Peptide and Ionic Modulation of Renal H^+-ATPases

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Cumulative evidence has demonstrated that chloride anions and guanylin peptides play important roles on cellular electrolyte homeostasis. Guanylin peptides are secreted by the gastrointestinal tract in response to salt ingestion, inducing Cl^- and water secretion, controlling the renal electrolyte homeostasis. Chloride ions moving along chloride channels act to dissipate the electrochemical gradient established by the electrogenic transport of H^+ ions performed by H^+-ATPase in cell membranes. In this talk it will be discussed how uroguanylin and Cl^- regulate the plasma membrane H^+-ATPase functional expression in renal distal cells involving a cGMP/PKG dependent pathway and the activation of chloride channels (CFTR and ClC-5) as a control mechanism of renal electrolyte homeostasis. Although the functional role of principal and intercalated cells has been established a long time ago, these recent findings highlight the key role of the H^+-ATPases on the molecular mechanism of the nephron electrolyte balance.

Key words: H^+-ATPase, uroguanylin, chloride, renal microperfusion, bicarbonate reabsorption

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