The FASEB Journal
www.fasebj.org

April 2009
The FASEB Journal vol. 23 no. 1 Supplement 796.26

Lipopolysaccharide (LPS) increases transepithelial sodium absorption in the guinea-pig trachea by increasing Na^+,K^+-ATPase activity

Michael Dodrill[1] **and Jeffrey S. Fedan**[2,1]

Author Affiliations

Abstract

Earlier, we reported that systemic LPS administration increases transepithelial potential difference (V_t) in the guinea-pig trachea. The increase in V_t was abolished by the epithelial sodium channel (ENaC) blocker, amiloride, and inhibited by the prostaglandin synthase inhibitor, indomethacin. Here, we hypothesized that LPS increases Na^+ absorption by increasing Na^+, K^+-ATPase activity. We investigated the effects of LPS on V_t using the isolated, perfused trachea preparation, which allows agents to be added to the luminal or the serosal surface. Eighteen hours after injection with LPS (4 mg/kg, ip), tracheas were removed, mounted on a holder, and perfused with Krebs solution. LPS increased basal V_t (−34.2 ± 6.1 mV) compared to control (−5.5 ± 1.8 mV, $P < 0.05$), consistent with increased cation absorption. Subsequently, apical amiloride (10 μM) reduced V_t to −4.5 ± 2.2 in controls and to −13.1 ± 2.9 in LPS-treated animals indicating increased flux of Na^+ across the apical membrane. The cation pore-forming antifungal, amphotericin B (7.5 μM apically) then increased V_t to −18.9 ± 2.7 in LPS-treated tracheas compared to −7.0 ± 2.1 in controls. V_t after apical permeabilization is the result of basolateral ion transport and represents the maximum capacity of Na^+, K^+-ATPase. We conclude that LPS increases Na^+ absorption, at least in part, via ENaC by increasing the activity of the Na^+, K^+-ATPase. Funded by NIOSH.