

Neuroplasticity in Drug Addiction

Michael Stevens*

Department of Psychology, University of Cambridge, United Kingdom

Commentary

Drug addiction is a state of uncontrollable consumption or use of a particular substance (especially addictive). Substance use disorder, where an individual gets involved in consuming substances like tobacco, alcohol, heroin, cannabis, marijuana, opium seeds, prescribed drugs/drugs used for medication which act like vasodilators, pain killers, neurotransmitters, etc.

Once a person starts consuming any sort of sedative substances they feel relaxed up to a certain extent and once if they take such on regular basis, it will be very difficult to come out of that state. People usually get addicted to such sedative narcotic agents due to peer pressure, casually for fun, parental or family issues, and even when their mental health is completely imbalanced or totally exhausted. Addiction of such narcotic drugs or opiate agents they have to face various health issues like insomnia, loss of appetite, fever, lower blood pressure levels, nausea, ulcers in the alimentary canal, liver damage, etc. and subsequently, they fall in a state where they will self-harm or harm people around them and completely lose control over their actions.

Neural plasticity/neuroplasticity/brain plasticity is the alterations and makes adaptations which control by the brain; they are based on previous or past experiences in one's life. Due to this plastic nature of our brain, these neurons get functioned and organize the stimulus according to the behavioral state throughout life. Neural networks of the brain are controlled by the brain's reward system. This reward system is helpful in learning, taking control of the response to new things/stimuli.

These sedative agents, drugs, alcoholic beverages, etc. when consumed enter into the bloodstream and gradually to the brain and this depends upon at what quantity they are taken. These when entered into the body, they transmit signals to the brain via neurons, and this particular process is controlled by the Brain's reward system. The stimulus obtained due to these drugs enters the mesolimbic dopamine pathway which takes over the control of one's pleasures and coordinates one's behavior if they come across any such behavioral adaptations. Many research studies have been proving that almost 80%-85% of the brain's reward system captures and grasps only positive actions.

How our Brain Learns to React when Drug Abuse

There can be a variety of effects that lead to the use of drugs or anesthetics. Our initial decision to use a drug can be caused by curiosity, circumstances, personality, and stressful life events. This initial drug exposure increases the release of a molecule (neurotransmitter) called dopamine, which expresses a sense of reward, pride. Changes with increases in dopamine levels in the brain reward system can lead to further neuroplasticity following repeated exposure to traumatic drugs; these neuroplasticity changes are also fundamental aspects of learning. Experience based learning, including repeated drug use, may fluctuate signal transmission between neurons. Neuroplasticity is a system of brain leakage following repeated drug use leading to increased and (at risk prone) compulsive drug use, where people ignore

the side effects. Thus, repeated exposure to anesthetic drugs creates experience dependent studies and brain related changes, which can lead to negative drug use patterns.

How does our Brain Cope up with Addiction

Our brain's plastic character depicts that we can change our behaviors throughout our lives by learning new skills and habits. To overcome this drug addiction or substance use disorder various learning models are taken into consideration and can be facilitated by adopting new cognitive modifications. Learning models suggest pursuing counseling or psychotherapy, including approaches such as cognitive behavioral therapy (Cognitive Behavioural Therapy), which can help a person modify their habits. NIDA suggests that, for some people, medications (also called medication assisted treatment or MAT) can help people manage symptoms to a level that helps them pursue recovery through various strategies like counseling and behavioral therapies, including Cognitive Behavioural Therapy. To maintain recovery from addiction many people use a combination approach of medications, behavioral therapies, and support groups.

Modifying Behavior with the help of Neuroplasticity

Cognitive Behavioural Therapy is an example of a learning based therapeutic intervention; thus, it utilizes neuroplasticity. Scientific evidence suggests that Cognitive Behavioural Therapy, alone or in combination with other treatment strategies, can be an effective intervention for substance use disorders. Cognitive Behavioural Therapy teaches a person to recognize, avoid, and learn to handle situations when they would be likely to use drugs. Contingency management has shown to be an example of evidence based behavioral therapy for substance use disorders. During this addiction treatment, individuals undergo various therapies to fortify positive behaviors and provide coupons if they find any positive results like self-resistance, the greater probability to rehab. This approach is based on the concept of work ethic, a form of learning, in which well reinforced character is often repeated. Using neuroplasticity, multiple evidence based approaches are used for the treatment of substance use disorders that require learning, acquiring, and maintaining good habits.

Our brains are plastic, and this character helps us learn new skills and trains our brains. Just as the brain can change in a negative way as seen in drug addiction, the brain can also change for the better as we embrace the skills we have learned from treatment and develop new, healthier habits.

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Corresponding author: Michael S, Department of Psychology, University of Cambridge, United Kingdom, Tel: +32489572676. Email: smichael@psychol.cam.ac.uk

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