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Epithelial sodium channel (ENaC) (version 2019.4) in the IUPHAR/BPS Guide to Pharmacology Database

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Abstract

The epithelial sodium channels (ENaC) are located on the apical membrane of epithelial cells in the distal kidney tubules, lung, respiratory tract, male and female reproductive tracts, sweat and salivary glands, placenta, colon and some other organs [20, 11, 7]. In these epithelia, ENaC allows flow of Na^+ ions from the extracellular fluid in the lumen into the epithelial cell. Na^+ ions are then pumped out of the cytoplasm into the interstitial fluid by the Na^+/K^+ ATPase located on the basolateral membrane [39]. As Na^+ is one of the major electrolytes in the extracellular fluid (ECF), osmolarity change initiated by the Na^+ flow is accompanied by a flow of water accompanying Na^+ ions [6]. Thus, ENaC has a central role in the regulation of ECF volume and blood pressure, especially via its function in the kidney [25, 30]. The expression of ENaC subunits, hence its activity, is regulated by the renin-angotensin-aldosterone system, and other factors that are involved in electrolyte homeostasis [30, 1, 29]. In the respiratory tract and female reproductive tract large segments of the tracts are covered by multi-ciliated cells. In these cells ENaC has been shown to be located along the entire length of the cilia [14]. Cilial location greatly increases ENaC density per cell surface and allows ENaC to serve as a sensitive regulator of osmolarity of the periciliary fluid throughout the whole depth of the fluid bathing the cilia [14]. In contrast to ENaC, CFTR that is defective in cystic fibrosis is not located on non-cilial cell-surface [14]. Thus, ENaC function is also essential for the clearance of respiratory airways, transport of germ cells, fertilization, implantation and cell migration [14, 33]. ENaC has been recently localized in the germinal epithelium of the testis, Sertoli cells, spermatozoa, along the epididymis ducts, and smooth muscle cells [35, 36]. Evidence has been provided that rare mutations in ENaC are associated with female infertility [5].

Contents

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    - ENaC δ
      http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=740

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