

# Epigenetics & Marijuana

## The Possibility of Multigenerational Impact



Though the concept of epigenetics has been around since the 1940s, the idea that genetic information passing from cell to cell can be slightly altered by environmental factors has been gaining momentum in the last decade.<sup>1</sup> These “epigenetic” changes can have many consequences to the human body, which includes influencing brain function. What is epigenetics?

**epi•ge•net•ic /adjective/: external changes to DNA that turn genes “on” or “off” but do not alter the DNA sequence<sup>2</sup>**

Because legalized marijuana is becoming increasingly more prevalent and potent, it’s important to understand its impact, both long-term and from generation to generation.

Genes play an important role in our health as do behaviors and environment. Epigenetic researchers explore the effects of these outside influences and their effect on the way our genes work. As cells divide, epigenetic modifications persist and, in some cases, are inherited through the generations. Environmental influences, like diet or exposure to pollutants, can also impact the epigenome. Unlike genetic changes which never change, epigenetic changes are reversible.

### Epigenetic Factors

Lifestyle is a primary factor that influences a person’s gene expression. For example, if a person’s ancestors live well into their 90s and that person expects to do the same, yet takes poor care of themselves, eating and sleeping badly, choosing to be a couch potato, and abusing alcohol or drugs, the person will probably not live as long. Epigenetic changes can help determine whether genes are turned “on” or “off” and can influence longevity.

Researchers have learned that epigenetic processes are especially important in early life when cells first receive instructions, telling the

### Cannabis Exposure Causes Disturbances

Though more research is needed, there is growing clinical awareness that cannabis exposure causes behavioral and neurobiological disturbances, including:<sup>4</sup>

- Anxiety
- Cognitive Deficits
- Depression
- Psychosis
- Social Impairments
- Subsequent Drug Addiction

cells how they will develop and specialize. These processes can be initiated or disrupted by such factors as:<sup>3</sup>

- Diet
- Stress
- Aging
- Pollutants
- Marijuana Use
- Other Substance Abuse

## Can Parents' Marijuana Use Affect Their Children?

If epigenetic markers are any indicator, the answer to that question is "yes." These markers can affect the health and the expression of the traits passed to children. For example, when a person uses cocaine, it can alter the DNA and increase the production of the proteins that are common in addiction.<sup>5</sup>

Using data from both human and animal models, scientists are beginning to understand how cannabis exposure is linked to abnormal epigenetic modifications in the brain; and that behavioral abnormalities and molecular impairments can be passed on by parents who were exposed to cannabinoids even before conceiving their offspring.

## Inheriting Health Consequences

Emerging research on marijuana exposure has revealed some alarming outcomes not only for people who use marijuana, but also for their children, including:<sup>6,7</sup>

- Changes in sperm including, lower sperm count, decreased sperm quality, increased risk of testicular germ cell cancers, altered states that could impact development and health of the child
- Adult mental health disturbances later in life with marijuana use by pregnant women and during adolescence
- Addiction, drug-seeking behavior, and abuse of harder drugs later in life especially with marijuana use by teenagers and young adults
- Autism and autism-like behaviors

## About This Campaign

Because much of the public conversation surrounding marijuana has been based on anecdotes rather than science, Prevention Action Alliance and the Ohio Department of Mental Health and Addiction Services created this campaign to help people better understand the facts about marijuana and its effects.

If you found this article helpful, we encourage you to share it with others. You can also find other fact sheets about marijuana at: [preventionactionalliance.org/marijuana](http://preventionactionalliance.org/marijuana)

If you have concerns about your own use of marijuana or a loved one's, and wish to seek help, go to: [findtreatment.samhsa.gov/](http://findtreatment.samhsa.gov/)

## Contact Us

For more information on marijuana, please contact us at:  
Prevention Action Alliance  
(614) 540-9985  
[preventionactionalliance.org](http://preventionactionalliance.org)

## About Us

Prevention  
Action Alliance



Prevention Action Alliance is a 501(c)3 nonprofit located in Columbus, Ohio. We're dedicated to leading healthy communities in the prevention of substance misuse and the promotion of mental health wellness. Learn more at [preventionactionalliance.org](http://preventionactionalliance.org).

The mission of the Ohio Department of Mental Health and Addiction Services (OhioMHAS) is to provide statewide leadership on the topics of mental health and addiction prevention, treatment, and recovery. Learn more about OhioMHAS at [mha.ohio.gov](http://mha.ohio.gov).

1. [ncbi.nlm.nih.gov/pmc/articles/PMC3941222/](http://ncbi.nlm.nih.gov/pmc/articles/PMC3941222/)

2. [ghr.nlm.nih.gov/primer/howgeneswork/epigenome](http://ghr.nlm.nih.gov/primer/howgeneswork/epigenome)

3. [niehs.nih.gov/health/topics/science/epigenetics/index.cfm](http://niehs.nih.gov/health/topics/science/epigenetics/index.cfm)

4. [ncbi.nlm.nih.gov/pmc/articles/PMC4789113/](http://ncbi.nlm.nih.gov/pmc/articles/PMC4789113/)

5. [drugabuse.gov/publications/drugfacts/genetics-epigenetics-addiction](http://drugabuse.gov/publications/drugfacts/genetics-epigenetics-addiction)

6. [ncbi.nlm.nih.gov/pmc/articles/PMC7081939/](http://ncbi.nlm.nih.gov/pmc/articles/PMC7081939/)

7. [ncbi.nlm.nih.gov/pmc/articles/PMC5682234/](http://ncbi.nlm.nih.gov/pmc/articles/PMC5682234/)