In vitro effects of wood creosote on enterotoxin-induced secretion measured electrophysiologically in the rat jejunum and colon

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＜和文タイトル＞

電気生理学的に測定したラットの空腸および結腸における *In vitro* のエンテロトキシン誘発性分泌に及ぼす木クレオソートの影響

[Abstract]

Secretory diarrhea occurs when the balance between intestinal absorption and secretion is disturbed by excessive secretion caused by enterotoxins produced by the pathogen. Wood creosote has long been used as a traditional antidiarrheal remedy. The goal of our study was to extend our knowledge about the antisecretory action of wood creosote against *Escherichia coli* enterotoxin-induced secretion in the small intestine and colon. Experiments were performed in mucosal sheets of rat jejunum and colon which were stripped of the external muscle layers to eliminate interactions with smooth muscle activity and local blood flow. Mucosal sheets were placed in modified Ussing chambers and hypersecretory conditions were induced by heat-labile (LT) or heat-stable (STa) *E. coli* enterotoxins added cumulatively (0.01-10 μg/ml) to the mucosal bathing solution. Intestinal secretion was monitored electrophysiologically as transmucosal short circuit current (Isc). LT induced a concentration-dependent increase in Isc in the rat jejunum, with no effect in the colon. In contrast, STa induced a significant increase in colonic Isc, without causing any change in Isc across the jejunum. In separate experiments the effects of increasing concentrations of wood creosote (0.1-50 μg/ml), added to the mucosal or serosal bathing solution, were examined against the secretory responses induced by LT or STa. In the small intestine the antisecretory activity of wood creosote against LT-induced secretion was more potent following serosal application, whereas in the colon wood creosote inhibited STa-induced secretion with equal potency following either serosal or mucosal addition. In summary, our findings demonstrate that wood creosote possesses antidiarrheal activity suppressing *E. coli* enterotoxin-induced secretion in both the small intestine and colon.