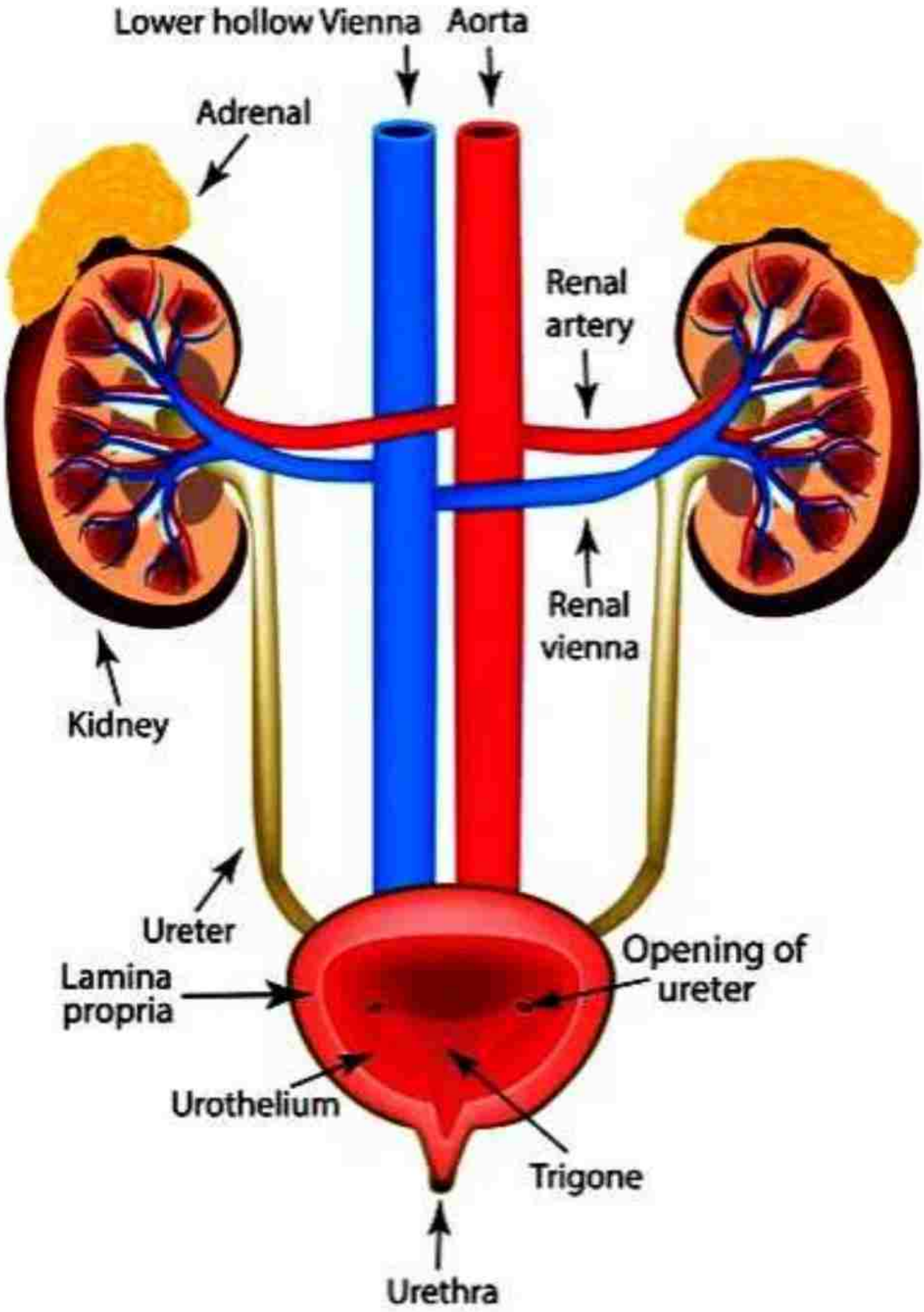

Lower hollow Vienna
Aorta
Adrenal
Renal artery
Renal vienna
Kidney
Ureter
Lamina propria
Opening of ureter
Urothelium
Trigone
Urethra

* Urinary System *

I> Kidney (each)

- **Definition** :- Pair of Excretory organs.
  :- Situated on Posterior abdominal wall.
  :- Each side of vertebral column behind the Peritoneum.

- **Location** :- occupy epigastric, Hypochondriac, Lumbar and umbilical Region.
  :- Extend - upper Border of T12 → to centre body of L3
  ★ :- Right kidney is slightly lower the left. Bcz upper liver is situated.

- **Shape** :- Bean Shape
  :- Each kidney is about - 11 cm long.
  - 6 cm broad
  - 3 cm thick.

- **weight** :- 150 gm in male
  :- 135 gm in female

- **External Feature**

o Two Poles :- i> upper Pole :- Broad.
:- close contact with Suprarenal gland.
ii> Lower Pole :- Pointed.

- Two surface :- i) Anterior - Irregular
  ii) Posterior - flat.
- Two border :- i) Lateral - convex
  ii) Medial - concave.
  - Medial border show depression in Middle part it's Hilum.
- Hilum :- following structure seen in Hilum.
  :- From anterior side to Posterior side
  - Renal vein, Renal artery
    Renal pelvis.

☆→ Renal vein and artery Enter -
Renal Pelvis Exit -

- Relation of kidneys -

→ Retroperitoneal organ - [• Peritoneum covered anteriorly only]

- Upper pole :- Suprarenal gland.
- Medial border :- Small part of suprarenal gland.
  :- Ureter.
- Posterior Relation :- Diaphragm
  :- Medial & lateral arcuate lig--
  :- Psoas Major
  :- Transverse abdominis.
  :- Quadratus lumborum
  :- Subcostal vessels and Nerve.
  :- ilihypogastric nerve.
  :- ilioinguinal nerve.

• Anterior Relation :—

1) Right Kidney
- Right suprarenal gland
- Liver
- Second part of duodenum
- Hepatic flexure of colon
- Small Intestine

2) Left Kidney
- Left suprarenal gland
- Spleen
- Pancreas.
- Splenic vessels
etc——

• Capsules or coverings of Kidney

1. Fibrous capsule :- thin membrane - closely invests the kidney.
:-

2. Perinephric fat :- Layer of adipose tissue.

3. Renal fascia :- Fibrocareal sheath, consist of 2 Layer Anterior & Posterior

(*) • Extension - Superiorly :- 2 Layer enclose suprarenal gland.
- then fuse each other and becomes continuous as diaphragmatic fascia.

- Inferiorly :- 2 Layer remain separate and enclose of iliac fossa.

- Lateral :- 2 layer unite filmy and continous with fascia transversalis

- Medial :- Anterior layer passes in front of kidney and merge with connective tissue surrounding aorta and Inferior Vena cava.

:- Posterior layer passes behind kidney and attached to fascia covering quadratus lumborum and Psoas Major.

4) Paranephric fat :- layer of fat lying out side of Renal fascia.

- **Structure**

1. An outer :- Reddish brown cortex
2. An Inner :- Pale Medulla
3. A Space :- Renal Sinus.

→ The Renal Medulla is made of about 10 conical Masses, called the Pyramids. Their apices form the Renal Papillae which indent the Minor calyces.

→ The Renal cortex is divisible into two parts
i) cortical arches or cortical lobules, which form cap over the bases of the pyramids.
ii) Renal columns, which dip in b/w the pyramids.

→ Each Pyramid along with the overlying cortical arch forms a lobe of kidney.

→ The Renal sinus is space that extends into the kidney from the <u>Hilus</u>

It contains : a. Branches of the Renal artery.
b. Tributaries of the renal vein
c. The Renal pelvis.

→ The pelvis divides into 2 to 3 <u>Major calyces</u> → turn divide into → 7 to 13 Minor calyces.

Minor calyces end an expansion → Indented by 1 to 3 Renal papillae.

• <u>Structure of uriniferous Tubule</u> –

→ Each kidney is composed of one to three million uriniferous tubules.
→ Each tubule consists of two parts.
i) The excretory part :- called the Nephron. which elaborates ([illegible]) urine. It is Nephron is functional unit of the kidney.

→ Renal corpuscle or Malpighian corpuscle made up of glomerulus, a tuft ([illegible]) of capillaries & Bowman's capsule.

→ Renal tubule → loop of Henle with descending & ascending limbs.

ii) The collecting part :- begins as a Junctional tubule from the distal convoluted tubule.
- Many tubules unite together to form the ducts of Bellini which open into the Minor calyces through the Renal Papillae.

→ Juxtaglomerular apparatus :- is formed at the vascular pole of glomerulus which is intimately related to its own ascending limb of the Henle's loop near the distal convoluted tubule.

→ Renal Artery gives 5 segmental Branches
4 from its Anterior division &
1 from its Posterior division

• **Blood Supply of Kidney**

Abdominal Aorta
at L2 level
↓
Renal artery
↓
5 segmental arteries
↓
Each segmental artery
↓
Lobar artery
↓
Interlobar artery
↓
Arcuate artery

Inferior Venal cava
↑
Renal vein
↑
5 segmental veins
↑
Lobar vein
↑
Interlobar vein
↑
Arcuate vein
↑
Interlobular vein
↑

↓

Interlobular artery

↓

Afferent arteriole

↓

Glomerulus

↓

Efferent arteriole → Peritubular Plexus

- Lymphatic Drainage

→ Lateral aortic Nodes, located at the level of origin of the Renal Arteries (L2)

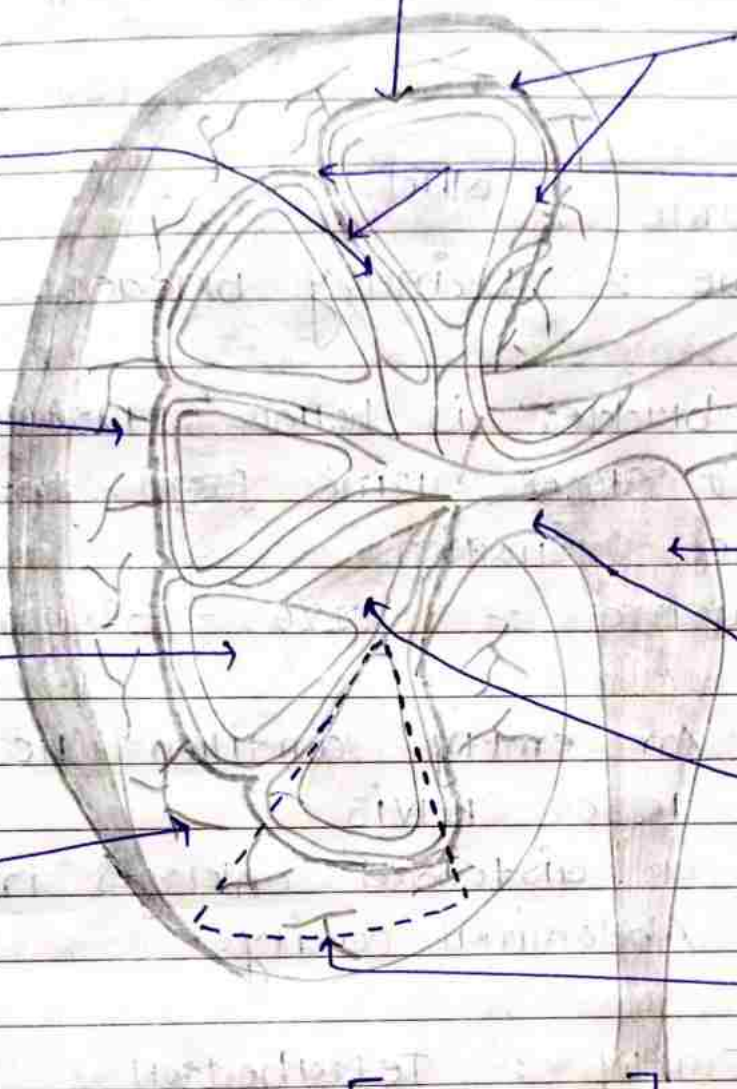
- Nerve Supply

→ Kidney Supplied By Renal Plexus
:- Sympathetic (T10 - L1) fibres - chiefly vasomotor.
:- Afferent Nerve of Kidney belong to segment T10 to T12

- Clinical Anatomy.

i) Dialysis :- treatment that filters & Purifies the blood using a machine in Kidney failure

ii) Kidney Stone (गुर्दे) :- These are solid masses made up of crystals.


Arcuate artery and vein
Interlobular artery & vein
Renal column
Inter lobar artery & vein
Renal Artery & vein
cortical lobule
Renal Pelvis
pyramid of renal Medulla
Major calyx
Minor calyx
Renal cortex
Lobe of kidney

[. Kidney .]