

LETTER TO THE EDITOR

PSYCHOACTIVE DRUGS ON BRAIN ACETYLCHOLINE (Ach) LEVELS IN RATS

Sir,

The level of total Ach in the brain has been shown to vary with the functional activity of the central nervous system. Such variation has been related to physiological changes in nervous activity, such as sleep or wakefulness, which causes increase in Ach content in the brain tissue (1). Neuropharmacological agents also changed the Ach content (2,3,4,5). The purpose of the present study was the quantitative determination of total Ach content in the whole brain tissue of the rat under the effect of chlorpromazine (CPZ), trifluoperazine (TRI), imipramine (IMI) and methylamphetamine (M-AMP).

Mongrel rats of either sex, weighing from 80-100 g were killed by decapitation. The entire brain (excluding cerebellum, pons and medulla oblongata) was very rapidly and carefully removed and wiped dry with a filter paper. The brain was rapidly transferred to eserinated (physostigmine 15 $\mu\text{g/ml}$) acidified amphibian Ringer - Locke solution contained in a centrifuge tube. The tube was immersed in a boiling water bath for 5 min with continuous stirring, then centrifuged and cooled. After cooling, the extract was brought to pH 7. The assays were performed on the frog rectus abdominis preparation. Psychoactive drugs were administered to animals and the total Ach content of the whole brain was assayed on frog rectus abdominis muscle. The results are shown in Table I.

TABLE I : Effect of acute treatment with psychoactive drugs on total brain acetylcholine content in rats.

Treatment	Time of sacrifice after administration of drugs (hr)	Mean Ach content of brain tissue $\mu\text{g/g} \pm \text{S.D.}$	Percentage change in Ach content and P value
Normal Saline 0.16 ml/100 g, ip (6)	$\frac{1}{2}$ hr	1.97 ± 0.8962	—
Chlorpromazine 10 mg/kg, ip (6)	2 hr	3.00 ± 0.2000	+52.2 P<0.10
Trifluoperazine 0.3 mg/kg, ip (6)	2 $\frac{1}{2}$ hr	2.83 ± 0.2886	+43.6 P<0.50
Imipramine 2 mg/kg, ip (6)	4 hr	2.59 ± 0.0574	+34.5 P<0.50
Methyl-Amphetamine 5 mg/kg, ip (6)	first set of convulsions	0.92 ± 0.03	-53.3 P<0.10

Figures in parenthesis indicate the number of observations.

The administration of CPZ, TRI and IMI caused an increase in the level of total Ach content of the whole brain tissue by 52.2, 43.6 and 34.5% respectively over the control levels. M-AMP caused decrease in the level of total Ach content of the whole brain tissue by 53.3% over the control levels. As far as the general behaviour is concerned, CPZ-treated group of rats showed marked sedation and reduction in spontaneous motor activity. TRI and IMI produced slight or no sedation. The M-AMP treated group of rats were observed to be stimulated and showed tremors.

ACKNOWLEDGEMENTS

The Author is thankful to Dr. G. Singh, Professor of Pharmacology, Lady Hardinge Medical College, New Delhi, for providing facilities to carry out this work.

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