PLOS Science Wednesday: I'm Dr. Peter McCormick, I published a study in PLOS Biology showing that the beneficial effects of Delta-9-tetrahydrocannabinol (THC), can be separated from the negative cognit

PLOSScienceWednesday [1] and r/Science AMAs[1]

[1]Affiliation not available

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Is the memory loss a permanent side effect or can your memory function (specifically verbal) recover after use has been ceased? If so, is this a long/short process? You do a fantastic job by the way, thanks.

CarlSagonist

Although, I am not a speech expert, from what I have read the memory loss should not be permanent. However, effects are different at different ages.

This study required the use of intracerebroventricular infusion to introduce the interference peptides to the mouse brain, which obviously complicates the possibility of translation to humans because it is so invasive. Are there any viable alternative delivery mechanisms that could be used that are capable of passing the blood brain barrier?

shiruken

Yes, although the study used a perfusion of the peptides, we are trying to find funding to port this approach to something that would be a small molecule. The study was a proof of principle.

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shiruken

I replied partially below to this, but yes in theory a small molecule could be developed to achieve the same as our peptide. Alternatively, one could develop a synthetic THC molecule that does not bind to this complex we have identified and only to the single cannabinoid receptor

What inspired you to work with THC? Personal or professional interest initially? Was It difficult to get funding, and what was your primary source?

scaston23

I became interested through a series of studies we did on the receptor family, the cannabinoid receptors. We had found some interesting things about these receptors in cancer and from there we segued into THC. The obvious challenge then became ok, if THC does have these beneficial effects, how can we reduce the side effects. Getting funding has been a challenge as most research funding organizations have stayed away. I think in the US this is beginning to change, but in Europe, except for maybe Spain and Germany, it is still a challenge.

Is this an instance where the negative side effects are removed but one would still feel high? Or is being high one of the side effects you have deemed negative?

getcurrency

Measuring whether the animals are "high" is difficult. All we could measure was their behavior and whether they had any cognitive impairments, which they did not if we treated them.

What are your hopes for the results of this study? Do you hope it will have a large impact on the medical use of THC in areas where current treatments are not as effective?

GourangaPlusPlus

Yes, I hope our study makes people realize the potential of THC or THC homologs in certain arenas and facilitates more research in ways to either target these receptors and / or investigate the molecular details of THC.

Marijuana is composed of many psychoactive compounds, yet the earliest cannabis-based drugs that have hit the market are typically composed of only one compound. Is there any research interest specifically into the synergistic effects of its compounds?

bucketsforyears

Yes, there something like over 100 known cannabinoid compounds identified. GW pharma in fact sells a cocktail of these for its sativex treatment. I think there is a lot still to be appreciated about the synergies or counter effects of combinations.

Can you say that the cognitive side effects are truly negative. i would assume that some varietals with a more narcotic effect help people sleep and overcome trauma's and things of a more sinister nature. You know help take the edge off.

horkenlad

Yes, this is a good point. Negative effects are all relative. What is important to take home from our study, is that whatever effects one is after, one can seem to dissociate one from the other.

Have u done any research on the effects of cannabis with stimulants such as adderal or cocaine? I have heard of cardiotoxicity effects, but any additional input would be appreciated.

Oppaganjastyle

Not in combination. We have several studies on cocaine and I can tell you don't do it. It is incredibly habit forming and does serious long term changes to brain function and chemistry.

What benefits, if any, do you think marijuana actually has?

that__one__guy

What we and others have seen is depending on the compound in question, THC, CBD, etc... there are cell growth benefits (eg. cancer) and significant inflammation benefits (eg. pain and MS). But more research needs to be conducted. Our studies argue you can avoid the cognitive side effects in cases where that is desirable, and still achieve some of these other effects. The challenge is to know understand what those are and how they work.

A few reports suggest co-administration of ibuprofen with delta9-THC abolishes memory impairment. What are your thoughts on this idea?

kintleko

There is a connection between Cox-2 and THC that was published in Cell a couple of years ago, it would be interesting if this is the mechanism that ibuprofen is working off of in these reports. We have not worked on that specifically, but my co-authors have.

What future do you see for medical and recreational marijuana in North America? Do you think that doing away with the stigma associated with medical marijuana will help pave the way for studies examining the benefits of other controlled substances, such as psilocybin?

*edit: spelling

c0nsciousperspective

I do think that the legalization of medical marijuana in North America will indeed lead to larger interest and hopefully more funding for the details on the molecular side of how cannabinoids function.

The marijuana used in this study, was it tested for levels of THC and CBD for this study? Do varying levels of THC and CBD effect the way the chemicals are received in the brain between the two receptors? What strains did you use?

dulceareola

We did not use marijauana in the study, but only pure THC or other CB1 or 5-ht2a compounds. We did not look at CBD.

Since the natural form also includes "negative cognitive effects" is there any reason to believe that the THC will be less effective without those effects?

DeusExOmnia

I guess it depends on what effects one is after. From the pain side, it did not appear that removing the cognitive effects reduced the pain effects at all.

Does your research require adding to or subtracting from the parent compound, if so, why, and what is the benefit/negative result from that (if you have found one). Also, what do you think the societal impact of this will be? Do you think this will increase awareness or further polarize the debate? Also, I know a few people who medicate their depression/anxiety with cannabis/related products, do you think this is a valid application or are the other medications available more effective/lower risk?

boxedblue

We are proposing a combination approach of a blocking molecule along with THC. The idea would be to allow the pain relief without the cognitive side effects. I would hope the societal impact would be to help de-stigmatize THC and medical marijauna as I believe there are some serious potentially medically useful arenas that should be investigated for the use of these. I think once we understand how these work at the molecular level then more potent or targeted therapies can be developed.

What are the ranges of types of treatments that this might work for? I know THC/Marijuana is being looked at for pain suppression, appetite boosting, nausea suppression, and there are a few preliminary indications that it might have some role in tumor suppression or epilepsy. Will your method only work for some of these, or would it possibly be able to work for all of them?

kerovon

From our work, it certainly looks like this approach works for pain. I would guess that it may not work on the mood side of things due to 5-ht2a's connection with mood and depression, but it would be interesting to investigate. We only did acute treatments so we could not measure food intake, but appeitite would be interesting to look at as well.