The Brain’s Response to Marijuana

Hi, my name is Sara Bellum. Welcome to my magazine series exploring the brain’s response to drugs. In this issue, we’ll investigate the fascinating facts about marijuana.

You may have heard it called weed, pot, grass, ganja or skunk, but marijuana by any other name is still a drug that affects the brain.

Did you know marijuana can have different effects on different people? For example, it can cause some people to lose focus on things around them. It makes others more aware of their senses—like sight, sound, smell, and taste, and it has still different effects on other people.

All these changes are caused by chemicals that affect the brain. More than 400 chemicals are in the average marijuana plant. When smoked, heat produces even more of them!

The Search Continues

Some chemicals in the marijuana plant might be useful in the world of medicine—like preventing nausea and blocking pain, and possibly treating other problems and diseases. The trick is for scientists to get these results without the harmful effects.

Researchers are studying these chemicals—so that they can develop medications that are chemically similar to THC but don’t negatively affect the brain.

Effects of Marijuana on the Brain

One region of the brain that contains a lot of THC receptors is the hippocampus, which usually helps with memory. When THC attaches to receptors in the hippocampus, it interferes with memory.

Researchers have also shown that heavy use of marijuana by young people can actually cause IQ to go down—and this change in IQ can last a long time and may even be permanent! This means that someone who uses marijuana may not do as well in school and may have trouble remembering things like their friend’s phone number.

Maybe you’ve heard that marijuana can cause a range of emotions from uncontrollable laughter to paranoia. That’s because THC also influences emotions, probably by acting on a region of the brain called the limbic system.

And don’t forget this: THC can make something as simple as driving a car really dangerous.

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Marijuana is the dried leaves and flowers of the hemp plant (*Cannabis sativa*). Like all plants it's sensitive to the environment where it grows.

Different weather and soil conditions can change the amounts of the chemicals inside the plant. That means marijuana grown in a place like Hawaii might be chemically different than marijuana from Mexico, or vice-versa.

**Where Does Marijuana Come From?**

How do the chemicals in marijuana change the way a person sees, hears, smells, tastes, and feels things?

When someone uses marijuana, these chemicals travel through the bloodstream and quickly attach to special places on the brain's nerve cells. These places are called receptors, because they receive information from other nerve cells. Chemicals carry this information, which changes the nerve cell receiving it.

One chemical in marijuana that has a big impact on the brain is called THC—tetrahydrocannabinol. (Whew! Try saying that 10 times fast.) Scientists have found that some areas of the brain have a lot of THC receptors, while others have very few or none. These clues are helping researchers figure out exactly how THC works in the brain.

**Marijuana Invades the Brain**

Marijuana interferes with some parts of the brain—such as those affecting emotions, memory and judgment—to lose balance and control.

Marijuana may cause some parts of the body to react in different ways. What do you know about:

1. **Rapid Heartbeat**—up to how many beats per minute? Is it 100, 130, or 160?
2. **Dilated blood vessels**—can be seen in what part of the body? Is it the face, the eyes, the feet?
3. A feeling of panic—accompanied by what kind of sensations? Is it sweating, dry mouth, breathing difficulties, or all of these?
4. **Daily cough and more frequent chest colds** very much like who? Is it tobacco smokers, construction workers, or the elderly?

**Answers:**

1. THC, or Nurses
2. Answer: Dilation of blood vessels can be seen in the face, the eyes, and the feet.
3. A feeling of panic may be accompanied by sweating, dry mouth, and trouble breathing.
4. Tobacco smokers.