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# Effects of Allicin on Electrogenic Ion Transports and Its Correlation with Contraction in the Colon

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Summary

Allicin, a main component of garlic, possesses a variety of beneficial pharmacological and therapeutic properties, including anti-carcinogenic, bactericidal, and intestinal regulatory effects. Although it is known to regulate intestinal contraction, its effect on intestinal ion transport is unclear. The aims of this study were (1) to examine the role of allicin in the regulation of electrogenic ion transport in the rat intestine by measuring transmural potential difference (ΔPD) with an Ussing chamber system and (2) to study the correlation between the effects of allicin on ion transport and intestinal peristalsis. Allicin (30 μM) induced significant positive ΔPD when administered to the serosal side of the colon and ileum. In experiment (1), allicin-induced increase in colonic ΔPD was mainly suppressed by bumetanide, an inhibitor of $Na^+$-$K^+$-$2Cl^-$ co-transporter (NKCC1). In addition, ΔPD induction by allicin was greatly diminished by 30 μM AP-18, an inhibitor of the TRP receptor TRPA1. In the ileum, removal of bicarbonate ion from the incubating solution completely suppressed allicin-induced increase in ΔPD. These results suggest that allicin mainly induces the electrogenic absorption of chloride ion in the rat colon via TRPA1 and the electrogenic absorption of bicarbonate ion in the ileum. In experiment (2), allicin induced significant ileal peristalsis, and this effect was suppressed when bicarbonate ion was removed from the incubation solution. These results suggest the possibility that allicin-induced ileal peristalsis depends on the extracellular bicarbonate ion electrogenically secreted in the ileum.