FUNCTION OF THE TUBULES

Proximal Convoluted Tubule (PCT):

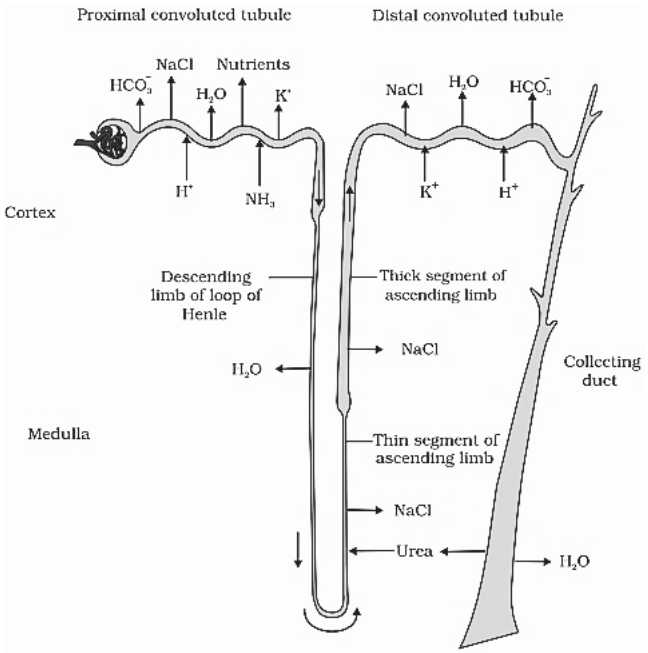
The PCT is lined with a simple cuboidal brush border epithelium, enhancing the surface area for reabsorption. This segment is responsible for the reabsorption of nearly all essential nutrients and 70-80 percent of electrolytes and water. Moreover, the PCT contributes to maintaining the pH and ionic balance of body fluids through the selective secretion of hydrogen ions, ammonia, and potassium ions into the filtrate, coupled with the absorption of HCO_3^- from it.

Henle's Loop:

The ascending limb of Henle's Loop exhibits minimal reabsorption. However, it plays a crucial role in sustaining the high osmolality of medullary interstitial fluid. The descending limb of the loop is permeable to water but largely impermeable to electrolytes, resulting in the concentration of the filtrate as it moves downward. Conversely, the ascending limb, while impermeable to water, actively or passively transports electrolytes. As a consequence, when the concentrated filtrate ascends, it undergoes dilution due to the passage of electrolytes into the medullary fluid.

Distal Convoluted Tubule (DCT):

The DCT is responsible for the conditional reabsorption of Na^+ and water. Additionally, it can reabsorb HCO_3^- and selectively secrete hydrogen and potassium ions and NH3 to preserve the pH and sodium-potassium balance in the blood.



Reabsorption and secretion of major substances at different parts of the nephron
(Arrows indicate direction of movement of materials.)

Collecting Duct:

Extending from the cortex of the kidney to the inner regions of the medulla, the collecting duct is a lengthy structure. This segment has the capability to reabsorb significant amounts of water, contributing to the production of concentrated urine. Additionally, the collecting duct permits the passage of small amounts of urea into the medullary interstitium, maintaining osmolarity. Its functions also include playing a pivotal role in preserving the pH and ionic balance of blood through the selective secretion of H^+ and K^+ ions.