because imipramine is a more potent blocker of 5HT uptake, while desipramine is more effective on NA uptake mechanisms (Ross & Renyi, 1969). Potentiation of the monoamine response was observed in forty-seven of the eighty-three cells studied, reaching a maximum about 10 min after application of the anti-depressant. This effect occurred most frequently with iontophoretic currents of 25 nA applied for 15 seconds. Antagonism of the amine response was observed in forty-five cells, usually after antidepressant applied at 50 nA for 30 seconds. The antagonism was immediate, and recovery was complete within 10 minutes. In many cells both effects were seen, the antagonism preceding the potentiation. Excitatory and depressant responses to the monoamines were affected in the same way. The interactions between desipramine and NA were similar to those between imipramine and 5HT.

The specificity of the effects of imipramine and desipramine was investigated in thirty-five cells excited by acetylcholine; seventeen responses were potentiated and eighteen antagonized. The latencies and durations of effects and the currents used to apply the antidepressants were similar to those with the monoamines.

Thus antidepressants can potentiate monoamine responses in the central nervous system, but antagonism also was seen requiring slightly larger currents to apply the antidepressant. Although antagonism of both NA (Callingham, 1967) and 5HT (Domenjoz & Theobald, 1959) occurs in peripheral systems, little importance has been ascribed to it in explanation of the central actions of the antidepressants. The similarity between the effects of antidepressants on responses to acetylcholine and to monoamines suggests that cholinergic systems might be involved, and that the study of antidepressant drugs should not be restricted to an examination of their actions on monoamine systems.

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Actions of 3,4-dimethoxyphenylethylamine in relation to the effects of catecholamines on brainstem neurones

J. A. GONZALEZ-VEGAS* and J. H. WOLSTENCROFT, *Department of Physiology, The Medical School, Birmingham* 15

In 1952 Osmond & Smythies suggested that disordered catecholamine metabolism might lead to the production of psychotomimetic compounds in schizophrenia, and in 1962 Friedhoff and Van Winkle found methoxy-derivatives in the urine of some schizophrenic patients. One of these compounds is 3,4-dimethoxyphenylethylamine (DMPE) which has been identified with the 'pink spot' although this remains a

controversial issue. DMPE has a potent action on the central nervous system of mice and rats (Brown, Lang & Gershon, 1965; Bueno, Masur, Breda & Carlini, 1969) and cats (Ernst, 1965).

The present study was undertaken to assess the action of this drug when applied iontophoretically, either by itself or in relation to noradrenaline and dopamine, two of the probable neurotransmitters in the brain. DMPE was applied iontophoretically in acute decerebrate, unanaesthetized cats using five barrelled micropipettes according to a technique previously described (Bradley, Dhawan & Wolstencroft, 1966). Of ninety neurones in the region of the medullary reticular formation, DMPE excited three, inhibited eighteen and had no effect on the remainder. These effects were unrelated to the actions of either noradrenaline or dopamine on the same neurone. Prolonged applications of the drug (3–5 min) blocked the inhibitory response to noradrenaline in seven of fifteen neurones tested. In the majority of these neurones this blocking action was partial, although in some cases it was able to block completely noradrenaline induced inhibition. DMPE was ineffective in blocking the excitatory effects of noradrenaline. Of fourteen dopamine responding neurones, DMPE blocked three, of which two were inhibited and one was excited by dopamine. In one case DMPE enhanced the inhibitory action of dopamine.

Our results demonstrate that DMPE is able to interact with two probable transmitters in the brain, thus suggesting a possible neuronal mechanism for its action on the central nervous system.

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Rate of turnover of γ-aminobutyric acid in various brain regions

G. G. S. COLLINS* and M. J. NEAL, *Department of Pharmacology, School of Pharmacy, University of London, Brunswick Square, London, WC1N 1AX*

The distribution of γ-aminobutyric acid (GABA) in various areas of the brain and the effect of drugs on endogenous GABA levels has been extensively studied (Berl & Waelsch, 1958; Elliott & Van Gelder, 1960; Singh & Malhotra, 1964) but little is known of the dynamic aspects of the metabolism of GABA in the brain. The storage levels of the free amino-acid pool in the brain is not static but reflect dynamic equilibria between the rate of formation and the rates of utilization.

In the present experiments an estimate of the turnover of GABA has been obtained by measuring the rate of disappearance of ^{3}H-GABA from whole brain and from various areas of rat brain after labelling the endogenous GABA pools. It is possible