metabolites which are known to occur in the urine after the administration of aniline to rats *in vivo* (Parke, 1960).

A.B. is an M.R.C. Scholar.

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The effects of electrical stimulation of the sympathetic nerves on the size and mitotic index of rat salivary glands

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Catecholamines can influence cell proliferation in rat salivary glands. The sympathomimetic compound isoprenaline causes both hyperplasia and hypertrophy of the parotid and submaxillary acinar cells (Selye, Veilleux & Cantin, 1961). Evidence that electrical stimulation of the sympathetic nerves itself can also cause both hyperplasia and hypertrophy has recently been obtained (Muir, Pollock & Turner, unpublished observations) and the present demonstration illustrates the methods used.

Rats were anaesthetized and one superior cervical nerve tract stimulated supramaximally for 1 h (20 Hz, 1 ms, for 30 s min^{-1}). Glands on the contralateral side acted as controls. Hypertrophy was estimated by:

(a) comparing the lengths of two acinar axes from the stimulated glands with the corresponding axes from the controls (the longest axis and that at right angles to and at the mid-point of this axis).

(b) comparing the wet and dry weights of the stimulated glands with the controls. Hyperplasia was estimated by comparing the mitotic indices of the stimulated glands with the controls.

In one group of animals the wet and dry weights of the salivary glands were determined 33 h after the commencement of stimulation. In another group, to determine the mitotic index of each salivary gland, colchicine (1 mg/kg I.P.) was injected 28 h after the beginning of stimulation to arrest dividing cells in metaphase. These animals were then killed a further 8 h later. The lengths of the acinar axes were measured in the glands taken from this group of animals.

Electrical stimulation increased the weight and acinar size of the parotid and submaxillary glands and the mitotic index of the former. The major sublingual gland which receives no sympathetic innervation was unaffected.

C.J.T. is an M.R.C. Scholar.

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The response of the rat anococcygeus muscle to electrical stimulation of the inhibitory nerves and to drugs, using, simultaneously, mechanical and intracellular electrical recording techniques

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The rat anococcygeus muscle (Gillespie, 1972) has a high ($\approx$60 mv) stable resting membrane potential and shows no spontaneous activity (Gillespie, Creed & Muir, 1973).

Discrete excitatory mechanical responses can be obtained to single pulses (0·01–0·25 Hz). The accompanying electrical changes following single pulses are graded junctional depolarizations rather than spike potentials.

Following infusion of guanethidine (5×10^{-5} M), which raises tone and depolarizes the muscle membrane, supramaximal field stimulation using single pulses (1 ms, 8 Hz) causes a mechanical relaxation which is graded with frequency; the membrane potential in most cases remaining unchanged though on occasions a slight (<10 mv) hyperpolarization has been observed. The mechanical inhibition so obtained is abolished by tetrodotoxin (8 μg) and by drugs reducing muscle tone, e.g. papaverine (0·6 mg) and is enhanced by perfusion with atropine (5×10^{-7}M). The demonstration is intended to illustrate the electrical basis of the mechanical relaxation and the effect of drugs upon these.

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Effects of salbutamol and terbutaline on physiological tremor in man

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Sympathomimetic bronchodilator drugs produce an increase in physiological tremor as an adverse effect and it has been postulated that this may be due to their action on β-adrenoceptors in skeletal muscle (Bowman & Nott, 1969). Animal studies have shown that β_2-adrenoceptor agonists produce an increase in rate of relaxation of slow skeletal muscle and this may account for the feeling of weakness and tremulousness associated with acute stress (Bowman & Zaimis, 1958). In man, Marsden, Foley, Owen & McAllister (1967) have shown an increase in physiological tremor with isoprenaline and adrenaline which may be blocked by propranolol. We have studied the effects of two other sympathomimetic drugs, salbutamol and terbutaline, on physiological tremor, bronchial tone, blood pressure and heart rate in man.

Finger tremor was recorded with an accelerometer, frequency analyser and integrating circuit. Bronchodilatation was expressed as degree of protection against histamine-induced bronchoconstriction, as measured by $F.E.V._1$. Salbutamol (4 and 8 mg), terbutaline (5 and 10 mg) and placebo were administered orally to six normal healthy volunteers in a double-blind randomized trial. Readings were taken before and at intervals up to six hours after administration of drug.

Salbutamol (4 and 8 mg) and terbutaline (5 and 10 mg) produced a significant increase in physiological tremor, as compared with placebo ($p<0·05$). Terbutaline (5 and 10 mg) produced graded responses which were significantly different from each other at 2 h ($p<0·02$) but there was no significant difference between 4 and 8 mg of salbutamol.

Terbutaline (5 and 10 mg) and salbutamol (8 mg) produced a significant bronchodilatation ($p<0·01$). The terbutaline response was dose-dependent with a significant difference between doses at 1 h ($p<0·02$) but there was no significant difference between 4 and 8 mg of salbutamol.

In the higher doses, both drugs produced a significant increase in heart rate ($p<0·05$). Significant differences between the doses for each drug were produced at 1 and 3 h with salbutamol ($p<0·02$) and at 1·5 h, with terbutaline ($p<0·05$). Neither drug produced any significant change in blood pressure.

Terbutaline (10 mg) appeared to produce greater responses than salbutamol (8 mg) on tremor, bronchial tone and heart rate but the differences were not statistically significant.