

in a municipal hospital. The principles of administering such programs are discussed, with illustrations of how to build a support base by applying research results to clinical programs, seeking funds from nonlocal sources, and addressing the needs of the organization in which it is located. The authors are co-directors of a Treatment Research Unit, one of eight units funded by the National Institute on Drug Abuse to develop and evaluate innovative drug treatments to slow the spread of AIDS. The San Francisco TRU is presented, including the leadership role of psychologists in fostering collaboration among professional disciplines, the scope of pharmacological and behavioral treatment trials, and preliminary research results. The roles described here (providing administrative and research leadership in substance abuse treatment) fit well with the discipline of psychology, but there is a need for more emphasis on substance abuse, applied research, and administrative leadership skills in training programs for psychologists. (Supported by Grant No. 1R18DA-06097 from the National Institute on Drug Abuse.)

**OPPORTUNITIES FOR CLINICIANS IN SUBSTANCE ABUSE.** Joan Ellen Zweben. The East Bay Community Recovery Project, Oakland, CA.

Many exciting possibilities exist for clinical psychologists with substance abuse expertise. Manifestations of alcohol and drug use readily imitate every other entity seen in a clinical practice, allowing both use and abuse to influence treatment in ways which often remain unrecognized. Failure to assess and appropriately treat or refer places the psychologist in an increasingly untenable position, especially as sophistication about drug and alcohol problems increases among other professionals and the lay public. The clinician with knowledge of addictive disorders is a valuable asset to treatment teams in mental health settings, crisis services, and other specialty settings such as eating disorders programs. Enormous opportunities for undergraduate, graduate, and postgraduate teaching have developed as clinicians in other fields become aware of the importance of this problem. An increasing number of states mandating substance abuse training as a condition of licensure heightens the demand for clinical supervisors with updated skills in this area. Within the field of substance abuse itself, increasing awareness of the comorbidity of mental disorders with alcohol and other drug abuse has stimulated a desire to upgrade the skills of existing practitioners. Historically, many front line counselors come to the field via the route of their own recovery, carrying a mistrust of the professional community. With the growing recognition of the magnitude of the problem of coexisting disorders, the sophisticated assessment and treatment skills of psychologists is increasingly appreciated. Working with victims of childhood physical and sexual abuse, AIDS dementia and other issues, and the need to document the effectiveness of treatment interventions are but a few examples of places psychologists in substance abuse have made contributions.

#### **PAPER SESSION**

*Recent Findings in the Neurobiology of Drug Abuse*

Chair: *Steven I. Dworkin*, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, NC.

**REINFORCING AND ANXIOGENIC PROPERTIES OF SELF-ADMINISTERED COCAINE.** Aaron Ettenberg. University of California, Santa Barbara, CA.

It has long been known that the administration of dopaminer-

gic antagonist drugs can interfere with the initiation and maintenance of operant behaviors. Qualitative and quantitative analyses of such results have led many to suggest a role for central dopamine (DA) pathways in neurobiology of positive reinforcement. To further investigate this hypothesis, our laboratory has developed a series of behavioral tests that provide a means of examining the putative reward-attenuating actions of dopamine antagonists in animals that are no longer drugged at the time of testing. Data derived from these tests are not, therefore, confounded by the motoric and sedative side effects of neuroleptic treatments. Our results thus far provide support for the notion of a dopaminergic role in the reinforcing action of food, water and amphetamine. In experiments with IV cocaine reward, an unexpected anxiogenic action of the drug was identified. This took the form of a diazepam-reversible "conflict" behavior for entering a goal box associated with prior cocaine administration. While the cocaine appears to maintain its reinforcing properties with repeated exposure (as measured by traditional conditioned place preference) the putative "anxiogenic" action appears to increase in magnitude over trials/days. This work has implications for understanding the concurrent positive (reinforcing) and negative (anxiogenic) consequences that together determine the nature and extent of cocaine self-administration.

**MDMA AND THE PSYCHOPHARMACOLOGY OF PRESYNAPTIC SEROTONIN RELEASERS.** Mark A. Geyer. University of California, San Diego, La Jolla, CA.

Methylenedioxyamphetamine (MDMA or Ecstasy) is an amphetamine derivative with novel effects that are distinguishable from hallucinogens or amphetamine. In rats, studies using a behavioral pattern monitor to record sequences of locomotion and investigation demonstrate that MDMA congeners increase locomotion and decrease investigation. The hyperactivity is blocked selectively by the serotonin uptake inhibitor fluoxetine or the serotonin synthesis inhibitor PCPA, but not by a dopamine synthesis inhibitor. These drugs also disrupt the spatial patterning of locomotion in a manner that is distinguishable from amphetamine. Hence, these drugs increase activity by releasing serotonin.

**NEURAL MEDIATORS OF THE DISCRIMINATIVE STIMULUS EFFECTS OF COCAINE.** Kathryn A. Cunningham and Patrick M. Callahan. The University of Texas Medical Branch at Galveston, Galveston, TX.

The subjective aspects of the reinforcing effects of cocaine can be inferred from the study of its interoceptive stimulus properties in animals using drug discrimination procedures; the neural mechanisms underlying this *in vivo* effect of cocaine are accessible to pharmacological analysis. In this behavioral assay, cocaine-induced internal states become biologically meaningful and function as interoceptive stimuli ("cues") which signal the availability of reinforcement. These subjective "cues" associated with cocaine probably play an important role in establishing and maintaining cocaine dependence. Although cocaine is a local anesthetic and inhibits reuptake mechanisms for dopamine (DA), serotonin (5-HT) and norepinephrine (NE), previous research suggests that DA is the primary neurotransmitter involved in the interoceptive cocaine state. To gain a full appreciation of the specific brain mechanisms underlying the stimulus effects of cocaine, the present research was designed to investigate the role of reuptake inhibition and specific DA receptor subtypes (D<sub>1</sub> and D<sub>2</sub>) in mediating the cocaine cue. Although reuptake inhibitors