

RENAL SYSTEM

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RENAL PHYSIOLOGY

The renal system is composed of two kidneys, two ureters and urinary bladder (Fig. 1).

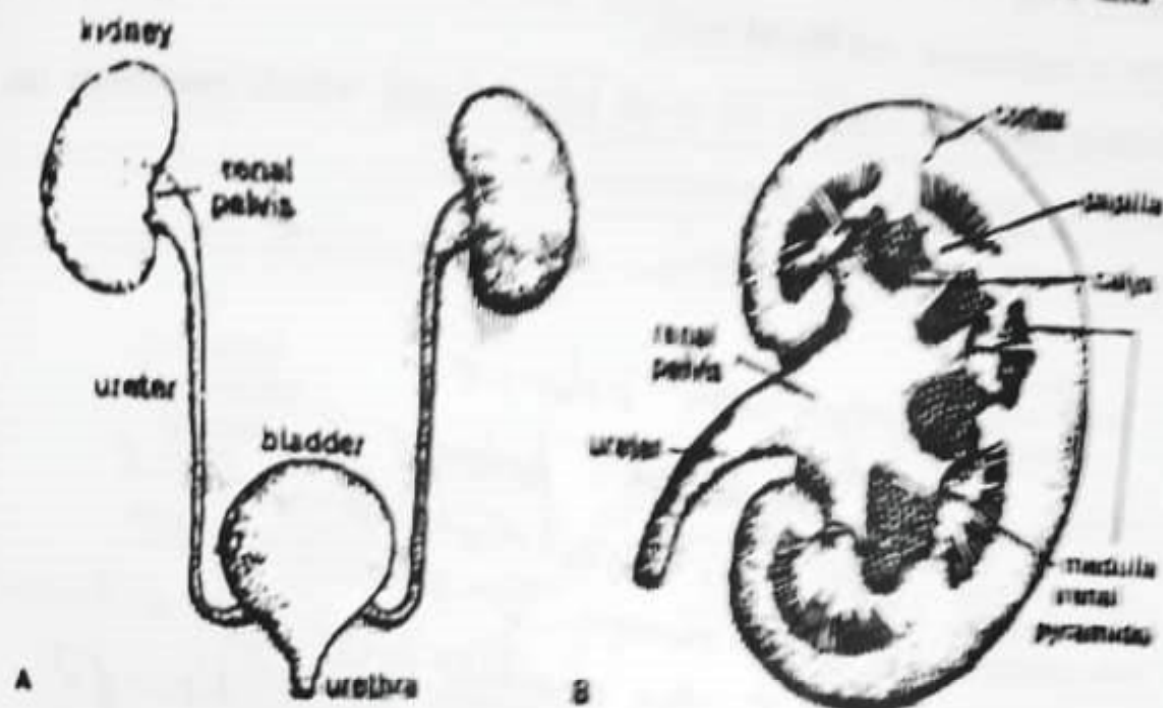


Fig. 1: [A] the urinary system; [B] section of a human kidney

Functions of the Kidney :

I. Homeostatic function :

The kidney keeps the internal environment constant through the formation of urine.

1. The kidney maintains water balance by excreting excess water.
2. The kidney maintains electrolyte balance by excreting excess inorganic ions (sodium, potassium, magnesium, calcium, chloride, etc.).
3. The kidney excretes excess acids or alkalis.
4. The kidney excretes waste products of metabolism as urea, uric acid and creatinine.
5. Urine contains the metabolic products of drugs and hormones.

II. Endocrine function :

1. The kidney secretes renin, which leads to the formation of angiotensin II

that regulates arterial blood pressure.

2. The kidney secretes erythropoietin hormone that stimulates the bone marrow to regenerate red blood cells.
3. The kidney converts vitamin D₃ to its active form, which promotes the absorption of calcium from the intestine.
4. The kidney secretes prostaglandins.

Physiologic anatomy of the kidney :

The main function of the kidney is the formation of urine. The fundamental unit for the formation of urine is the nephron (Fig. 2), and there are at least one million nephrons in each kidney.

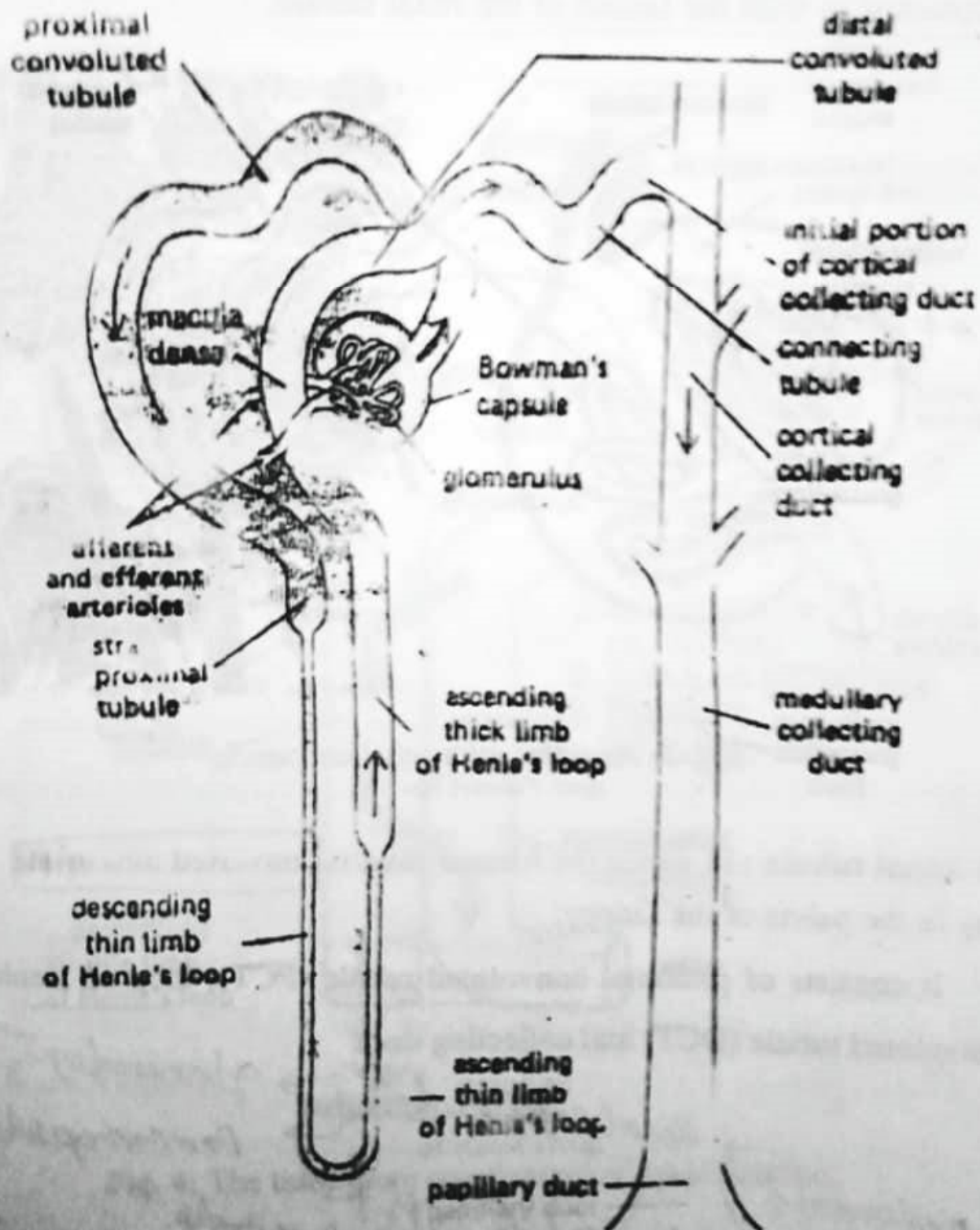


Fig. 2: Relationships of component parts of a nephron

The nephron consists of two main parts :

I) Renal corpuscle (Fig.3) : From which the fluids are filtered.

It is formed of :

a) The glomerulus : network of capillaries. Blood enters the glomerulus by afferent arteriole and leaves it by efferent arteriole.

b) Bowman's capsule : It is the dilated blind beginning of the nephron. It is continuous with the lumen of the renal tubule.

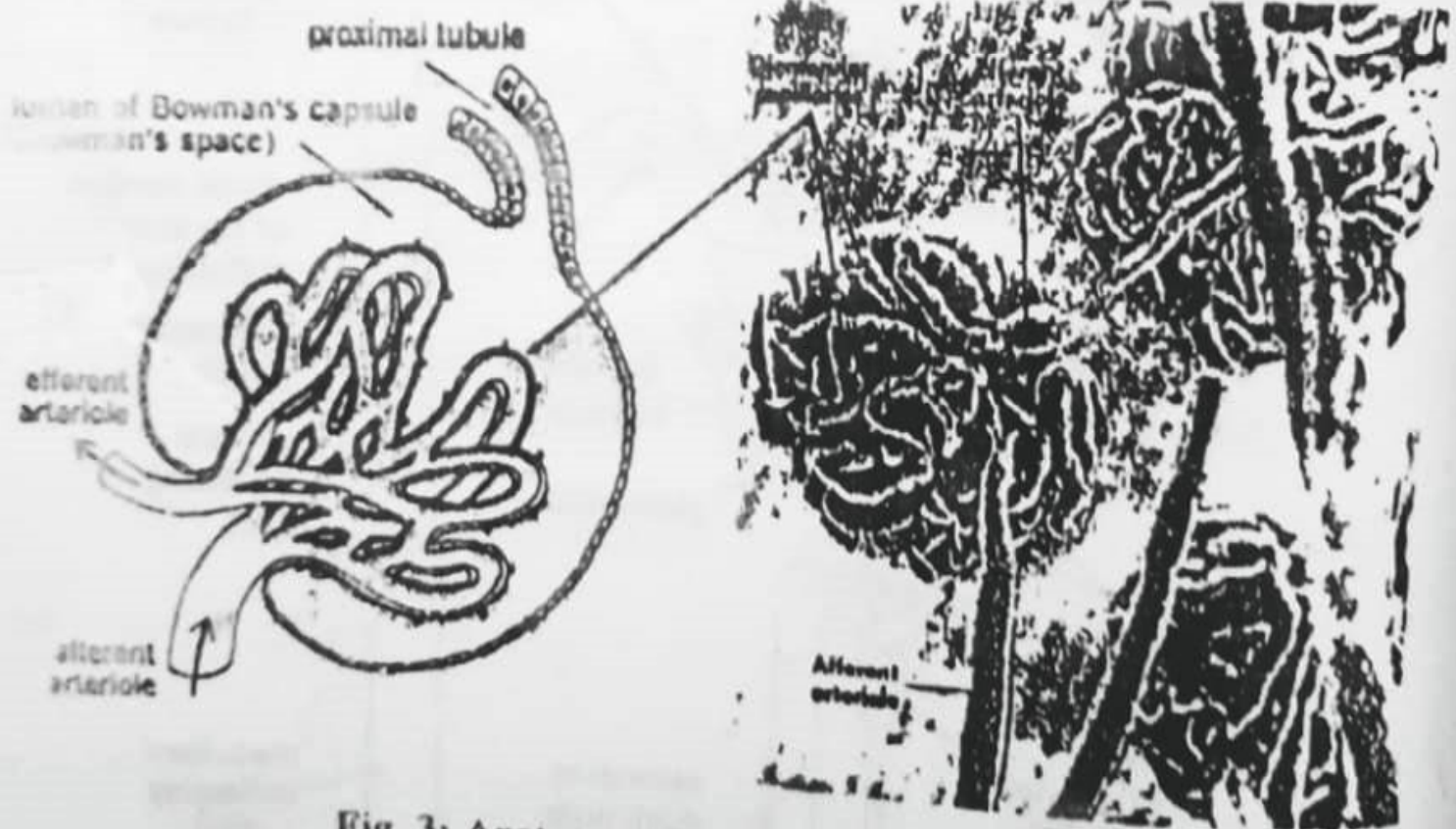


Fig. 3: Anatomy of a renal corpuscle

II) Renal tubule : in which the filtered fluid is converted into urine way to the pelvis of the kidney.

It consists of proximal convoluted tubule (PCT), loop of Henle distal convoluted tubule (DCT) and collecting duct.