

It has become increasingly in vogue to state that nicotine is more addictive than heroin, cocaine and other prototypic drugs of abuse. Often used to support the claim are data such as those showing the extraordinarily high likelihood of progression to daily tobacco use following experimentation with a few cigarettes as well as the high percentage of cigarette smokers who appear addicted when compared to users of other addictive drugs. In the context of criteria for addiction or dependence presented by the World Health Organization, the American Psychiatric Association, and the U.S. Surgeon General, we present a review of several lines of evidence including patterns of use, mortality, physical dependence potential, and pharmacologic addiction liability measures. Comparative data from studies in which human and animal subjects have been permitted to self-administer either nicotine, cocaine or heroin are also reviewed. These sets of data provide a rational framework for comparing nicotine to opioids and psychomotor stimulants, and to a lesser extent, to alcohol. We conclude that nicotine is not more addicting than cocaine or heroin. We suggest that these are all highly addicting drugs for which factors such as availability, price, social pressures, regulations, and certain pharmacologic characteristics, strongly influence patterns of use, the development of dependence, and other problems.

BEHAVIORAL TREATMENT OF NICOTINE ADDICTION. Maxine Stitzer, The Johns Hopkins School of Medicine, Baltimore, MD. (Abstract not available)

CLINICAL TRIALS WITH NICOTINE REPLACEMENT THERAPIES. Dorothy Hatsukami, University of Minnesota, Minneapolis, MN.

Several studies have been conducted examining the efficacy of nicotine gum on smoking cessation treatment outcome. In general, the results show that nicotine gum is an effective treatment agent; however, the efficacy diminishes over time. Further, in physician-based trials, the results are not very promising. Treatment efficacy may be maximized by varying the dose, duration and/or route of nicotine replacement. However, only a small number of studies have been conducted examining whether these factors may improve success. Further, very limited research has been conducted examining the effects of nicotine replacement on other tobacco dependence disorders such as smokeless tobacco. This paper will discuss current and new studies examining the effects of dose and duration of nicotine replacement on treatment outcome. In addition, the results from a multicenter trial which found significant effects of a transdermal nicotine system on nicotine withdrawal signs and symptoms and treatment outcome will be covered. Finally, research on the effects of nicotine gum on smokeless tobacco withdrawal symptoms and treatment outcome will be presented.

PRIMARY REINFORCEMENT IN THE MAINTENANCE OF CIGARETTE SMOKING. Jed E. Rose and Edward D. Levin, VA Medical Center, Durham, NC.

Research on smoking cessation has increasingly focussed on pharmacological aspects of nicotine and nicotine withdrawal. However, cigarette smoking also provides a characteristic set of sensory cues. These sensory aspects of smoking are important to address in that they may be potent conditioned reinforcing stimuli linked to the actions of nicotine. The repetition of the smoking act thousands of times per year by a moderately heavy

smoker leads to a strong conditioned association between the sensory aspects of smoking (the putative CS) and the pharmacological effects of nicotine (the putative UCS). Strategies for disrupting CS-UCS associations may be useful in developing more effective smoking cessation treatments. These include: counter-conditioning of the CS; presenting the CS alone; presenting the CS with the UCS but pharmacologically blocking the UCS; and presenting the CS and UCS in an unconnected fashion. The role of sensory cues in alleviating craving for cigarettes is discussed, and specific techniques for duplicating relevant sensory aspects of smoking without delivering significant doses of nicotine are described. The combination of nicotine and nicotinic antagonists to block primary reinforcement and hasten extinction of conditioned reinforcement is also considered.

NICOTINE AS A TREATMENT FOR MEDICAL AND PSYCHIATRIC DISORDERS. John R. Hughes and Paul A. Newhouse, University of Vermont, Burlington, VT.

Nicotine is one of the major neurotransmitters; thus it is likely to have effects on medical and psychiatric diseases independent of its role in smoking dependence. This presentation reviews several possible therapeutic roles for nicotine therapy. Parkinson's disease is less prevalent in smokers and some positive therapeutic effects of nicotine in Parkinsonism have been reported. Nicotine also may improve motor tics and Tourettes syndrome. Patients with Alzheimer's disease have fewer nicotinic receptors and nicotine appears to produce at least short-term benefit in Alzheimer's. Ulcerative colitis, but not granulomatous colitis, is less prevalent in smokers and patients with ulcerative colitis describe worsening of the disease with smoking cessation and improvement with relapse. The single nicotine therapy trial was negative. Depressed patients are more likely to smoke and smoking cessation may precipitate depression in subjects with a past history of depression. Whether nicotine could be used as a treatment for depression in such patients is unclear. The above-cited information on nicotine therapy is based almost exclusively on case reports; thus results are quite tentative at this time. Before scientific tests of nicotine therapy are indicated, studies of nicotine tolerance, abuse, dependence and safety in nonsmokers and ex-smokers using acute and then chronic dosing are needed.

SYMPOSIUM

Dependence Potential of Caffeine in Humans

Chair: *Stephen J. Heishman*, NIDA Addiction Research Center, Baltimore, MD.

Discussant: *Jack E. Henningfield*, NIDA Addiction Research Center, Baltimore, MD.

CAFFEINE-NICOTINE INTERACTIONS DURING NICOTINE WITHDRAWAL. David Sachs, Palo Alto Center for Pulmonary Disease Prevention, Palo Alto, CA. (Abstract not available)

SUBJECTIVE AND DISCRIMINATIVE STIMULUS EFFECTS OF CAFFEINE. Larry D. Chait, University of Chicago, Chicago, IL.

Studies of the subjective and discriminative stimulus effects of caffeine will be reviewed. Drug discrimination studies with laboratory animals indicate that the stimulus effects of caffeine show at least some drug-class specificity—in most studies theophylline, another methylxanthine, fully substitutes for caffeine, whereas stimulants from other pharmacological classes (e.g.,