

LETTER TO THE EDITOR

On the Marihuana Attenuation of the Rise of Ethanol Levels in Human Subjects

In the August, 1992, issue of *Neuropsychopharmacology* 7:77–81, Lukas et al. reported the results of a study in which subjects smoked marihuana after ethanol ingestion. In their study, subjects were randomly assigned to one of three marihuana dose groups ($n = 5$ subjects/group): placebo (0.004% THC); 1.26% THC, or 2.53% THC. They returned to the laboratory on three separate occasions and drank a different dose of ethanol in a random order (placebo, 0.35 g/kg or 0.70 g/kg). The results indicate that “marihuana significantly attenuated the rise in plasma-ethanol levels after ingestion of the 0.7 g/kg dose.”

This result differs from the findings of our placebo-controlled study in which the interaction between two

doses of ethanol and one dose of marihuana was investigated in six healthy volunteers. Each subject was randomly assigned to one of six conditions in a single-blind, Latin-square crossover design (Perez-Reyes et al. 1988). In this study, we found that marihuana smoking after ethanol ingestion did not significantly alter blood-ethanol concentrations over time, the time to peak, the peak value, or the area under the ethanol-blood concentration over time curve (AUC 0 to 360 min). Our results are reported in Table 1.

There are the following differences between our study and that of Lukas et al.: the dosage of ethanol that we used (0.425 g/kg and 0.85 g/kg); the single dose of marihuana that we used (2.4% THC); the man-

Table 1. Blood-Ethanol Concentrations

Subject	T _{max} (min)	C _{max} (mg/dl)	AUC (mg/dl*min)	T _{max} (min)	C _{max} (mg/dl)	AUC (mg/dl*min)
Low Ethanol/Placebo						
1	45	46	5,010	45	29	3,563
2	45	67	6,945	30	62	5,693
3	45	77	7,673	45	75	11,820
4	30	80	7,538	45	59	6,855
5	45	96	13,275	30	90	9,458
6	30	50	4,695	45	36	3,975
Mean	40	69.3	7,523	40	58.5	6,894
SEM	3.2	7.8	1,262	3.2	9.4	1,315
High Ethanol/Placebo						
1	75	76	15,938	120	77	17,903
2	60	110	22,950	45	140	26,085
3	90	140	32,978	75	98	27,180
4	60	120	27,668	45	140	29,520
5	30	130	24,315	30	110	18,293
6	75	84	18,533	30	130	20,520
Mean	65.0	110.0	23,730	57.5	115.8	23,250
SEM	8.4	10.4	2,515	14.2	10.4	2,028
High Ethanol/Marihuana						
1	75	76	15,938	120	77	17,903
2	60	110	22,950	45	140	26,085
3	90	140	32,978	75	98	27,180
4	60	120	27,668	45	140	29,520
5	30	130	24,315	30	110	18,293
6	75	84	18,533	30	130	20,520
Mean	65.0	110.0	23,730	57.5	115.8	23,250
SEM	8.4	10.4	2,515	14.2	10.4	2,028

ner in which our subjects ingested ethanol (2 ml/kg of 100 proof vodka dissolved to 300 ml with orange juice was ingested in divided doses over a 30-minute interval); the manner in which our subjects smoked marijuana (uncontrolled smoking); the length of time of observation (360 minutes) and the intervals in which we collected the blood samples (15 and 30 minute intervals); and the biofluid that we used to measure ethanol levels by gas chromatography (whole blood). These minor methodological differences would not appear to account for the divergence of the results between the two studies. However, a major difference in the experimental design between the two studies was the use of a within-subjects paradigm ($n = 6$) in our study, in which each subject served as his own control, in contrast, to the between-subjects paradigm ($n = 5$) used by Lukas et al. in which each of the three experimental groups was composed of different subjects.

It should be noted that there are large individual variations in the rate of ethanol absorption from the gastrointestinal tract. Thus, despite the precautions

taken in our study to maximize the uniform absorption of ethanol (ingestion after an overnight fast, always at the same time of the day, dose calculated in terms of body weight, and uniform rate of administration), the gastrointestinal absorption of ethanol varied considerably (Table 1). It is possible that the difference in experimental design between the two studies may account for the disparity between the results. However, because both studies used a small sample size, further research is necessary to clarify the effects of marijuana smoking on the gastrointestinal absorption of ethanol.

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REFERENCE

- Perez-Reyes M, Hicks EH, Bumberry J, Jeffcoat AR, Cook CE (1988): Interaction between marijuana and ethanol: Effects on psychomotor performance. *Alcohol Clin Exp Res* 12:268-276