Help yourself to some glucose... we will be doing some Bio 101- need your brain working
Marijuana Molecules (THC/CBD): Stuff we all need to know

Linda Hancock, FNP, PhD
LindaGivesBack.com
Email: linda@lindagivesback.com
Is “legal” the same as Safe?

- Alcohol
- Tobacco
- Prescription Drugs

- Above are legal... but not necessarily safe!
POLICY & history
Our relationship with Marijuana in the U.S.
• Since the 1930s, federal law has declared the use, sale or distribution of marijuana illegal.

• The Controlled Substances Act (CSA) classifies and regulates illegal drugs
  • It schedules drugs according to their medicinal value and potential for abuse.

• Under the CSA since the 1970s, marijuana is a Schedule I controlled substance.

• This designation is reserved for drugs that have a high potential for abuse, lack any medical value and can’t be safely prescribed
  • NOTE: Therefore --Doctors can’t prescribe it!

• So...research on marijuana’s medicinal properties is NOT where it needs to be.

Some good news

- In 2017, the National Institutes of Health funded cannabinoid research $140 million
  - Including $15 million on CBD.

Federal Law

• Federal law still treats marijuana as a controlled substance

Even if you live in a state that legalized medical or recreational marijuana use, you are is still committing a federal crime by possessing, buying, or selling marijuana.

The FDA doesn't regulate it because it’s illegal.
Marijuana Legalization and Answers to Our "Drug Problems"

Educate yourself. Impress your friends. Nuanced drug policy positions explained.

Posted Jul 11, 2017

Policy Continuum

• Prohibition (Criminalization)

• Decriminalization (you are caught in possession of small amounts of a drug for personal use, you do not incur a criminal penalty. It is still illegal to use the drug. The penalty, however, is typically nothing more than a modest fine

• DePenalization (What Portugal did - Administrative penalties with referral for free help)*

• Defacto Decriminalization - existing criminal law prohibiting use is no longer enforced.

• Medicalization is medically “recommended” rather than actually “prescribed,” due to a limited availability of rigorous empirical evidence on health benefits.

• Legalization- without commercialization (bans product branding and advertising that are designed by industries to proactively increase sales, consumption, and profits. An alternative is to have local, state, or federal control over the production and sale of the drug.

• Legalization – with limits on commercialization such things as having a minimum age for use (e.g. being at least age 21), ensuring quality control in production, and listing of ingredients including the nature and potency of its psychoactive content; limiting the number of licensed sales outlets in a given area; prohibiting use under certain conditions, such as when driving a car; and having a minimum price per unit ...

• Legalization –with FULL commercialization

We haven’t legalized marijuana, we have commercialized THC.

Source: 2017 TED Talk Dr. Sabat
The False Dichotomy of Legalization and Criminalization
Drug Bio 101

The science behind the molecules
How they work in the brain/body
AND...

why it matters!
Marijuana: THC vs CBDs
Bio 101-the science

Thanks to-
My best resource: Dr. Tricia Smith
Pharmacologist
Cannabis Researcher
VCU Drug Bio Teacher

THEMED ISSUE: CANNABINOIDS

REVIEW

Cannabinoid CB₁ receptor-interacting proteins: novel targets for central nervous system drug discovery?

Tricia H. Smith, Laura J. Sim-Selley and Dana E. Selley
Marijuana:
3 varieties (two smoked)
thousands of strains

• Fast growing plant

• Requires 6 gallons of water a day (twice as much as a grape plant)

• To force grow marijuana even more:
  Fertilizers, 24/7 lighting, genetic breeding

• Because it’s moist- pesticides and antifungals are used to prevent mold/disease

Marijuana – THC strength increasing

1970’s
?1-1.5% THC

1980’s
?3-4% THC

Average THC for Marijuana Flower by Strain

- **Sativa**
  - Average THC: 22.11%
  - THC Range: 11% - 30%

- **Hybrid**
  - Average THC: 21.56%
  - THC Range: 14% - 29%

- **Indica**
  - Average THC: 21.19%
  - THC Range: 12% - 29%

**Average potency (nation)** = 13.18%
**Average potency (Seattle)** = 21.62%

**Concentrates average potency (nation)** = 55.85%
**Concentrates average potency (Seattle)** = 71.71%
What’s in marijuana?

It depends...
The plant has over 400 known components!

All can be influence by
The breeding
The strain
The pesticides & fertilizers
3 Classes of Cannabinoids

1. **Endogenous cannabinoids** — 5 known, we make them in our body
   Anandamide and 2AG are most studied

2. **Phytocannabinoids**
   THC & CBD are the two most talked about but about 100 exist
   found in leaves, flowers, stems, and seeds collected from the Cannabis plant

1. **Many Synthetics** (synthesized in a laboratory) like spice, K2, etc
   Examples include CB1 agonists (CPP-55, ACPA)
   CB2 agonists (JWH-133, NMP7, AM1241)
   CB1/CB2 nonselective agonist (CP55940)
   ajulemic acid (AJA), nabilone, and dronabinol.
The Endocannabinoid System!

Anandamide & THC work on our cells!
Anandamide fits Cannabinoid Receptors

**CB1** – “central” cannabinoid receptor
- **most** abundant G-coupled receptor in the brain!
- also present in the gut

**CB2** – “peripheral” cannabinoid receptor
- localized mainly on immune cells and in lymphoid organs

**GPR55**? - Orphan receptor. Now CB3?!
Phytocannabinoids

Over 80-100 in the plant – 2 get all the press – THC/CBD

THC $\Delta^9$-tetrahydrocannabinol (responsible for the “high”) is just one – a partial agonist

“No high”

Cannabidiol (CBD): very weak CB1 agonist, antagonizes other cannabinoids

Others include

• Cannabinol (CBN) weak agonist, prefers CB2

• Tetrahydrocannabivarin THCV CB1 antagonist & CB2 partial agonist

• Cannabigerol CBG; CB1 antagonist, $\alpha_2$-adrenergic agonist, 5-HT1a antagonist
How cells communicate

If it’s a drug of abuse dopamine is released
Cannabinoids don’t work like other neurotransmitters

• Other brain chemicals –
  • are stored in “bubbles” (like dopamine and serotonin) in the PRE-synaptic membrane
  • When signaled, get “dumped” into the synapse
  • Action potential moves forward in the system

• Anandamide and 2AG are synthesized..
  • on demand and in the POST synaptic membrane
  • The signal moves in a retrograde fashion NOT forward.
Almost all drugs of abuse move action potentials forward.
Cannabinoids are the volume control system for your brain.
Cannabinoids are calming but... *we have more than 1 kind of neuron*

**Excitatory Neurons**
- If calmed work like a **STOP SIGN**
- “Don’t go”
- **Examples**
  - Chill out
  - Calming seizures
  - Inflammation etc.

**Inhibitory Neurons**
- If calmed then it is like **Stopping the STOP SIGN**
- Which means “GO”
- **Examples**
  - perceptual effects
  - Taste
  - Sight
  - Hallucinations (psychosis)
Where at receptors located in the brain?

Localization of CB1

Basal Ganglia includes VTA! The pleasure center
Where are receptors located in the body?
Therapeutic Indications? Research now in progress...

- Cancer!
- Cancer chemotherapy-induced nausea & emesis
- Appetite increase in AIDS and cancer patients
- Palliative (quality of life)
- Inflammatory diseases
- Pain (Neuropathic, arthritis)
- Movement Disorders (MS)
- PTSD
If you use THC or CBD, they work all over the body & you can’t effect just one system.

- Energy Balance
- Sexual Reproduction
- Cardiovascular Effects
- Immune System Control
Side Effects

Modulation of the endocannabinoid (EC) system in human disease

Desirable effects
- Pain, nausea/vomiting ↓
- Appetite (in cachexia) ↑
- Insulin resistance, inflammation ↓
- Lipogenesis, cardiometabolic risk ↓
- Lipolysis, glucose tolerance ↑
- Inflammation, tissue injury ↓
- Pain, anxiety ↓, inflammation?

Undesirable effects
- Psychoactive, cardiovascular obesity, diabetes, inflammation ↑
- Gastrointestinal motility ↓
- Fertility ↓
- Peripheral CB₁ inhibition
- CB₂ stimulation
- Inhibition of the EC metabolism/transport
- Immunosuppression?, fertility?
- Psychoactive, cardiovascular metabolic, inflammation ↑?
Synthetic Cannabinoids

• HU210, JWH-073, JWH-018, AM2201
  • John W. Huffman: organic chemist at Clemson University

• FULL to potent agonists at the CB1 Receptor!

• Panic attacks
• Vomiting
• Convulsion
• Psychosis (prolonged!)
• Tachycardia
• Hypertension
• Agitation
• Hallucinations
• Myocardial infarction

• Professor John W. Huffman, who first synthesized many of the cannabinoids used in synthetic cannabis, is quoted as saying, "People who use it are idiots.” “You don’t know what it’s going to do to you.”
• THC (see green line) is a very weak partial agonist.
  • You can NOT overdose
• Synthetics are strong agonists and hold on (see WIN)
  • You CAN over dose
Marijuana is great at reducing nausea and vomiting!

What about its use during pregnancy?
Marijuana & Pregnancy

• Animal Studies:
  • lifelong changes in behavior; including hyperactivity, learning deficits, and enhanced response to rewarding drugs

• Human studies (following maternal use):
  • impairments in mental development; including decreased memory, verbal reasoning, and attention and sleep efficiency and an increase in impulsivity and hyperactivity

• functional magnetic resonance imaging (fMRI) scans show decreased activity in parts of the prefrontal cortex and the cerebellum and increased activity in frontal gyrus
A 2017 Report
National Academies of Sciences, Engineering, and Medicine

Offers a rigorous review of scientific research published since 1999

The committee that carried out the study and wrote the report considered more than 10,000 scientific abstracts to reach its nearly 100 conclusions.

The academic Impact of marijuana?

RESOURCE
Check out the VCU COBE Town Hall 2018 videos

Look for Dr. Jason Kilmer
the brilliant guy in the sweater vest
Marijuana and cognitive abilities

• Effects on the brain (hippocampus)
  Attention, Concentration and Memory

• Research with College Students
  • Impact on these even after 24 hours (Pope & Yurgelun-Todd, 1996)
  • After daily use, takes 28 days for cognitive impact to go away (Pope, et al 2001)
  • Hanson et al (2010) study on verbal learning, memory and attention:
    • Deficits in verbal learning (takes 2 weeks before no differences with control group)
    • Deficits in verbal working memory (takes 3 weeks before no differences)
    • Deficits in attention (still present at 3 weeks)

IS MARIJUANA AS SAFE AS WE THINK?

Permitting pot is one thing; promoting its use is another.

By Malcolm Gladwell

https://www.newyorker.com/magazine/2019/01/14/is-marijuana-as-safe-as-we-think
And mental health implications...

**Suicide risk – 7 fold**

**Psychosis – 4 fold**

"...Cannabis use was associated with increased risk of suicide attempt (adjusted OR 6.83)...

Source: Lancet Psychiatry, Vol 1, Sep 2014
There is such a thing as too much cannabis:
Cannabis Hyperemesis Syndrome

- Occurs rarely heavy users
- Repetitive vomiting
- Improves in hot shower
- Only cure – stop using

https://www.mdedge.com/ccjm/article/100709/gastroenterology/cannabinoid-hyperemesis-syndrome-marijuana-both-antiemetic-and
Times are changing fast...
It’s Not just grandpa's joint

Find a discussion “buddy” (pun intended)
<table>
<thead>
<tr>
<th>Question</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Job title of the person at marijuana dispensary who helps you select a THC/CBD product for your health issues?</td>
<td>• Budtender</td>
</tr>
<tr>
<td>2. When you use too much marijuana and feel dizzy, look green or pale, nausea, may get paranoid, anxious, psychotic?</td>
<td>• “Greening out”</td>
</tr>
<tr>
<td>3. Where to find weed in Wash D.C.?</td>
<td>• Pop Up Pot Parties</td>
</tr>
<tr>
<td>4. JUUL like device for THC concentrates?</td>
<td>• PAX ERA</td>
</tr>
<tr>
<td>5. Who just bought 35% of JUUL and 45% of Cronos?</td>
<td>• Altria</td>
</tr>
</tbody>
</table>
How much training to be a pharmacist vs budtender?

Green CulturED has developed an online Budtender Certification course that can provide you with the skill-set and knowledge as it relates to the various strains of medical marijuana, dosing limitations, chemistry, compounds, growing and laws governing sales, social media promotion and advertising and managing inventory and sales. The 19-part course includes:

- 19 Course Videos (4:38:57 Time) with access to supplemental video materials
- Discussion Forum – Ask Questions, Get Answers
- Photo Glossary of strains and a Medical Marijuana Photo Dictionary
- 19 eBooks (117 Pages Total)
- Handouts including talking points, customer conversation tips, strain abbreviations and factual tables
- 19 Learning Outcome Assessments
- Certificate of Completion

The total cost of the Budtender Certification is $119, which makes it one of the most affordable comprehensive online programs on the market. Green CulturED also offers Master Grower certification courses for indoor, green house and hydroponic growing.

https://www.thecannabisreporter.com/want-budtender/
What are “green outs”?

• A term used to describe a situation where a person feels sick after smoking cannabis.
• They go pale (turning ‘green’ or ‘white’) and start to sweat, they feel dizzy and nauseous, and may even start vomiting.
• The experience can be quite frightening and users can become very anxious and start to panic.
• In extreme cases, the person may experience prolonged vomiting and even hallucinations.
• Cannabis users often report that the only way they can alleviate these symptoms is to lie down.

4 steps to helping a friend who’s greened out

Sometimes when people smoke or eat too much weed too quickly, they can become very pale and feel nauseous, dizzy, sweaty and possibly vomit.

1. Take them to a quiet safe place
2. If not vomiting, have them sip on water or juice
3. Put them in the “recovery position” - Lie them on their side
4. If anxious or paranoid, stay with them, be soothing and reassuring

This figure has less to do with Civilized’s wallet than it does with the district’s shaky legal status surrounding the substance. Back in 2014, DC voters passed ballot initiative 71, which effectively legalized both the possession and use of recreational marijuana, but Congress stepped in to prevent the nation's capital from allowing marijuana retailers.

So, basically, you’re allowed to grow it, store it and smoke it, but you can’t buy it. This, of course, begs the question--how does one get it in the first place? This was what I hoped to answer.
Future of Vaping and THC/marijuana connection
Pax Era Vapor app-
download it free in the Google Play or Apple App stores and turn on your Bluetooth.
Open the app up side-by-side with your Era, shake the vape to activate its Bluetooth pairing function and wait for the four-LED logo on the front to blink white.

The fun features:
name your Era (mine is Lil’ Homie) choose a color scheme for the LED (I match it to my mood and/or outfit). The four LEDs are the interface for three simple games to play while puffing: Simon, Pax Man, and Spin the Pax.
Altria (aka: Philip Morris the company who makes Marlboro) just bought

Marlboro company buys 35% stake in Juul e-cigarette maker for $12.8bn

Altria Group preparing for future in which ‘adult smokers overwhelmingly choose non-combustible products’

The deal values San Francisco-based Juul at $38bn


45 % of Canadian Cannabis company named Cronos
Commercial sales goal: get people to use a lot targeting the adolescent brain
Increased risk of addiction and heavy users

“30% of the population consumes 80% of the product”

www.learnaboutSAM.org
Impact on performance

Driving
Sports
Academic
Impaired driving and duration of effects

- Effects on the brain
  - Authors of I-502 set DUI at 5 ng THC/ml of blood for those over 21 (any positive value for those under 21)
  - Why 5 ng? Similarities in impairment to .08% for alcohol
  - How long does it take to drop below 5 ng?
  - Grotenhermen, et al., (2007) suggest it takes 3 hours for THC levels to drop to 4.9 ng THC/ml among 70 kg men
  - From a public health standpoint, Hall (2013) recommends waiting up to 5 hours after use before driving
Almost half of young adults who use marijuana are driving impaired.
In Colorado, marijuana-related traffic deaths increased by 48 percent after the state legalized recreational use of the drug.
NCAA Student-Athlete Substance Use Study

The 2017 NCAA Student-Athlete Substance Use Survey, developed by the NCAA’s research staff, provides the latest insights into the use of drugs, alcohol and tobacco by student-athletes. The study, released in June 2018, shows college athletes continue to make healthier decisions in many areas than their peers in the general student body.

http://www.ncaa.org/about/resources/research/ncaa-student-athlete-substance-use-study
SUMMARY: Marijuana Use in NCAA Student Athletes

• Self-reported marijuana use
  • lower among student-athletes (25% use by inhaling or ingesting)
  • than the non-athletes (33%, Core; 39%, MTF).

• In 2017, **24% inhaling marijuana** in the last year
  (compared to 22% in 2013).

• **11% of used edibles**

• Use was **higher if living in a state where it is legal** for recreational or medical use (39% vs. 26%)

• **Division III** student-athletes – **highest use**.

http://www.ncaa.org/about/resources/research/ncaa-student-athlete-substance-use-study
Marijuana Use During the Playing Season

- 76% Not used in the last year
- 15% Only during the off season
- 9% Only during the competitive season
- <1% During BOTH the off season and competitive season

Note: Represents percentage of all student-athletes.

The majority of athletes endorsed testing for banned substances deter drug use. AND believed that the associated punishments were appropriate.

http://www.ncaa.org/about/resources/research/ncaa-student-athlete-substance-use-study
What Student-Athletes Need to Know About Marijuana

Updated October 2018

http://www.ncaa.org/sport-science-institute/topics/what-student-athletes-need-know-about-marijuana
Break Out 3

Take time to read the infographic.

- What are the potential consequences of using marijuana for your personal well-being and goals?
- How could marijuana impact the success of your team?
- Do you have a team agreement about marijuana?
- How will you feel if a teammate’s decreased performance or legal problems cost the team a game? How about a season?

AGAINST NCAA POLICY
MARIJUANA IS A BANNED SUBSTANCE IN THE “ILICIT DRUG” CLASS. IF YOU TEST POSITIVE ON AN NCAA DRUG TEST, YOU WILL LOSE:

- **+** HALF THE SEASON (1ST TEST)
- **++** FULL CALENDAR YEAR OF ELIGIBILITY (2ND TEST)

AND BECAUSE IT IS A “ILICIT DRUG”, THERE IS NO “MEDICAL EXCEPTION” WAIVER AVAILABLE

http://www.ncaa.org/sport-science-institute/topics/what-student-athletes-need-know-about-marijuana
Marijuana’s impact on sports performance

http://adai.washington.edu/marijuana/factsheets/sports.htm

Ergolytic - decreases performance

- Research shows negative impact on sports performance:
  - Increase heart rate while decreasing cardiac stroke volume, resulting in diminished peak performance
  - Alterations to motor performance
    - Slowed reaction time
    - Problems of motor coordination
    - Problems of hand-eye coordination
    - Problems of perceptual accuracy
  - When smoked, harmful to the respiratory system
    - Increases the risk of respiratory tract infection, bronchitis
  - Potentially dangerous in sports that rely on quick reactions and fast decision-making.

Ergogenic - enhances performance

- Indirect possible benefits (not studied)
  - Euphoric effect, reducing anxiety and increasing the sociability of a player

- To date, no research has objectively demonstrated that marijuana use has resulted in observable increases in performance through relaxing the athlete or improving their sleeping patterns.

- In contrast, for some users, the acute adverse effects of marijuana use have been demonstrated to result in increased anxiety, panic, nervousness and restlessness, thus causing disruption to sleeping patterns.
Conclusion: Number & quality of studies was low...

“The effects of marijuana performance remains unclear.”
Travel and student athletes

Curiosity? Accidental use?

Legal & Health Risks are possible

Discussion buddies – talk about

What could happen if...

You are stopped at the Denver Airport with weed?

You have it on campus in Washington state?

You are in Colorado & mail some edibles to your friend in Virginia?

You eat your roommates brownie before post-season play?
THC concentrates
THC - The dose (and delivery method) is the difference!

Photo from http://treespotshop.com/greenwoods-best-cannabis-concentrates/
THC concentrates...

The fastest-growing segment of the legal market in Washington State was extracts for inhalation!

the mean THC concentration for those products was more than 65%.

https://www.newyorker.com/magazine/2019/01/14/is-marijuana-as-safe-as-we-think
So... what was on your gummy bears?
1 gummy bear could = 17 servings of THC

“Repurposed Candy”
Spray the outside with THC concentrate

In Colorado
House Bill 16-1436
recently banned animal- and fruit-shaped edibles.
Harm reduction and THC concentrate

• ACCIDENTAL CONSUMPTION is possible!

• Start with a single 10mg (of THC) serving or less 2..5 to 5 mg
• Wait at least 2 hours, don’t take more
• Go low and slow in the dose
• Have other non THC food available if you get the munchies

• Keep away from children and pets!

Will Ingesting Marijuana Affect Me Differently Than Smoking It?
Yes. Smoking/vaping almost immediate: Edibles es can take from 30 minutes to 2 hours
Intoxication may last longer than expected
  -depending on the dose
  -Time of last meal
  -Other meds, drugs or alcohol used at the same time.

http://learnaboutmarijuanawa.org/factsheets/edibles.htm
What You Need to Know
Concentrates

- Not well-studied
- Trigger psychosis/paranoia
- Contaminants and residues

[Image: Vaping Factsheet]

Safer: concentrates or flowers?

- Vaporization safer for respiratory system
- Harmful solvents
  - Unknown risk
- Post-extraction additives
  - Effects unknown
- Pesticides and contaminants
  - Concentrates not retested
  - Levels exponentially increase

Dab ribs & dabbing

- High dose of THC delivered all at once
- Almost no studies
- More likely to trigger psychotic episodes
- Higher risk of cannabis use disorder

How are marijuana flowers used?

Vaping the flower = Safest method

Washington State Fact Sheets
http://learnaboutmarijuanawa.org/factsheets/edibles.htm
How do THC concentrates get made?
• 57 California medical cannabis concentrates screened for-
  • cannabinoid content
  • residual solvents
  • pesticides

• Over 83% of concentrates were contaminated with solvent
  (0% of the hash group)

• 1/3rd had pesticides

• THC ranged 24%-76%

• Only 5 out of 57 samples contained >5% CBC
Real Marijuana Medicines

Doctors prescribe. Pharmacies sell.
Insurers cover.

Contain no pesticides, mold, mildew, E coli, salmonella, or other contaminants.

States do not need to legalize marijuana for patients to access these medicines.

Fake Marijuana Medicines

Doctors cannot prescribe. Pharmacies cannot sell.
Insurers do not cover.

No safety guarantees. Can contain pesticides, mold, mildew, E coli, salmonella, or other contaminants.

No uniform standards for growing, processing, testing, or labeling “medicines.”

No proven health claims.
What about Edibles
Edible harm reduction fact sheet

Learn About Marijuana: Concentrates, Edibles & Flowers

Edibles

- Hard to control THC
- THC not evenly distributed
- Stronger potency
- Long-lasting effects

What is the dosage for edibles?

- 1 dose = 10mg THC
- Some edibles have > 1 dose
- Directions to consume only part
- Read dosing information carefully

What about CBD?
What are people saying/doing about CBD?
Why Is CBD Everywhere?

Cannabidiol is being touted as a magical elixir, a cure-all now available in bath bombs, dog treats and even pharmaceuticals. But maybe it’s just a fix for our anxious times.

Snake Oil or Wonder Drug?

“It’s hot, everywhere and yet almost nobody understands it.”

CBD oils are expensive.

No quality control!

- Only 26 of 84 samples of CBD oils, tinctures and liquids purchased online contained the amount of CBD claimed on the labels.

- 18 of them contained THC, which could lead to intoxication/impairment.

The FDA has also found many products did NOT have CBD.

The researchers at VCU, tested Diamond CBD products-

Found synthetic cannabinoids in Liquid and in Vape products
“Nature endowed us with our own cannabinoids, so unless you have a deficiency of them or sluggish receptors, you really don’t need supplementation.”

“Future studies may show otherwise, but at present CBD looks more like an expensive placebo than a panacea.”

Comments on

Prevention
Early Intervention
Treatment/Cessation
Avoid health terrorism:
Failed prevention program in Australia

Australia’s “Stoner Sloth” Anti-Cannabis Campaign Delights Instead of Deters
TED talk that is a great social justice discussion prompt

GROWING MARIJUANA REQUIRES prodigious amounts of water, regardless of whether it is grown inside or outdoors. In California, where growers have decades of experience cultivating, plants still require about six gallons of water per plant each day. That adds up to almost 300 million gallons of water for each square mile of marijuana grow each growing season. (1)

For reference, that is twice the amount of water wine grapes use, and the same amount of water consumed by almond orchards—a crop some experts say has aggravated water problems in the Western United States. (2)

Marijuana cultivation already accounts for one percent of the United States’ total electricity consumption, and is almost four times more energy-intensive than the petroleum and coal industries.

POWER CONSUMPTION is a similar story. In 2012—since which time, marijuana cultivation has expanded significantly—marijuana growing was responsible for one percent of the nation’s entire electricity use. That is
Cannabinoid addiction

• Addiction: ~9% of users become addicted (NIDA)
• Addiction increases with those who start younger (17%) and those who use daily (25-50%)

• How to diagnose if there is a problem:
  • Would life be different without it?
    • Yes, I’d be into hobbies,
    • have friends who didn’t smoke,
    • not be tolerant,
    • not live in a privately defined world,
    • have a better job,
    • keep my promises to smoke less,
    • not plan my life around it, etc.)
Just like you don’t want to be disrespected for your Substance Use Disorder...

Please don’t disrespect Marijuana Addiction
It devastates people’s lives.
SUMMARY

- Marijuana – has been selectively grown for more THC
  - Pesticides, fungicides and fertilizers contaminate THC products
  - The Dose and Delivery is the Difference
- Not enough research on THC & CBDs & Receptors are ALL over the body
- If you use THC or CBs you hit ALL receptors
- Yes, CBDs could be a beneficial source of meds – but research inconclusive
- Solid Research shows impair learning, memory and concentration
- It is still against FEDERAL LAW and NCAA regs
- THC has never been shown to enhance sports performance
- THC can be addictive
- Synthetic THC is very dangerous - avoid
- THINK THINK THINK THINK THINK – use common sense
www.learnaboutSAM.org  Helpful resource with data

REMEMBER BIG TOBACCO? THEY'RE BACK.
It's Time To Put People Before Profit.

The Science
Learn About Marijuana
Science-based information for the public

Resources
http://learnaboutmarijuanawa.org/

Learn About Marijuana E-Learning Modules

What You Need to Know
Our Bodies & Marijuana

What You Need to Know
Concentrates

Adults who want to quit
• It can be hard to quit
• Some people benefit from counseling
• 30% of past-year users experience disorder
• Not unusual to struggle with marijuana use
• There is help!

Watch the modules now!

http://adai.washington.edu/marijuana/index.htm
What Advocates of Legalizing Pot Don’t Want You to Know

The wave toward legalization ignores the serious health risks of marijuana.

By Alex Berenson
Mr. Berenson is the author of a forthcoming book on marijuana use.

Jan. 4, 2019

LESSONS LEARNED FROM MARIJUANA LEGALIZATION IN FOUR U.S. STATES AND D.C.

MARCH 2018

Reviewed by researchers from:
University of Colorado at Denver
Harvard Medical School
Boston Children's Hospital
University of Connecticut
Yale University
University of Kansas
and more

SAM
Smart Approaches to Marijuana
preventing another big mistake
www.learnaboutsam.org
Nothing is simple in the body

• “Most drugs act by being either agonists or antagonists at receptors that respond to chemical messengers such as neurotransmitters.

• An **agonist** binds to the receptor and produces an effect within the cell.

• An **antagonist** may bind to the same receptor, but does not produce a response, instead it blocks that receptor to a natural agonist.

• A **partial agonist** can produce an effect within a cell that is not maximal and then block the receptor to a full agonist.”