

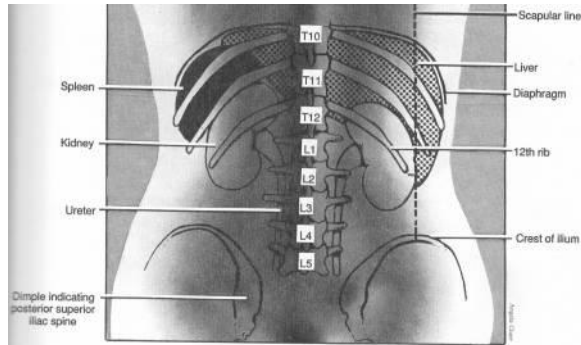
## **Anatomy of the Kidney**

**Rearrangement of Prof. Saied slides**

- Kidneys are **reddish brown** in color.

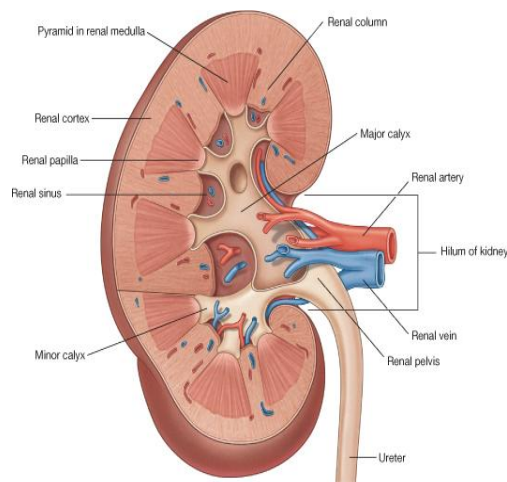
### Position

- Lie **behind** the peritoneum on the posterior abdominal wall on either side of the **vertebral column**.



- They are largely under cover of the costal margin.
- The right kidney lies slightly lower than the left due to the large size of the right lobe of the liver.
- With contraction of diaphragm they move downward as much as 2.5 cm.

### Shape



- The lateral border is convex, the medial border is convex too at both ends but its middle part shows a vertical slit called the **hilum**.

The hilum :

- extends into a large cavity called the renal sinus.
- transmits the renal **vein**, two branches of renal **artery**, ureter, and the third branch of renal **artery** from the front backward (**V.A.U.A.**)

## COVERING

### ❶ Fibrous capsule:

surrounds the kidney

### ❷ Perirenal fat :

covers the fibrous capsule

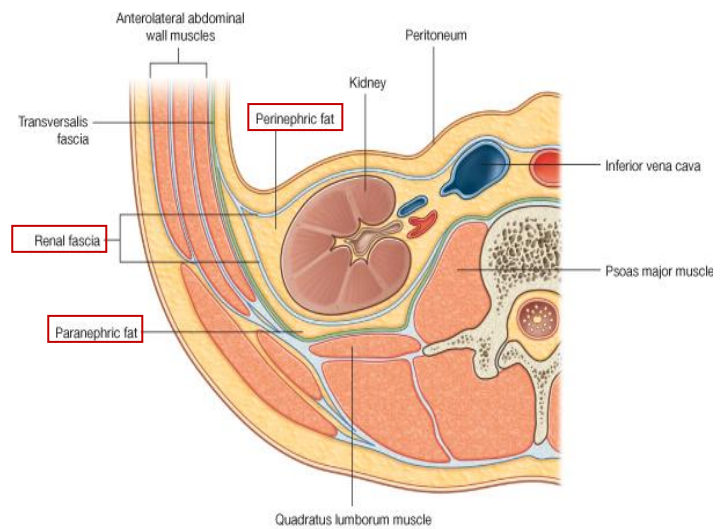
### ❸ Renal fascia:

encloses the kidneys and suprarenal glands.

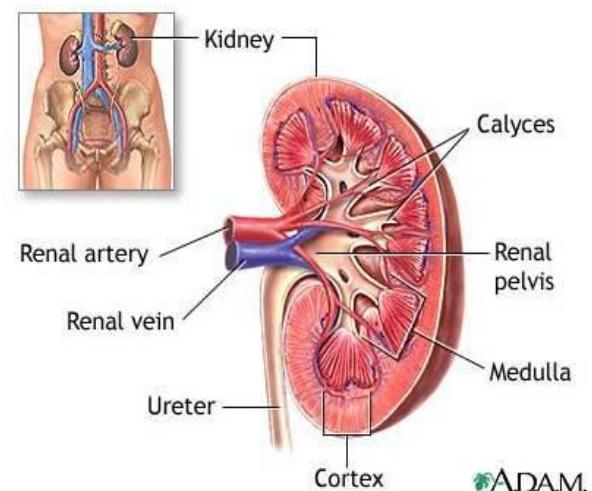
### ❹ Pararenal fat :

lies external to the renal fascia, and forms part of the retroperitoneal fat.

✳ The last 3 structures support the kidney in position.



- Each kidney has an outer cortex and an inner medulla.
- Medulla is composed of about 12 renal pyramids.
- The base of each pyramid is directed toward the cortex & its apex (the renal papilla) is projecting medially.
- The cortex extends into the medulla between adjacent pyramids as the renal column.



- Extending from the bases of the renal pyramids into the cortex are striations known as **medullary rays**.
- The renal sinus within the hilum, contains the upper expanded end of the ureter, the renal pelvis.
- Renal pelvis divides into two or three major calyces, which divides into two or three minor calyces

## POSTERIOR RELATIONS

( Last rib + 4 muscles + 3 nerves ) :

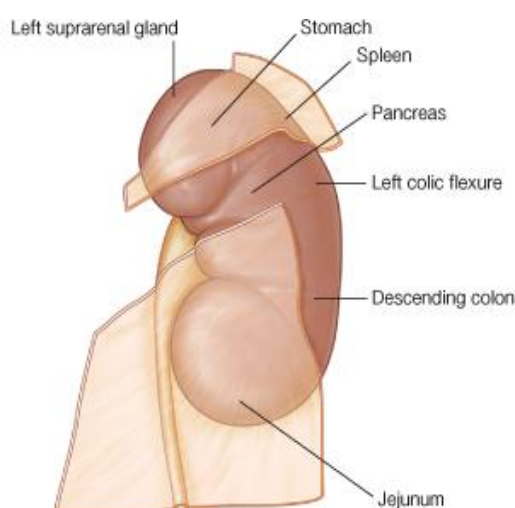
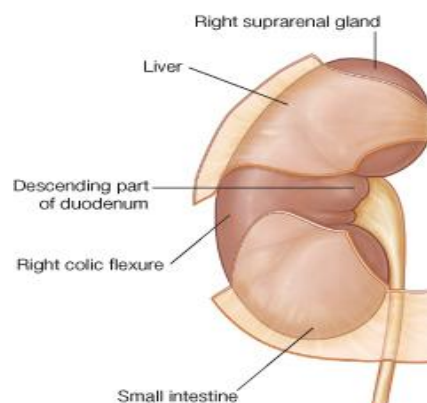
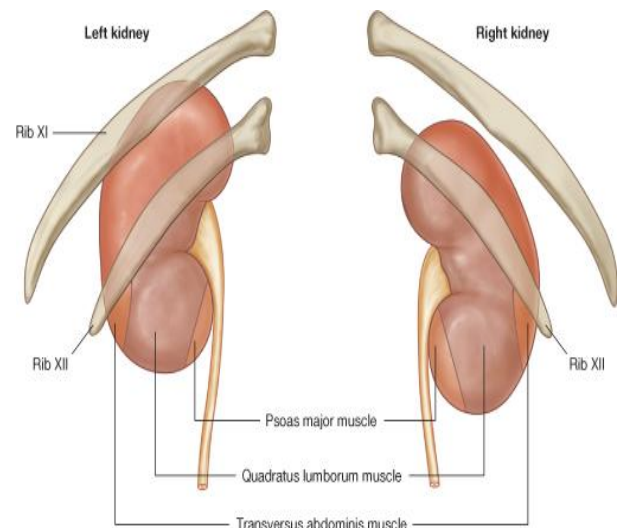
- Diaphragm, (last intercostal space)
- Costodiaphragmatic pleural recess.
- 12<sup>th</sup> rib,
- Psoas major m.,
- Quadratus lumborum m.,
- Transversus abdominis m.,
- Subcostal nerve (T12),
- Iliohypogastric (L1) nerve.
- Ilioinguinal (L1) nerve

NB. The left kidney reaches up to the 11<sup>th</sup> rib.

Anterior relation :

### Right Kidney

- Right suprarenal gland
- Liver
- Second part of the
- duodenum
- Right colic flexure
- Coils of small intestine



### Left Kidney

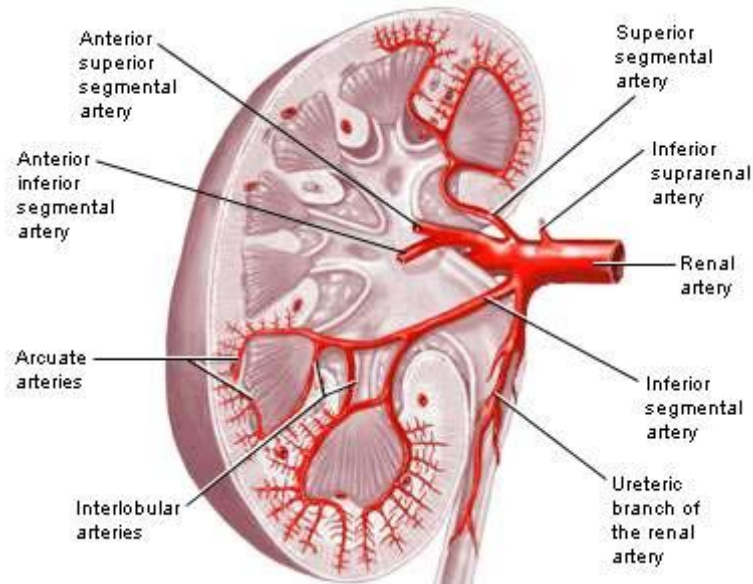
- Left suprarenal gland ○
- Stomach •
- Spleen •
- Pancreas ○
- Left colic flexure ○
- Descending colon ○
- Coils of jejunum •

Notice :

Red isn't covered with protenium

Black is covered with Protenum

## BLOOD SUPPLY



- The renal artery arises from the aorta at the level of the **2<sup>nd</sup>** lumbar vertebra
- Each renal artery divides into **5 segmental arteries** that enter the hilum of the kidney, 4 in front and 1 behind the renal pelvis
- They are distributed to different segments of the kidney
- **Lobar artery** arise from each **segmental artery**, one for each renal pyramid
- Each **lobar artery** gives off 2 or 3 **interlobar arteries**.
- The **interlobar arteries** run toward the cortex on each side of the renal pyramid.
- **Interlobar arteries** give off the **arcuate arteries** at the junction of the cortex and medulla
- The **arcuate arteries** give off several **interlobular arteries**
- Afferent **glomerular arterioles** arise as branches of **interlobular arteries**

**segmental arteries → Lobar artery → interlobar arteries → arcuate arteries → interlobular arteries → glomerular arterioles**

Each nephron is associated with two capillary beds:

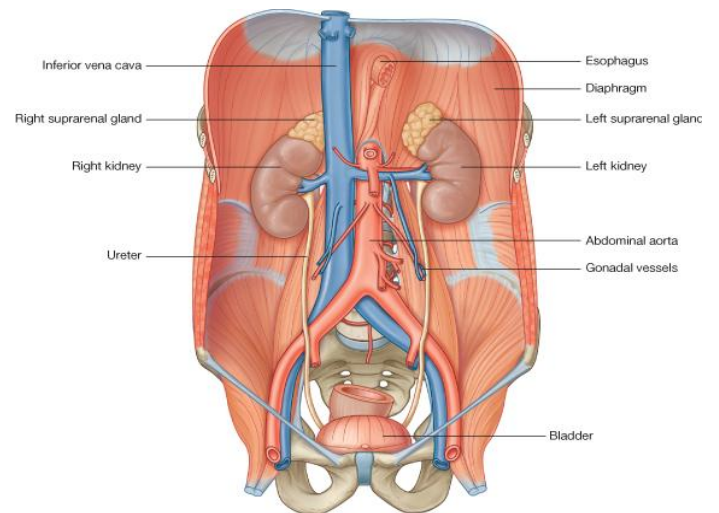
1. The glomerulus and
2. The peritubular capillary bed.

The glomerulus is both fed and drained by arterioles.

- The afferent arteriole, which arises from an interlobular artery, is the "feeder vessel," and
- the efferent arteriole receives blood that has passed through the glomerulus

## Venous Drainage :

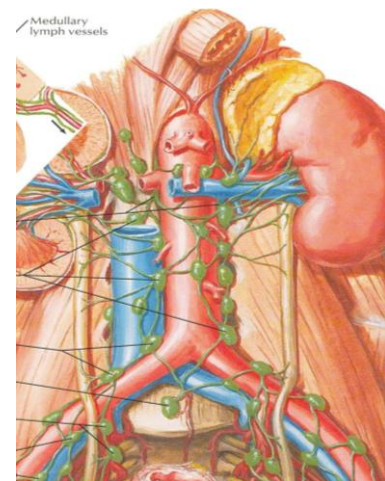
- Renal **vein** emerges from the hilum in front of the renal artery and drains into the **Inferior Vena Cava** .
- The left renal vein is longer than the right renal vein.
- The left renal vein receives the :
  - left gonadal
  - the left suprarenal veins.



## Lymph :

- **Lymph Drainage:**

Lateral aortic lymph nodes around the origin of the renal artery.



## Nerve Supply

- Renal sympathetic plexus.
- The afferent fibers that travel through the renal plexus enter the spinal cord in the **10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> thoracic nerves**

