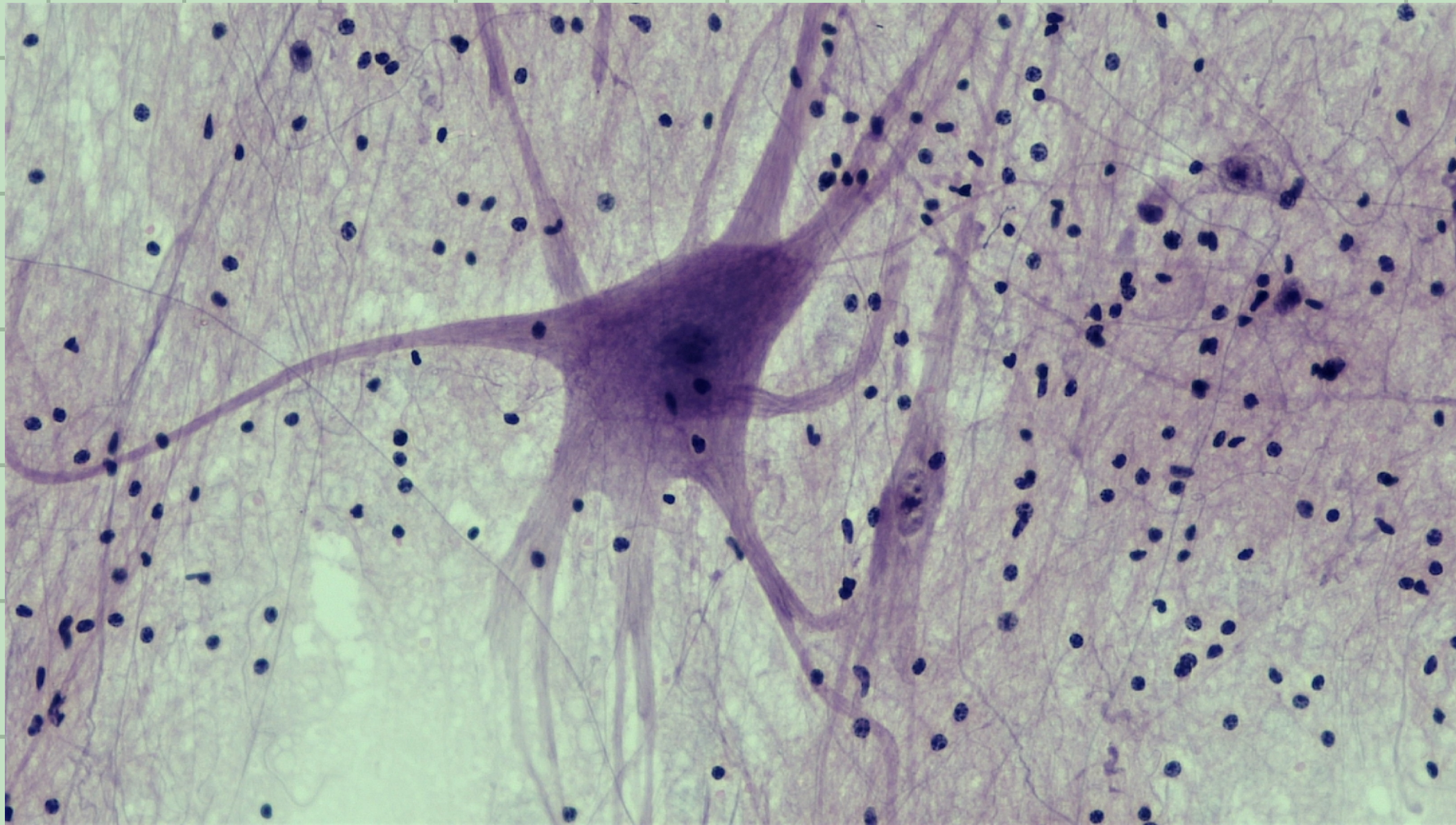
prominent yung
striations

Ere last na, Nervous Tissue

4. NERVOUS TISSUE

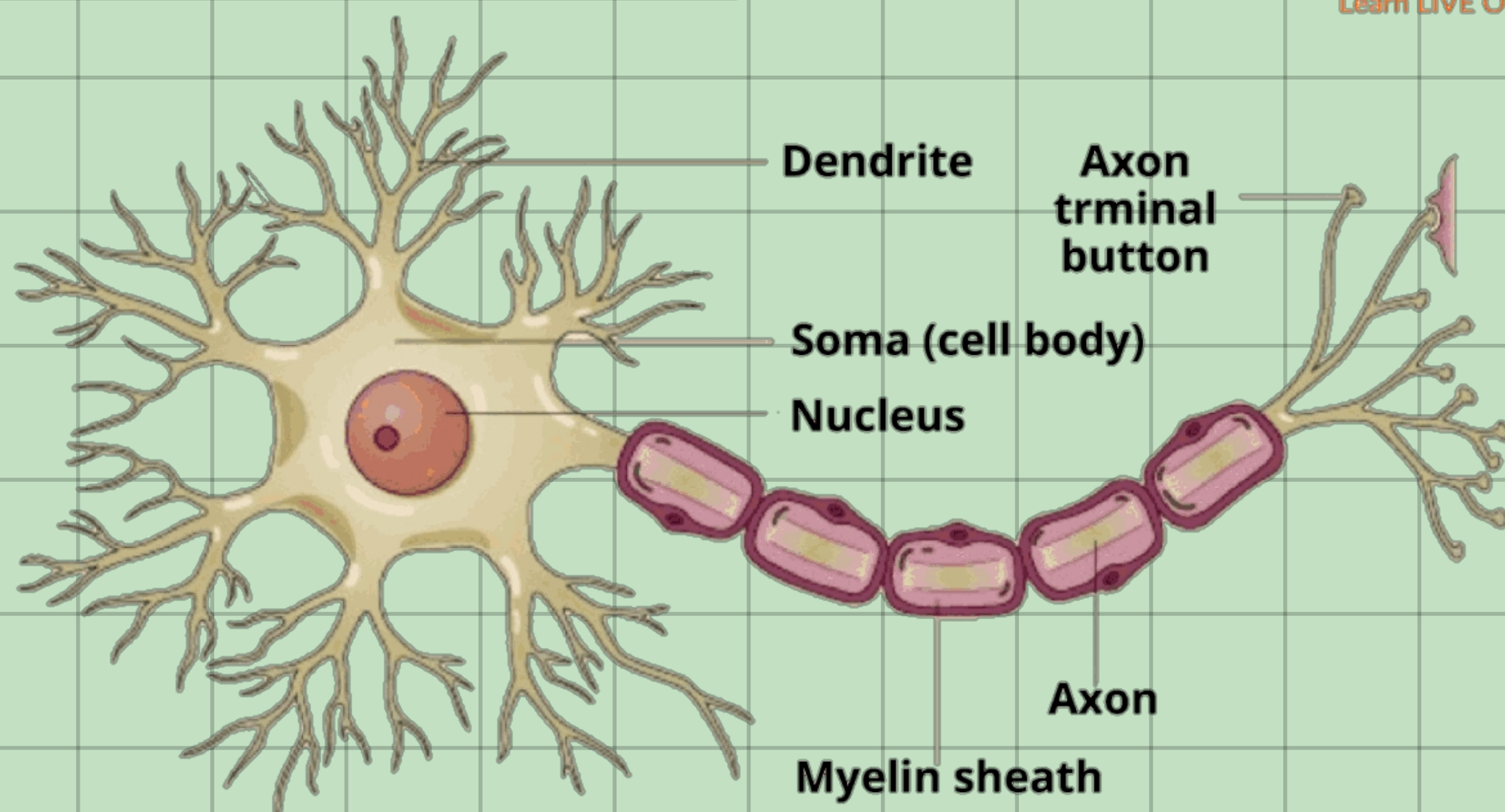
cell present: neurons

- capacity to generate electrical impulses (action potential)
- yan lang muna, sa nervous system ko i discuss yung parts ng neurons



SHAPE OF A NERVE CELL

Vedantu
Learn LIVE Online



Thanks, class!!
Ipasa ang Anaphy!!

Gabe Oliver, RN