

ous history of cigarette smoking The nicotine tube has been marketed as a nicotine delivery system that allows smokers to obtain nicotine from the tube in settings where smoking is prohibited The manufacturer makes no health claims about the product Its use may remove environmental pressures to quit smoking and help maintain tobacco dependence The effectiveness of the tube in delivering nicotine to the body has been questioned Nicotine gum has been marketing as a therapeutic device to aid nicotine dependent users in abstaining from tobacco cigarettes The gum is dispensed only through the prescription of a physician, although its acceptance by the medical community has not met initial expectations of some The proliferation of nicotine delivering devices has raised a number of public policy issues Recent state and federal actions that regulate the devices or their marketing will be discussed as well as future policy trends

SYMPOSIUM

The Impact of Diet on Mood States

Monday August 31, 1987 • 2 00 p m -2 50 p m
Marriott Marquis Hotel • Empire/Hudson/Chelsey Room

Chair *Larry Christensen*, Texas A&M University

THE BIPHASIC EFFECT OF CALCIUM ON MOOD AND EMOTIONAL BEHAVIOR

Kamyar Arasteh, Texas A&M University

Mood and emotion have been shown to be attenuated by biochemical changes The therapeutic use of pharmacological agents in the therapy of depression, for example, is an instance of the general susceptibility of emotion to physiological change Dietary substances represent a major source of the transient biochemical make-up of an organism and as such they should influence behavior, cognition, and emotion Calcium, as one of the essential minerals in the diet of humans, plays an important role in the cellular processes including neuronal transmission, and neurotransmitter secretion Moreover, because alterations in emotion have been shown to be associated with changes in the neurotransmitter function, calcium might prove influential in the emotional process In one experiment intended to assess this proposed effect, rats were maintained on a high calcium water solution and tested in a learned helplessness paradigm The high-calcium rats showed significantly longer escape latencies than their control counterparts Also, biochemical assays revealed that, in contrast to the control group, high-calcium rats had a significantly lower level of activity of the neurotransmitter 5-hydroxytryptamine, a finding associated with depression In another experiment, human participants were given a much lower dose of calcium and were then administered several scales designed to assess changes in mood and cognition The calcium group, when compared to the placebo group, showed a significant enhancement of mood It is, therefore, proposed that calcium influences mood and emotional behavior, and that this influence is exerted in a dose-dependent and biphasic fashion More specifically, small increases in the level of calcium are suggested to enhance mood, while large increases are thought to exacerbate the same

PRESENTING SYMPTOMS AND PSYCHOLOGICAL CHARACTERISTICS OF DIET INDUCED MOOD-DISTURBANCE

Kelly Krietsch, Texas A&M University

Caffeine is a dietary substance that has typically been

thought of as a psychoactive drug which has the effect of increasing alertness and decreasing drowsiness Since the late 1970's a number of studies have appeared which have challenged this general assumption and have revealed that caffeine seems to be related to a variety of mood states such as depression, anxiety, and irritability However, caffeine's effect is very idiosyncratic affecting different individuals in different ways Additionally, caffeine is not a substance affecting all individuals who are experiencing depression or anxiety Sucrose is another substance which seems to have a similar idiosyncratic influence on individuals Although the literature on sucrose is contradictory, evidence exists indicating that this dietary substance does have an effect on certain individuals although these individuals are definitely not those with Attention Deficit Disorder The literature is very consistent in demonstrating that the effect of sucrose, if any, is to benefit this disorder However, another body of literature indicates that sucrose seems to have the effect of increasing fatigue, reducing vigor and increasing depression But sucrose is not related to all individuals with such symptoms Therefore, several studies were conducted which attempted to identify the presenting symptoms and the psychological characteristics of individuals who possessed symptoms induced by dietary caffeine and dietary sucrose In order to identify these presenting symptoms and psychological characteristics it was necessary to identify a group of individuals who were responsive to each of these substances and then focus on the characteristics and symptoms which differentiated these two groups Double-blind challenges with dietary caffeine or sucrose were used to identify those individuals whose symptoms were totally or partially due to ingestion of caffeine and/or sucrose Analysis of the presenting symptoms revealed that the subjects responsive to these substances presented with a specific set of symptoms but they did not reveal a set of psychological characteristics which would differentiate them from those who did not respond to dietary caffeine and/or sucrose

A PSYCHOMETRIC TEST FOR IDENTIFYING A DIETARY INDUCED MOOD DISTURBANCE

Larry Christensen, Texas A&M University

Within the past decade a number of studies have appeared in the literature documenting the fact that various dietary substances can have an impact on behavior Caffeine, for example, has been demonstrated to have an impact on anxiety, depression, restlessness, and irritability Sucrose has been demonstrated to have a variety of effects such as inducing sleepiness, drowsiness, and confusion, and reducing vigor The difficulty with applying this knowledge is that the affects of these dietary substances are idiosyncratic Caffeine, for example, will produce insomnia and nervousness in some people and increased alertness and a feeling of contentedness in others Similarly, sucrose has been demonstrated to produce drowsiness and confusion in some individuals but have no negative impact on other individuals such as hyperactive children In fact some evidence indicates that sucrose may be of benefit to hyperactive children Consequently, some mechanism is needed that will be able to identify those individuals that are experiencing a negative impact from the dietary substances caffeine and sucrose For the past several years we have been developing a psychometric instrument explicitly for the purpose of identifying individuals with a dietary induced mood disturbance This

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 adjust-

ments 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-