

Addiction *is* a disease

Distinguishing between dependency and abuse

“Drug [including alcohol] addictions are medical diseases which deserve parity in national healthcare programmes...” states scientist and professor Carlton Erickson, as he reveals the latest neurobiological research

Public and professional stigma against addictive diseases is a major social problem when dealing with conditions which have traditionally been dealt with by behavioural and spiritually-based programmes. Reducing this stigma is critical, as negative attitudes damage the level and quality of patient care – and funding for prevention, education and research.

For far too many years, the “field” of drug addiction treatment and prevention has drifted aimlessly, based on insufficient research evidence that addictions are brain diseases and about the pharmacology of addicting drugs. Much of the confusion is based on an incomplete understanding of the differences between intentional drug abuse and pathological drug dependence, the “new term for addiction”.

There is also a great deal of misinformation about the pharmacology of addicting drugs. This picture is changing rapidly, based on new neuroscience (brain) research which strongly indicates that the pleasure pathway – the medial forebrain bundle – of the brain is affected by all addictions, particularly in the pharmacological qualities of euphoria, craving and a theoretical concept of “drug need”. This is the psychological correlate of behavioural “impaired control”. The neuroanatomical and neurochemical bases of drug need have yet to be demonstrated in the laboratory. But the research technology, such as brain scans, is now at hand to test the theories.

Everyone who cares about the victims of addiction must become more scientifically literate about the implications of new research findings, and ‘spread the news’ that biomedical research is on the threshold of proving what recovering people already know – that drug dependencies are medical diseases which deserve parity in present and future national healthcare programmes. Drug dependence must also be ‘handled’ differently from drug abuse in terms of responsibility and culpability in law enforcement.

This article covers the latest research on the neurobiology of dependence, including how the brain's pleasure pathway works. It covers the differences between chemical abuse and chemical dependency, the latest therapies for drug dependency, and research methodologies which promise even more exciting breakthroughs in understanding “addictions” in the future. This information has important implications for prevention and education of the public about the true causes of drug problems, and how society can best deal with such problems.

The solution. First, get rid of “Spam”: an acronym for stigma, prejudice, anger and misunderstanding. All of these lead to myths – widely-held, inaccurate beliefs – as compared to research-generated facts. And there are some dangerous myths in this world. These include the myths that club drugs and marijuana are not addicting... that everyone who uses cocaine or heroin is addicted... that caffeine is highly addicting... that the form of a drug and how it is taken affects its “addiction potential”... and that alcoholics can stop drinking, since all they have to do is go to AA meetings.

Two critical definitions. It is vital that professionals carry out assessments to distinguish between chemical abuse and dependence. As the cover story by Norman Hoffman in the last issue of *Addiction Today* emphasises, assessment directly affects what type of treatment is most effective for each client, and thus their care plan, choice of treatment unit and outcome results. To distinguish between the two is the most humane, most cost-effective and most professional course of action.

Chemical abuse is intentional overuse of substances in cases of celebration, anxiety, despair or ignorance. It is about people making bad choices about the use of drugs. It declines with adverse consequences, supply reduction or change in drug-use environment. Drug abusers have a major economic impact on society; for example, it is estimated that property theft to fund drug habits accounts for at least £2billion a year in the UK.

The criteria for chemical abuse, according to the *DSM-IV* diagnostic and statistical manual, are:

- 1) a maladaptive pattern of drug use leading to impairment or distress, presenting as one or more of the following over a 12-month period –

- * recurrent use leading to failure to fulfill obligations
 - * recurrent use that is physically hazardous
 - * recurrent drug-related legal problems, and
 - * continued use despite social/interpersonal problems
- 2) the symptoms have never met the criteria for chemical dependence.

Dependence is “impaired control” over drug use, probably caused by a dysfunction in the brain's pleasure pathway. This is the disease of addiction, an “I can't stop without help” disease. It requires formal therapy and/or 12 steps and might require anti-craving drug therapy. The *DSM-IV* criteria for chemical dependence are:

- 1) a maladaptive pattern of drug use, leading to impairment or distress, presenting as three or more of the following over a 12-month period –
 - * tolerance to the drug's actions
 - * withdrawal (generally, physical withdrawal)
 - * drug is used more than intended
 - * there is an inability to control drug use
 - * effort is expended to obtain the drug
 - * important activities are replaced by drug use, and
 - * drug use continues despite negative consequences
- 2) two types of dependence can occur –
 - * physiological dependence, including tolerance and withdrawal, and
 - * non-physiological dependence, excluding tolerance and withdrawal.

The terms “physical addiction” and “psychological addiction” are no longer valid, since the *DSM-IV* term includes both psychological and physical components.

Does abuse lead to dependence? A five-year follow-up of 1,300 men and women (Schuckit et al 2001) found that only 3% of abusers met criteria for dependence five years after being diagnosed as abusers. But many people believe that abuse usually leads to dependence. Instead, the two conditions appear to be separate; abuse may be a milder disorder not usually progressing to dependence.

Risk of dependence. Data from the National Comorbidity Survey of 8,100 men and women aged 15-24 years old (Wagner & Anthony 2002) showed that different drugs are associated with different rates of dependence. In the 10 year study, 15-16% of cocaine users become dependent, 12-13% of alcohol users and 8% of marijuana users. Of those who became dependent on cocaine, 5-6% became dependent in the first year of use. Fully 80% of people who became dependent on cocaine over the 10 years had become dependent in the first three years.

These are only single studies which deserve more replication, but they are interesting in that they begin to break down some myths that people have about the onset of dependence in users and abusers.

Early vs late onset. So, although it “looks” as if most people evolve from abuse to dependence, people can become dependent during their first year of using drugs, including alcohol. People in recovery seem to understand that some people become “instantly” dependent with the very first use of the drug; most reports concern early onset with the use of alcohol and cocaine. There is only one explanation, and it lies in the physiology of the medial forebrain bundle, or MFB, also known as the mesolimbic dopamine system.

The neurobiological model of “impaired control” characteristics. A key point is that the “dependence” brain areas are in the part of the brain that governs unconscious thought. Dependence is not a “lack of will power” because

- * the main problem with dependence lies in the MFB
 - problems with the frontal cortex portion of the MFB produce a pathological impairment of decision-making. Dependence is not mainly under conscious control!

Basic neurobiology: neurotransmitters involved in dependence. Dependence is probably due to a functional dysregulation – meaning: they aren't working right! – of one or more neurotransmitter chemicals in the MFB. These include dopamine (which is affected by cocaine, amphetamines or alcohol), serotonin (alcohol or LSD), endorphins (alcohol or opioids such as heroin), gamma-aminobutyric acid (alcohol or benzodiazepines – antianxiety agents), glutamate (alcohol) and acetylcholine (nicotine or alcohol).

The dysregulation could be related to too much or too little neurotransmission, abnormal breakdown of neurotransmitters or abnormal receptor function. How does it come about? Is it due to genetic ‘malfunctions’, to drug-induced changes, or to other aspects of the environment? Neurobiological research points to genetics and drug-

induced changes as being primary causes of dependence, whereas the environment is a major, though secondary, contributor to drug abuse and thus dependence.

The rationale based on genetics. Abnormal genes lead to abnormal proteins. This results in abnormal transmitter-synthesising enzymes, abnormal transmitter-breakdown enzymes, or abnormal receptors. This is the cause of neurotransmitter dysregulation in the pleasure pathway. Impaired control appears to be due to this brain-chemistry disruption. It is the reason that scientists and clinicians now believe that dependence is a chronic medical brain disease.

Summary. Addicting drugs seem to ‘match’ the transmitter system that is not normal. To treat such individuals, detoxification – weaning people off the drug of choice – is the first step. Then, ideally, abstinence-based treatments are attempted, which traditionally have the greatest chance of success. But abstinence is not for everyone, so more treatment choices are becoming available through scientific research. For some, continued use of a similar drug (such as methadone for heroin- dependent people) or the initial drug (nicotine patches for people who stop smoking) is the choice, because some people report that they “need” a chemical to “feel normal” – in other words, to overcome the non-normal transmitter system.

Today's treatment options. More options create greater chances for helping people. Today's options include some or all of the following:

- * traditional – 12-step programmes/abstinence
- * talk – inpatient/outpatient/aftercare
- * misunderstood but useful – harm reduction, including methadone
- * new – brief motivational counselling, cognitive behavioural therapy, motivational enhancement therapy, ‘significant others’ therapy, vouchers
- * medical treatment – new medications to enhance abstinence, anticraving medications, methadone, buprenorphine, vaccines, drugs to alleviate withdrawal.

So, if addictions are a medical disease, why do we treat them behaviourally? What is the similarity between behavioural or talk therapies and pharmacotherapies in the way they work? Simple. Behavioural therapies probably change brain chemistry! If this is a brain disease, and people get better in behaviourally-based therapies, then brain chemistry has to change. Recent brain-scan research is confirming this rational conclusion.

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