

Effects of Drugs on the Brain

Certain Medications are notable for their effect on the brain.

Types of Drugs

Uppers

Amphetamines, also known as “uppers” or “speed”, are used to treat:

- Attention Deficit Conditions
- Depression
- Obesity, due to appetite suppressing effects

Safer drugs are now available that are analogues; similar in effect but safer. They do not pose the same level of risk of the original parent drug.

Downers

For the opposite effect of “uppers,” there are two classes of drugs that cause sedation and sleep. They will calm high anxiety states, stop seizures and help in treating depression.

1. Benzodiazepines which includes: Alprazolam [Xanax], Clonazepam [Klonopin], Diazepam [Valium], Lorazepam [Ativan].
2. Barbiturates cause sedation and sleep. Tranquilizers calm high-anxiety states, stop seizures and help in treating depression.

Opiates

Opiates are derived from the opium poppy. Drugs of this class are mainly used to treat pain. A wide variety of analogues are currently in existence, Morphine is the parent drug to this class of drugs.

How Drugs work

Receptors in the Brain

All of these drugs work by affecting certain receptors found in different regions of the brain. Think of a lock and key: the drug acts as a key, the receptors (the lock) are located on the membranes of different cell types in different areas of the brain and spinal cord. Everyone understands the lock and key concept. If it's the correct key for the lock, it turns, allowing the lock to open. Certain other keys may fit into the lock without turning or opening the lock. This blocks the lock if the correct key becomes available.

There are several known opiate receptors in the brain. These receptors control feelings like pain, dependence, sedation or euphoria.

When these drugs are used for a long period of time the brain responds to high concentration of drugs by making more receptors to keep opening for the available drugs. When those drugs are used up the brain responds with symptoms of withdrawal.

Tolerance

Tolerance describes the brain's response to prolonged, repeat drug exposure. When this occurs the brain will then create more receptors. As more receptors are created, then more of the drug is required to reach the same effect.

Dependence

Dependence is another affect when there is an excess of a drug; if the drug is not available to the brain in the concentration formerly available then the brain goes through the withdrawal process.

Withdrawal

Withdrawal symptoms will be the opposite of the desired (therapeutic) effect of the drug.

Abruptly withholding or withdrawal of a tranquilizer will induce the anxiety/ irritability initially, and can later cause death from seizures.

Withdrawal from Alcohol, Uppers, and Downers can cause death from seizures as well.

Withdrawal from opiates causes “cold turkey” symptoms including: goose bumps, nausea, vomiting, tremors, pain, yawning, runny nose, diarrhea, cramps and sweats. Patients typically wish that they would die from misery of opiate withdrawal. Fortunately the withdrawal symptoms last less than a couple of days or so and are not lethal.

**The symptoms of withdrawal can be lessened in intensity by lengthening the process: slowly reducing the dose of the drug over a period of time will cause milder symptoms of withdrawal for a longer period of time.

It is important to note that dependence, tolerance, and withdrawal are not the same as addiction.

Addiction

Addiction doesn't refer to how the brain is responding to the presence of these drugs. Addiction is a set of complex behaviors found in addiction susceptible people (not everyone is affected equally). Addiction presents itself as frequent demands for more medication, higher and more frequent doses of the medication, etc. Addiction is not confined to any one class of drugs. If a patient has alcohol addiction or a history of misuse, they are a much higher risk of addiction to drugs. The faster the drug causes effect in the brain, the more addicting it tends to be. Short term drugs are therefore more addictive because of the rapid effects the drug, the stronger the reinforcement to continue use.

Studies in lab animals showed that the animals would ignore all distraction just to get that rush in their pleasure centers. Animals studied had wires placed in the pleasure centers of their brain and they were provided with a button to push to get an immediate dose of pleasure. The animals will ignore food, water, even opportunities for sex and everything else to keep pushing the button and getting immediate pleasure until they die. This statement accurately describes the power of addiction.

Not All Drugs

Another key concept to understand is that not all drugs are prone to these problems. Medications that are used to correct chemical imbalance do not cause dependence, tolerance, or withdrawal. It is also important to understand that some drugs correct chemical imbalances in the brain while other drugs simply “mask” the symptoms caused by that imbalance can even worsen over time while the symptoms are masked by the higher and higher doses of the drug being used (tolerance leads to dependence).

We Can Help

With lower doses of medically necessary medication, directed by a licensed provider, given in a sustained manner over a long period of time, we are able to control and in many cases prevent dependence and addiction. Doing so will provide the therapeutic benefit with a much lower risk to you, the patient.

Please listen to your provider as he/she discusses the options to treat your medical problems. We want to help you! We as medical professionals also have responsibilities to uphold including: seeing that each individual is treated with the best quality care and not put in a position of harm.

May 2012

RJ Oenbrink DO
Danielle Miller