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# Marijuana Facts

- **Most commonly used illicit drug** (19.8 million past-month users) according to the 2013 National Survey on Drug Use and Health.
- Used by 81.0% of current illicit drug users (defined as having used a drug at some time in the 30 days before the survey) and the only drug used by 64.7 % of them.
- In 2014: 11.7% of **8<sup>th</sup>-graders** reported past-year use, and 6.5% were current users.  
27.3% of **10<sup>th</sup>-graders** reported past-year use, and 16.6% were current users  
35.1% of **12<sup>th</sup>-graders** reported past-year use, and 21.2% were current users;  
**5.8% reported daily or near-daily use.**
- **Teens' perceptions of the risks of marijuana use have steadily declined** over the past decade, possibly related to increasing public debate about legalizing or loosening restrictions on marijuana for medicinal and recreational use.

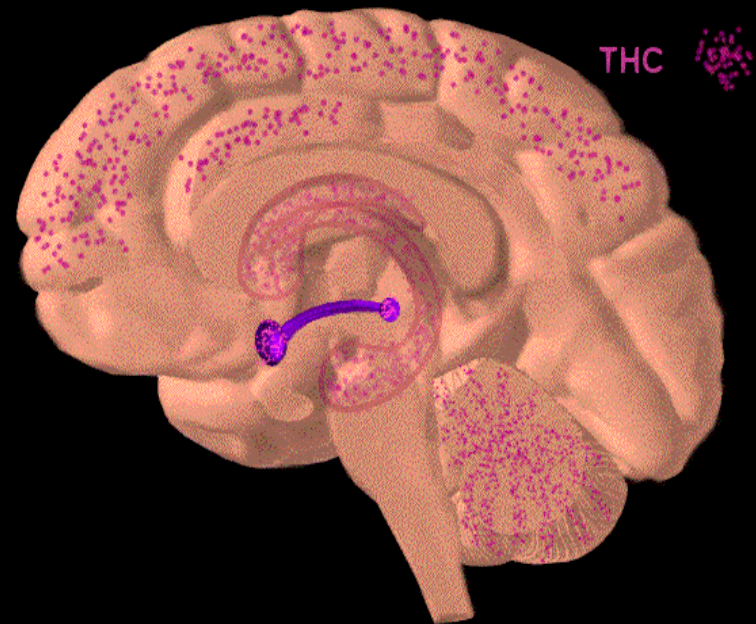
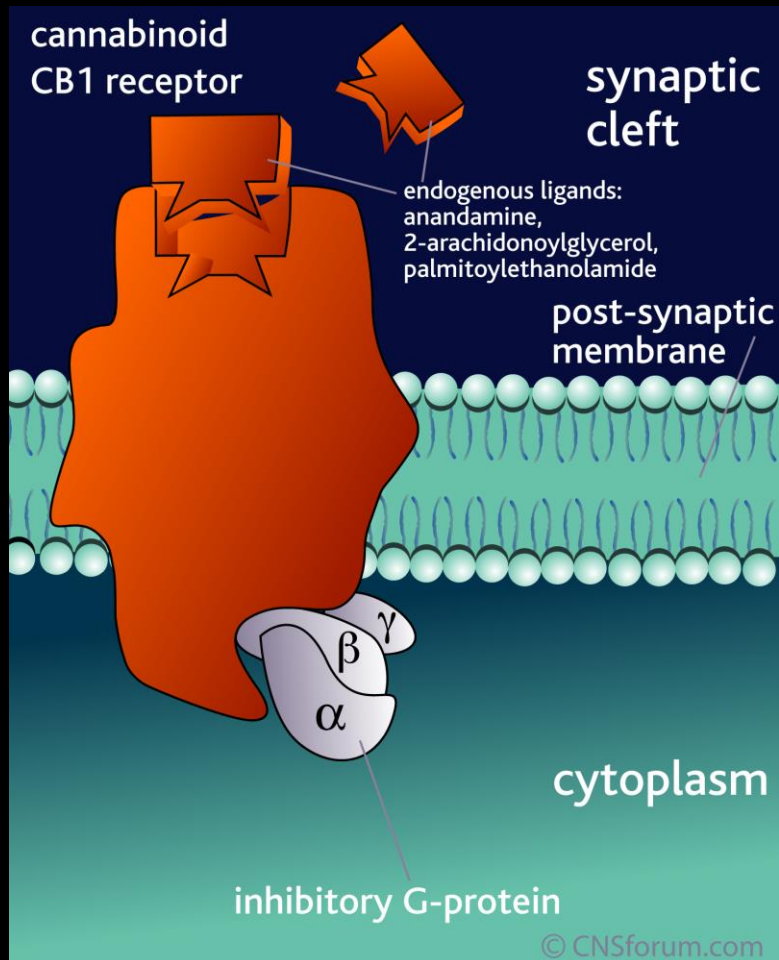
**Marijuana is one example of a "cannabinoid,"  
but there are many others.....**



Plant (Phyto-cannabinoids)	plant leaves, flowers, stems, and seeds collected from the Cannabis sativa plant and ingested in some form (cigarettes, vapor)
Endogenous	made by the body: N-arachidonylethanolamine or anandamide (AE) or 2-arachidonoylglycerol ( 2-AG).
<u>Purified</u>	naturally occurring cannabinoids purified from plant sources: <b>Cannabidiol (CBD)</b> , D9-tetrahydrocannabinol (THC), and Sativex (THC/CBD mixture).
Synthetic	synthesized in a laboratory: CB1 agonists (CPP-55, ACPA), CB2 agonists (JWH-133, NMP7, AM1241), CB1/CB2 nonselective agonist (CP55,940), Ajulemic Acid (AJA), Nabilone, <b>Dronabinol (Marinol)</b> , and several other proprietary chemicals in development

adapted from: <http://www.drugabuse.gov/drugs-abuse/marijuana/nida-research-therapeutic-benefits-cannabis-cannabinoids>

# Cannabinoids – Mechanism of Action



**Brain's Chemical**



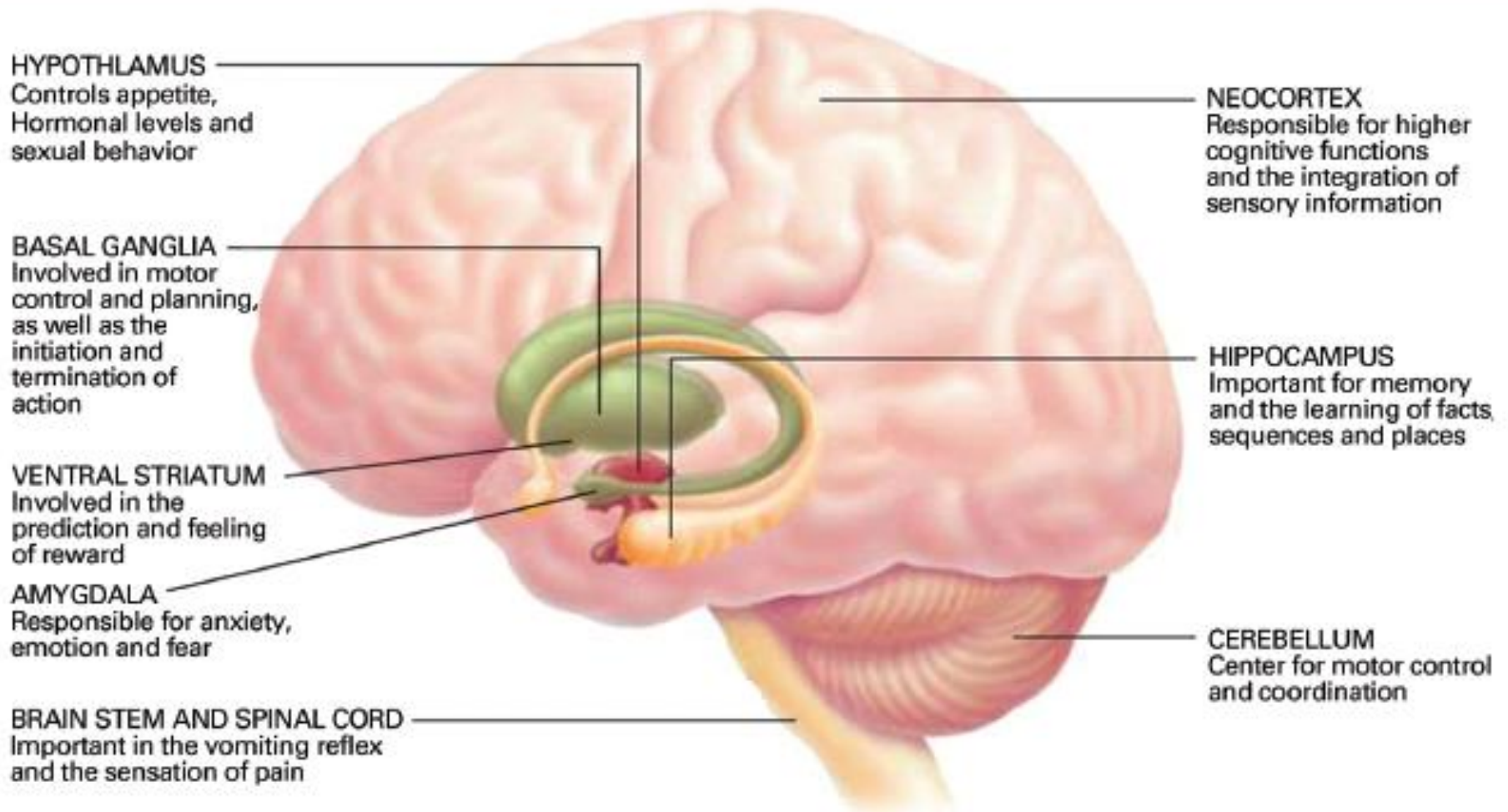
**Anandamide**

**Drug**



**THC**

# Marijuana's Effects on the Brain



© Alice Y. Chen, 2004. Adapted from *Scientific American*.

## **Research is Needed !!!!!!!!!**

"While the existing data show promise, **it is still too soon to tell whether and for whom CBD will be effective.** Like most medical treatments, it doesn't seem to work for everyone. Much more research needs to be done, but it should be done quickly..... In short, CBD appears to be a safe drug with no addictive effects, and the preliminary data suggest that it may have therapeutic value for a number of medical conditions. Addressing barriers that slow clinical research with CBD would accelerate progress."

Nora Volkow, Director of the National Institute on Drug Abuse, Senate Testimony;  
<http://www.drugabuse.gov/about-nida/noras-blog/2015/07/researching-marijuana-therapeutic-purposes-potential-promise-cannabidiol-cbd>

"The recent anecdotal reports of positive effects of the marijuana derivative cannabidiol for some individuals with treatment-resistant epilepsy give reason for hope. However, we must remember that these are only anecdotal reports, and robust scientific evidence for the use of marijuana is lacking. The lack of information does not mean that marijuana is ineffective for epilepsy. It merely means that we do not know if marijuana is a safe and effective treatment for epilepsy, which is why it should be studied using the well-founded research methods that all other effective treatments for epilepsy have undergone. **Such safety concerns coupled with a lack of evidence of efficacy in controlled studies result in a risk/benefit ratio that does not support use of marijuana for treatment of seizures at this time.** Healthcare professionals, patients, and caregivers are reminded that use of marijuana for epilepsy may not be advisable due to this lack of information on safety and efficacy...."

American Epilepsy Society Position on Medical Marijuana,  
[https://www.aesnet.org/about\\_aes/position\\_statements/AES%20Position%20on%20Medical%20Marijuana](https://www.aesnet.org/about_aes/position_statements/AES%20Position%20on%20Medical%20Marijuana)

# What Products Are Available????

➤ Two FDA-approved drugs, **dronabinol** (synthetic THC; Marinol) and **nabilone** (a synthetic cannabinoid with a structure similar to THC; Cesamet), contain THC. They treat nausea caused by chemotherapy and increase appetite in patients with extreme weight loss caused by AIDS.



➤ The United Kingdom, Canada, and several European countries have approved nabiximols (**Sativex**), a mouth spray containing THC and CBD. It treats muscle control problems caused by multiple sclerosis. The United States is conducting clinical trials.....



➤ Although it has not yet undergone clinical trials, scientists have recently created **Epidiolex**, a CBD-based liquid drug to treat certain forms of childhood epilepsy. Epidiolex was developed by GW Pharmaceuticals and has been given to more than 400 children under the FDA's expanded access ("compassionate use") program.



<http://www.drugabuse.gov/about-nida/noras-blog>

<http://www.drugabuse.gov/about-nida/legislative-activities/testimony-to-congress/2015/biology-potential-therapeutic-effects-cannabidiol>

# Cannabidiol (CBD)

- One of more than 80 active cannabinoid chemicals in the marijuana plant
- Unlike THC, CBD does not produce euphoria or intoxication
- CBD has a very low affinity for cannabinoid receptors (100-fold less)
- CBD may acts on other brain signaling systems (serotonin??)
- CBD may have anti-seizure, antioxidant, neuroprotective, anti-inflammatory, analgesic, anti-tumor, anti-psychotic, anti-anxiety properties.
- NIH is currently supporting a number of studies effects as well as the health risks of cannabinoids.

<http://www.drugabuse.gov/about-nida/noras-blog>

<http://www.drugabuse.gov/about-nida/legislative-activities/testimony-to-congress/2015/biology-potential-therapeutic-effects-cannabidiol>



\$20

BONANA  
1/8 \$55 1.2g \$20

BIG FATTY  
1/8 \$55 1.2g \$20

SILVER HA  
1/8 \$50 1g

# Marijuana and Increasing Potency.....

In the early 1990s, the average THC content in confiscated cannabis samples was roughly **3.7** percent for marijuana and 7.5 percent for sinsemilla (a higher potency marijuana from specially tended female plants).

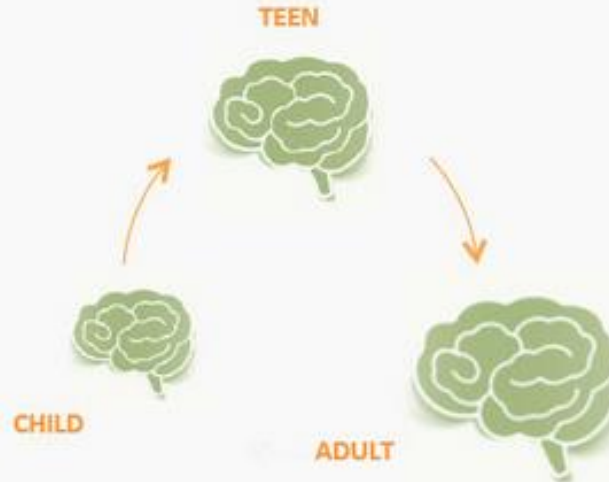
In 2013, it was **9.6** percent for marijuana and 16 percent for sinsemilla.

Also, newly popular methods of smoking or eating THC-rich hash oil extracted from the marijuana plant (a practice called “dabbing”) may deliver very high levels of THC to the user.

The average marijuana extract contains over **50** percent THC, with some samples exceeding **80** percent. These trends raise concerns that the consequences of marijuana use could be worse than in the past, **particularly among new users or in young people, whose brains are still developing.**

# MARIJUANA MAY HURT THE DEVELOPING TEEN BRAIN

The teen brain is **still developing** and it is especially vulnerable to drug use.



# ↓ IQ

Regular heavy marijuana use by teens can lead to an IQ drop of up to **8 points<sup>3</sup>**

## HEAVY MARIJUANA USE BY TEENS IS LINKED TO<sup>4</sup>:

### Educational Outcomes



**lower**  
grades and  
exam scores



**less likely**  
to graduate  
from HS or  
college



**less likely**  
to enroll in  
college

### Life Outcomes



**lower**  
satisfaction  
with life



**more**  
likely to be  
unemployed



**more likely** to  
earn a **lower**  
income



National Institute  
on Drug Abuse

1. NSDUH, SAMHSA, 2014; 2. MTF Survey; 3. Meier et al 2012; 4. MTF Survey; Cobb-Clark et al, 2013; Silins et al 2014; Tucker et al 2005; Homel et al, 2014; Volkow et al 2014; Fergusson and Boden 2008; Brooks et al 2013

# Marijuana and Dependence.....

It is estimated that **9** percent of people who use marijuana will become dependent on it.

The number goes up to about **17** percent in those who start using young (in their teens) and to 25 to 50 percent among daily users.

According to the 2013 NSDUH, marijuana accounted for 4.2 million of the estimated 6.9 million Americans dependent on or abusing illicit drugs.

**Marijuana addiction is linked to a mild withdrawal syndrome** (i.e., irritability, mood and sleep difficulties, decreased appetite, cravings, restlessness, and/or various forms of physical discomfort that peak within the first week after quitting and last up to 2 weeks).

# **Marijuana and Pregnancy.....**

Marijuana use during pregnancy is linked to increased risk of both brain and behavioral problems in babies. If a pregnant woman uses marijuana, the drug may affect certain developing parts of the brain of the unborn child. Resulting challenges for the child may include problems with attention, memory, and problem-solving.

For additional information, see NIH Publication Number 15-3859

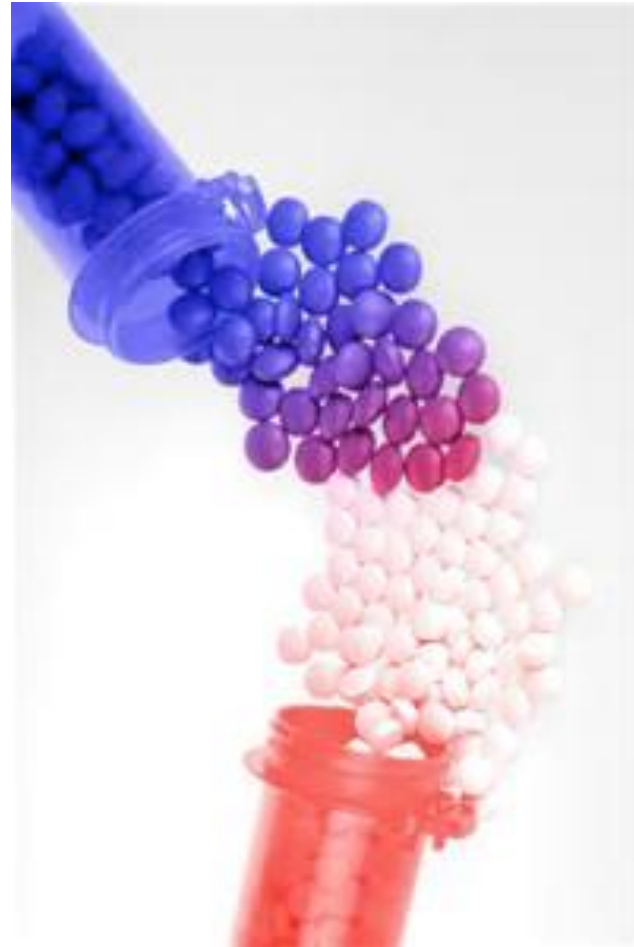
# Marijuana and Mental Illness

Several studies have linked marijuana use to increased risk for mental illnesses, including psychosis (schizophrenia), depression, and anxiety, but whether and to what extent it actually causes these conditions is not always easy to determine.

Genetic variants.....

For additional information, see NIH Publication Number 15-3859

# Drug Interactions



# Adverse Consequences of Marijuana Use

## Acute (present during intoxication)

- Impaired short-term memory
- Impaired attention, judgment, and other cognitive functions
- Impaired coordination and balance
- Increased heart rate
- Anxiety, paranoia
- Psychosis (uncommon)

## Persistent (lasting longer than intoxication, but may not be permanent)

- Impaired learning and coordination
- Sleep problems



## Long-term (cumulative effects of repeated use)

- Potential for addiction
- Potential loss of IQ
- Increased risk of chronic cough, bronchitis
- Increased risk of schizophrenia in vulnerable people\*
- Potentially increased risk of anxiety, depression, and amotivational syndrome\*

*\*These are often reported co-occurring symptoms/disorders with chronic marijuana use. However, research has not yet determined whether marijuana is causal or just associated with these mental problems.*

# Recommended Reading.....

NIH Publication Number 15-3859  
(<http://www.drugabuse.gov/publications/research-reports/marijuana/letter-director>)

<http://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-addictive>

[https://www.aesnet.org/clinical\\_resources/medical%20marijuana](https://www.aesnet.org/clinical_resources/medical%20marijuana)



How does marijuana use affect school, work, and social life? See page 7.



National Institute on Drug Abuse

from the director:

Changes in marijuana policies across states legalizing marijuana for medical and/or recreational use suggest that marijuana is gaining greater acceptance in our society. Thus, it is particularly important for people to understand what is known about both the adverse health effects and the potential therapeutic benefits linked to marijuana.

Because marijuana impairs short-term memory and judgment and distorts perception, it can impair performance in school or at work and make it dangerous to drive an automobile. It also affects brain systems that are still maturing through young adulthood, so regular use by teens may have a negative and long-lasting effect on their cognitive development, putting them at a competitive disadvantage and possibly interfering with their well-being in other ways. Also, contrary to popular belief, marijuana can be addictive, and its use during adolescence may make other forms of drug abuse or addiction more likely.

Whether smoking or otherwise consuming marijuana has therapeutic benefits that outweigh its health risks is still an open question that science has not resolved. Although many states now permit dispensing marijuana for medicinal purposes and there is mounting anecdotal evidence for the efficacy of marijuana-derived compounds, there are currently no FDA-approved indications for "medical marijuana." However, safe medicines based on cannabinoid chemicals derived from the marijuana plant have been available for decades and more are being developed.

This Research Report is intended as a useful summary of what the most up-to-date science has to say about marijuana and its effects on those who use it—both young and old.

Nora D. Volkow, M.D.  
Director  
National Institute on Drug Abuse

Research Report Series



# Marijuana

What is marijuana?

**M**arijuana—also called *weed*, *herb*, *pot*, *grass*, *bud*, *ganja*, *Mary Jane*, and a vast number of other slang terms—is a greenish-gray mixture of the dried, shredded leaves and flowers of *Cannabis sativa*—the hemp plant. Some users smoke marijuana in hand-rolled cigarettes called *joints*; many use pipes, water pipes (sometimes called *bongs*), or marijuana cigars called *blunts* (often made by slicing open cigars and replacing some or all of the tobacco with marijuana).<sup>1</sup> Marijuana can also be used to brew tea and, particularly when it is sold or consumed for medicinal purposes, is frequently mixed into foods ("edibles") such as brownies, cookies, or candies. In addition, concentrated resins containing high doses of marijuana's active ingredients, including honey-like "hash oil," waxy "budder," and hard amber-like "shatter," are increasingly popular among both recreational and medical users.

The main *psychoactive* (mind-altering) chemical in marijuana, responsible for most of the intoxicating effects sought by recreational users, is delta-9-tetrahydrocannabinol (THC). The chemical is found in resin produced by the leaves and buds primarily of the female cannabis plant. The plant also contains more than 500 other chemicals, including over 100 compounds that are chemically related to THC, called *cannabinoids*.<sup>2</sup>

continued inside

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