

Altered (Chemical) States

A Practical Look at Brain Chemistry and Addictions

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In the past, chemical dependency has been characterized by such terms as "character defects," "personality traits," and sets of behaviors identified as common to chemically dependent persons.

In reality, will power and character traits have little or nothing to do with this disease. Instead, the necessary causal factors amount to chemical deficiencies, excesses, or imbalances in the brain. These abnormal chemistries occur as a result of genetic and environmental factors beyond the control of individuals. These altered chemical states actually become the precursors or factors necessary for a person to receive positive reinforcement through the use of chemicals.

The way we think and feel, and behaviors that result, all happen because of chemical reactions/interactions in our brains. These chemical reactions are dependent upon balanced levels of many separate chemical molecules working together with specialized brain cells to produce thoughts, feelings, and actions. For every thought, feeling, and behavior there exists a neurochemical equivalent in the brain. As a person continues to use externally sourced chemistries to gain thoughts, feelings, or behaviors deemed desirable, he or she becomes "chemically" dependant.

In other words, for people to become dependent on an externally sourced chemical to produce the desired thought, feeling, or behavior, there must first exist, or be developed, a deficiency of a chemical component in their brains. The first step toward an acceptable (for those people) lifestyle free from the need for external chemical intervention is, necessarily, abstinence from the use of these chemical sources. This step, however, results in a set of dramatically uncomfortable end unacceptable thoughts, feelings, and potential behaviors as they attempt to interact in society with excessively curtailed brain-chemical capabilities.

This is the rationale for physiological stabilization as the necessary starting focus for recovery from chemical dependency. This focus is also what has been lacking in many treatment experiences until recently.

The major deterrent to chemical dependency counselors gaining a usable understanding of this process, I believe, has been the lack of practical interpretation of recent research findings into some thing we can use.

Most in this field espouse the disease concept because the American Medical Association. has said alcoholism is a disease (AA calls it a "progressive illness"), and

this makes the process "treatable." Those of us who are recovering believe ourselves to be of strong character and will, and readily accept the disease concept. Most non-recovering counselors voice the same acceptance but may, in all honesty, wonder to a degree about the claim.

In this society, a condition that meets four criteria may be termed a disease:

1. Etiology - factors that cause the condition are identifiable.
2. Symptomology - identifiable symptoms, i.e., tolerance, blackouts, and loss of control are present.
3. Morbidity - the symptoms describe a stage of the process.
4. Prognosis - In the case of chemical dependence, "guarded."

Now, if alcohol caused alcoholism, for example, everyone who drinks would have the disease, and not nearly everyone does.

The etiologic factors being discussed, and the focus of this writing, are neurochemical and enzymatic. (I am not discussing here those liver enzyme levels and activities we know to be very important.)

Approximately 50 substances naturally produced by the brain have been identified as neurotransmitters of thoughts, feelings, and actions. Of these, several are of special interest in chemical dependency recovery, and, very importantly, they can be identified with certain emotional states. This allows us to greatly simplify and make usable an understanding of neurochemistry.

Let's look at some of these neurochemicals and the associated thoughts, feelings, and behaviors.

Opioids, endorphins and enkephalins, are substances used by the brain to moderate pain. Endorphins (endogenous morphine) seem to work to moderate physical pain. Enkephalins (met-enkephalin and leu-enkephalin) appear to have a profound effect in those neural areas associated with emotional memory. What is the most painful emotional feeling we suffer? Low self worth.

Studies reported in the March/April 1987 *Professional Counselor* consolidated important areas of information. As a result of studies, we know, for instance, that opioid levels can be influenced by genetics or stress. When a person's opioid

availability is low, due to genetic susceptibility or unmanaged environmental stress, that person feels incomplete. Inadequate, and unworthy, due to decreased enkephalin availability. Inherited deficiencies of these chemistries are likely the cause of extreme shyness in children. They may never feel equal to their peers, regardless of reality. They always feel "second or third," never "first" or "as good as" others. When the levels of those chemistries are adequate, such as following nurturing by a parent, for example, which increases the release and utilization of endorphins/enkephalins, a child feels internally focused and calm, and has a sense of completeness. Sustained exercise releases opioids, and the person feels calm, centered and complete, euphoric.

Opiate drugs will fill these same receptor sites and produce the desired feelings of well-being. Alcohol metabolism and the eventual production of salsolinol provide a molecule that will fill enkephalin sites and increase feelings of well-being. Beer drinkers get a double dose of enkephalin replacement because, in addition to alcohol metabolism providing salsolinol, this chemical is naturally present as result of hops fermentation.

Dopamine functions in areas associated with reward, pleasure, and altruism in the frontal lobes of the brain, for instance, as well as maternal and paternal feelings associated with the limbic system. When dopamine is depleted, as in cocaine addiction, inadequate neurotransmitter is available in these areas to produce these feelings.

Consequently, addicts do not feel remorse about their actions and do not experience maternal or paternal concerns. When confronted with child neglect or abuse, for example, they typically will say they should care but just "can't" seem to. Norepinephrine (NE) is produced from dopamine and is the brain's energizer/ arousal neurotransmitter. When adequate norepinephrine is available, a person feels energetic, motivated, and full of "drive." If NE is lacking, a person has no energy, lacks motivation and drive, and feels depressed.

Serotonin is the brain's emotional stabilizer. When adequate serotonin is available, a person has rational emotions. If serotonin is decreased - during premenstrual syndrome, for example, a person feels irritable on the verge of tears for no reason, and can't sleep well; noises bother that individual more than usual, he or she lacks rational emotions and feels depressed. If someone is depressed, and this depression has an aspect of irritability, then serotonin is likely low.

GABA accounts for up to 40 percent of the brain's neurotransmitters. Think of it as functioning in stress management. When inadequate GABA is available, a person feels calm. When insufficient GABA levels occur, a person feels anxious (free-floating anxiety) for no identifiable reason and can experience panic attacks and eventually convulsions. GABA depletion is a major factor in delayed Stress syndrome, and GABA depletion may result in various phobias.

Alcohol, barbiturates, and benzodiazepines all attach to GABAergic neurons and enhance the binding of GABA, producing calmness and a sense of stress reduction by reducing the fight-or-flight response. Acetylcholine functions in concentration and memory. When less than adequate, acetylcholine is available, a person has trouble concentrating for more than a few seconds and experiences short-term memory problems. Some enlightening studies have been published concerning enzyme and certain hormone functions. When blood samples of people involved in alcohol abuse or alcoholism were infused with alcohol equivalent to approximately 4-6 drinks (2.5 oz. pure alcohol), certain enzymes were dramatically impacted. When control samples from individuals with no alcohol problems were tested, there did not appear to be a similar impact.

One of these enzymes, monoamine oxidase (MAO), was functionally depressed, or slowed down, when contacted by the alcohol molecule. What can this mean? This one example significantly answers the question. "Why do certain people feel energized and more positive by the depressant drug, alcohol?"

The monoamines affected are dopamine, norepinephrine and serotonin. MAO functions to reduce the levels of these neurotransmitters. When MAO is inhibited by alcohol, the level of the monoamines will increase. The result of this is increased feelings of energy (norepinephrine), increased feeling of pleasure (dopamine) and increased feelings of stability (serotonin). People gaining this effect as a result of MAO inhibition feel more in control, more positive, and less depressed at four to six drinks (or equivalent in beer or

wine). This is the benefit of gulping drinks for persons susceptible to this enzyme alteration; the quicker they get to the effective level inhibiting their MAO, the sooner they feel positive effects. MAO Inhibition is also a primary factor in elevating blood pressure in susceptible individuals.

In those same studies, cortisol function was found to be lowered by the alcohol in blood samples of alcohol abusers and alcoholics. Cortisol is used by the brain to monitor threatening situations, making ready for fight or flight. When susceptible individuals lower their cortisol function with alcohol, they sense "no threat present," no uncomfortable feelings of concern, and no reason to stop drinking. In people not experiencing this effect, the brain responds to the alcohol as a toxin and increases cortisol availability.

Using these few examples, then, we could say that if genetically susceptible individuals, or those who have altered their biochemistry as a result of unmanaged stress, feel more assertive, more active, less depressed, a greater sense of pleasure, more stable, and more in control when they drink, and do not sense a threat from alcohol, why wouldn't they drink? They do!

Individuals become addicted to compulsive behaviors due to changes in brain chemistries as a result of their behavior. Gamblers and compulsive shoppers cause a norepinephrine and dopamine rush by "betting" and "buying." This rewarding rush of energy will temporarily lift depression and may substitute for feelings of inadequacy. Starvation, as in anorexia, causes increased enkephalin levels in the brain. This functions to keep individuals calm while a food source is found. Since these people may take in no dietary source for enkephalin, they must emaciate their own muscle tissue for protein.

Bulimics cause a rush of norepinephrine and dopamine when they purge and, consequently, gain a sense of energetic and pleasurable "control" through this behavior. Overeaters also cause an increase of enkephalin through satiation with food, especially "pleasant" tasting foods. As stresses increase, they realize that if they eat excessively, they return to calm - via enkephalin release.

People who crave chocolate may feel less than special, unloved. If they binge on chocolate, they provide the brain with phenylethylamine, which is our "love" chemical. When PEA is available, we feel special.

The stress of codependency lowers enkephalin and GABA availability. Family members feel increasingly anxious, unworthy and helpless as a result.

Seeking to fill this void of inadequacy, they substitute the norepinephrine and dopamine rush achieved by doing more, being more, and taking charge, much as "workaholics" attempt to do.

To a significant degree, compulsive behaviors can be explained neuro-chemically. Once you come to understand and utilize this knowledge with your clients, it all begins to make sense to them and you.

An alteration in the balance of brain chemistries alters our thought, feelings, and behaviors. People with well-balanced brain chemistry not only appear enviably assertive, confident, in control, concerned for others, and able to think quickly, but will feel these same capabilities within themselves. It does not occur to them that there is anything to

fear, because all systems are in concert and their survival does not appear threatened. They are able to take life as it presents itself and alter their thoughts and behaviors to feel comfortable. They have no need for external chemical input. Alcohol and other drugs present a destabilizing influence to them. They sense chemicals as "dope." But people who gain positive feelings from chemicals, in spite of adverse effects, may think of these chemicals as "hope."

As Maslow has shown us, the foundation for building toward self-actualization must be physical stabilization. This stabilization in chemical dependency recovery must involve improving brain chemistry capabilities. Today nutritional supplement combinations are available that dramatically enhance neurotransmitter availability and hasten the recovery to acceptable, comfortable, positive feelings and thoughts.

In the past, we have attempted to construct the second, third, and fourth levels of self-esteem "building" without providing a sound physiological foundation. As a result, the structure often collapses.

To wage an effective war on drugs and dysfunctional compulsive behaviors, we need to make "peace" with our biochemistry.

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