

LETTER TO THE EDITOR

INFLUENCE OF ETHYL AND METHYL ALCOHOL ON RAT
BRAIN HISTAMINE CONTENT

Sir,

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The primary objective of this study is to quantify the brain histamine content in alcohol treated albino rats in order to elucidate the specific changes induced by the administration of ethanol and methanol.

Histamine in brain tissue was identified by Kwiatowski in 1943 (1). Subsequent pharmacological, biochemical and neurophysiological studies have shown that histamine may act as a neurotransmitter or neuro-modulator in mammalian central nervous system (2,3,4,5,6). It has also been shown that histamine plays a major role in drinking elicited by spontaneous eating in rats (7).

Ethanol, the most common "drug of abuse", is known to alter behaviour by modulating the central neurotransmitters. Methanol the simplest alcohol is commonly used as an adulterant in the illicit liquor is also shown to change the brain catecholamines (8) by a direct action on neuronal membranes. Alcohol induced behavioural alterations can be due to the change in cerebral biogenic amines. It has also been suggested that brain monoaminergic system could be involved in the basic mechanism of alcohol abuse. Since the effect of alcohols on brain histamine content is not known, this preliminary investigation was undertaken.

Male wistar strain albino rats (150-180 G) maintained under standard laboratory conditions were selected for this study. The rats were divided into three groups as given below.

Saline ip treated animals served as control group (Group I). Group II rats received ethanol (2 gm/kg) i.p. and Group III rats received methanol (2 gm/kg) by the same route.

Thirty minutes after intraperitoneal administration

of alcohols/saline the animals were decapitated. The brain was removed rapidly and various discrete regions viz. hippocampus, corpus striatum, cerebellum, cerebral cortex, hypothalamus, midbrain and pons medulla were dissected out on a chilled glass plate (9). The discrete areas of the brain were weighed separately and processed for fluorometric histamine assay (10).

All the data were analysed for statistical significance by one way ANOVA and if there is a significant F test ratio, the individual data was analyzed by Tukeys test for multiple comparisons.

Analysis of variance of the three groups studied in this investigation has shown that F ratio ($f = 7.452$, $df 2,25$) was significant at hippocampus ($P < 0.001$) and hypothalamus ($P < 0.05$) only. Analysis of the results by Tukeys multiple comparison test of these regions have shown that the histamine content was significantly less ($P < 0.01$) in hippocampus of ethanol ($P < 0.01$) and methanol ($P < 0.05$) treated animals compared to the controls. On the other hand in methanol treated animals only hypothalamus showed a significant reduction in histamine content ($P < 0.05$). However in other regions there is no significant differences between ethanol and methanol (Table I).

The present study has shown that in control the histamine content was highest in hypothalamus followed by hippocampus, pons medulla, midbrain cerebellum and corpus striatum. The lowest concentration was noted in cerebral cortex. The regional distribution of histamine estimated by biochemical procedure correlated well with the immunocytochemical studies of Inagaki et al (11) who have shown extensive histaminergic fibers in hypothalamus. Similar results were also reported by Airaksinen and Panula (12) in guinea pigs. Since our

TABLE I : Influence of ethanol and methanol on histamine content in discrete areas of rat brain.

Group	No. of rats	Hippocampus	Corpus striatum	Cerebellum	Cerebral cortex	Hypo-thalamus	Mid brain	Medulla Pons
Saline (Control)	10	947.64±136.7	476.186±67.04	542.518±95.18	411.06±49.33	2853.51±421.1	599.63±61.94	607.31±80.95
Ethanol (2 gm/kg)	9	438.54±66.66**	455.86±52.33	379.92±39.33	375.92±39.66	1950.20±181.00	465.44±52.33	517.37±49.00
Methanol (2 gm/kg)	9	552.70±70.33*	445.41±53.66	457.52±55.00	369.20±42.33	1636.77±130.33*	444.16±30.66	461.39±24.60

Histamine levels in ng/g of brain tissue – All values are Mean ± SEM
Significance with respect to controls – * P<0.05, ** = P<0.01

perusal of literature has not shown any similar work on the influence of alcohols on brain histamine content, it is not possible to compare our results with other workers. However it may be noticed that with the given concentration of alcohols the observed changes are seen only in regions where the histamine content is high and not in those regions where the initial content is low. Further it may be noted that while the hippocampal histamine is altered by both ethanol and methanol, the hypothalamic histamine content is altered only by methanol. The exact cause and mechanism for these

observed effects are not known at present and need further indepth study.

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