

3 were depolarized and 3 were hyperpolarized, although the slow PSP in this cell type is a depolarizing response. Although synaptic stimulation increases the concentration of both cyclic GMP and cyclic AMP in these sympathetic ganglia (Weight, Petzold & Greengard, 1974), it appears that further investigation is needed to establish a role of these cyclic nucleotides in the mediation of slow postsynaptic potentials.

Dopamine receptor mediated inhibition by bromocriptine of accelerator nerve stimulation effects in the pithed cat

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It has been postulated by several investigators that adrenergic nerve terminals in various tissues are endowed with dopamine receptors, stimulation of which causes a decrease of transmitter release (Rand, McCullough & Story, 1975; Tayo, 1977). Recently, the new ergopeptine derivative bromocriptine (2-bromo- α -ergocryptine mesylate, Sandoz), which inhibits prolactin secretion (Flückiger, 1972; Del Pozo, Brun Del Re, Varga & Friesen, 1972), has been characterized as a central dopamine receptor agonist (Corrodi, Fuxe, Hökfelt, Lidbrink & Ungerstedt, 1973; Johnson, Loew & Vigouret, 1976). It was therefore of interest to see whether dopamine receptor stimulation with bromocriptine leads to inhibition of peripheral nerve transmission. The present experiments were performed in 59 cats, in which the activation of prejunctional dopamine receptors with apomorphine inhibits the function of postganglionic sympathetic heart nerves (Scholtysik, 1976).

In pithed cats, electrical stimulation of spinal segments C7 and T1 at 0.5 to 32 Hz induced frequency-dependent increases in heart rate due to selective activation of cardiac sympathetic nerves. Bromocriptine (10 μ g/kg i.v.) did not affect the resting heart rate but shifted the stimulation frequency-response curve to the right. The inhibition of the stimulation effects was dose-dependent, as was demonstrated by i.v. infusion of bromocriptine (0.5 or 1 μ g kg⁻¹ min⁻¹) during repeated heart nerve stimulation at 4 Hz. Bromocriptine (10 μ g/kg i.v.) inhibited pre- and postganglionic accelerator nerve stimulation effects but failed to modify the dose-response curve to exogenous adrenaline. Therefore, ganglionic blockade or post-synaptic β -adrenoceptor blockade of bromocriptine can be excluded.

In order to investigate the mechanism of this inhibitory action on postganglionic adrenergic neurones

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of the cat heart, bromocriptine was infused intravenously (1 μ g kg⁻¹ min⁻¹) following previous injection of either the α -adrenoceptor antagonist phentolamine (1 mg/kg i.v.), the 5-HT antagonist pizotifen (1 mg/kg i.v.), or the dopamine receptor antagonist haloperidol (0.03, 0.1 and 0.3 mg/kg i.v.). Accelerator nerve stimulation at 4 Hz was repeated every 5 minutes. Pretreatment with haloperidol prevented the neuronal inhibitory effect of bromocriptine in a dose-dependent manner. In contrast to haloperidol, phentolamine and pizotifen caused only slight delays in the onset of the inhibitory action of bromocriptine.

These findings suggest that bromocriptine causes postganglionic inhibition of the cardiac adrenergic nerve function, mainly due to stimulation of prejunctional dopamine receptors. The results are compatible with the present concept of the regulation of transmitter release in the adrenergic neurotransmission.

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