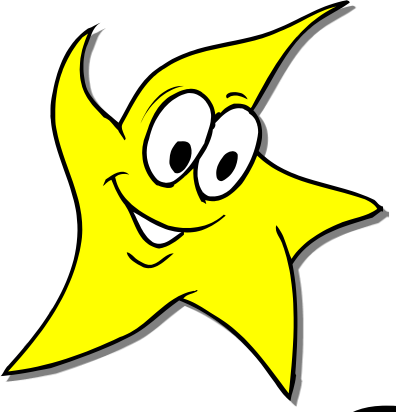
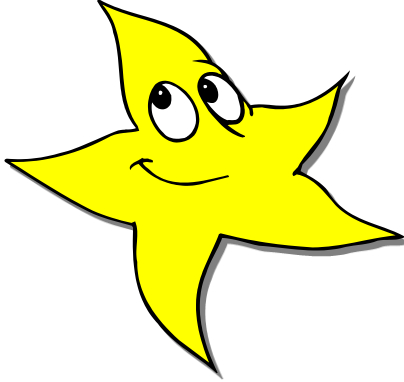
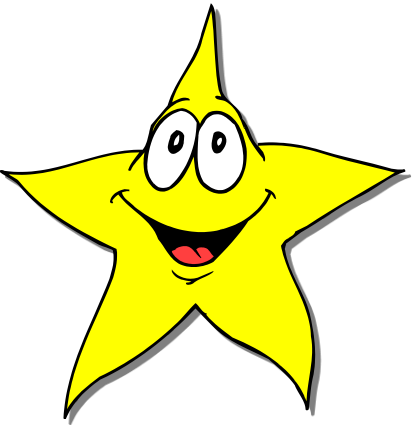
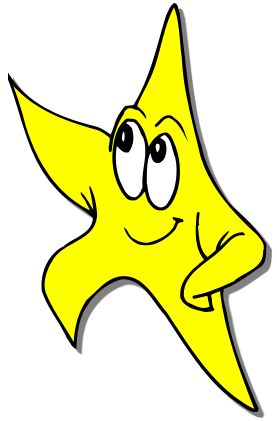


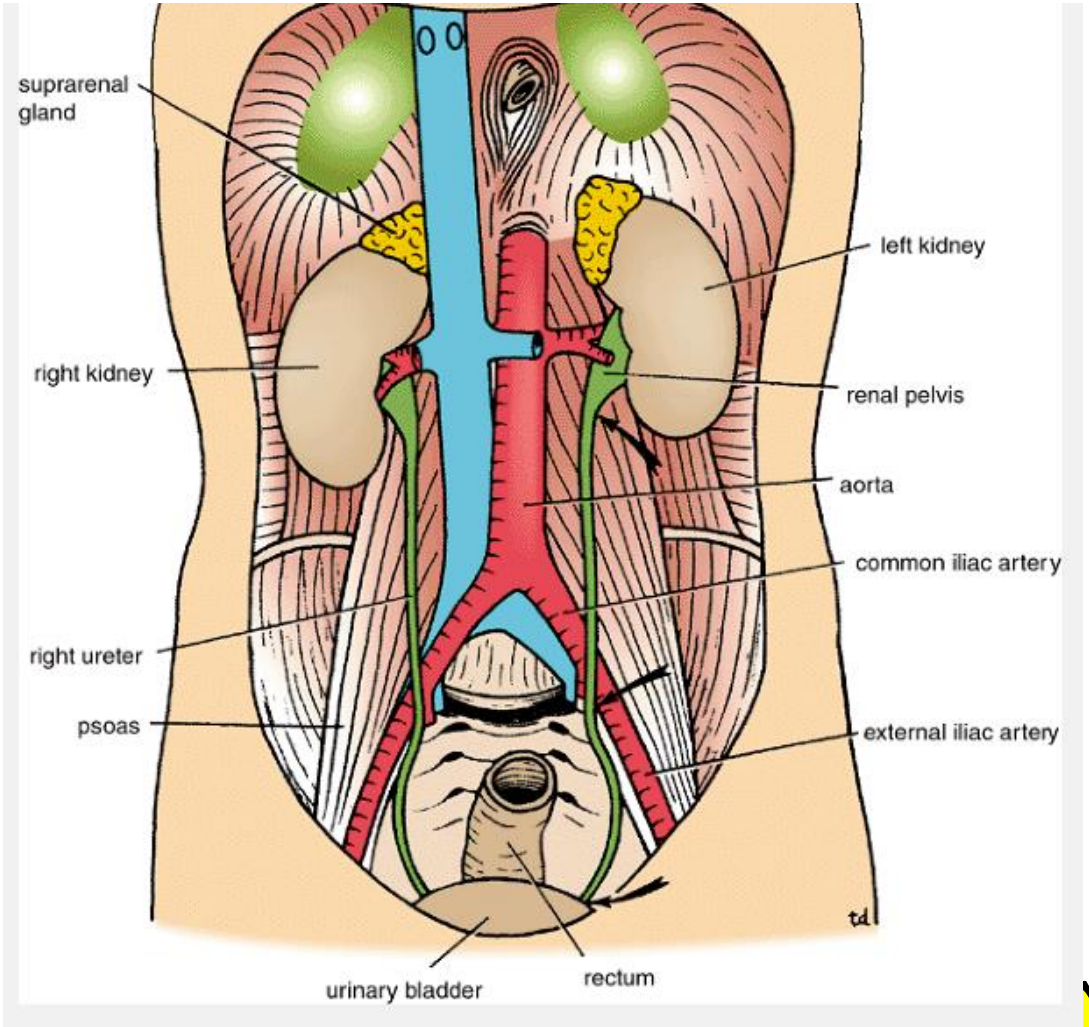


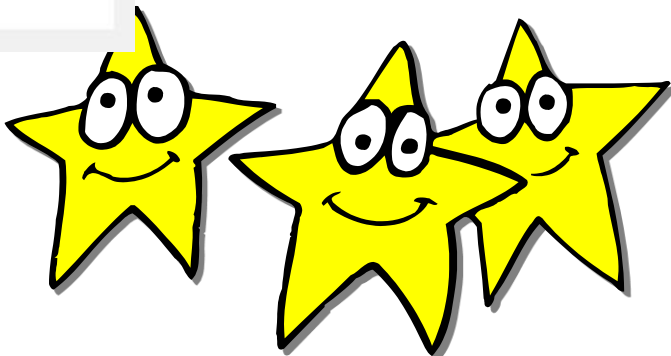
KIDNEY
Gross & Histology



Dr.Priti Acharya

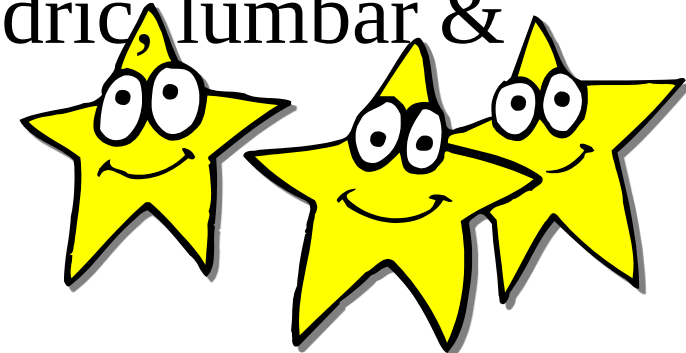



suprarenal gland
left kidney
right kidney
renal pelvis
aorta
common iliac artery
right ureter
psoas
external iliac artery
urinary bladder
rectum
td

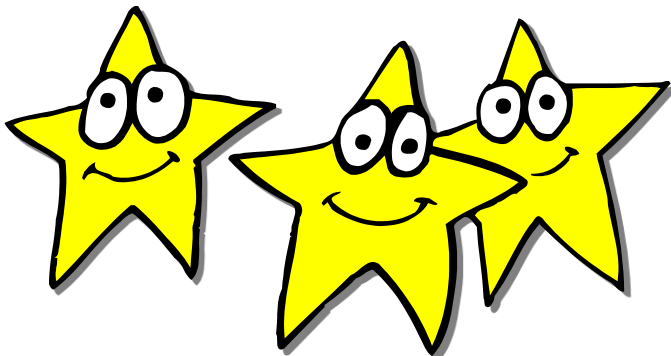


KIDNEY- LOCATION

- Kidney is a bean shaped organ of the renal system
- Retro-peritoneal (behind the peritoneum)
- Lies posterior abdominal wall one on each side of the vertebral column (T12- L3) below the diaphragm
- Occupies- epigastric, hypochondric, lumbar & umbilical regions



- Right kidney posterior to liver
- Left kidney posterior to spleen
- Right kidney is slightly lower than left because of space occupied by liver

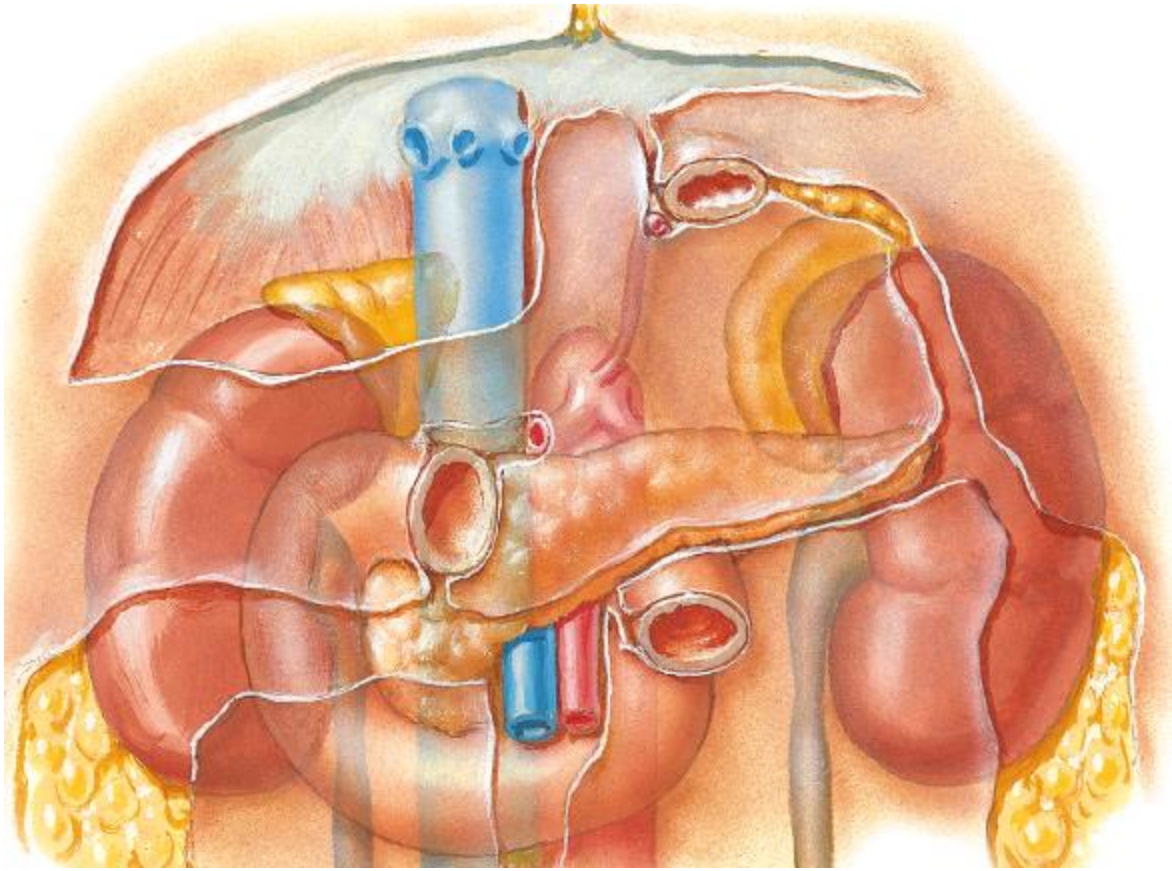


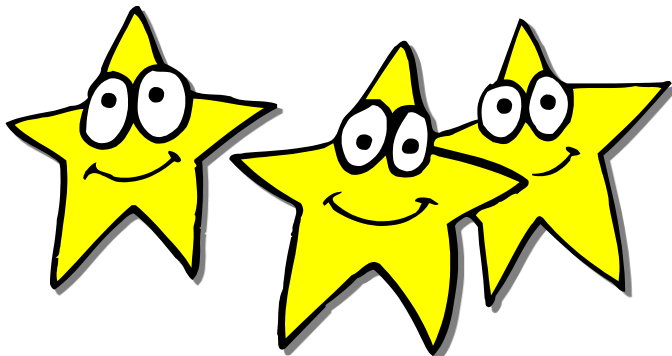
MEASUREMENTS

Measurements:

- L= 11 cm
- B= 6 cm
- T= 3 cm
- W= 150 g-in male

  135 g- in female

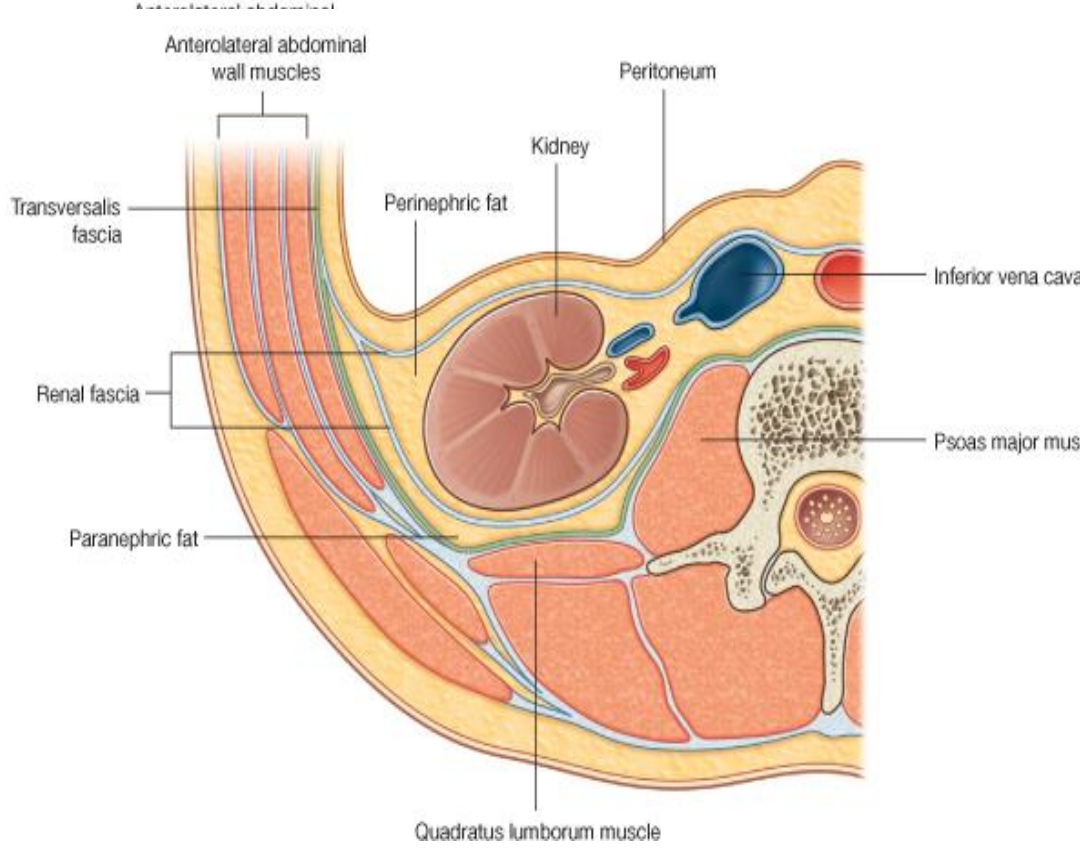


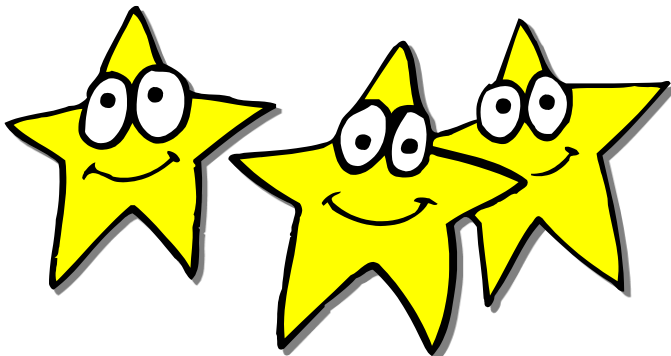


COVERINGS OF KIDNEY

From within outwards:

1. Fibrous/ true/Renal capsule
2. Perinephric/ perirenal fat- adipose capsule
3. Renal fascia/ false capsule/ fascia of Gerota
4. Paranephric/ pararenal fat



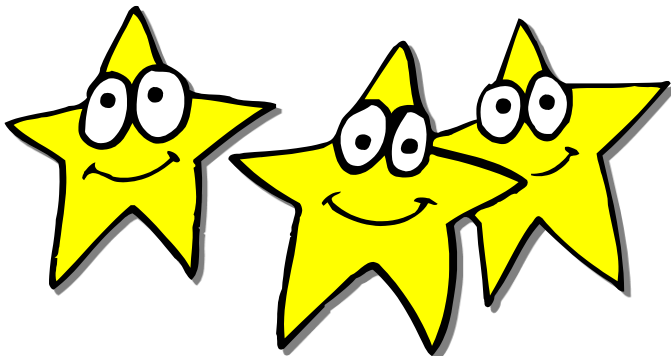


Fibrous capulse

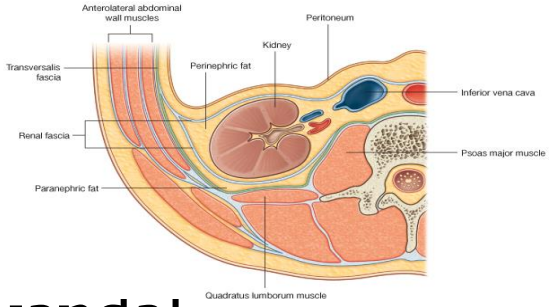
- Thin membranous sheet that covers the outer surface of the kidney
- Normally it can be easily stripped off the kidney

Perirenal Fat

- Layer of adipose tissue lying outside the fibrous capsule
- Play a part in retaining the kidney in position
- Thickest boarder of the kidney



Renal Fascia



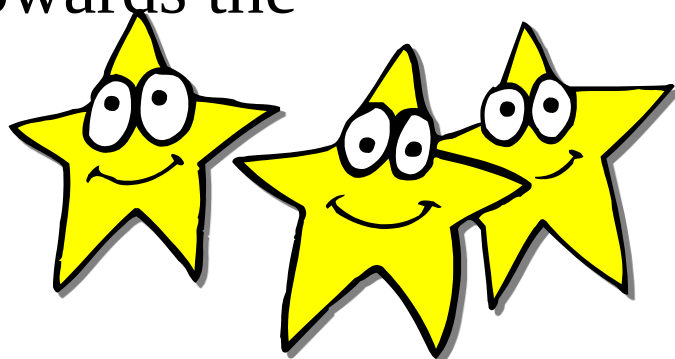
- Made of two separate layer

  Posterior layer called fascia Zuckerkandal

  Anterior layer called fascia of Gerota
- The above two layers fuses laterally to form lateral conal fascia
- Post layer of renal fascia on medial side fuses with fascia of psoas major

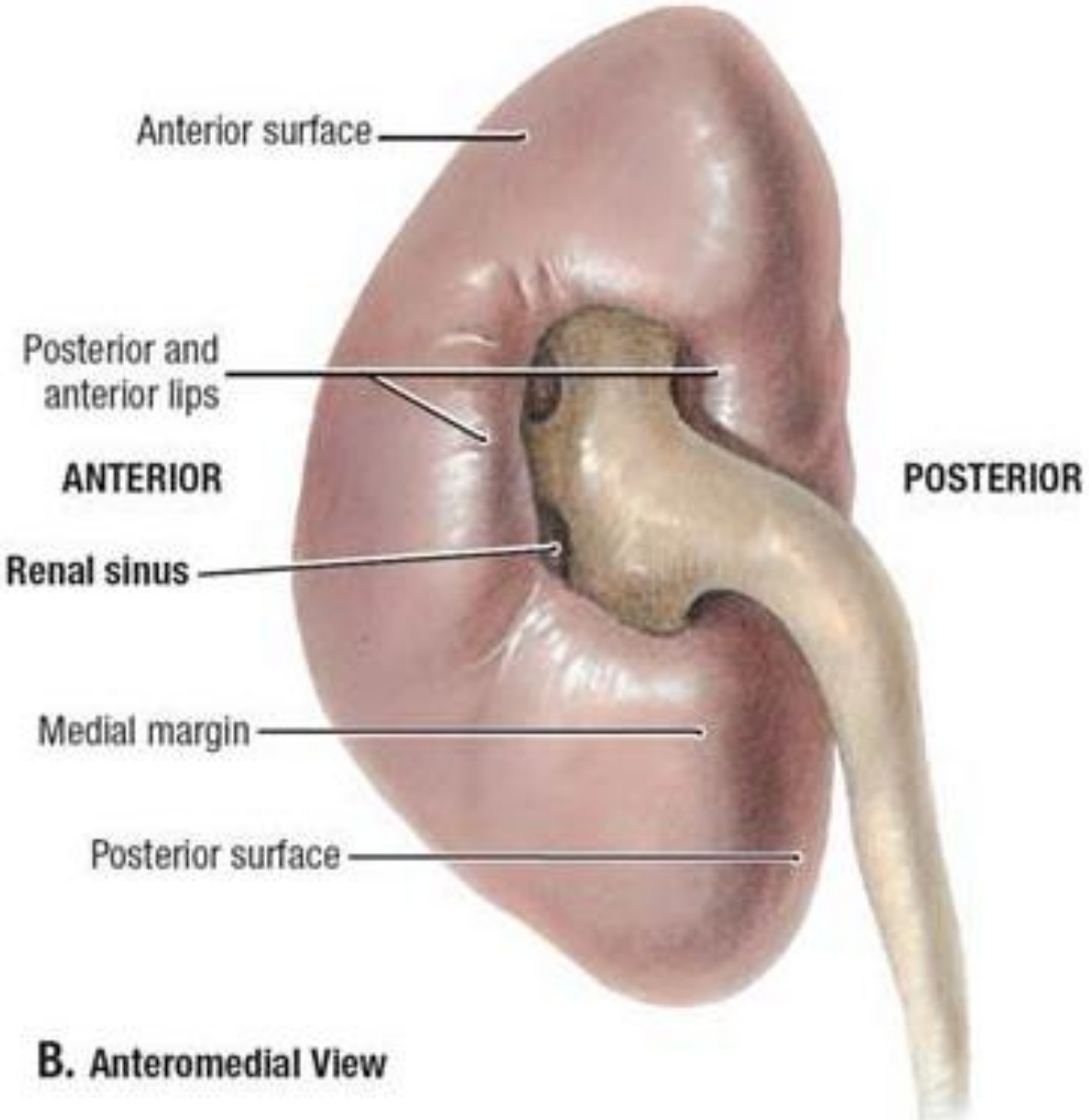
Para renal fascia

- More Abundant posteriorly and towards the lower pole of the kidney

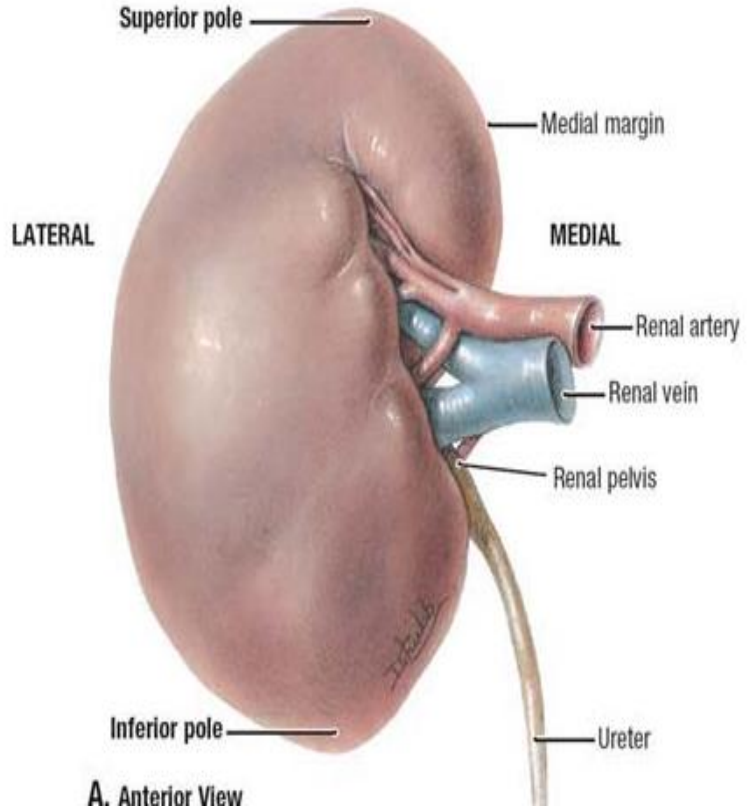


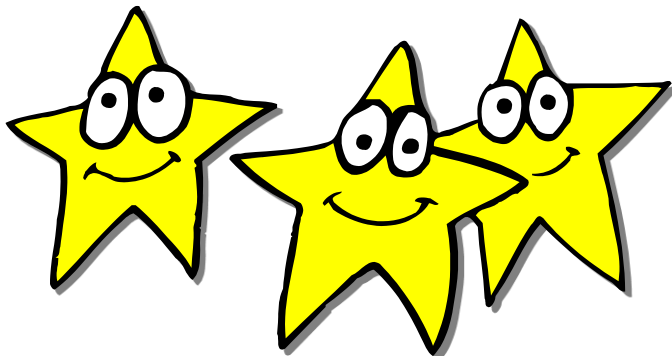
PARTS OF KIDNEY:

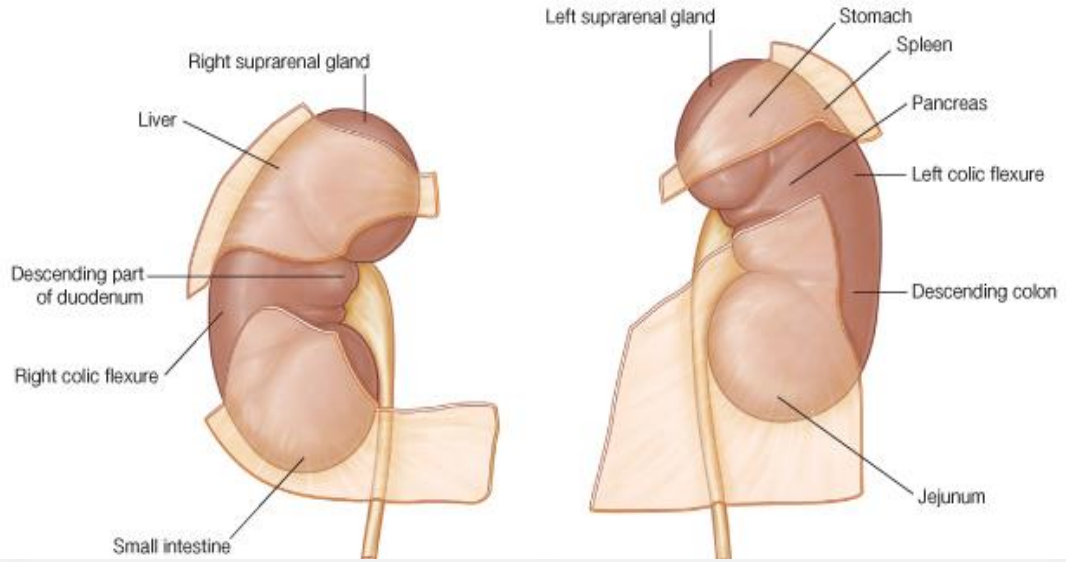
- 2 poles/ ends:
  - Upper
  - Lower
- 2 borders:
  - Lateral
  - Medial
- 2 surfaces:
  - Anterior
  - Posterior

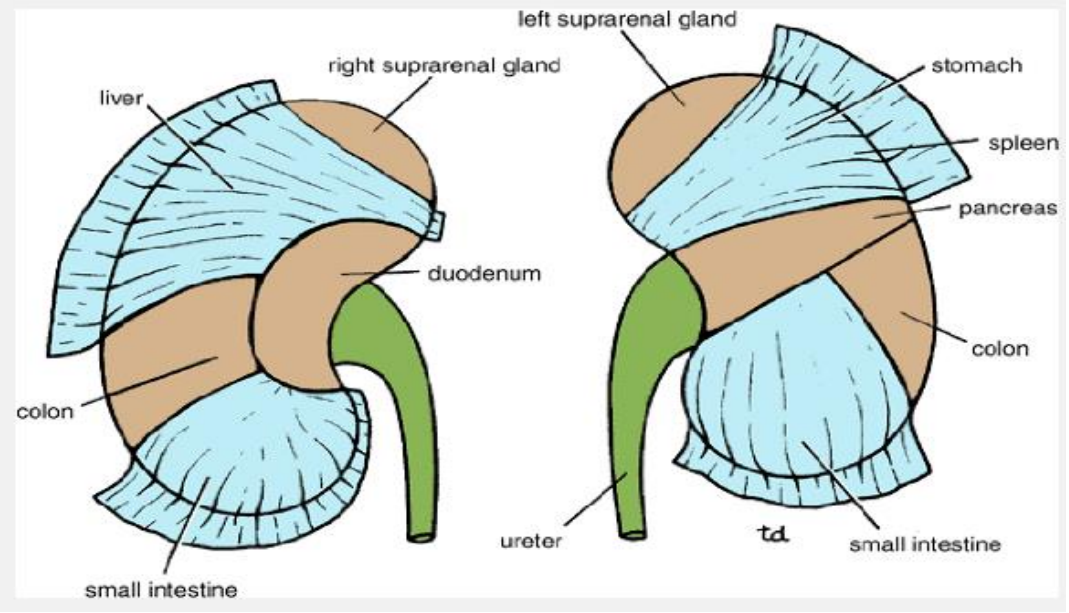


- Medial border
  - Convex -upper and lower parts
  - Concavity-middle- hilum- 5 cm from median plane
  - Structures passing through the hilum- before backwards
    - Renal vein
    - Renal artery
    - Renal pelvis
    - renal lymphatics, nerves and perinephric fat









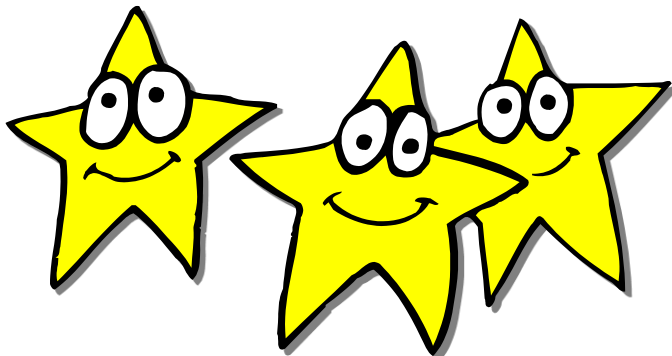
REALTIONS- ANTERIOR SURFACE

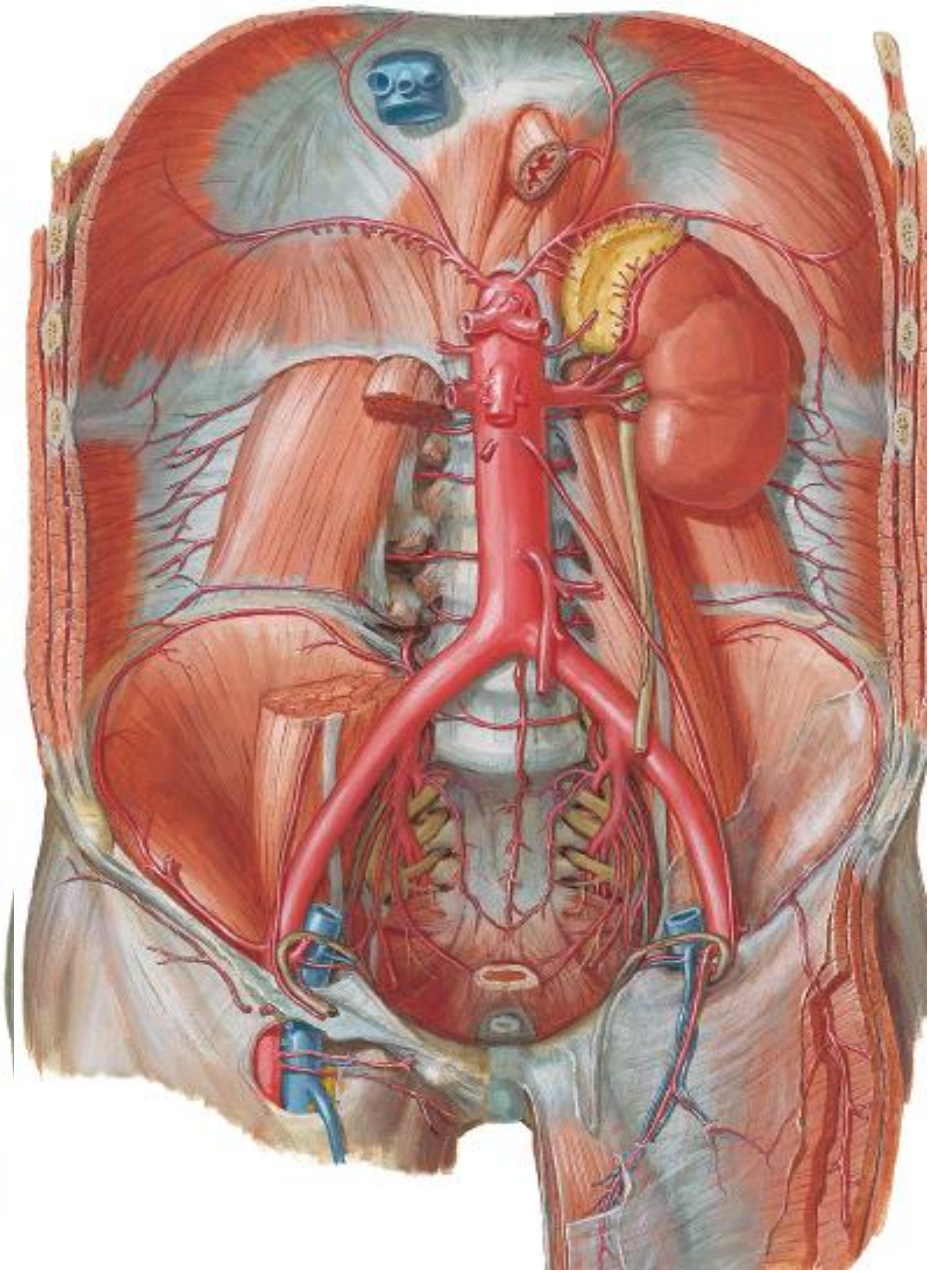
Right kidney

- **Rt. Suprarenal gland**
- **2nd part of duodenum**
- **Rt. Lobe of liver**
- **Hepatic flexure of colon**
- **Coils of jejunum**

Left kidney

- **Lt. suprarenal gland**
- **Spleen**
- **Stomach**
- **Body of pancreas & splenic vessels**
- **Splenic flexure and descending colon**
- **Coils of jejunum**





RELATIONS- POSTERIOR SURFACE

- **Upper part**
  - **Diaphragm arising from medial and lateral arcuate ligaments**
  - **Costodiaphragmatic recess**
  - **11^{th} & 12^{th} ribs- lt. side, 12^{th} rib- rt. Side**
- **Lower part- medial to lateral side**
  - **Psoas major**
  - **Quadratus lumborum**
  - **Transverse abdominis**
  - **Infront of quadratus lumborum-**
    - **Subcostal vessels and nerve**
    - **Iliohypogastric nerve**
    - **Ilioinguinal nerve**
    - **4^{th} lumbar artery- on rt. side**

STRUCTURE OF KIDNEY- MACROSCOPIC

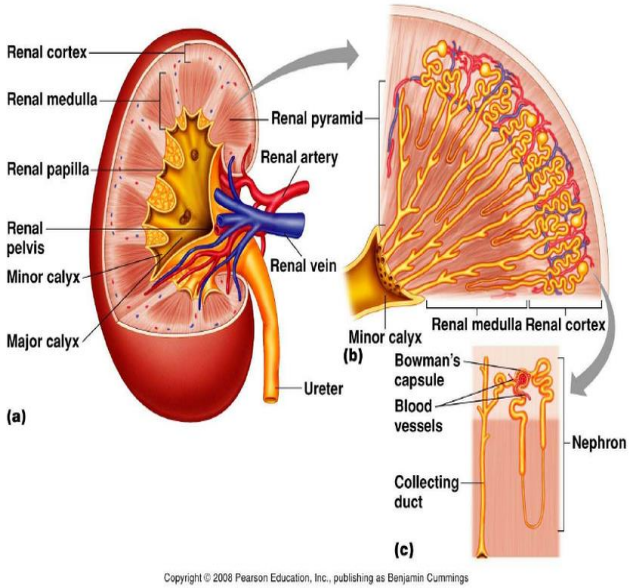
Renal Capsule- Outer covering of kidney made of tough fibrous connective tissue. It is smooth thin and transparent

Cortex-

- outer reddish brown below the renal capsule
- Renal cortex is divided into two parts

Cortical arches/lobules- caps over the bases of pyramids

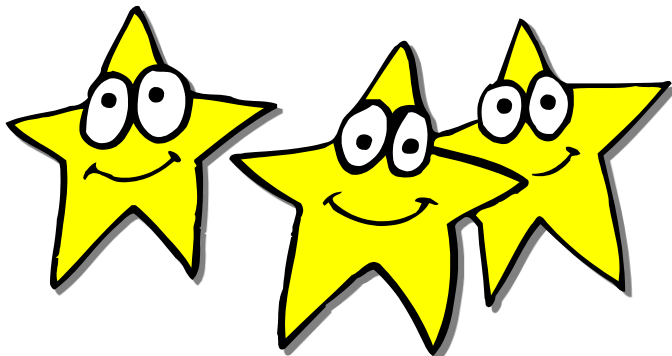
Renal columns- between pyramids

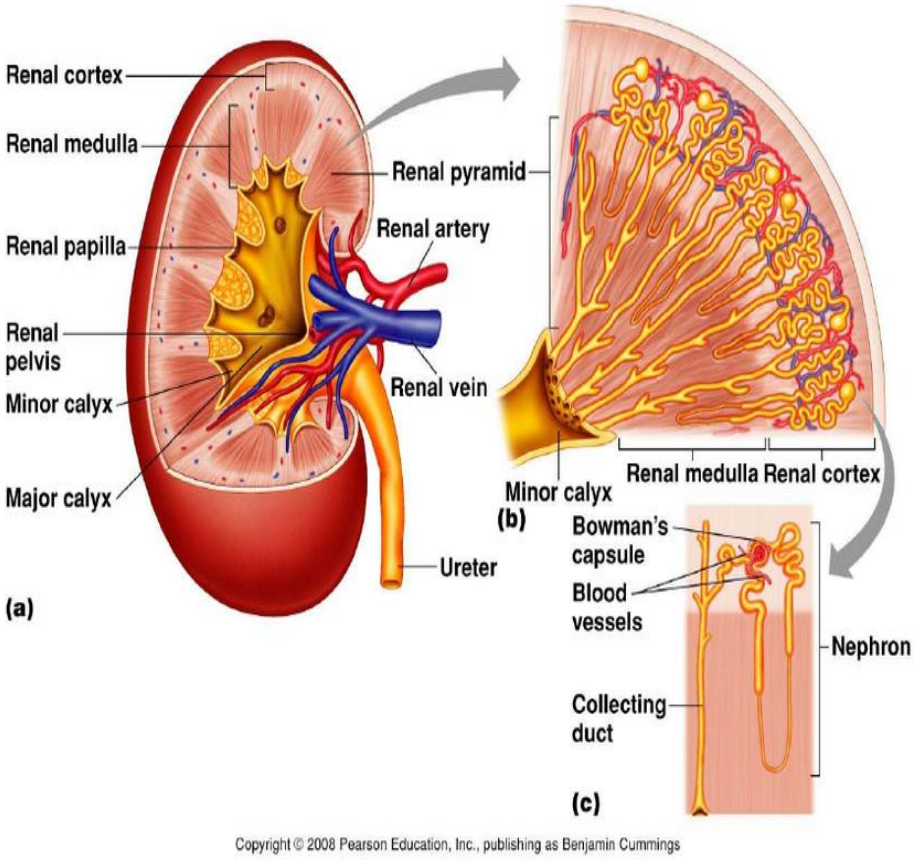


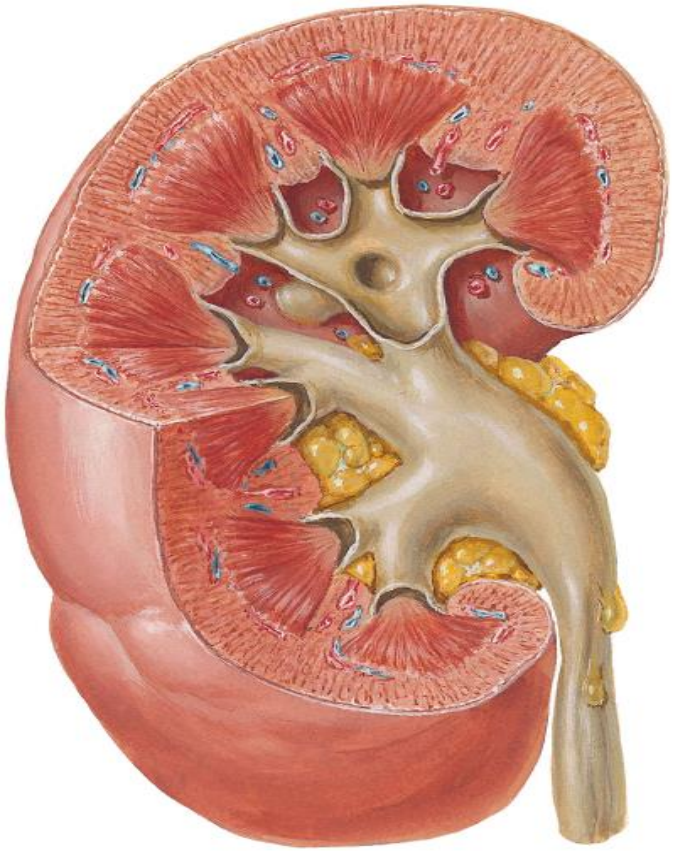
- Medulla-
  - inner, pale
  - 8-18 conical masses called renal Pyramid
  - Apex form the renal papilla, indent the minor calyx

Renal sinus- is a space that extends into the kidney from the hilus. It contains:

- a. Branches of the renal artery.
- b. Tributaries of the renal vein.
- c. Renal Pelvis





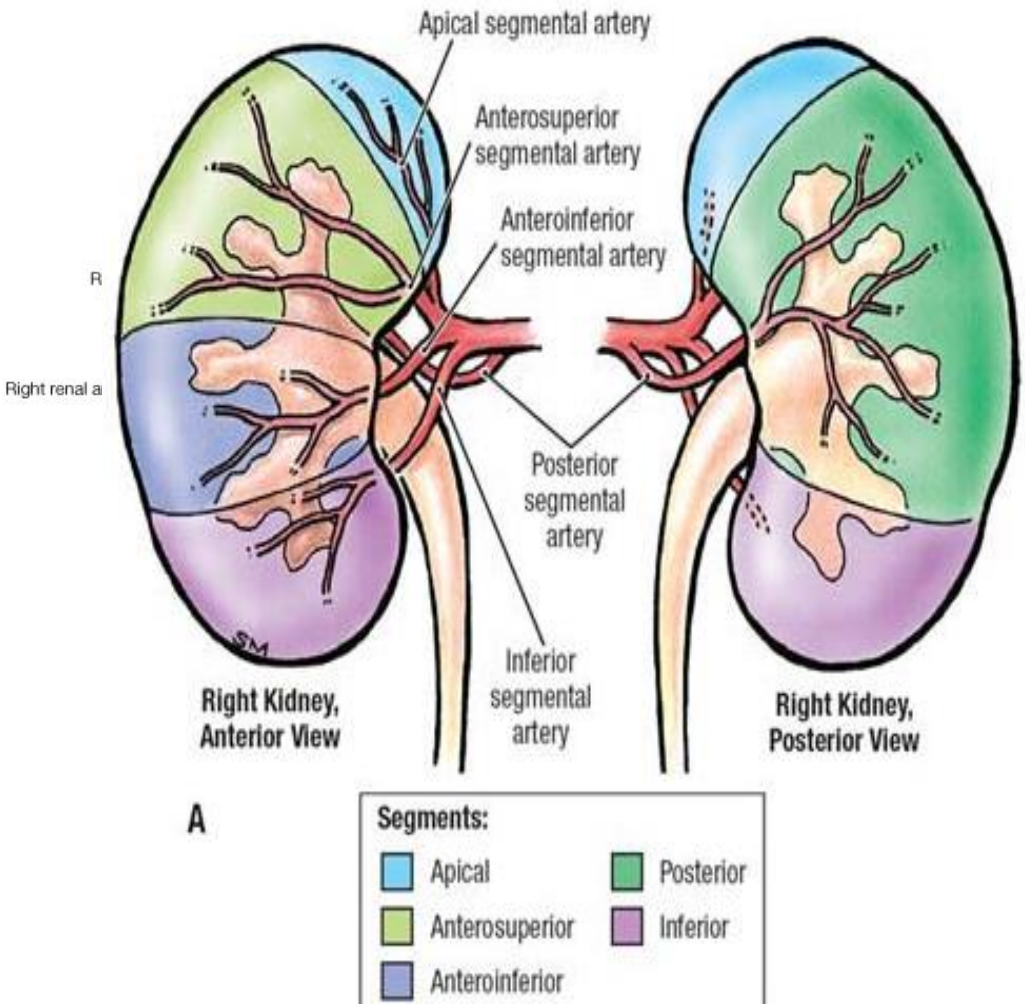


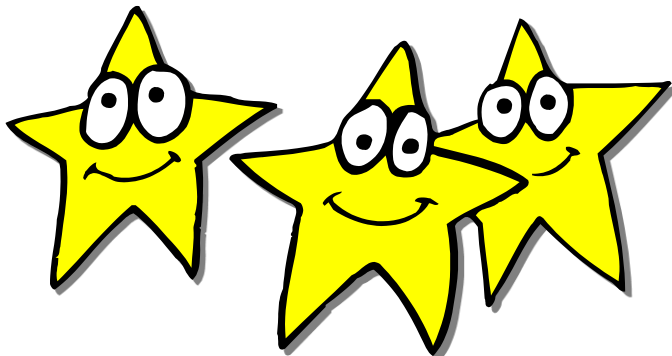
ARTERIAL SUPPLY

- Renal artery- from AA
- St.- accessory renal artery

VASCULAR SEGMENTS OF KIDNEY

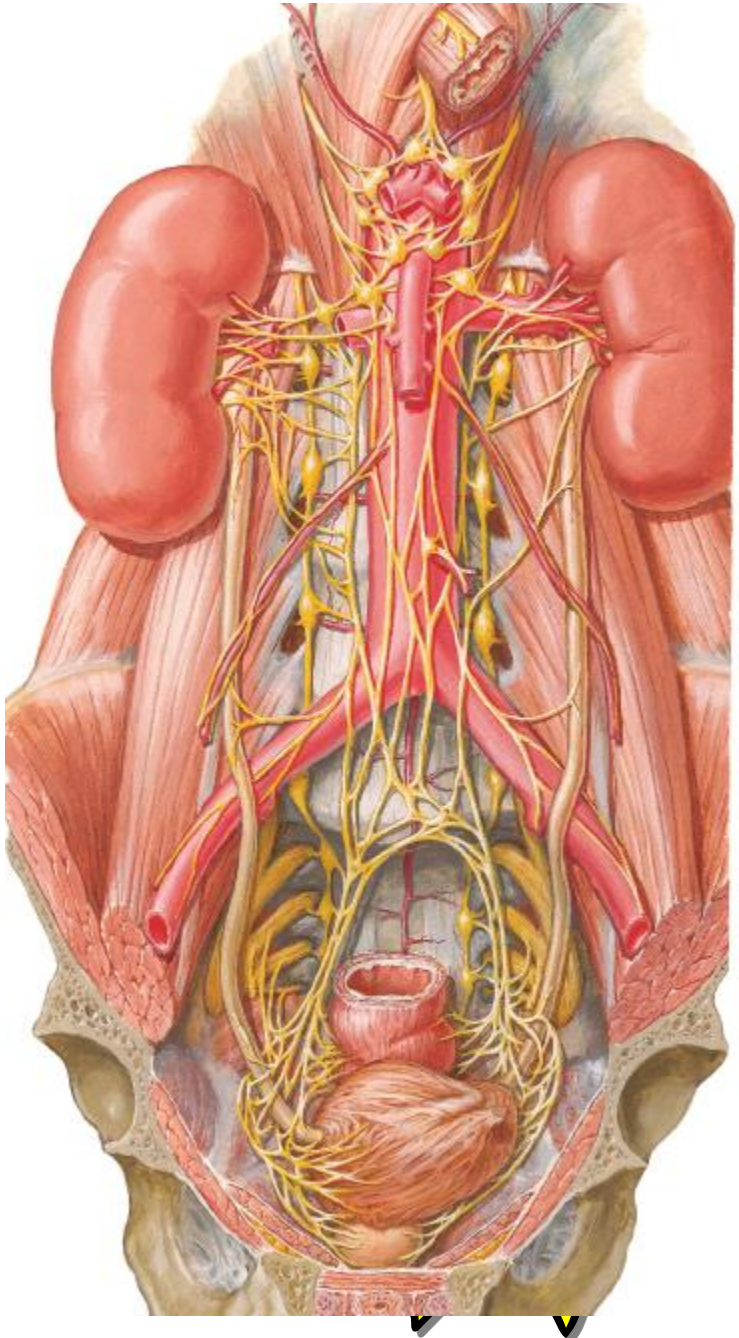
- Area of kidney supplied by each segmental artery





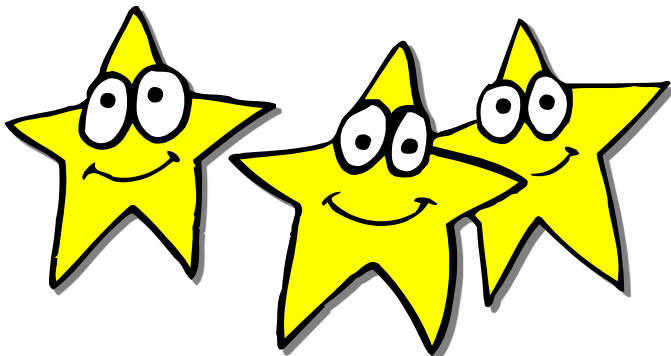
Nerve supply

- Renal plexus -coeliac plexus
- Sympathetic fibers- T10- L1,
- Parasympathetic- vagi, S2-4



CLINICAL ANATOMY

- During surgical exposure- danger of opening of pleural cavity
- Perinephric abscess- extends towards the pelvis
- Nephritis, Renal stones, Tumors- Manifest as renal failure- renal edema, hypertension, raised blood urea



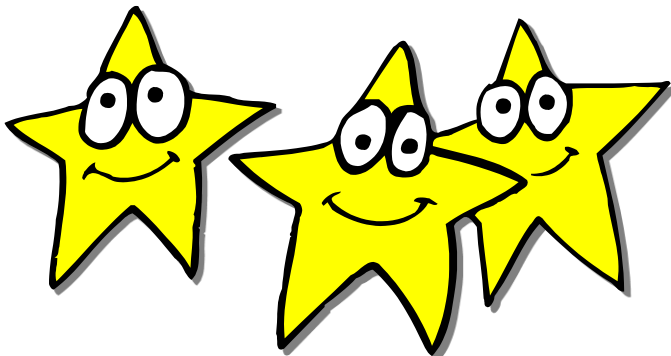
HISTOLOGY OF KIDNEY

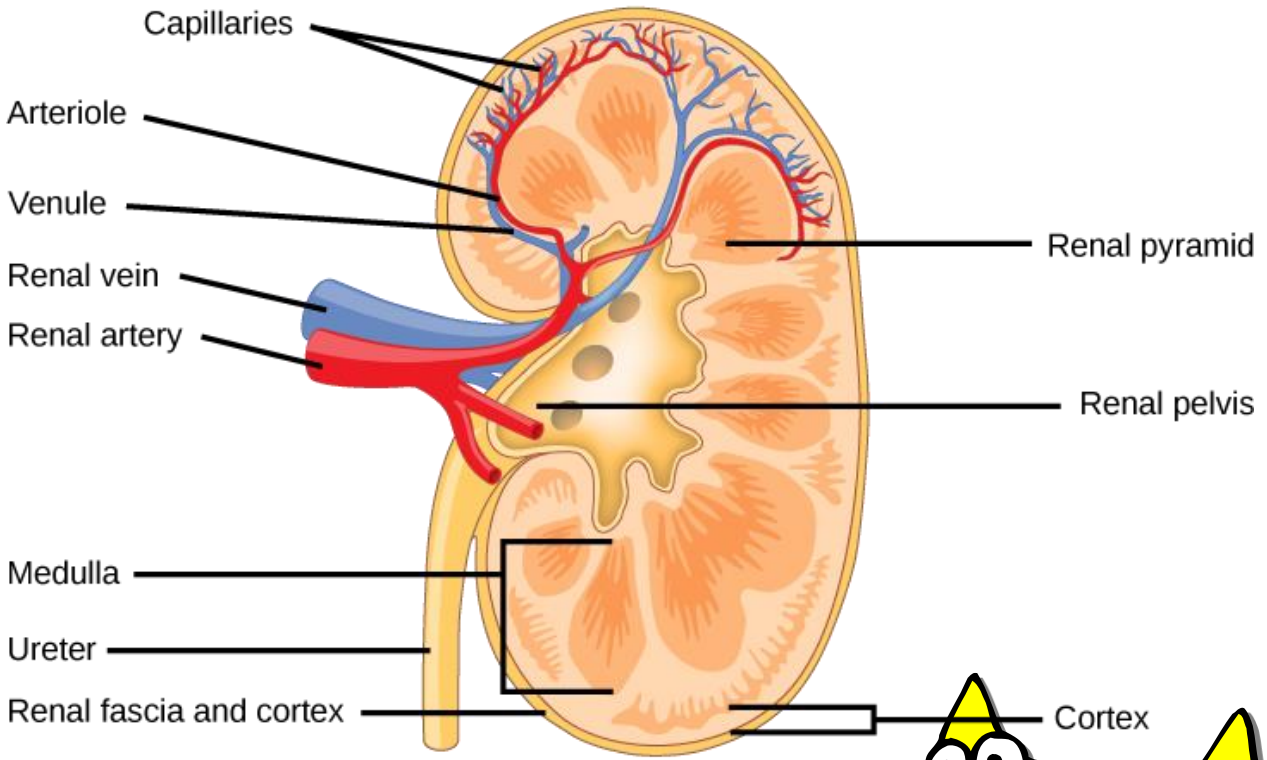
Consist of

- Capsule (renal capsule), Cortex- dark staining & Medulla-light staining

- Cortex: both distal and proximal convoluted tubules, loop of henle, renal corpuscles, glomeruli, Bowman's capsule, interlobular arteries and interlobular veins

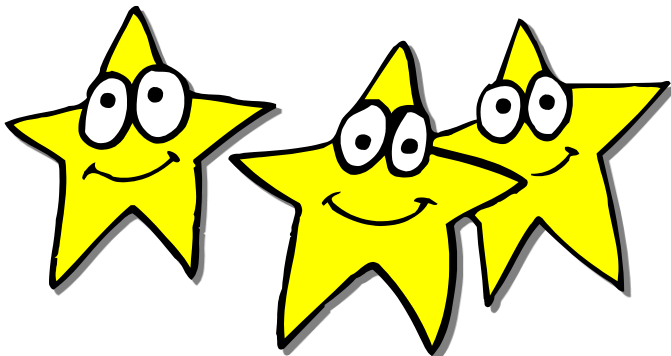
- Medulla: parts of loop of henle, Collecting tubules, larger collecting ducts

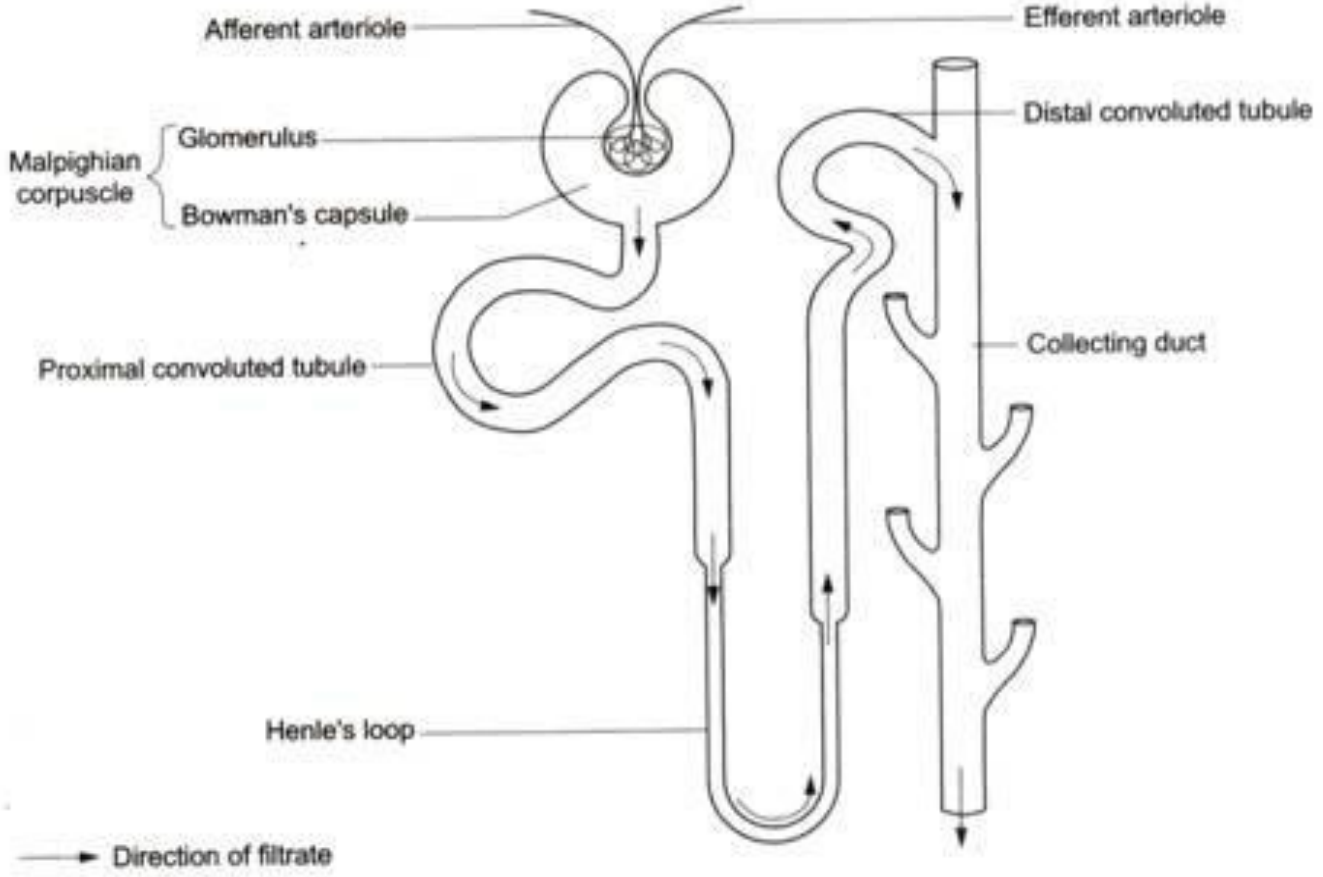



Capillaries
Arteriole
Venule
Renal vein
Renal artery
Renal pyramid
Renal pelvis
Medulla
Ureter
Renal fascia and cortex
Cortex

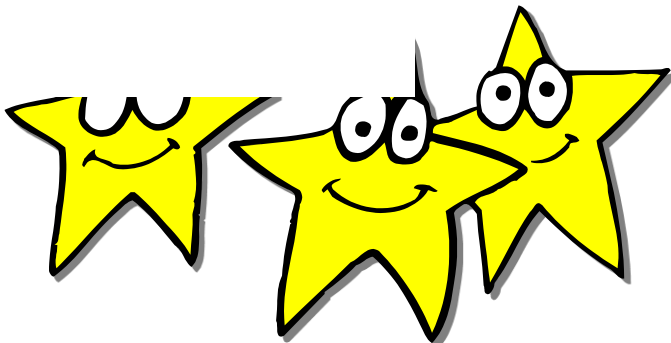
Nephron

- Nephron is functional unit of kidney
- It is a excretory part of kidney
- Kidney contains about 1 millions of nephrons in each kidney
- Length =35-55 mm





Different parts of a nephron



Nephron

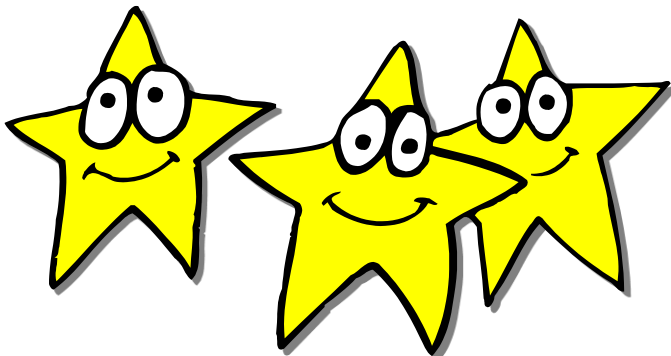
a. Renal corpuscle

Glomerulus – network of tiny artery capillaries

Glomerular capsule(Bowman's capsule)- Nephron is closed to one end to form the expanded cup shaped structure which enclose the glomerulus

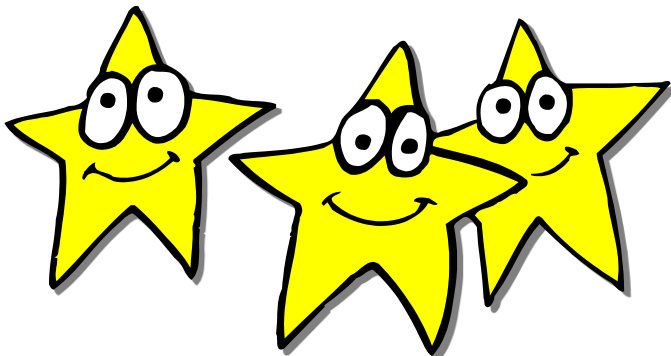
b. **Renal tubule**

Proximal convoluted tubule, loop of Henle with its descending and ascending limbs, and the distal convoluted tubule



Function of Nephron

- Waste Excretion
- Filtration of blood
- Regulation of Blood pressure

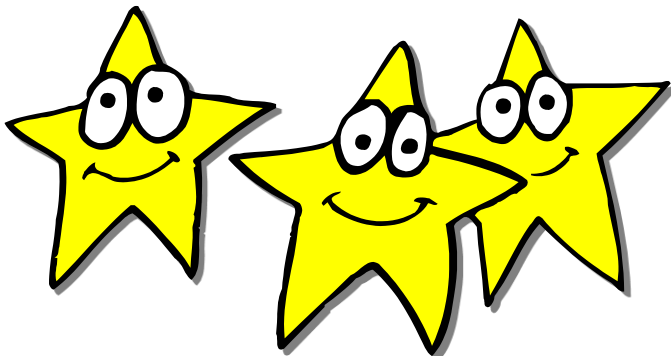


Suprarenal gland/Adrenal gland

- This are retroperitoneal gland
- It lies anterior superior part of each kidney and behind the peritoneum
- Weigh 4 gm
- This gland are surrounded by fat
- Yellowish color, Asymmetrical shape , nodular appearance
- Size-50mm height,30mm breadth,10 mm thickness

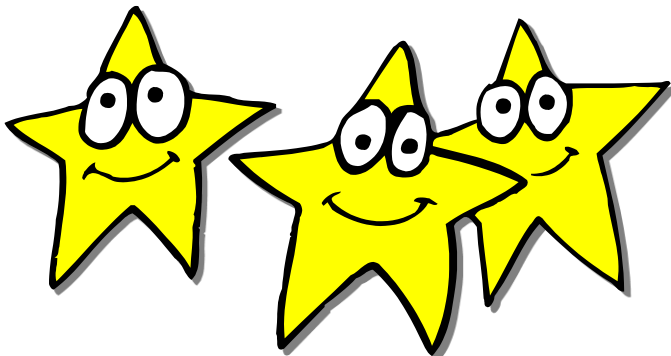
- Right is pyramidal shape

  Left is semi lunar
- Lies in their own compartment of renal fascia
- They are endocrine gland which helps to maintain water and electrolytes balance



They are made up of 2 parts

- Outer cortex- secretes steroids hormones
- Inner Medulla-made up of chromaffin cells and secretes adrenaline and noradrenaline hormones



Blood supply

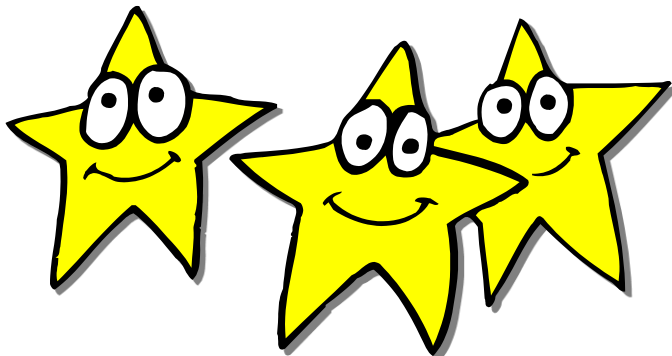
- Highly vascular organ supply by 3 artery
- Middle supra renal artery branch of abdominal aorta
- Superior supra renal artery branch of inferior phrenic artery
- Inferior supra renal artery branch of Renal artery

Vein

- Suprarenal vein

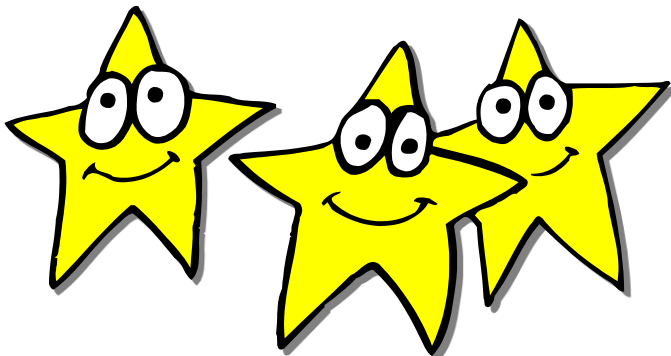
Rt (drain into IVC)

LT(drain into renal vein)



Applied Anatomy

- Addison’s disease- Deficiency of mineralocorticoids
- Conn’s Disease-adrenal hyperplasia with excessive mineralocorticoids secretions



Pheochromocytoma

- Tumor of adrenal medulla
- Elevation of catecholamines

Symptoms

- Headache
- Sweating
- Tachycardia

Ix

- Urine, Blood(metanephrine,dihydroxymandelic acid)
- CT/MRIScan

THANK YOU