

URINARY SYSTEM

The urinary system includes

1. Kidneys
2. Ureters
3. Bladder
4. urethra.

Essential functions of the kidneys include:

A. Homeostasis via control of

1. Electrolyte and water balance
2. Plasma PH
3. Tissue osmolality
4. Blood pressure

B. Filtration and excretion of metabolic waste products

C. Endocrine activities

1. Regulate bone marrow erythropoiesis (erythropoietin)
2. Blood pressure (renin)
3. Calcium metabolism (activation of vitamin D).

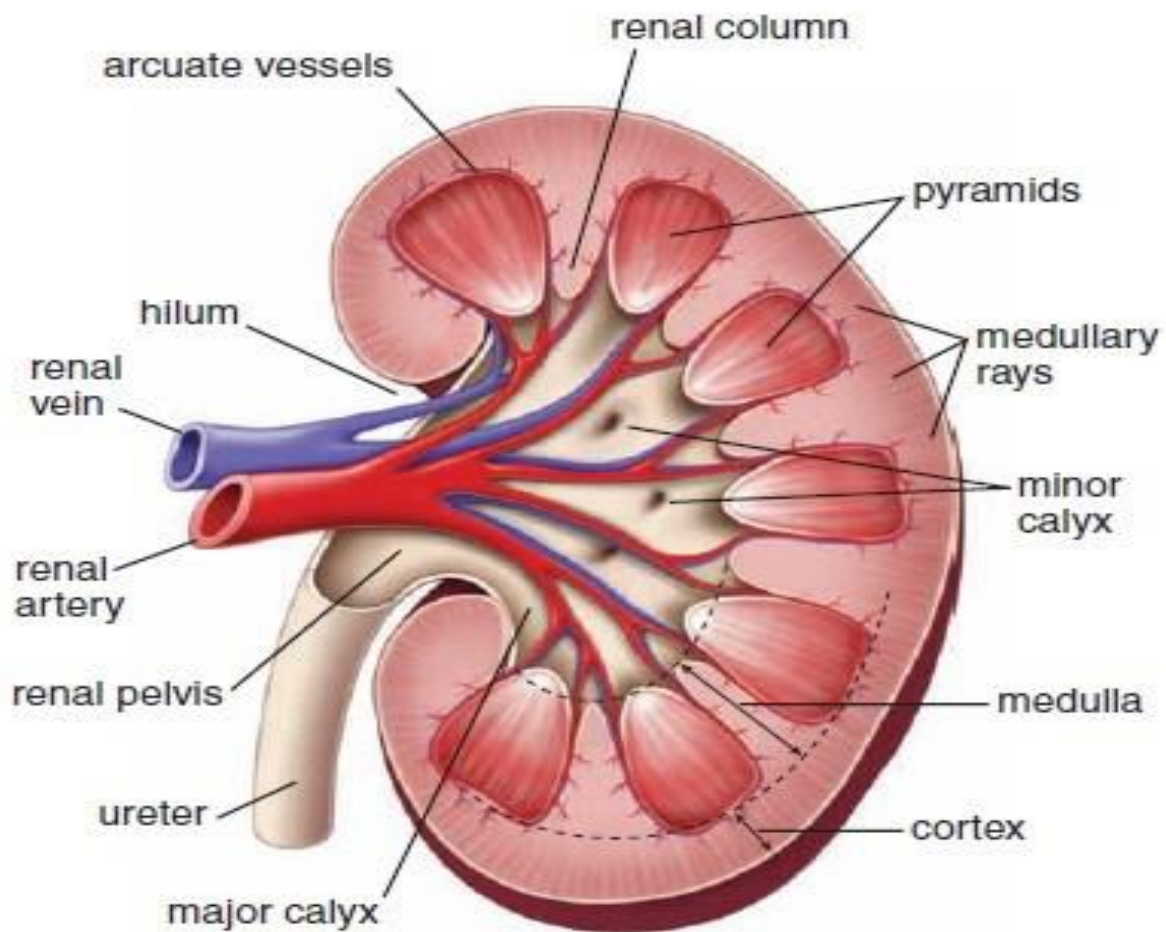
GENERAL STRUCTURE OF THE KIDNEY

1. Capsule: Each kidney is surrounded by connective tissue capsule

2. Inner medulla: which is divided into 8 to 12 renal **pyramids**.

3. Outer Cortex: characterized by renal corpuscles and their associated **convoluted and straight tubules**.

- ✓ Aggregation of straight tubules and collecting ducts in the cortex form the **medullary rays**.
- ✓ The cortex extends into the medulla to form **renal columns** that separate the renal pyramids from each other.
- ✓ A renal **lobe** includes the renal pyramid and its associated cortical tissue.
- ✓ The base of each renal **pyramid** faces the cortex and the apical portion (**papilla**) projects into the minor calyx, a branch of the **major calyx** that in turn is a division of the renal pelvis.
- ✓ At the **hilum**, the renal pelvis extends into the ureter, which carries urine into the urinary bladder.



Blood supply to kidney

- ✓ Each kidney receives blood from the **renal artery**, which branches into the **interlobar arteries** => **arcuate arteries** => **interlobular arteries** that supply the cortex.
- ✓ In the cortex, the interlobular artery gives off the **afferent arterioles** (one to each glomerulus), which give rise to the capillaries that form the glomerulus.

- ✓ The glomerular capillaries reunite to form a single **efferent arteriole** that, in turn, gives rise to a second network of capillaries, the **peritubular capillaries**.
- ✓ Some of the peritubular capillaries form long loops called the **vasa recta**, which accompany the thin segments of the nephrons.
- ✓ The peritubular capillaries drain into the **interlobular veins**
=> **arcuate veins** => **interlobar veins** => **renal vein**