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Role of Dopamine in the Caudate Nucleus of Cats: Behavioral Effects Produced by Intracaudal Applied Dopaminergic Substances

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In view of reports [2] that dopamine in the caudate nucleus is involved in extrapyramidal functions, a behavioural study of the effects of intracaudal applied dopamine and chemically or functionally related compounds has been undertaken. Stereotaxic implanted cannulas are used to inject Dopa, dopamine, Dopac, 3-methoxy-Tyramine, noradrenaline, dexamphetamine, apomorphine and procaine into the caudate nucleus of cats. Locally applied haloperidol, an inhibitor of the depressure effects of dopamine and α -methyl-para-Tyrosine, an inhibitor of the dopamine synthesis, are tested as possible inhibitors of the centrally induced effects.

Behavioral parameters were assessed to measure the drug action. Dopa, dopamine, 3-methoxy-Tyramine, dexamphetamine and apomorphine, caused a stereotyped contralateral behavior, that resembled the inactivation syndrome induced by electrical stimulation of this nucleus [1], while haloperidol, α -methyl-para-Tyrosine and procaine caused a stereotyped homolateral behavior. The α -methyl-para-Tyrosine or haloperidol pretreatment suppressed the dopaminergic stereotypies, while this suppression could be surmounted by high doses of the dopaminergic drugs except 3-methoxy-Tyramine.

Since the effects of procaine, haloperidol or small lesions abolished the dopaminergic stereotypies and contrasted with the dopaminergic effects, dopamine is supposed to be an activator of inhibiting neurons instead of an inhibitor of excitatory neurons.

References

1. Akert, K., Anderson, B.: *Acta physiol. scand.* 22, 281—298 (1951).
2. Hornykiewicz, O.: *Pharmacol. Rev.* 18, 925—961 (1966).

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