

include some assumed to be physiologically related to the drug dependence process (e.g., anxiety or stress), while others are assumed to function at more of a behavioral level (e.g., the sight of drug-associated stimuli).

### **Types of Treatment for Drug Dependence**

Treatment approaches can be divided into those which involve the administration of drugs (Pharmacologic Treatment Approaches) and those which do not (Nonpharmacologic or Behavioral Treatment Approaches). Sophisticated methods involving both pharmacologic and behavioral approaches are more recent developments and show considerable promise for the treatment of dependence to alcohol, opioid, cocaine-like drugs, and nicotine (Grabowski, Stitzer, Henningfield 1984). Although considered separately in this Section, pharmacologic and behavioral treatment approaches are commonly combined and may be most effective when used in combination (Grabowski, Stitzer, Henningfield 1984; Crowley and Rhine 1985). Combined treatment approaches specific to cigarette smoking are discussed in Chapter VII.

### **Pharmacologic Treatment of Drug Dependence**

Four pharmacologically based approaches for the treatment of drug dependence can be differentiated: (1) *replacement* or *substitution therapy* (e.g., methadone for opiate dependence), in which a more manageable (and ideally, less addicting) form of the drug is provided; (2) *blockade therapy* (e.g., naltrexone for opiate dependence), in which the behavior-controlling effects of the abused drug are blocked by pretreatment with an antagonist; (3) *nonspecific pharmacotherapy*, in which the patient is treated symptomatically (e.g., use of clonidine during opioid detoxification); and (4) *deterrent therapy*, in which administration of the treatment drug results in the occurrence of aversive effects when the abused drug is subsequently taken (e.g., the use of disulfiram to treat alcoholism (Grabowski, Stitzer, Henningfield 1984; Jaffe 1985). Each of these approaches has been described in greater detail elsewhere and will be only briefly described below (Cooper, Altman, Brown, Czechowicz 1983; Bigelow, Stitzer, Liebson 1985; Jaffe 1985; Jasinski, in press; Jasinski and Henningfield 1988; Jarvik and Henningfield, in press).

#### *Replacement Therapy*

The most widely investigated and evaluated pharmacologic treatment approach for drug dependence is replacement therapy. The general principle of replacement therapy is to provide the patient with a safer and more manageable form of drug that directly alleviates signs and symptoms normally suppressed by the substance

upon which the patient is dependent (Jaffe 1985, 1987; Jasinski and Henningfield 1988). Ideally, it should also be of lower dependence potential so that its use may be more readily discontinued than use of the original form on which the person is dependent.

Replacement therapies function through four general actions: (1) they block the onset of the physiologically mediated aspects of withdrawal; (2) they maintain a level of tolerance that attenuates the reinforcing properties of the abused chemical; (3) they treat ("suppress") other signs and symptoms such as dysphoria that may constitute vulnerability and pose an impediment to normal functioning and well-being; (4) they directly suppress drug-taking behavior, much as caloric loading can suppress eating.

The drugs that are widely used to alleviate withdrawal symptoms by providing some level of pharmacologic replacement are the following: methadone for opiate withdrawal (Cooper, Altman, Brown, Czechowicz 1983), benzodiazepines for alcohol withdrawal (Sellers et al. 1983; Newsome and Seymour 1983; Liskow and Goodwin 1987), and nicotine polacrilex gum for tobacco withdrawal (Chapters IV and VII). The potential effectiveness of these agents in prevention or relief of withdrawal symptoms has been well documented (Jaffe 1985). However, relief of early withdrawal symptoms does not necessarily yield improved overall treatment outcomes. Primary withdrawal symptoms for all dependence-producing drugs are time limited, and their duration does not span the entire high-risk period for postcessation relapse. These observations are consistent with the finding that withdrawal symptomatology is only one of several potential relapse determinants.

Besides relief of withdrawal symptoms, there are several other functions that a replacement therapy might serve that would make continued long-term treatment beneficial. One of these functions is a reduction in the need for the primary addicting drug, along with a similar reduction in drug seeking. Just as importantly, the replacement therapy may reduce or eliminate symptomatology (e.g., anxiety, antisocial behavior, inability to concentrate on tasks) that may interfere with the person's ability to perform in occupational settings and maintain social relationships. Analogously, nicotine replacement therapy during cigarette abstinence can reduce or eliminate tobacco intake and symptoms that interfere with normal social or occupational activities, even though urges to smoke may not be eliminated (Chapter VII).

The constraints on the efficacy of replacement therapies are generally similar across drug classes. Most importantly, the clinical application of replacement therapies is impeded by the influence of nonpharmacologic factors, which vary among individuals and/or situations (e.g., the specific drug delivery system customarily used and ritualistic aspects of the behavior). Pharmacologically related

differences may also mitigate acceptability of the replacement drug; e.g., orally administered replacements are generally not as satisfying to the user as i.v. or inhalation systems, such as the "crack" form of cocaine or tobacco smoke. In addition, replacement therapies do not reliably diminish the urge to use the drug or specific drug formulation (e.g., cigarette brand or alcoholic beverage) to which a person is accustomed. (Issues related to craving are discussed in greater detail in Chapters IV and VII; Childress et al., in press; Henningfield and Brown 1987.)

### *Blockade Therapy*

A pharmacologic alternative to replacement therapy is to produce a pharmacologic blockade of receptors which mediate the reinforcing as well as the toxic effects of the drug (Jaffe 1985). For opioid agonists such as morphine and heroin, the short-acting antagonist naloxone can be used to reverse the effects of an overdose of the opioid agonist. The longer acting antagonist naltrexone can be given on a daily basis to opioid users to prevent them from experiencing the reinforcing and toxic effects of opioid agonists. Unfortunately, clinical trials have shown that there is frequently poor compliance with blockade therapy (Ginzburg 1986). Lack of compliance results in limited clinical utility. No clinically tested antagonist treatments are currently available for the treatment of alcohol or nicotine dependence, although experimental research with the nicotine blocker, mecamylamine, suggests that such an approach may hold promise (Chapter VII; Jarvik and Henningfield, in press).

### *Nonspecific Pharmacotherapy or Symptomatic Treatment*

Administration of and abstinence from dependence-producing drugs produce a cascade of effects involving a variety of neurochemical and physiological effects. As discussed with regard to nicotine in Chapters III and VI, such drug actions mediate many of the desirable and undesirable effects. In principle, it is possible to target treatment approaches on a symptomatic basis.

One example of such an approach is the use of an antidepressant (desipramine) to help achieve and maintain abstinence from cocaine (Gawin and Kleber 1984); cocaine abstinence is often accompanied by symptoms of depression. Somewhat analogous is the use of clonidine to treat opioid withdrawal symptomatology (Gold, Dackis, Washton 1984). Clonidine seems to exert its primary actions by suppressing aspects of opioid withdrawal that are mediated by the activity of the sympathetic nervous system (SNS). In one study, clonidine was just as effective as morphine in the reduction of certain physiological signs of opioid withdrawal (Jasinski, Johnson, Kocher 1985); however, in that study, clonidine did not reduce the self-reported

“discomfort” as effectively as did morphine. These observations are consistent with the conclusion that some but not all of the effects of the opioid withdrawal syndrome are mediated by the SNS and that treatment of these effects may provide limited but objective benefit. An analogous approach has been explored for application of clonidine in the treatment of tobacco withdrawal (Glassman et al. 1984, 1988), but conclusions are only suggestive of the possible viability of this approach (Chapter VII; Jarvik and Henningfield, in press).

### *Pharmacologic Deterrents*

Drug taking can sometimes be reduced or eliminated if the consequences are immediate and/or severe enough (Crowley and Rhine 1985). There has been some effort to develop pharmacologic treatments that ensure immediate, reliable, and highly aversive (but safe) effects following self-administration of the drug of dependence. Only one such agent has provided a near approximation of these criteria: disulfiram, which is used in the treatment of alcoholism (Jaffe and Ciraulo 1985; Miller and Hester 1986a). When disulfiram has been taken, a small amount of alcohol can produce rather severe discomfort and acute illness. Reviews of controlled treatment outcome studies (Miller and Hester 1986a) suggest that many of the therapeutic effects of disulfiram may also derive from placebo effects. Thus, in some studies (e.g., Fuller and Roth 1979), outcomes have been similar for placebo and active drug groups, with only medication-compliant individuals (about 20 percent in each group) showing good outcomes.

No deterrents comparable to disulfiram in potential efficacy have been clinically tested for treatment of dependence on opioids or nicotine (see also Chapter VII). As with antagonists, a practical problem in treatments using deterrents is compliance, i.e., maintaining adequate levels of use of the medication itself. A deterrent is ineffective if it is not taken, and development of contingencies to ensure that the patient takes the deterrent has proceeded slowly (Bigelow, Stitzer, Liebson 1984, 1985; Stitzer, Bigelow, Liebson, McCaul 1984). Therefore, even if theoretically effective deterrents become available for treatment of other drug dependencies, their utility might be limited.

### **Behavioral Treatment Strategies**

Despite the powerful sequelae which may accompany both drug administration and drug abstinence, most drug-dependent persons (possibly excluding opioid users) are not systematically treated with pharmacologic approaches. Drug dependent persons may eventually “spontaneously remit” (discussed earlier in this Chapter), but many others enter formal treatment programs that provide supportive and

behavioral therapy. Behavioral treatment approaches have a heterogeneous array of theoretical bases and means of implementation (Stitzer, Bigelow, McCaul 1983). Although the term "behavioral treatment" is often reserved for approaches which involve the systematic application of behavior modification, it is sometimes applied to any nonpharmacologic approach. Thus, behavioral strategies may involve group support, individual counseling, skills training, or family intervention (Krasnegor 1979a; Grabowski, Stitzer, Henningfield 1984). The present Section will provide a brief review of behavioral approaches aimed largely at relapse prevention.

The major challenge in the treatment of drug dependence is no longer in the initial attainment of abstinence; rather it is in the maintenance of abstinence. In fact, it is worth noting that the shift in emphasis from achievement of abstinence to the maintenance of abstinence is an important advance in treatment efficacy in itself (McAuliffe et al. 1986). This current focus has resulted in the development of nonpharmacologically based approaches aimed at what is often termed relapse prevention. In the past decade, relapse prevention interventions have been increasingly founded on empirical investigations of situational precipitants of relapse and/or have addressed factors known to predict relapse that can be manipulated (Catalano and Hawkins 1985; Catalano et al., in press; Hawkins and Catalano 1985; Marlatt and Gordon 1985; Tucker, Vuchinich, Harris 1985; Brownell et al. 1986; Todd, 1984).

A specific goal of approaches to relapse prevention is to increase the impact of those factors that are negatively associated with relapse and to decrease the impact of factors that are positively associated with relapse. These approaches have led to the development of a number of techniques that hold promise for prevention of posttreatment relapse. Some of the better documented approaches are summarized below.

#### *Relapse Prevention Skills*

Marlatt and his associates (Marlatt and Gordon 1980, 1985; Cummings, Gordon, Marlatt 1980) have developed a cognitive behavioral model of relapse which includes skills training for each phase of the relapse process. They advocate training: (1) to recognize "apparently irrelevant decisions leading to relapse"; (2) to identify and cope with personal high-risk relapse situations; (3) to practice behaviors which increase perceptions of self-efficacy and control such as reading, relaxation, and meditation; (4) to recognize the negative effects in biphasic drug action which follow immediate positive effects; (5) to cope with a slip; and (6) in some cases, to practice a relapse under controlled circumstances called a "programmed relapse" (although the general efficacy of this approach has not been confirmed).

Reports of skills training with alcoholics far outnumber reports of similar training with users of other drugs. Treatment in these studies usually involves assertion/social skills training, problem-solving training, and/or practice of high-risk situations using a combination of methods, including didactic presentation, modeling, role play, feedback, generation and evaluation of alternative problem solutions, and homework assignments. Skills improvement has been achieved as indicated by role play, self-report, and questionnaire measures, and a positive impact of skills training procedures has been shown in the treatment of alcohol use (Watson and Maisto 1983; Van Hasselt, Hersen, Milliones 1978) and cigarette smoking (Shiffman 1982; Hall, Rugg et al. 1984).

The effectiveness of skills training with users of drugs other than alcohol has not been as thoroughly evaluated as for alcohol. In five single-case and uncontrolled group studies involving primarily opioid users, two reported reduced drug use at followup (Cheek et al. 1973; Polakow and Doctor 1973); four found self-reported improvements in social functioning (Cheek et al. 1973; Matefy 1973; Polakow and Doctor 1973; Wolpe 1965); and one reported improved role play performance (Callner 1973). Four studies of users of a variety of illicit drugs (Callner and Ross 1978; Hawkins, Catalano, Wells 1986; Smith 1982; Lin et al. 1982) have reported improvements in skills related to high-risk relapse situations, and one found decreased use of marijuana (Smith 1982). In one study, skill changes generalized to untrained situations and were maintained 1-year posttreatment (Hawkins, Catalano, Wells 1986). As discussed in Chapter VII, preliminary studies suggest that skills training strategies may be of some utility in the treatment of tobacco dependence. For example, Hall, Rugg, Tunstall, and Jones (1984) found that smokers receiving relapse prevention skills training were significantly less likely to relapse than smokers assigned to a discussion control condition. Subsequent studies and reviews indicate mixed results (Hall et al. 1985; Schwartz 1987).

### *Leisure Activity Skills*

In recognition of the association of relapse with an absence of active leisure activity, a number of aftercare programs have attempted to increase participation of clients in organizations beyond work or treatment (Catalano and Hawkins 1985; McAuliffe et al. 1986; Nurco et al. 1983; Wolf and Kerr 1979). Controlled studies have shown that drug users can be encouraged to participate in voluntary community organizations and activities following inpatient treatments and that these contacts can be maintained over a 1-year period following treatment, but in these studies there were no beneficial effects in reducing relapse rates (Catalano and Hawkins 1985; Hawkins and Catalano 1985).

For alcoholics and cigarette smokers, physical exercise has been examined as a potential relapse prevention strategy. Murphy, Marlatt, and Pagano (1986) found that problem drinkers trained in running reported greater reductions in drinking at followup than did drinkers trained in meditation. In a retrospective self-report study, Koplan, Powell, Sikes, Shirley, and Campbell (1982) found at 1-year followup that of the 2,500 runners competing in the 10K Peachtree Road Race in Atlanta and returning questionnaires, 81 percent of males and 74 percent of females who smoked cigarettes before they started running had stopped smoking after they began running.

### *Stress Management Skills*

As discussed earlier in this Chapter and in Chapters VI and VII, negative emotions associated with stressful events or interpersonal interactions have been strongly implicated in relapse precipitation. In principle, such emotional states can be addressed through stress management training, relaxation, meditation, or other "lifestyle" interventions (Marlatt and Gordon 1985; Charlesworth and Dempsey 1982). Although stress reduction techniques are frequently included as a part of drug abuse treatment, there are a surprisingly small number of well-controlled studies addressing the effectiveness of anxiety-reduction techniques with drug-abusing clients (Marlatt and Gordon 1985). As indicated earlier in this Section, there is evidence that programs which may reduce anxiety by use of aerobic exercise or relaxation practice can bring about significant reductions in alcohol use among heavy drinkers (Marlatt and Marques 1977; Marlatt et al. 1984; Murphy, Marlatt, Pagano, 1986). Further research is needed to assess the effectiveness of these techniques in reducing the use of substances following treatment for alcohol, opioid, and tobacco dependence.

### *Motivation Enhancing Treatments*

Treatment interventions in which the primary purpose is to improve or bolster motivation for continued abstinence can take many forms. Many drug-dependent persons enter treatment as the result of some form of pressure from friends, employers, family, medical practitioners, or legal agencies. Sometimes treatments can be designed that incorporate these sources of community pressure and support for abstinence. The present Section will focus on interventions that involve social support from professional therapists, peers, and family.

Social support strategies designed to bolster environmental support for abstinence include enlistment of support from families and existing social networks, the creation of new primary social support such as self-help groups or linkages with community volunteers, and

supportive services provided by professional human service workers. Only preliminary systematic research has been conducted utilizing such interventions; however, the approach appears of similar applicability and utility in the treatment of opioid, alcohol, and tobacco dependence (Ashery 1979; Nurco et al. 1983; Leach 1973; Madsen 1974; Janis and Hoffman 1970).

Professional contact is a special kind of support strategy which has been used in drug use treatment. Typically, it involves ongoing contact with professionals from the primary treatment program. This approach may include booster sessions of individual or group counseling, followup phone calls or letters from therapists, or followup visits by counselors to former clients in the community to review progress and problems. Fitzgerald and Mulford (1985) found that bimonthly phone calls to alcoholic patients by an alcohol counselor did not affect drinking outcome. Pokorny and others (1973) found that weekly group therapy sessions following 60-day inpatient treatment for alcoholism produced relapse results equivalent to more expensive 90-day inpatient treatment with no followup. Colletti and Supnick (1980) found that weekly contact with therapists during the first month following treatment for smoking resulted in better smoking outcomes at 6 months than when subjects received no aftercare, though these differences were not maintained at 12-month followup. Chapter VII describes additional analogous strategies used to treat tobacco dependence.

Family support is a potentially cost-effective and long-lasting form of motivation enhancement. The potential importance of family support is emphasized by the correlation between stable family environment and good treatment outcomes previously discussed. In recognition of this relationship, self-help groups to assist family members of addicts and alcoholics have proliferated since the early 1970s. They include Alcoholics Anonymous (AA), Narcotics Anonymous (NA), and Families Anonymous groups for families coping with alcoholism and drug abuse (Ashery 1979; Brown and Ashery 1979), and service-agency-based aftercare groups for families (Dunlop, Skorney, Hamilton 1982). Agencies which have also focused on broader informal social networks have also arisen (Collins and Pancoast 1976; Gottlieb 1981; Speck and Attneave 1973; Whittaker and Garbarino 1983). A study by Stanton, Todd, and Steier (1979) provides support for the benefits of involving the families of opioid users in treatment. They found that in families of opioid users which received structured family therapy, there were more days free of the use of opioids, nonopioid illegal drugs, and alcohol than for opioid users whose families did not receive such treatments. While not reporting drug use outcomes, others have enlisted family members and close friends of drug dependent persons as supportive sponsors in drug treatment programs (Sorensen and Gibson 1983; Callan,



Garrison, Zerger 1975). Such networks are being increasingly developed in recent years to help tobacco dependent persons (Chapter VII; see also Schwartz 1987).

Peer support constitutes a potentially powerful motivation-enhancing approach. A difficulty of peer support is that it often involves establishing a new peer group for the drug dependent person if his or her current peer group continues to support drug use. Self-help groups such as AA and NA, for example, provide former substance abusers with a new social support network of individuals in like circumstances (Ashery 1979; Nurco et al. 1983). Descriptive followup studies of non-probability samples of AA members have suggested that AA is an effective approach for assisting some recovering alcoholics to maintain their sobriety (Leach 1973; Madsen 1974; Maxwell 1962). Several studies of the effectiveness of residential AA programs have also found better outcomes associated with participation (Alford 1980; Smith 1984, 1985). However, these studies have either failed to utilize control groups or utilized "matched" comparison groups that differ on pretreatment criteria which may influence outcome. Thus, these studies do not provide conclusive efficacy data.

A few studies have attempted to create or enhance existing peer social support, with mixed results. For example, a volunteer sponsor program for "skid-row" alcoholics was described by Fagan (1986), in which sponsor groups from churches were assigned alcoholics in a rehabilitation program. This program was not evaluated in a controlled manner. Janis and Hoffman (1970) investigated the effects of a self-help social support intervention on relapse following smoking cessation treatment. Clients paired in a high-partner-contact condition (daily calls for 5 weeks) were more successful in maintaining abstinence at 1- and 10-year followups than were clients in low-contact or control conditions. The critical dimension appeared to be quality of peer support.

### **Conclusions**

1. The pharmacologic and behavioral processes that determine tobacco addiction are similar to those that determine addiction to drugs such as heroin and cocaine.
2. Environmental factors including drug-associated stimuli and social pressure are important influences of initiation, patterns of use, quitting, and relapse to use of opioids, alcohol, nicotine, and other addicting drugs.
3. Many persons dependent upon opioids, alcohol, nicotine, or other drugs are able to give up their drug use outside the context of treatment programs; other persons, however, re-

quire the assistance of formal cessation programs to achieve lasting drug abstinence.

4. Relapse to drug use often occurs among persons who have achieved abstinence from opioids, alcohol, nicotine, or other drugs.
5. Behavioral and pharmacologic intervention techniques with demonstrated efficacy are available for the treatment of addiction to opioids, alcohol, nicotine, and other drugs.

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