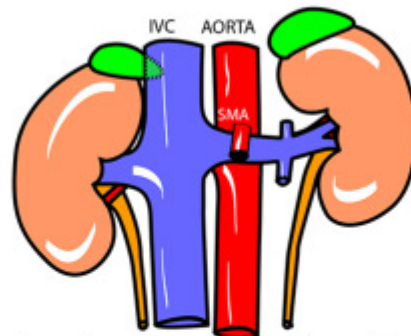
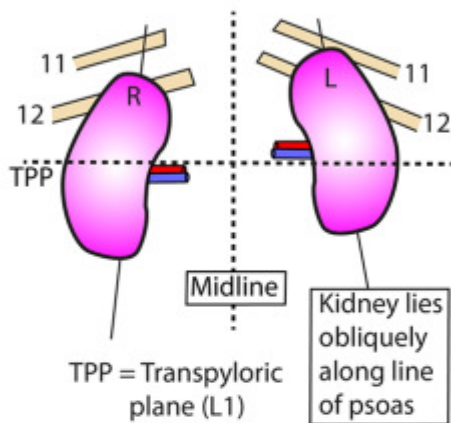


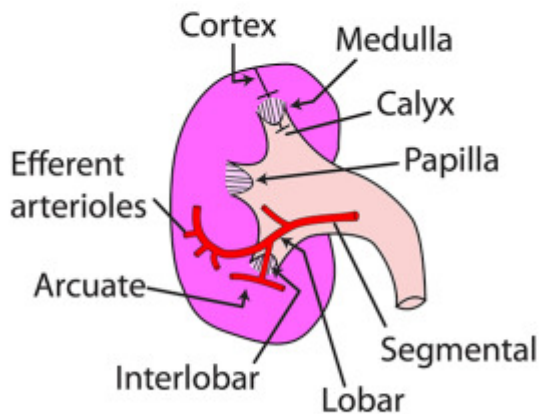
## KIDNEYS - GENERAL

- 120g each, 11x6x4cm, 1200ml blood/minute
- Retroperitoneal, move 2.5cm on respiration
- Pelvis faces medially/anterior
- 1 million nephrons/kidney
- Lymphatics to para-aortics
- Sympathetic from T12-L1 for vasoconstriction & pain
- Parasympathetics from vagus. Function unknown
- Polar & capsular vessels give minimal collateral supply



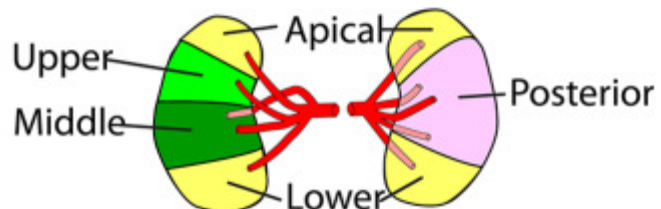
Order of structures at hilum from anterior to posterior V-A-U (vein, artery, ureter)

Left renal vein is longer making left nephrectomy easier



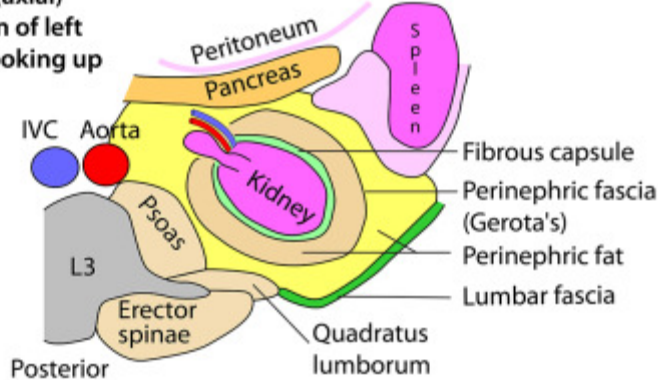
### Segmental blood supply

ANTERIOR VIEW      POSTERIOR VIEW



## KIDNEY - RELATIONS

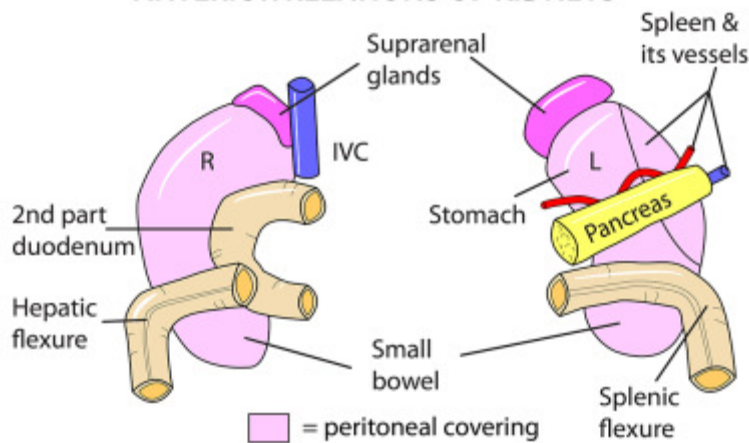
Cross (axial)  
section of left  
side looking up



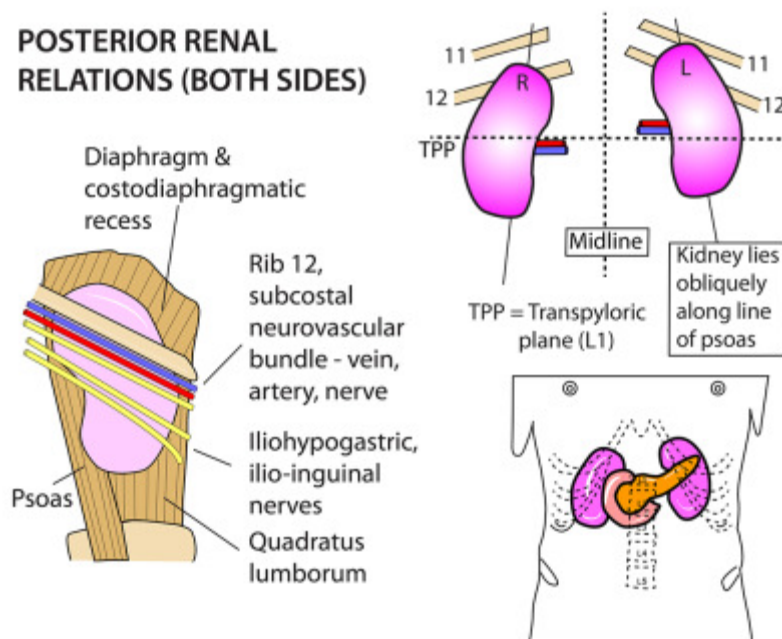
Note: The perinephric fascia is attached around the renal pelvis but is open inferiorly so that pus or extravasated urine can track down alongside the ureter.

**Kidneys move 3-4cm on respiration**

## ANTERIOR RELATIONS OF KIDNEYS



## POSTERIOR RENAL RELATIONS (BOTH SIDES)



## URETER

25cm long. From kidney to bladder

**Posterior relations:** Psoas, genitofemoral nerve, sacroiliac joint, common iliac artery bifurcation

**Anterior relations: Right-** Duodenum, right gonadal artery, right colic artery, ileal mesentery, superior mesenteric artery. **Left-** Left gonadal artery, left colic artery, sigmoid mesentery

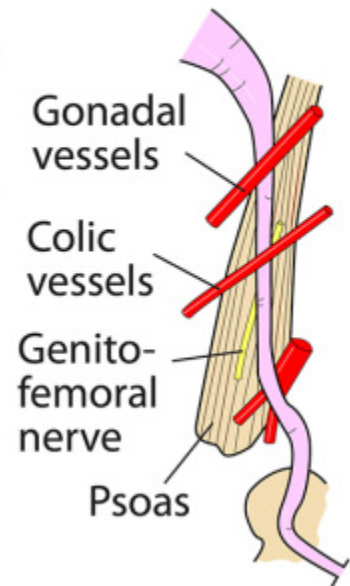
**Passes under:** Vas, uterine artery

**Related to:** Lateral fornix of vagina in females

**Blood supply:** Renal, gonadal, vesical. Smaller branches from aorta, common iliac & vaginal arteries

**Nerves:** General visceral afferents for pain & sympathetics probably for vasoconstriction only

**Points of potential hold up:** Pelviureteric junction, pelvic brim, ureterovesical junction



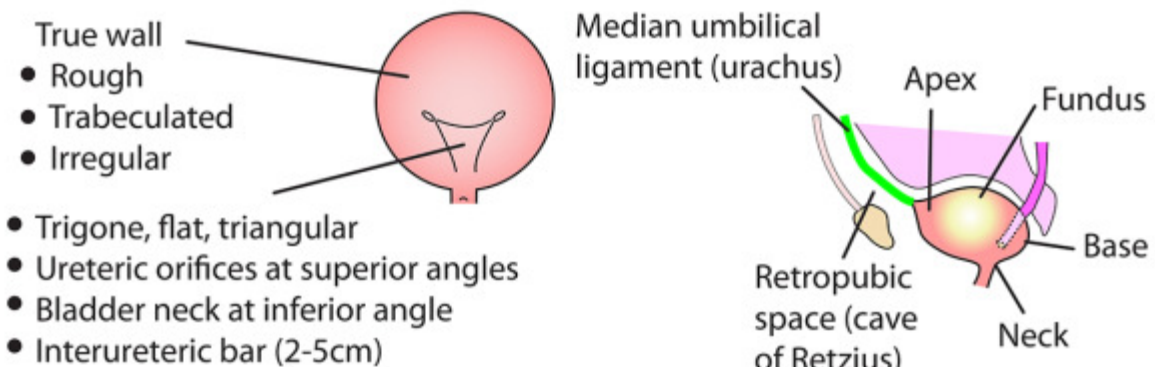
It is recognisable as it:

- Is the most superficial structure in the pelvis
- Shows peristalsis
- Sticks to the posterior surface of the peritoneum
- Passes around the pelvic brim to 1 cm short of the ischial spine then swings medially.
- Enters the bladder at the level of the pubic tubercle on a plain abdominal X-ray
- Right ureter may be irritated by an inflamed appendix
- Pain is referred to loin, groin & tip of penis

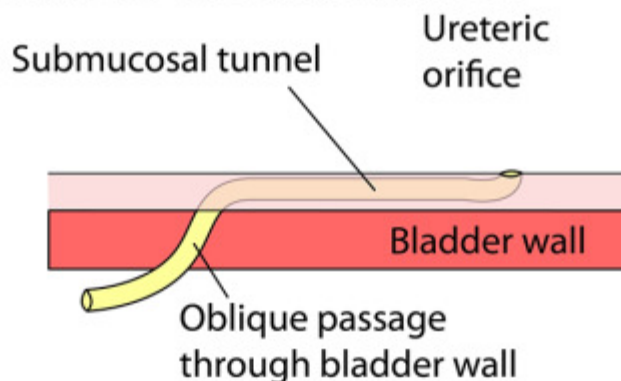


## BLADDER - GENERAL

- **Epithelium:** Transitional - Rubbery, watertight, lax, stretchy  
no glands
- **Muscle:** Whorls of smooth muscle - detrusor  
3 layers- Inner & outer longitudinal, middle circular
- **Arteries:** Superior/inferior vesical, obturator, inferior gluteal,  
uterine, vaginal
- **Veins:** Converge to vesicoprostatic plexus in males  
Converge to plexus at base of broad ligament in female  
Then to internal iliac
- **Lymphatics:** Internal & external nodes
- **Nerves:** Sympathetic (male only at bladder neck) closes bladder  
neck at ejaculation. Inhibitory, vasomotor, pain in both sexes  
Parasympathetic - motor to detrusor, sensory for full  
bladder, some pain, autonomic stretch reflex in infants,  
later modified by cortical inhibition



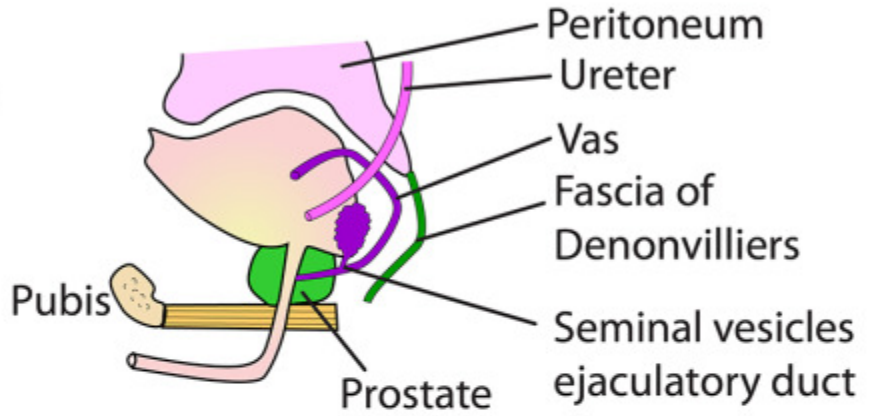
## URETEROVESICAL JUNCTION



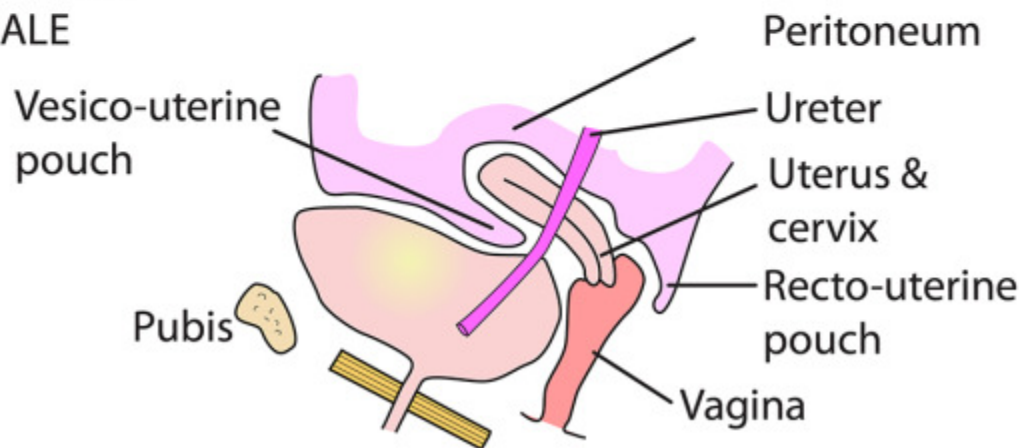
The ureter passes obliquely through the bladder wall then runs sub-mucosally for a distance that is 5 times the diameter of the ureter. This prevents vesico-ureteric reflux of urine

# BLADDER - RELATIONS

SAGITTAL VIEW  
OF MALE



SAGITTAL VIEW  
OF FEMALE



## SUPRARENAL (ADRENAL) GLANDS

- Medulla: Neural ectoderm
- Cortex: Mesoderm
- Lie: Outside Gerota's fascia
- Colour: Yellowy/brown
- Arteries: Suprarenal direct from aorta, Branches of inferior phrenic and renal
- Veins: Right short to inferior vena cava, left to renal
- Shape: Right pyramidal (hat-shaped)  
Left crescentic (cap-shaped)

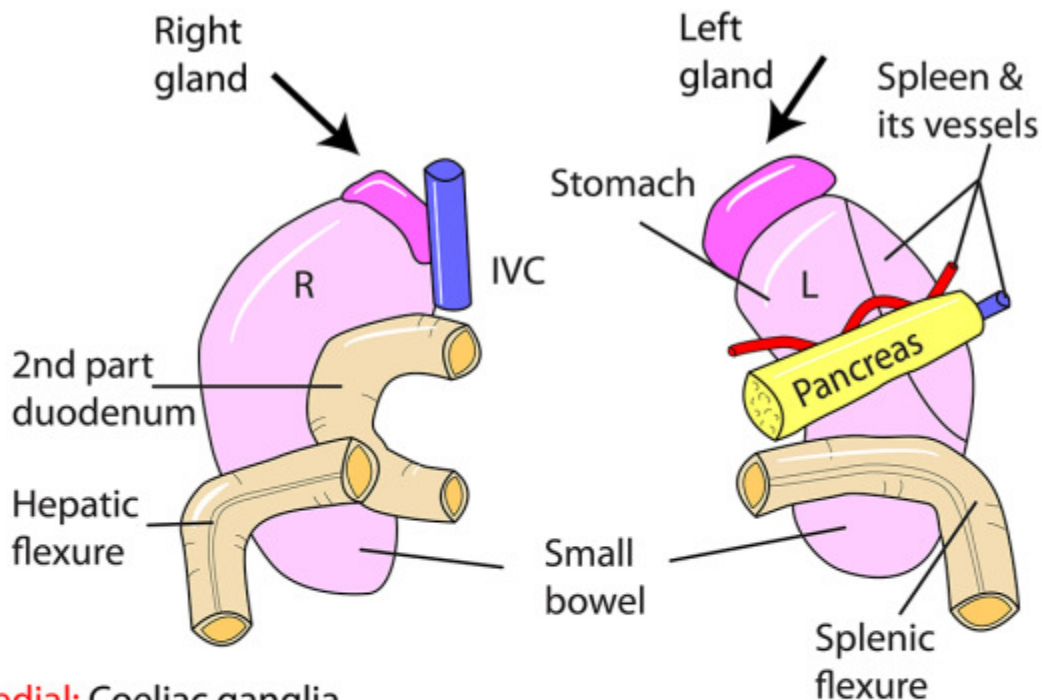
### RELATIONS

**Anterior:** Right lobe of liver  
Inferior vena cava

**Anterior:** Lesser sac  
Stomach

**Posterior:** Right crus of diaphragm

**Posterior:** Left crus of diaphragm



**Medial:** Coeliac ganglia  
Inferior phrenic  
arteries

**Note:** The short length of the right suprarenal vein can make it difficult to ligate it at surgery. The right gland is tucked up posterior to the inferior vena cava (see above)