Abstract: The mechanism of increased chloride currents by inflammatory cytokine, interferon-gamma (IFN-γ), was investigated in cultured a human bronchial epithelial cell line (BEAS-2B) using cell-attached and inside-out patch configurations. The channel sensitive to chloride ion was activated by forskolin, an activator of adenylate cyclase, or 100 μM dibutyryl 5'-cyclic monophosphate in cell-attached configurations. The conductance of this channel was 40 ± 4 pS in symmetrical 150 mM chloride solution between membrane potentials of 0 to +50 mV, and this channel was blocked by 500 μM 4,4'-diisothiocyanatostilbene-2, 2'-disulfonic acid (DIDS), suggesting that this channel was an outwardly rectifying chloride channel (ORCC). Treatment of 10-1000 U/ml IFN-γ for 3 hours, but not IFN-α, significantly increased channel activities of ORCC, and this activation was observed at least 24 hours after treatment. Erythromycin, a macrolide antibiotic, at a concentration of 100 μM inhibited the activation of ORCC induced by IFN-γ. The findings of the present study indicate that increased mucus secretion during inflammation might be partly due to activation of chloride permeability by cytokine and erythromycin might improve oversecretion of mucus from bronchial epithelium by blocking ORCC. J. Med. Invest. 48 : 97-101, 2001

Keywords: chloride channel; epithelial cell; outwardly rectifying chloride channel, cystic fibrosis transmembrane conductance regulator
Isolation and culture of human bronchial epithelial cells

Electrical recording

Solutions and chemical

Data analysis

Characterization of the chloride channels
Effect of interferon-γ on epithelial chloride channels

Effect of erythromycin

The Journal of Medical Investigation Vol. 48 2001
a) Control

b) IFN-γ (100 U/ml)

c) + DIDS 500 μM

50 msec $\mid$ 3 pA

N. Ge et al. IFN-γ activates ORCC in BEAS-2B cells