

Effects of NO on minute rhythm contraction and the activity of cellular K_{ATP} in isolated guinea-pig teania coli smooth muscle

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Abstract

AIM: The smooth muscles of guinea-pig taenia coli (GPTC) has myogenic rhythmic contraction (MMC). We observed that emodin could enhance MRC. NO is an inhibitory mediator of nonadrenergic noncholinergic (NANC) nerve. External NO could rapidly hyperpolarize the cellular membrane of gastrointestinal smooth muscle and relax muscle strips. In this paper, we studied the effects of NO on MRC and emodin action in GPTC, as well as the relationship between these effects and cellular K_{ATP} channel.

METHODS: Experimental preparations were isolated from GPTC. They were perfused by Krebs solution. The parameters of spontaneous MRC: Amplitude (CH) period (CP) and amplitude index (CHI) were detected NO was provided by sodium nitroprusside (NaNP).

RESULTS: (1) NaNP rapidly inhibited the MRC in GPTC in a dose dependent manner. Low concentration of NaNP (50 μmol/L) significantly decreased the CH of MRC ($P < 0.05$) and prolonged the CP of MRC ($P > 0.05$). Higher concentration of NaNP more markedly inhibited or eliminated the MRC. (2) Meb, an inhibitor of soluble guanylate cyclase, decreased the inhibitory effect of various concentration of NaNP on MRC. Glibenclamide (Gli, 10 μmol/L), an antagonist of K_{ATP} channel, significantly inhibited the action of NaNP on the MRC. The elimination of MRC induced by high concentration of NaNP could be partly reversed by Gli. (3) Emodin significantly enhanced the MRC in GTPC. Addition of NaNP remarkably inhibited the action of Emodin.

CONCLUSION: NO has significant inhibitory effect on the spontaneous MRC in GPTC. The enhancement of the activity of cellular K_{ATP} channel by NO might be through cGMP and/or other pathways of signal transduction.

Key words: NO; Minute rhythm contraction; Cellular K_{ATP}; Guinea-pig taenia coli

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