

Science AMA Series: I'm Dr. Wilson Compton, I study the epidemiology of drug abuse and addiction, the role that genes play in addiction, and how personalized medicine might one day be used to wean peop

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Abstract

Hi Reddit! Wouldn't it be wonderful to attribute our compulsion for addictive damaging activities, such as overeating, taking illicit drugs or smoking, wholly to our genetic make-up? Then, we would have a clear explanation for these complex behaviors. Yet, environmental influences shape and are shaped by our genetic predispositions. A key issue is that we know that certain behaviors are bad for us but we still do them. Why? My research explores the latest public health and brain research behind addictive behavior. Personalized medicine provides plenty of research linking genetics and disease. But establishing a relationship between genetic variation and behavior is trickier. From these genetic and environmental perspectives, how do we understand and explain the recent epidemic of opioid overdose deaths? First prescription opioid deaths increased in the USA and more recently heroin deaths have markedly increased. How do biological and environmental factor explain how these two epidemics are related to one another? What can be done to address these serious health issues? Genetics plays a key role but is only one part of the puzzle. Environments, including intrauterine, early childhood, school, neighborhood and broad social settings, all play a key role in determining addiction outcomes. The three strands of biological, psychological and social elements working together is key to both understanding and intervening to prevent or treat addictions. This AMA is facilitated by the American Association for the Advancement of Science (AAAS) as part of their Annual Meeting Wilson Compton, MD, Deputy Director, National Institute on Drug Abuse, Bethesda, Md. Understanding Vulnerability to Substance Addictions I will be back at 3 pm EST (12 pm PST, 8 pm UTC) to answer your questions, Ask Me Anything!

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WILSON_COMPTON [R/SCIENCE](#)

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Hello! Thank you for doing this AMA!

I was recently watching a video on addiction from [Kurzgesagt](#) stating that everything we think we know about addiction is wrong. They brought up Bruce Alexander's 1970 experiment with the "Rat Utopia" and how the water bottle laced with heroin was essentially untouched by the rats living near-perfect lives, while a rat who was alone usually would die from over indulging from the drugged water. Their reasoning is that living creatures have an innate need to bond with something, and when we feel disconnected we use these to fall back on comfortable and sometimes harmful things.

Do you believe there is a correlation between how an individual bonds with friends/family and how they bind themselves to certain addictions? And is it appropriate to say that addiction is just a symptom of the crisis of disconnection around us?

[GlasseS_Tape](#)

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I'm not sure that addiction is a symptom of the crisis of disconnection because there have been problems related to substances for time immemorial. Yet, social factors (especially family factors) are strongly linked to drug use. These provide ways to PREVENT drug use by strengthening the early childhood environment. Take a look at the NIDA website: drugabuse.gov for more information.

Pain management seems like a necessary evil. Everyone will experience pain at some point and seek out a treatment. In your opinion what do you think the future of pain treatment is?

Should we go after different targets besides the opioid receptors? Do we need biased ligands? Allosteric enhancers of opioid receptors?

Or do we just need better prescription policies for the opioid drugs we currently have?

[chipmunkpunk](#)

We need BOTH better policies for today's medications AND research to identify new treatments. Current targets include direct brain stimulation to reduce pain as well as cannabinoid receptor modulators.

Hi Dr. Compton,

From the Big Book of AA,

Physicians who are familiar with alcoholism agree there is no such thing as making a normal drinker out of an alcoholic. Science may one day find a way, but it has not done so yet.

This was written in the 1930's, and it seems we're no closer to finding such a way. In your opinion, is this something that's possible?

If so, how would it work? Would it treat the underlying psychological condition that drives addicts to drink, use drugs, work themselves to death, overeat, undereat, cut themselves, etc.?

Or would we be looking at something that was substance specific, for example, a drug that changes the subjective experience of intoxication to be more like what normal people have?

My feeling is that the latter case would be about as effective in the absence of treatment for the underlying psychological issues as antabuse and vivitrol are -- to wit, that addicts would simply skip their pill or shot, or switch to another substance or behavior.

Any thoughts are welcome, and thanks in advance!

Edit: werds

[pbtree](#)

Addictions (including alcoholism) are learned behaviors that change the brain in measurable ways and so may be particularly hard to "unlearn".

How is addiction to overeating or the inability to regulate ones food consumption any different than drug abuse, and why isn't it considered to be more similar?

[rimagana](#)

Overeating shares many of the same underlying behaviors and brain correlates as drug addictions.

The same central reward circuits are impacted in "food addiction" as in substance addictions. And the behavioral treatments are very similar. Of course, we don't have the option of "abstinence" from food and so overcoming a food addiction must include learning to control food intake.

Any surprising information coming from places that decriminalize drugs or make some totally legal such as Colorado? Also is it viable to treat withdrawal symptoms of hard drugs with milder ones such as cannabis?

[SpookySP](#)

We are seeing in some harms from marijuana in Colorado--higher numbers of emergency department visits and driving under the influence issues. Rates of marijuana use are also higher in Colorado and may be increasing compared to other states. Whether and how this influences teenager use is not as clear and is a major area of research.

What are your thoughts on the notion that those who are born with "addiction genetics" will inevitably become addicts if they touch drugs and/or alcohol? I've heard this sentiment expressed among addicts I know.

[yolanda_here](#)

Genetics definitely plays a role and children of someone with an addiction are at higher risk of addiction. But it's not a 1 to 1 relationship. Caution is warranted but the pathway to addiction is much more complicated than just genes. The family, friendship and neighborhood environments matter!

Hey Dr. Wilson my questions are, as a recovering Xanax addict (1 year clean) I was told at rehab once your addicted to one your addicted to all. Now this seems to have some truth too it but I don't really believe it. I've done other drugs but nothing ever stuck like Xanax, what is your opinion? Also what is your opinion on trading one for another? Example I don't use Xanax but I smoke pot and while I do have addict tendencies with the kush in my mind I'm still not out there doing Xanax or God knows what else. How does the recovery world feel about trading in 1 addiction for a less severe one? Also I'm 21 years old and I feel a lot of us younger addicts have these similar questions.

[J_swizzl](#)

Persons with addiction to one substance really do seem to be at higher risk for addictions related to another. For example, even previous tobacco addiction seems to increase the chances of becoming addicted to prescription pain medications. But these are relative increases--increasing the chances of experiencing a problem. Caution is warranted.

What makes one drug more addictive than others? From my understanding, dopamine levels are increased in certain parts of the brain. Is addiction correlated to the part of the brain brain being activated?

Thank you for doing this AMA.

[psychAdelic](#)

Whether and how addictive is a substance depends on both the properties of the substance itself and on the person consuming the substance. Even the route of administration matters--smoking or injecting

a drug gets it into the circulation and to the brain very rapidly and so is especially addictive. (Though even when taken by mouth, substances can be addictive, too.)

[It has been reported that making medical marijuana legal has decreased opioid drug OD's.](#)

CONCLUSIONS AND RELEVANCE: Medical cannabis laws are associated with significantly lower state-level opioid overdose mortality rates. Further investigation is required to determine how medical cannabis laws may interact with policies aimed at preventing opioid analgesic overdose.

What is your stance on medical marijuana? Does it offer an alternative to opioids?

[matt2001](#)

So far, the data on medical marijuana and pain are quite uncertain. But we need to study whether and how cannabinoid systems in the brain may provide new targets for pain medication treatment.

What are your thoughts on the future of anti-addiction vaccines; namely, giving drugs conjugated to large proteins to stimulate the production of antibodies against those drugs? Is this a feasible idea?

[kflesh94](#)

Vaccines as a way to keep an addictive drug in the circulatory system and out of the central nervous system is quite promising. There have been multiple proof of concept studies but figuring out how to make this a feasible and useful clinical treatment has a long way to go. You might check out our website: [drugabuse.gov](#) for a podcast by Dr. Thomas Kosten who has been working to develop cocaine vaccines to treat people with cocaine addiction.

I'll go with the obvious question:

How do you attempt to separate family "influence" with what the individual could be prone to without it? long lost twins?

One psychological theory I've heard is that that the youngest son is usually willing to risk more to gain the approval of the house because he will always be impatiently behind the achievements of his elders.

[foresculpt](#)

From a research perspective, twin studies separate the genetic and environmental factors. Identical twins share 100% of their genes and fraternal twins share (on average) just 50%. But the twins are raised in the same environment. This is a way to distinguish genetic from environmental factors. Similarly, adoptees have genetic risks from their biological parents but uncorrelated adoptive family environments. We can use these studies to show whether and how genes influence outcomes.

What's your opinion on the common saying that weed is a gateway drug for more serious drugs. My experience with friends battling drug abuse or addiction problems is that they all started with weed. Not sure if this is by chance or a commonality.

If it is a gateway drug are you for or against the legalization assuming this will just encourage people to try harder drugs.

[Wormfall](#)

The key issue is that early use of ANY substance is especially risky. Those who start using tobacco at an early stage are at higher risk of tobacco addiction. Similarly, those who start using marijuana or alcohol at an early age (especially early teens) are at higher risk of future problems. We are launching a large study called the Adolescent Brain Cognitive Development Study (ABCD) at NIDA to help explain the pathways among the drugs in teenagers. Check it out on the NIDA website: drugabuse.gov

Is it logical to say that most addictive personalities are just depressed personalities, who naturally seek other outer sources for happiness? Naturally they become addicts because of prolonged drug use trying to treat this general depression/unhappiness. Or is there actually a physiological basis as to why some people just can't moderate usage?

[HostDisorder](#)

We know that some people are more likely to be unable to moderate their use of substances than others. But we can't really explain why this happens--genes play a role but the social environment matters too. In fact, early childhood trauma seems to predispose to addiction (i.e. being unable to moderate substance use).

Do you think that it is substantially better to use opioids with a long half life to wean dependent/addicted people off of shorter acting opioids?

[GReggz732](#)

Weaning someone off of opioids (called "detoxification") is generally conducted under medical supervision using longer acting medications. That said, most difficult part of treatment is KEEPING off of the opioids and recovering. Detoxification is just the first step. Long-term treatment with medications like methadone or buprenorphine is often indicated to help maintain abstinence.

Where is the line between use and abuse? Are there circumstances that would make illicit drug use (in moderation) favourable?

[Wcm1982](#)

From a health perspective, the goal of abstinence is the safest goal. Especially for teenagers, whose brains are developing rapidly, substance use of all types appears to be particularly risky.

Is there one "addiction" gene sequence? Or is it dependent on the drug?

[1amathrowaway](#)

While we know that genes are important in the onset of addiction, we don't know the precise genes involved. Some of the risk may be the same for all substances, but many of the genes are likely to be specific to the particular substance. Some of the genes for tobacco addiction have been identified and are only seen in tobacco--not other substances. We have a lot more research to do!

I keep seeing more and more research in genetics/biological predisposition factors for addiction. Yet it seems to me that most addictions come in huge waves that affect a huge percentage of the population

(i.e.: smoking > 50% of the population when it was/where it is socially acceptable, obesity, ludopathy after videolottery legalization, pot etc...etc...)

If "uncontrollable" factors account for the predisposition to addiction, how can such large chunks of the population become addicted altogether and then stop all together?

[lucaxx85](#)

Addictions are caused by combinations of both family (i.e. genetic) and social factors. The added complexity is that decision-making is a key part of the puzzle. People with addiction are still able to make decisions that can help them to turn their lives around.

There has been a recent push to rebrand the language of "addiction" and "substance abuse" away from patient responsibility towards more medical and pathological language. We know language is a powerful tool and shapes frameworks of reception by individuals and cultures. Do you have an opinion on this linguistic shift? Is addiction and abuse something that happens to you or something you do to yourself? Assuming (as I think is reasonable) that the answer is a more nuanced combination of the two, which side should language err on?

[hearthebeard](#)

Language matters. I'm trying to shift my own use of language to emphasize addiction as an external phenomenon. So I describe someone as "a person with addiction" not as "an addict". We need to separate out the behavior from the person.

Docs are asked to do the impossible: distinguish between patients who actually truly really have severe ongoing pain and may benefit from treatment with opioids, vs pretend-patients who visit a doc to try to gain access to their chosen drug of abuse (because society has decided to disallow such access through other means).

How should society help addicts, AND help pain patients, at the same time?

Does restricting access to addicting substances and criminalizing their use, in balance, help or hurt addicts?

Should addiction be treated as a crime or as an illness or public health issue?

So many questions! Thanks for any insight.

[bill_tampa](#)

Treating pain from a holistic perspective (with physical therapy, exercise, behavioral approaches and non-opioid medications) is important as a way to avoid the problems associated with opioids. I agree that balancing the risks and benefits both to the patient and to the larger community is difficult. That's why we're working at the NIH on new pain treatments that don't rely on opioids.

Do you believe that everyone can be saved from their addictions? I ask this as a nurse who regularly works with drug dependent and abusing populations. Probably 1/4 of my patients on the unit are addicted to at least one substance. I have yet to see any success stories in weaning patients off drugs, using methadone, fighting alcohol dependence, etc.

[Sparklepancakes](#)

People surprise us at every stage of addiction and recovery is nearly always possible. Of course, there are some who have experienced such brain damage that the effects will be permanent. But even for those who have failed previous treatment, recovery is still possible. Keeping a long-term perspective and continuing care for an extended period of time may be essential.

What is your view of the current landscape of addiction treatment in Western culture? Is there anything you find particularly effective for the largest amount of people? And vice versa, anything that is particularly counter-productive? Is there anything out there that is working amazingly well for some people, but is doing serious damage to others' treatment?

Views on 12 step programs? Maintenance Programs? Speaking of maintenance programs, are the 'personalized medicines' you are researching to be taken indefinitely, or only during initial treatment? Thanks for doing an AMA!

[spread_panic](#)

One of the key features of successful treatment appears to be long-term engagement in care. For many who enter treatment, the addiction is a chronic condition (sometimes with many years of persistence). Treatment, including medications at times, and recovery support for many years is often required. Short-term (like the famous "28 day programs") may help to launch recovery but is just the start of the process.

I am a workaholic, alcoholic, and a compulsive overeater. I put down the booze first, then upped the work and food. I came into 12 step recovery, and put down the food and work. I now think I am addicted to 12 step meetings and other people's stories. Is this as good as I can hope for? How can I do all things in moderation?

[mommarina](#)

Participation in 12-step recovery is associated with stable and successful outcomes. Those who continue to participate have better outcomes.

To what extent do you agree with the saying that "you can't help someone who doesn't want to be helped" ?

Even if they are compelled to take a custom wean off drug they might just counter by wanting to restart or up the dose later to get the same high, how do we ensure we aren't encouraging a more dangerous situation with these?

[foresculpt](#)

I'm afraid that this will have to be my last answer...It's been a pleasure being with you this afternoon!

Compulsory treatment seems to have nearly as good an outcome as completely voluntary care. We see this in treatment of persons in jail or prison which can have very good outcomes. Of course, over time, we expect a patient to begin to participate voluntarily and actively.

Have you information showing that some psychiatric drugs actually have addiction as a side effect? And do you think it acceptable that there is no warning about this, leading people with no addiction history into addiction. How can drugs be part of the solution if they are causing the problem? I know

people with no history of this end up addicted to drugs, alcohol, gambling, shopping, sex who years later get told it's a side effect of drugs like Abilify. So my question is if there is a risk a drug can/does cause the problem like opioid and psych drugs why are people not told about this risk?

[informed consent](#)

Not all psychiatric drugs are addictive. This means that not all psychiatric drug are associated with a sense of pleasure or tendencies to increase. You're absolutely right that opioids are highly addictive but most antidepressants and other psychiatric medications are not addictive. Making sure that the treatment is needed and useful seems key.