Distal Tubule

The distal tubule is the part of the nephron between the loop of Henle and collecting duct system. It is the last area of nutrient absorption in the nephron, and is regulated by many endocrine hormones. This regulation allows for the body to respond to certain physiological conditions by absorbing more or less water and salts. One hormone that affects the distal tubule is aldosterone, which causes sodium reabsorption. It does so by activating the basolateral sodium-potassium pumps that pump three sodium ions out of the cell for every two potassium ions entering the cell. The net result is reabsorption of sodium ions. This allows the next segment in the nephron, the collecting duct, to more readily absorb water under the action of vasopressin. The distal tubule is also the site where parathyroid hormone orchestrates calcium reabsorption.

PLAY PICMONIC

Characteristics

Hormonally Regulated

Harmonica Referee

The distal tubule is regulated by many endocrine hormones that affect the reabsorption of solutes. These include aldosterone and parathyroid hormone.

Aldosterone Causes Na+ Reabsorption

Aldo-stereo throwing out Salt-shaker

Aldosterone increases sodium reabsorption by up-regulating and activating sodium-potassium pumps.

Na+ Reabsorbed Via Active Transport

Salt-shaker on ATP conveyor-belt

Sodium is reabsorbed through active transport via the sodium-potassium ATPase pumps. These sodium-potassium pumps create the gradients necessary for sodium to be absorbed through Na/Cl symport.

Water follows Na+

Water-bottle following Salt-shaker on conveyor belt

Water follows sodium concentration gradients through osmosis. Water flows from areas of low sodium concentrations to high sodium concentration. This is true throughout the entire nephron, though the distal tubule is relatively impermeable to water.

Parathyroid Hormone Causes Ca2+ Reabsorption

Parachute-thigh-droid Harmonica rescuing Cow

Parathyroid hormone increases calcium absorption in the distal tubule through a calcium-phosphorus regulation mechanism.

Leads to Collecting Duct

Leads to Collection Duck

The distal tubule leads to the collecting duct system, which is the last part of the nephron. This is an important site of water reabsorption under the action of vasopressin or ADH which increases the collecting duct's permeability to water.