longitudinal muscle myenteric plexus. An almost complete disappearance of NA was obtained with extrinsic denervation. Reserpine (0·05 mg/kg) reduced, by about 80%, the NA content of both ileum and colon. Less than 0·2 μg/g of 5-HT were found in the longitudinal muscle-myenteric plexus of the ileum. Large amounts of 5-HT were found in the circular muscle-submucosa-mucosa. Its concentration decreases steadily from duodenum to rectum. 5-HT content of the ileum was not significantly affected by extrinsic denervation, nor by reserpine (0·05 mg/kg). Decrease of 5-HT was obtained with a higher dose of reserpine (1 mg/kg). Dopamine (DA) was found in concentrations 10–15% those of NA, which suggests that DA is mainly a precursor of NA.

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Depolarization and neuromuscular block in the rat

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The remarkable difference in sensitivity to decamethonium as a neuromuscular blocking agent between species is well known. In the cat which is particularly sensitive, neuromuscular block is produced by a maintained depolarization (Burns & Paton, 1951). However, rat muscles are particularly insensitive (Paton & Zaimis, 1949) and the characteristics of the paralysis *in vivo* (Derkx, Bonta & Lagendijk, 1971) and *in vitro* (Galindo, 1971) indicate that end-plate depolarization may not be the cause of the block.

In this study, isometric contractions of the rat diaphragm *in vitro* were recorded in response to nerve stimulation and the time course of neuromuscular block measured over a range of concentrations of decamethonium. In parallel experiments changes in potential in response to decamethonium were recorded from the end-plate region by means of external electrodes (Lu, 1970) and log dose-response curves obtained. Depolarization was found to occur at relatively low doses with a median effective dose of 4·7 μM. In contrast neuromuscular block required considerably larger doses.

A concentration of 50 μM decamethonium produced a depolarization which was 94–100% of maximal. In parallel experiments this dose produced no sign of neuromuscular block within the first hour. A higher concentration (100 μM) produced complete depolarization which declined within minutes to a residual value while several hours were required to produce complete paralysis. Progressively larger concentrations while producing no greater depolarization caused complete paralysis within minutes. Since both the time course and the concentration required for depolarization are so distinct from those required for neuromuscular block it appears that neuromuscular block by decamethonium in rat muscle *in vitro*, is not the result of a prolonged postsynaptic depolarization.

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Specificity of adenosine on transmitter output at the neuromuscular junction

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It has recently been found that the amount of transmitter released from the phrenic nerve of the rat, as measured by the ratio of the amplitude of evoked to spontaneous end-plate potentials, is reduced in the presence of adenosine, in a concentration of 0·025 mM or above (Ginsborg & Hirst, 1972). Investigations have now been made of the effects of a number of substances which might be expected to share some of the pharmacological properties of adenosine (see Burnstock, 1972). Of these only 5′-adenosine monophosphate (5′-AMP) shared the action of adenosine. The remainder, adenine, inosine, guanosine, cystine and uridine, in concentrations of up to at least 1 mM, did not reduce either the quantal content of end-plate potentials or alternatively the twitch tension of indirectly stimulated rat diaphragms bathed in high Mg^{2+}/low Ca^{2+} solutions: they were thus presumably without effect on transmitter release.

The interest in these results is related to the fact that adenosine and 5′-AMP are known to increase cyclic 3′,5′-adenosine monophosphate (cyclic AMP) in central nervous tissue whereas the remaining substances tested in these experiments are known not to have this effect (Sattin & Rall, 1970). The possibility that cyclic AMP is involved in the effect of adenosine on transmitter release or that the effect of adenosine on transmitter release and cyclic AMP have a common step cannot yet be rejected.

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Bicuculline and frog spinal neurones

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Bicuculline has been reported to antagonize selectively the inhibitory effect of γ-aminobutyric acid (GABA) on mammalian spinal neurones (Curtis, Duggan, Felix & Johnston, 1970). Both GABA and glycine depress ventral root responses to dorsal root stimulation in amphibian spinal cord (Curtis, Phillis & Watkins, 1961). In the present experiments some preliminary attempts have been made to see whether these effects show a differential sensitivity to bicuculline.