mined after oxidation with potassium ferricyanide (von Euler & Lishajko, 1961), and DA according to Carlsson & Waldeck (1958). For extraction and dosage of 5-HT the method of Snyder, Axelrod & Zwerg (1965) was used. Plasma corticosterone was determined by the method of Silber, Bush & Oslapas (1958); methylene chloride was purified according to Mattingly (1962). After prenylamine, no correlation could be observed between brain amine content and adrenocortical activation. Restraint stress, however, markedly increased plasma corticosterone as well as brain 5-HT content. Nialamide strongly increased brain amine content but did not change the high plasma corticosterone levels provoked by restraint stress (Table 1).

TABLE 1

Treatment	Hours after administration or restraint stress	5-HT	NA	DA	Plasma corticosterone
None (controls)		616±10 (50)	394±4 (50)	492±21 (50)	20·8±2·4 (40)
Prenylamine	6	480±26 (18)*	212±21 (18)*	281±21 (18)*	28·5±2·5 (22)*
	24	540±20 (12)*	301±18 (12)*	343±14 (12)*	15·7±2·9 (10)
	168	601±15 (12)	531±10 (12)*	411±8 (12)*	15·4±3·4 (10)
Restraint stress (RS) (6 hr)		723±15 (16)*	327±10 (16)*	433±12 (16)*	43·3±4·5 (8)*
Nialamide	26	931±31 (16)*	640±15 (16)*	756±24 (16)*	19·2±1·8 (12)
Nialamide+RS (6 hr)	26	1,040±36 (18)**	621±25 (18)**	750±20 (18)**	49·3±3·1 (18)

5-HT, NA and DA values were expressed in ng/g, and plasma corticosterone concentrations in μg/100 ml. The values shown are means±standard errors. The figures within brackets show the number of determinations. One and two asterisks signify $P<0·01$ with respect to the controls or stressed rats, respectively.

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Spinal reflex activity during exposure to saxitoxin and tetrodotoxin

M. H. EVANS†, *Sherrington School of Physiology, St. Thomas's Hospital Medical School, London S.E.1, England*

Monosynaptic and polysynaptic reflexes were tested in spinal cats to find out whether intravenous administration of saxitoxin or tetrodotoxin had any effects on the functions of the spinal cord during the time course of an acute experiment, other

than effects resulting from paralysis of conduction along the peripheral nerves. The cats used were made spinal under ether anaesthesia by destruction of the brain rostral to the first cervical segment, and subsequently maintained on artificial ventilation. This avoided the complicating effects of long-acting anaesthetics and of respiratory arrest and hypotension that otherwise would have resulted from administration of the neurotoxins.

Saxitoxin or tetrodotoxin (1–3 μg/ml. in 0.9% NaCl) was given by slow intravenous infusion. When the dose reached 2.4–7.8 μg/kg the monosynaptic and polysynaptic spinal reflexes began to fall in amplitude. Simultaneous recording of the ingoing afferent volley in the dorsal root, central to the dorsal root ganglion, showed, however, that this was also being blocked. Superimposition of the partially blocked responses on a control of the input–output curve of the monosynaptic reflex showed no significant central depression of the reflex during the development of the block. The temporal patterns of facilitation, inhibition and post-tetanic potentiation of monosynaptic reflexes did not change during the administration of the neurotoxins, other than a decrease in absolute amplitude from control levels.

When a partial block of the afferent input, and consequent diminution of reflex amplitude had been produced no more toxin was given. The degree of block continued to increase slowly during the next few minutes. Between 1 and 3 hr later, the nerve responses began to recover and in some experiments this recovery was followed for 6 hr after stopping the administration of toxin. In some experiments there was never any evidence that the neurotoxins had a significant central effect, but in others the monosynaptic reflex remained small at a time when the afferent input at the dorsal root had largely recovered. Only in these experiments was there evidence that saxitoxin and tetrodotoxin had a central depressant action following intravenous administration, but this may not be significant in view of the length of time which elapsed before recovery commenced.

It is concluded that saxitoxin and tetrodotoxin cannot readily pass from the blood into the spinal cord during the time of a short experiment. The loss of reflexes reported here, and by other workers, can be accounted for by the well known ability of these neurotoxins to block conduction peripherally in the afferent limb of the reflex arc. Only after prolonged exposure to the toxins is there some evidence that they may have a central depressant action within the spinal cord.

† Present address: A.R.C. Institute of Animal Physiology, Babraham, Cambridge, England.

Centrally-active drugs and the discharge rate of spontaneously occurring action potentials in the superior cervical trunk of the cat

R. C. ELLIOTT (introduced by J. P. QUILLIAM), *Department of Pharmacology, Medical College of St. Bartholomew's Hospital, London, England*

Elliott (1967) described a reduction in the rate of discharge of action potentials occurring in the preganglionic sympathetic fibres of the superior cervical trunk of the cat, anaesthetized with ether, following the intravenous injection of chlorpromazine (0.5 mg/kg). Using the methods described in detail in that communication some other drugs have been studied.

Perphenazine, a congener of chlorpromazine, produced a reduction in the discharge rate (Fig. 1 C and D). When the rate of discharge 10 min after intra-