

LETTERS TO THE EDITOR

The Electrically Stimulated Circular Muscle Strip of the Rabbit Ileum

SIR,—The circular muscle strip of the guinea-pig ileum is insensitive to acetylcholine, compared with a longitudinal muscle strip under identical experimental conditions, and is wholly insensitive to histamine, 5-hydroxytryptamine and nicotine. After cholinesterase inhibition the response to acetylcholine is greatly potentiated and the preparation becomes responsive to histamine, 5-hydroxytryptamine and nicotine (Harry, 1963). I have found that the circular muscle strip of the rabbit ileum will respond invariably only to carbachol (from 100 $\mu\text{g./ml.}$), but not to acetylcholine, methacholine, histamine, 5-hydroxytryptamine or nicotine. It has not been found possible to change this pattern by inhibiting cholinesterase in the preparation with mipafox.

However, circular muscle strips from the rabbit ileum can be made to respond regularly by applying transmural square wave electrical stimulation (Paton, 1955) from a Multitone stimulator at supramaximal voltage (usually 80–90 V), 0.3 msec. duration and a frequency of 50/sec. for 15 sec. not more frequently than once every 10 min. The electrodes consist of two vertical, parallel platinum wires fixed one on either side of a perspex channel with the muscle strip between the wires (Birmingham and Wilson, 1963). The response to stimulation, which consisted of a large twitch followed by a gradual diminution in the height of contraction, developed after a latent period of at least 5 sec. and in some preparations did not develop until stimulation had ceased. Such responses could be elicited for more than 6 hr.

The pulse width of stimulation used in these experiments was indicative of the activation of a nervous mechanism in the tissue. This was confirmed by the use of procaine or lignocaine which consistently abolished the response to transmural stimulation in concentrations which did not reduce the response of the muscle to carbachol. This inhibition could be reversed by washing the preparation for 1 hr. If, in the presence of lignocaine or procaine, the parameters of stimulation were increased to 120 V and 10 msec., at the same frequency as before, then the preparation responded with a maintained contracture of immediate onset. This response, attributed to direct stimulation of the muscle cells was not affected by concentrations of local anaesthetic ten times or more in excess of that required to abolish the nervous response.

The exact nature of the nervous response is under investigation, but the results so far obtained suggest that it may be mediated by acetylcholine.

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REFERENCES

- Birmingham, A. T. and Wilson, A. B. (1963). *Brit. J. Pharmacol.* (in press).
Harry, J. (1963). *Ibid.*, **20**, 399–417.
Paton, W. D. M. (1955). *J. Physiol.*, **127**, 40–41P.