research has resulted in the development of a 34 item inventory which seems to discriminate individuals experiencing a mood disturbance as a result of the ingestion of either caffeine or sucrose The cross-validation phase of this research revealed that the inventory successfully discriminated between individuals who were sensitive to these dietary substances as opposed to those individuals who were not sensitive to these substances The sensitive individuals were identified by the use of double-blind challenges Consequently, this research has resulted in the development of an instrument that can be used by researchers to identify the individuals experiencing a dietary induced mood disturbance

POSSIBLE MECHANISMS FOR DIET-INDUCED CHANGES IN MOOD Michael E Trulson Texas A&M University

Recently, a great deal of research has been directed at elucidating the effects of dietary manipulations on mood The most commonly studied dietary constituents are proteins, amino acids, and carbohydrates Ultimately, all three of these categories of foodstuffs concern the role of amino acids on brain function This is due to the fact that proteins are broken down to their constituent amino acids In addition, carbohydrates elicit the secretion of insulin which, in turn, has an effect on plasma levels of amino acids Of the amino acids, tryptophan and tyrosine have been most intensively studied Tryptophan is converted in brain to the neurotransmitter serotonin, while tyrosine is converted to the neurotransmitters dopamine and norepinephrine All three of these monoamine neurotransmitters have been postulated to be involved in mood regulation It has been established that it is the ratio of a given neutral amino acid to the sum of the competitive neutral amino acids in the plasma that determines how much of that amino acid is taken up into the brain The concentration of tryptophan divided by the concentration of the sum of the competing neutral amino acids will determine how much tryptophan is taken up into the brain Likewise, the concentration of tyrosine divided by the concentration of the sum of the remaining neutral amino acids that will determine how much of tyrosine is taken up into the brain When tryptophan is taken up into the brain it is converted to serotonin and produces an increase in brain serotonergic function, due to the unsaturated state of the rate-limiting enzyme, tryptophan hydroxylase Similarly, dietary manipulations that change the ratio of tyrosine to the sum of the competing neutral amino acids would change brain tyrosine and, since the rate-limiting enzyme in catecholamine biosynthesis, tyrosine hydroxylase, is unsaturated, would change the amount of catecholamines synthesized Such changes occur rapidly in a subject with no mood disturbances and there appears to be a simple relationship between synaptic monoamines and mood On the other hand, individuals with clinical symptomatology do not respond immediately to dietary manipulations Rather, there is a lag time in the treatment of patients with mood disorders The reason for this lag time in patients with mood disorders is not clear However, it is interesting to note that a similar lag time exists for treatment of mood disorders with drugs such as tricyclic antidepressants or lithium That is, even though a single administration of these drugs elevates synaptic levels of monoamine neurotransmitters, clinical improvement is not seen for approximately two weeks of drug therapy This has been attributable to the need for adjustments at postsynaptic receptor sites Thus, there appears to be two separate mechanisms by which dietary-induced mood changes occur First, in normal subjects the changes seem to be directly attributable to alterations in synaptic levels of monoamine neurotransmitters and occur after acute administration of dietary change Secondly, individuals with clinical mood disturbances require a prolonged administration to achieve a therapeutic effect, which appears to be due to post-synaptic adjustments

SYMPOSIUM

Motivational Determinants of Alcohol Use A Multidisciplinary Perspective

Monday August 31, 1987 • 3 00 p m –4 50 p m
Marriott Marquis Hotel • Julliard/Imperial Room

Chair *Eric Klinger*, Division of Social Sciences, University of Minnesota, Morris, MN

INVOLVEMENT OF MONOAMINES IN DRINKING BEHAVIOR OF SELECTIVELY BRED ALCOHOL PREFERRING RATS W J McBride, J M Murphy, L Lumeng and T -K Li Department of Psychiatry, Medicine and Biochemistry, The Institute of Psychiatric Research and The Regenstrief Institute, Indiana University School of Medicine and the VA Medical Center Indianapolis, IN

There is convincing evidence that heritable factors contribute significantly to the development of alcoholism In addition, there is evidence that there are probably several subtypes of alcoholism, affected to different degrees of environmental and genetic factors One experimental approach toward understanding the biological basis of the factors which contribute to the genetic predisposition to alcoholism is to establish, through selective breeding, an animal model of alcoholism We have developed such an animal model through the selective breeding of a line of alcohol-preferring (P) rats This P line of rats (a) freely consumes 5–7 g ethanol/kg body wt /day, (b) drinks sufficient alcohol to produce intoxicating blood alcohol concentrations, (c) works to obtain alcohol, (d) self-administers ethanol for its CNS pharmacological effects, (e) develops chronic tolerance to alcohol, and (f) demonstrates signs of physical dependence upon withdrawal of alcohol Neurochemical data indicate a deficit in the serotonergic and dopaminergic pathways projecting to the nucleus accumbens of the P line of rats Evidence also indicates that acute or chronic ethanol affects both of these monoamine pathways in the P line Pharmacological studies demonstrated that serotonin uptake inhibitors (e g , fluoxetine) can reduce the oral consumption or intragastric self-administration of alcohol in the P line of rats In addition, it appears that IP fluoxetine increases the physiologically active pool of serotonin in the nucleus accumbens Since the nucleus accumbens is thought to be a critical part of the brain reward system, the data suggest that serotonin and possibly dopamine may be involved in the alcohol drinking behavior of this selectively bred line of rats (Supported in part by HHS AA-03243)

CONDITIONING AND LEARNING VARIABLES THAT DEFINE THE REINFORCING PROPERTIES OF ALCOHOL Peter E Nathan Rutgers, The State University

The role of learning factors in the development and main-