Abstract for the scheduled symposium “Acetaldehyde and Alcoholism: Basic and Clinical Perspectives”

ACETALDEHYDE AND THE CENTRAL EFFECTS OF ALCOHOL: BEYOND THE DISCREPANCIES BETWEEN ANIMAL AND HUMAN STUDIES

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Whereas human studies keep reporting evidence that acetaldehyde accumulation prevents alcohol drinking and alcoholism, animal studies support a rewarding rather than aversive role for acetaldehyde. In recent years, the reinforcing properties of acetaldehyde were demonstrated in various rodent strains and using different experimental methods. These results led to the hypothesis that acetaldehyde might be involved in the addictive properties of alcohol. The most recent experimental studies suggest that the apparent discrepancies between animal and human studies might be due to the localization of acetaldehyde accumulation. Whereas peripheral acetaldehyde accumulation leads to adverse reactions and prevents alcohol drinking, brain acetaldehyde is believed to be primarily reinforcing in both rodents and humans. In addition to its possible role in the reinforcing properties of alcohol, there is also evidence that acetaldehyde is involved in many other behavioral effects of ethanol. This presentation reviews the latest results about the behavioral properties of acetaldehyde. In both CD1 and C57BL/6J mice, acetaldehyde induces locomotor depressant, sedative and amnesic effects. These effects are observed when acetaldehyde is administered either in the periphery or directly into the brain. In contrast to previous studies in rats, we found no evidence of the stimulant effects of acetaldehyde over a wide range of doses, whether injected in the periphery or administered intracerebroventricularly. Additional studies with cyanamide, an aldehyde dehydrogenase inhibitor leading to peripheral and central acetaldehyde accumulations after ethanol administration, also confirm the role of acetaldehyde in the locomotor depressant, sedative and amnesic effects of ethanol. However, a key issue remains to be addressed in order to demonstrate the role of acetaldehyde in alcohol abuse. To date, it remains uncertain whether pharmacologically relevant acetaldehyde concentrations are formed in the brain after alcohol consumption in vivo.