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The effect of Enteroaggregative escherichia coli (eaec) on 5-Hydroxytryptamine (5-HT), carbachol and electrical field stimulation (EFS)-induced contraction in the rat ileum

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EAEC, are important diarrhoeal pathogens, being the most common cause of watery, persistent and inflammatory diarrhoea (Okeke &Nataro, 2001). Several neurotransmitters such as 5-HT and substance P have been implicated in the pathogenesis of diarrhoea induced by cholera toxin and clostridium difficile toxin A (Farthing 2000). The aim of the present study was to investigate the effect of EAEC on 5-HT, carbachol and EFS-induced contraction in the rat ileum.

Ileal segments (1.5 cm length) taken from adult male Lister Hooded rats (250-270 g) were exposed for 3 hours to either vehicle or different strains of EAEC (non-pathogenic strain, MG; and 2 pathogenic strains 60A and 042). After 3 h, the segments were mounted in 10 ml organ baths containing Krebs' solution (37 ^{o}C, 95% O_2, 5% CO_2), and left under 1.0 g resting tension to equilibrate for 60 min and washed every 20 min. The contractions were recorded isometrically. Using a paired experimental design, the non-cumulative concentration-response curves to 5-HT and carbachol (10.0 nM - 30.0 μM) were established in separate tissues, using a 20 min drug cycle. In separate experiments, tissues were exposed to a 1 min EFS (1 and 10 Hz, 0.5 ms width, 30 V, double pulses). Tension changes were expressed as the mean ± s.e. mean of a control KCl (120 mM) induced contraction; n=5 and data were analysed using paired student's t-test.

5-HT and carbachol (10 nM - 30 μM) induced concentration dependent contractions. The contraction responses to 5-HT at concentrations < 10.0 μM were significantly ($p<0.05$) attenuated in tissues exposed to MG and 042. In addition, the contraction responses to 5-HT (30 nM- 30 μM) were significantly ($p<0.05$) reduced in tissues exposed to 60A as compared to the control tissues examined. The contraction responses to carbachol (0.3–30.0 μM) were significantly ($p<0.05$, $p<0.01$) attenuated in tissues exposed to 60A but not in tissues exposed to MG and 042. EFS (1 and 10 Hz) induced frequency related contractions which were attenuated by pre-exposure to 042 ($p<0.05$) but not to MG. Pre-exposure to 60A significantly ($p<0.01$) attenuated the responses to EFS at 10 Hz (Table 1).

Table 1. The effect of of EAEC strains MG, 60A and 042 on the contraction responses to EFS in the rat ileum.

	1 Hz	10Hz
Control	20.3±4.5	90.1.0±8.9
With MG	12.0±4.7	63.1±21.5
With 60A	12.3±2.2	54.1±5.4**
With 042	7.6±2.3 *	42.9±8.1**

The data suggest that EAEC may influence serotonergic and cholinergic mechanisms and the transmitters activated by EFS within the ileum.

References:

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