The mechanism by which interleukin-1 beta reduces net fluid absorption from the rat colon.

Kreydiyyeh SI, Al-Sadi R.

Department of Biology, Faculty of Arts & Sciences, American University of Beirut, Beirut, Lebanon. Sawkreyd@aub.edu.lb

IL-1beta is suspected to be involved in the diarrhea that always accompanies inflammatory bowel disease. This work was aimed at studying the in vivo effect of IL-1beta on the net absorption of fluid, Na(+) and Cl(-) from the rat colon, and at delineating its mechanism of action. Rats were injected i.p. with IL-1beta (1 mug/kg body weight) and the colon was perfused, four hours later, with Krebs-Ringer buffer. Net fluid absorption was calculated as the difference between the total volume of the buffer infused and collected per cm(2) of perfused intestine. Chloride in both buffers was determined by titration according to Mohr's method and net Cl- absorption was calculated in the same way. IL-1beta reduced the net absorption of water and chloride. The cytokine also reduced the percentage recovery of the Na(+)-K(+) ATPase activity in crude homogenates of membranes from surface and crypt colonic cells as revealed by the determination of inorganic phosphate released. In addition IL-1beta decreased the protein expression of the Na(+)-K(+) pump and increased that of the NaKCl(2) symporter. It is concluded that IL-1beta has a dual effect: it inhibits the Na(+)-K(+) pump and consequently NaCl absorption, and up-regulates the NaKCl(2) transporter and increases Cl(-) secretion. The ultimate effect of the two processes is a net decrease in Na(+) and Cl(-) absorption and an increase in water retention in the colon leading to the observed diarrhea in inflammatory bowel disease.

PMID: 12231480 [PubMed - indexed for MEDLINE]