

How urine is formed? Describe the role of kidney in excretion.

formation of Urine

Urine formation is a complex and multi-step biological process essential for removing waste material (nitrogenous waste) and maintaining internal environment. This process occurs within the nephron, the basic unit of kidney.

Steps of Urine formation

There are four different steps of urine formation

- 1) Glomerular filtration
- 2) Selective Reabsorption
- 3) Tubular secretion
- 4) Excretion

1) Glomerular filtration

Afferent Arteriole carries the blood into the Glomerulus under hydrostatic pressure. At Glomerulus the filtration of small molecules like water, salt, urea and glucose takes place into the Bowman's capsule, while large molecules

(Protein and blood cell) remains in the blood stream.

Selective Reabsorption

In the Proximal Convulated Tubule (PCT), essential nutrients (glucose, amino acids, water) are reabsorbed into blood through capillaries. While Loop of Henle manages water and salt reabsorption, crucial for concentrating urine.

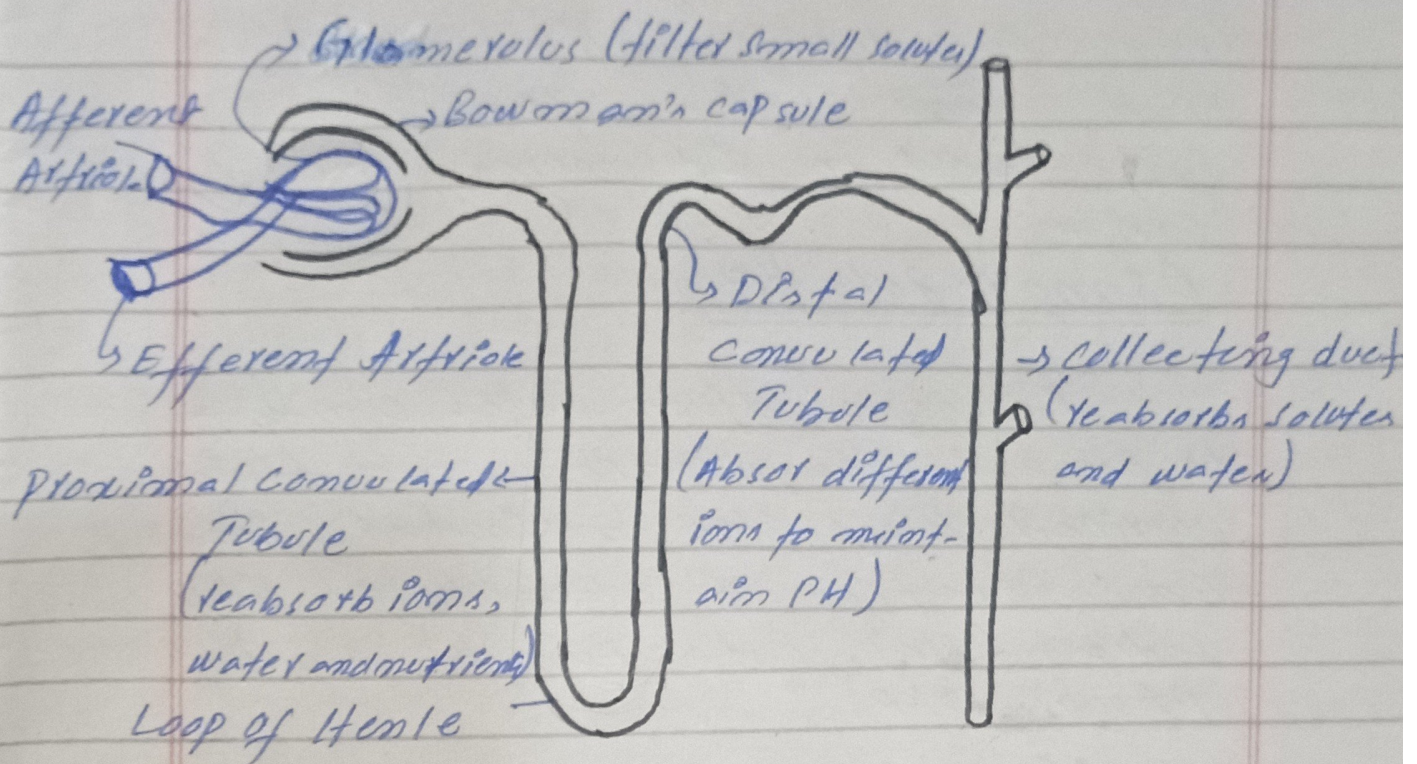
Tubular Secretion

Blood secretes additional ions, toxins and drugs into Distal Convulated Tubule and Collecting Duct. This step helps to regulate blood pH and maintain electrolyte balance.

Excretion

final urine mainly composed of water, urea and salt collects in collecting duct, flows into renal pelvis, passes down ureters to bladder, and excretes via urethra. urine accumulates in the urinary bladder, where it is retained for a brief period of time prior to excretion.

Formation of urine



Role of kidney in Excretion

Kidneys play a critical role in maintaining internal balance by filtering blood, maintaining ions and excreting wastes.

Filtration of blood

The Glomerulus filters about 180 liters of plasma daily. Removes nitrogenous wastes such as urea, uric acid, and creatinine from blood.

Formation of urine

The waste product removed

from blood during "filtration of blood" ~~and~~ water, urea and salts lead to the formation of urine.

Osmoregulation

Kidneys adjust water content to prevent dehydration and fluid overload. They also maintain ideal concentration of electrolytes like Sodium (Na), Potassium (K) and Phosphate (P).

Elimination of Toxins and Drugs

Kidneys break down the pharmacological substances and also excrete. And they also act with liver to detoxify the bloodstream.