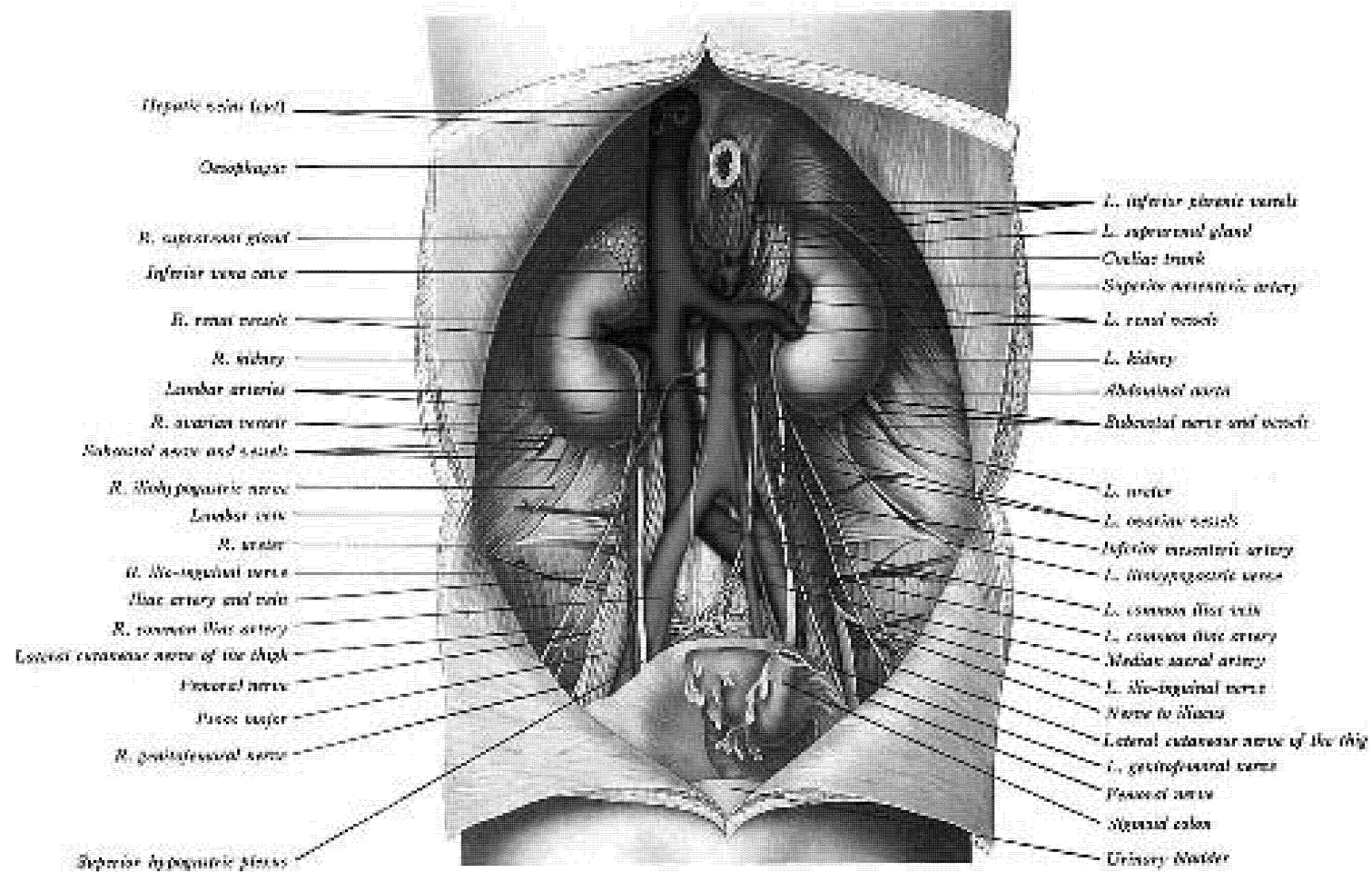




KIDNEY

- Reddish brown, retroperitoneal
- Superior upper border of Th.12
- Inferior border of 3rd Lumbar vertebrae.
- Left kidney longer and narrower, lies nearer the median plane
- Transpyloric plane passes through the superior part of right renal hilum and the inferior part of the left hilum.
- 11 cm x 6 cm x 3 cm
- Weight 150 g in men, 135 g. in women

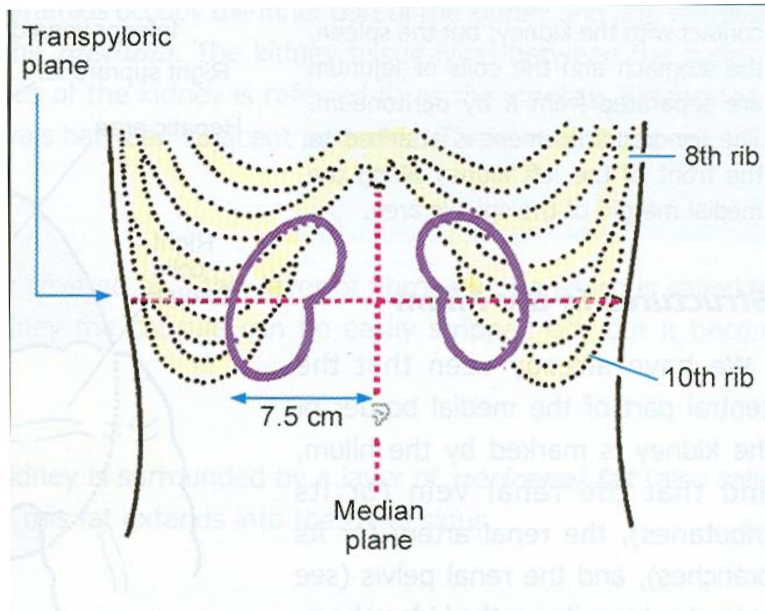


Fig. 44.3 Projection of the kidney to the front of the body.

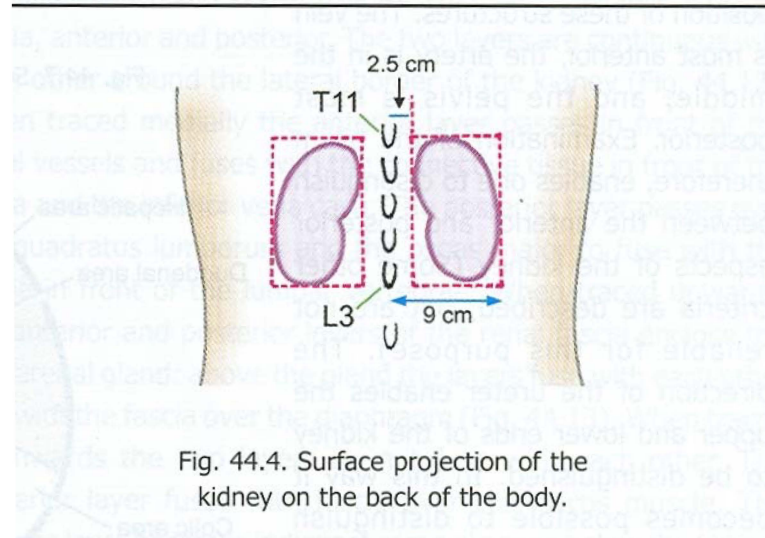


Fig. 44.4. Surface projection of the kidney on the back of the body.

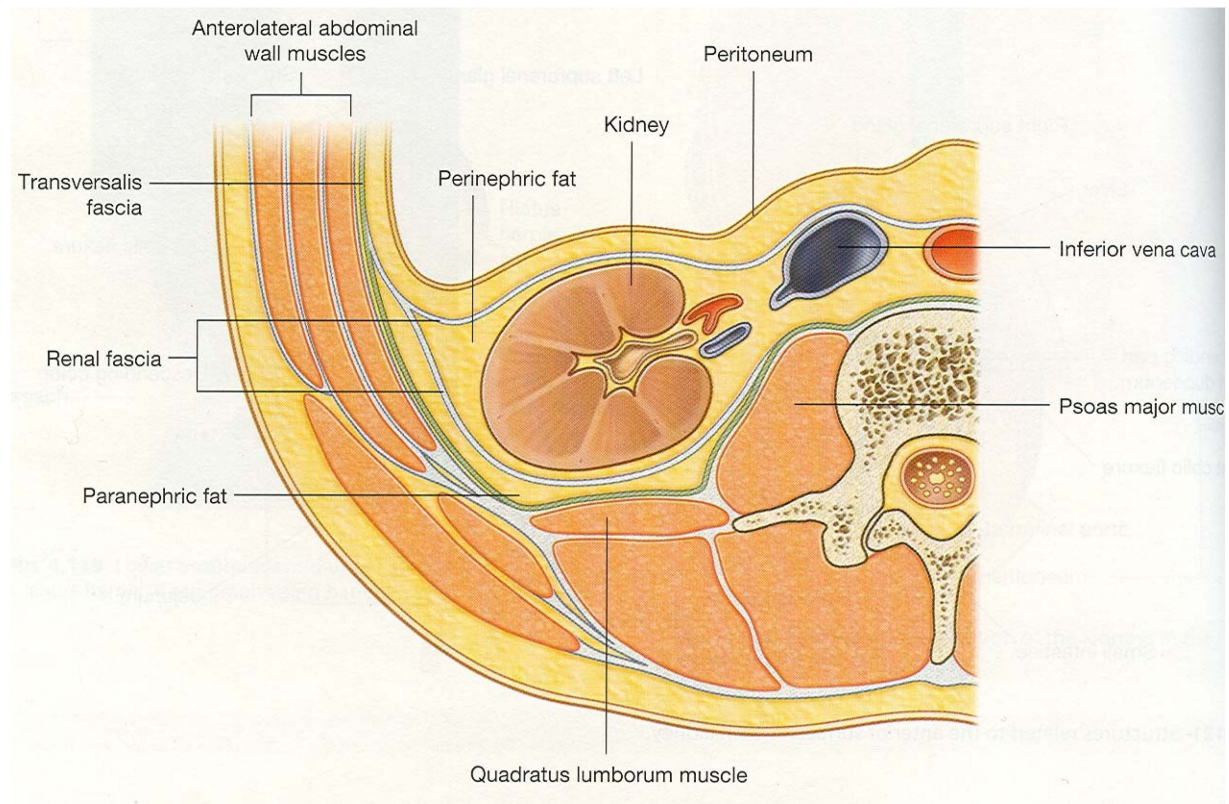
Renal Coverings

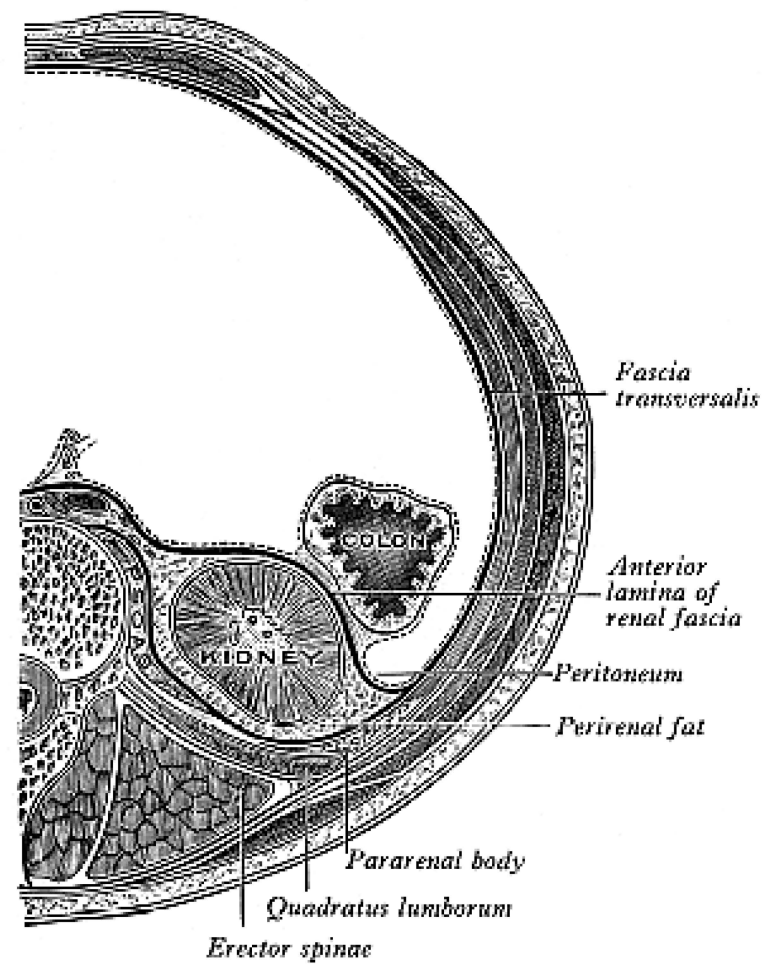
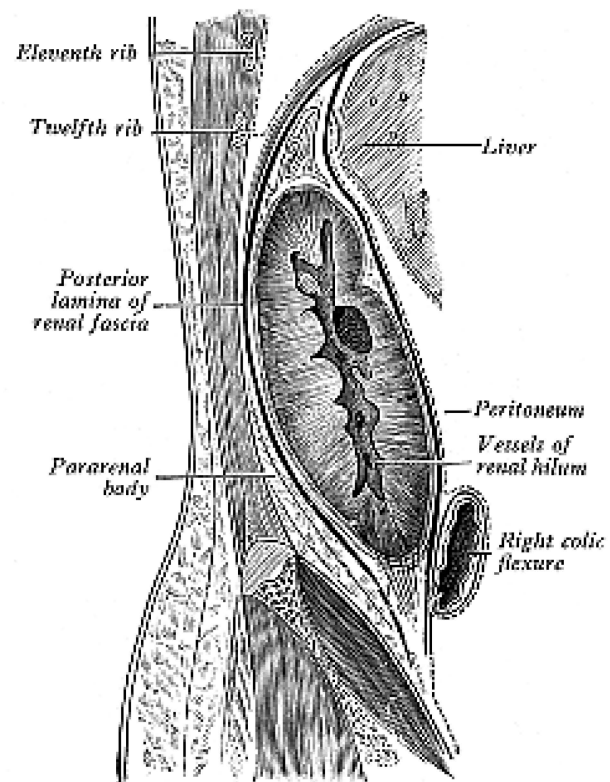
1.Renal Capsule

2.Perirenal fat

3.PERIRENAL FASCIA

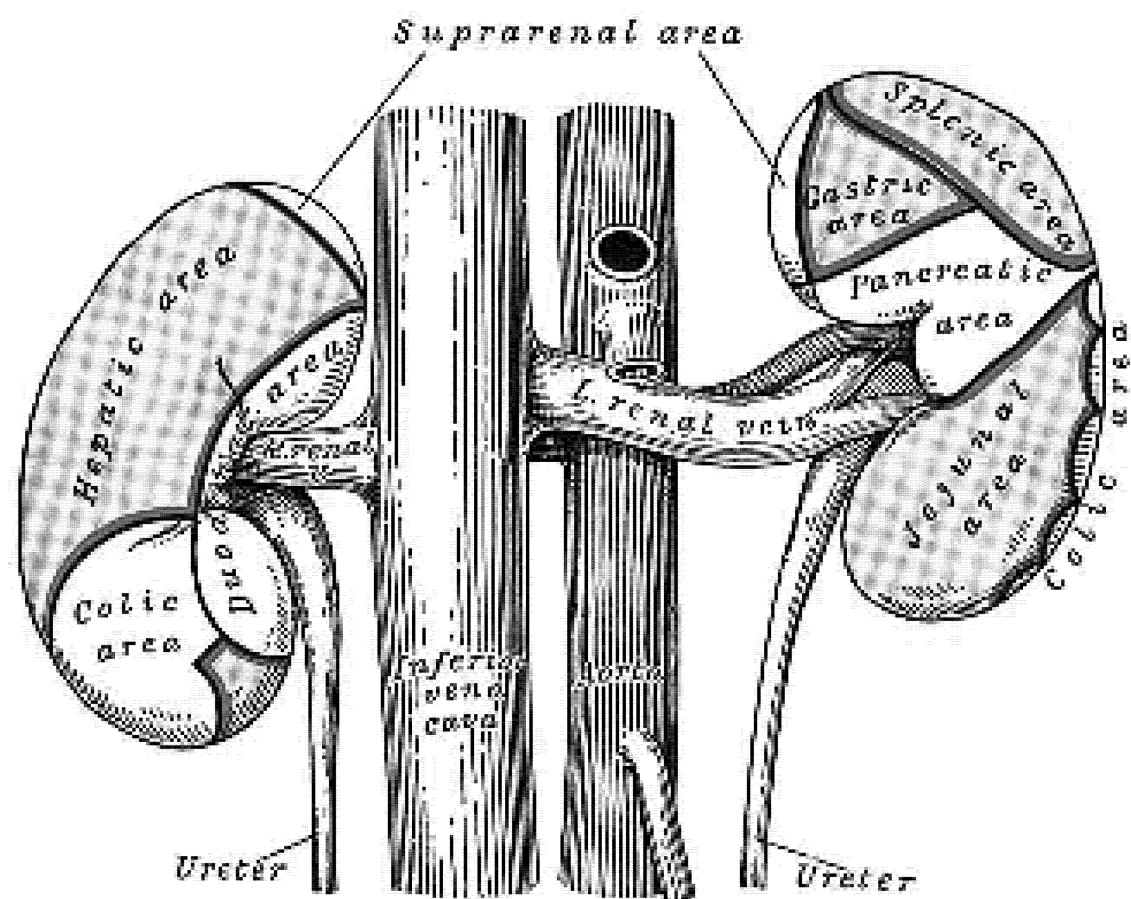
- Dense, elastic connective tissue sheath enveloping each kidney and suprarenal
- Thickest at the borders
- Two layers – anterior and posterior continuous with each other around the lateral border
- Medially anterior layer passes in front of renal Vs and fuses with adventitia; posterior layer passes over quadratus lumborum and psoas major to fuse with fascia in front of lumbar vertebrae.
- Superiorly the two layers fuse; inferiorly they diverge.

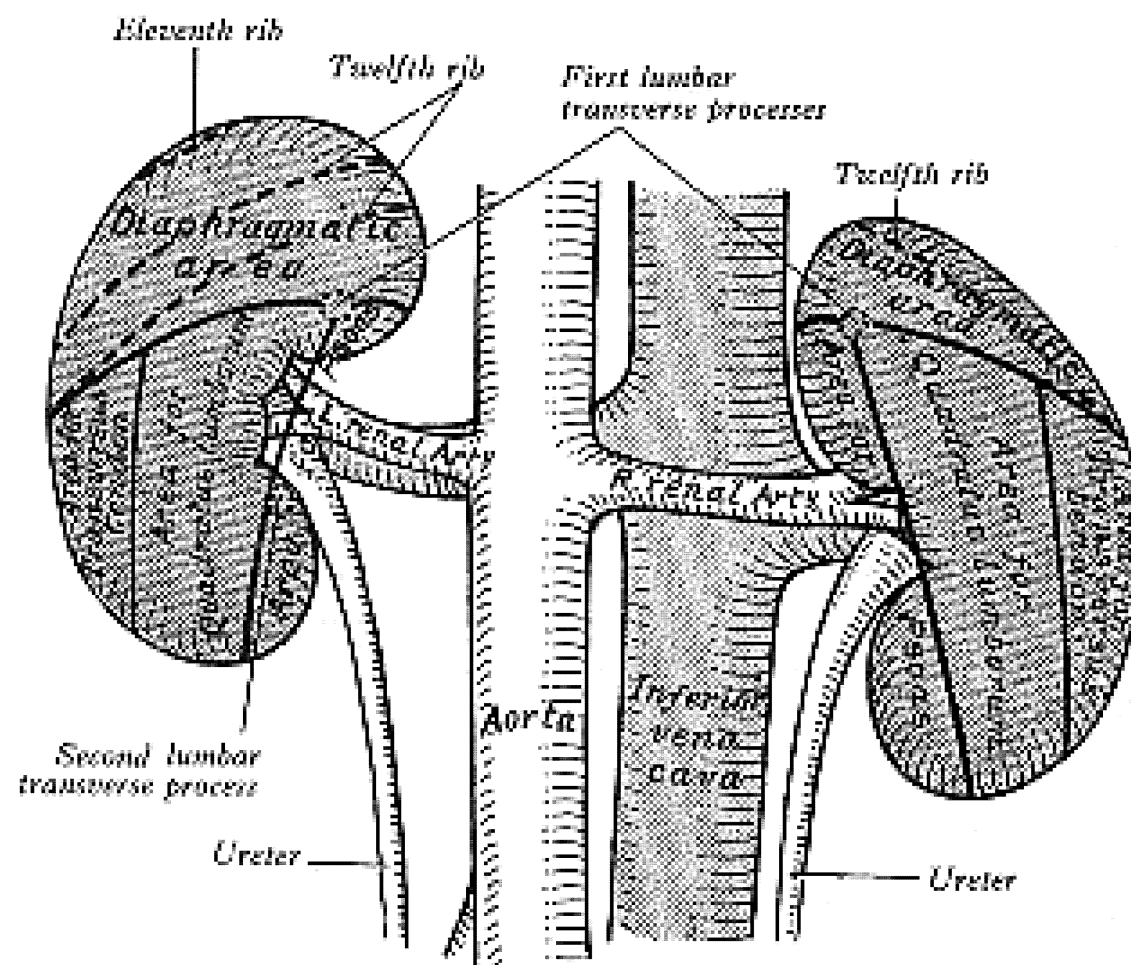




RELATIONS

- Superior poles – suprarenal gland
- Lateral borders – convex
- Medial border – convex near poles concave at hilum
- Hilum – a deep vertical fissure bounded by anterior and posterior lips
 - Contains renal vessels, nerves and renal pelvis
 - Anterior – renal vessels, intermediate- renal artery, Posterior – pelvis
- Above hilum, medial border is related to suprarenal glands below to the origin of ureter





ANTEROLATERAL SURFACE

- Right kidney:

- Superior pole and upper part of medial border – suprarenal glands
- Right lobe of liver (P)
- Descending part of duodenum
- Right colic flexure
- Small intestine (P)

- Left Kidney

- Superior pole – suprarenal gland
- Upper 2/3 of lateral half – spleen (P)
- Central quadrilateral area – pancreas and splenic Vs
- Between suprarenal and splenic areas – stomach (P)
- Narrow lateral strip – left colic flexure
- Medial area – jejunal coils (P)

Posteromedial surface

- Embedded in fat; devoid of peritoneum
- Related to –
- Diaphragm- Medial and lateral arcuate ligaments
- Psoas major
- Quadratus lumborum
- Transverse abdominis
- Subcostal vessels and nerves
- Iliohypogastric nerve
- Ilioinguinal nerve
- 11 & 12th ribs (left); only 12th rib (right)

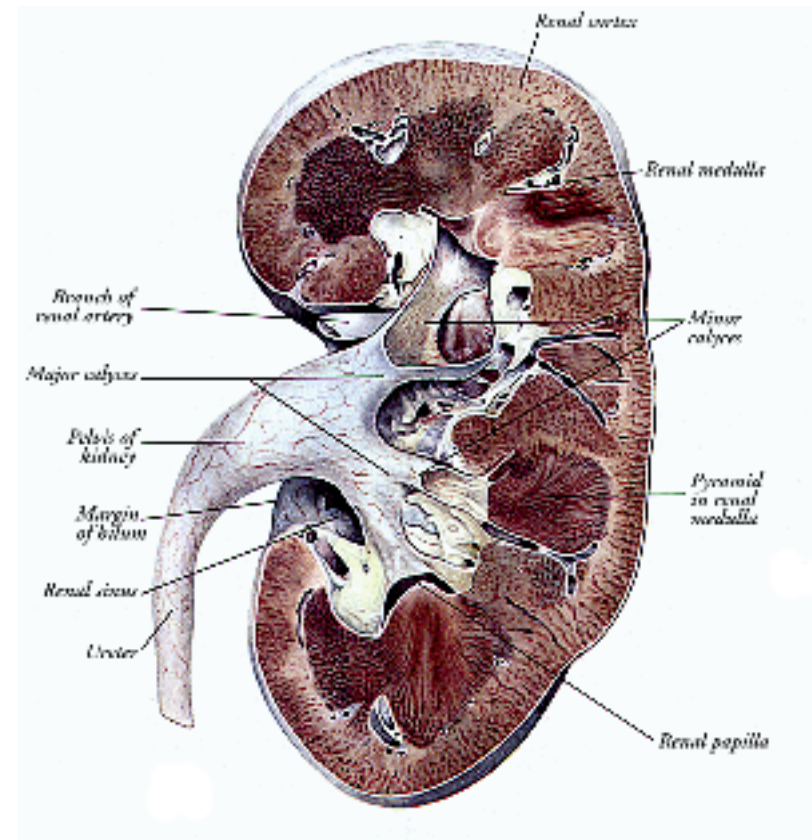
General renal structure

- Thin capsule
- External cortex
- Internal medulla

Renal pyramids

Renal sinuses - calyces

- Cortex
 - Renal columns
 - Presence of glomerulus
 - Proximal convoluted tubules
 - Distal convoluted tubules
 - Medullary rays





ARTERIAL SUPPLY

- Renal arteries

- Branch laterally at the level of L2

- Right renal Artery- Longer, higher

Crosses the crus of diaphragm; Posterior to IVC, Right renal vein, head of pancreas and 2nd part of duodenum

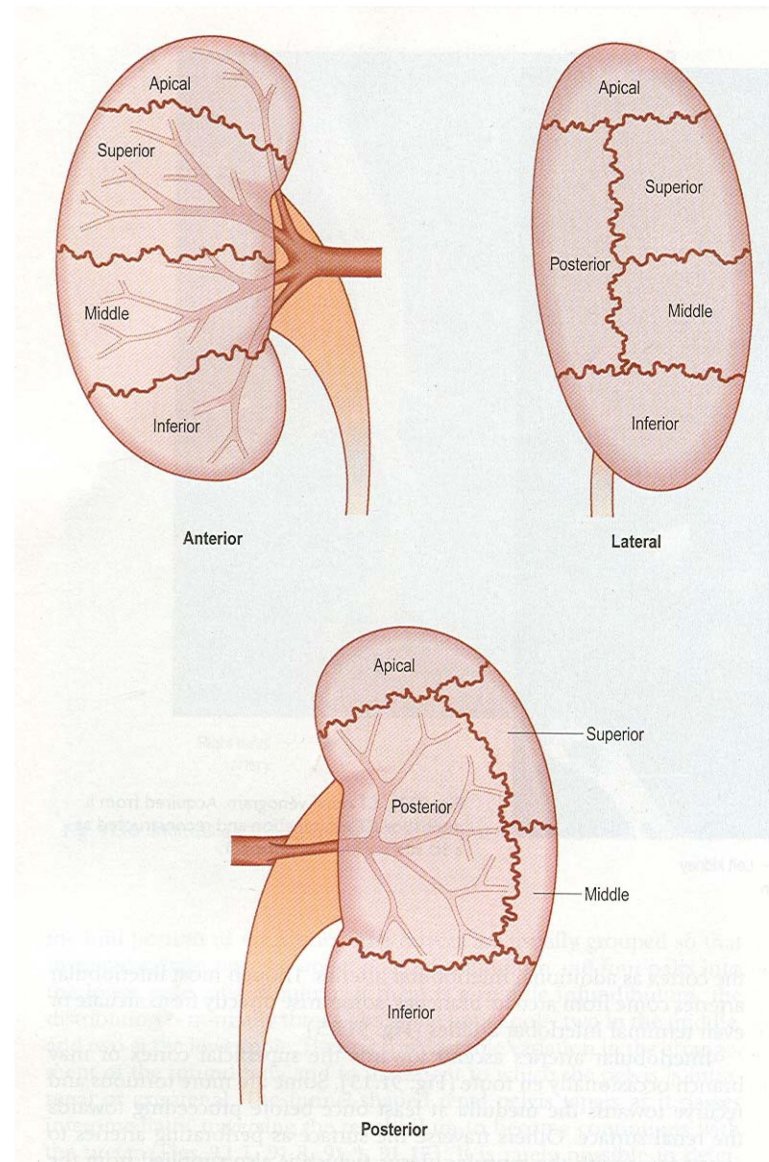
- Left renal artery- Passes posterior to left renal vein, body of pancreas, splenic vein

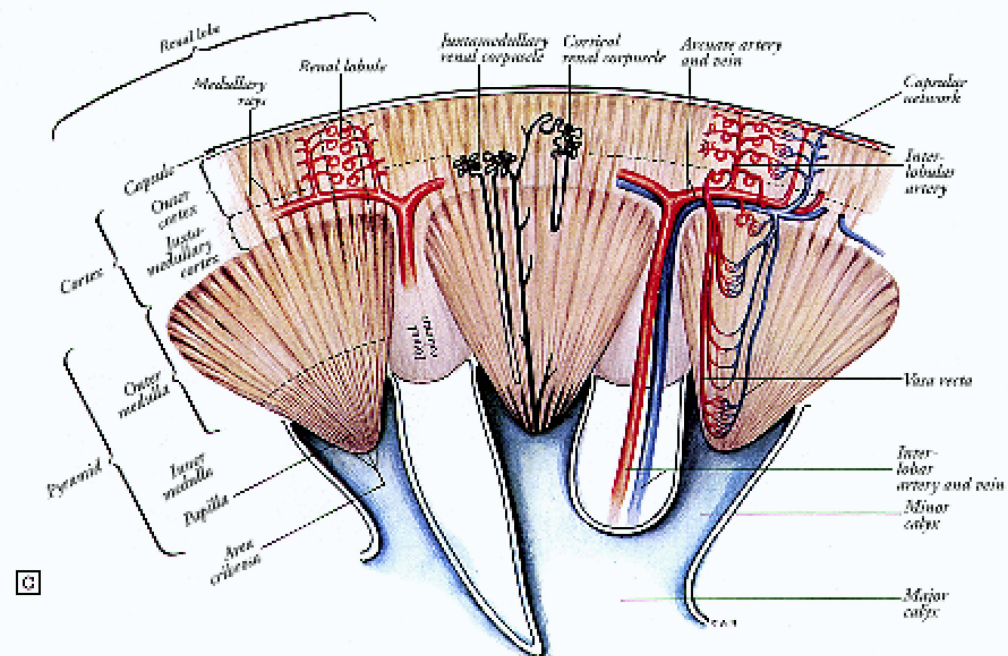
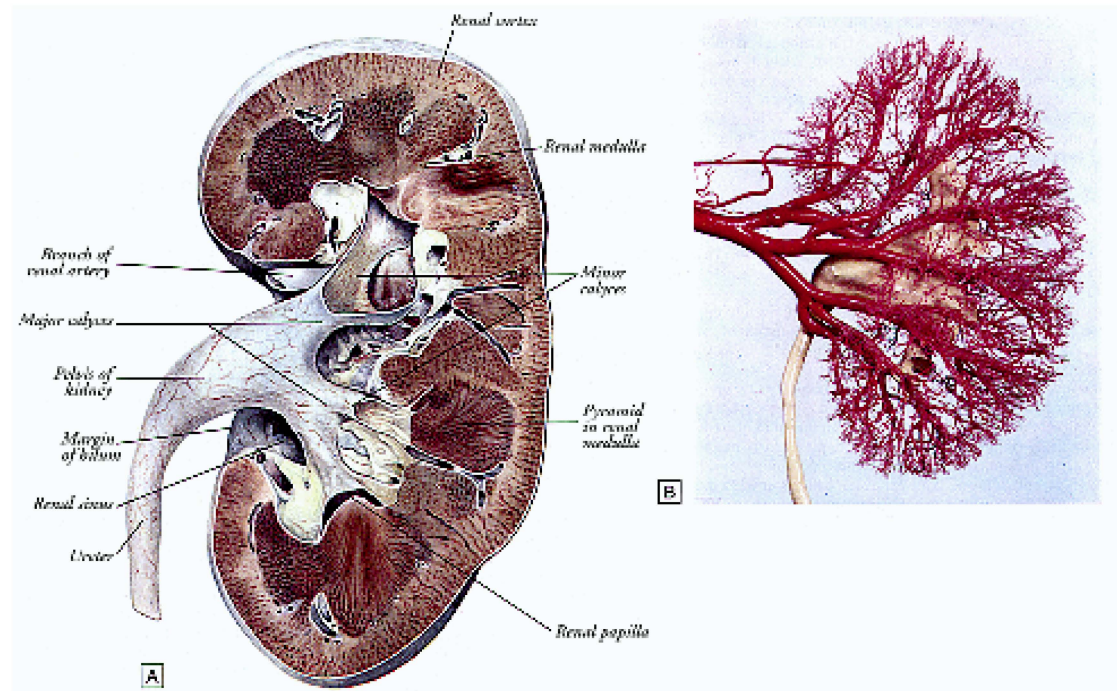
- Give branches to – suprarenal (inferior)

ureter

perinephric tissue

- Near the hilum each artery divides in to two divisions – anterior and posterior which further divide into 5 segmental Aa.





- Arterial segments
 - Apical
 - Superior
 - Middle
 - Inferior
 - Posterior

- Segments supplied by virtual end arteries

- Intrarenal veins – intersegmental

- Bloodless line of Brodel

- Important for partial nephrectomy

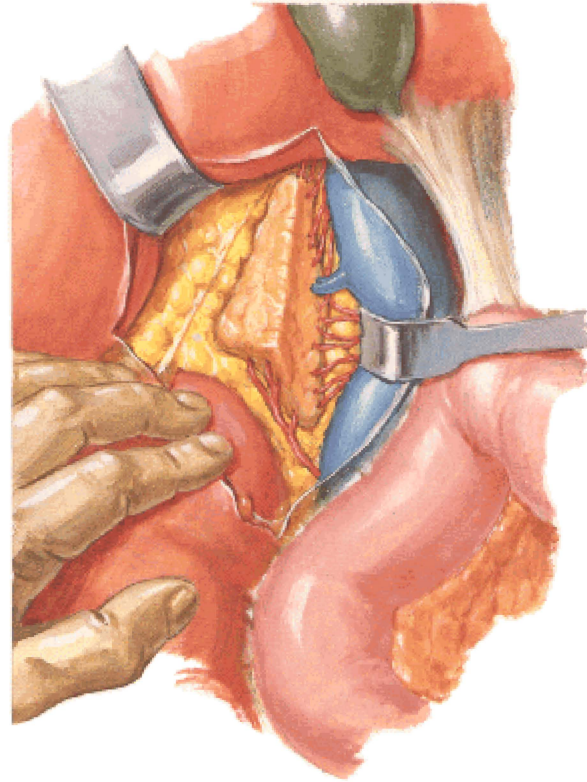
- Segmental A → Lobar → Interlobar → Arcuate → interlobular → afferent and efferent glomerular arterioles → capillary plexus → vasa recta → capillary plexus → renal vein

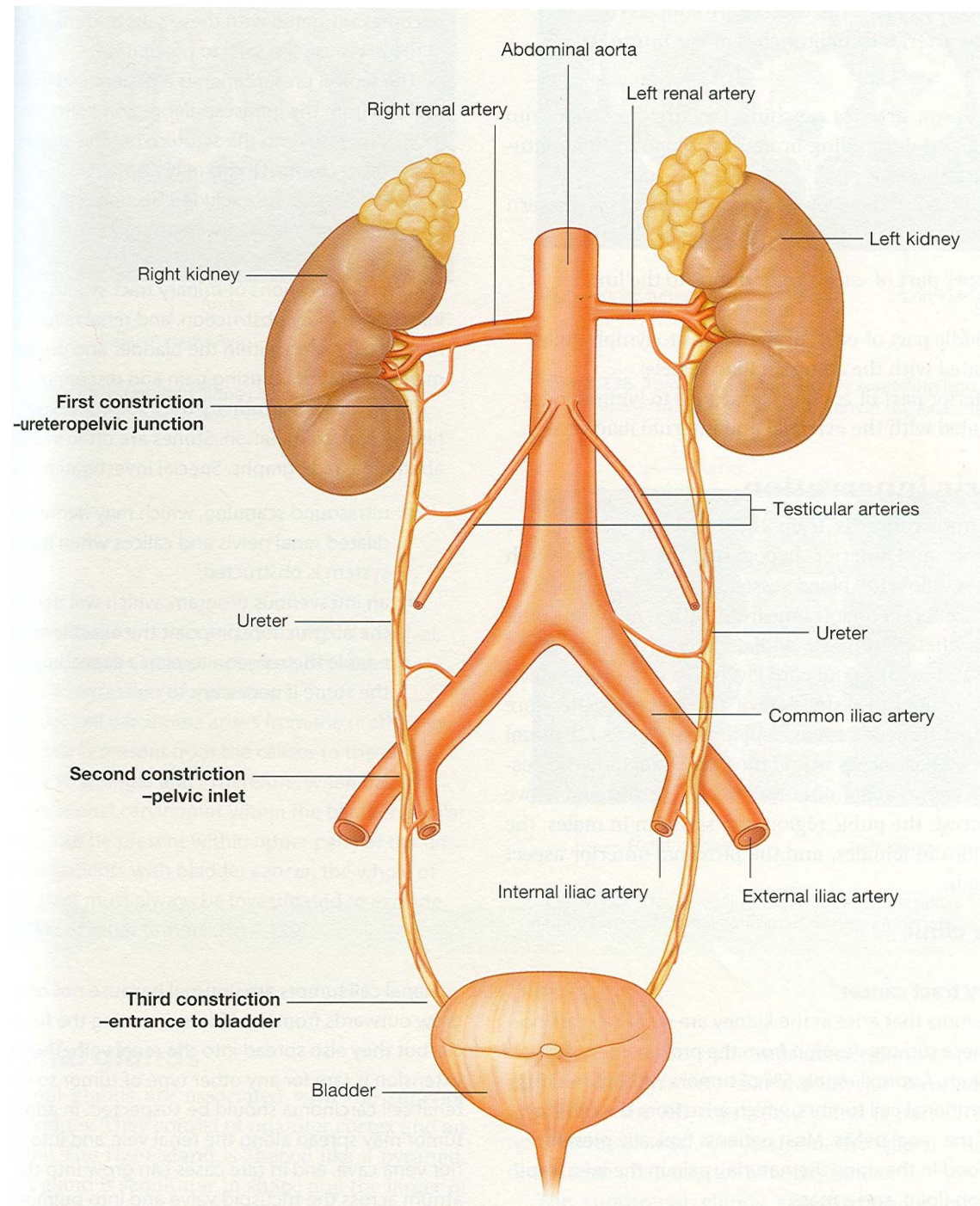
VEINS

- Renal Veins lie anterior to renal artery
- Drain in to IVC at right angles
- Left is 3 times longer, runs posterior to splenic V, body of pancreas
Anterior to aorta
- Tributaries - Left inferior phrenic Vein
Left gonadal Vein
Left suprarenal vein
- Lymphatic drainage- Lumbar group of lymph nodes (Aortic/caval)

APPLIED ANATOMY

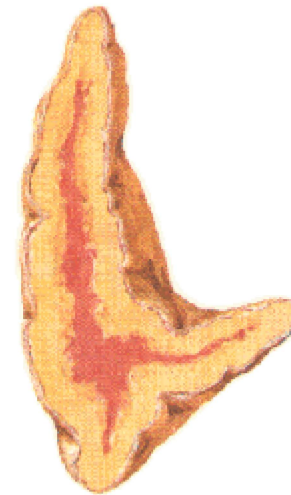
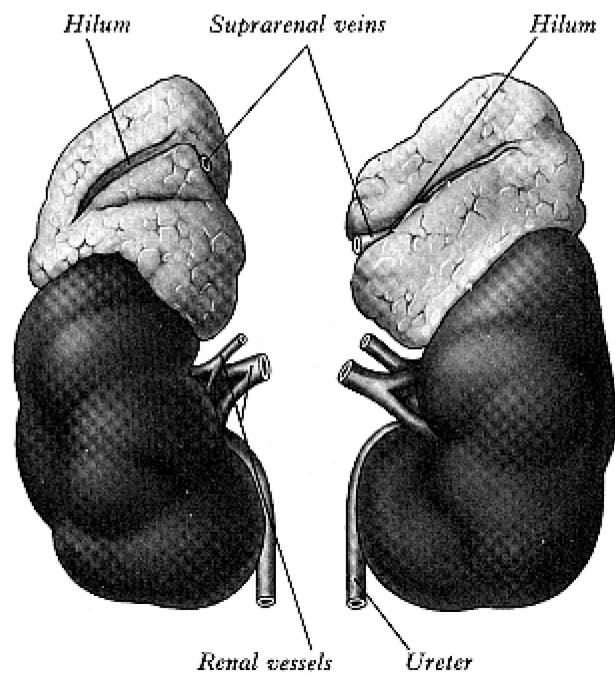
- Nephrolithotomy
- Hypermobility kidney (reduction of perirenal fat) causes renal colic by kinking of ureter
- Oblique incision from renal angle towards anterior superior iliac spine
- Renal calculi
- Anomalies of shape
- Anomalies of position
- Fetal lobulation
- Congenital polycystic kidney
- Aberrant renal arteries

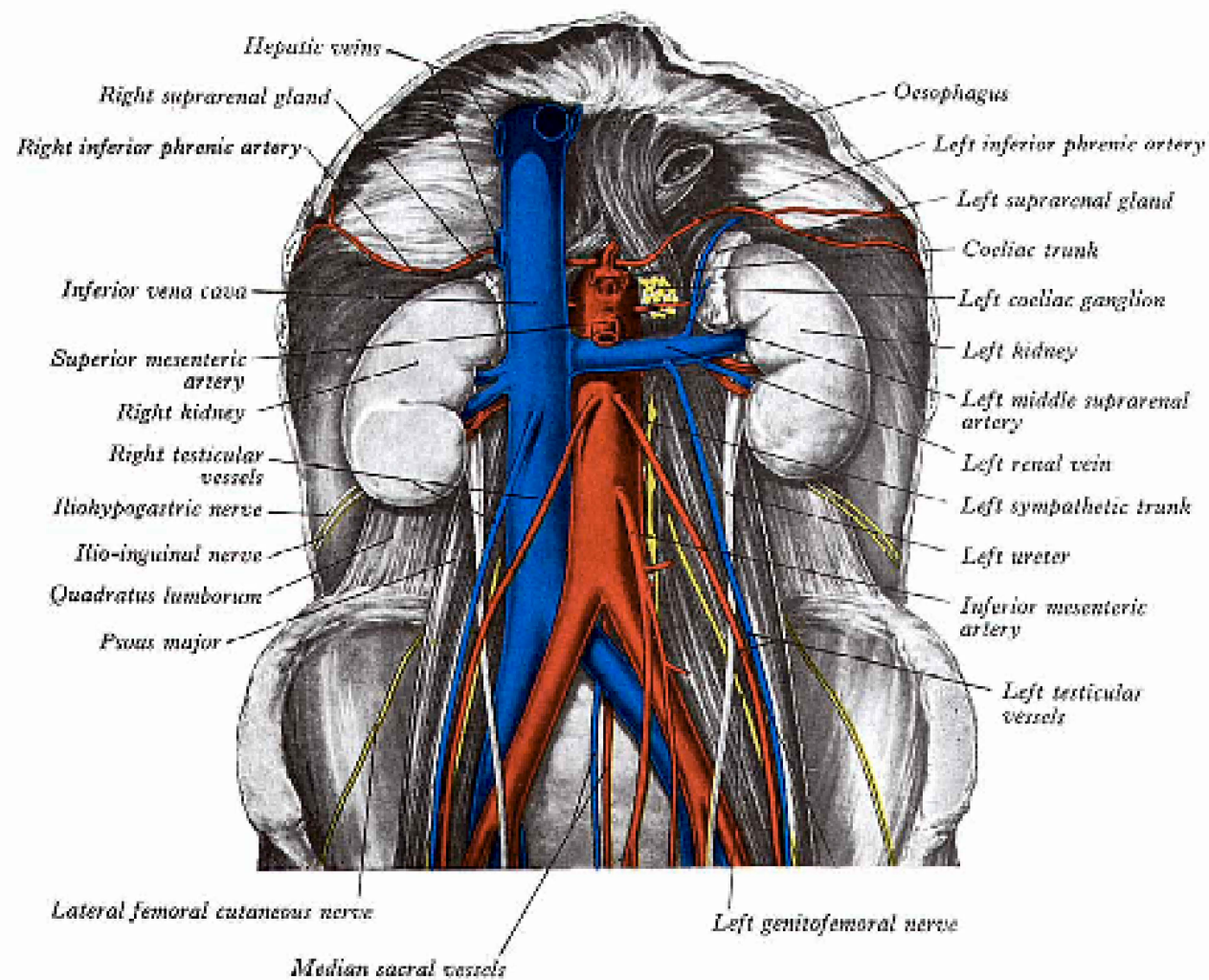


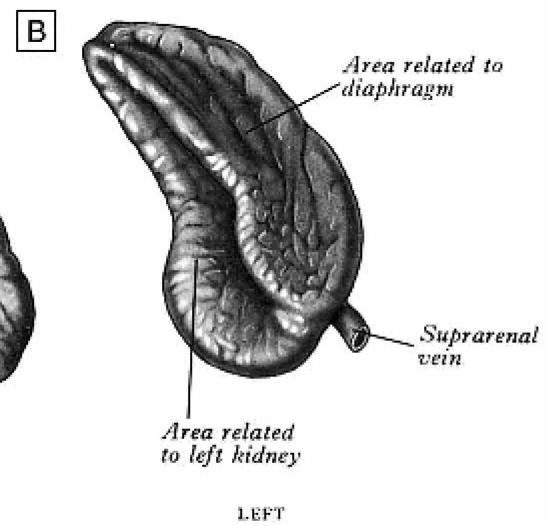
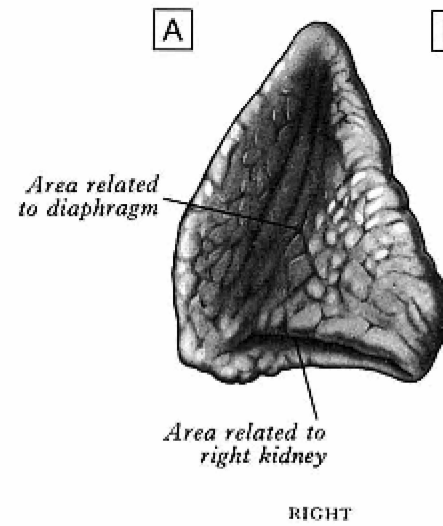
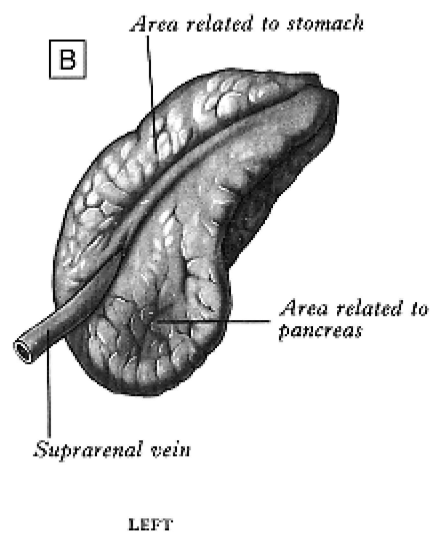
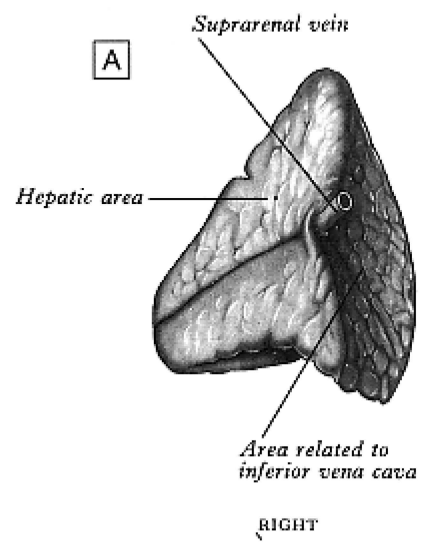


Suprarenal Glands

- Located between superomedial aspect of kidneys and diaphragm
- Enclosed by perirenal fat and fascia; separated from kidney by true capsule
- Size: 50x30x10 mm
- Weight: 5 gms (medulla is $1/10^{\text{th}}$ of total weight)
- At birth the gland is $1/3^{\text{rd}}$ the size of kidney; in adult it is $1/30^{\text{th}}$)







Right gland- Pyramidal, higher.

Anterior relations:

IVC medially and right lobe of liver laterally

Posterior relations

Right crus of diaphragm above and
superior pole of kidney below

Hilum

Emergence of rt suprarenal vein

Below the apex near the anterior border

Medial border

related to coeliac ganglion and
inferior phrenic artery

Left gland – Semilunar, flattened anteroposteriorly

Anterior relations

Above- stomach separated by lesser sac

Below- pancreas and splenic artery

Posterior relations

Medially- left crus of diaphragm

Laterally- kidney (medial border from upper pole
up to hilum)

Hilum-Near the lower part of anterior surface

Medial border

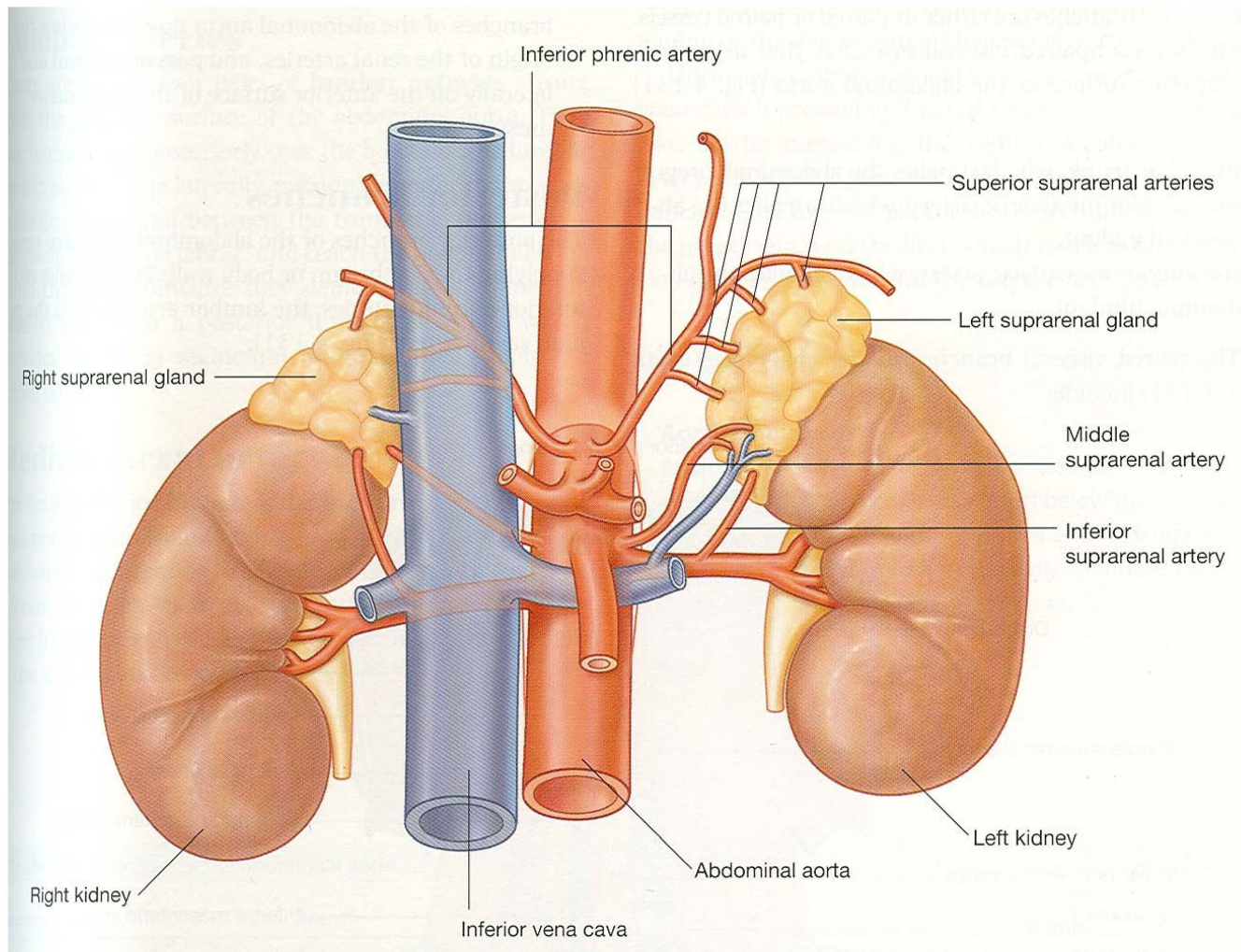
Convex; related to coeliac ganglion and inferior
phrenic artery

Structure

Two parts:

Cortex- Derived from mesoderm and secrete corticosteroids and androgens

Medulla- Nervous tissue derived from neural crest cells; permeated with capillaries and sinusoids; secrete epinephrine and norepinephrine



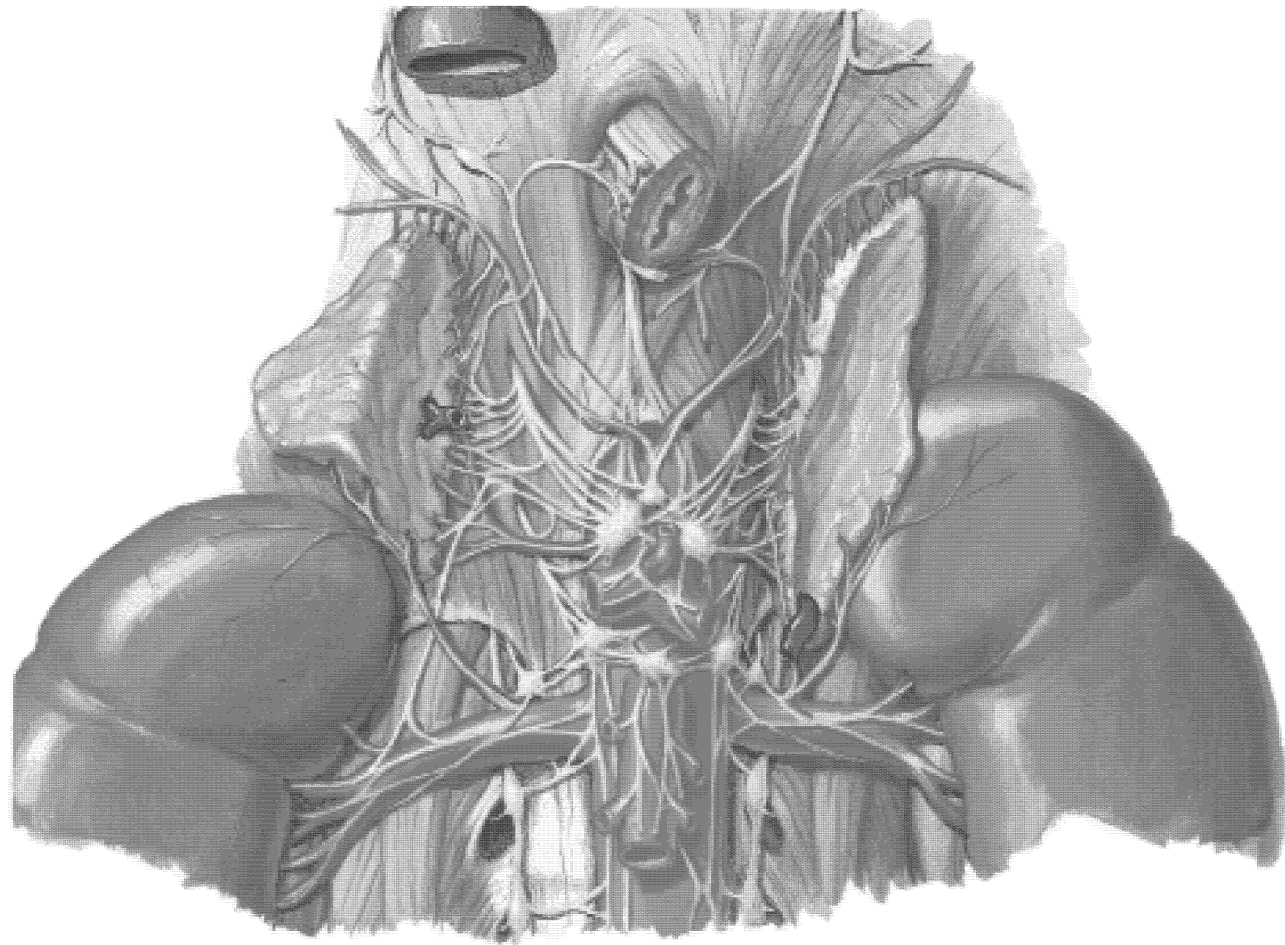
Vascular Supply

- Superior suprarenal arteries(6-8) from inferior phrenic
- Middle suprarenal from abdominal aorta
- Inferior suprarenal from renal artery

Before entering the gland, the arteries branch freely so that 50-60 branches enter the capsule of gland

- Single large suprarenal vein drains into IVC on the right side
Left renal vein on left side





Ureter

- Length- 25-30 cm
- Retroperitoneal
- Has abdominal and pelvic course
- Enters pelvis at the level of bifurcation of common iliac artery
- Left ureter is related to apex of attachment of sigmoid mesocolon

Abdominal course

Lie on psoas major (at level of tips of lumbar transverse processes)

Right ureter

Related anteriorly to

2nd part of duodenum,

right colic and iliocolic arteries,

gonadal vessels and

mesentery of ileum

Left ureter

Related anteriorly to

Left colic artery,

gonadal vessels and

sigmoid mesocolon

