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Impairment and restoration of spontaneous contractile activity of longitudinal smooth muscles in the TNBS-inflamed hamster distal colon

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ABSTRACT

In the present study, we aimed to determine how inflammation affects spontaneous motility in the longitudinal direction of a hamster colon preparation. Trinitrobenzene sulfonic acid (TNBS) injected into the distal colon caused diarrhea 4-7 days after the treatment, but diarrhea was not observed in hamsters kept for 4 weeks. At 1 week after induction of colitis, spontaneous motility in the longitudinal direction was strongly suppressed. Contraction of longitudinal smooth muscles induced by electrical field stimulation was impaired, but not that induced by exogenously applied acetylcholine, indicating that acute inflammation preferentially impairs neurotransmissions with a minor effect on contractility of the longitudinal smooth muscle itself. The spontaneous motility reappeared in the colonic preparation isolated from the hamster maintained for 4 weeks after induction of colitis. The reappearance of the motility accompanied cholinergic and nitrergic regulations of contractile activity. These results demonstrated that impairment and following restoration of spontaneous contractile activity of longitudinal smooth muscles in the TNBS-inflamed distal colon of the hamster may depend on the damage and recovery of neural factors, rather than alteration of muscle contractility.

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