more than four-fold greater than that required to cause contraversive rotation after 6-hydroxydopamine lesions). The substantia nigra electrolesion abolished the effects of intrastriatal dopamine.

If an electrolesion in substantia nigra was followed by a 6-hydroxydopamine injection into the medial forebrain bundle, unilateral striatal dopamine fell to 33% of normal. Such animals rotated only ipsiversively to both s.c. apomorphine and i.p. amphetamine.

An electrolesion in substantia nigra (or medial forebrain bundle) appears to abolish the effect of s.c. apomorphine or intrastriatal dopamine on the denervated striatum. We conclude that such electrolesions destroy not only the ascending nigrostriatal dopaminergic pathway, but also a second neuronal system, perhaps a non-dopaminergic nigrostriatal tract or a strio-pallidal efferent pathway, required for expression of rotational behaviour resulting from stimulation of dopaminergic receptors in the denervated striatum.

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The role of dopamine in rotational behaviour produced by unilateral lesions of the locus coeruleus

I. DONALDSON*, ANNETTE DOLPHIN, P. JENNER, C.D. MARSDEN & C. PYCOCK

Dept. of Neurology, Institute of Psychiatry, De Crespigny Park, Denmark Hill, London SE5 8AF

Rats with unilateral electrolytic lesions of the locus coeruleus rotate contraversive to the side of the lesion when given apomorphine hydrochloride (1 mg/kg i.p.) or dexamphetamine sulphate (5 mg/kg i.p.). This turning is transient and persists for less than 2 months. It is accompanied by a rise in the dopamine content of the ipsilateral striatum which is also transient and has a similar time course to the turning (Marsden & Pycock, 1974; Pycock, Donaldson & Marsden, 1975). Further experiments suggest that it is due to asymmetrical stimulation of the striatal dopamine receptors.

The turning induced in such animals by dexamphetamine is not modified by pretreatment with alpha (phenoxybenzamine 20 mg/kg i.p. 90 min before) or beta (propanolol 5 mg/kg i.p. immediately before) adrenoceptor blockers. However, turning to both dexamphetamine and apomorphine is completely abolished by pretreatment with the dopamine receptor blocker pimozide (0.25 mg/kg i.p. 4 h before). Similarly the adrenoceptor stimulant clonidine (0.05-0.5 mg/kg i.p.) does not produce rotation whereas the dopamine receptor stimulant piribedil (100 mg/kg i.p.) does.

Rotation produced by a locus coeruleus lesion is abolished by a unilateral electrolytic lesion of the substantia nigra on the same side. The resultant turning is the same as that normally produced by the substantia nigra lesion alone.

Intrastriatal injections in rats with unilateral locus coeruleus lesions show that the striatum on the side of the locus lesion is more sensitive to apomorphine than the opposite striatum. The dose of apomorphine required to produce rotation when injected intrastriatally on the side of the lesion was only 22 ± 6 micrograms while 61 ± 9 micrograms was required to produce the same effect when injected into the opposite striatum.

These results are consistent with the suggestion that the drug induced turning behaviour due to a unilateral locus coeruleus lesion in the rat is mediated via the ipsilateral striatal dopamine receptors. Their behaviour may be altered by the locus lesion which may have a facilitatory effect on transmission in the ipsilateral nigrostriatal pathway.

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