

RATES OF ETHANOL ELIMINATION IN THE
LUNCHTIME ALCOHOL SYNDROME

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Some people complain that they feel drowsy and depressed after two alcoholic drinks at lunchtime but that the same amount of alcohol in the evening is a pleasant stimulant. In a small survey of our colleagues, 21 out of 33 (i.e. 60%) who take alcohol had noticed this phenomenon and none were affected more adversely by alcohol in the evening.

We can find only three conflicting reports on the rate of alcohol metabolism at different times of the day in man. Sturtevant et al. (1976) studied only one subject; Jones (1974) compared afternoon decline of breath alcohol in one group with previous evening measurements in another group. Wilson et al. (1956) found in five day-workers, given 17 mL alcohol every hour, that blood concentrations tended to rise up to around 2000 hours and then decline, but they did not control the size of their subjects' meals.

We therefore carried out experiments in the Metabolic House in which healthy volunteers took vodka and orange (alcohol 0.3 g/kg) on two occasions: at midday and in the evening. Capillary blood was taken every 20 min from fingertips, heparinized, spun in a micro-centrifuge, refrigerated and analysed in a batch for ethanol by gas chromatography with isopropanol as internal standard. Eight subjects had a standard 'lunch' (2.4 MJ) at midday and a standard 'dinner' (5.2 MJ) in the evening; another nine had 'lunch' at dinner-time and 'dinner' at lunchtime. Blood alcohol showed no consistent differences in the down-slope of the 4-hour curve but the ascending parts and the peaks were variable, possibly because the alcohol was taken over 45 min with the meal.

In a further experiment, 12 subjects consumed the same dose of alcohol (pure) as a draught before the meal, on two occasions: at midday and in the evening (or vice versa). The meal was the same at both times (mixed and 4.4 MJ). Blood alcohol peaks were higher (around 9 mmol/L or 42 mg/dL) and usually reproducible within pairs. But the rate of disappearance was not slower in the afternoon, whether determined by inspection of the graphs, by exponential curve fitting, by linear regression analysis (Kalant 1971), or by measurement of the areas under the curves.

We conclude that the lunchtime alcohol syndrome is not caused by differences in concentration of alcohol in body water or in liver metabolism. It must presumably result from circadian changes in the sensitivity of the brain to ethanol.

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