nificantly the ulceration by pylorus ligation (Table 2). Propranolol 20, 50 mg/kg slightly reduced the secretory volume and peptic activity but increased the acidity. From these results, we confirmed that propranolol has a strong anti-ulcer property, probably because of the inhibition of gastric motility and peptic activity. However, we cannot neglect the participation of the essential effect of propranolol as a beta-receptor blocking agent on the blood vessels of the stomach. Now, we are studying the effect of other beta-blocking agents on the gastric ulceration.

REFERENCES


MECHANICAL RESPONSE OF GUINEA PIG TAENIA COLI IN HIGH-K/Na-DEFICIENT MEDIUM UNDER ANOXIA

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For investigation of the properties of smooth muscle contraction hypertonically added 40 mm K medium has been used as a routine in this laboratory. Others have used isotonic high K/Na deficient medium for the same purpose.

The distinct difference existing between the mechanical response of guinea pig taenia coli in hyper-40 K medium and that in iso-152 K medium has been reported earlier. The response in hyper-40 K medium consisted of a phasic and a tonic phase (1). The tonic response in hyper-40 K medium at a steady level was very much higher than that in iso-152 K medium (2). The tissue calcium in hyper-40 K medium increased considerably above control levels while that in iso-152 K medium decreased sharply below control levels (2). The \(^4\)Ca uptake of the fraction which did not exchange within 4 minutes in hyper-40 K medium was also considerably above control while that in iso-152 K medium was not above control (2).

The tonic response in hyper-40 K medium has been found to be abolished by factors suppressing sodium transport mechanism or aerobic breakdown of carbohydrates (3), but the nature of this response in iso-152 K medium has not been studied. This small contracture was therefore investigated.

Strips of taenia coli isolated from white male guinea pigs were suspended in an organ bath containing Tyrode solution of the following composition (mm): NaCl 136.8, KCl 2.7, CaCl\(_2\) 2.5, MgCl\(_2\) 1.0, Na\(_2\)HPO\(_4\) 0.4, NaHCO\(_3\) 11.9 and glucose 5.5, saturated with 95% O\(_2\) and 5% CO\(_2\) mixture at 37°C. Iso-152 K medium was prepared by substituting all sodium ions of normal Tyrode solution by potassium ions. Hyper-40 K medium was prepared by the addition of KCl crystals to normal Tyrode solution to give a final concentration of 42.7 mm K. Tension changes were recorded isometrically with mechanoelectro-transducer.

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The mechanical response in both media has been known to be dependent on calcium in the external medium. The method employed was to produce the small contracture in iso-152 K medium, abolish it by the removal of calcium and then to reproduce it by the addition of calcium to the medium. Using factors inhibiting sodium transport e.g. ouabain and lithium substitution, inhibitors of aerobic metabolism like KCN and anoxia, inhibitors of anaerobic glycolysis like iodoacetic acid (IAA) and deoxyglucose, and inhibitors of both aerobic and anaerobic metabolism like glucose removal and 2,4-dinitrophenol (DNP), this tonic response was found to be produced under both aerobic and anaerobic conditions as long as substrate was available but was abolished when both aerobic and anaerobic metabolism were suppressed. However, a phasic contraction of about 1-2 g tension remained. Based on this finding, the calcium contracture in iso-152 K medium is assumed to be composed of a phasic and a tonic phase. These results are summarized in Table 1.

From the above it could be seen that although the tonic response in hyper-40 K medium is dependent on sodium transport and aerobic breakdown of carbohydrates, the tonic response in iso-152 K medium is unaffected by a sodium transport inhibitor and is not solely dependent on aerobic breakdown of carbohydrates. It was also noted that the phasic response in both media was not effected by any of the above factors other than calcium.

It was concluded that the differences between the mechanical response of the guinea pig taenia coli in the two media lies not only in the tension developed and calcium movement but also in the quality and probably the quantity of energy utilization for the maintenance of the tonic response.

REFERENCES