



MECHANISMS OF SPASMOLYTIC ACTIVITY OF ENTEROCIN

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ABSTRACT

Parasympathetic stimulation and histamine increases general gut activity. Parasympathetic nervous system, mediates its action in the gut by stimulation of muscarinic receptors and nicotinic receptors. Histamine causes contraction of smooth muscle of the alimentary tract. An antidiarrhoeal herbal formulation, Enterocin was tested on spontaneous contractions of isolated guinea pig ileum and contractions induced by acetyl choline, nicotine, and histamine in isolated guinea pig ileum. Enterocin decreased the spontaneous contractions of isolated guinea pig ileum and also inhibited the acetyl choline, nicotine and histamine induced contractions of isolated guinea pig ileum. It indicates that spasmolytic effect of Enterocin may be through ganglionic and histamine receptors but not through the muscarinic receptors.

KEYWORDS: Mebarid, muscarinic, ganglionic and histamine receptors.



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INTRODUCTION

Diarrhoea is the frequent passing of loose or liquid stools. Acute diarrhoea usually occurs suddenly and only lasts a short time. Chronic diarrhoea continues for a long period of time. Diarrhoea is often accompanied by wind, stomach pains, cramps, nausea, vomiting or a headache^{1, 2}. The most common cause is an infection of the intestines, such as gastroenteritis or food poisoning. Diarrhoea can be dangerous for babies and young children³. An antispasmodic is a drug that aims to control gut spasm. Antispasmodics help to give relief not only for spasm, but also for bloating and abdominal pain, and limit the movement of the intestines^{4, 5}. The present study was carried out to investigate the effect of Enterocin on spontaneous contractions of isolated guinea pig ileum and contractions induced by acetyl choline, nicotine, and histamine in the isolated guinea pig ileum.

MATERIALS AND METHODS

Drugs

i) Enterocin Syrup - Ayurlab Herbals (P) Ltd. ., ii) Acetylcholine - Sigma Chemicals Ltd. iii) Nicotine – Sigma Chemicals Ltd. iv) Histamine - Sigma Chemicals Ltd.

Composition of Enterocin

Each 4 ml of Enterocin contains i) Vidangphal (1250 mg), ii) Daruhaladi chaal (1000 mg), iii) Dhaiphool (500 mg), iv) Kuda chaal (500 mg), v) Shodhit geirik pashan (500 mg), vi) Mustamool (500 mg), vii) Lodhara chaal (500 mg), viii) Ativishmool (250 mg), ix) Soonthimool (250 mg), x) Saindhav (10 mg), xi) Sanchal (10 mg), xii) Syrup base (q.s.).

Animals

Guinea pigs (300 – 400 gm each) were obtained from VIPER, Pune. They were fed with commercially available standard feed. The animals were housed under standard condition. Water was provided ad libitum. The Institutional Animal Ethical Committee of Government College of Pharmacy, Aurangabad, Maharashtra, India

(GCPA/IAEC/2011/235,11/03/2011), approved the study.

Effect of Enterocin on stimulant effect of Acetyl choline, Nicotine and Histamine in isolated guinea pig ileum.

Guinea pigs were killed by a cervical blow using an iron rod. The abdomen was opened and a piece of ileum was removed, cleaned and placed in a petri dish containing Tyrode solution. The perfusion fluid in petri dish was aerated and debris inside the lumen was washed gently with pipette. Length of ileum was kept 2 cm. Two threads were tied to the upper and lower portion of the gut. The thread tied to the lower portion was attached to the hook of the air-delivery tube inside the bottom of the chamber, in a water jacketed organ bath containing 10 ml Tyrode solution (composition in mM: NaCl 136.89, KCl 2.68, MgCl₂ 1.05. CaCl₂ 1.36, NaH₂PO₄ 0.32, NaHCO₃ 11.90 and glucose 5.55) and the thread tied to the upper portion of gut was attached to the force displacement transducer. Tissues were mounted under an initial load of 0.5 g and allowed to equilibrate for 30 min. before the addition of any drug. The experiments were performed at 37 °C and bubbled with a mixture of 95% oxygen and 5% carbon dioxide. Normal rhythmic motility was recorded on a student's physiograph (Bio-Device, Ambala – 134003)^{6, 7, 8}. The effect of Enterocin (0.2 ml/ml) was tested on spontaneous contractions of guinea pig ileum induced by acetyl choline (1µM), nicotine (2 µg/ml) and histamine (1µg/ml).

Statistics

The results of all experiments were reported as mean ± S.E.M. Statistical analysis was carried out using Student's 't'-test. A level of significance of P < 0.05 was regarded as statistically significant.

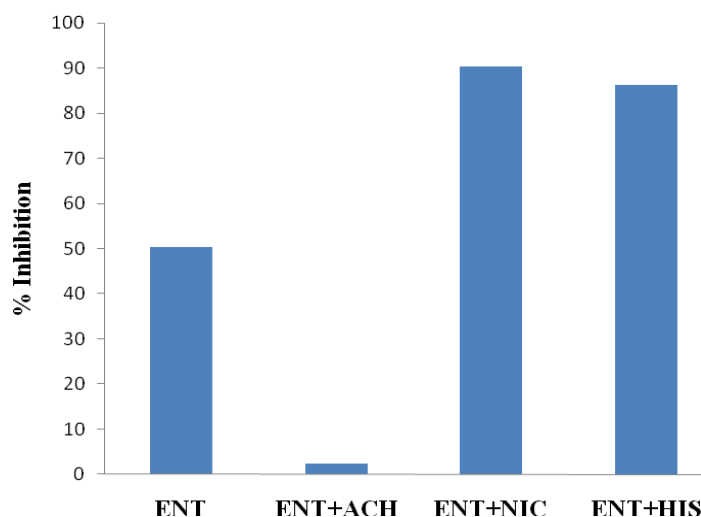
RESULTS

Effect of Enterocin on stimulant effect of Acetyl choline, Nicotine and Histamine in isolated guinea pig ileum.

Enterocin (0.2 ml/ml) produced relaxation of guinea pig ileum by 50.31%. Stimulant effect induced by acetyl choline (1 μ M) on isolated guinea pig ileum was not significantly changed by Enterocin (0.2 ml/ml). But Enterocin (0.2

ml/ml) decreased stimulant effect of nicotine (2 μ g/ml) and histamine (1 μ g/ml) on isolated guinea pig ileum by 90.27% and 86.30%, respectively as shown in graph 1.

Graph 1
Effect of Enterocin with Acetyl choline, Nicotine and Histamine on guinea pig ileum



The 'X' axis represents the dose of the drug and The 'Y' axis represents percent inhibition of contraction of guinea pig ileum. ENT - Enterocin (0.2 ml/ml), ACH - Acetyl choline (1 μ M), NIC - Nicotine (2 μ g/ml), HIS - Histamine (1 μ g/ml).

DISCUSSION

Gut function is controlled by the enteric (intestinal) nervous system and central nervous system^{9, 10}. The gastrointestinal motor tone is regulated through multiple physiological mediators by acting on muscarinic receptors, ganglionic receptors, histamine receptors. Acetyl choline produces its stimulant effect on gastrointestinal tract through muscarinic receptors while nicotine produces a stimulant effect via nicotinic receptors (ganglionic

receptors) in gastrointestinal tract^{11, 12}. Histamine causes contraction of smooth muscle of the alimentary tract and stimulates the secretion of gastric juice^{13, 14, 15}. Enterocin produced the relaxation of guinea pig ileum. Relaxation of guinea pig ileum by Enterocin may be produced by blocking of ganglionic and histamine receptors but not the muscarinic blocking.

CONCLUSION

Antidiarrhoeal and spasmolytic effect of Enterocin an herbal formulation may be mediated through ganglionic and histamine receptors but not through the muscarinic receptors.

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