Center for Community Engagement at Chestnut Health Systems

THE BRAIN & THE DISEASE OF ADDICTION

ADDICTION

Addiction is a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual's life experiences. Just like diabetes is a chronic disease that affects the pancreas, addiction is a chronic disease that affects the brain. Neither disease is a character flaw, a moral failing, or a choice. And like all chronic diseases, while it cannot be cured, addiction can be treated, and people can learn to manage it.

Addiction develops as a result of drugs and alcohol hacking into the brain's communication system. Others can't see how the brain has been rewired, they only see the repeated risky, inappropriate, and sometimes illegal behaviors. But it is the disease of addiction that causes substance use to become compulsive, or uncontrolled, and to continue despite harmful consequences.

HOW DOES ADDICTION CHANGE THE BRAIN?

Individuals may make a choice about whether to take a drink or use drugs the first time, but no one has a choice about how their brain will react. In other words, what began as a choice can become hardwired in our brain as something that is CRITICAL for our survival. Addiction changes both the brain structure, its physical parts, and its function, or the way it works. The main job of the brain's reward pathway is to collect information from our life experiences to help us avoid pain or harm and to make us feel good when we do things that we enjoy, like eating our favorite food, doing well in work or school, or hanging out with friends or family.

As it collects this information, it rewards behaviors it finds pleasurable by releasing the chemical dopamine, which will motivate us to repeat the behavior in the future. Drugs and alcohol cause the brain to release a huge amount of dopamine, and at far greater levels than other activities we may enjoy such as eating or exercising.

Substances can cause our brain to flood with more dopamine than it can handle. Some brains decide it doesn't like that and will learn not to do that again. Other brains like it, and if the behavior is repeated, the brain will begin adapting to this new higher level of dopamine. With continued use, the brain makes less dopamine naturally, relying on and needing more of the substance to get the same effect. This is called "tolerance." At this point, the ability to exert self-control over when, how often, and how much to use can become seriously impaired. This impairment in self-control is one of the traits of addiction.

When this happens, the brain views drugs and alcohol as more important than food, water, sleep, and interacting with family and friends. This is why people with a severe addiction may quit taking care of themselves or taking care of their children – their brain has been tricked into thinking they will die if they do not use again. As the brain continues to adapt to the substance, areas outside of the reward pathway are also affected.

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