

The action of tranquillizing drugs on the spontaneous discharge rate of the preganglionic superior cervical sympathetic nerve of the rabbit

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Elliott (1970) showed that chlorpromazine (CPZ) reduced the rate of spontaneous discharge of action potentials in the preganglionic superior cervical trunk of the anaesthetized cat. The experiments have now been repeated for the rabbit using CPZ and other drugs.

Farnel digital measuring system DMF-100P.

Control recordings were taken for 1 h prior to administration of drugs which were given via the femoral vein. Recording continued for 1-2 h after drug administration. The results are shown in Table 1.

The effects of the drugs used were not due only to their local anaesthetic properties at the site of recording because:

- Procaine hydrochloride (5 mg/kg) caused no reduction in the rate of spontaneous discharge whereas CPZ (4 mg/kg) given 1 h later did reduce the discharge rate.
- The central ischaemic response at death (which is a massive rise in discharge rate) was observed in all experiments in which drugs had previously reduced discharge.

Table 1 The effect of tranquillizers on spontaneous activity in the cervical sympathetic nerve of the rabbit at 5 min and 60 min after intravenous administration

<i>Drug used</i>	<i>Chlorpromazine (7 expts.)</i>	<i>Diazepam (4 expts.) *</i>	<i>Chlordiazepoxide (5 expts.)</i>	<i>Sodium pentobarbitone (5 expts.)</i>	<i>Meprobamate (5 expts.)</i>
Dose (i.v.)	4 mg/kg	8 mg/kg	8 mg/kg	10 mg/kg	Up to 20 mg/kg
Percentage reduction after 5 min	25.0-74.7 mean 51.5 \pm 7.9	0-17.0 mean 14.5	0-25.6 mean 4.1 \pm 7.9	0-20.0 mean 12.9 \pm 19.4	0.0
Percentage reduction after 60 min	0-55.0 mean 26.0 \pm 18.6	24.6-74.4 mean 60.2	20.8-95.1 mean 30.8 \pm 15.4	26.5-100 mean 80.2 \pm 20.9	0.0
Recovery	begins 6-20 min after admin. of drug	none after 2 h	none after 2 h	none after 2 h	—

* in three additional experiments there was no effect.

100% activity = discharge rate immediately before drug is given.

Anaesthesia was induced in 2-3 kg rabbits (female) with Saffan (alphaxalone 0.9% w/v + alphadalone acetate 3% w/v) (6 mg/kg) and maintained with 50% w/v solution of urethane. The preganglionic superior cervical trunk was fined down to a few fibres and the discharge rate of spontaneous action potentials recorded using a narrow-band-pass Tektronix 2A61 differential amplifier and a Hewlett Packard 141A storage oscilloscope from which photographs were taken. The number of potentials per 10 s was counted for five periods of 10 s at 5 min intervals using a

We suggest that tranquillizers do not act merely as local anaesthetics but have a central action which reduces discharge rate in the preganglionic superior cervical nerve.

Reference

- ELLIOTT, R.C. (1970). The action of central depressant drugs on the spontaneous discharge of action potentials in the superior cervical sympathetic trunk of the cat. *Neuropharmacol.*, 9, 129-136.