

# Biochemistry

## What does your brain have to do with addiction?

Research has shown that addiction is not a matter of an individual's strength, moral character, willpower, or weakness. Instead it can be attributed to the way an individual's brain is "wired." Powerful, naturally occurring chemicals called neurotransmitters control our brain's activities, carrying messages between neurons. When we use alcohol and/or drugs, our bloodstream quickly carries these intoxicating chemicals to our brain. In the brain, drugs set off complex chemical reactions and activities that can distort our sense of reality. This causes us to feel intoxicated or "high." Some of us find this feeling pleasurable and worth repeating. Other people find getting high an unpleasant experience and, as a result, seldom use alcohol and other drugs.

## How do drugs and alcohol damage your brain?

Research on the physiological effects of drugs and alcohol reveal a number of abnormalities in brain areas involved in behavior, such as the frontal and temporal lobes. Brain scans show that the most common similarity among substance abusers is the brain's generally toxic appearance: it tends to be more shriveled, less active, and less healthy than a normal brain. While normal brain patterns show smooth activity across the cortical surface, substance-abused brains show a wavy, rough surface. This is similar to patterns of brain damage found in patients who have been exposed to toxic fumes or oxygen deprivation.

## How do substances condition your brain's pleasure center?

To understand addiction, we need to understand the brain's pleasure center. Located in the limbic system, the pleasure center responds to enjoyable stimulation and learns to repeat it. Neurotransmitters, including endorphins and dopamine, activate the pleasure center. Alcohol and other drugs increase the activity of neurotransmitters, resulting in feelings of euphoria or a "high."

When you first started using, you learned quickly that with drugs and/or alcohol, if a little is good, more must be better. As you continued using, your desire to repeat the pattern developed into a need to repeat the pattern. Your body was

getting used to the presence of the substance. Eventually, your brain stopped producing neurotransmitters on its own and came to rely on the substance to produce “feel good” chemicals.

### **How does your body build up a tolerance to substances?**

Substance-induced pleasurable feelings quickly wear off, leaving you feeling worse than before you started using. Without alcohol and/or drugs in your system, you feel lower than low. Your body is now chemically out of balance. As you begin to withdraw from the substance, you feel strong cravings to use. Your need to use is more powerful than your best intentions or will to quit.

Because you can't quit, your use becomes progressively worse. As you build up a tolerance to the substance, you have to use more to get high. The substance is upsetting the normal endorphin levels in your brain.

Even if you briefly stop, you quickly end up using again, and now your life feels even more unmanageable than before you quit. It's as if the disease kept progressing even though you had stopped using. Without drugs and/or alcohol in your system, dopamine levels in your brain are low. You feel flat, lifeless, and depressed. Without the substances, your life seems joyless. Now you need them just to feel “normal”—to bring your dopamine levels up to normal levels.

Eventually, your brain adapts to repeated chemical use and overrides your rational thought processes. The chemical use/reward sequence that leads to the euphoria in the pleasure center becomes “hardwired,” or imprinted, into your brain. Once this occurs, normal drinking and social drug use are impossible. You've crossed the line into addiction. You're no longer able to control your use.

### **How does cross-addiction happen?**

People with substance use disorders do not crave particular drugs, but rather they crave the euphoria that a substance produces. We each have a favorite “drug of choice,” but we're not addicted to that substance itself—we're addicted to the feeling of intoxication. This means that we can become easily addicted to any mood-altering chemical that gives us the feeling we're looking for.

For example, if you're addicted to meth, you might say, “I'm going to quit meth, and I'll just have a few drinks instead.” This strategy will never work.

You will not be able to replace your meth use with controlled use of any other mood-altering chemical, such as alcohol. Alcohol use, or use of any other drug, will eventually take you back to meth use. Why? Because it's what your brain is craving—an instant dopamine fix. The alcohol is just a teaser—a temporary substitute for what your brain really wants.

To recover from addiction you must stop using ALL mood-altering chemicals.

### How can triggers cause a return to use?

The automatic recall of emotions and memories makes staying sober more difficult. You've probably heard a song on the radio that reminded you of your first date and brought back nostalgic memories of youth. The smell of fresh baked goods may trigger memories of Grandma's house and of warmth and safety. These automatic triggers work the same way with drugs. Many alcoholics and drug addicts salivate when they see a chilled beer in a TV commercial, or have intense cravings while watching drug scenes in a movie.

#### Recovery Action Step

What situations or people trigger using urges for you? Write your triggers down and discuss them with your sponsor and recovery group. Your sponsor can help you develop a plan to avoid the triggers that could cause you to return to use.

### Can you think your way out of addiction?

Is the knowledge that you're an addict or alcoholic enough to keep you from using? Absolutely not. Experience shows that the mere knowledge that we're addicted will not stop us from drinking or drugging. The rational, thinking portion of our brains may tell us that we shouldn't use these chemicals, but the automatic recall of memories and emotions, along with a brain that's hardwired to seek drugs, will always override your best intentions.

As a person suffering from the disease of addiction, you can't stop using, even when you are faced with losing everything: your job, your family, your life. This is because you can't control the addicted way your mind and body react to drugs and/or alcohol. This is powerlessness. This is why Step One is so important to your recovery.

**“We admitted we were powerless over alcohol—that our lives had become unmanageable.”**

It's not easy to accept that we are powerless. But it's the first step to recovery. Once we accept our disease, we can then get down to the work of recovery.