

The Science of ADDICTION

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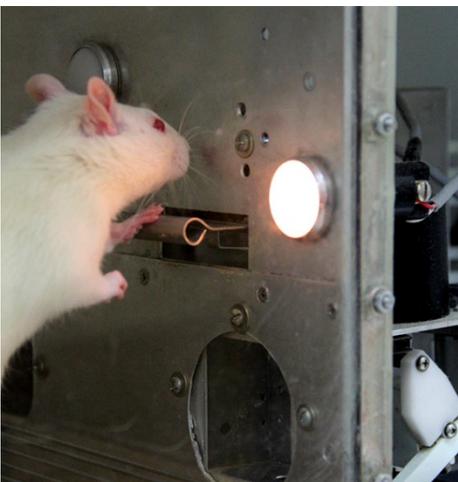
When I speak with citizens about the importance of drug prevention programs, and the need to talk to their children about the risks associated with drug and alcohol use, they often make a statement to the effect that they cannot understand why an individual would engage in an activity that ruins their life, destroys their relationships with friends and family and which may ultimately result in death or a long prison sentence. The answer to that question is simple – addiction. “Addiction” is a word that is becoming more commonly heard throughout society, but it is a concept that is not readily understood by most people.

Any discussion of addiction requires a certain understanding of the human brain.

In the mid-twentieth century, in an effort to increase the effectiveness of brain surgery, doctors started to map out the various regions of their patients’ brains. A person who was ultimately destined for surgery was put under a local anesthetic and the doctor would touch an electric probe to a certain area of the patient’s brain and the patient would report what he or she experienced. For example, the doctor could touch an area and the patient would report that he tasted salt. The doctor would touch a second area and the patient would report hearing a certain sound or seeing a certain color, etc. The doctor eventually touched a certain area of the patient’s brain and the patient reacted by becoming absolutely euphoric. However, when the doctor removed the electrical stimulation, the patient became very agitated or even enraged.



In an effort to understand why patients reacted in that way, researchers took 100 lab rats and inserted electrical probes into the same region of the brain that had caused the euphoric reaction in the human patients. The researchers also provided the rats with levers that the rats could push to receive electrical stimulation. At the end of 30 days the study was conclusive and the researchers were astounded by the results. All 100 rats were dead of a combination of malnutrition, dehydration and exhaustion. They did not eat, they did not drink, they did not sleep. All they did was push those levers until they died.

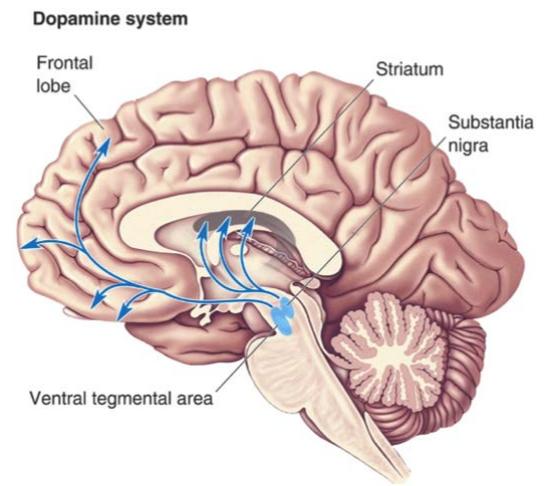


The researchers then inserted probes into the brains of another group of rats. However, instead of providing the rats with unrestricted access to a single lever that would provide electrical stimulation every time that it was pushed, they placed levers at different ends of the cage so that the rats would have to push one lever to receive the electrical stimulation, but then they would have to run to the other end of the cage to push the second lever to receive their second jolt of electrical stimulation. Essentially, the rats were trained that they would have to run back and forth between the levers if they wanted to continue receiving electrical stimulation. The researchers then placed a metal grid on the middle portion of the cage floor, between the levers, and electrified it such that touching it was so painful that a starving rat would not cross the electrified grid in order to obtain food. However, that grid did nothing to slow down the rats that needed to obtain the electrical stimulation of the brain that they craved. That group of rats continued to run back and forth across the electrified grid, enduring excruciating levels of pain, until those rats likewise died of a combination of malnutrition, dehydration and exhaustion.

The researchers, being perplexed as to why the brain was designed in such a way that it could lead someone to act in such a self-destructive manner decided to insert probes into the brains of a third group of rats. However, instead of giving the rats a lever to push so that they could artificially stimulate their brains, the researchers simply measured those activities that naturally triggered a reaction. The researchers observed that the rats’ brains were naturally

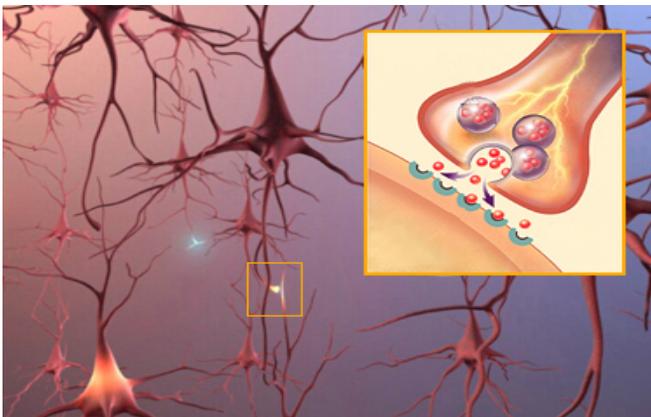
triggered by those activities that keep an individual or species alive – eating when hungry, drinking when thirsty and procreation. Essentially, the researchers had discovered the brain’s pleasure center.

The researchers concluded that over the course of human existence, the brain essentially became preprogrammed to use these pleasure centers to help us survive in what could be an inhospitable world. These pleasure centers worked hand in hand with our survival instincts in this simple way – if I consume a substance or engage in an activity and it makes me feel good, our brain concludes that that substance or activity must be good for me, causing an urge to consume more of that substance or to repeatedly engage in that pleasurable activity. Think of a newborn infant. Does an infant know that milk is good for him? That it allows him to survive or that it makes him healthy? Of course not. What the infant knows is that drinking milk alleviates his hunger and makes him feel good. The pleasurable sensations that take place in the infant’s brain causes him to want to consume more and more milk as his brain seeks to relive that pleasurable experience. The connection between the pleasure centers of our brains and our survival instincts is the essence of “addiction”. At its root, “addiction” is simply a misapplied survival drive.



In that regard, researchers have discovered that not all activities trigger the brain’s pleasure center in the same way. For example, if a person is little bit hungry, eating will release only a small amount of the chemicals that naturally

trigger the brain’s pleasure center. However, if the individual is very hungry or is presented with a food that they find very appealing, eating releases a larger amount of those same chemicals, thereby triggering a more pleasurable response. Drugs take those natural responses and turn them on their heads. Instead of the brain releasing a relatively small amount of those pleasure inducing chemicals in response to a natural event, drugs artificially cause the brain to flood itself with these chemicals, burning through a huge amount of these chemicals at one time, and causing a chemical imbalance that may last for days, weeks, months or even years.



To give a non-addict some idea of the powerful nature of drug addiction, there is a scale that gives a relative comparison regarding the release of the chemicals that trigger the brain’s pleasure center. For example, eating your favorite food scores “150” on the pleasurable experience scale, while engaging in sexual activity scores a “200”. Consuming nicotine from tobacco products, such as cigarettes, scores a “225” on the pleasurable experience scale. However, when it comes to methamphetamines or heroin, the person who uses those illegal substances is involved in an event that scores a “1050” on the pleasurable experience scale. We all know of the difficulties that a person faces when they try quit smoking. How they may do well for a while, but how they often cannot resist the urge to smoke. Drug addicts undergo the same experience as smokers, the main difference being that drug addicts are trying to quit a habit that is almost 5 times more pleasurable than any event that a cigarette smoker has ever experienced.

That is the scientific explanation for the powerful nature of addiction, and it answers the question of why someone simply cannot stop taking illegal drugs, even if they know that the drugs are killing them. It also explains why drug addicts who are able to “get clean” refer to themselves as being in “active recovery” rather than as being “recovered”. Once someone is addicted they will carry the desire to use their substance of choice for the rest of their life, even if they are able to successfully fight that urge on a daily basis.

Statistics show that children whose parents repeatedly speak to them about the dangers of substance abuse are significantly less likely to ever try drugs in the first place.

That is why I urge parents to speak with their children on a regular basis about the dangers that are associated with drug use, to explain to their children that they strongly disapprove of drug use and to describe to their children how addiction can derail the child’s future hopes and dreams. In simplest terms, the power of drug addiction is such that the only way to truly beat it is to never become addicted in the first place.



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