Healing the Addicted Brain

By Harold C. Urschel III, MD, MMA

This is Part One of a two-part series.

Introduction

Each year, medical problems caused by addiction, along with lost earnings, accidents and crime, cost Americans more than $500 billion. State and federal governments spend more than $15 billion per year, and insurers another $5 billion more annually, on substance abuse treatment services for about four million people. Researchers estimate that some 20 million Americans who could benefit from treatment are not getting it. Additionally, for those patients who are receiving treatment, the majority of our industry still treats alcohol and drug addiction with only behavioral and psychosocial approaches.

While traditional, 12-step based programs have certainly helped countless people achieve sobriety, the long term sobriety failure rate is estimated at 70 percent, a figure most would consider unacceptable, as alcoholism is the third leading cause of death in the United States. Also, the majority of patients do not have the funds or the time to commit to residential treatment or intensive outpatient counseling. The bottom line is that until we stop treating alcohol and drug addiction insufficiently in the U.S., we will continue to see countless people die unnecessarily, as many of them will give up hope if they can't get well.

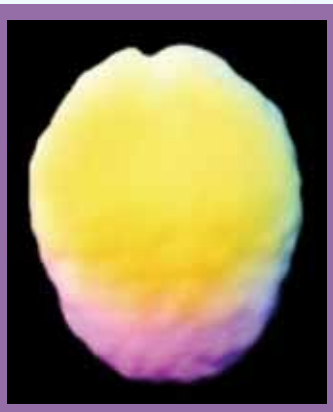
Fortunately, we now have scientific evidence that concludes addiction is a chronic, progressive disease of the brain with many similarities to other chronic medical diseases such as diabetes, hypertension and asthma and needs to be treated with a combination of behavioral therapy and a medical approach. The American Medical Association (AMA), National Institute on Drug Abuse (NIDA), National Institutes of Health (NIH), World Health Organization (WHO), American Psychiatric Association (APA), as well as many other organizations in the scientific and medical fields, now recognize alcohol/drug addiction as a chronic and progressive physical disease that attacks the brain, damaging key parts of the limbic system and cerebral cortex causing lasting changes in the brain. These changes don't go away, sometimes for months or years, even after recovering patients stop using. Although an individual's initial choice to drink alcohol or use another substance is a voluntary one, over time the substance physically changes the brain to where the individual truly cannot stop his or her addictive behavior, even though the desire to do so might be high.

In chronic, multi-factorial conditions such as cardiovascular disease, the standard of care involves front-line physiological interventions through surgery or medication, followed by environmental and behavioral modifications. Hypertension and high cholesterol are often controlled by medication, but modifying dietary habits and exercise are necessary steps as well. Addiction treatment is no different, and with the proper treatment it too can be managed and more importantly, give addicts realistic hope that they can be healed and live a clean or sober life.

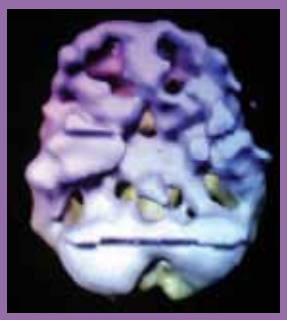
Countering Brain Injuries From Past Alcohol and Drug Use Can Map the Road to Recovery

In figure 1, you can clearly see the marked overall decreased activity in the brain of a 38-year-old male with 17 years of heavy weekend alcohol use when

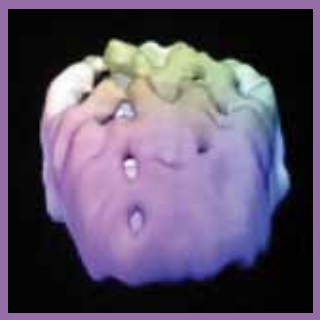
Figure 1: Profound Changes in Brain Metabolism



Normal brain



Underside surface of an affected brain



Front on surface of an affected brain

Right side surface of an affected brain

compared to a normal brain. *(SPECT images courtesy of D.G. Amen, MD)*

These scans clearly demonstrate that alcohol severely injures the brain. Scientists believe that it is this damage that causes the brain disease of alcoholism. As a result, millions of dollars have been spent on basic science and clinical research studies on alcohol/drug addiction treatment each year by the NIH, so, we now have an increasing understanding of the neurobiological mechanisms of the brain that maintain substance dependence. This has led us to be smarter about how to treat addiction, and in recent years has resulted in the development of several FDA-approved, anti-addiction medications that when combined with the appropriate behavioral approaches can dramatically improve the treatment outcomes of substance-dependent patients.

New anti-addiction pharmacological treatments can be used to counter the brain injury from past alcohol/drug use, to relieve withdrawal symptoms, or to help overcome alcohol/drug cravings. These science-based, anti-addiction medications circumvent the neurological pathways in the brain that cause the cravings and/or the euphoric "high" an addict experiences. Once this circumvention is interrupted, and the substances are removed from the body, the brain can effectively start to "rewire" those harmful pathways (i.e. heal itself). Additionally, there are other medications that can help to accelerate the brain's healing, returning the damaged portions to up to 90 percent of their pre-addictive state. These anti-addiction medications allow the brain to cool down to a more "normal" state, so it can begin to "reboot" and start the healing process. These medications are a remarkable tool in treating addiction, but they are not a magic bullet. You still have to combine the medication with various evidence-based therapies to get the full benefits and significant healing you will need for life-long sobriety.

Treatments for Alcohol Dependence: A Variety of Effective Treatment Options

In spite of the long-standing national focus on drug addiction, it is important to remember that alcoholism is still the most serious substance abuse problem in the U.S. According to the latest statistics,-alcoholism is the nation's third leading cause of death behind cancer and heart disease, with approximately 100,000 deaths each year attributed to excessive alcohol use. Several medications are currently being used in alcohol rehabilitation including Vivitrol™, Campral®, the Prometa™ Treatment Program and Antabuse®.

Vivitrol is an intramuscular medication for the treatment of alcohol dependence. A once-monthly extended-release, injected version of naltrexone, which was approved by the FDA in mid-2006, has significantly revolutionized the recovery from alcoholism by removing the need for daily decision-making about compliance, thereby drastically reducing or completely stopping alcohol use for alcoholics receiving the medication and attending active treatment programs. Vivitrol reduces the reward (or "high", the ability to get drunk) from alcohol ingestion, significantly reducing cravings for alcohol and decreasing the "priming effect" of the first drink for a relapse or slip.

Campral (acamprosate) was approved in the U.S. by the FDA in 2004. Although the precise mechanism of action or "cellular target" of Campral is unknown, it appears to decrease cravings for alcohol primarily by restoring the balance in certain neurotransmitter pathways (most likely GABA) that have become altered by chronic alcohol consumption. In some instances, Campral has appeared to enhance the ability to accelerate the brain's healing back towards its pre-addictive state.

In actual practice, I have found it helpful to prescribe both Campral and Vivitrol simultaneously to most alcoholics. As both medications have different mechanisms of action, they are rather synergistic in their impact on this devastating chronic medical illness. Vivitrol begins working effectively by the third day after it is injected, and primarily focuses on keeping the alcohol out of the brain (decreasing cravings and blocking the ability to get drunk), so that the brain can begin to heal on its own but it does not heal the brain at all. (Brain healing usually takes four to 12 months of complete sobriety from alcohol/drug use.) Campral, on the other hand, can actually help to accelerate brain healing, which can occur over eight to 12 weeks, but does nothing to keep alcohol out of the brain for the first four to eight weeks that one are taking it.

Many patients ask for what length of time will they need to take Vivitrol/Campral? The answer is it depends on each person's specific life circumstances. In general, however, they should be on them for a minimum of 18 months.

Yet another potentially exciting treatment option which has been recently introduced for the treatment of alcoholism is the Prometa™ Treatment Protocol, which is a combination of medications, nutritional education and psychosocial therapy. From a pharmacological standpoint, the Prometa protocols consist of a combination of FDA-approved medications administered orally and intravenously, over a 30-day time period.

Finally, Antabuse (disulfiram), the oldest approved medication for alcoholism, is probably the least used today. It has been used as an aid in managing chronic alcoholic patients who want to remain in a state of enforced sobriety, so that they can pursue supportive and psycho-

therapeutic treatment to their best advantage. Although, disulfiram does have a valid place as an integral part of certain alcoholic recovery programs, in my opinion, it is obviously more effective when its compliance can be verified, most frequently via direct daily observation of ingestion.

During chronic abuse of alcohol and drugs, an imbalance between the inhibitory and excitatory activity in the brain occurs, triggering undesirable symptoms and behaviors leading to relapse. An analogy would be that with both alcohol and stimulant addiction, the circuit breakers within the brain have flipped off, and consequently the brain's normal functioning is significantly impaired. One hypothesis is that restoring the brain's neurotransmitter balance — analogous to "resetting the circuit breakers" — could help a patient who is in recovery to stay sober more easily. Campral and the Prometa Treatment Protocol constitute a new class of treatment taking this approach. They target changes in brain chemistry (most probably in the GABA neurotransmitter systems) and function, which play an important role in the physical and behavioral symptoms of substance dependence, including tolerance, withdrawal symptoms, craving and relapse.

This has led us to be smarter about how to treat addiction and resulted in the development of anti-addiction medications that, when combined with the appropriate behavioral approaches, can dramatically improve the treatment outcomes of substance-dependent patients.

Progress in New Treatments for Opiates

Over the past decade, the use of opioids, including prescription painkillers and heroin, has grown significantly. According to the 2009 National Survey on Drug Use and Health, nearly two million Americans were dependent on or abusing prescription pain relievers — nearly twice as great as the number of people addicted to cocaine, and 2007 statistics compiled by the Centers for Disease Control and Prevention indicate painkillers killed twice as many people as cocaine and five times as many as heroin. Unfortunately, only a fraction of these patients (maybe 25 percent at most) was currently receiving treatment for their chronic medical illness of narcotic addiction.

Opiates have been used for pleasure and for treating pain for thousands of years, but abuse again became prevalent during the second half of the 19th century after the invention of the hypodermic syringe. By the early 1960s, the medical profession concluded that no known treatment could cure more than a small fraction of long-term opiate addicts, 70 to 90 percent of whom would relapse within a short time. As part of research to determine if addicts could be maintained on stable doses of pharmaceutical opiates, a synthetic narcotic called methadone was found to be effective in stabilizing opioid addicts, without the euphoria or other negative effects of opiates. It also had the advantage of being cheap, significantly orally active and long-acting.

Methadone maintenance treatment then moved into the mainstream, allowing addicts to be restored to productive lives, reestablish relationships with families and improve their physical and mental health. It has received more scientific scrutiny and evaluation than nearly any other medical treatment or human service program. However, methadone maintenance treatment has remained a controversial issue among addiction treatment providers, public officials, policy makers, the public at large and the medical profession itself. Consequently, the opiate addiction treatment field is predominantly turning to the use of buprenorphine.

The Drug Addiction Treatment Act in 2000, granted physicians the right to use approved opioids (buprenorphine) to treat opioid dependence in their offices. Initially developed to treat pain, buprenorphine was approved by the FDA for this purpose in October 2002. Buprenorphine is a partial opioid agonist, meaning its opioid effects partially mimic those produced by full opioid agonists such as hydrocodone or heroin and partially mimic those produced by opioid antagonists such as naltrexone. The primary formulation, Suboxone®, contains buprenorphine and naloxone, an opioid antagonist to discourage people from dissolving the tablet and injecting it. Consequently, most practitioners only prescribe Suboxone to their narcotic addicts, as it has less potential for diversion or misuse.

Suboxone is an amazing and life-saving medication which is used to reduce illicit opioid use and help patients stay in treatment by blocking the effects of opioids, decreasing cravings and suppressing symptoms of withdrawal. Most narcotics addicts seem to benefit from Suboxone, regardless of their histories of opiate addiction. Suboxone is very safe and effective and is a revolutionary step in the treatment of narcotic addiction. It can be easily used in both the detoxification and maintenance phases of opiate treatment. Also, because of its ease of use and excellent safety profile, its adoption by the growing number of primary care physicians who are screening for and recognizing narcotic addiction in their patient populations and then referring them to appropriate psychosocial treatment programs, should make a very positive impact in the treatment success for narcotic addicts.

Finally, oral naltrexone also has been successfully used to treat narcotic addiction. Once-daily ingestion of a 50 mg tablet will almost completely block the effects of any narcotic that an addict will attempt to use. Consequently, naltrexone prevents any euphoria or other benefit which an addict may hope to achieve through an opiate relapse. Because daily administration is required, it is best to have an addict take oral naltrexone under direct observation to enhance his/her compliance (for this reason Vivitrol {see above} is an even more effective treatment option for this population). Naltrexone treatment is not successful in all narcotic addicts, yet there is strong data that it significantly enhances a sobriety program especially when used with impaired professionals who are highly motivated to stay sober (i.e. physicians). The FDA approved the use of Vivitrol for the treatment of opiate addiction in October of 2010.

Progress in New Treatments for Stimulants

The stimulant class of substances (i.e.. methamphetamine and cocaine) has proved to be one of the most difficult dependencies to treat, methamphetamine addiction in particular. To date, there are no medications in widespread use for the treatment of stimulant addiction.

A number of medications commonly used for other indications are under examination or in use to various degrees in the attempt to treat cocaine and methamphetamine addiction, including disulfiram, gabapentin, baclofen, Provigil, Seroquel and ondansetron to name a few. Additionally, double-blind, placebo controlled trials evaluating the Prometa Protocol for Stimulant Dependence have been published and have added more rigorous data into this important treatment's relevance for this difficult to treat population. In my opinion, it is the first line pharmacological treatment component for treating stimulant addiction.

Part Two will continue in the next issue.

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Want to learn more from Dr. Urschel on healing the addicted brain? Check out the archived webinar the Addicted Brain: Cutting Edge Science and Brain Neurochemistry at www.naadac.org/education/webinars.

Straight Truth About Marijuana, continued from page 23

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