EFFECTS OF DRUGS ON THE REFLEX RESPONSE OF THE CERVICAL VAGUS NERVE

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In a previous paper (1), one of the present authors reported the reflex efferent responses of the vagus nerve evoked by a single shock stimulation of the vagus, great splanchnic and sciatic nerves, respectively. Thereafter, we also showed that the afferent volley of the left vagus nerve might relay to the right vagus nerve in the midline region with the upper margin of about 1 mm.

Fig. 1. Effects of strychnine (100 μg/kg, i.v.), mephenesin (30 mg/kg), pentobarbital (15 mg/kg), GABA (200 mg/kg) on the reflex response of the right cervical vagus nerve. In each series of record from above downwards: reflex responses to the stimulation of the left cervical vagus, great splanchnic and sciatic nerves. Strychnine (A) augmented and mephenesin (B) reduced mainly the reflex response to the stimulation of the sciatic nerve. Pentobarbital (C) reduced or abolished all reflex responses. However, the third component of response to the vagus nerve stimulation and the first component of response to the great splanchnic nerve stimulation rather resisted. GABA (D) reduced only the third component of response to the vagus nerve stimulation. Arrow indicates the administration of drug, and white dot supramaximal single shock stimulation on each nerve. Time scale: 50 msec.
rostral to and the lower margin of 2 or 3 mm caudal to the obex in the medulla oblongata, and that the superficial sagittal section of this region of about 1 to 1.5 mm depth abolished only the third component of response to the vagus nerve stimulation (2). From these experiments, it was presumed that some specific pathways existed in the medulla for the vago-vagal, splanchnic-vagal and sciatic-vagal reflexes.

This communication reports the effects of some drugs on these reflex responses recorded in the right cervical vagus nerve in cats.

After operation under ether animals were anesthetized with chloralose (50 mg/kg, intravenously), immobilized by repeated doses of gallamine triethiodide and artificially ventilated. Drugs were administered into the saphenous vein.

Strychnine (100 μg/kg) augmented mainly the first component of response to the stimulation of the sciatic nerve (Fig. 1-A). This effect lasted over sixty minutes. On the other hand, mephenesin (30 mg/kg) reduced this component for about thirty minutes (Fig. 1-B). These two drugs had much less effects on the responses to the vagus and the great splanchnic nerve stimulation. The effect of mephenesin was decreased by the preceding administration of strychnine.

Pentobarbital (15 mg/kg) reduced or abolished all of these reflex responses. Among them, the first two components of response to the vagus nerve stimulation and the first component of response to the sciatic nerve stimulation were greatly affected, but the third component of response to the vagus nerve stimulation and the first component of response to the great splanchnic nerve stimulation were fairly resistant to this dose of the drug (Fig. 1-C).

Relatively large dose of GABA (200 mg/kg) reduced only the response to the vagus nerve stimulation, particularly the third component. In most cases this effect of GABA disappeared within about fifteen minutes. Responses to the great splanchnic and the sciatic nerve stimulation were not affected by this drug (Fig. 1-D).

REFERENCES


TRYPTAMINE RECEPTORS AND TYRAMINE

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Considerable evidence has accumulated to support hypothesis of Burn and Rand (1) that tyramine acts by releasing catecholamine from the tissue stores (2–5). Vane (6) observed that tyramine produced a stimulant effect on rabbit duodenum and a biphasic effect on rat stomach strip. This effect was inhibited by bromlysergic acid diethylamide (BOL) and phenoxybenzamine. On this basis, he suggested that the action of tyramine on these preparations was due to an action on tryptamine receptors. Since BOL and phenoxybenzamine block ‘D’ type of tryptamine receptors (7) it may be presumed that tyramine acts on ‘D’ receptors. To test this presumption we have studied the effect of tyramine on rat uterus which contains only ‘D’ type of tryptamine receptors.