



## Ultrasonography

المحاضرة الثالثة عشر / تشريح وفسلجه / قسم هندسة الاجهزة الطبية

الأستاذ الدكتور خيرى عبدالله

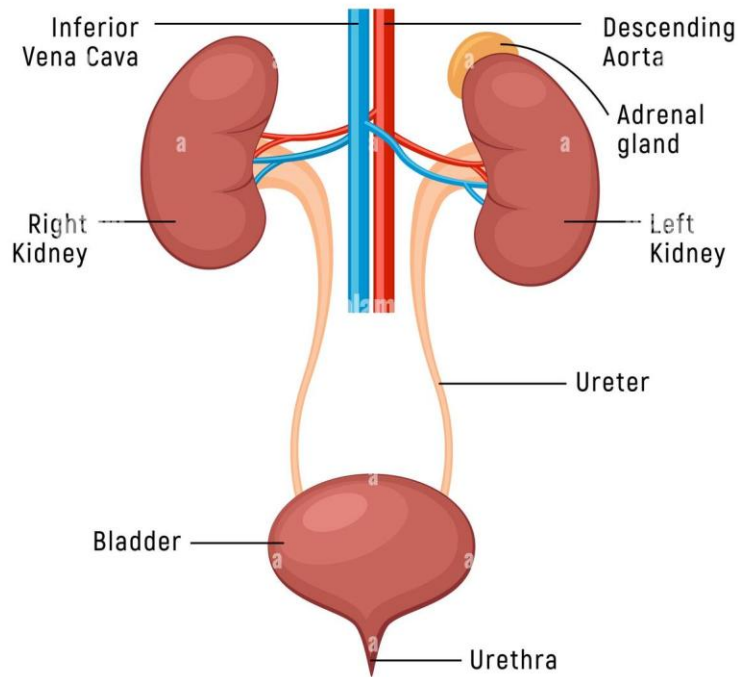
الجهاز البولي

## Urinary System / Renal System

Organs : Consist of the following organs :

Kidneys , Ureters , Urinary bladder , Urethra .

## Urinary System



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### Functions of Urinary system :

- 1 –Regulate blood volume due to eliminate waste products
- 2 – Regulate blood pressure
- 3 - Regulate the levels of electrolytes and metabolites and control Ph .
- 4 - Get rid of waste such as urea and uric Acid
- 5 - The urinary tract is the body drainage .

## **Kidneys : Anatomy**

**1 - Two reddish bean shaped about 12 cm in length with convex and concave border and surrounded by tough fibrous tissue ( renal capsule ) .**

**2 – Hilum of kidney present in concave border , it is the entrance of Blood supply of kidneys renal arteries and exit of renal veins ) .**

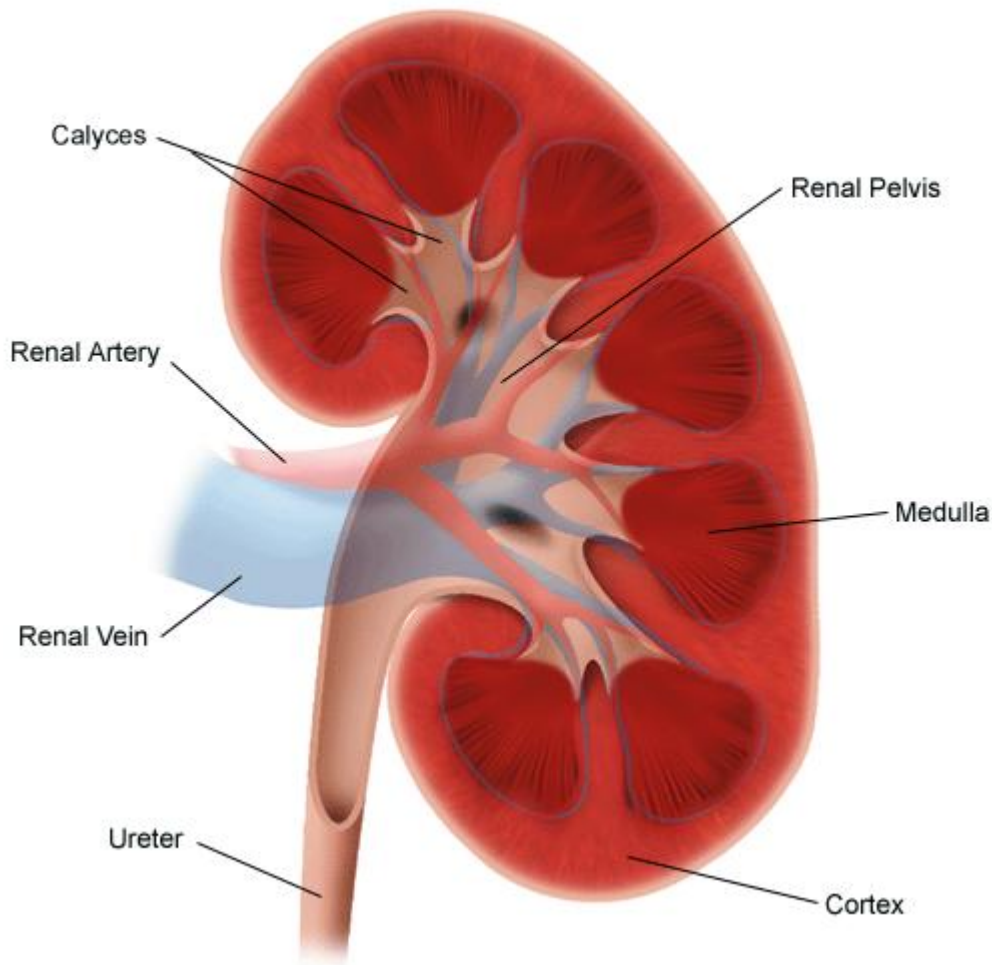
**3 - Cross section of kidney reveal from outside to inside , capsule , Cortex , Medulla , renal pelvis .**

**4 – Each kidney consists of functional units called nephrons about 1 million nephrons in each human kidney**

**5 – Each kidneys is attached to ureter , tubes made of smooth muscle fibers , these ureters connect urinary bladder down ward .**

**6 – Right kidney located lower than level of left kidney .**

## Anatomy of the Kidney



renal-capsule-seen  
under-light-260nw-13

## Physiology of Kidney :

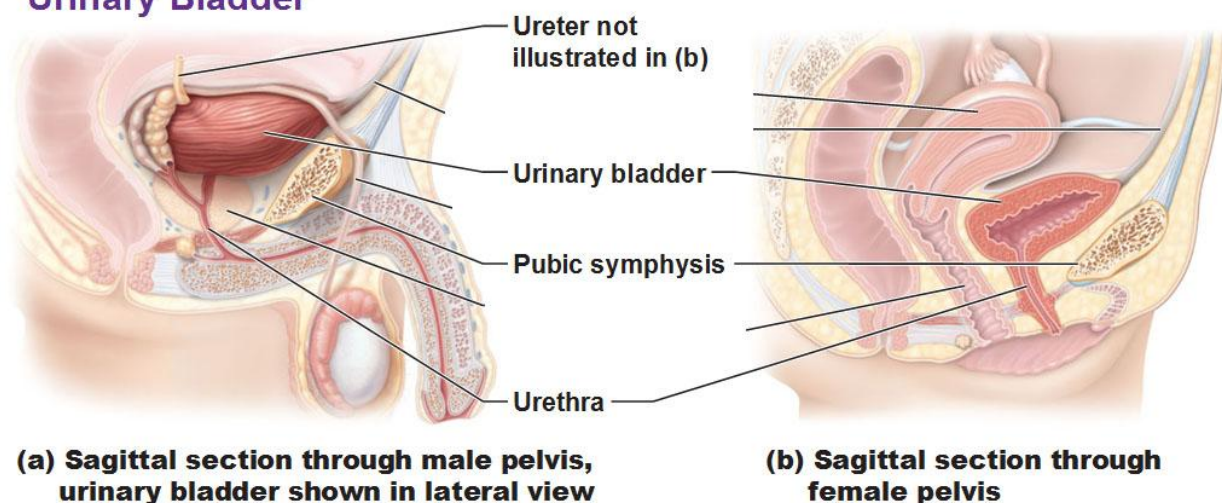
**1 – Nephrons are the functional unit of kidney .Each kidney contain 1 million nephron .**

**2 – Parts of nephron , glomerulus ( tuft + Bomann’s capsule) , proximal convoluted tubule , loop of Henli , distal convoluted tubule ,collecting tubules .**

3 – Filtration of urine occur in glomerulus , substances which reabsorbed are water , Sodium , bicarbonate , glucose , and amino acids while substances secreted , ammonium , potassium urea and uric acid .

urethra is much shorter than male urethra and terminate at the vaginal vestibule .

### Urinary Bladder



**Ureter** : Two long thin tubes connect kidney with urinary bladder , ureters have smooth muscles contract and relax forcing urine downward away from kidneys

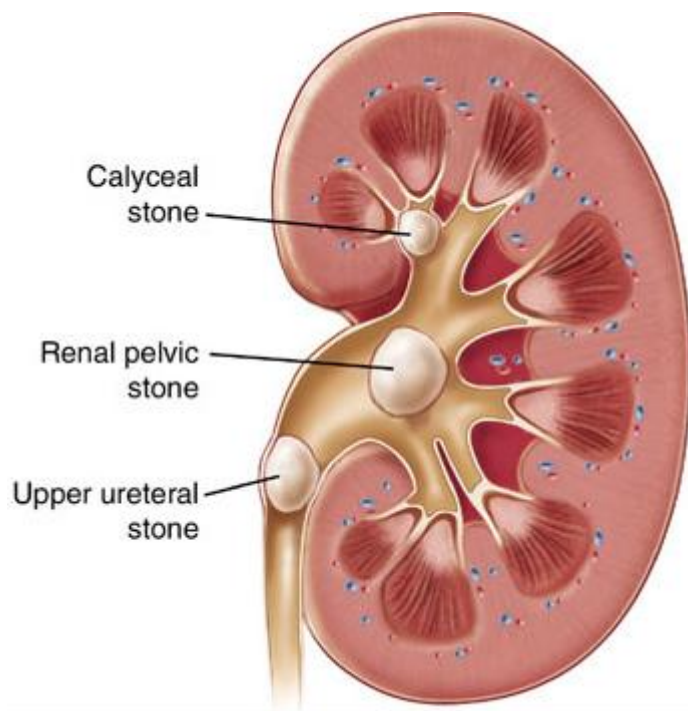
**Urinary bladder** : it is a hollow organ , situated at the base of pelvis . urinary bladder store urine from the kidney before disposal by urination . Urine enters the bladder via the ureters and exits via urethra . It is wall transitional epithelial tissue .

## Urethra :

It begins at the internal urethral orifice of the bladder continue and open at the external urethral orifice , in male urethra pass through prostate gland but in female .

Common disease of this System :

- 1 - Nephritis ( inflammation of kidney )
- 2 – Glomerulonephritis ( autoimmune disease )
- 3 - Urolethiasis ( renal stone ) .
- 4 - Hematuria ( blood in urine ) .
- 5 - Hyperplasia of Prostate ( retention of urine ) .
- 6 – Tumors



**Renal stone or renal calculi**

**Ultrasonography technique (Ultrasound instrument )  
called medical sonar used for diagnosis pregnancy , tumors  
, calculi .**



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