
بسم الله الرحمن الرحيم

CVS SYSYTEM

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WALL OF BLOOD VESSELS

Tunica intima	Tunica media	Tunica adventitia
INNER MOST	MIDDLE	OUTER MOST

BLOOD VESSELS

Tunica intima

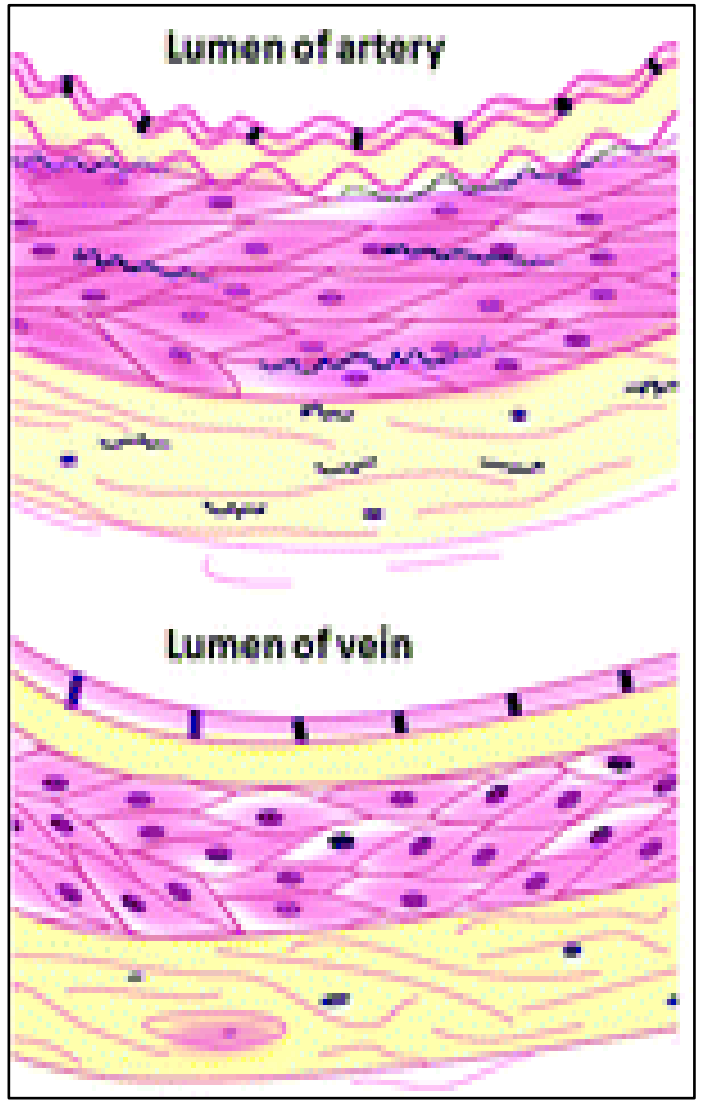
- **Endothelial lining: simple squamous epithelium**
- **Subendothelial layer: loose C.T. rich in elastic fibers**
- **Internal elastic lamina (arteries) fenestrated band of elastic fibers**

Tunica media

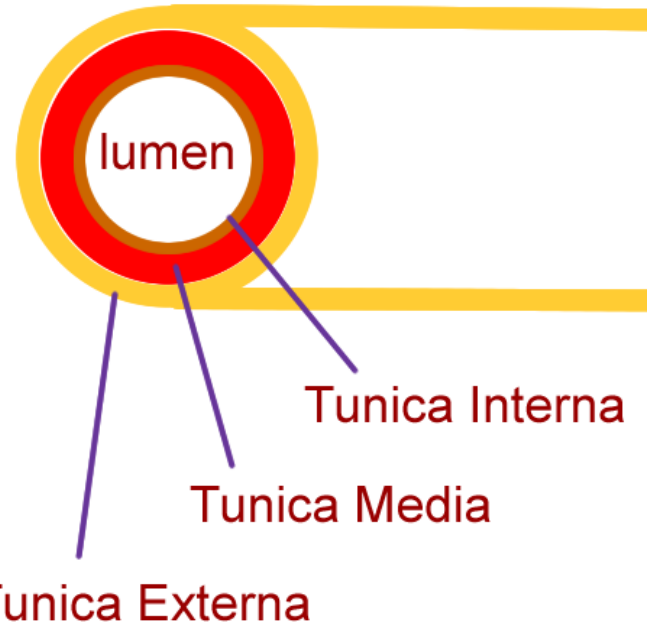
- **Smooth muscle cells.**
- **Elastic fibers.**
- **Collagenous and reticular fibers.**

Tunica adventitia

- **Collagen fibers (type I).**
- **Elastic fibers.**
- **Tiny blood vessels called Vasa Vasorum**



LARGE ARTERIES: AORTA



Characters:

- **Thick walls and wide lumen.**
- **Their media are rich in elastic fibers.**

Tunica intima

- **About 1/6 of the thickness of the wall.**
- **The intima is thicker than intima of a muscular artery.**
- **The subendothelial layer is thick and rich in elastic fibers.**
- **The internal elastic lamina is present but not easily seen .**

Tunica media

- **It is very thick and forms the main thickness of the wall.**
- **It contains fenestrated elastic laminae.**
- **In between the elastic laminae, smooth muscle cells, reticular fibers, collagenous fibers and ground substance.**

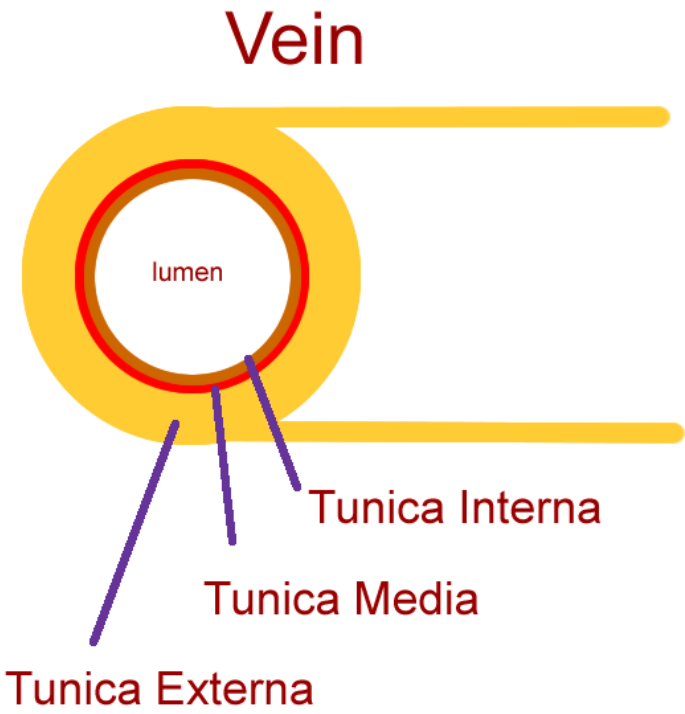
Tunica adventitia

- **Relatively thin layer**
- **Collagen fibers & elastic fibers.**
- **Vasa Vasorum lymphatics, and nerves are also present**

LARGE VEINS: INFERIOR VENA CAVA

Characters:

- **Has a very wide lumen with many valves.**
- **Has collapsed thin and flat wall.**



Tunica intima

- **Similar to medium-sized vein**

Tunica media

- **Thin and contains only smooth muscle fibers.**

Tunica adventitia

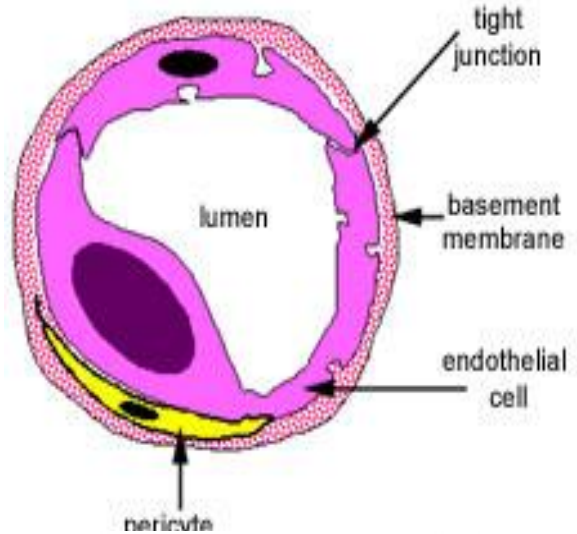
- **very thick layer of loose C.T containing collagenous fibers, C.T cells, vasa vasorum and nerves.**
- **Also contains longitudinally arranged bundles of smooth muscle fibers.**

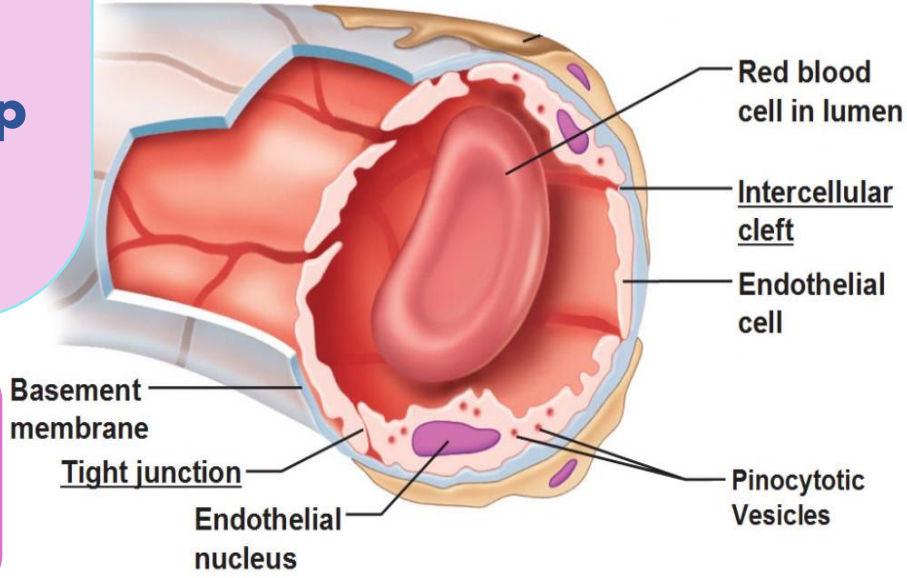
ARTERIO-VENOUS CONNECTION

BLOOD CAPILLARIES

Histological structure:

1. Single layer of endothelial cells resting on a basal lamina.
2. **Pericytes** lie in between the endothelium and the basal lamina.
3. The cells hold together by zona occludens and gap junction.





After tissue injury pericytes proliferate and differentiate to form new blood vessels and C. T. cells.

Compare between Capillaries and Sinusoids?

	Capillaries	Sinusoids
Diameter:	Uniform 8-10 µm.	Irregular 5-30 µm.
Lumen:	Narrow.	Wide.
Structure:		
1. Lining endothelium	fenestrated or continuous.	Fenestrated not covered with diaphragm.
2. Basement membrane	Well developed.	Absent.
3. Pericytes	Present.	Absent.
4. Macrophages	Absent.	Present.

Mention 4 types of capillaries?

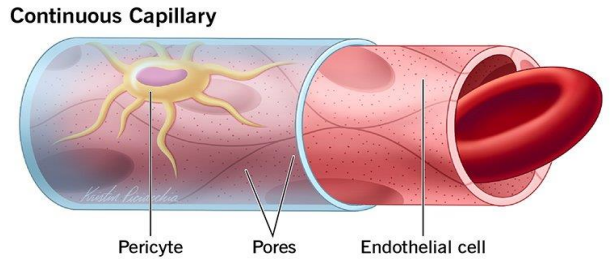
TYPES OF BLOOD CAPILLARIES

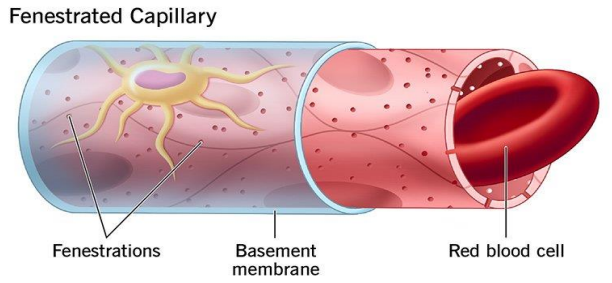
Continuous capillaries:

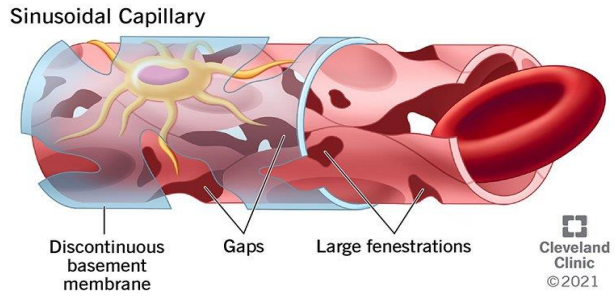
Fenestrated capillaries

Fenestrated capillaries without diaphragm:

Discontinuous sinusoidal capillaries:







Which of the following best explains the role of pericytes in blood capillaries?

A. They form the primary structure of the capillary wall.
B. They are responsible for the contraction and relaxation of the capillary.
C. They can differentiate into other cell types after tissue injury.
D. They are the main cells involved in gas exchange.
E. They produce the basal lamina of the capillary.

ANS: C

Blood sinusoids are characterized by which of the following?

A. Fenestrated endothelium

B. Rapid blood flow

C. Thick basement membrane

D. Regular lumen

E. Surrounded by smooth muscles

ANS: A

- Vasa vasorum are usually seen in:……

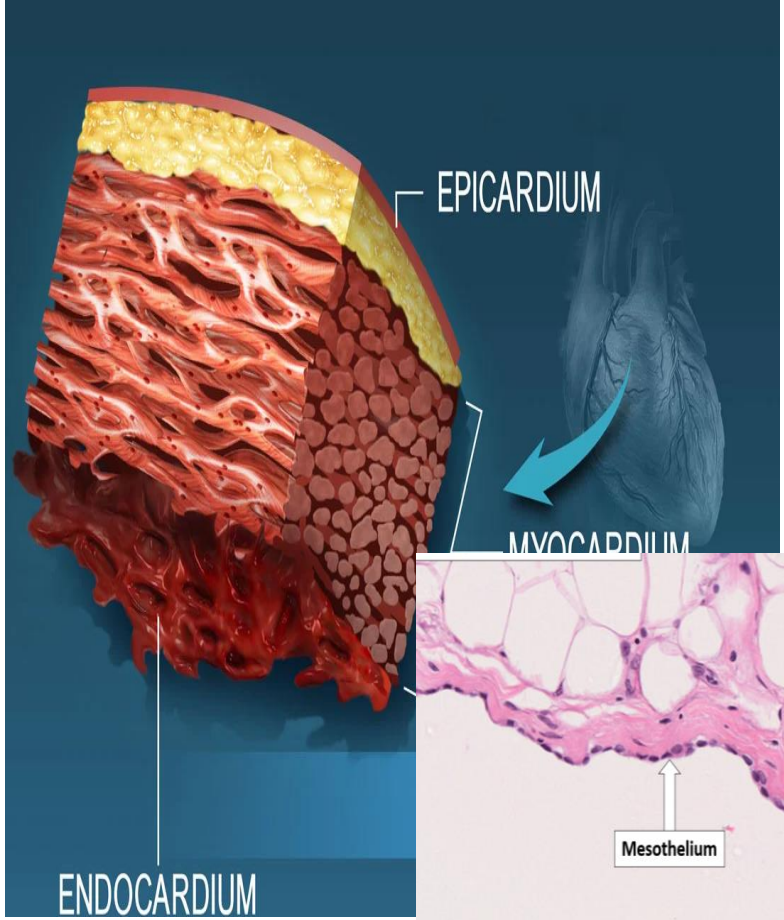
a) Intima of large veins
b) Media of large arteries
c) Adventitia of large veins
d) Media of large veins
e) Media of muscular arteries

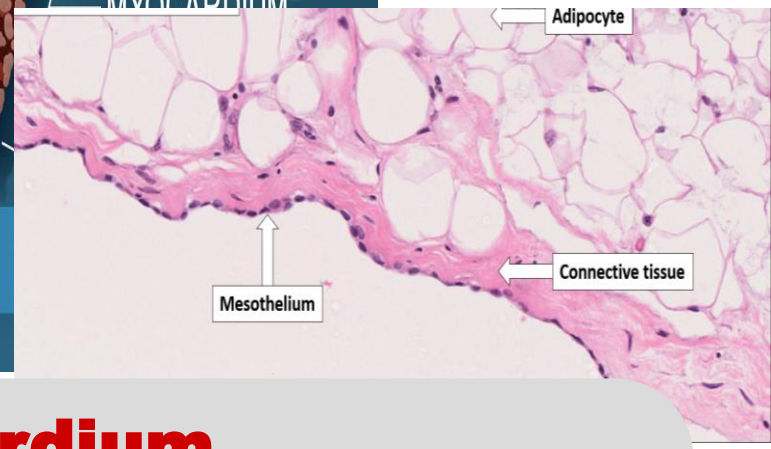
Answer: c

Wall of The Heart

Its wall is formed of 3 main layers:

- **The epicardium.**
- **The myocardium.**
- **The endocardium.**





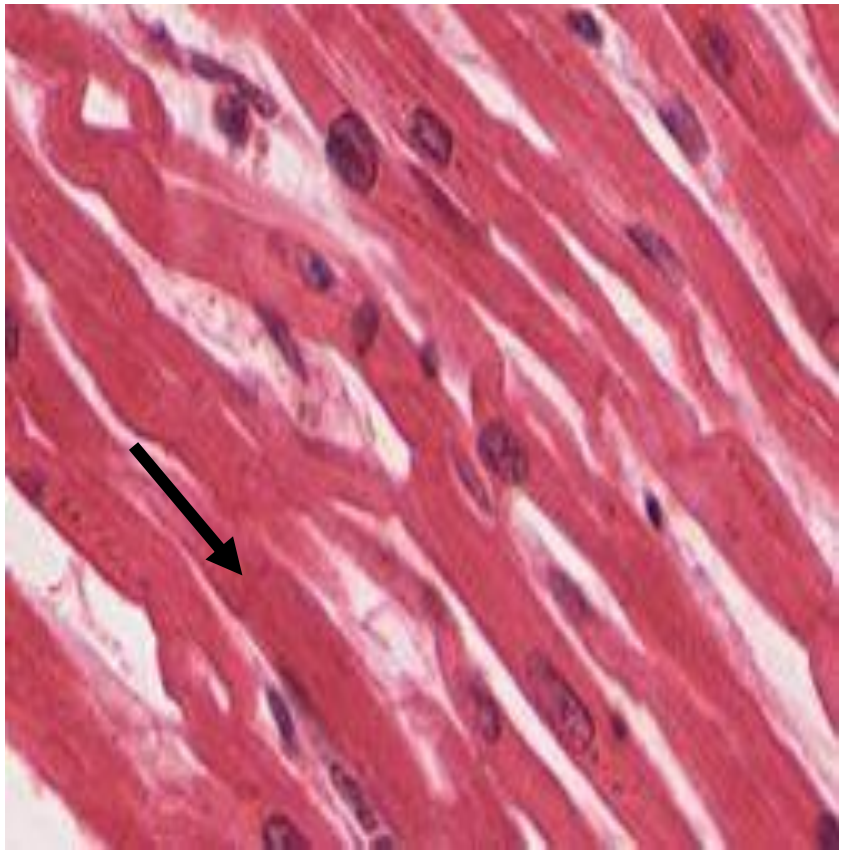
The epicardium (outer layer):

- ❖ **Visceral layer of the double layered pericardium.**
- ❖ **It is formed of:**
  - ➢ **Simple squamous epithelium (outer).**
  - ➢ **Subserous layer of C.T. contains coronary blood vessels and fat cells.**

The Myocardium (middle layer):

It is formed of: Cardiac muscle fibers (Main bulk) which run in various directions.

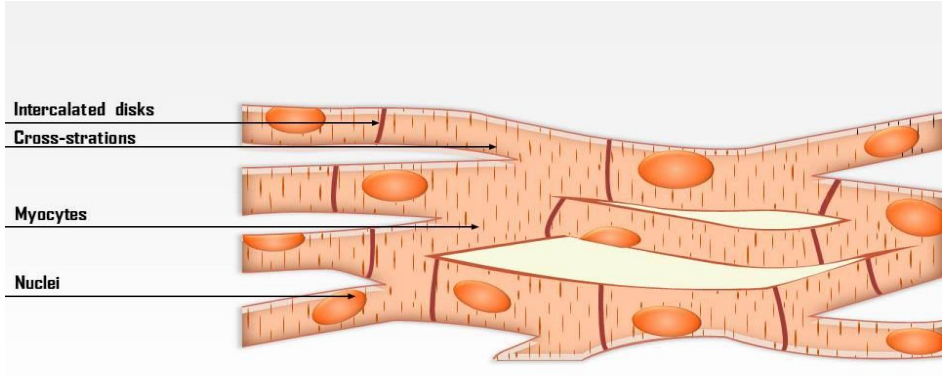
- **These fibers are separated by loose C.T. endomysium (which contains blood vessels and lymphatic)**
- **Covered from outside by (the epicardium) and inside by (the endocardium)**



CARDIAC MUSCLE FIBERS

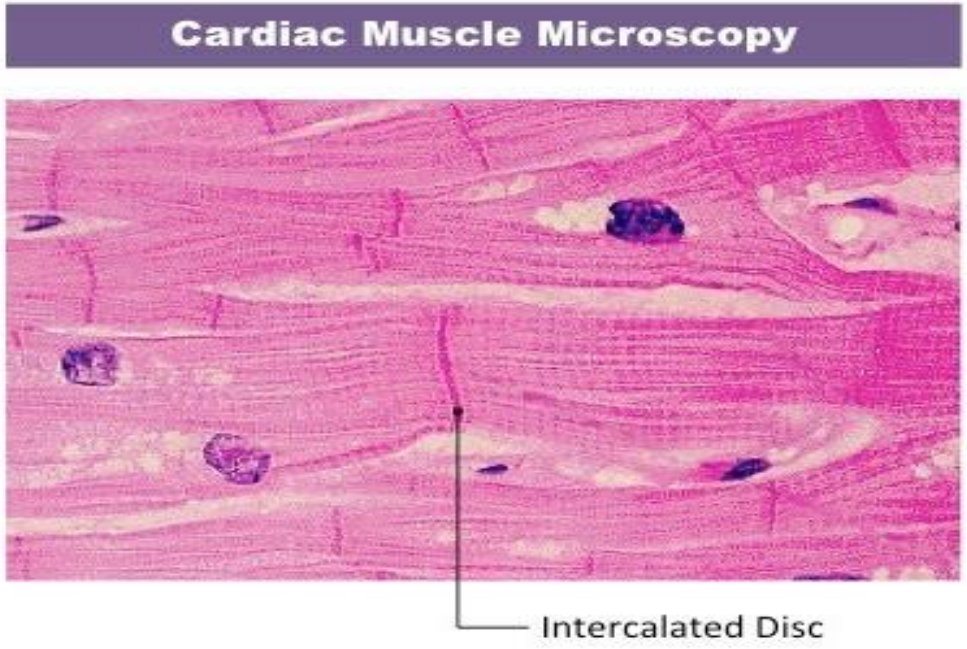
* Cardiac muscle is an involuntary muscle.

Site: the wall of the heart (myocardium).

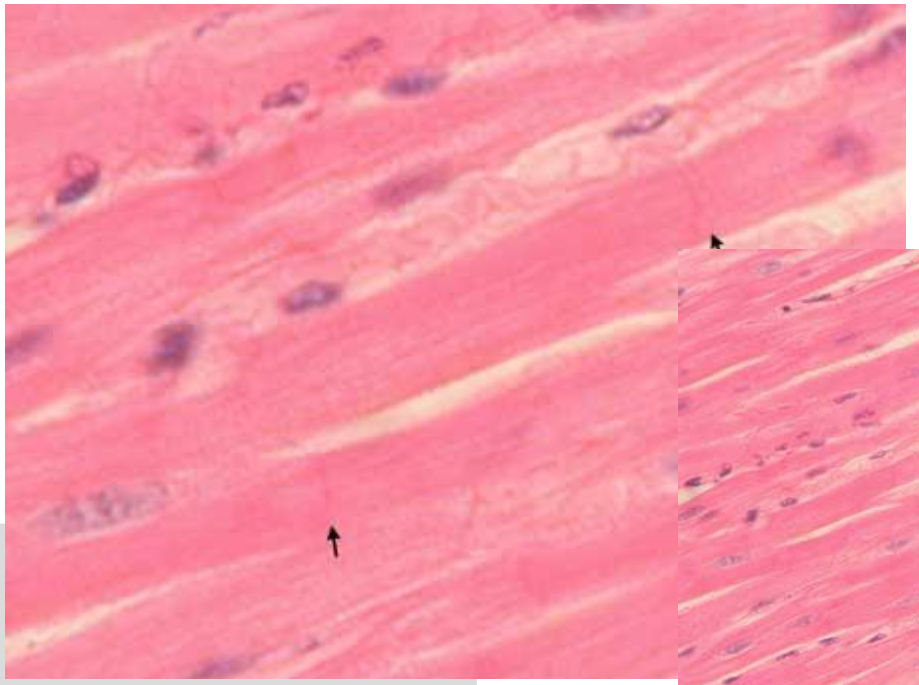


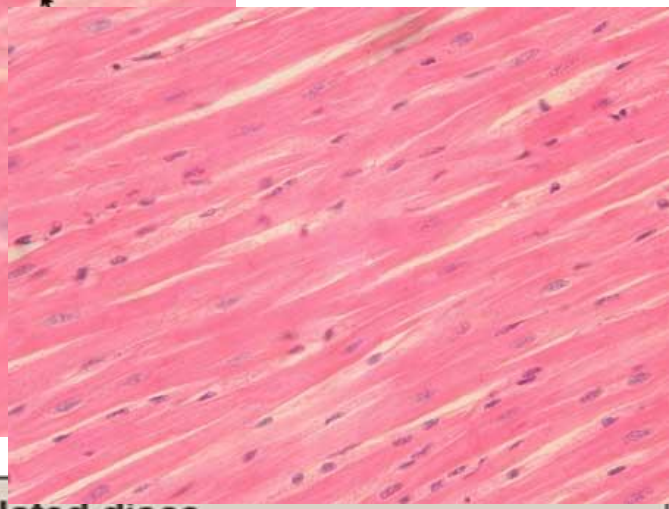
* Cardiac muscle fiber is formed of a chain of short cylindrical cells.

* The cardiac muscle fiber is not a syncytium as the individual muscle cells are joined together end to end by cell junction (called Intercalated disc).



Describe the **LM of cardiac muscle fiber?**



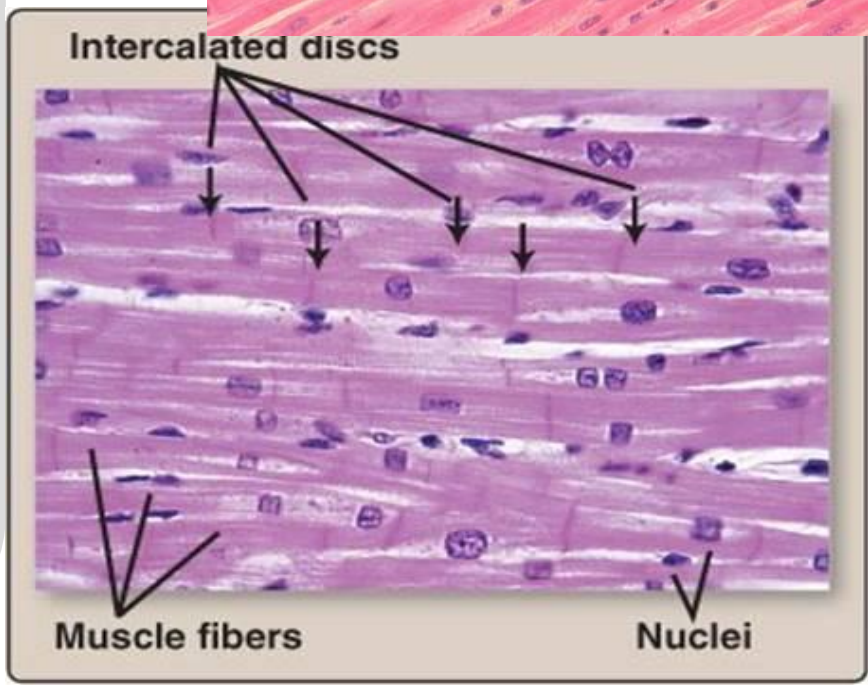


LM of cardiac muscle fiber:

* **Small in caliber (25 um).**
* **Variable in length.**
* **Extensive branching and anastomosing.**
* **It is surrounded by C.T (Endomysium) that contains blood vessels and lymphatics.**
* **Irregular striation.**

Nuclei: large, oval, central, mono or binucleated

The Sarcoplasm (cytoplasm): Granular and acidophilic.



Intercalated Discs

Definition:

It is a site where the cell membranes of two adjacent muscle cells interdigitate and are joined together. So, it prevent cytoplasmic continuity between different segments

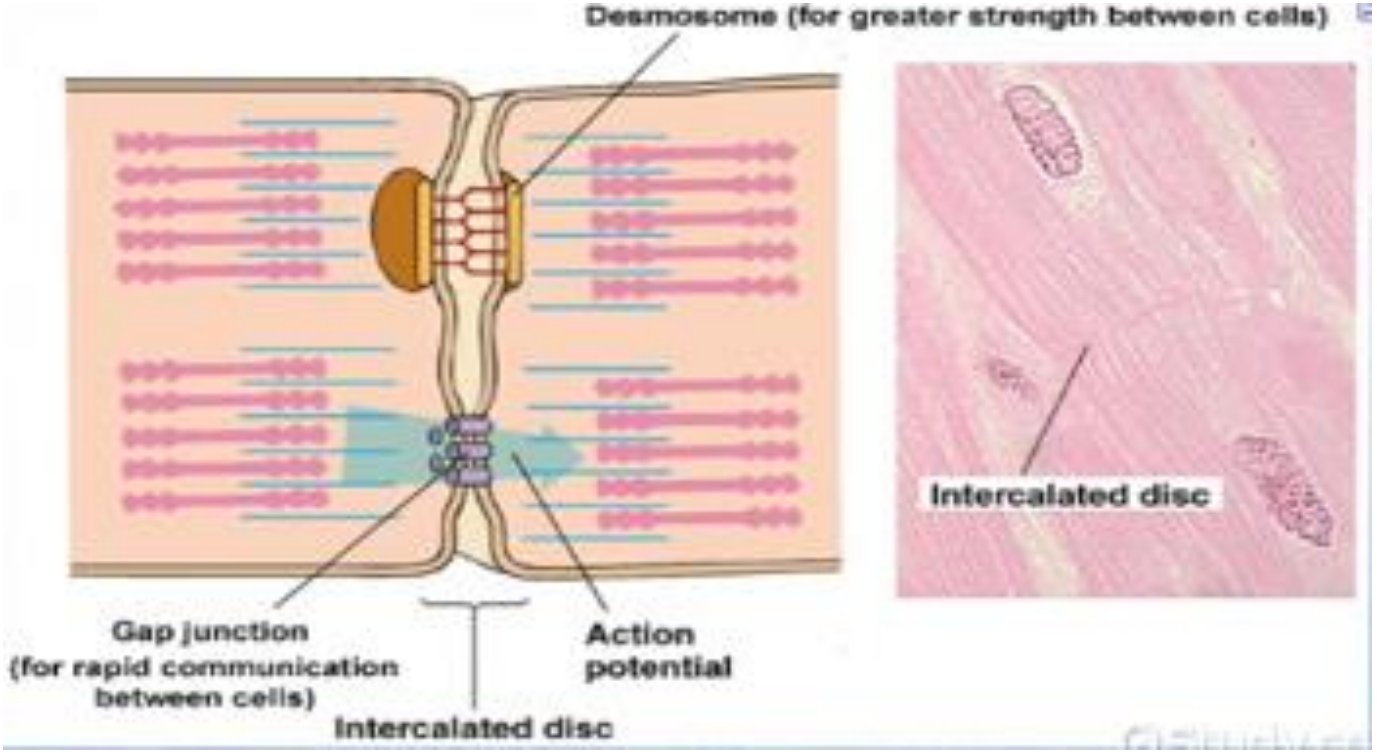
LM:

It appears:

- Straight. **- Step-like.**

Staining:

- Iron Hx. **- Silver.**



Mention 2 types of junctions present in intercalated disc and mention their role?

Types of junctions:

A: Fascia adherence:

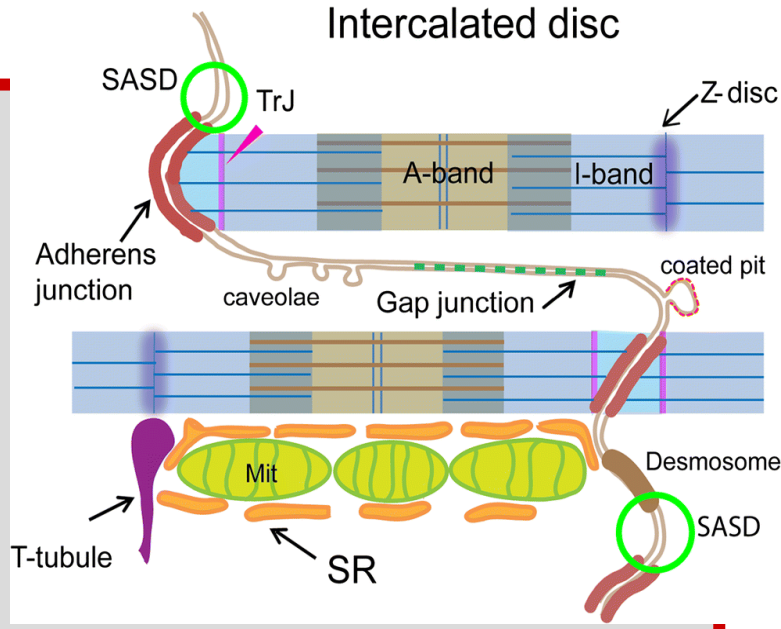
- It performs intracellular adhesion.
- Anchoring site for myofibrils (represent half a Z-line).

B: Desmosome:

- It prevents separation of cells during contraction.

C: Gap junction:

- In longitudinal and transverse part.
- There is a gap 2nm between cells.
- This gap is traversed by intercommunicating channels between the cells.
- Allow free and rapid transmission of nerve impulse from cell to another.
- Thus, the fiber contracts as one unit.



- Nuclei of cardiac muscle fibers are :……

a) Flat nuclei
b) Central nuclei
c) Multinucleated
d) Vesicular nuclei
e) Peripheral nuclei

Answer: b

- Which of the following is the most external cardiac structure:……

a) Mesocardium
b) Endocardium
c) Myocardium
d) Epicardium
e) Peritoneum

Answer: d

Which layer of the heart wall contains **coronary blood vessels**?

A. Epicardium
B. Myocardium
C. Endocardium
D. Moderator band
E. Subendocardium

ANS: A

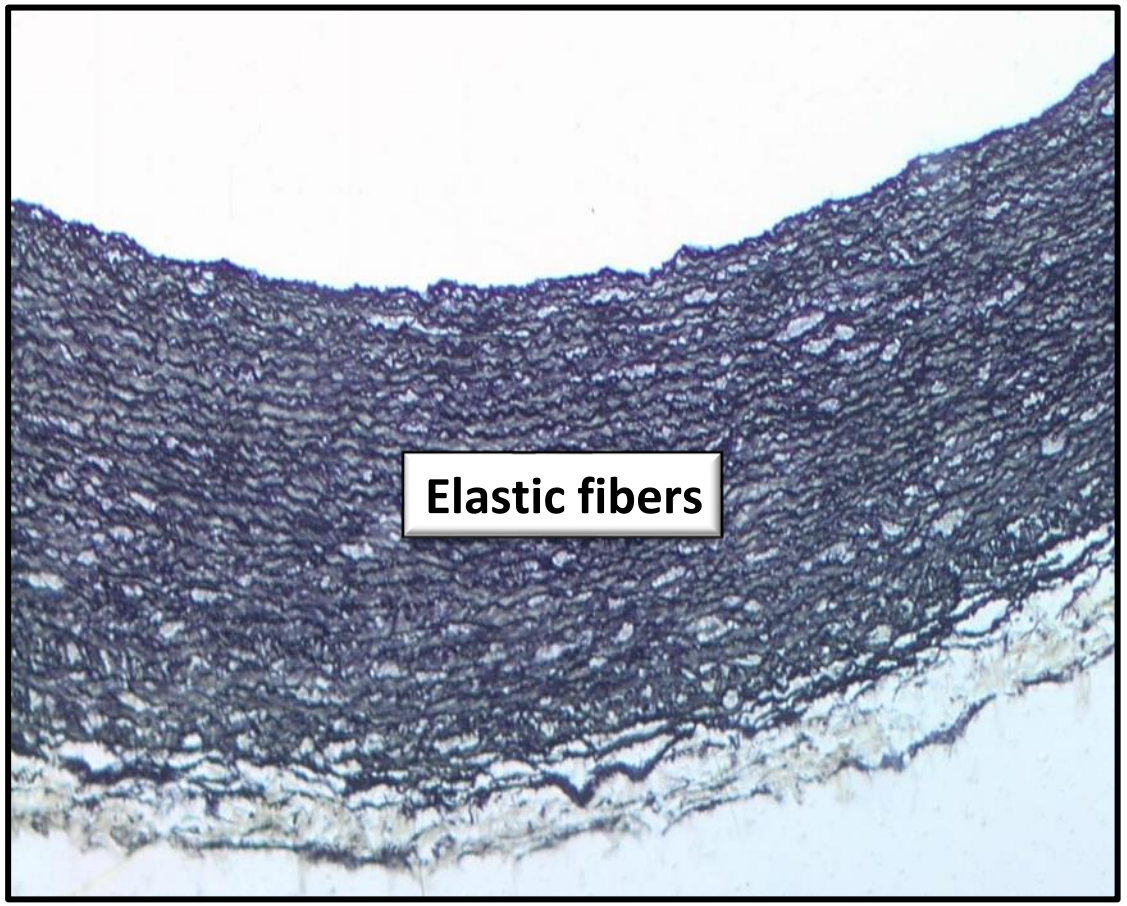
Practical Revision

Aorta (H.&E.)

- Thick wall & wide lumen.
- **Tunica intima:** thin, lined by simple squamous epithelium and not distinct from tunica media.
- **Tunica media** formed of fenestrated elastic membranes with only few smooth muscle fibers in between (forms the main thickness).
- **Tunica adventitia** is thin.

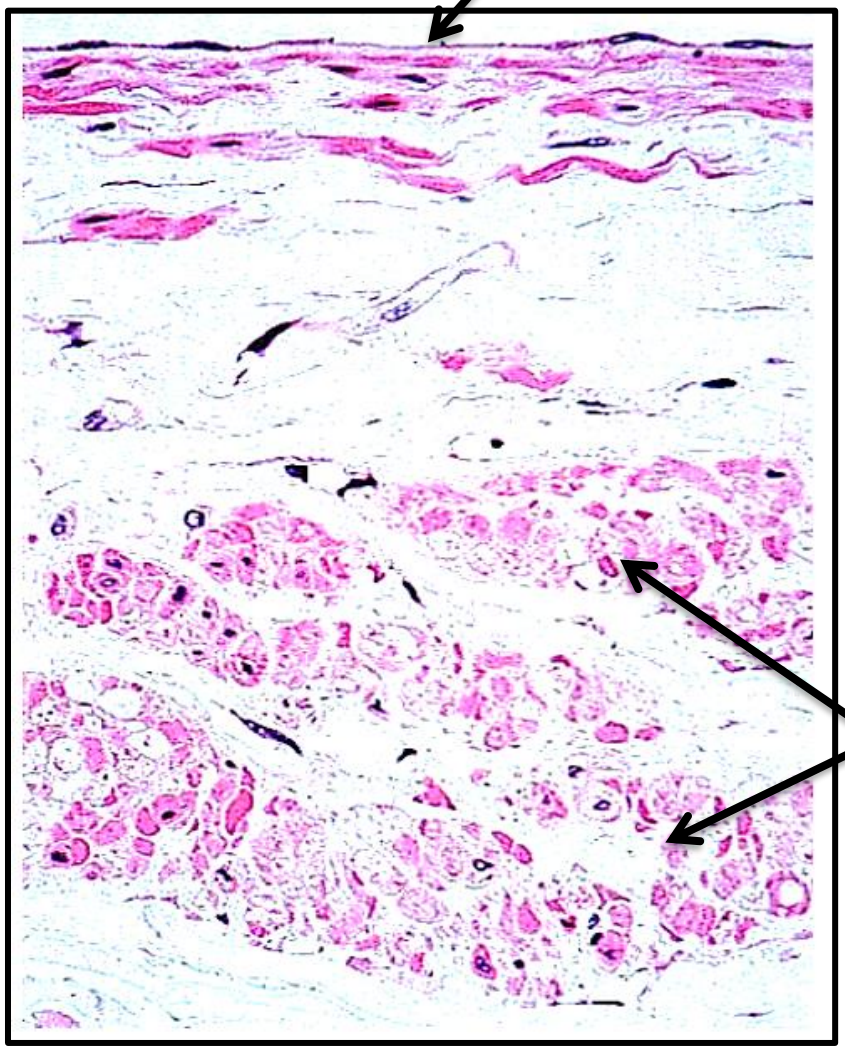
Aorta (Verhoeff's stain)

- Thick wall & wide lumen.
- The fenestrated elastic membranes of the tunica media appear **black** in staining.



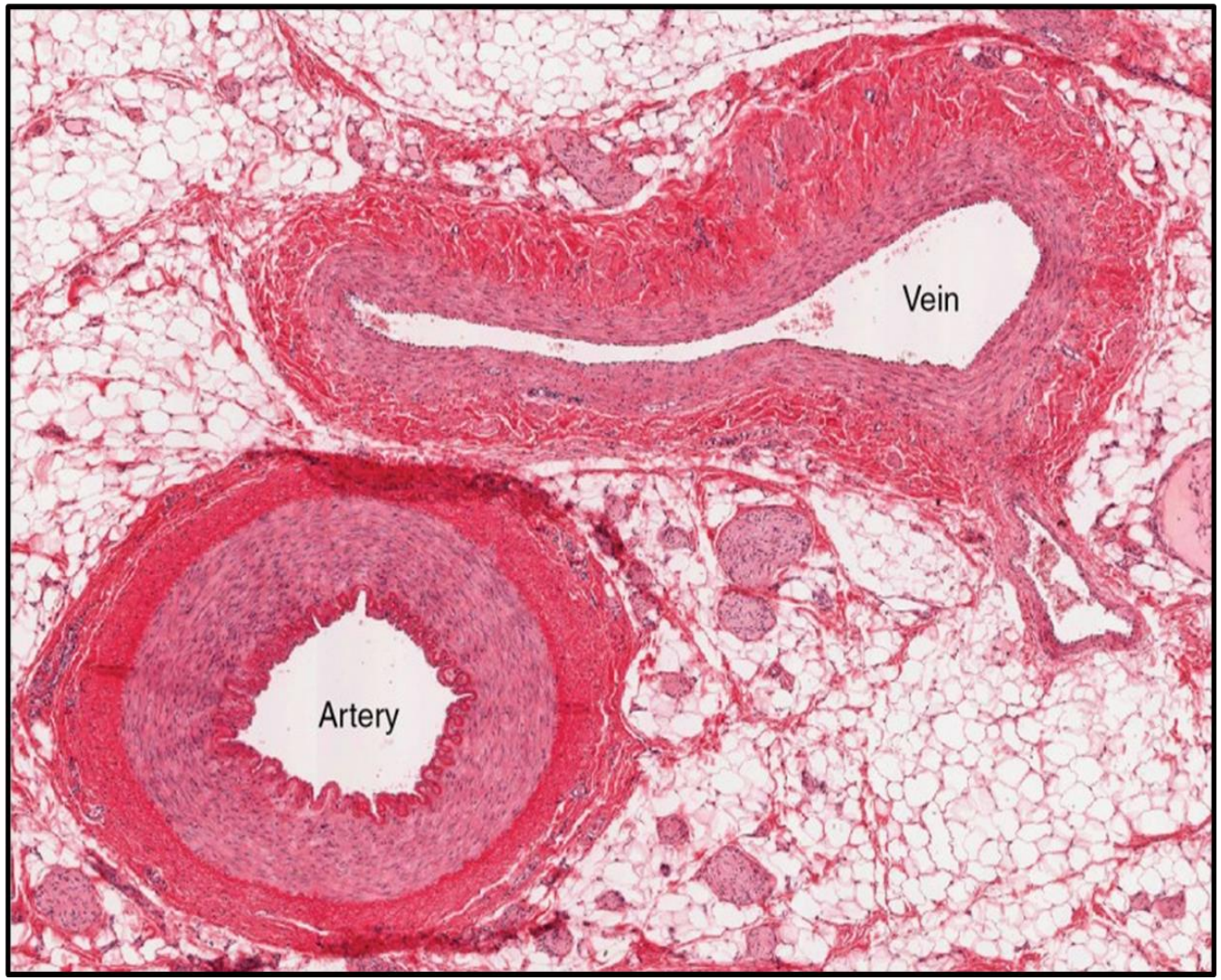
Inferior Vena Cava

- **Tunica intima:** thin, internal elastic lamina is absent.
- **Tunica media:** thin, formed of smooth muscle fibers only & there is no internal elastic lamina.
- **Tunica adventitia:** thick containing bundles of longitudinally arranged smooth muscle fibers.

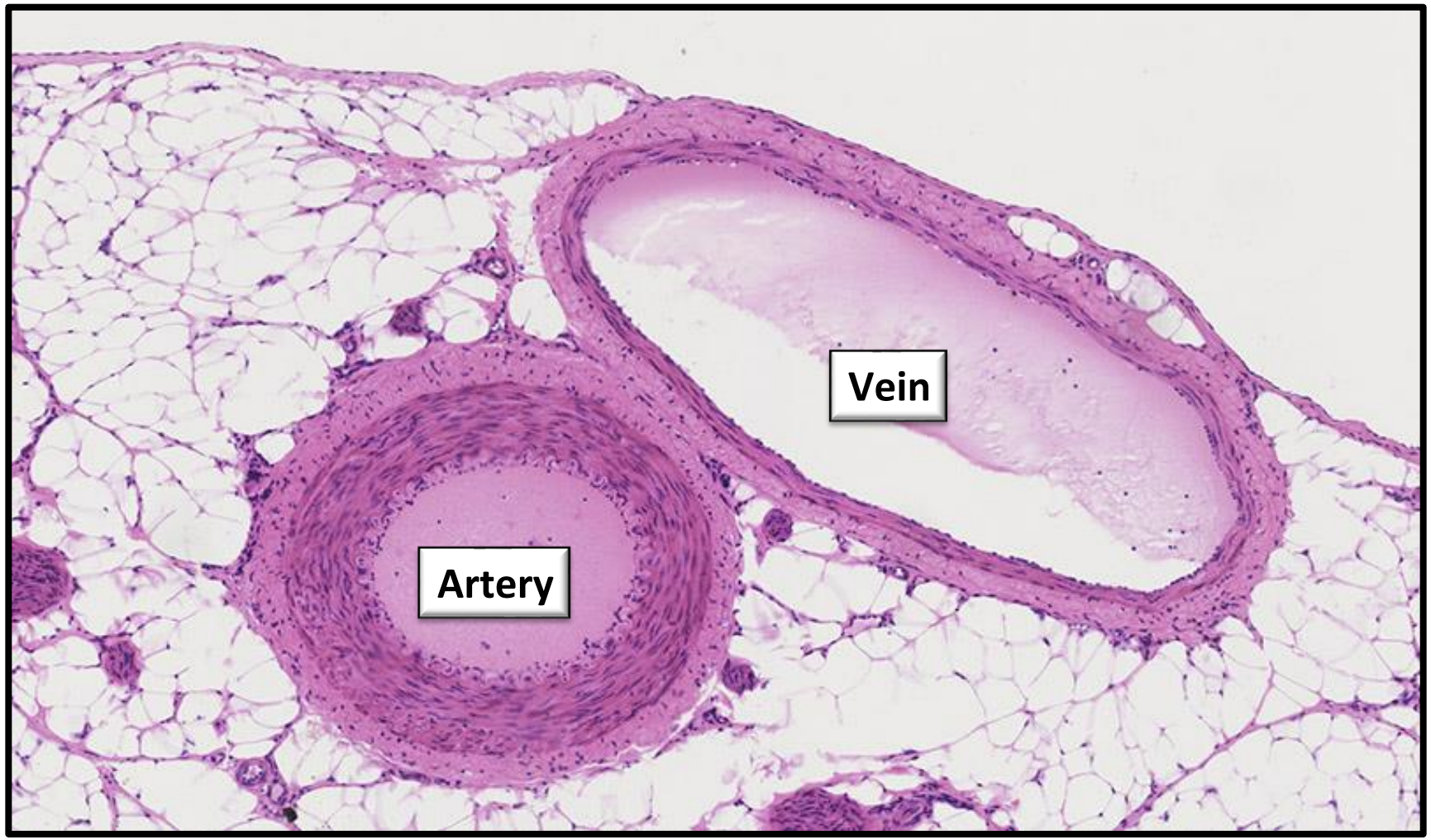


Medium-Sized Artery & Vein

- The wall of the artery is thick & its wall is not collapsed in contrast to the vein.
- The media is thick in the artery but the adventitia is thicker in the vein.



Medium-Sized Artery & Vein



RESPIRATORY SYSTEM

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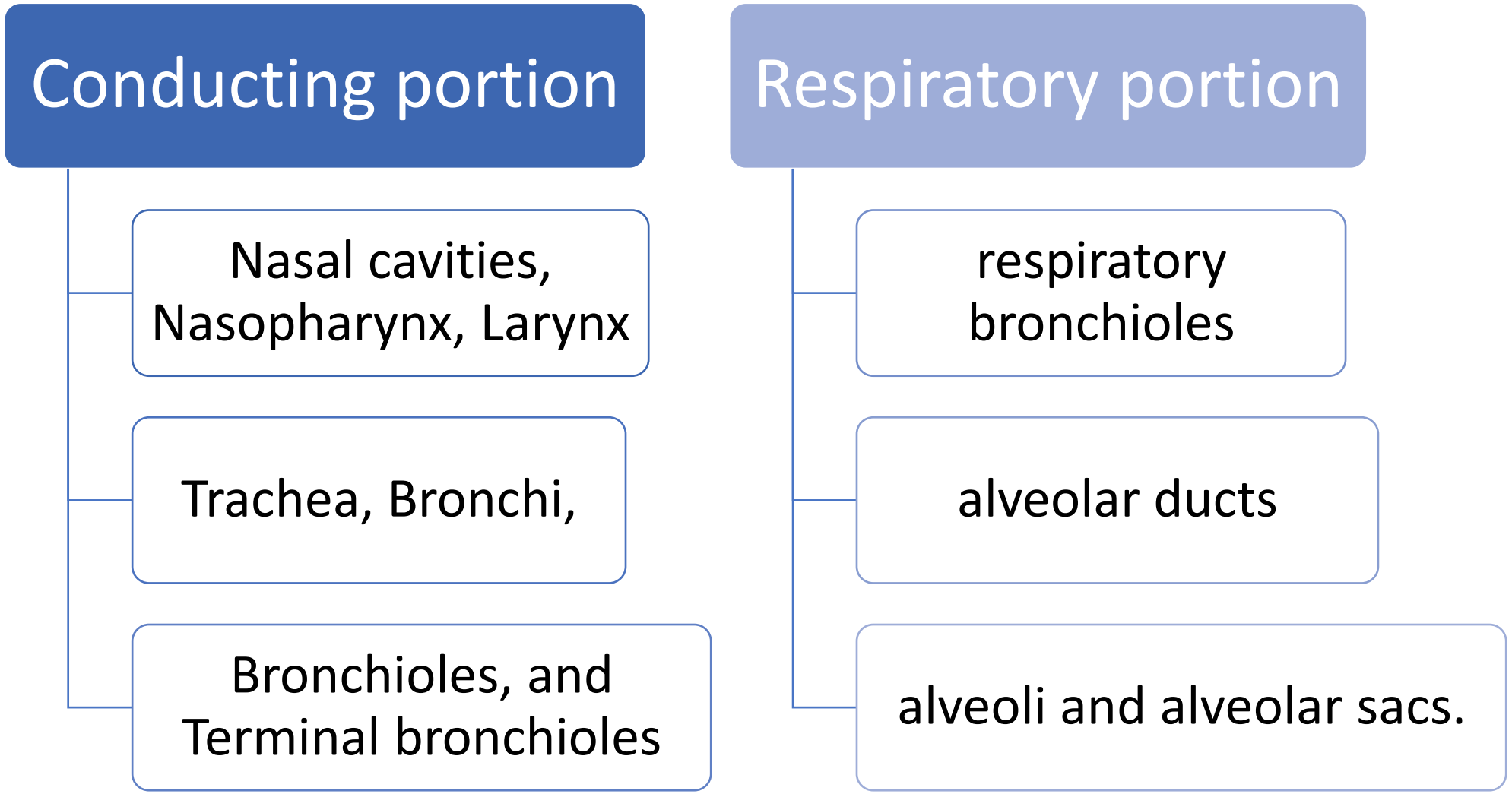

Conducting portion
Nasal cavities, Nasopharynx, Larynx
Trachea, Bronchi,
Bronchioles, and Terminal bronchioles
Respiratory portion
respiratory bronchioles
alveolar ducts
alveoli and alveolar sacs.

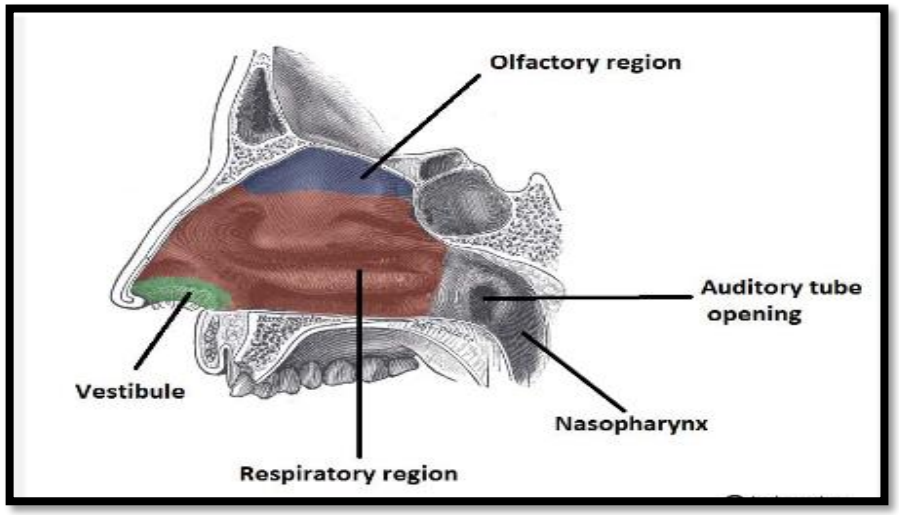
Nasal Cavities

consist of two structures:

The external vestibule	The nasal fossae

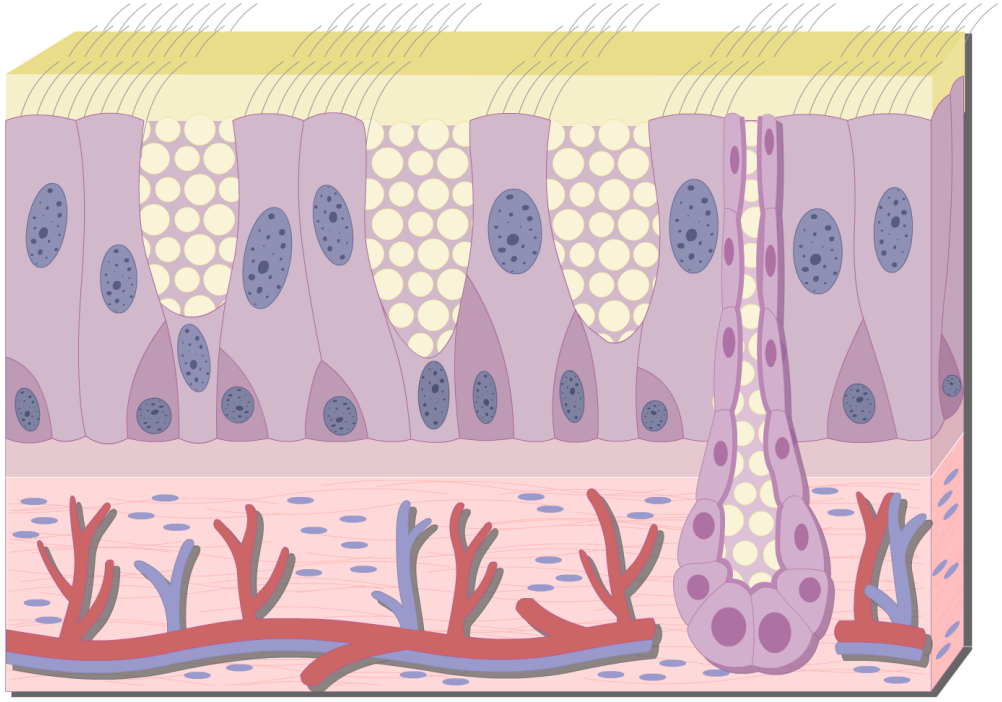
THE VESTIBULE

- **Lined by thin skin with numerous sebaceous, and sweat glands, in addition to thick short hairs.**
- **The hairs filter out large particles from the inspired air.**

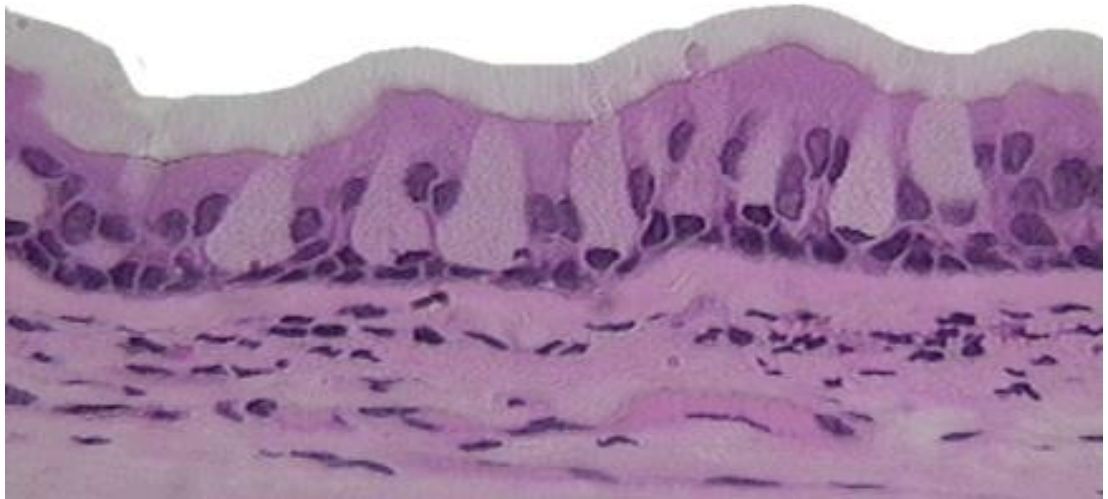


Respiratory area

Olfactory area



Respiratory (nasal) mucosa



Respiratory area

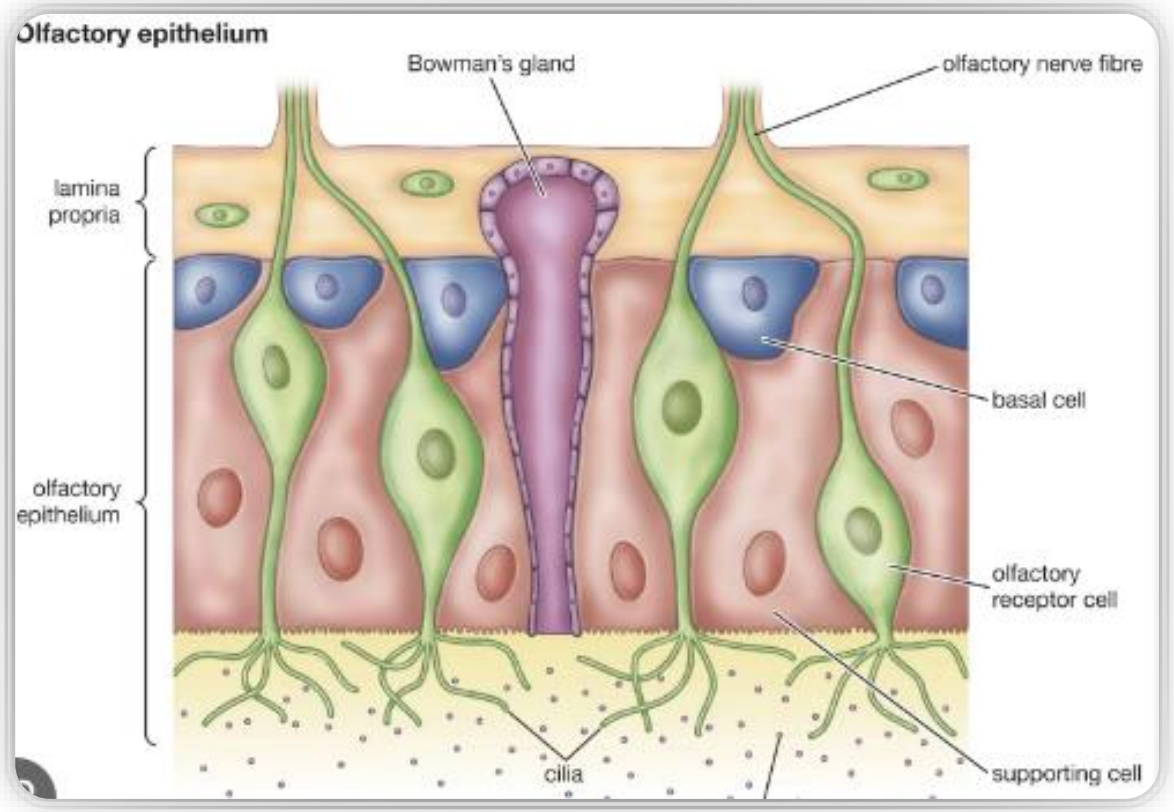
Lined by mucous membrane consisting of:

A. **Epithelium:**

Pseudo-stratified columnar ciliated with goblet cells.

B. **Corium:**

- *Dense fibro-elastic connective tissue.*
- *Within the lamina propria of the conchae are large venous plexuses known as **swell bodies**.*



OLFACTORY AREA

Lined by olfactory mucosa which consists of:

A- <u>Olfactory epithelium:</u>

- **A thick pseudo-stratified neuroepithelium;**
- **Consists of three types of cells:**

i. The olfactory (sensory) cells

ii. Supporting cells

iii. Basal Cells

B- <u>Corium:</u>

Dense fibro-elastic tissue contains Bowman's glands secrete a serous fluid.

8

- **Enumerate the cells forming the Olfactory epithelium?**

- **Consists of three types of cells:**

i. **The olfactory (sensory) cells**

ii. **Supporting cells**

iii. **Basal Cells**

LARYNX

- **Irregular tube connects the pharynx with the trachea.**
- **The mucous membrane consists of:**

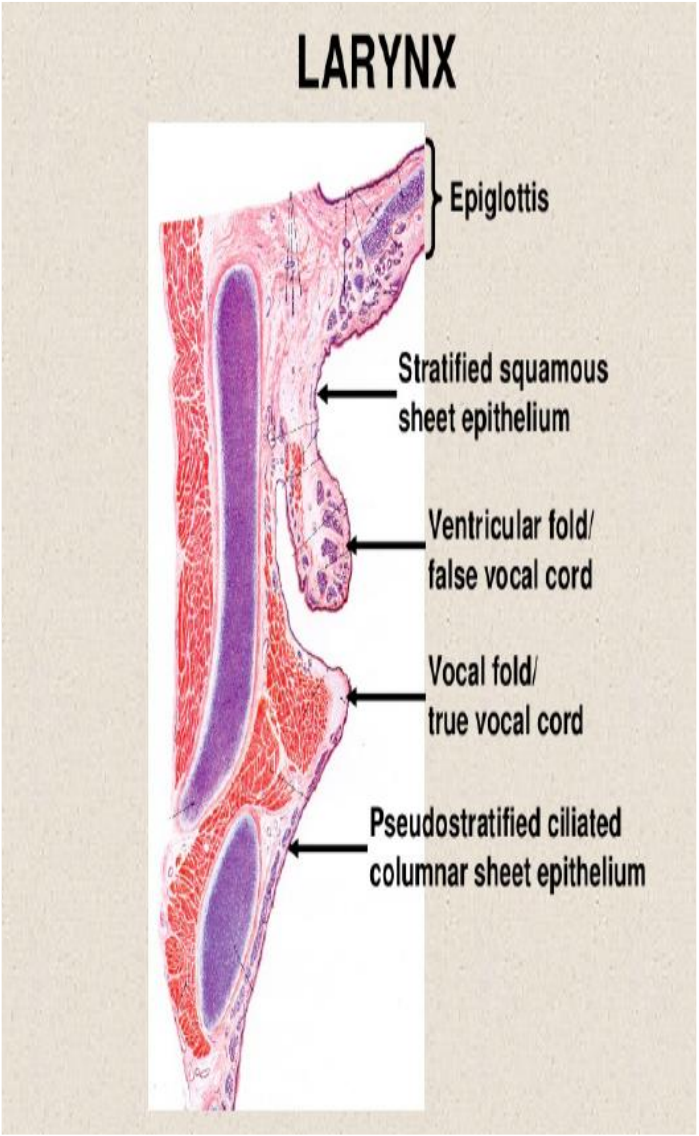
1-Epithelium:

Pseudo-stratified columnar ciliated with goblet Cells

except on the vocal cords, the anterior surface of the epiglottis and the upper parts of the posterior surface where the epithelium is stratified squamous non keratinized.

2-Corium (Lamina propria):

- Infiltrated with lymphocytes and in certain sites lymphatic nodules (laryngeal tonsil).



TRACHEA

Mucosa

Submucosa

Fibro-Cartilaginous coat

Epithelium

corium

C.T

Dense C.T & hyaline cartilage

TRACHEA

Mention 4 cell types of tracheal epithelium?

1- Mucosa: folded posteriorly, it is formed of:

A) Epithelium: Pseudo-stratified columnar ciliated with goblet cells.

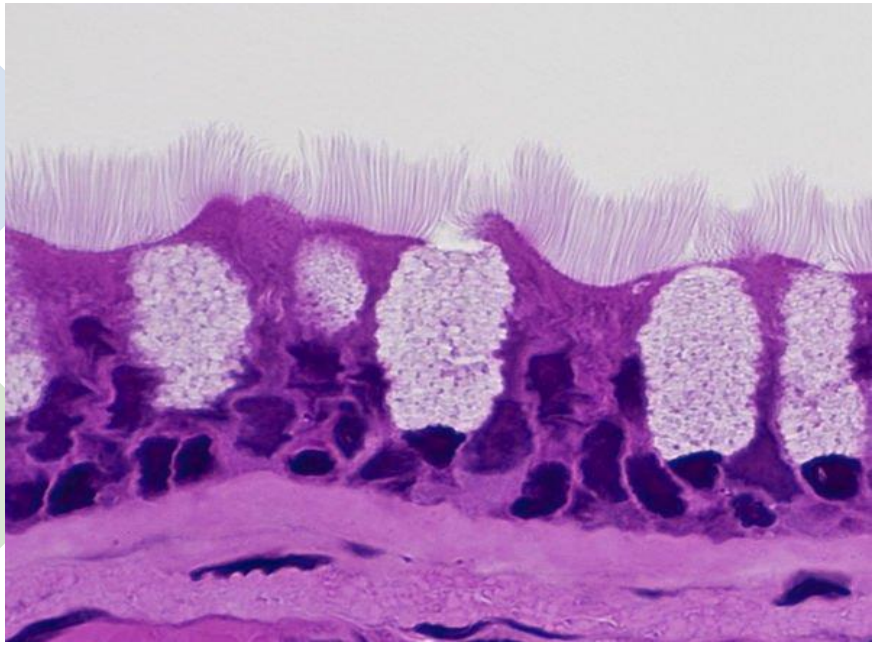
- **The cells of the epithelium are:.**

1-Ciliated cells:

- **columnar ciliated cells. The cilia beat towards the larynx.**

2-Goblet cells:

- **have expanded apical parts distended with mucinogen granules**



3- Basal cells:

- Between the bases of the columnar cells
- Act as reserve stem cells for the ciliated cells and the goblet cells.

4-Serous cells:

- Have apical electron dense granules.
- Produce a secretion of lower viscosity than that of the mucus.

5- Brush cells:

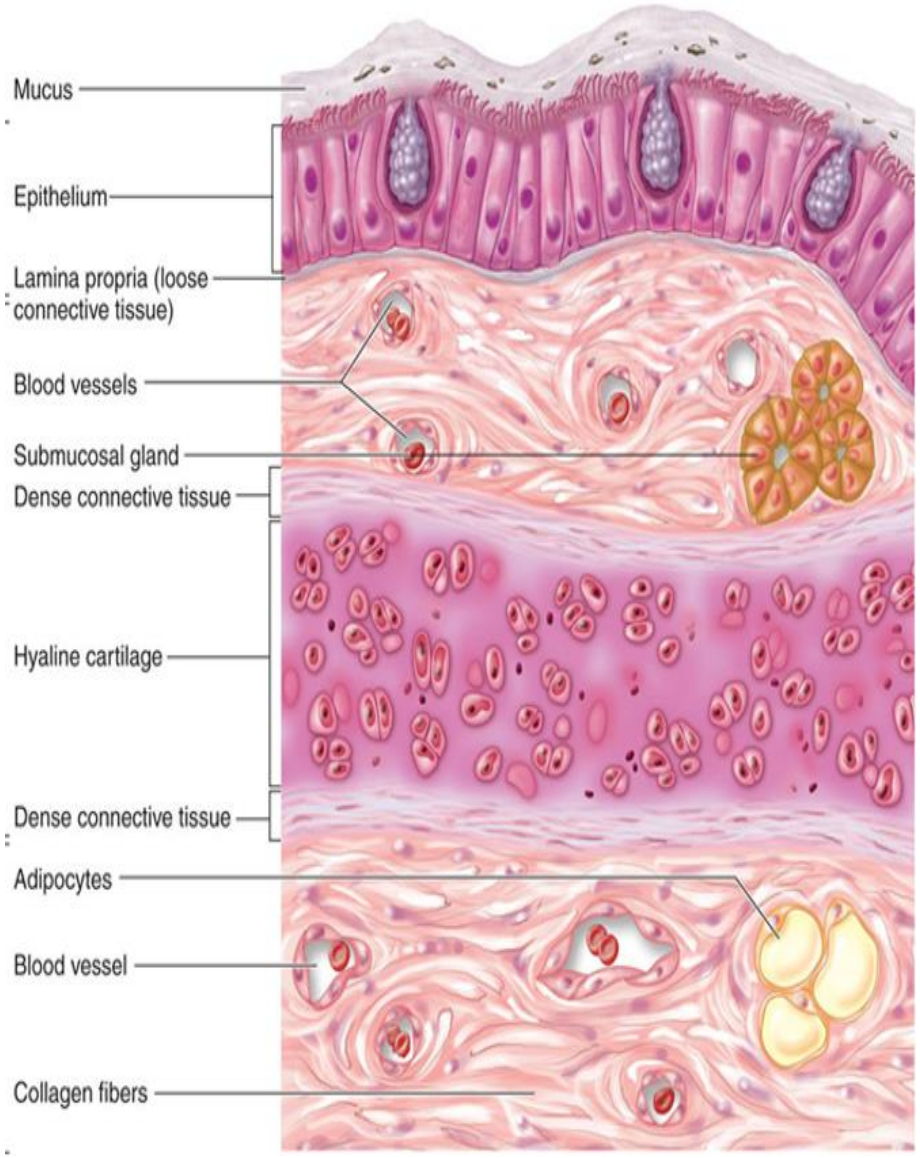
- Columnar with few luminal microvilli.
- Interpreted as depleted goblet cells or intermediate between differentiation of the basal cells into goblet cells.

6- Neuro-endocrine cells (Kulchitsky cells):

- Granule containing cells have neuroendocrine function.
- Secretes serotinin, calcitonin.

7- Migratory cells:

- Lymphocytes
- Globule leucocytes (mast cell like).



2- Submucosa

Loose connective tissue contains Tracheal glands [mixed mucous and serous glands].

3. Fibro-Cartilaginous coat

Dense connective tissue contains16–20 C-shaped rings of hyaline cartilage.

- **The hyaline cartilage rings the following characters:**

- **Arranged above each other.**
- **The gap between the free edges are bridged by smooth muscle fibers.**
- **Connected together by fibro-elastic membrane attached to the perichondrium**

BRONCHI

Extra-pulmonary bronchi: → **resemble the trachea.**

Intra-pulmonary bronchi:

1. Mucosa **Highly folded**

A. Epithelium;

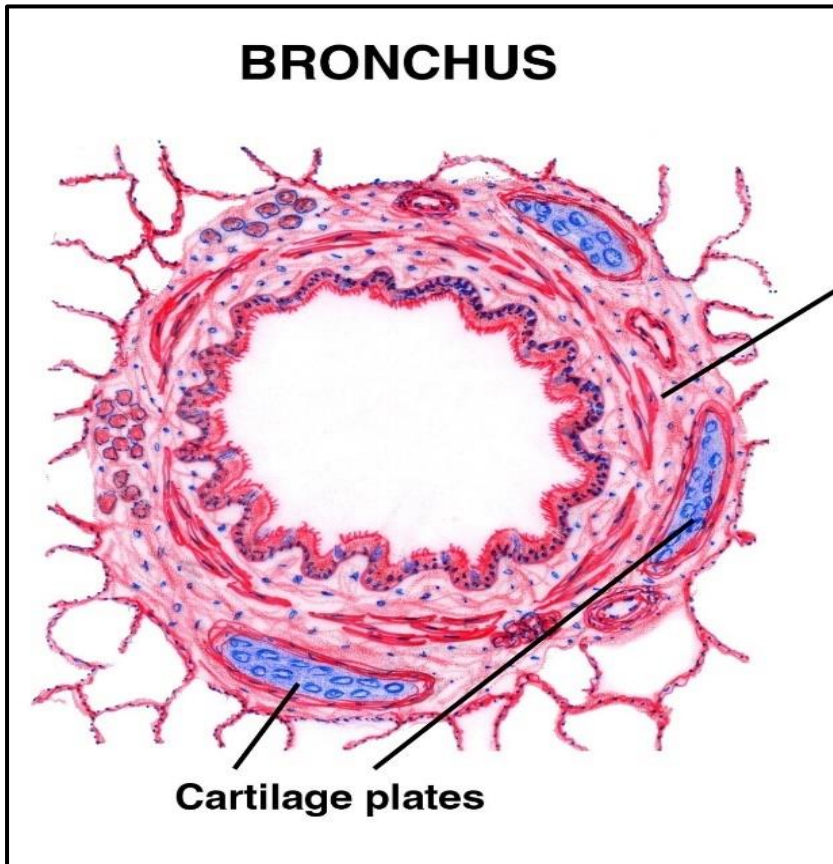
Pseudostratified columnar ciliated with goblet cells.

A. Corium; Loose C.T contains elastic fibers.

2. Muscle layer spirally arranged smooth muscle fibers.

3. Adventitia C.T rich in elastic fibers contains:

- **Hyaline cartilaginous plates.**
- **Bronchial (mucous and serous) glands.**
- **Lymphatic nodules.**



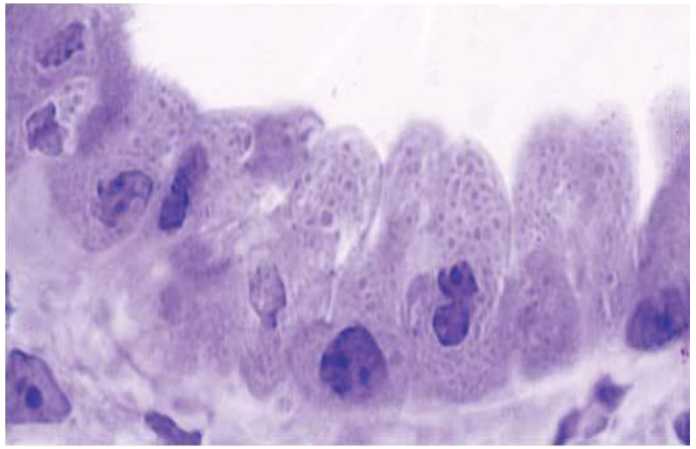
BRONCHIOLES

1. **Mucosa**

A. **Epithelium; Contains 2 types of cells:**

1. **Simple columnar ciliated cells.**
2. **Non ciliated cells (called Clara cells).**

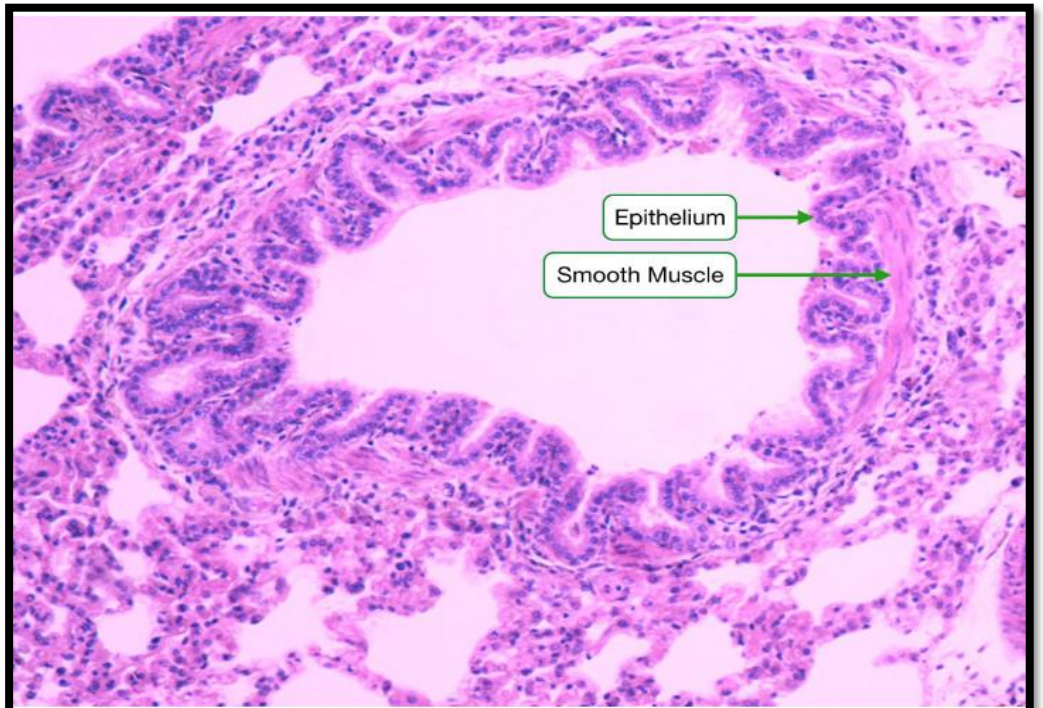
- **Columnar cells with rounded apex.**
- **Possess microvilli.**
- **Contain dense granules.**
- **Function: secrets serous fluid rich in protein.**



B. **Corium; Loose C.T contains elastic fibers.**

1. **Muscle layer Well developed, spirally smooth m. fs.**
2. **Outer connective tissue layer with:**

- **No cartilage.**
- **No glands.**
- **No Lymphatic nodules.**



A. Alveolar epithelium:

Compare between Type-1 pneumocytes and Type-2 pneumocytes?

I. Type I pneumocytes

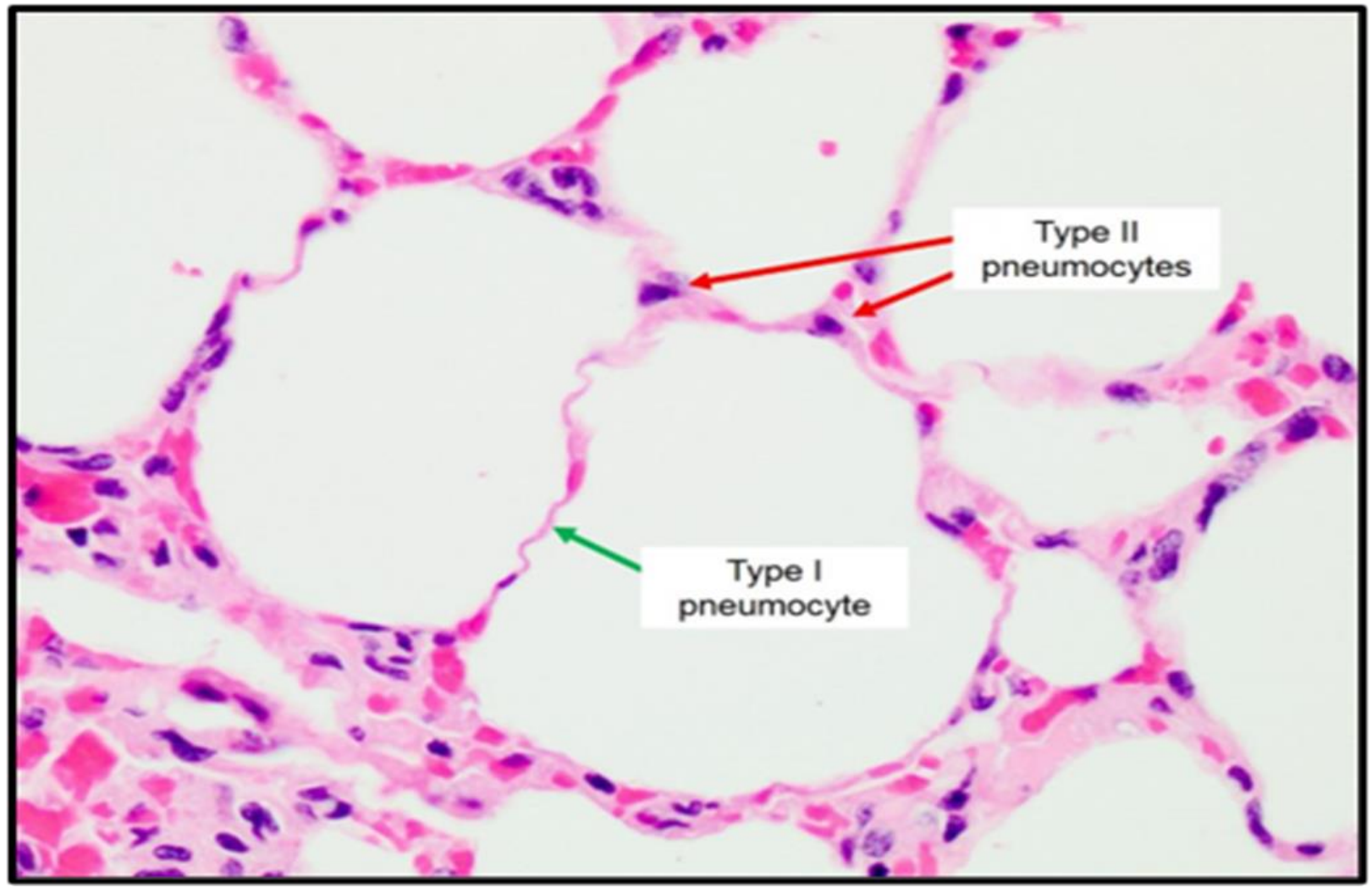
- **No:** 95% of cells line the alveoli.
- L/M: Flat squamous cells with bulging nuclei.
- Attached by **occluding junction** to each other and to type-2 pneumocytes.
- Have thin basement membranes fuse with basement membranes of nearby capillaries.
- Function: form thin membrane though which gas exchange occurs.

II. Type II pneumocytes

- **No:** 5% of cells line the alveoli.
- L/M: cuboidal cells
  rounded central nuclei.
  Commonly located near the angles of the interalveolar septa.
- Function:

1- act as progenitor cells for type I and type II pneumocytes.

2-secrete the pulmonary surfactant.


Type II
pneumocytes
Type I
pneumocyte

BLOOD AIR BARRIER

Mention 3 layers forming **BLOOD AIR BARRIER?**

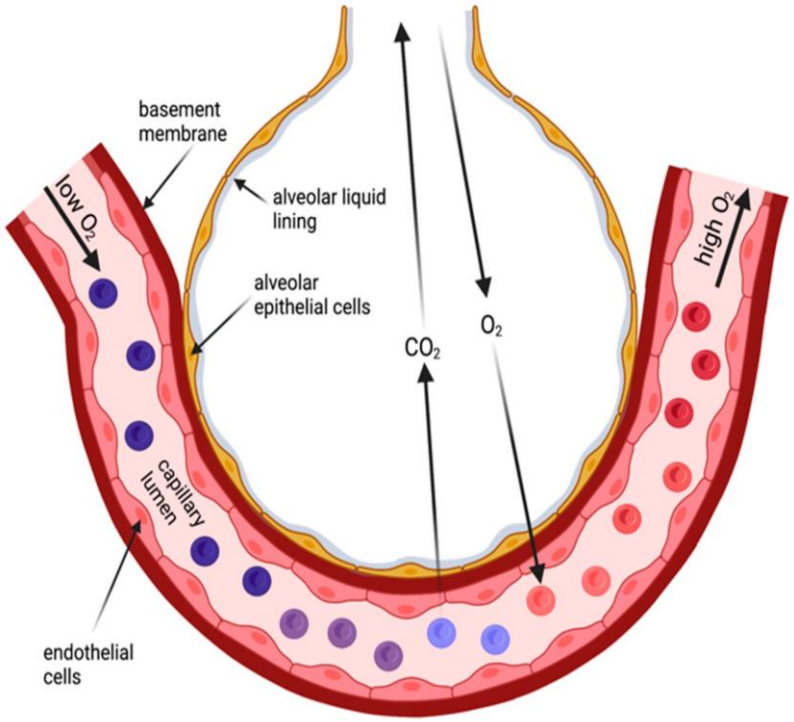
The wall separating the air in the alveoli from the blood in the capillaries.

- **Formed of three components:**

1- The surface lining and cytoplasm of the alveolar cells.

2- The fused basal laminae of the alveolar and endothelial cells.

3- The cytoplasm of the endothelial cells of the capillaries.



ALVEOLAR MACROPHAGES

Mention 2 cell types of ALVEOLAR MACROPHAGES?

The first line of defense against infection.

Types:

(1) Dust cells:

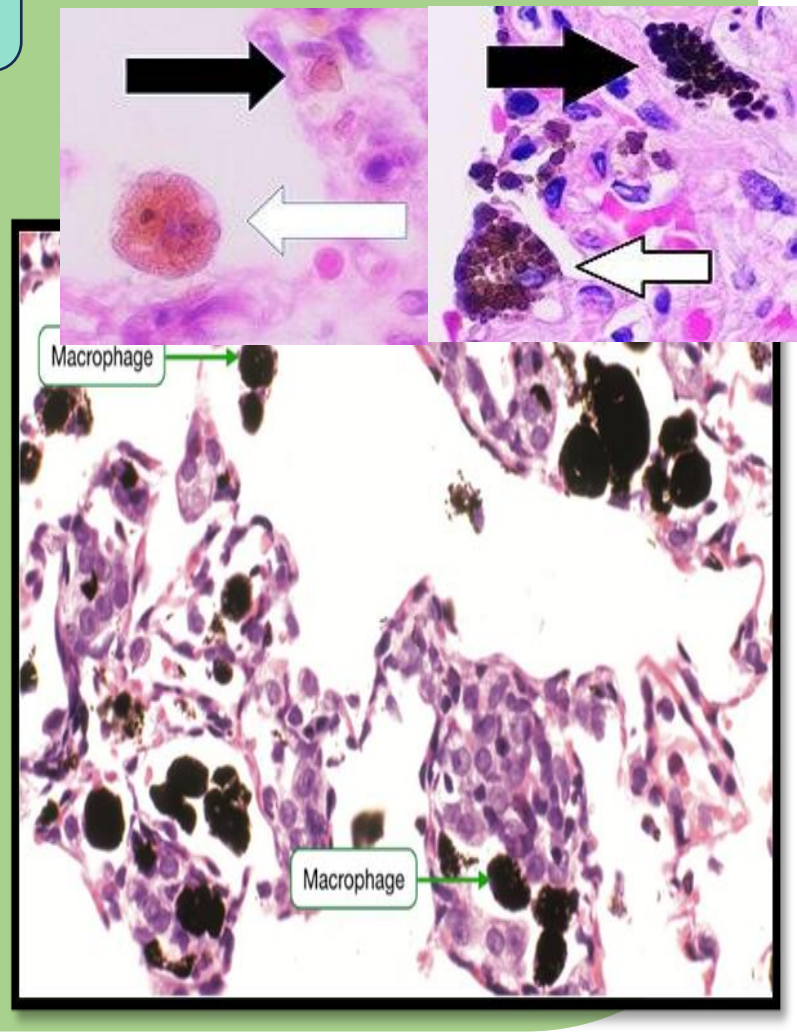
- **These phagocytose dust or coal particles that are inspired with air.**

(2) Heart failure cells:

- **These phagocytose the extravasated RBCs, which escape from the congested capillaries into the alveoli.**

Fate:

Many of them migrate from the alveoli to the bronchi, then to the pharynx where they are swallowed with saliva or expelled in the sputum (through coughing).



Which of the following best describes the epithelium of the vocal cords?

A. Simple columnar ciliated epithelium

B. Stratified squamous non-keratinized epithelium

C. Pseudo-stratified columnar ciliated epithelium

D. Transitional epithelium

E. Simple cuboidal epithelium

Answer: B. Stratified squamous non-keratinized epithelium

Which of the following structures is part of the conducting portion of the respiratory system?

A. Alveoli
B. Alveolar ducts
C. Respiratory bronchioles
D. Terminal bronchioles
E. Pulmonary capillaries

Answer: D. Terminal bronchioles

What type of epithelium lines the majority of the conducting portion of the respiratory system?

A. Simple squamous epithelium
B. Stratified squamous epithelium
C. Simple columnar epithelium
D. Pseudo-stratified columnar ciliated epithelium
E. Transitional epithelium

Answer: D. Pseudo-stratified columnar ciliated epithelium

Which cells in the tracheal epithelium are responsible for producing mucus?

A. Ciliated cells
B. Basal cells
C. Goblet cells
D. Serous cells
E. Brush cells

ANS: C

10

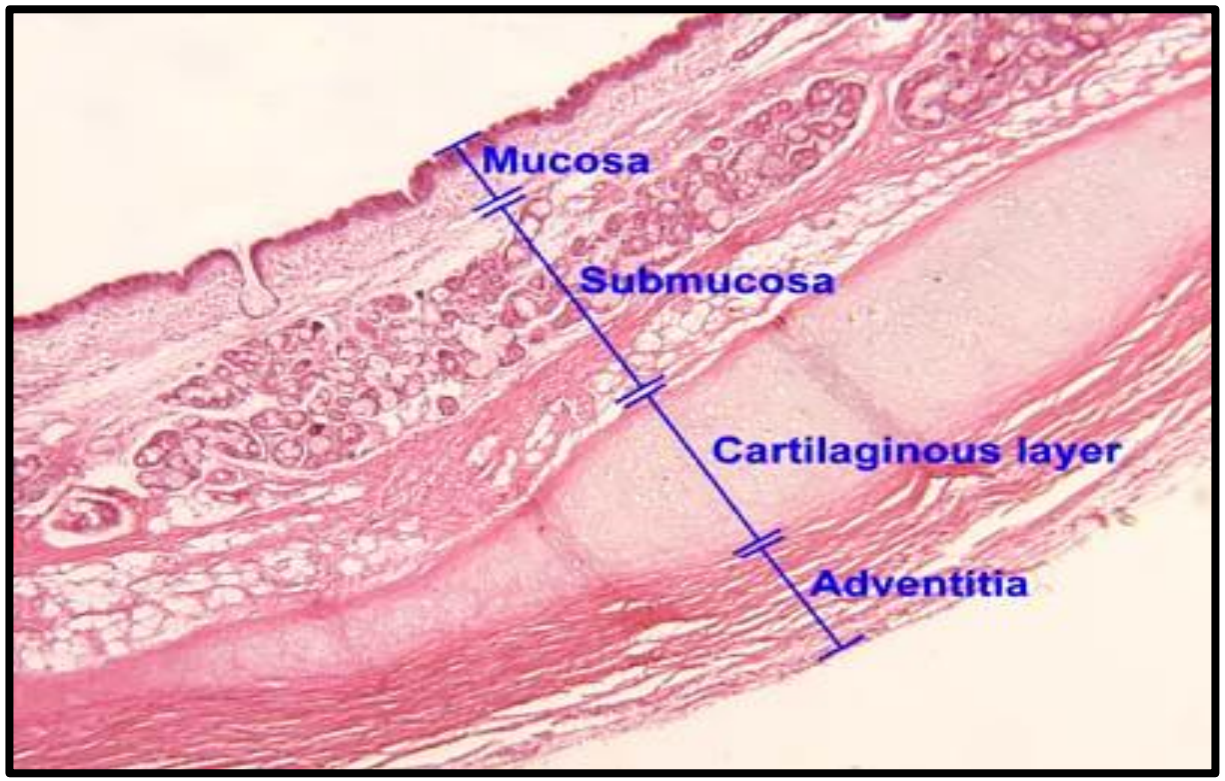
- **Enumerate 2 types of alveolar macrophage?**

(1) **Dust cells:**

(2) **Heart failure cells:**

Practical Revision

Trachea



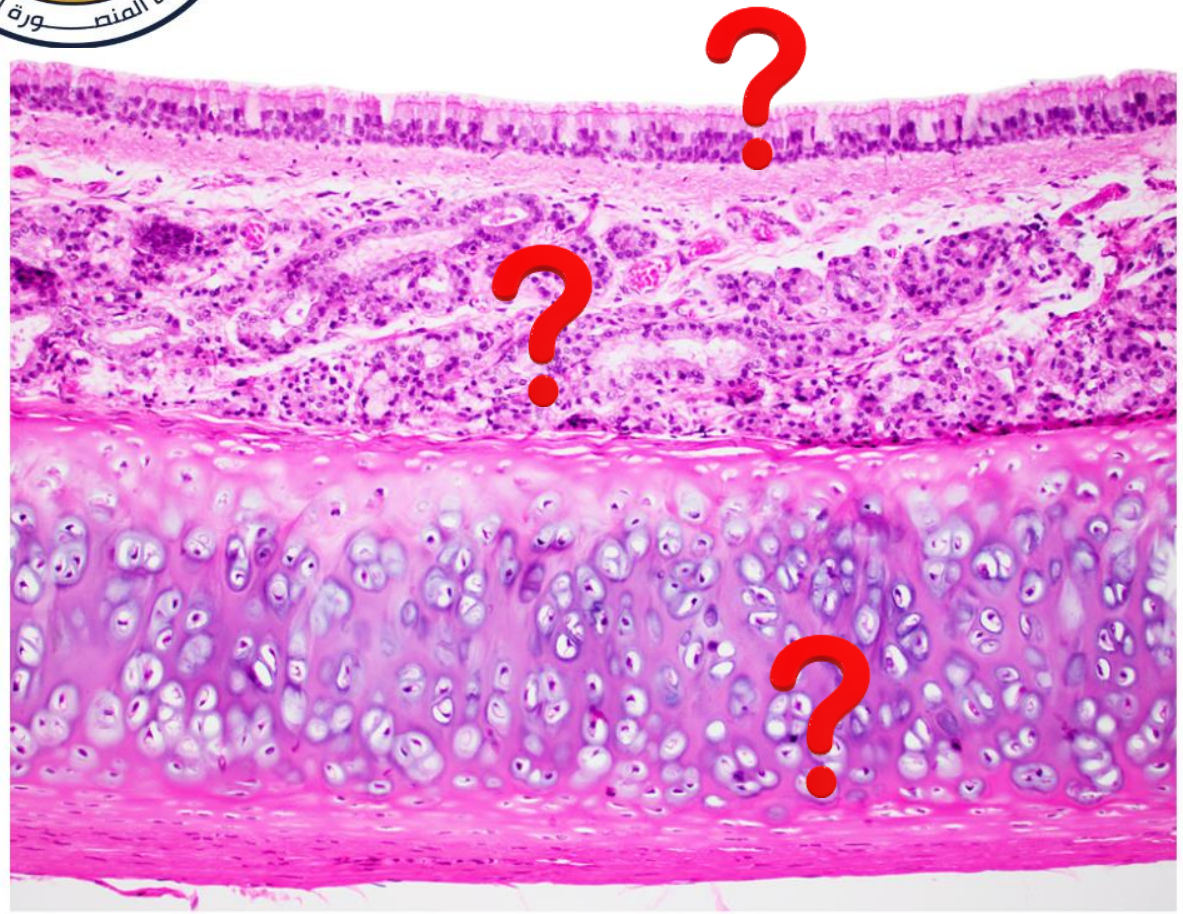
❖ **Trachea is formed of:**

1- **Mucosa:** Epithelium and corium.

2- **Submucosa:** Mucous and serous (Mixed) tracheal glands.

3- **Fibro-cartilagenous coat:** C-shaped rings of hyaline cartilage.

Trachea



Mention the type of epithelium lining this structure.

Pseudostratified columnar ciliated epithelium with goblet cells.

Name the layers forming this structure.

1. Mucosa
2. Submucosa
3. Fibro-cartilagenous coat

mention the Component present in the submucosa of this structure.

Mixed (Mucous and serous) tracheal glands.

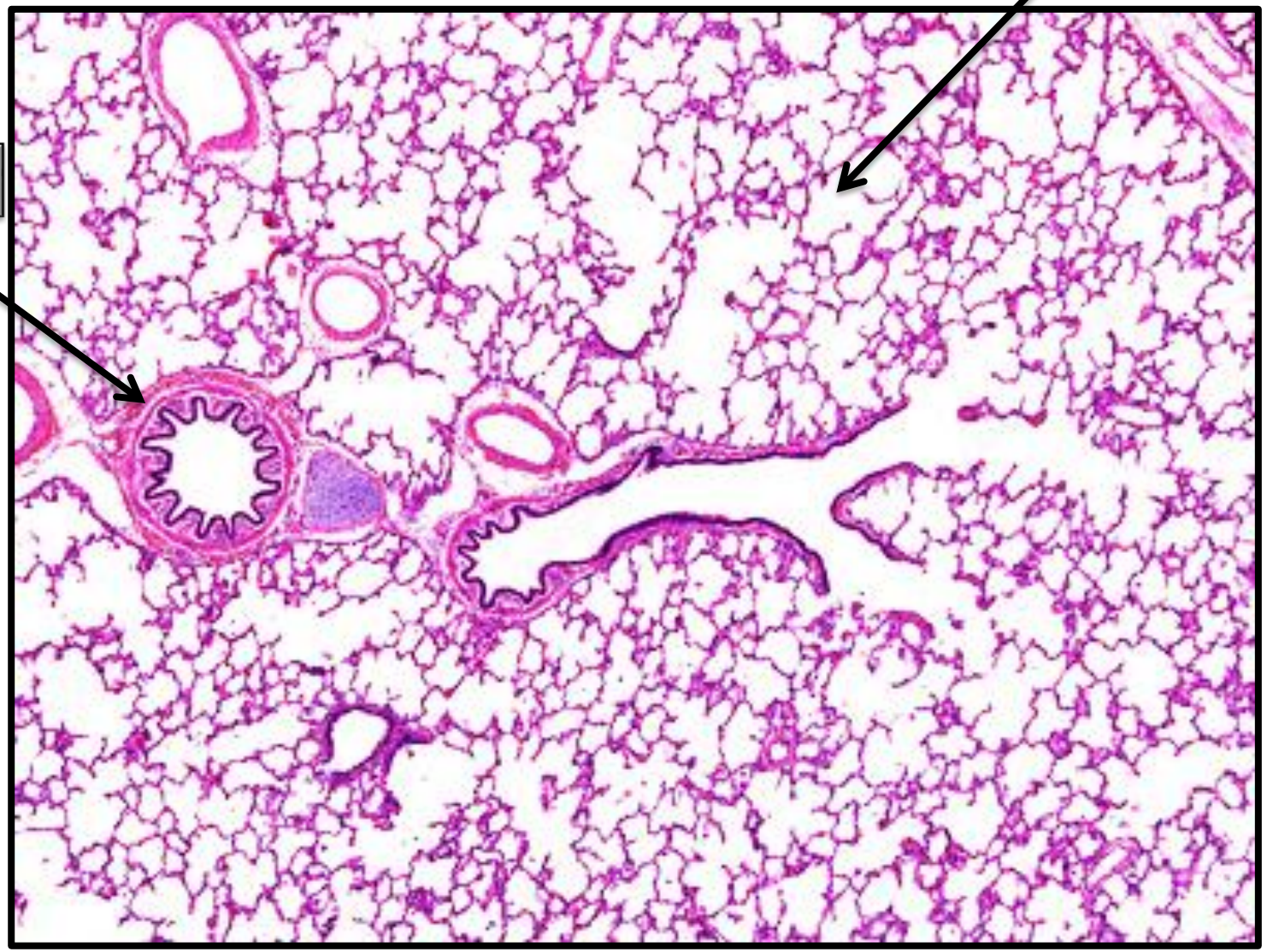
Mention the type of cartilage present in this structure.

Hyaline cartilage

Mention 3 types of cells of epithelium of this structure.

1. Goblet cells
2. Basal cells
3. Serous cells
4. Brush cells
5. Neuro-endocrine cells (Kulchitsky cells)
6. Migratory
7. Ciliated cells

Lung



- **Alveoli:** thin polyhedral spaces lined with squamous epithelial cells.
- **Bronchiole:** simple columnar ciliated epithelium, well developed muscle layer.

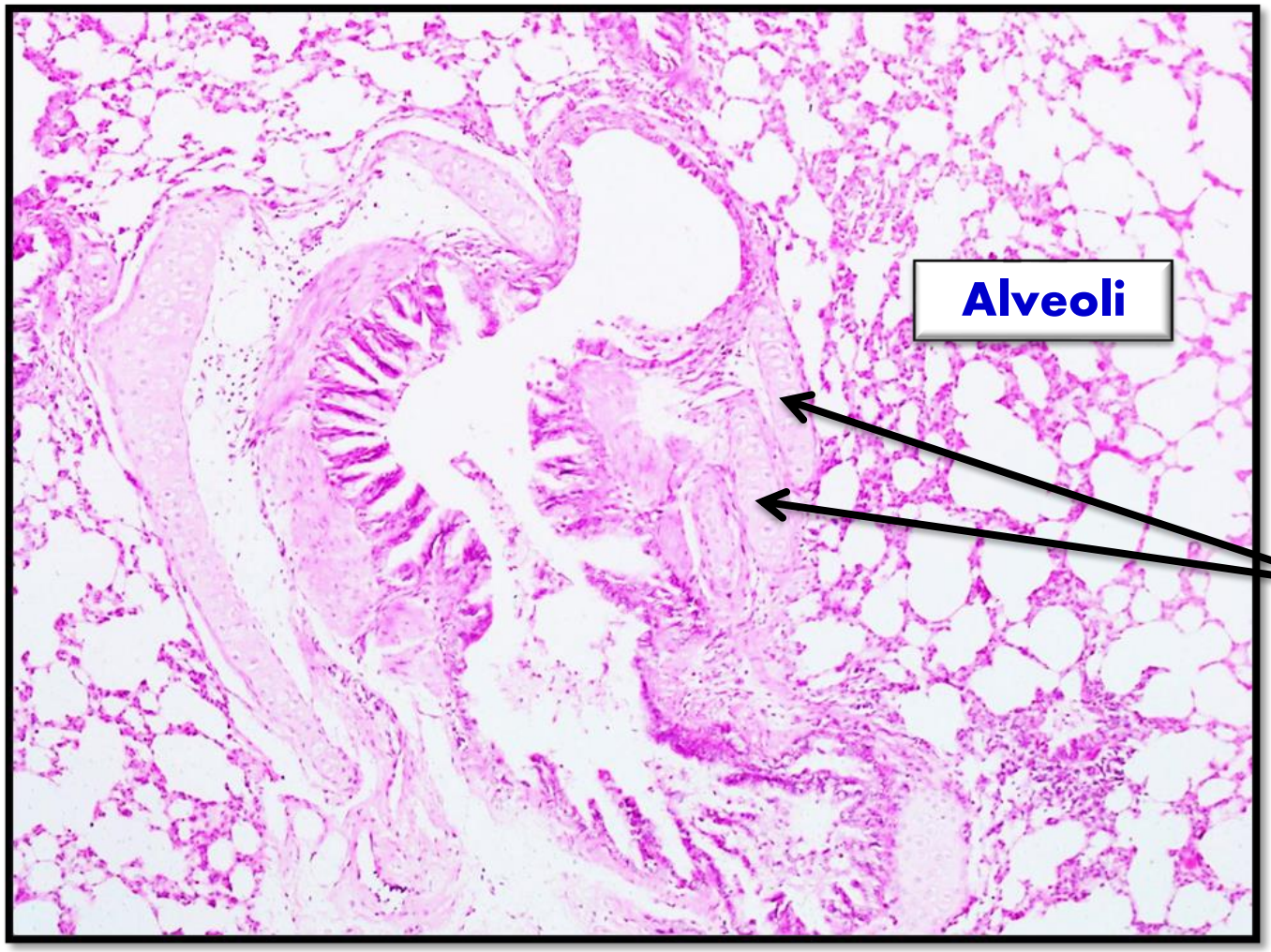
Mention the type of epithelium lining bronchiole?

Simple columnar ciliated epithelium

Mention the layers of the bronchiole.

1. **Mucosa**
2. **Muscle layer**
3. **Adventitia**

Lung



- **Intrapulmonary bronchus:** pseudo-stratified columnar ciliated epithelium with goblet cells & several cartilage plates.

Mention the. type of epithelium lining intrapulmonary bronchus:

Pseudostratified columnar ciliated epithelium with goblet cells

Mention the components of the adventitia of intrapulmonary bronchus

Hyaline cartilaginous plates, mucous and serous glands and lymphatic nodules.

Urinary System

DR. Dalia Eita

THE KIDNEY

Structure:

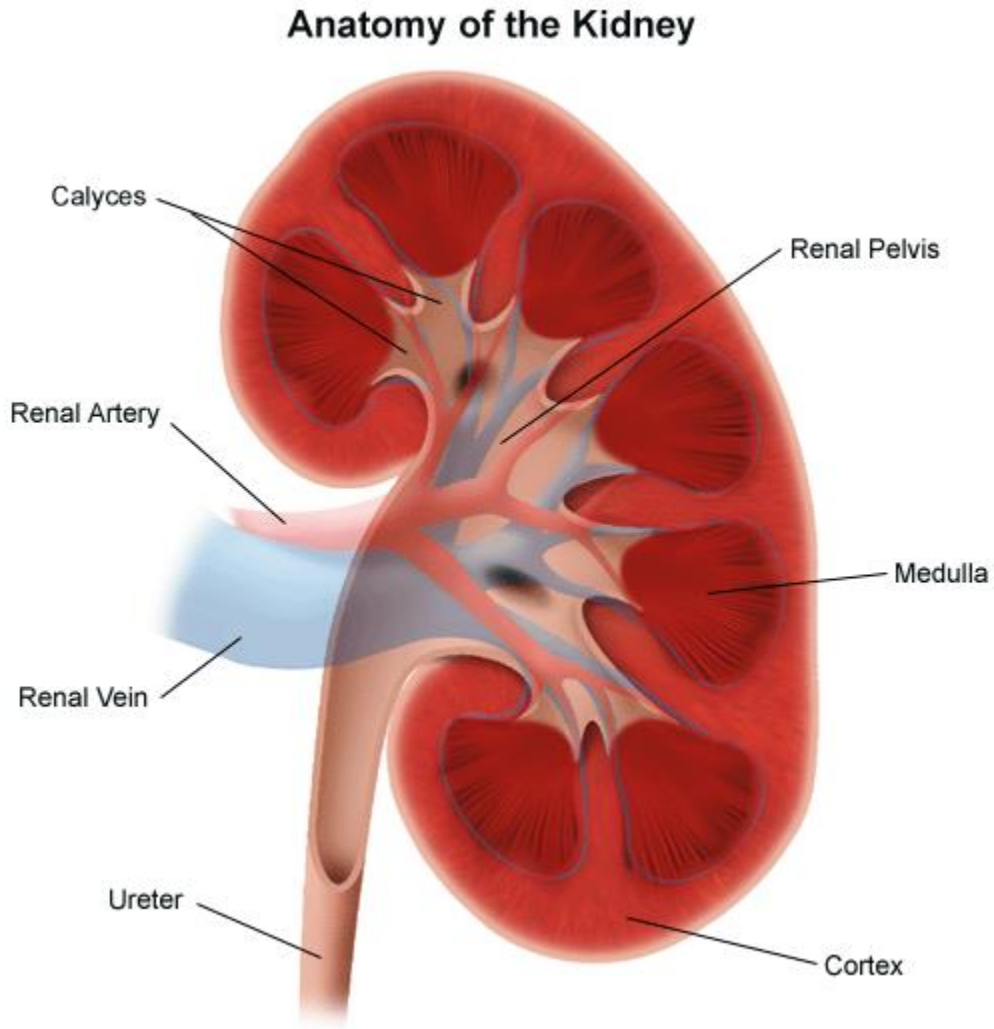
A-Stroma:

-Capsule

-Reticular tissue

B-Parenchyma:

Uriniferous tubule



Uriniferous tubule

-It is the structural and functional unit of the kidney.

-It consists of **nephron + collecting tubule.**

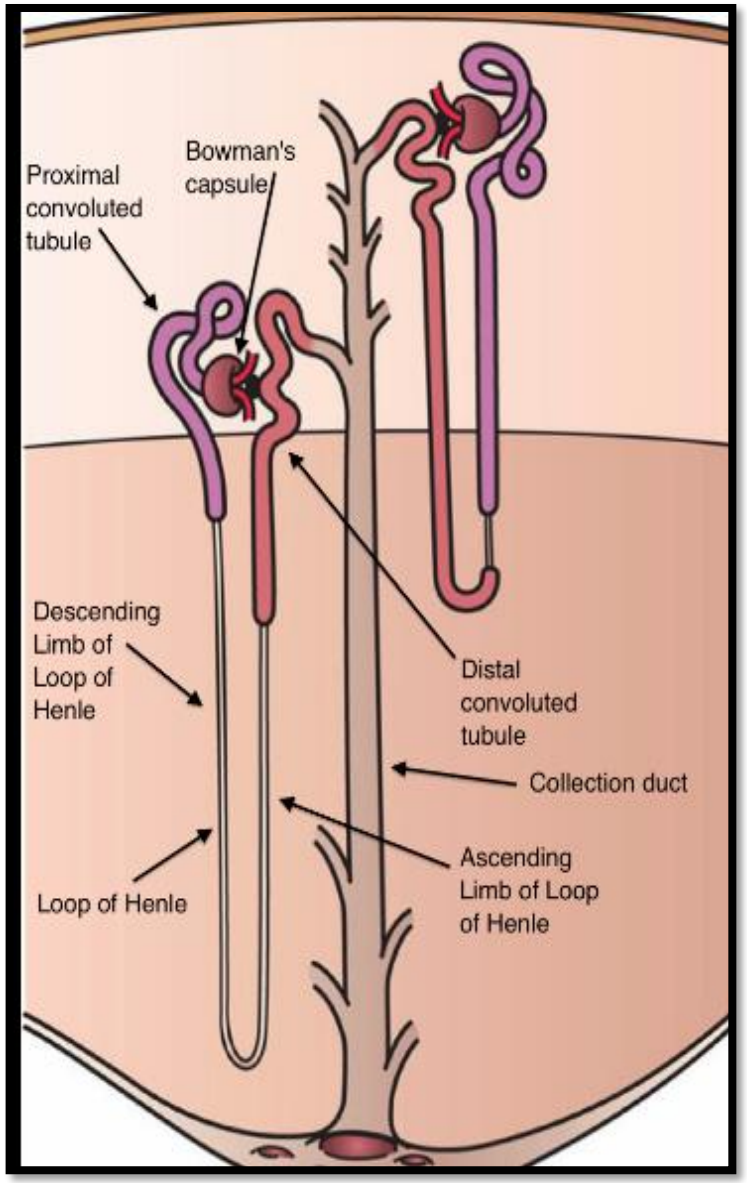
-The **Nephron** is the active part and subdivided into:

1-Renal corpuscle.

2-Proximal convoluted tubule (P.C.T.).

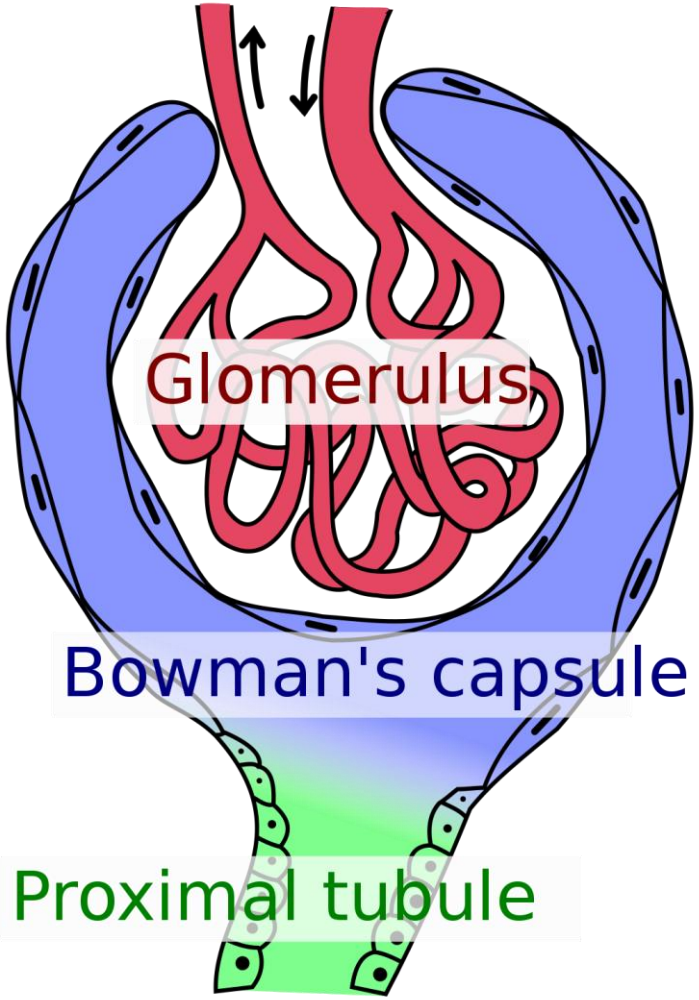
3-Loop of Henle.

4-Distal convoluted tubule (D.C.T.)



1-The renal corpuscle (Malpighian corpuscle)

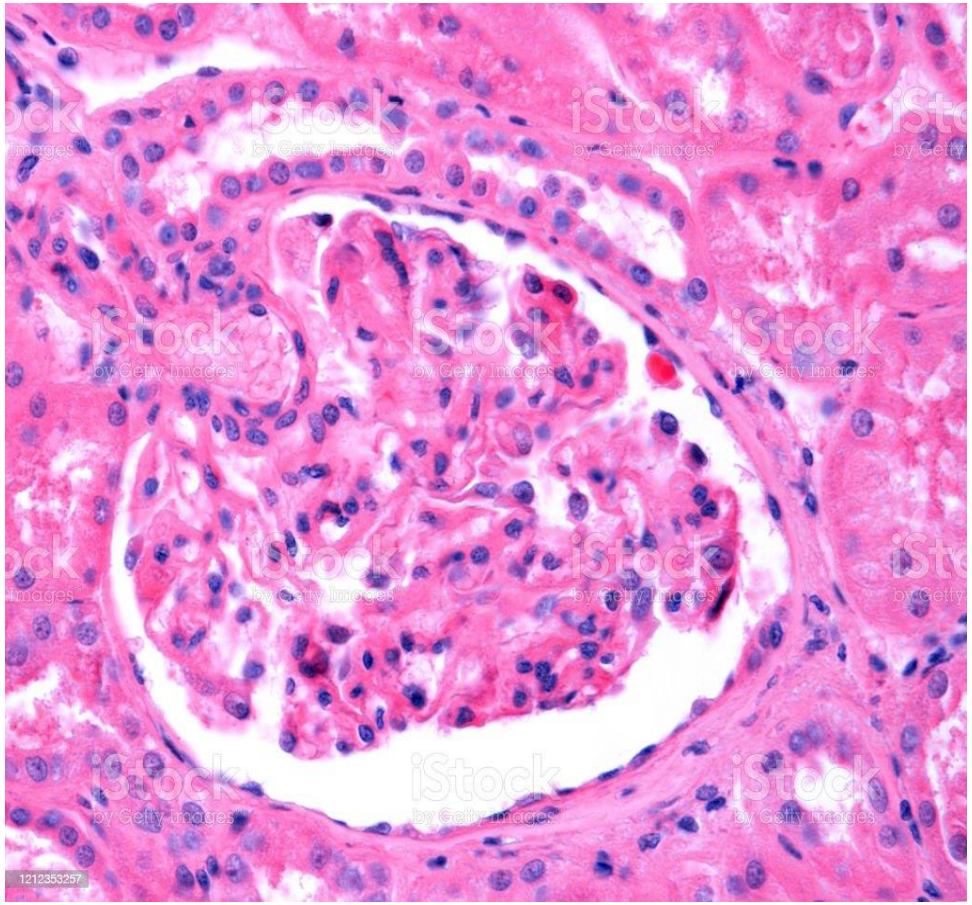
It is formed of → Bowman’s capsule + glomerulus.



A- Bowman's Capsule:

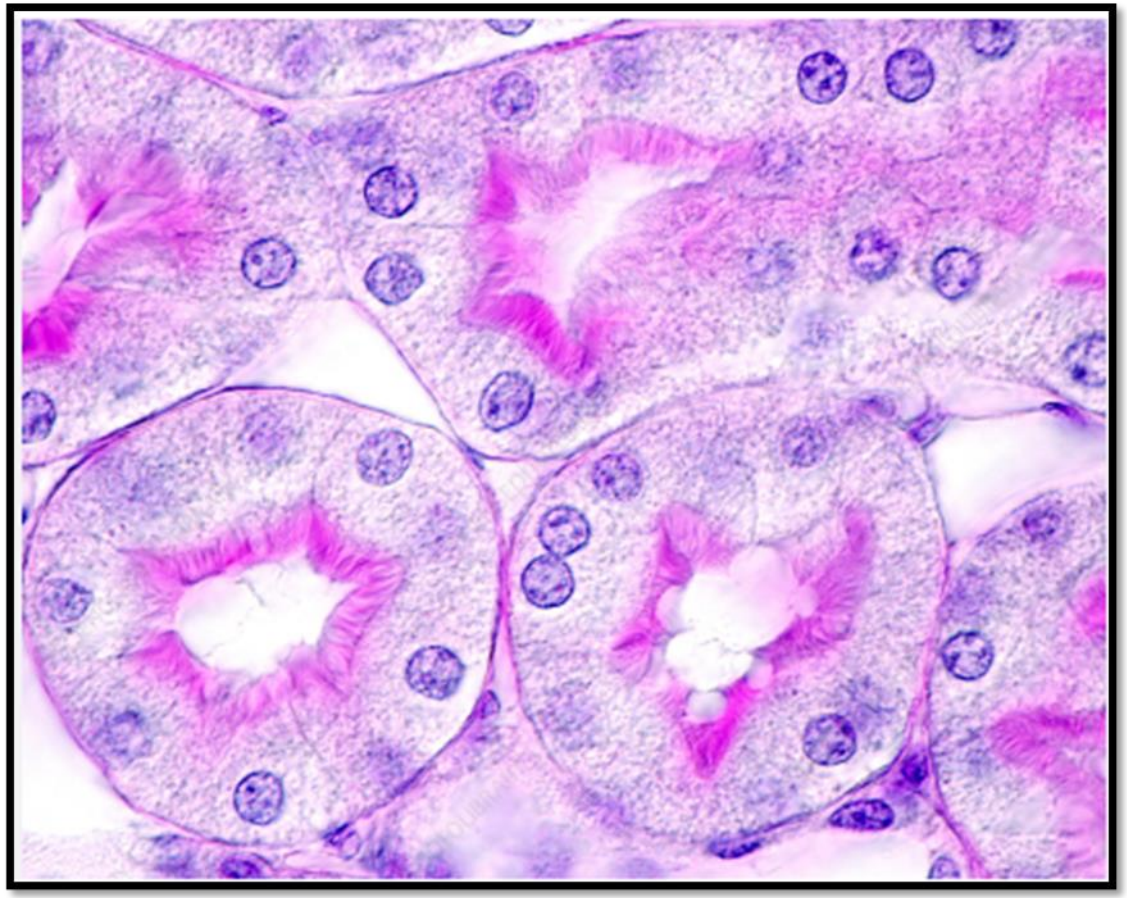
-It has 2 layers, separated by capsular space.

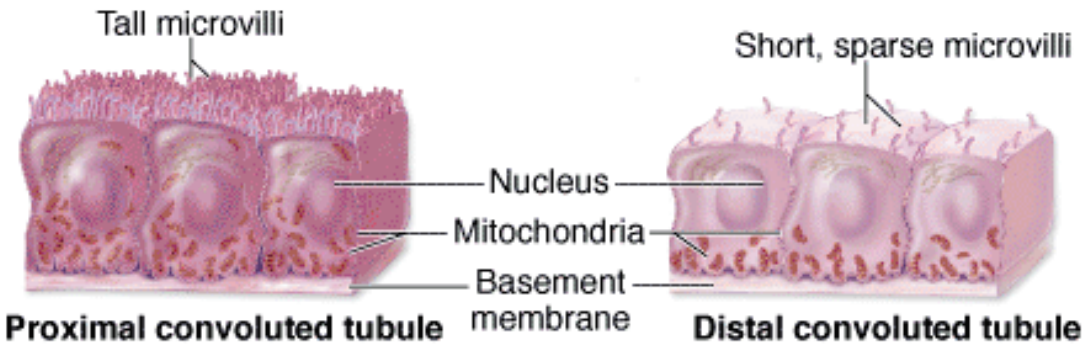
- **Parietal layer** (outer)
  It is called capsular epithelium.
  It is formed of simple sq. epithelium.
- **Visceral layer** (inner)
  It is called glomerular epithelium.
  It is formed of podocytes.



2-Proximal convoluted tubule

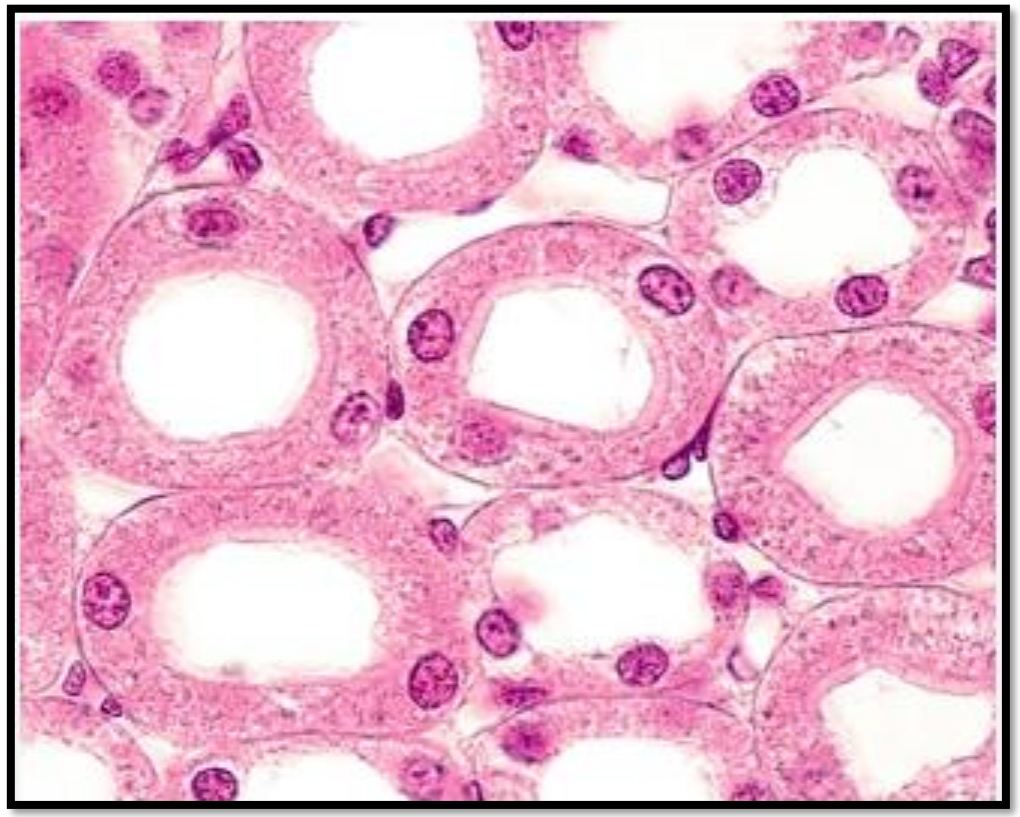
	P. C. T.
Length:	– About 15 mm
Convolutions:	– More convoluted
Diameter:	– Large diameter (60 µm)
Lumen:	– Narrow lumen
<u>Lining cells:</u>	
Number:	– 3-5 cells
Shape:	– Cubical shape
Nucleus:	– Basal and rounded
Side border:	– Are not clear (due to interdigitation of the cell membranes)
Luminal border:	– Shows brush appearance due to microvilli
Base of cell:	– Shows basal mitochondrial striation
Cytoplasm:	Deeply acidophilic and granular

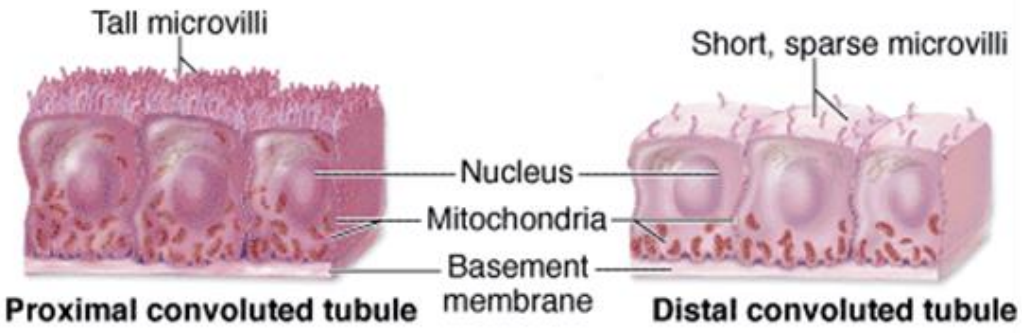




3-Distal convoluted tubule

	D. C. T.
Length:	-About 5 mm
Convolutions:	-Less convoluted
Diameter:	-Small diameter (30-50 µm)
Lumen:	-Wide lumen
Lining cells:	
Number:	-5-8 cells
Shape:	-Less cubical
Nucleus:	-Central and rounded
Side border:	-Are Clear
Luminal border:	-Microvilli are few and short
Base of cell:	-Basal mitochondrial striation
Cytoplasm:	Pale acidophilic and non granular





4-The Loop of Henle

- It is a u-shaped tube in which connects P. C. T. with the D. C. T.

- Each loop is formed of two limbs: (ascending and descending limbs)

1- Descending limb	D. Thick part-lined by simple cubical cell (like P.C.T.) D. thin part-lined by simple squamous epithelium
2- Ascending limb	A. Thin part-lined by simple squamous epithelium. A. Thick-lined by simple cubical cell (like D.C.T.)

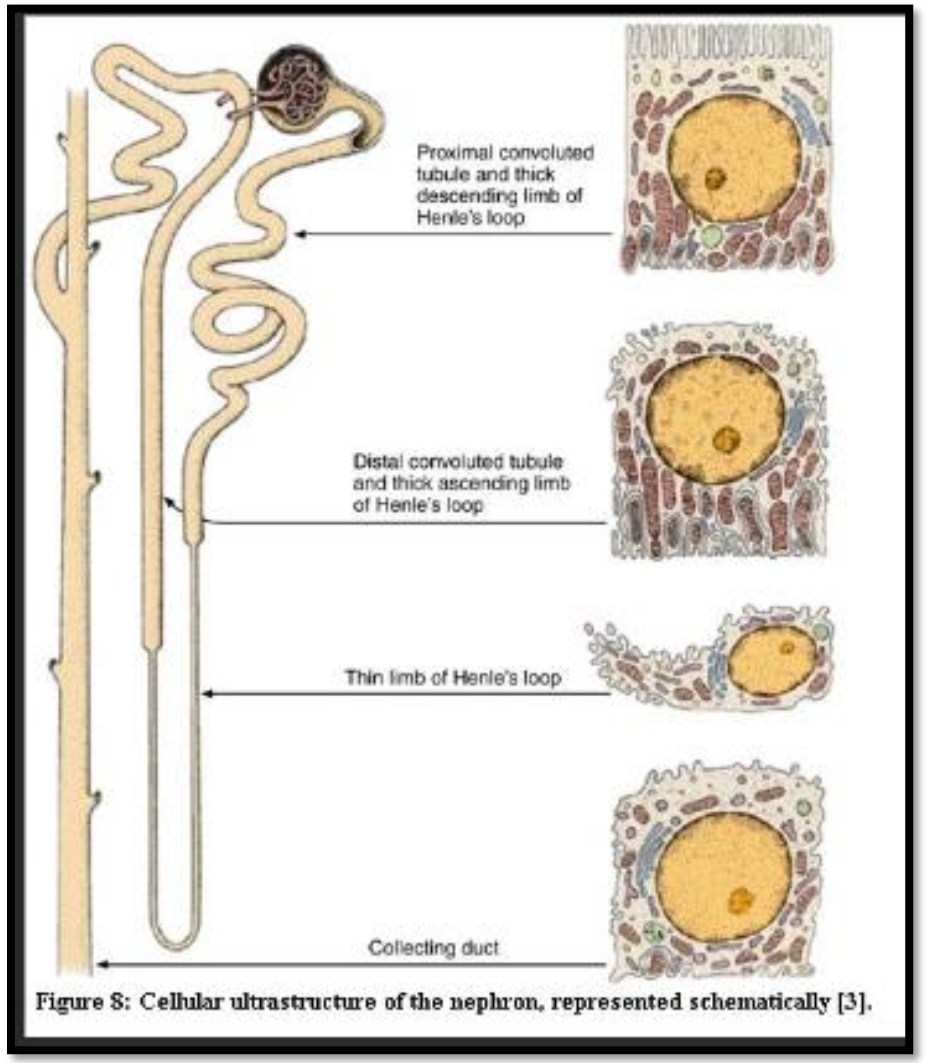
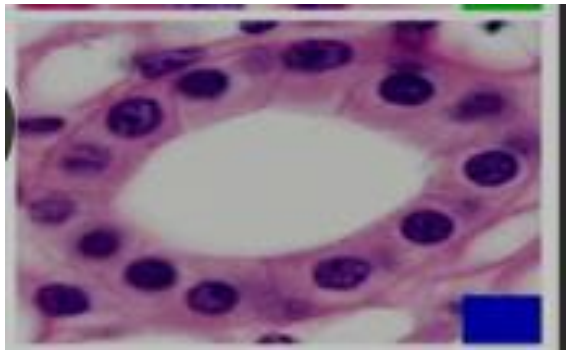
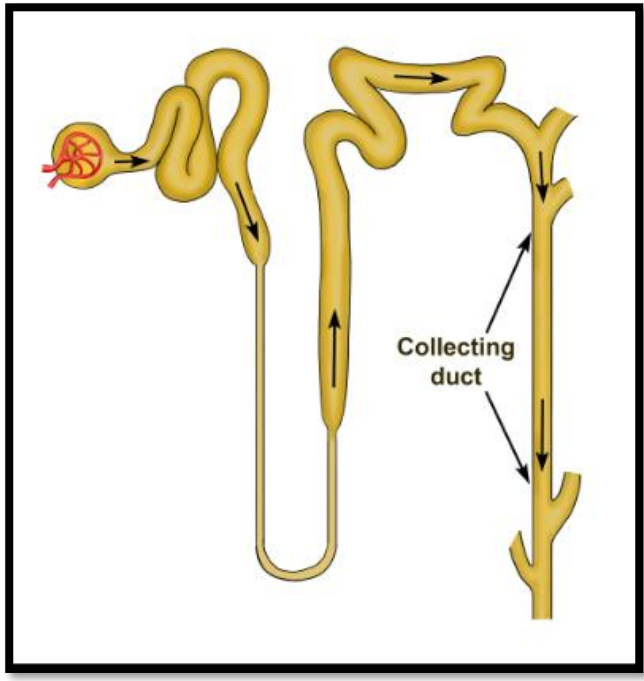


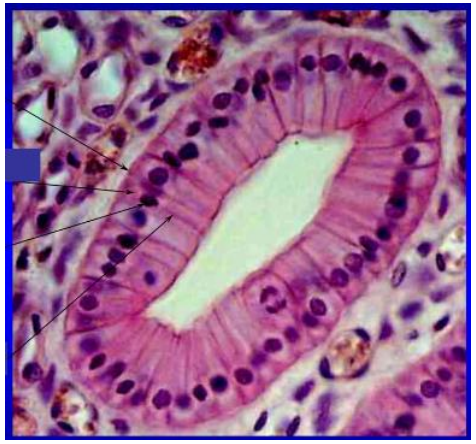
Figure 8: Cellular ultrastructure of the nephron, represented schematically [3].

Collecting tubules

- Each one collecting tubule in the cortex drains about **5-10** nephrons.
- In the medulla about **6-8** collecting tubules open into a large duct called duct of Bellini which open at the summit of medullary pyramid.
- **Collecting tubule** → is lined with cubical cells with clear basophilic cytoplasm.
- **Duct of Bellini** → is lined with columnar cell with clear basophilic cytoplasm.







The wall of urinary bladder

formed of three layers:

1- Mucosa:

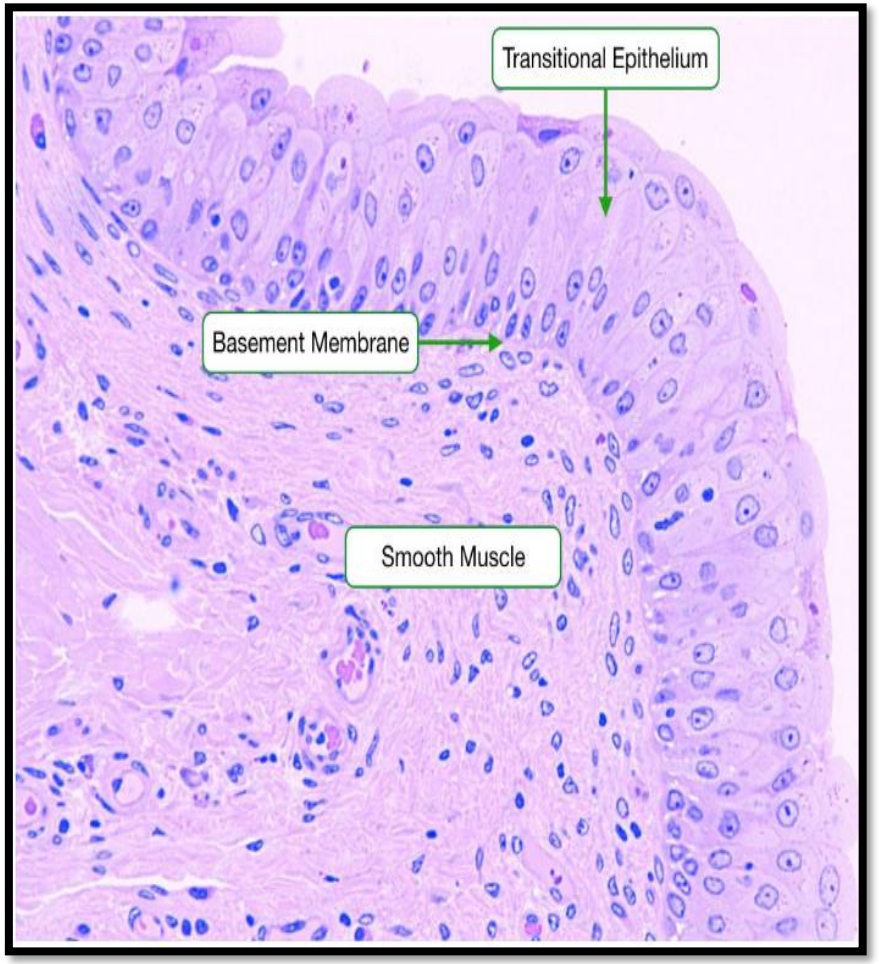
- **The urothelium (transitional epithelium).**
- **Corium.**

2- Muscle layer:

Smooth muscle fibres arranged in three layers:

1. **Inner longitudinal**
2. **Middle circular**
3. **Outer longitudinal**

3- Adventitia: (Serosa in the fundus as it is covered with peritoneum)



The wall of ureter

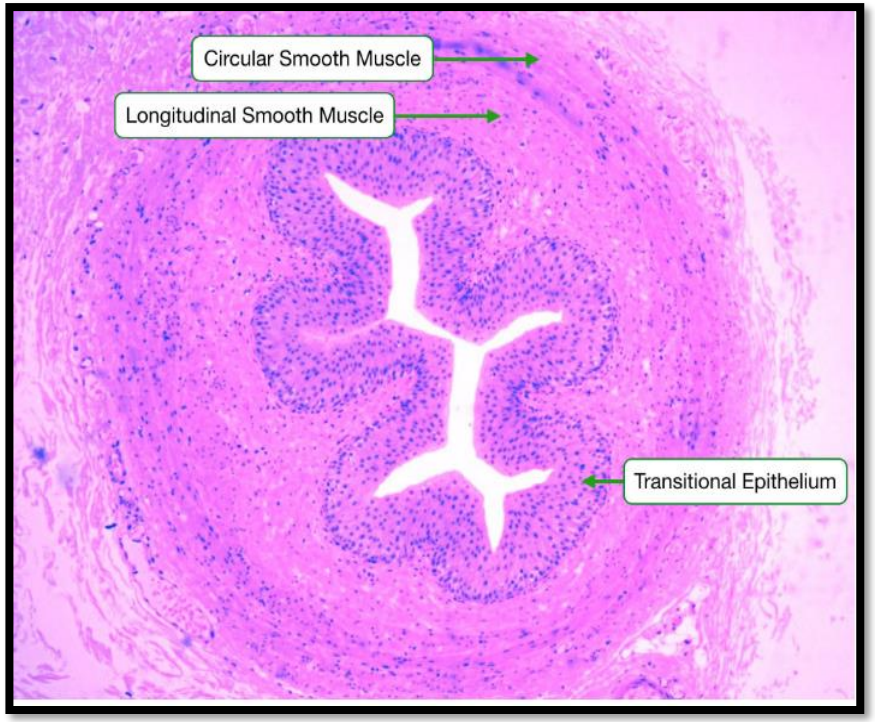
Similar to that of urinary bladder but:

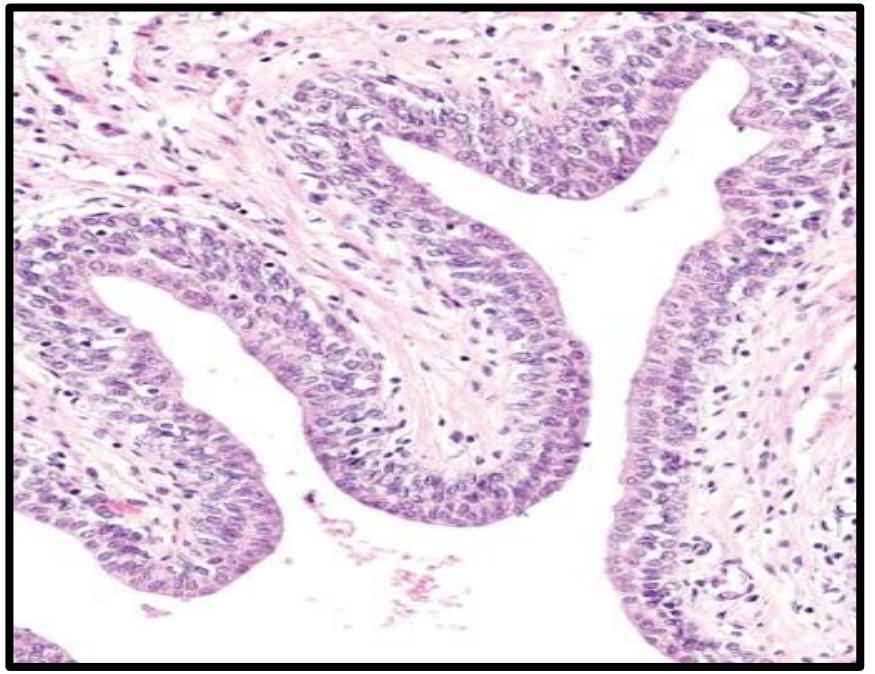
1-The lumen is narrow.

2-Muscle layer is formed of 2 layers only:

- **Inner longitudinal**
- **Outer cicular**

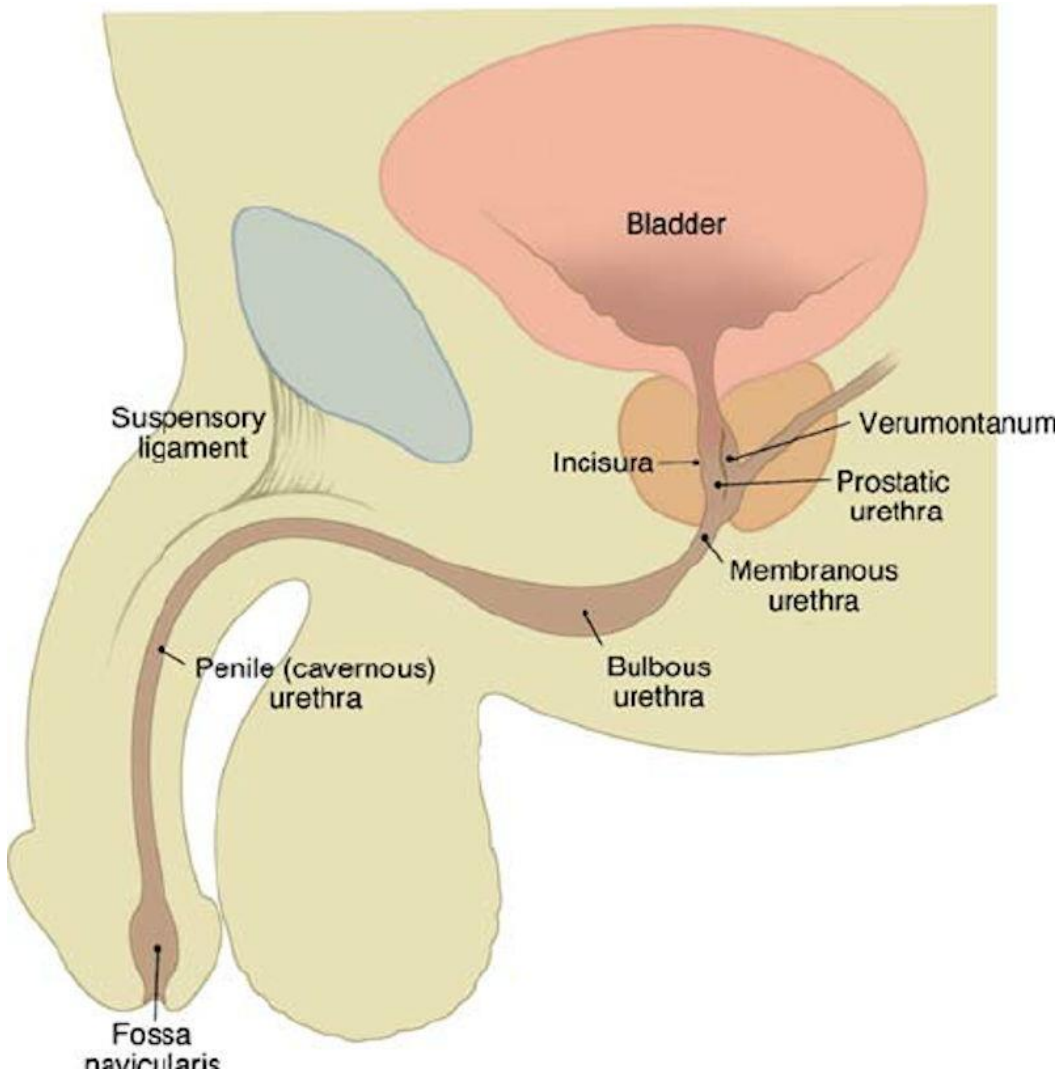
In the lower 1/3 it has 3 layers (similar to the urinary bladder).





The Male Urethra

-The male urethra is long (20cm) twisted tube.
-Many glands open in the course of the urethra (prostatic gland, glands of Littre and bulbo-urethral gland).
-The male urethra has three parts:



The Male Urethra

1-Prostatic urethra	Transitional epithelium proximally. Pseudostratified columnar distally. Internal urethral sphincter
2-Membranous urethra	Stratified columnar epithelium. External urethral sphincter
3-Penile Urethra	Stratified columnar epithelium proximally. Stratified squamous distally.

1

- **The lining epithelium of the Membranous urethra is:**

a. **Stratified squamous epithelium.**
b. **Simple columnar ciliated epithelium.**
c. **Cubical ciliated epithelium.**
d. **Stratified columnar epithelium.**
e. **Thin skin.**

answer : d

2

- Internal Sphincter of urinary bladder surrounds which part of male urethra:

a. Penile urethra
b. Membranous urethra
c. External orifice of female urethra
d. Disatl part of male urethra
e. Prostatic urethra

Answer: e

3

- **The lining epithelium of the distal part of penile urethra is:**

a. **Stratified squamous epithelium.**
b. **Simple columnar ciliated epithelium.**
c. **Cubical ciliated epithelium.**
d. **Stratified columnar ciliated epithelium.**
e. **Thin skin.**

answer : a

Which layer of the urinary bladder wall contains the urothelium?

a) Muscle layer

b) Adventitia

c) Mucosa

d) Serosa

e) Corium

ANS C

Which part of the male urethra is surrounded by striated muscle forming the external sphincter?

a) Prostatic urethra

b) Membranous urethra

c) Penile urethra

d) Bulbar urethra

e) Spongy urethra

ANS B

- **Mention 2 differences between the ureter and the urinary bladder?**

- **In the ureter**

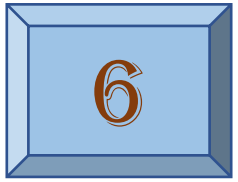
1-The lumen is narrow.

2-Muscle layer is formed of 2 layers only:

- **Inner longitudinal**
- **Outer cicular**

- **Mention the parts of loop of Henle and its lining epithelium?**

1- Descending limb	**D. Thick part** lined by simple cubical cell (like P.C.T.) **D. thin part** lined by simple squamous epithelium
2- Ascending limb	**A. Thin part** lined by simple squamous epithelium. **A. Thick part** lined by simple cubical cell (like D.C.T.)



- Compare between lining cells of PCT and DCT according to convolutions, diameter and lumen?

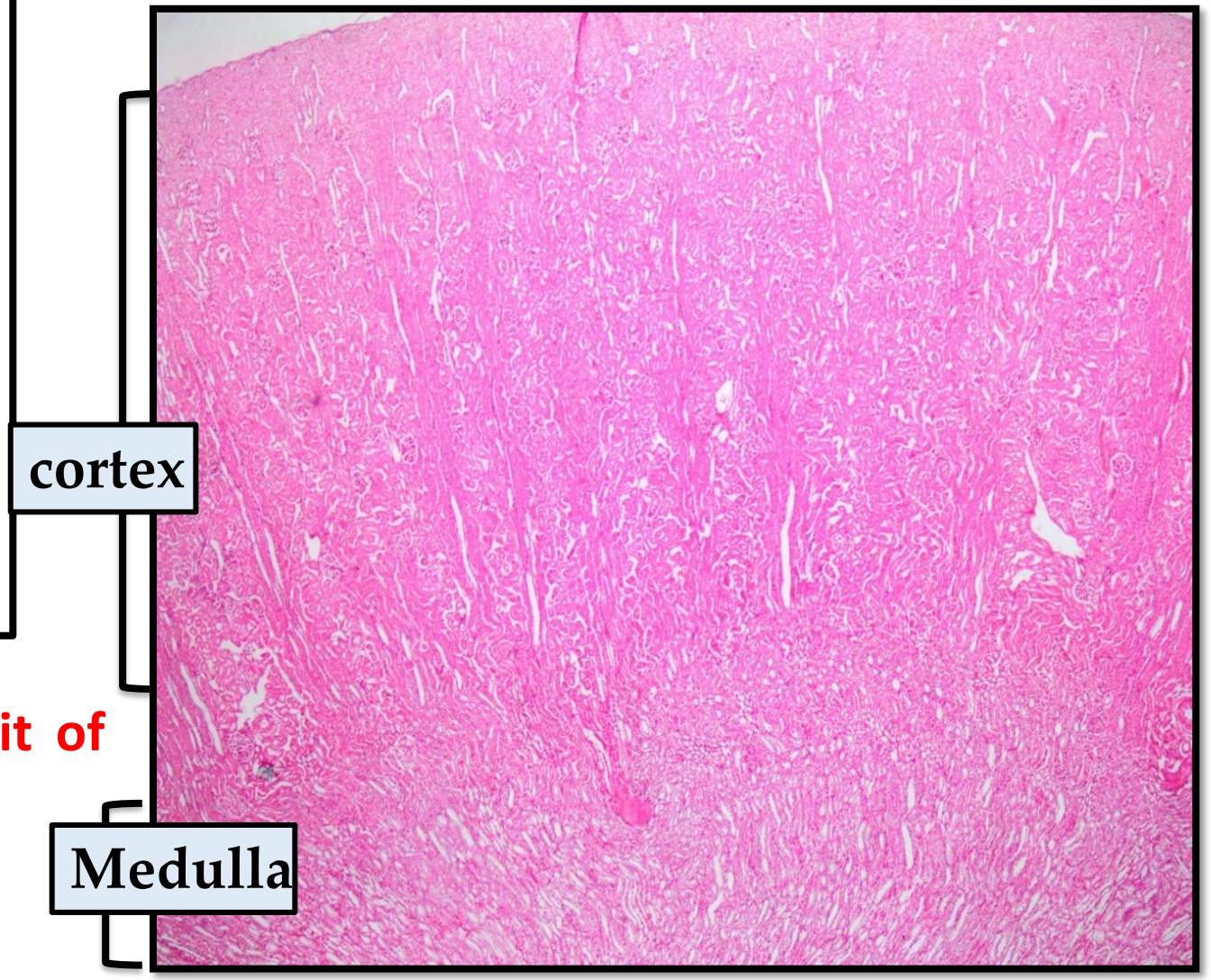
	P. C. T.	D. C. T.
Convolutions Diameter: Lumen:	-	

	P. C. T.	D. C. T.
Convolutions Diameter: Lumen:	– More convoluted – Large diameter (60 µm) – Narrow lumen	– Less convoluted – Small diameter (30-50 µm) – Wide lumen

Practical Revision

Kidney

- It is formed of cortex and medulla.
- The cortex contains renal corpuscles, proximal and distal convoluted tubules.
- The medulla contains collecting tubules & loop of Henle.

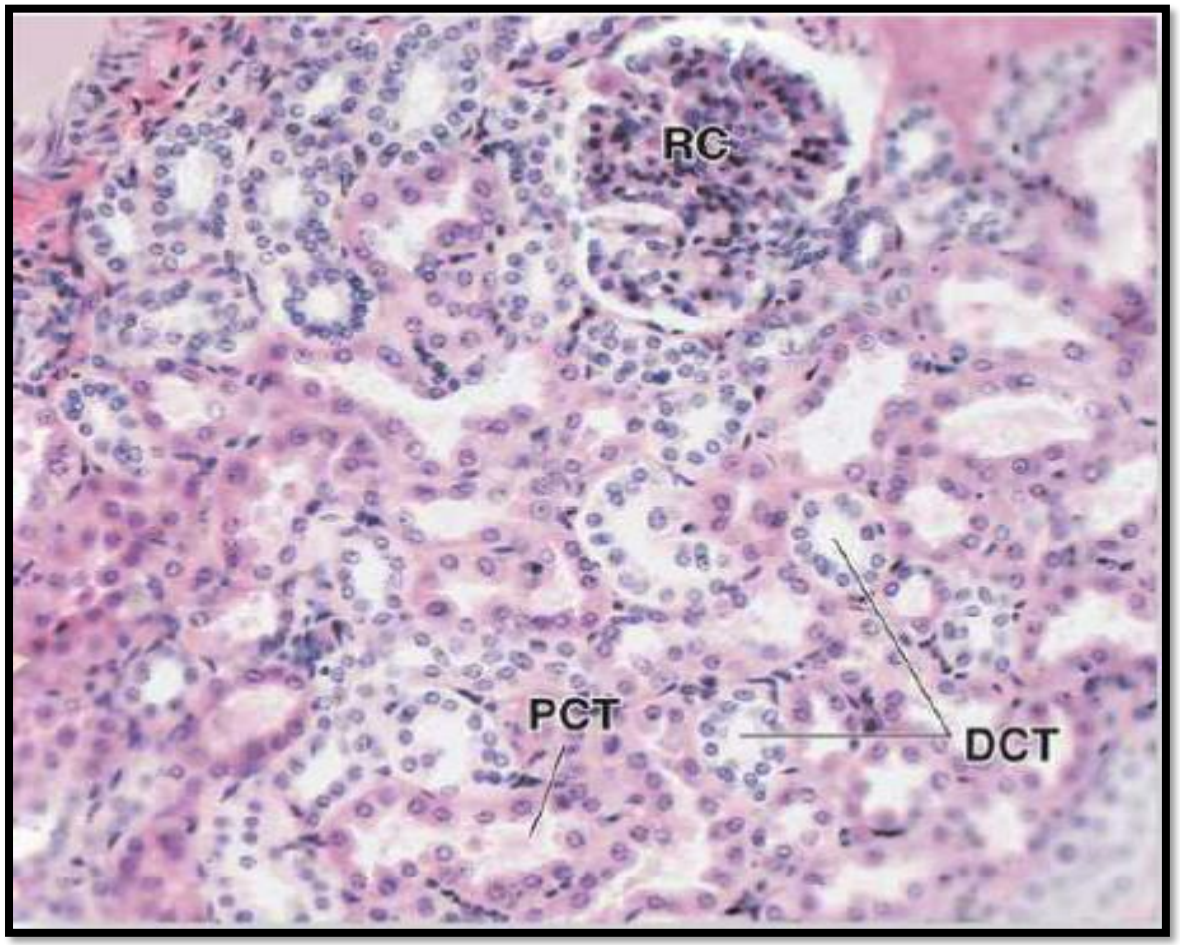


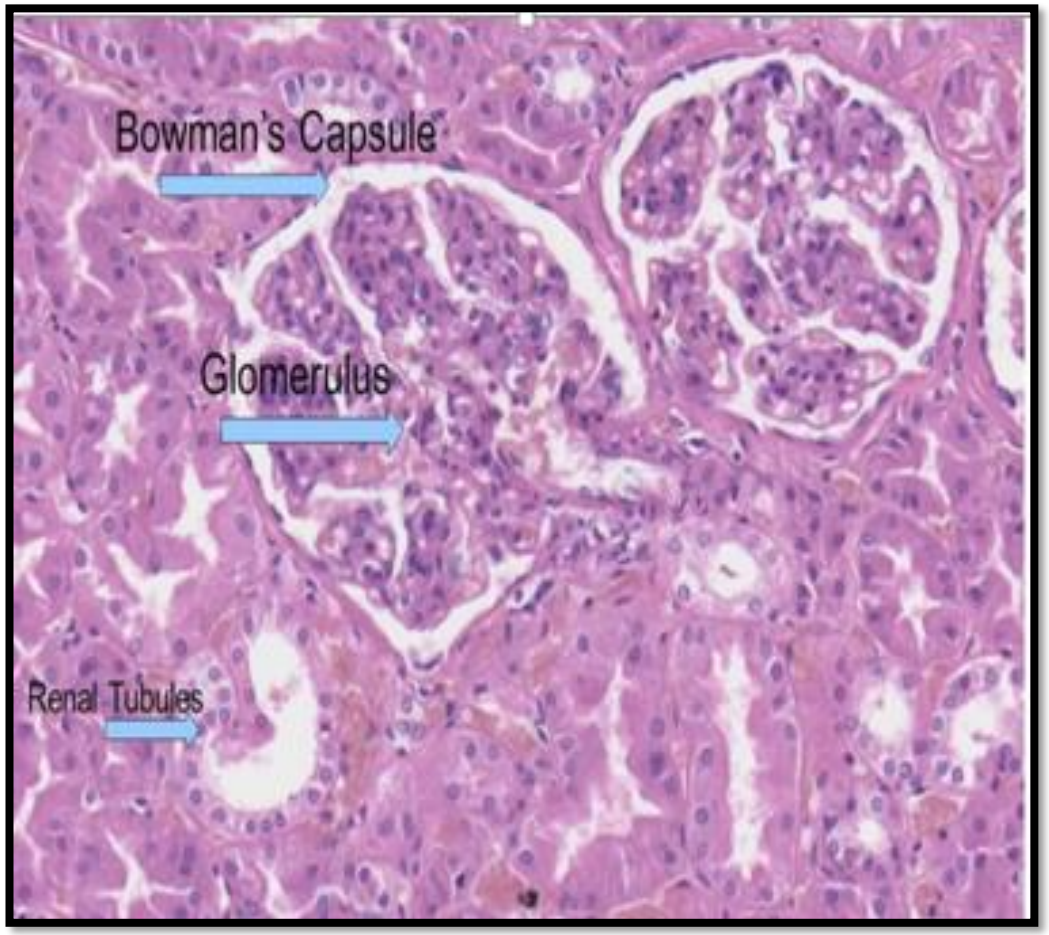
What is the structural and functional unit of this structure?

Uriniferous tubule

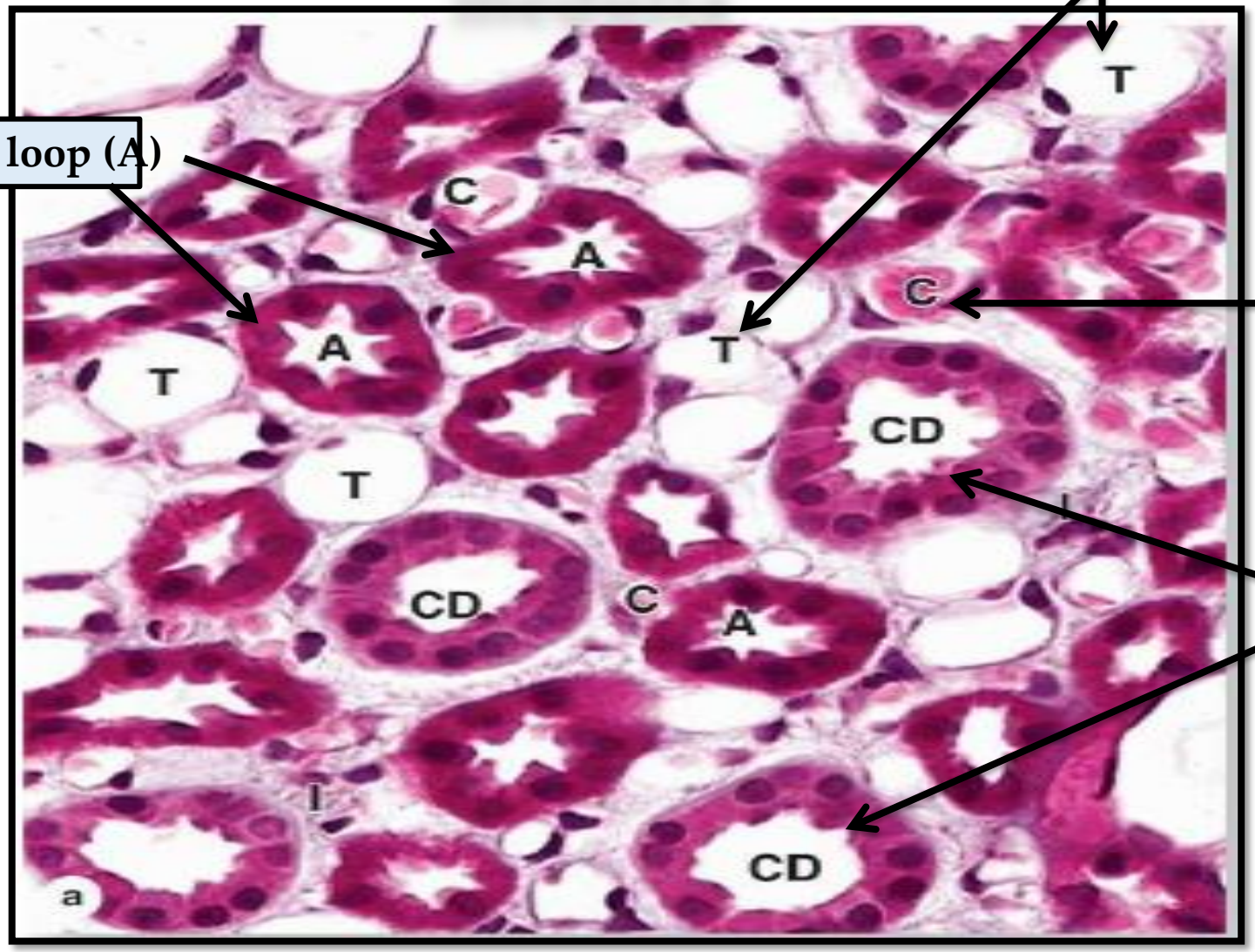
Renal cortex

The cortex contains renal corpuscles, proximal convoluted tubules, distal convoluted tubules and collecting tubules





Renal medulla



Thin limbs of Henle loop (T)

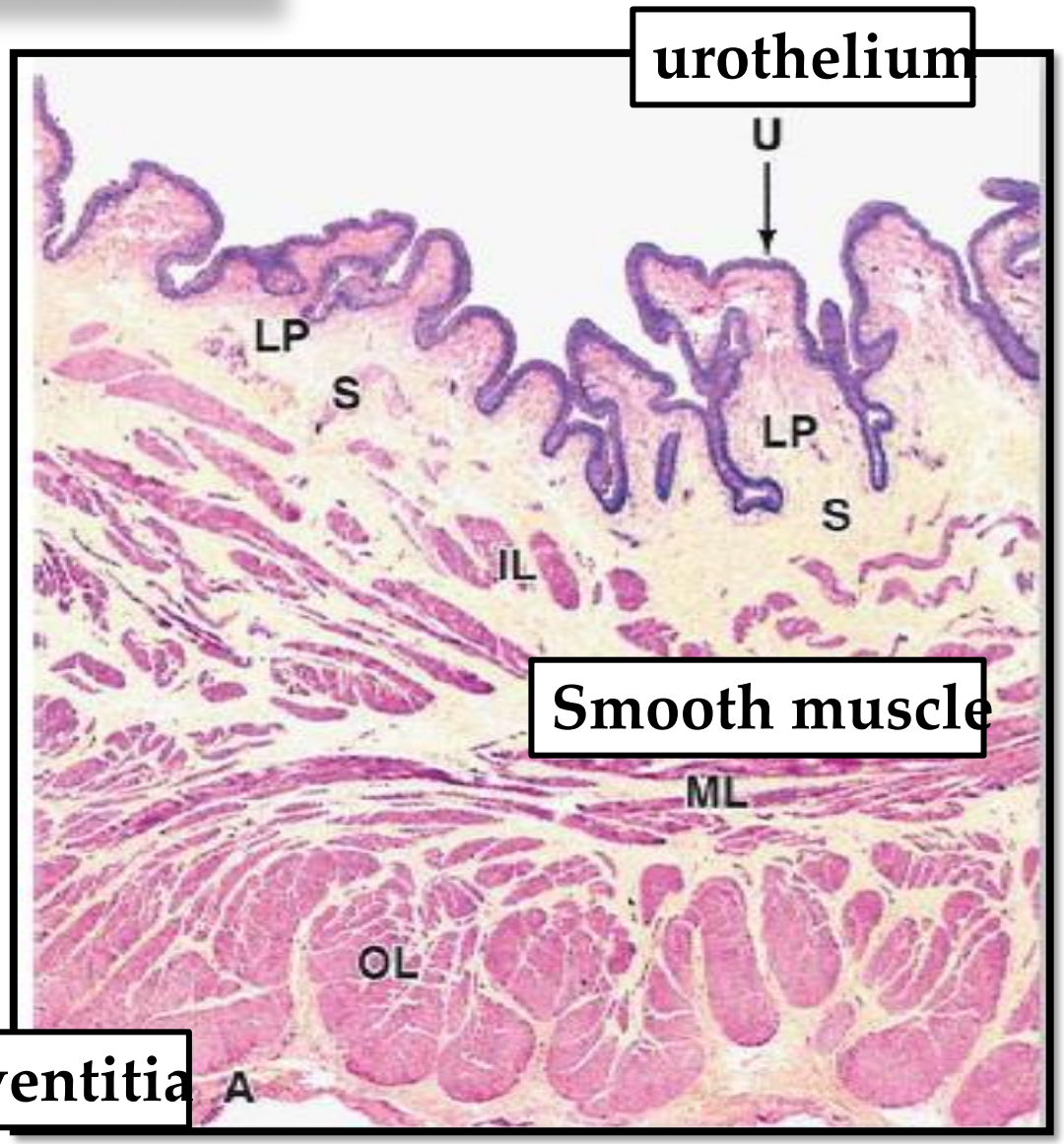
Thick limbs of Henle loop (A)

Capillaries

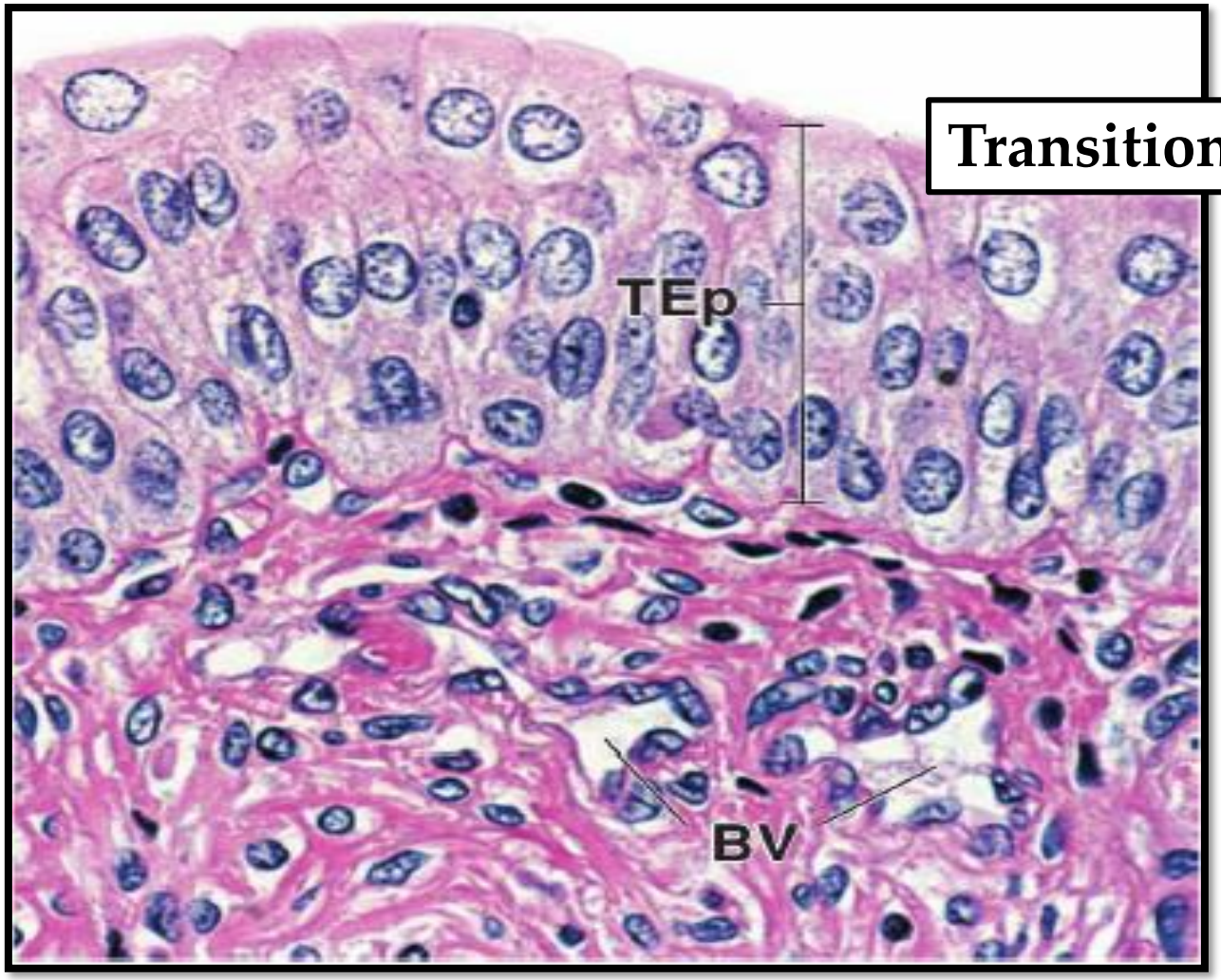
Collecting ducts

Urinary bladder

- It is lined by transitional epithelium .
- No submucosa and muscularis mucosa.
- The muscle layer is formed of bundles of smooth muscle fibres separated by loose connective tissue (inner longitudinal, middle circular and outer longitudinal)



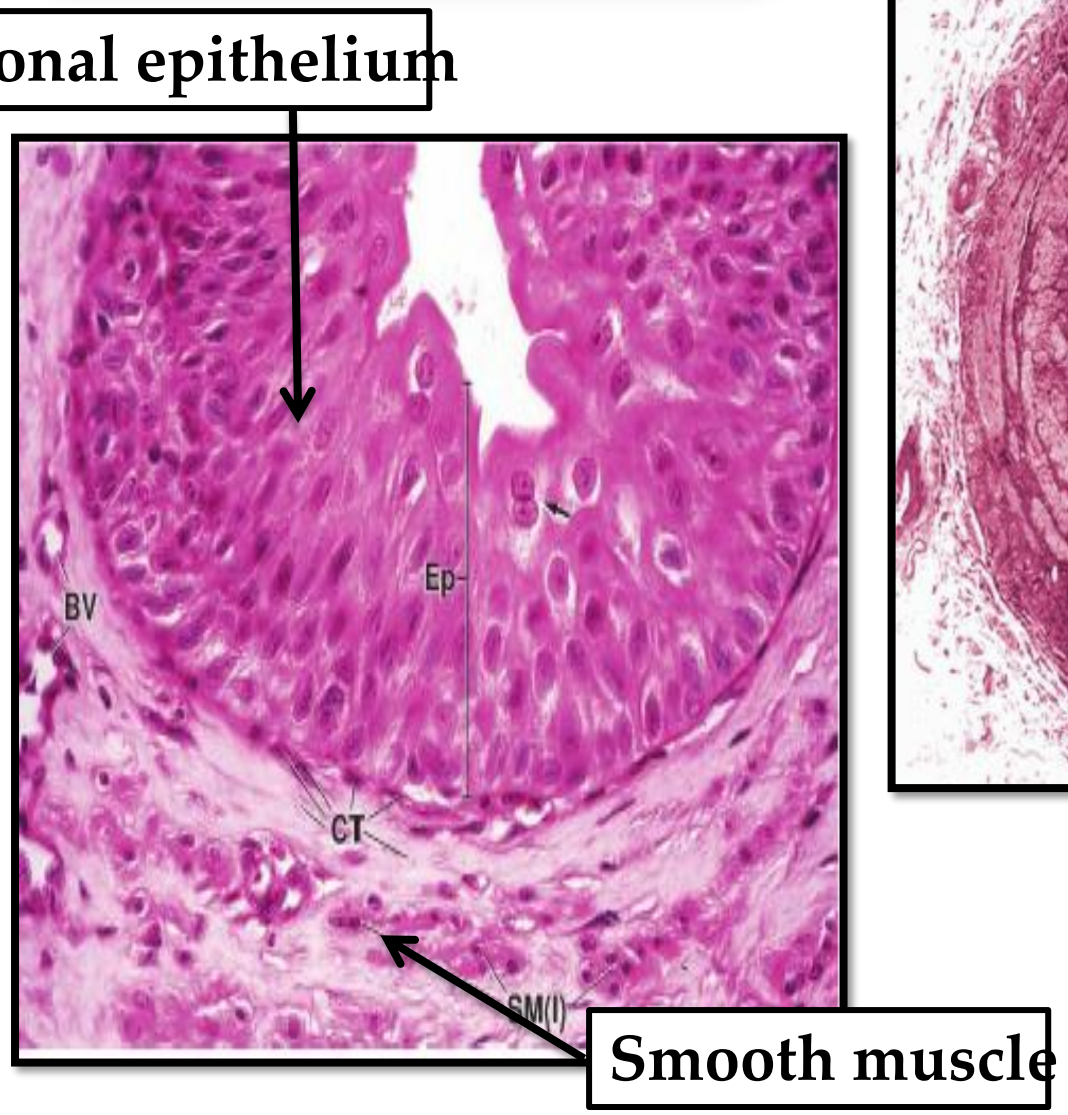
Urinary bladder

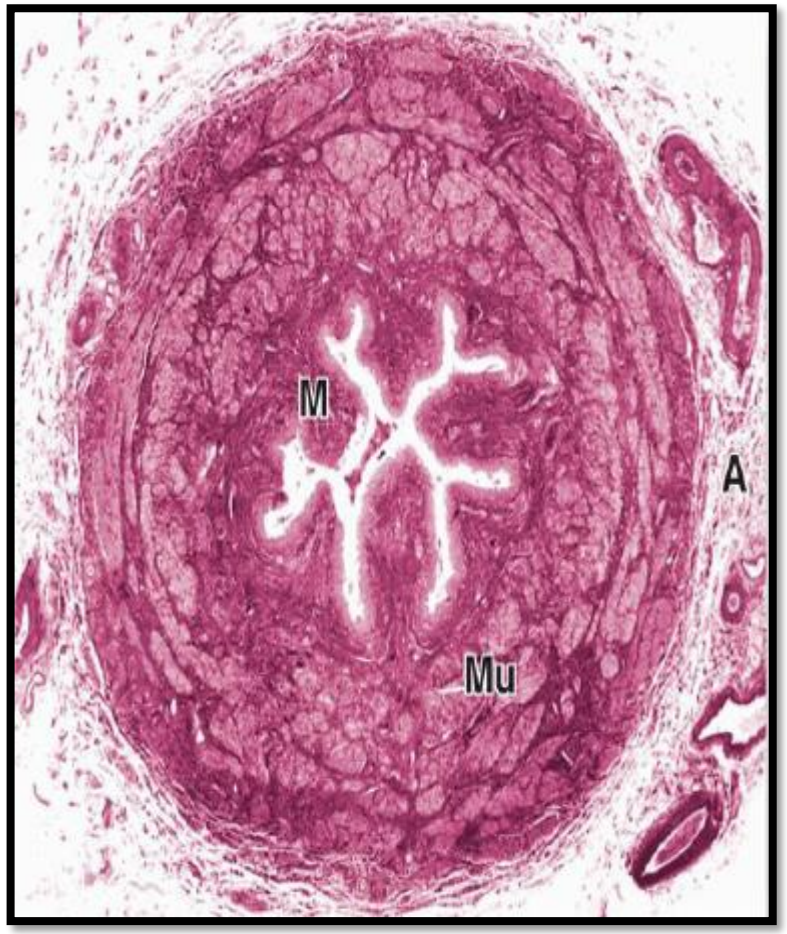


Transitional epithelium

Ureter

- It is lined by transitional epithelium and has narrow lumen.
- The muscle layer is formed of inner longitudinal and outer circular layers of smooth muscle fibres.





BEST WISHES

DR. DALIA EITA