with chloroform and then in the same direction with chloroform/acetone, 97/3, v/v. The barbiturates were located by staining a marker strip and extracted from the gel into 10 ml. acetone.

The purified extracts were concentrated to 100 μl. and 10 μl. aliquots were evaporated on stainless steel gauzes for gas chromatography. Amylobarbitone and quinalbarbitone were retained for 12 min and 15 min respectively under the following conditions: chromatograph Pye 104, model 24; N_2 50 ml./min; Chromosorb *W*, AW, DCMS, 80–100 mesh, NPGA 3% w/w, trimer acid 0·75% w/w, Perkin-Elmer Ltd.; solid injection preheater 230°; oven 180°; flame ionization detector. The ratio of the peak areas for amylobarbitone and quinalbarbitone gave a direct measure of the concentration of amylobarbitone in the sample. Fig. 1 shows a calibration curve prepared from serum to which known amounts of amylobarbitone had been added.

With the following modifications the same method has been used to measure hydroxyamylobarbitone (5 ethyl, 5(3′hydroxyisoamyl) barbituric acid) in serum and urine: internal standard cyclobarbitone: thin layer solvents chloroform/acetone, 9/1, v/v and 5/7, v/v; gas chromatograph preheater 255°; oven 205°; retention time for cyclobarbitone 15 min and hydroxyamylobarbitone 19 min.

Beta-receptors in human isolated smooth muscle

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Although the actions of catecholamines on smooth muscle from animal tissues have been extensively studied for their α- and β-receptor activity, little is known about the receptor populations in human smooth muscle. Bucknell & Whitney (1964) showed that α- and β-receptor stimulation caused relaxation of the human isolated taenia coli. Similar results were obtained with human isolated ileum (Bennett, 1965), longitudinal jejunal muscle (Whitney, 1965) and longitudinal and circular strips of stomach (Bennett & Whitney, 1966).

TABLE 1. *Potencies of isoprenaline (ISO), adrenaline (A), phenylephrine (PE) and salbutamol (S) relative to noradrenaline (N) as free bases on isolated human smooth muscle*

Tissue and number of specimens		Mean relative potencies					ED_{50} value for A (molar conc.)	
		ISO	A	N	PE	S	α-receptor activity*	β-receptor activity
Bronchus	Circular muscle (1)	140	110	1		30		$4{\cdot}4\times10^{-6}$
Oesophagus	Lower third circular muscle (1)	$\geqslant1$	>1	1	<1		$3{\cdot}0\times10^{-7}$	$7{\cdot}6\times10^{-7}$
Stomach	Lower body longitudinal muscle (4)	3·75	2·66	1	0·07	0·03	$6{\cdot}0\times10^{-7}$	$2{\cdot}0\times10^{-6}$
Duodenum	Longitudinal muscle (1)	3	0·6	1	0·001	—	$7{\cdot}0\times10^{-8}$	$3{\cdot}5\times10^{-6}$
Jejunum	Longitudinal muscle (1)	<1	>1	1	<1			$1{\cdot}0\times10^{-5}$
Ileum	Longitudinal muscle (4)	<1	>1	1			$1{\cdot}0\times10^{-7}$	$4{\cdot}5\times10^{-6}$
	Circular muscle (3)	10	5	1				$2{\cdot}0\times10^{-6}$
Colon	Longitudinal muscle (4)	5	3	1	0·08	—	$4{\cdot}25\times10^{-7}$	$6{\cdot}0\times10^{-6}$
	Circular muscle (4)	2	6	1	0·2			$2{\cdot}0\times10^{-5}$
Rectum	Longitudinal muscle (1)	$\geqslant1$	>1	1			$4{\cdot}0\times10^{-6}$	$5{\cdot}0\times10^{-6}$
	Circular muscle (2)	0·4	22·5	1				$6{\cdot}5\times10^{-5}$
Appendix	Longitudinal muscle (2)	7	2·25	1	—	0·06		$7{\cdot}0\times10^{-6}$

—, 50% maximum relaxation not reached in concentrations used.
* Coupar, I. M., 1969 (personal communication).

In the present study, the order of potency of isoprenaline, adrenaline, phenylephrine and salbutamol relative to noradrenaline (1·00) was determined. The method of tissue preparation and recording was that of Coupar & Turner (1969), with the exception that thymoxamine (2 μg/ml.) was substituted for propranolol in the Krebs solution to block the α-adrenoceptive receptors.

The results are shown in Table 1. In all tissues studied the response to β-receptor stimulation was relaxation. This included oesophagus, in which α-receptor activity is excitatory (Coupar & Turner, 1969). In ileum, colon and rectum, the orders of potency in longitudinal compared with circular muscle strips suggest a difference in the number of β-receptors in these tissues. The concentrations of adrenaline required to stimulate β-receptors were greater than those to activate α-receptors. The potency of salbutamol relative to isoprenaline was markedly greater on bronchus than on the other tissues studied.

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A technique for the continuous micro-infusion of chemicals into discrete parts of the brain in unrestrained rats

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The effects of potential transmitter substances on brain function have been studied by their direct application in solution to individual neuro-structures (Miller, 1965). To obtain selective effects the volume of chemical so introduced must be small in relation to the target area. Single micro-injections have been used for this purpose, but the quantity of chemical injected may be reduced rapidly by diffusion or enzymic destruction. To obviate this, a technique has been developed whereby micro-volumes of sterile chemicals may be continuously infused into discrete parts of the brain in unrestrained rats.

A flow-rate of less than 1 μl./hr can be achieved using a Delta micro-metering pump (Drive assembly type D/K48H; Watson-Marlow Ltd., Marlow, Bucks). The chemical solution is pumped through a Swinney Adaptor (Millipore) fitted with a " Millipore " filter (pore size 0·45 μ) and via narrow bore polythene tubing (PP10; Portex Plastics Ltd., Hythe, Kent) to a specially designed unilateral cannula (Fig. 1).