In contrast no marked changes have been noted in whole brain levels of NA (Garattini, 1965, Columbini *et al.*, 1970, Maitre *et al.*, 1970, Welch *et al.*, 1971). However, the use of turnover analysis in this investigation shows that changes occur in NA metabolism as well.

Intracisternally administered ^{3}H-NA was recovered from brain homogenates either as the unchanged amine or normetanephrine (NM) by a dual column ion exchange procedure. Rats were pretreated one hour earlier with either 5 mg/kg of Δ^{9}-THC or a synthetic metabolite, 11-hydroxy-Δ^{8}-THC.

When measured at intervals up to one hour Δ^{9}-THC caused a progressive retention of free NA, whereas 11-OH-Δ^{8}-THC elicited this effect only in the early time periods (< 15 min). Both drugs produced a marked decrease in the amounts of NM, and, in the case of the metabolite showed greater potency. These studies when combined with the observations of other minimal changes in the brain content of NA indicate a slowing of NA metabolism produced by THC and its metabolites.

Brain amine changes have been further studied by examining the effects of their alteration by drugs. Pretreatment of rats with α-methyltyrosine (50 mg/kg i.p. g 4 h$\times$3 doses), which markedly lowers all brain catecholamines, produced potentiation and prolongation of many behavioral and neurophysiological parameters when these were measured by the semiquantitative observational screening procedures of Irwin (1968). These include lowered body position, catatonia, increased biting and decreased coordination on a wire manuever test. Pretreatment of rats with *para*-chlorophenyl alanine (400 mg/kg i.p.) 12 h prior produced few significant changes other than a marked loss of the pinna reflex.

It is concluded that THC shows marked effects on NA as well as 5-HT metabolism. The opposite changes, elevation of brain 5-HT and slowed NA metabolism may produce a combined effect typical of other hallucinogens which is more significent than either alone.

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Marijuana and heroin use in Vietnam: A report

As consultant to the Department of Defense, I was able to survey marijuana and heroin use and efforts at rehabilitation throughout Vietnam where patterns of use are sharply different from the United States experience. Elements of this social setting which may apply to the outbreak of marijuana and heroin use will be analyzed and contrasted to the Army experience in Thailand where heroin and marijuana use is minimal.

Two groups are involved: one, the expected character disorder with previous history of drug use. The other, larger group shows a variety of personality types and educational experience, chiefly from small towns and without preponderance of any ethnic or racial group. United States use of heroin is predominantly intravenous but in Vietnam, because of purity of drug, heroin use is usually by smoking or inhaling until recently, and can be occasional, moderate, regular, or spree. Most heroin use in the United States is by individuals who may have a significant relationship with other users while in Vietnam it is principally an acceptable small group phenomenon as is marijuana use.

The Army has mounted a vigorous education, rehabilitation, and treatment and enforcement campaign against heroin but has relaxed its campaign against marijuana. The programs will be described and discussed with special attention to matters such as development of tolerance, extent of withdrawal, capacity to function, psychological reactions to these, and the interaction betwen marijuana and heroin use in Vietnam.

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Metabolism of 7-hydroxy-$\Delta^{1(6)}$-THC and CBN

7-Hydroxy-Δ^1-THC has been demonstrated to be a primary metabolite of Δ^1-THC. The metabolite is undoubtedly a pharmacologically potent compound although its suggested role as the carrier of cannabis activity yet remains to be proven. $\Delta^{1(6)}$-THC which has similar activity as Δ^1-THC is similarly metabolized to the 7-hydroxy compound.

In view of its interesting activity, a preliminary study on the metabolism of 7-hydroxy-$\Delta^{1(6)}$-THC *in vivo* has been carried out. The tritium labelled compound prepared by acid catalyzed exchange, was injected i.v. into rabbits. 7-Hydroxy-$\Delta^{1(6)}$-THC was initially distributed quickly from the blood but after 10 min a slow release, mainly of the orginal compound, back into the blood stream was observed. There appears to be a correlation between the blood level of 7-hydroxy-$\Delta^{1(6)}$-THC and the gross effects on the animal. The elimination pattern in urine and faeces of metabolites from the administered compound agrees well with cor-