Loop of Henle

The loop of Henle is a U-shaped tube in the middle of the nephron and mainly involved in water and salt absorption. It consists of a descending limb, which is permeable to water. This permeability is what leads to an in increase medulla tissue osmolarity as filtrate travels down the descending limb, where water is extracted from the loop. Water follows increasing salt gradients osmotically, moving out of the loop of Henle into surrounding renal cells. The vasa recta are a series of capillaries that maintain the salt concentration gradient, despite the continuous absorption of water and salts. In the ascending limb of the loop of Henle, sodium is reabsorbed through active transport, which uses ATP to bring sodium into the tissue. The filtrate becomes less concentrated in the ascending loop because of the large amount of salt reabsorbed into renal cells out of the loop of Henle. In addition to this, the ascending loop because it is impermeable to water, which also aids in making the filtrate less concentrated. The ascending limb leads to the distal tubule, which is the last major site of absorption in the nephron.

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Characteristics

Descending Limb

Down-arrow into tube

The descending limb is the part of the loop of Henle where filtrate travels from renal cortex tissue to renal medulla tissue. This part of the loop of Henle is very water permeable, meaning water freely exits from within the loop.

Water Follows Na+

Water-bottle Follows Salt-shaker

In addition to increased permeability, water is drawn out of the descending limb due to an osmotic gradient created from a higher sodium concentration in surrounding renal tissues.

Medullary Hypertonicity

Medusa and Hiker-tonic

The salt concentration of the medulla increases as filtrate travels further in the loop. When water exits the more proximal descending limb, solutes build in the remaining filtrate and contribute to medullary hypertonicity.

Increased Water Reabsorption

Up-arrow Water

Water is absorbed from the descending loop of Henle into the surrounding renal tissues, helping to increase the loop of Henle's medullary salt concentration.

Vasa Recta

Vase Erector-set

The vasa recta describes a series of capillaries maintaining the concentration gradient of renal tissue. These capillaries do so by transporting the sodium absorbed from the ascending limb back to the descending limb.

Na+ Reabsorbed Via Active Transport

Salt on ATP conveyor-belt

Sodium is reabsorbed into renal tissues in the ascending loop of Henle via active transport, in a process requiring ATP use.

Ascending Limb

Up-arrow Tube

The ascending limb of the loop of Henle moves filtrate toward the renal cortex tissue. It is more permeable to salts and impermeable to water than the descending limb.

Reabsorbs Na+, K+, Cl-

Salt-shaker, Banana and Chlorine-dispenser

Na+, K+ and Cl- are actively reabsorbed by the Na+/K+/2Cl- cotransporter into the renal tissues and bloodstream surrounding the Loop of Henle.

Decreased Concentration of Filtrate

Filtrate fluid turns from Dark yellow to Light yellow

The filtrate becomes less concentrated as it exits the loop of Henle as Na+, K+ and Cl- are actively reabsorbed into renal tissues and bloodstream.

Impermeable to Water

Impermeable-raincoat

The ascending limb of the loop of Henle is impermeable to water and leads to less concentrated filtrate through the loop.

Distal Tubule

Disco-ball Tube

The loop of Henle exits to the distal tubule: the last major site of absorption in the nephron.