

HUMAN ANATOMY & PHYSIOLOGY-II- BP201T**UNIT: 3 (Urinary System)****CLASS: 6****TOPIC: Anatomy of urinary tract**

Excretion is the process by which the unwanted substances and metabolic wastes are eliminated from the body. Although various organs are involved in removal of wastes from the body, their excretory capacity is limited. But renal system or urinary system has maximum excretory capacity and so it plays a major role in homeostasis.

Renal system includes:

1. A pair of kidneys
2. Ureters
3. Urinary bladder
4. Urethra.

Kidneys produce the urine. Ureters transport the urine to urinary bladder. Urinary bladder stores the urine until it is voided (emptied). Urine is voided from bladder through urethra.

Kidneys perform several vital functions besides formation of urine. By excreting urine, kidneys play the principal role in homeostasis.

Thus, the functions of kidney are:

1. ROLE IN HOMEOSTASIS
2. HEMOPOIETIC FUNCTION
3. ENDOCRINE FUNCTION
4. REGULATION OF BLOOD PRESSURE
5. REGULATION OF BLOOD CALCIUM LEVEL

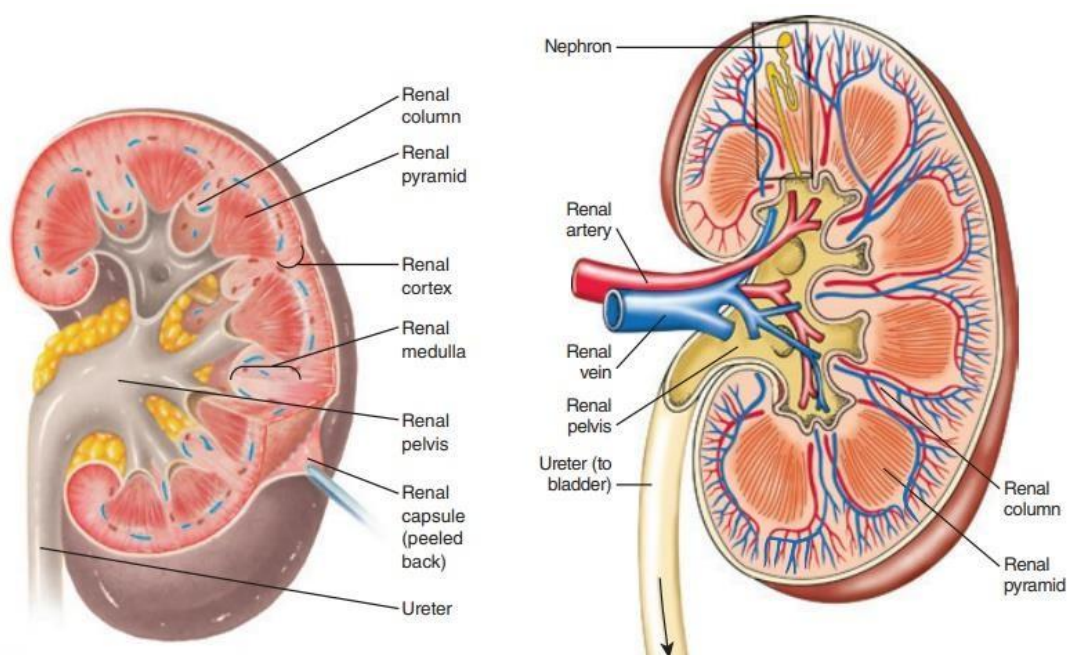
Kidney is a compound tubular gland covered by a connective tissue capsule. There is a depression on the medial border of kidney called hilum, through which renal artery, renal veins, nerves and ureter pass.

Kidneys are arranged in three layers: 1. Outer cortex 2. Inner medulla 3. Renal sinus

Cortex is dark and granular in appearance. It contains renal corpuscles and convoluted tubules. At intervals, cortical tissue penetrates medulla in the form of columns, which are called renal columns or columns of Bertini.

Medulla contains tubular and vascular structures arranged in parallel radial lines. Medullary mass is divided into 8 to 18 medullary or Malpighian pyramids. Broad base of each pyramid is in contact with cortex and the apex projects into minor calyx.

Renal sinus consists of the following structures: i. Upper expanded part of ureter called renal pelvis ii. Subdivisions of pelvis: 2 or 3 major calyces and about 8 minor calyces iii. Branches of nerves, arteries and tributaries of veins iv. Loose connective tissues and fat.



Nephron is defined as the structural and functional unit of kidney. Each kidney consists of 1 to 1.3 million of nephrons. The number of nephrons starts decreasing after about 45 to 50 years of age at the rate of 0.8% to 1% every year.

Each nephron is formed by two parts:

1. A blind end called renal corpuscle or Malpighian corpuscle
2. A tubular portion called renal tubule.

Renal corpuscle is situated in the cortex of the kidney either near the periphery or near the medulla. Function of the renal corpuscle is the filtration of blood which forms the first phase of urine formation.

Renal corpuscle is formed by two portions:

1. Glomerulus
2. Bowman capsule.

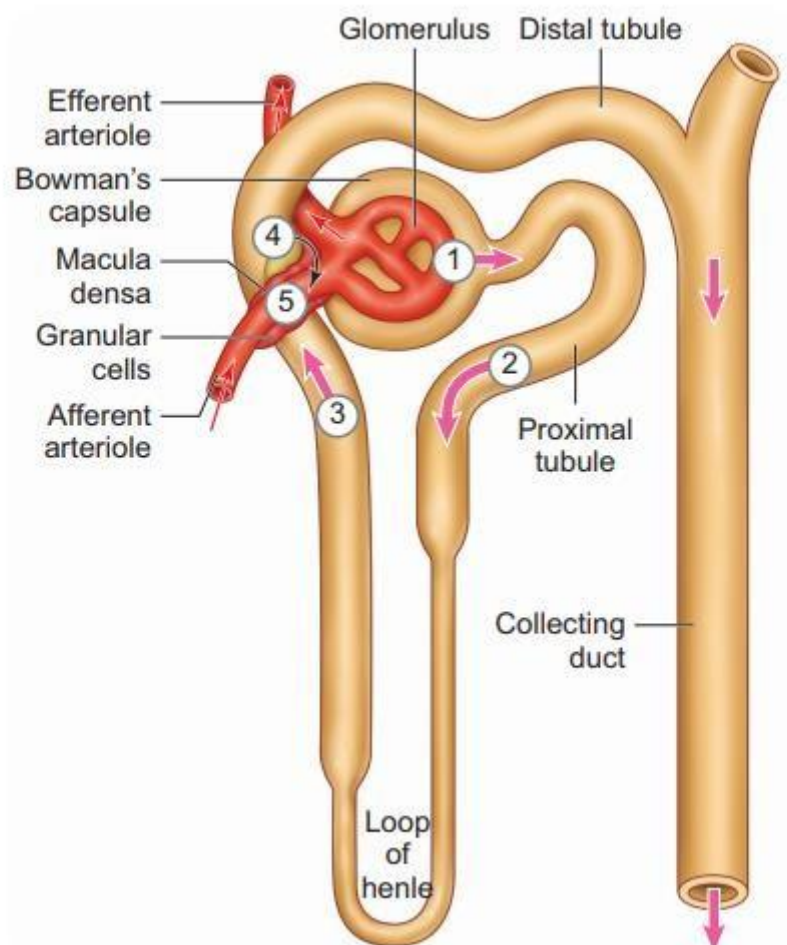
Glomerulus is a tuft of capillaries enclosed by Bowman capsule. It consists of glomerular capillaries interposed between afferent arteriole on one end and efferent arteriole on the other end. Thus, the vascular system in the glomerulus is purely arterial. Glomerular capillaries arise from the afferent arteriole. After entering the Bowman capsule, the afferent arteriole divides into 4 or 5 large capillaries.

Bowman capsule is a capsular structure, which encloses the glomerulus. It is formed by two layers:

- i. Inner visceral layer
- ii. Outer parietal layer.

Tubular portion of nephron is the continuation of Bowman capsule. It is made up of three parts:

1. Proximal convoluted tubule 2. Loop of Henle 3. Distal convoluted tubule.



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