



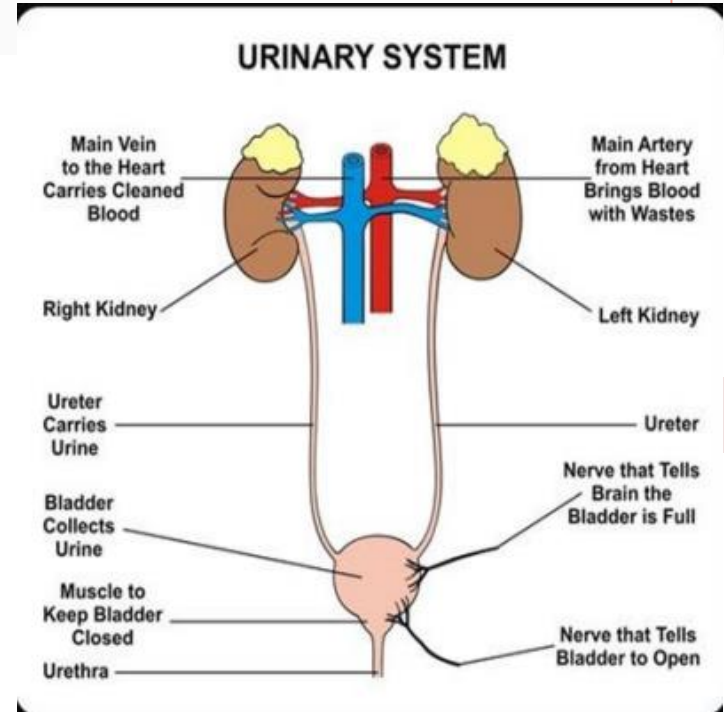
**The Urinary system
(excretory system)**

Urinary system consist of :-

- a- Paired Kidneys
- b- paired ureters
- c- Bladder
- d- Urethra

Functions

- a- filtration of wastes from blood.
- b- selective reabsorption of water and solutes
- c- Excretion of wastes and excess water as urine



Note :- The Two kidneys produce 125 ml of filtrate per minutes of which 124 ml reabsorbed and 1 ml released into the ureters as urine . 1500 ml of urine is formed in (24 hours)

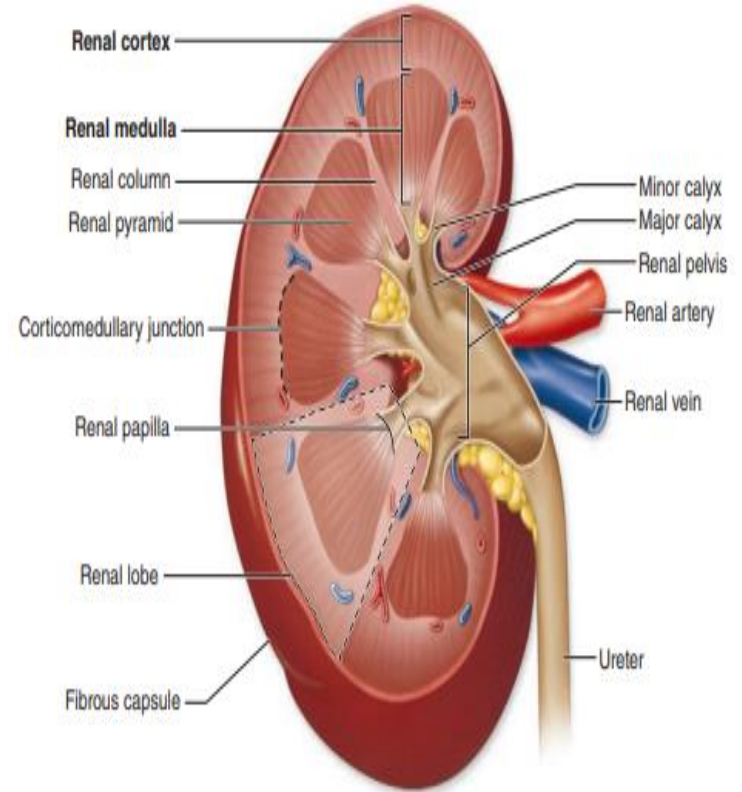
Kidneys

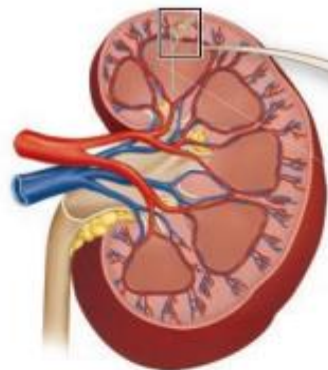
Each kidney is bean – shaped with a concave surface both covered by a thin fibrous capsule.

Each kidney contains (1-4) millions functional units called **nephrons**.

- Each Nephron consist of :-

- a- renal corpuscle
- b- proximal tubule
- c- nephron loop(loop of Henle)
- d- distal tubule
- e- collecting tubule
- f- collecting ducts





Renal corpuscle

- Glomerulus
- Glomerular capsule:
 - Visceral layer
 - Parietal layer
 - Capsular space

Cortex

Medulla

Connecting tubules

Collecting duct

Macula densa

Connecting tubule

Proximal convoluted tubule

Distal convoluted tubule

Loop of Henle:

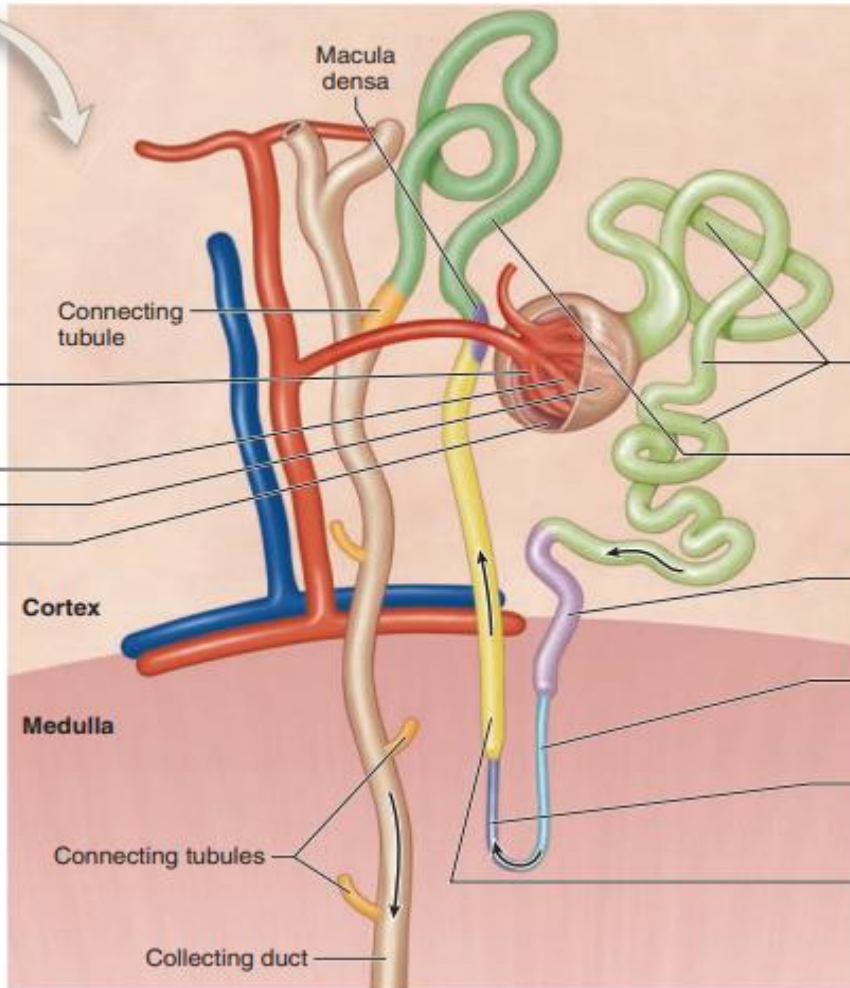
Proximal straight tubule

Thin descending limb

Thin ascending limb

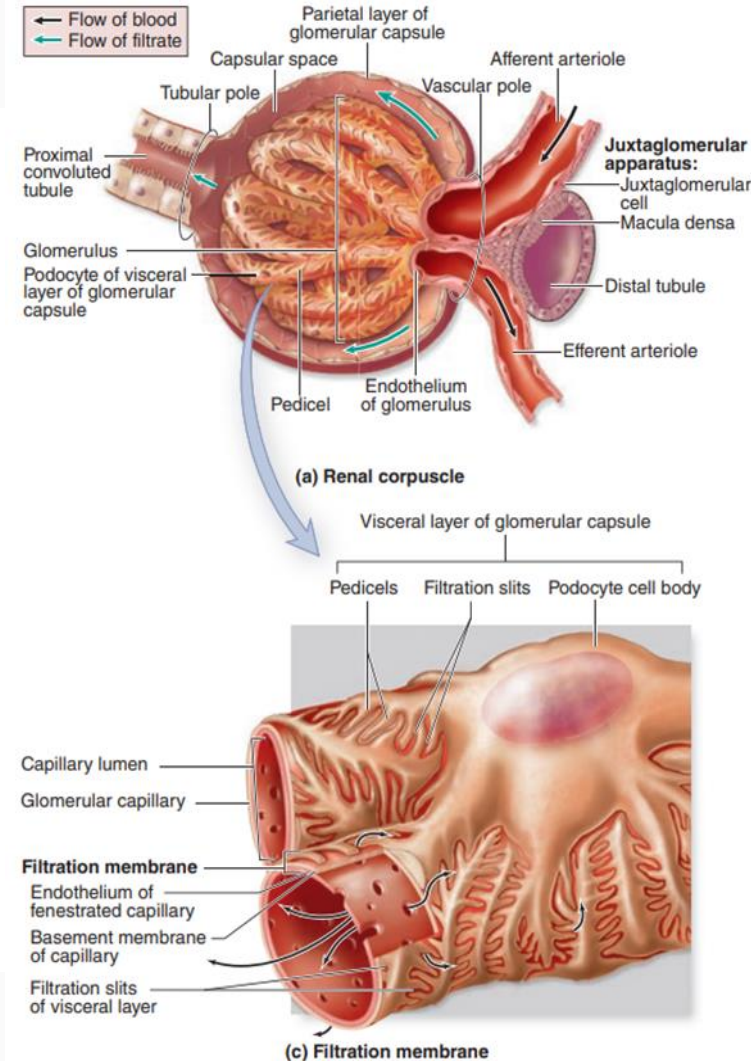
Thick ascending limb

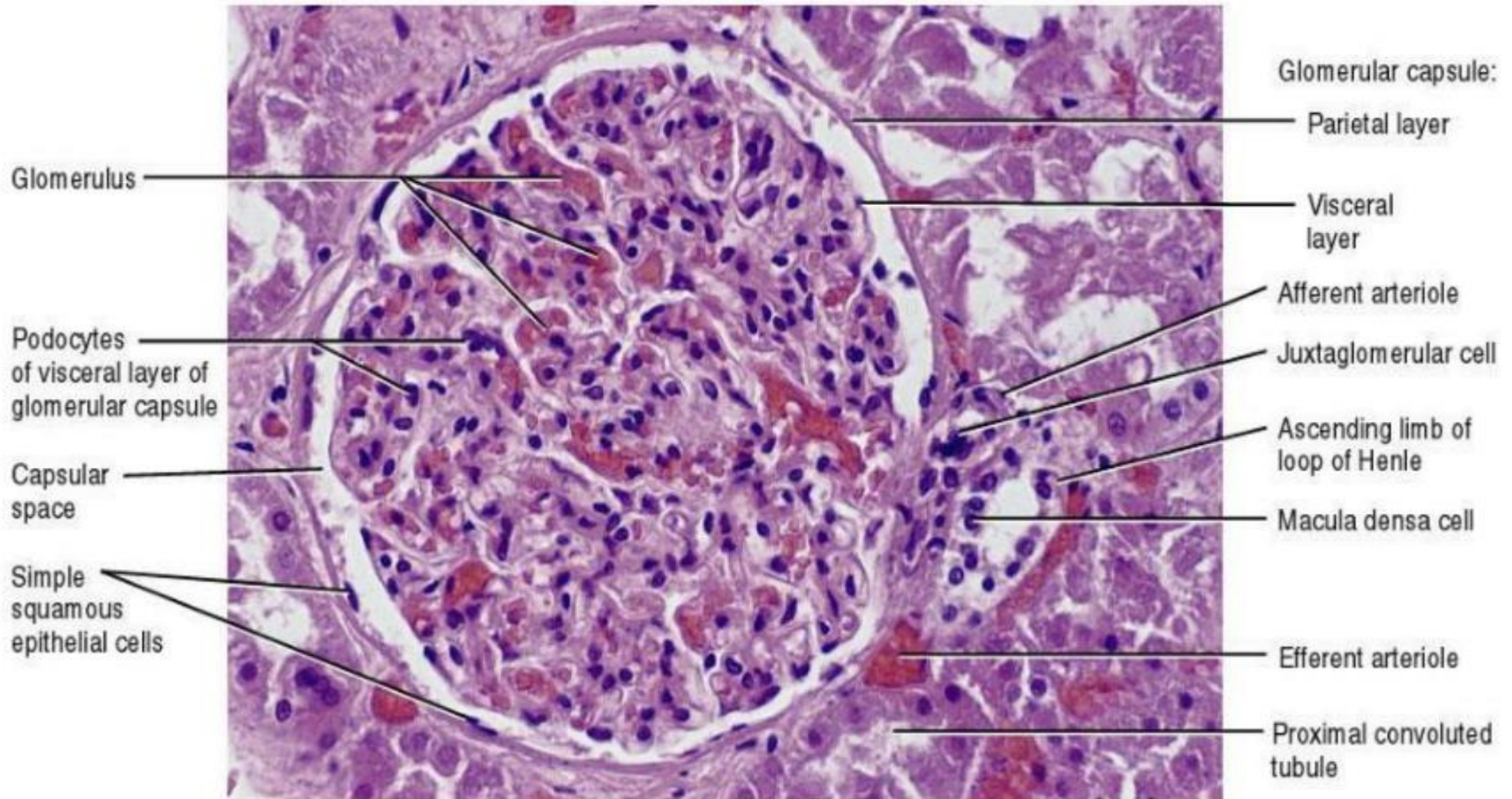
Renal tubule



Histological structure of renal corpuscle

- Renal corpuscle is surrounded by double walled of simple squamous epithelial capsule supported by basal lamina propria .
- The internal layer of corpuscle is generally modified to certain cells called **podocytes** with several primary processes (pedicles) or foot .
- In addition to endothelial cell and podocytes, renal corpuscle also contain **mesangial** cell .
their functions :-
- They provide internal support and act as phagocytosis and secretion

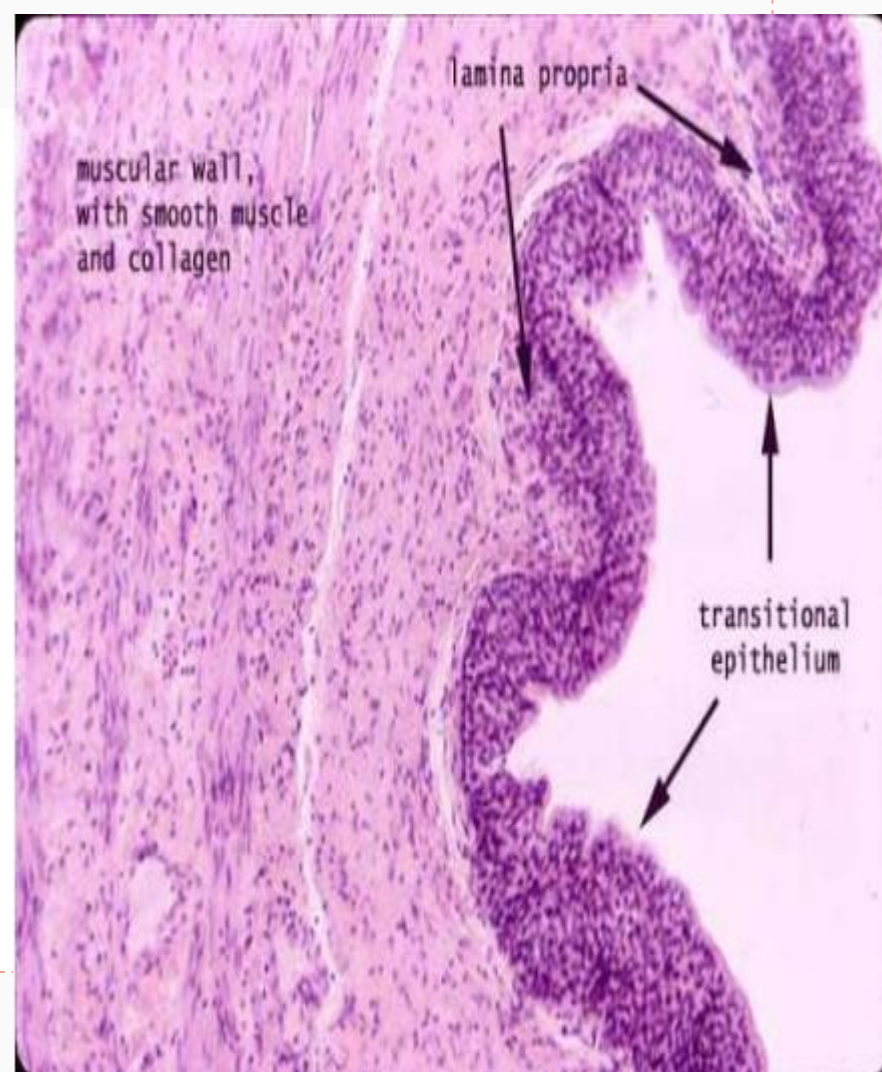


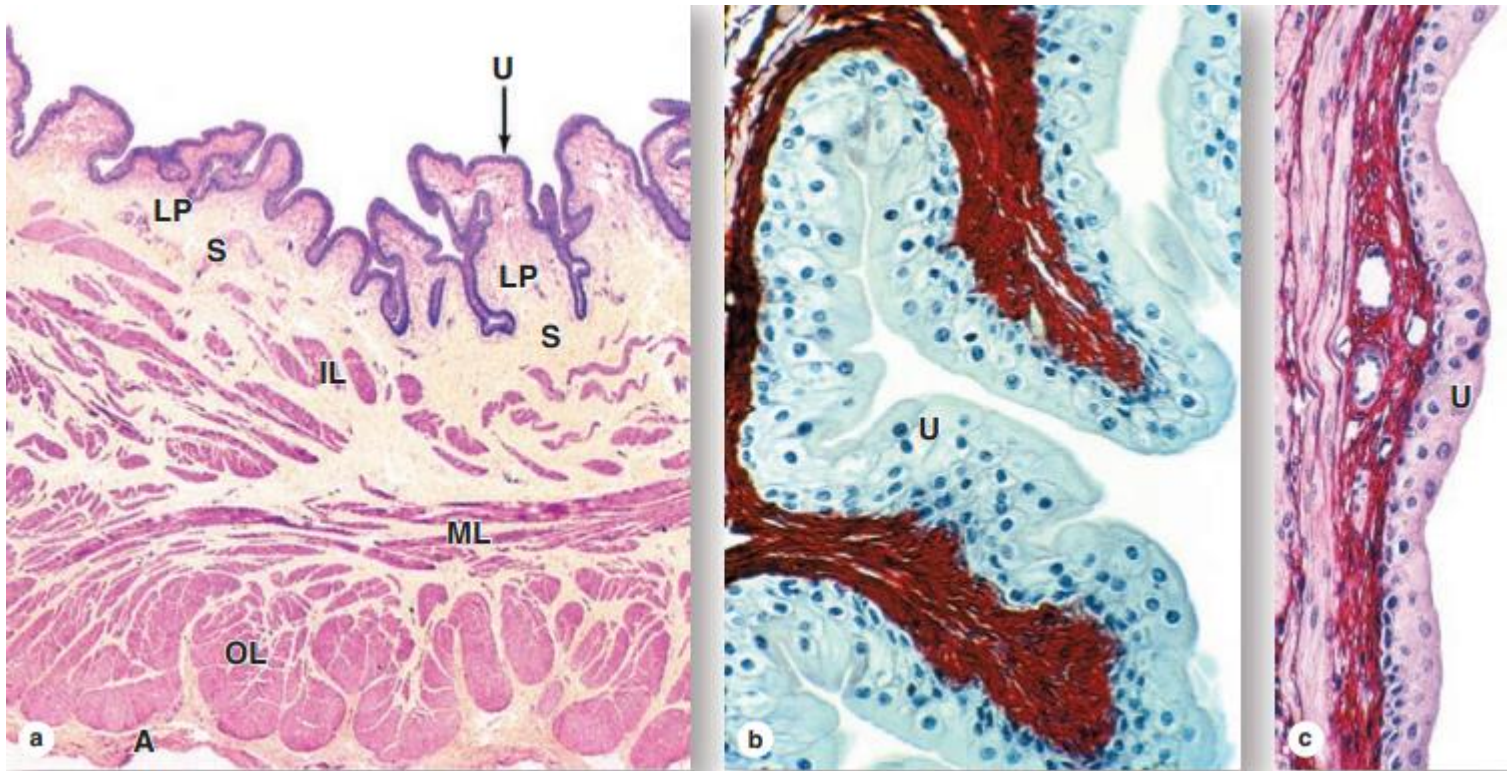


Histology of ureter, bladder and urethra

- The three structures have the same basic histologic structure
- walls of these organs becoming gradually thicker closer to the bladder .
- The mucosa of all organs is lined by unique stratified transitional epithelium (urothelium) tissue .

This is surround by lamina propria and submucosa followed by a dense sheath of interwoven smooth muscle layer and adventita .





Bladder wall and urothelium

Urothelium is composed of **three** layer :-

a- a single layer of basal cells

b- an intermediate region of one to several layers of columnar cells.

c- a superficial layer of umbrella cells to protect the underlying cells against cytotoxic effects of urine .

❖ All urinary organs are covered externally by adventitial layer except upper part of bladder.

THANK YOU

