



17. Medical Cannabis

With Special Guest, Dr. Steven Booth.

Recorded on 25th March, 2019 in Byron Bay, Australia.

Future Sense is a podcast edited from the radio show of the same name, broadcast on BayFM in Byron Bay, Australia, at www.bayfm.org. Hosted by Nyck Jeanes and well-known international futurist, Steve McDonald, Future Sense provides a fresh, deep analysis of global trends and emerging technologies. How can we identify the layers of growth personally, socially and globally? What are the signs missed; the truths being denied? Political science, history, politics, psychology, ancient civilisations, alien contact, the new psychedelic revolution, cryptocurrency and other disruptive and distributed technologies, and much more.

This is Future Sense.

Nyck: You're now tuned to *Future Sense* on BayFM with my co-host, Steve McDonald. Good morning, Steve.

Steve: Hi Nyck.

Nyck: Lovely to see you here this morning. You've been away for a few days—we'll get to that shortly—and a great pleasure to welcome back to the studio, our special guest for about the third or fourth time I think, Dr. Steven Booth.

Dr. Steven Booth: Thanks, Nyck. Good morning. Pleased to be here.

Nyck: Lovely to see you, Mr. Booth—Boothie, as we like to call him at times. He's a doctor of Chinese medicine, acupuncturist—esoteric acupuncturist, transpersonal acupuncturist—and a man with a lot of experience in a lot of those areas. We'll be talking a lot about energy today in a different way, particularly with regard to where we've all been partly over the last four days—these two blokes over here for the whole time, me for half of it—and that's been at the *United in Compassion Australian Medicinal Cannabis Symposium* in Tweed Heads. An extraordinary event, really, in so many ways.

We're going to be covering a lot of ground to do with this extraordinary plant today, starting probably with a little bit of history, I think, Steve. A lot of people know the

history—probably all of us—but even though we thought we knew a fair bit about this plant, I think we all discovered a huge amount at this conference.

Steve: We did. I didn't realise the history goes back so far. I've been searching for a slide with the details of it and have been unable to find that but some of the speakers were saying that evidence of human and cannabis plant interaction goes back as far as recorded history, and even beyond written history.

Dr. Steven Booth: It was trading in China in 2700 B.C. That was the first recorded written history.

Nyck: That's nearly 5,000 years ago.

Steve: Yes, and apparently there's material evidence of cannabis being found in campsites and those sorts of things that goes back even further—thousands of years.

Nyck: And of course, for many people in this area, many of our listeners, no doubt everybody is very familiar with this particular plant to one degree or another, but we're going to be talking today particularly about medicinal cannabis and some of the incredible chemistry, the microbiology and the neurobiology of our cells which connects through the endocannabinoid system in our bodies. We'll talk about that a bit, we'll talk about the communication networks, we'll talk a little bit about opioids, we'll talk a little bit about something called the Entourage Effect, which we discovered—a kind of obvious thing in one sense, and yet perhaps a little bit of a tell-tale sign, a bellwether at this time in human history. We'll talk a little bit about the medical applications for things like epilepsy, we'll talk a bit about regulation, legality in the politics of such—drug testing and so forth; we'll talk also about the quality of soils and so forth and how we grow these plants and many others. Lots of stuff to talk about.

Steve: And as we covered on a previous show, cannabis has played a very big role in the change process as this new paradigm has gradually rolled out in various waves of change, most notably back in the 60s and 70s, of course. Something that we found very, very interesting is the emergence of new paradigm science—science that's taking a network-centric, humanistic perspective on discovery, which is very, very fascinating. We had many a giggle as we noted the language and the concepts being presented there and how they fitted with Graves's Layer 6.

Nyck: Very true. Before we move on today and play a track before we launch into this discussion between the three of us this morning, great congratulations to Tamara Smith from the Greens, who's not only held the seat of Ballina, but also increased the majority slightly there. So well done. It is the case, though, that overall, of course, for those of us who are somewhat more left-leaning, the result of the New South Wales election is possibly not what we hoped for. Gladys Berejiklian is back as Premier and possibly with a workable majority—that's still yet to be determined. The Greens actually dropped 1% of their vote state-wide—I think that's an interesting thing—and why? Well, perhaps *Keep Sydney Open* and other smaller parties took some of that vote—that's probably true—but I think there are some things to be learned from what people actually are focused on at this time. But congratulations to Tamara, certainly it's a vote for the environment up here in this region, clearly, where we are in a bit of a bubble, and it's a good bubble. We're yet to extend those concerns a bit wider to the places where they possibly should be, in our experience, but we're getting there.

Nyck: The recreational use of cannabis, of course, has been going on for a very, very long time, and most people now are pretty familiar with the use—if you haven't tried it yourself, you certainly know people who have and you know something about it or you have a particular judgement or an idea about it—but the medicinal use of cannabis is something else. Of course they cross over somewhere, but today we're talking particularly about the medicinal use of cannabis down through time and the current state of affairs with regard to that here in this country.

We do seem to be lagging behind pretty much everywhere else on the globe with regards to medicinal cannabis, despite the protestations or the ideas that might be given to us by our polities who govern us at the moment, as if to say that we actually have a regimen here in this country which is leading edge. Clearly that's not true—that's one of the things I learnt from the *United and Compassion Medicinal Cannabis Symposium*—but of course, as Steve alluded to earlier, the medicinal use of cannabis goes back a very long way. So we're going to do to a little bit of a coverage of some of the history just to update and have a bit of fun with that as well.

You're the expert, Steve, in history.

Steve: Yeah ... Thanks, Nyck. I'm delighted to be appointed the expert in the issue. As I was saying just before the break, I haven't been able to track down the slide that I saw on the weekend which gave the key dates, particular for milestones of human interaction with the cannabis plant, but as Dr. Booth was saying before, we know that from Chinese history ...

Dr. Steven Booth: Yes, Shen-Nung in 2700-and-something B.C. was the first person to write down the use of medical cannabis. Since then we've had continuous use in varying ways, except for the last eighty years—there's been a bit of a blip.

Nyck: Well, that's the key, isn't it? The last 80 years? And that was a key from the 5,000 years or so of history that was presented at the conference as a bit of a backdrop to the discussion of cannabis—clearly, just in the last eighty years beginning in the US, the concerted effort to bring down this substance for political and economic reasons.

Steve: Yes, one of the slides that I do remember from the weekend was just talking about the fact that there's a need to overcome around about 110 years of propaganda, and particularly noting the actions in the US around about the early 1900s where there were crackdowns initiated against cannabis use and the imposition of a marijuana tax early on.

Most of those things seemed to be racially oriented. It was a time where Chinese and other immigrants were coming into the US and creating tension socially, I guess, and the authorities saw the need to try and dampen down their social impact somehow. One of the ways of doing that was to restrict the drugs that they enjoyed.

Nyck: And, of course, the rise of jazz via the African-American population, in particular. Louis Armstrong was an advocate of using cannabis and got into quite a lot of trouble himself.

Steve: That's right. I'm trying to remember who the quote was from—it might have been the notorious character called Anslinger who was a legislator early on in the US ...

Nyck: Yes, post-World War II, it was written that: "Anslinger testified in the 1930s that cannabis could turn a person into an irrational, vicious, mad dog killer who would engage in inexplicable violence. Now, in '48, he testified that cannabis (or marijuana, as it was referred to), led to pacifism and caused the cannabis consumer to be an easy mark for leftist propaganda and become a commie dupe."

Dr. Steven Booth: Can't have it both ways, can you?

Steve: That's right. That kind of a 180 degree flip has been fairly common in the government spin that's been put on cannabis over the years. As many of the speakers pointed out, if we look at the full spectrum of human history, the norm has been a very close human relationship with the cannabis plant, and it's only been the last 80 to 100

years or so that that's been quite an anomaly. Most people don't look at the full length of history and consider that, and they think that this is some new thing that people are trying to introduce to society, but in fact, it's very, very, very old plant that we've had great use of for a long, long time, and that use has just been interrupted for a short period of time in a relative sense.

Dr. Steven Booth: And in the future, looking back at this time, it probably won't be looked on favourably.

Steve: Not at all, I'm sure. It might be worth just explaining to our listeners, too, what the *United and Compassion* event was all about. I think the first event was in 2014 in Tamworth.

Nyck: Yes, this was the fourth one this year, I think.

Steve: Yes, and the driver has been Lucy Haslam, who's done an amazing job. Her personal story is that she is married to a retired policeman who was actually a drug cop for many, many years. Their son, Dan, was diagnosed with cancer and he turned to medical cannabis to treat his symptoms and found great relief from that, and I guess it brought a change of mind to Lucy and her husband, who both had quite conventional backgrounds.

Nyck: Yes, they were very against it. We had Lucy on our show last week on the phone, and they were very against marijuana generally, on principle, at that time.

Dr. Steven Booth: Lucy was a nurse as well, wasn't she?

Steve: That's right.

Dr. Steven Booth: There were representatives from the *NSW Nurses and Midwives Association* there on the weekend in support.

Nyck: Indeed, yes. Their personal story led them to become such powerful advocates, and clearly, she has an enormous amount of respect amongst all these world-leading scientists and researchers in this area for the job that she's done in bringing this issue to the fore and hopefully accelerating where we're at in Australia, because as I said

before, we're actually incredibly behind here in this country, which is a sad tale; and it's not the only place in research that we're behind.

Steve: Yes, we might look at some of the potential reasons for that later on, but this being the fourth event, Lucy has got a global reputation now as a mover and shaker in this field in Australia. She's been able to attract some amazing people from around the world for this most recent event, including people like Dr. Ethan Russo, who is a board-certified neurologist, psychopharmacology researcher and Director of Research and Development at the *International Cannabis and Cannabinoids Institute* in the USA. I think he spoke every day and his talks were an amazing array of up-to-date information about this research and the use of cannabis. Another interesting speaker was Dr. Dedi Meiri from Israel, the principal investigator, *Technion Israel Institute of Technology*, from the *Laboratory of Cancer Biology and Cannabinoid Research*, and they're doing some really leading-edge stuff in Israel. I was blown away. I don't normally go to scientific conferences as such, and I was delighted to see the complexity of the science that was being presented and how a lot of it is moving beyond the Modern Scientific-Industrial paradigm into new-paradigm science.

Dr. Steven Booth: Very high calibre, wasn't it?

Steve: Absolutely, very, and exhibiting all of the properties that we know human consciousness is adopting in this new layer that's emerging: network-centric thinking, looking very closely at the relationships between things and not just the material aspects of the things themselves. Very, very interesting stuff.

Nyck: We all saw that analogue of the change process in the relationship to the plant and the research that's going into this particular plant, and of course there's so many amazing plants on this planet, but cannabis does seem to be somewhat unique—well, very unique in many ways, besides the applications that we know about, both recreationally and medicinally so far. The actual complexity of the plant really blew me out. Most people would be familiar, of course, with THC and CBD, some of the phytocannabinoids in the plant. There are currently 144 phytocannabinoids that they've identified in the plant, which is a lovely number, isn't it, Steven? We do like that number too—my favourite number, 144; a bit of a magic number—part of the Fibonacci series and other things. They may find others, but we both got tweaked by the fact that there are 144 of them.

Dr. Steven Booth: Yes, and so many other chemicals in there—the turpenes and terpenoids.

Nyck: The turpenes and turpenoids, and I didn't know anything about this. For those who don't know, a layman's take on that, the turpenes and the turpenoids, are the chemicals, the molecules, which actually create the aroma and the particular characteristics of a flowering plant.

Dr. Steven Booth: They can have very strong medicinal benefits on their own. There was a Komori et al. 1995 study that showed limonene was very effective in treating severe depression, and actually, after a week of ambient exposure, just pumped into the air, that seven out of twelve participants in that small study were no able to be classified as having severe depression (<https://pubmed.ncbi.nlm.nih.gov/8646568/>).

Nyck: And that's essentially, folks, just the fragrance of lemons. Limonene is in those citrus fruits and other places, and also in cannabis, as one of the terpene profiles, and it has a direct effect on depression.

Dr. Steven Booth: So get out your essential oils.

Nyck: Get out your essential oils. This is really the basis of aromatherapy. This was given, too, the other day—I suddenly realised with this chemistry around turpenes, that you can actually adjust the terpene and the turpenoid profile along with the CBD-THC profile in a plant in order to get specific effects for specific people, and the reason that's possible is because of the endocannabinoid system.

Dr. Steven Booth: And because of the complexity as well, your individual make-up of your receptors will affect what the plant does to you, and so the same plant might do different things to different people. So it's really that N-of-1 medicine, but also using the very complex make-up of the plant in the way that the cannabinoids and the turpenes work together to create a larger effect than any of those compounds individually.

Nyck: Indeed.

Steve: And the number of different compounds in the plant—I'd heard bits and pieces in the past and cannabis has never been an area that I've really delved deeply into from a scientific point of view—but I think they were saying that, as far as we know so far, there are 500-plus different compounds in the plant, which is much, much more than I thought, which makes it an extremely complex medicine. Very, very interesting indeed.

And just briefly, you mentioned "N-of-1 medicine" just then. That was a term that came up over the weekend, too, and it's this idea of customising medicine to each individual rather than just having a blanket approach.

Dr. Steven Booth: As a Chinese medicine practitioner, that's something that we're very interested in—that individualisation of treatment. Actually, there are many parallels with Chinese medicine. One of the primary uses of medicinal cannabis is for pain. Pain is a \$55 billion industry in Australia, so that's a big effect; and also the fact that people will seek out what works regardless of current research and what's being supported.

Nyck: Yes, there was one quote on one of the panels on the second day there, with a mother quoted as saying: "Caring mothers don't lie", referring to the fact that if you have an experience, even if you were going against the law—you're growing your own to get access to CBD from somewhere because you can't damn well get it—and it's actually having an effect on your sick child or your sick brother or whatever, there is no reason why a mother is going to lie about the efficacy of this plant.

Dr. Steven Booth: For the welfare of your child, you will use it, right?

Nyck: Absolutely.

Dr. Steven Booth: And mother's milk contains endocannabinoids itself.

Nyck: You mentioned the \$55 billion industry in pain management in Australia. That \$55 billion is also a figure that's quoted to do with the opioid industry in Australia—it's the same figure.

Dr. Steven Booth: Yes, that's where it came from.

Nyck: Because that's what we treat most pain with in Australia currently—the legal pharmaceuticals, the opioids of which Australia, in Tasmania, apparently grows some 95%. We looked it up earlier this morning.

Steve: Of the thebaine variety, which is used to make medicines like *OxyContin*, which is a kind of a new breed of semi-synthetic opioids.

Dr. Steven Booth: Yes. Opioids are the highest cause of death in prescription medications as well. We should add that in too.

Nyck: Indeed. And we all learnt, amazingly, that the opioid system in the body which receives those opioid drugs—pharmaceuticals that have been created—and the endocannabinoid system which we will come back to shortly, are related somewhat, and in fact, regarding the use of medicinal cannabis for an opioid user, particularly for someone who's addicted to opioids, there's a fantastic research of the very quick and safe minimisation of the use of opioids when cannabis is introduced, so the two can work together.

Steve: Yes, great synergy.

Nyck: And opioids can actually drop down and perhaps even vanish out of a person's need to use them because they're getting the same effect from the cannabis. This is pretty extraordinary, but of course, very threatening for the pharmaceutical industry, and you could argue that for our governments here, it feeds into the equation about how we are approaching this in a regulatory and political manner at this time—slowly.

Steve: Yes, one of the scientific studies that was presented was looking at the combination of medical cannabis and opioids for pain relief, and they found that very small doses of each—doses so small that if given individually as either an opiate or medical cannabis, neither would be effective—but in combination, those two very small doses can provide effective pain relief, which is really interesting. They were using the term "opioid sparing" where, in combination with medical cannabis, you could massively reduce the dose.

Dr. Steven Booth: And the safety as well—the safety profile of cannabis seems to be much more favourable than of opiates, of course.

Steve: Absolutely.

Nyck: And we'll come back to the safety profile because, of course, many people talk about issues such as roadside testing for marijuana use—for THC in the system—and that's a contentious issue. We'll come back to talking a bit about that today as well, and some of the suggestions about how we can more intelligently approach that particular topic, too, especially in this era of pill testing.

The conference, by the way, was emceed by and presented on Thursday by the wonderful Dr. David Caldicott—Irishman, incredibly funny chap, incredibly intelligent, and himself in the front line at the moment, as you would be aware, as the commentator, often, on the pill testing issue in particular.

Steve: He's been one of the main drivers of the pill testing issue in Australia, and amazingly, I think he got the first legal trial of pill testing happening in the ACT at the *Groovin the Moo* festival.

Nyck: You are tuned to *Future Sense* here on *BayFM*, and we're talking cannabis today. A bit of a joke there with one of the songs—that was *What if God Smoked Cannabis*, which was from Bob Rivers, although that was clearly not Bob Rivers singing there (<https://www.youtube.com/watch?v=iiZwrRLS2-A>)—but the joke aside, we're talking some serious science here as well, so let's delve a little bit into the endocannabinoid system.

Steve: Yes, this was perhaps the biggest surprise that I got over the weekend, was just understanding how much the cannabinoid system has an impact on our body generally, and the fact that it's spread right throughout the body. Like most people out in the general public, I'd heard little bits and pieces about the fact that we've got cannabinoids that are naturally occurring in our body, and in mother's breast milk and those sorts of things, but I just didn't grasp how important this system is to our body and what a massive impact it has on the body. It's spread right throughout the body and it plays different roles in different parts of the body in different tissues and things.

I think one of the functions that was most commonly discussed on the weekend was in the nervous system, and how, where you've got two nerve cells talking to each other through the process of electrical and chemical signals being sent across the synapses, it's actually the endocannabinoid system which moderates the strength and duration of the chemical signals. So one side of one nerve cell will release something like glutamate or some neurochemical that's like a messenger molecule and travelling across and sending a message to the next nerve cell, and then once there's been an adequate reception of the actual message, it's then the endocannabinoid system which swings into play and sends cannabinoids back across the synapse to the origin of the signal, saying, 'OK, that's enough'. Very, very interesting indeed.

Dr. Steven Booth: It's a complex modulation system as well. It's not just an on-and-off switch, it's more like a thermostat.

Steve: That's right. One of the presenters put a picture of a light switch up and made the point, as you say, that this is not how the endocannabinoid system works—it's not just on and off—then he had a picture of a rheostat, like a dial that could be adjusted finely, and so the overall role of this endocannabinoid system seems to be homeostasis in the body.

Dr. Steven Booth: It's balancing and evening things out and keeping things as they should be.

Steve: Exactly, and that is a very, very strong theme of the consciousness shift that's underway globally at the moment. On a global scale, we're moving from this old, Modern Scientific-Industrial way of thinking and being human, which was really driven by this need to be successful at an individual level, and the *modus operandi* was to push the limits—so taking everything to the extreme. One of the natural evolutionary responses to that has been, 'okay, that's enough of that now; we need to moderate our action in society', so it's like this paradigm shift globally is replicating the action of the endocannabinoid system.

Dr. Steven Booth: The endocannabinoid system is the adaptive, balancing component.

Dr. Steven Booth: Exactly, so it's like the cannabis plant has swelled up and made its presence more known in society and its impact is to stabilise and slow things down.

Nyck: Yeah, chill out, folks. Just chill out.

Steve: And of course, then this is exactly what we're seeing in the human response to the Scientific-Industrial era—it's: 'Okay! Too much! Stop it! Slow down!' We've made some amazing breakthroughs and we've moved forward rapidly in terms of technology, our capacity to travel and communicate and all these sorts of things—amazing progress—now we just need to chill out and slow down and actually integrate.

Dr. Steven Booth: And collectively. The endocannabinoid system works collectively with these terpene profiles of the plants and their different effects, more than they would individually.

Steve: Yes, that's right, and it plays a key role in allowing the different parts of the body to talk to each other. Another thing that I learnt on the weekend is this communication

between cell receptors, which I really never heard of before. If you're not familiar with biology folks, if you imagine a cell in the body and on the outside, on its membrane, there are a whole bunch of little receptors which are there to be able to receive messages in the form of chemical messengers or chemical compounds. Different types of compounds carry different messages for the cell, and then the cell can have many, many different types of receptors on it, so it's getting a combination of different messages; it's not just a matter of receiving a single message.

Dr. Steven Booth: It's not a telegram, it's a complex system of networks.

Steve: It's a complex communication system.

Dr. Steven Booth: Lots of information going through.

Steve: Exactly, and these endocannabinoids play a very critical role in that, and so there is this is a massive similarity between what's happening to consciousness on a global scale where we've been through this crazy active period of the Modern Scientific-Industrial—it's been amazing. I mean, we've developed all this incredible technology which allows us to speak on the radio around the world and have podcasts and those sorts of things—and now, just in the natural flow of things, it's time to actually slow down, come together, speak to each other, take stock of what we've achieved during that era, and integrate it, because if we just keep running the way that the Modern Scientific-Industrial era ran, then we're going to burn out and blow out. And of course, that is happening on a small scale in various parts of the world to various people.

Nyck: It's interesting, too, with what you're saying, that this period that we're moving out of is also characterised, as you're suggesting, by, in one word: reductionism—going in and splitting things up to understand them. As you said, Steve, this has created a huge number of advancements in technology, and a lot of what we're doing now today is a result of that ability to take things apart and understand them, but now cannabis seems to be a very good example of how that understanding on a reductionist level—taking this plant apart and understanding it in this way—and now actually bringing it back together and seeing that this is a whole network system in this plant, which then networks with the human body and beyond in this way, is an amazing analogue for this time, as you're saying.

Steve: It is, and really the perfect medicine. I see human progression through the paradigms and through these layers of consciousness as a very natural process, and it has its patterns where it swings towards individuality and changing the world, and then

back towards community and changing ourselves—it's all part of a natural rhythm. But for some folks, particularly those who are very much in the paradigm shift themselves, the natural human response is to reject the old and to highlight the new. You sometimes hear people even saying that the old way, this Modern Scientific-Industrial way, is a sickness that we need to cure, and if you did want to take that particular perspective, then cannabis is like the perfect medicine. It's a cure for the Modern Scientific-Industrial mind.

Nyck: That's good.

Dr. Steven Booth: There's that Entourage Effect as well, which is that communal effect of the chemicals.

Steve: That's right, yes.

Nyck: This was quite a big 'aha' moment for all of us, even though it's pretty obvious to us and to many of you out there. Nevertheless, explain what the Entourage Effect actually is.

Steve: What it's saying is that if you isolate any one of the active compounds in the plant and use it on its own as a medicine, then the science is showing that it's going to be much, much less effective than using the whole plant itself. The whole plant has this amazing, huge array of compounds which have many, many different healing effects, and these compounds work in conjunction with each other. The Entourage Effect—you could also call it the Network Effect, right?—because, rather than having one isolated action, you've got a very, very complex, combined action with many, many different players, which provides a much richer result and a more effective healing outcome.

Nyck: And of course, as was also talked about at the conference, this synthetic desensitisation of some of these particular compounds, like synthetic THC or CBD, is problematic in a number of ways because of this very thing.

Dr. Steven Booth: Worse than useless.

Steve: Yes, that's right, so the key message was that using the whole plant is really the most effective way of applying it.

Dr. Steven Booth: The other thing relative to that Green Layer 6 is the anti-inflammatory effects. It's putting out fires, but it's also balancing, so it's shoring up your entire energy system, ready for the next quantum leap or the next stage in healing.

Steve: Yes, and just to analyse the language there, inflammation—on fire—isn't that also a wonderful descriptor of the Modern Scientific-Industrial? We've been putting people on these giant flaming rockets and sending them into space, for example.

Nyck: Yes, and to counter that, I love the word that was used much on the weekend, and that was 'inflation'—the flowering, the inflorescence of a plant, and that natural evolutionary and sacred geometrical unfolding of the flowers of plants or the flowers of our being for that matter, instead of 'light something up and see what happens then.'

Steve: That's right. In this amazing similarity that we're seeing between the characteristics of the shifting of human consciousness and the nature of the cannabis plant and its action, there are fractal layers. I mean, the flower of the plant is not just a flower, is it? It's a combination; a massive collection of flowers.

Nyck: Magnificent.

Steve: In what we call 'the bud', it's not just a single flower, it's a whole bunch of flowers working together. Very interesting.

Nyck: You are here on *Future Sense*, and we haven't mentioned the text line yet. Usually we get quite a few texts in. It comes and goes in different weeks but if you are nearby your text—you're not driving—and you want to drop a question or any response to what we're talking about, please do: 0437 341119, it comes up here on the computer. I just want to mention that you can also check out our *Twitter* feed, and our podcasts arrive on there a couple of days after each show, and that is @futuresenseshow.

We are here—myself, Nyck Jeanes, my co-host, Steve McDonald, and our special guest this morning, Dr. Steven Booth—and we're talking about cannabis, having all of us attended the *United in Compassion Australian Medicinal Cannabis Symposium* in Tweed Heads, and as you can hear, we're all a bit enamoured by, carried away with, and stimulated and excited by it, in quite a random way; as Steven Booth said off-air, it's similar to cannabis, really. It's all sort of connected, and we just sort of jump from one thing to the other—and that's okay—but let's look at some a few more specifics here, Steve.

Steve: Yes, we've got notes from presentations all across the weekend. We may sound like we're jumping around a bit at times, but we'll just trawl through those and dig out a few things that are definitely of interest to our listener base. One of the big points that was made, of course, was the prevalence of some really bad science that's been put forward and being used to spread government propaganda, trying to portray cannabis as an evil plant and something that will damage you and all this sort of stuff. A lot of those myths were busted very, very effectively by some of the world's leading medical cannabis scientists over the weekend up there at Coolangatta/Tweed Heads.

Some of the things that they spoke about were the fact that because of prohibition and because of this campaign that's been running for about 110 years or so against the cannabis plant and the use of it, much of the funding that's been put forward, especially by governments, has been put forward with the specific purpose of proving things wrong with the plant. That kind of skewed science, we're seeing a lot of that at the moment and over recent years, and not just in this field, but across all science, really—people who say that they will fund the research, but they'll fund the research to prove 'this'.

Dr. Steven Booth: And then once we get the data, we'll interpret it in a certain way with our tactical framing.

Steve: Exactly.

Nyck: Yes, we will interpret correlation as causation, for example, when it's not.

Steve: Exactly, and a couple of the speakers had a wonderful slide just to make that point—that just because things occur at the same time, it doesn't mean that they cause each other. One of the main examples they used was a correlation between ice cream sales and shark attacks. If you plot out the volume of ice cream sales during the year, of course they peak in the summertime, and in the summertime, the weather is warm and so people go swimming in the ocean and there are more shark attacks, but that doesn't mean that more ice cream sales causes more shark attacks.

Nyck: It might depend on the flavour, but anyway, that's another thing.

Dr. Steven Booth: Yes, stay away from the strawberry.

Nyck: Stay away from strawberry. That's a serious study area of future study, I think.

Steve: I've never seen fish-flavoured ice cream, but you never know, I'm sure it's out there somewhere.

And so, this harps back to the consciousness of the Modern Scientific-Industrial era and the fact that it, itself, grew out of the Authoritarian-Agricultural era where all information was given by a higher authority and often that higher authority was God and so we just accepted what we were told. People in society generally always looked to a higher authority to tell them what was right, what was wrong, how to live life, what's good, what's bad; and with the Scientific Revolution and the Industrial Revolution, our mindset changed and we figured out that we can actually discover the truth through a process which we call science, of experimentation and testing to find the best options and the facts about things. The Modern Scientific-Industrial mindset, being what it is and having this idea that it could create and craft things rather than having to rely on somebody else to provide or tell, would often put its own spin on things in order to achieve whatever outcome it wanted to achieve.

That, of course, has happened to science—it has shifted the way that science is funded in the way that science is done, and people will even suppress scientific results which don't fit with what they want to prove. We've seen a lot of that in the pharmaceutical industry, particularly around things like antidepressants, where an enormous number of the clinical trials that have been done with antidepressants haven't produced any clear outcomes. I think in the vast majority of them, the actual antidepressant medications have performed no better than placebo, and many of those scientific studies were never published in journals. They were kind of put in the bottom drawer and they say, 'well, we won't talk about that one.'

Dr. Steven Booth: And a small percentage of them were published, and they weren't even particularly good; and this is in specific cases.

Steve: Yes, that's right, so cannabis has been subject to that same kind of thing, and that is an issue right across science. We often talk about this on the show in relation to other fields of endeavour as well, and over the coming years, as this paradigm shift continues and we see the emergence of more network-centric, humanistic thinking from the next layer of consciousness—Layer 6 in Graves's model—we're going to see revelations and it is going to really have a massive impact on people's opinion towards science. I, personally, am predicting a major, major social crisis and loss of confidence in science altogether over the next ten years in particular.

Nyck: Though it is good to see, having been at this symposium, the quality level and clarity of these particular scientists in this particular field. It's hard to argue with where they're coming from and how they're doing their work.

Dr. Steven Booth: There's a lot of really work going and there were some really clever scientists there—some passionate people—and even in Australia, we have had some great people involved. The *Lambert Institute* seem to be doing really good work (<https://www.sydney.edu.au/brain-mind/our-research/lambert-initiative.html>).

Steve: That's right, and the best of it is new-paradigm science—it's science being done from this expanded consciousness which is taking into account the network effect and all of these other things.

Nyck: You mentioned antidepressants there. We already talked about opioids. Those two genres, so to speak, those types of drugs (I don't know what the right word is) for pain in particular of various types and for mental disorders. Those two are, in fact, the two major uses for medicinal cannabis anyway, so that's rather interesting there, politically. We don't even have to talk about conspiracy theories. It's pretty straightforward, isn't it? There's a lot of money involved in this, and a natural plant like cannabis—which can't be owned, as much as they're trying to own it in various ways; that actually may be more efficacious, more natural, and the Entourage Effect be more interesting—that actually this networked plant, applied specifically to the specific endocannabinoid system in a particular person's body with particular issues, that the targeted use of this in this way, it may be so efficacious as to literally wipe off the planet some of these legal pharmaceuticals that are not doing the job very well anyway and cause addiction.

Dr. Steven Booth: And this we haven't discussed, like preventative medicine or entheogenic use, and all of the other things that have potential uses in that way.

Nyck: Indeed.

Steve: The pain medicine industry is massive, worth an awful lot of money, and it itself is problematic because the medications that they're providing are a major cause of death. I was just reading some statistics this morning which said that since the year 2000—and this article that I was looking at was written a couple of years ago—since the year 2000, something like 200,000 Americans have died from opioid overdoses. In one single year, up to the time this article was written, it was something like 30,000 people had died. Of course, prescription medications are the major cause of overdose deaths here in Australia also, and so there's an argument here that medical cannabis is providing a solution to that problem in that, a) it addresses pain, and b) it also enables the reduction of opioid use. We were talking before about that opioid sparing mechanism, where very small doses of medical cannabis and very small doses of

opioids provide effective pain relief, and neither of those on their own at those small doses would do the job, but in combination, they have a synergistic effect.

Dr. Steven Booth: People will go out of their way and put themselves at risk to access this stuff because it works. That's really saying something.

Steve: That is saying something, and of course, John Easterling, who is famously Olivia Newton-John's husband, made the point that here in Australia—and we can only estimate the number of people who are using or who need medical cannabis at the moment because much of it is underground—but I think the estimate was that there probably around about 30,000 medical cannabis users.

Dr. Steven Booth: It could have been as high as 300,000, according to some estimations.

Steve: Well, yes, that's identified legally, and the point was that they estimate that it's probably more likely 300,000 and may well be larger than that. We really don't know.

Nyck: And only 3,000 of those, whatever that number is, actually have legal access.

Dr. Steven Booth: And only a small percentage of those—about a third of those—can actually afford to obtain the medicine, so people are getting scripts, which is hard enough, but then unable to fill them.

Steve: Yes, that's right. John spoke at the dinner we had over the weekend at the symposium, and made the point that if that figure is correct and there are 300,000 patients in Australia who need access to medical cannabis, then the government system that's been put in place is currently supplying about three of them, which is ridiculous.

The other thing that became really clear over the weekend is that the process that has been put together by the Australian government for the introduction of medical cannabis has really been designed to fail. Compared to what's happening overseas, it's a ridiculously bureaucratic system which is full of obstacles; it's not working very well at all and it really has been designed to fail, and it's very hard to resist thinking that, 'Oh, okay, well, Australia is one of the largest suppliers of opium poppy products ...'

Nyck: In fact, the only three countries in the world that are legally allowed to grow medicinal opium poppies are Australia, India and Turkey, which we just discovered this

morning, so obviously there's a very large investment in the legal growing of poppies for opiates, both in this country and around the world, so, yes, there's a lot of money involved there.

Dr. Steven Booth: If there was only another crop somewhere they could find.

Steve: Yes, and clearly medical cannabis—I mean, if you were an executive in one of these big pharmaceutical companies, you would see medical cannabis as a major, major threat to your market. Something that not only replaces the pharmaceutical pain relief medications, but also is instrumental in allowing people to reduce the use of those things, it is just a massive business threat in terms of profits.

Dr. Steven Booth: Well, we saw frustrated doctors over the weekend who had their patients on 11 or more pharmaceutical products for a range of different conditions and symptoms that would have or could have—may have—been treatable with cannabis.

Steve: Absolutely. I've got a slide up here from one of the talks over the weekend, which just looks at the various conditions in clinical practice that medical cannabis is being used to address, and this is in rank order in terms of the most common down to the least common. By far the most common application for medical cannabis globally is for pain relief—there's no doubt about it, it stands out. Second is for cancers.

Interestingly, they had a panel of some of these very senior researchers from around the world, and David Caldicott, the emcee, asked them to give a rating between 1 and 10 as to how confident they were that cannabis could or may, at some time in the future, be proven to cure cancer. The general feeling was to give it a score of around 2 out of 10, so there's not a lot of evidence—in fact, bugger all evidence—that cannabis cures cancer.

Dr. Steven Booth: Some of the studies that have been done have been for adjunctive therapies around cancer, like therapy treatment causing nausea and so on, and it's shown to be very effective in those cases.

Steve: Extremely effective.

Dr. Steven Booth: And for the pain, of course.

Steve: Yes, so for addressing associated symptoms, but in terms of actually curing cancer, it's still very early days in terms of our understanding there. One of the doctors, I think it was Dr Hergenrather from San Francisco, was saying that in his private practice, he's treated probably about 400 cancer patients over the space of many, many years—I think he said something like 20-something years—and they had been given medical cannabis for their cancer and none of them survived the cancer. So, I mean, that's pretty telling, and yet it's proven to be extremely useful in addressing associated symptoms from cancer.

Nyck: Anxiety and fear of end of life, and everything, really.

Steve: All sorts of things—and reducing the impact of radiation.

Nyck: One of the slides that you sent us regarding this, I think it was from the *Lambert Initiative*, has a lot of information on it, but just the summary here is that: "the total Australian health system saving of bringing medicinal cannabis online over time would be \$1.2 to 1.3 billion a year, growing to \$3 to 3.2 billion per year by 2045, for palliative and chronic pain care, with aging, particularly with the ageing of baby boomers." So, you know, there's a massive saving.

Steve: That's right. All we need is a forward-thinking politician who thinks further ahead than the next election. A big part of the issue here, let's be clear, is that the mindset associated with many of our politicians in the way they approach their work, is really one from the old paradigm, which is the Modern Scientific-Industrial way, which tends to think in much shorter time frames. As we look at these swings and the movement between evolutionary paradigms, they alternate between individually-oriented where the motivation is to want to change the world, and those always think in short periods of time because they really want to change the world now; and then the communal paradigms, which we're moving to right at the moment, are generally thinking much, much longer-terms and also are interested in changing themselves to fit with what the world needs.

Dr. Steven Booth: There were some Green [Layer6] Green [political party] politicians at the event.

Steve: Yes, of course. Richard Di Natale was there, and also Fiona Patten. Both of them were very active and spoke at different times and participated in discussion panels and things.

I just might skip back to this list of conditions that medical cannabis is being applied for. Pain, number 1; cancers ,number 2; mental disorders, number 3—anxiety, PTSD, ADHD, all kinds of mental disorders—which for some people I know will be counterintuitive, because again, this is one of the myths that was busted on the weekend, was that cannabis causes mental conditions. Really, what the science that was being presented on the weekend is saying, and this is the best science that anybody has access to globally, really, is that in the case of schizophrenia, if somebody is predisposed—in other words, they have some underlying schizophrenic condition that hasn't presented itself—then the use of cannabis can ...

Dr. Steven Booth: It can bring on the pre-existing the symptoms that might have occurred later on.

Steve: Yes, exactly.

Dr. Steven Booth: I think the complexity of the plant as well, because cannabis isn't one thing. You can have a sedating type of cannabis that will reduce anxiety, or one that can make you more alert.

Nyck: Exactly. We talked about the terpenes before and you mentioned that limonene can do exactly that—it can lighten you up and make you alive again—but if you have a terpene that is associated with things like lavender, which can also be found, then suddenly you find yourself relaxing and possibly falling asleep.

Steve: Yes, good point, Steve. That was really clear. The research that's coming out of Israel, where they're doing a very, very detailed mapping of various chemovars as they call them, which are essentially chemical varieties of the plant.

Nyck: You can't say 'species' of cannabis, it's 'chemovars'.

Steve: That's right, apparently. Not species, but 'strains' was the word.

Nyck: Strains. Yes, thank you.

Steve: One of the researchers made the point that we very commonly talk about different cannabis strains but in a technical scientific sense, they're not actually

different strains. I think, and correct me if I'm wrong, that they said there are really only two strains, which are the *sativa* and *indica*.

Dr. Steven Booth: And possibly the *hemp* strain, sorry, *hemp* species as well, but now that's becoming less relevant because we are interbreeding, I suppose you could say, the various species and strains or chemovars to create new ones and more selective, so we'll have a big library of different plant compounds.

Steve: That's right, and they also spoke about what they called Landraces, which is where you take the same plant and put it in a different country under different environmental conditions.

Dr. Steven Booth: Because it's such an adaptive plant. They talked about the plasticity of the plant's make-up.

Steve: Yes, exactly, and the point I was working towards there was that one of the things that's complicating the research is that you can get such a massive difference from one plant to the next, and one chemovar to the next, and there are different content levels of the different cannabinoids and terpenes, and so what they're finding in the research is that a certain plant is good for certain medical conditions, but you take a different plant and it actually doesn't work, but it will work for other things.

Dr. Steven Booth: And for different people as well, because those are just tendencies for different individuals with different endocannabinoid receptor levels, that those same plants will work differently for them.

Steve: Yes, there are so many different variables. The number and type of different cannabinoid receptors that an individual has—different enzymes in the body which are associated with the metabolism of the various compounds—and the fact that the plants themselves can have different levels of the cannabinoids and terpenes and so are going to be acting in different ways on the receptors and with the enzymes that you have in your body, what it's leading us towards, really, is very customised-oriented medicine, which I think is probably the next step. The change that we've been talking about in the science and in the medical application, which is very network-centric—looking at how things are connected, how they talk to each other and how when we work with all of the different individual parts of the system, we can affect the system much more with much greater impact and bring balance—this is a very Layer 6, Postmodern perspective on science. I think the customisation thing—I'm not sure if it's going to come. It's more likely to come in an individually-oriented paradigm because it's about individual

customisation, so we're probably going to see that emerge on scale with this big leap to Second Tier consciousness and Layer 7, which is individually-oriented.

Dr. Steven Booth: We're seeing some things in the recreational area in the US where the branding of recreational cannabis is becoming very specific. You'll have the skaters' brand or you'll have the musicians' branding. That's becoming more individual again now in that way.

Steve: Absolutely. What I've seen is in late stage Scientific-Industrial thinking, we've seen some of this fairly sophisticated individual customisation emerging, and the next big wave of that ought to come with the seventh layer.

Dr. Steven Booth: Very specific and individual.

Steve: Yes, and also, the other thing that ought to be unlocked when we make this leap to Second Tier is the multidimensional, interdimensional aspects of medicine.

Nyck: Entheogenic aspects and beyond.

Steve: Yes.

Nyck: While I think of it too, when you're talking about the specificity of the plant and the quality and so forth, what was also interesting to all of us was what was revealed—that the cannabis plant, like many other plants, but certainly and particularly this plant, has the capacity and does draw up from the soil, heavy metals or other impurities that are in the soil, so this brings the whole issue of where you grow and how you grow it, especially when it's coming down to medicinal cannabis to the fore. I think it was very important. As we know, the soil quality on the planet is pretty screwed anyway, but when it comes to cannabis—and we're talking about a medicinal, and in fact, if people are smoking the stuff—it's kind of important to know what sort of soil that plant has been growing in.

Steve: That's right, and again, this is another one of the confounders of the science, is looking at, okay, this is the plant that we used in this particular medical study, and then doing an analysis on anything that's undesirable that might actually be in the plant like pesticides, heavy metals and those sorts of things which we're starting to think about. There was, of course, a lot of discussion about the permission to grow your own

medicine in your backyard issue and I think everybody was, in a very general sense, supportive of that, but also the scientists made the point that in practise, a lot of the people who are really sick and using medical cannabis at the moment, most of them don't really want to grow their own stuff because they're sick and so they've got better things to do. And so there is a strong argument for the medical standardisation and the production of plants that are grown under very set conditions—known chemovars—so we really know what we're getting and then we can specialise the application of certain plant chemovars to treat certain things, and knowing what we're getting and being able to control the dosage more effectively, and knowing that they're not contaminated.

Dr. Steven Booth: There were people there talking about the responsiveness of the plants to an individual as well, so you might be able to sit with your plants and have them communicate with you.

Nyck: Ah, yes. We'll come back to that, too.

Steve: We'll come back to that. I see that Nyck is starting to press buttons and make things happen here, but just one more point before we do that: in our region here, in the Byron region, it's an old banana-growing region and the soil is greatly contaminated in many parts of the Brunswick Valley with all of those chemicals that were sprayed. I came into the area roughly about 10 years ago and there were still crop dusters spraying banana crops close to Mullumbimby at that time, and so that's something to be aware of. If you did want to try this at home and grow your own plant, just be wary of what you put the plant in terms of soil, and the potential contamination. It's a very good plant for sucking up contaminants from the soil, and you're going to ingest that if you're not careful.

Dr. Steven Booth: It's a good argument for regulation, isn't it?

Steve: Absolutely it is.

Nyck: You are tuned to *Future Sense* and you're with Steve McDonald, myself, Nyck Jeanes, and Dr Steven Booth, our special guest here this morning. We're talking about the *Cannabis Symposium* that we were all at over the weekend, and we will come back to your texts too—there are quite a few of them, so we'll come back to them at the end of the show—because we still want to cover some of the other things that we wanted to do. Steve?

Steve: Yes, we've got massive amounts of information from this conference and not enough time to really get through it all, but I just started a couple of times to go through this list of conditions that we reported as being the most common things that medical cannabis is consumed for, and I'm just going to run through the whole list now really quickly. This is from the most common application, which is pain, through to the less common ones, and they're in rank order of commonality of usage: pain; cancers; mental disorders; gastrointestinal disorders; insomnia; autoimmune disorders; in one line here, we've got epilepsy, autism, Tourette's, dystonia tics and tremors; and then neurodegenerative disorders—things like fibromyalgia, dementia, migraine headaches; harm reduction as an alternative to opioid use; spastic disorders; glaucoma; skin diseases; AIDS; and other infections. So that's very, very broad, as you can see there.

The same presenter talked about optimising the clinical effects of the medicine, and the key variables that need to be considered and controlled are: the method of administration; the frequency of use and the dosage; the different ratios of the various compounds—and in very, very simplistic terms, they've sort of come up with three types of cannabis, and that is THC-heavy, balanced THC-CBD content, and then CBD-heavy, and that's a massive generalisation because I think that, as I said, there are 144 (and probably more that they haven't discovered yet) different cannabinoid compounds in the plant.

Nyck: Not to mention the turpenes, but that's a good basic analysis.

Steve: Just a basic, simplified generalisation. Another key variable is the nature of the THC, whether it's carboxylated or decarboxylated. In its natural form in the plant, it's actually an acid THC-A, and then through the application of heat, it can be decarboxylated, which means a little bit of the molecule flies off and it actually makes it into THC as we know it. I think there are some conditions where THC-A is more effective than THC, and mostly THC is seen as the most effective variant of the compound.

Dr. Steven Booth: There are definitely different effects between THC- and CBD-heavy. CBD tends to be used for more anti-inflammatory-type effects, and because the receptors are in different places, the CBD type is usually given for immune-type conditions, where THC is more for the central nervous system and has more mental effects.

Steve: Yes, and he spoke about methods of administration. When smoked and vapourised, the bioavailability can vary greatly, actually. Generally there's less of the compounds getting into your system through smoking as compared to some other methods of administration.

Nyck: But a much faster action.

Steve: Much faster action—that's the trade-off.

Nyck: Almost an instant action.

Dr. Steven Booth: It depends on your smoking ability—if you're going to inhale or hold it in—it's a skill-based thing.

Steve: That's right. The presenter said it's very hard to really give accurate information because there are so many variables. As you said, it depends on how you smoke it. If you're an experienced smoker and you know how to kind of hold it in for a while and you're comfortable with doing that, but if you cough and splutter and don't get much the smoke down, then it's not going to be as effective.

There was a whole section of the conference which was looking at potential harms and what the science is saying about that, and one of the clear things that came out is that there is no substantial link that's been established between smoking cannabis and lung cancer. Basically they're saying it's just not an issue; it doesn't happen.

Dr. Steven Booth: Well, it has a history of use for bronchodilator and vasodilator effects. It's used for asthma and other things.

Nyck: Was it Queen Victoria that was administered ...? Oh, it was for menstrual pains, but some others have also been given it for asthma, too.

Steve: Yes, and the only medical condition that has been clearly identified through good science that might result from smoking is an increase of mucous in the throat, which if it builds up, can lead to a cough.

Dr. Steven Booth: Or mixing it with tobacco or alcohol or other compounds.

Steve: Well, yes, that's a completely different story. Obviously there are some of the harms of tobacco in that case, but in the case of smoking cannabis on its own, basically they said it's quite safe.

Dr. Steven Booth: Except for your civil liberties.

Steve: Yes, except from a legal point of view. They said that even if you do develop mucous and a cough from it, just simply by stopping for a while, that would be resolved and then you can get back at it again, so they say.

Another interesting thing was that there is some adaptation that happens, so your response to a particular dose of cannabis may change over time as your body gets used to it, and they were saying that it's very easy to reset your system just by stopping for a few days, and very, very quickly the endocannabinoid receptor system resets itself and then it's like you're starting afresh again just after a short break.

Dr. Steven Booth: In general, the therapeutic approach was just common sense: start low, go slow; if it's working, add more; if it's not, stop, that kind of thing.

Steve: That's right, and that was the sort of mantra, wasn't it, that cannabis is a slow medicine? The idea is to start with small doses and if you don't get a response, then slowly increase the dosage. Because of the massive variation from one plant to the next and the difficulty in working out what is actually in each particular individual plant, then that titration process is recommended by all of these very experienced practitioners that were speaking at the conference: start small and just slowly increase the dose over time as you require.

Dr. Steven Booth: Particularly with high THC compounds. For people who have never tried anything like that before, they might be put off if they are getting a psychoactive effect, so start slower and slowly increase.

Steve: That's right.

Nyck: Let's move on in the last little bit of the show today to the legality—to the regulations and that whole area which was talked about, of course, a lot at the conference—because there's a great deal of frustration, not only, as we've already said, for the many people out there, patients who are seeking to use medicinal cannabis in one form or the other, and the loopholes that they've got to jump through to get to that point. The researchers themselves and the scientists who, with all the evidence on the table, clearly go, 'well, there is something seriously wrong here, there's a disjunct between what is clearly research-driven, good science, and the very slow, if not glacial response of the regulatory bodies and politics.'

There's a slide you've got here from the *Lambert* driving study—well, it's just generally from *Lambert Institute*—which looks at the barriers to cannabis research. A couple of specific regulatory barriers include: 1. The classification of cannabis as a Schedule 1 substance—we'll come back to that—that impede the advancement of cannabis and cannabinoid research; 2. It's often difficult, as you've also alluded to, Steve, for researchers to gain access to the quantity, quality and type of cannabis product necessary to address specific research questions on the health effects of cannabis use; 3. A diverse network of funders is needed to support cannabis and cannabinoid research that explores the beneficial and harmful health effects of cannabis use, if there are any; and lastly, to develop conclusive evidence for the effects of cannabis use on short- and long-term health outcomes, improvements and standardisation in research methodology, including those used in controlled trials and observational studies, are all needed.

Steve: Yes, one of the confounding issues, particularly in the US, is the only place that you can get legal plant material is from *NIDA*, the *National Institute of Drug Abuse*, so they're the only ones who legally grow and provide to researchers and they're really, really bad at growing cannabis.

Dr. Steven Booth: There were some reports by some researchers saying it was just such poor quality, maybe even mouldy.

Steve: It's really shitty, and so that obviously affects the research outcome, so it's just another way that the science has been skewed in the wrong direction.

Nyck: Some of them were talking about a new regulatory body aside from the *Therapeutic Goods Administration*, the *TGA*, which administers all of these things in Australia, similarly to the *FDA* in America. Can you flesh that out a little bit, about what was talked about regarding the new potential for a regulatory body to look after cannabis?

Steve: Yes, I think the key thing is that everyone agrees that the *TGA* is not equipped to manage the introduction of any medical cannabis adequately, and we really need an independent regulatory body.

Dr. Steven Booth: An independent advisory come regulator.

Steve: Yes, that understands the nature of medical cannabis. The point was made that it's really not a drug—unless you extract some compounds from the plant itself and make a drug, it's actually a medicinal plant.

Dr. Steven Booth: It's a herbal medicine.

Steve: It's a herbal medicine and it needs to be treated as such. It shouldn't be regulated in the same way that a pharmaceutical drug is regulated.

Dr. Steven Booth: There's a double standard in the research as well. If it was any other drug, it would be approved.

Steve: That's right, and this is very clear also in the legal issues around random drug testing of drivers—cannabis is being treated differently than other medicinal drugs. I mean, you look at benzodiazepines, for example. Most people would know those under brand names like *Valium*, and you can take a *Valium* and go driving and you don't have to worry about the police pulling you over and charging you with a criminal offence.

Dr. Steven Booth: But you're severely impaired.

Steve: It impacts your capacity to operate machinery—there are warnings on the pamphlet in the packet saying 'don't operate heavy machinery'—and so why should cannabis be treated any differently than these other drugs? You can dose yourself silly on opioids and then get in your car and go driving and you're not going to get pulled over and charged with a criminal offence. Why are medical cannabis users subject to different laws, different approaches? It's just not fair.

Dr. Steven Booth: And the relevance of concentrations of THC in the blood to impairment is non-existent.

Nyck: This is the thing, isn't it? It's complex. I mean, you can have THC in your blood and not be impaired, not having even smoked it or taken it in any form whatsoever for several days or weeks even in some cases, and so it's a very complicated equation.

Dr. Steven Booth: There were several examples cited of where using medical cannabis could actually improve your driving. For instance, if you were taking it for severe pain

and you were driving around with severe pain, you might be more impaired than if you didn't have that pain.

Steve: Yes, exactly, and interestingly, the *Lambert Initiative* is planning a new driving study which is going to focus on whether the use of cannabis improves your driving skills, and there's obviously a case for that based on the research they've done so far, so that's really interesting.

Nyck: It is indeed, although we do hesitate to add, as you mentioned earlier, too, the combination of cannabis and alcohol is clearly not a good combination for driving.

Steve: Exactly.

Dr. Steven Booth: Yes, if impaired, just get off the roads.

Steve: Yes, and that was a really strong message that came through, that those two things, cannabis and alcohol, don't play well together and they'll really mess you up.

Dr. Steven Booth: Whatever you're impaired with—if you're impaired with your emotional state or any consumption of anything, just get off the road. Please.

Nyck: Thank you, Doctor.

Dr. Steven Booth: That's my advice.

Nyck: It would be great, and they did talk about it—it's scientifically out of out of reach at the moment—the notion of how do you measure impairment of a person on THC if you were to do some sort of testing on the roadside? 97,000 mobile drug tests are done from 2017—the New South Wales government increased it by three times at that time—nearly 100,000 mobile drug testing units are out there in Australia, so it's not going to go away and we're seeing all sorts of problems with charging someone over this issue. So how do you actually come to a science where you can actually measure impairment of this particular substance? Probably not easily.

Steve: It's extremely problematic. According to Professor McGregor, some really interesting stuff is coming out of their driving studies, which will be of interest to our

listeners. One of them was that in terms of THC levels that are detectable by the saliva testing units that the police have, there's a particular spike around about the 15 minute mark after you vaporise in this case, according to the graph I'm looking at, and then it rapidly drops away in the next hour or so, and then from around about four to six hours after smoking or vaping, the levels normally drop below detectable levels, according to the testing kits that are being used in New South Wales in particular.

Dr. Steven Booth: The method of ingestion really affects those detectable levels in the saliva. If you took a sublingual dosage or one of the spray-type applicators, you could show your full dosage as your detectable amount in your saliva, but if you were to encapsulate your dosage and swallow it so it never touched your mouth, you would not show any THC where you might actually have a very high blood concentration.

Steve: Yes, and the other point that he made was that in the case of edibles, you can consume an edible and you can actually be quite heavily affected by it in terms of your capacity to operate machinery, and yet your THC levels in the blood are actually quite low.

Dr. Steven Booth: In the saliva.

Steve: In that case, yes, and zero in the saliva. He was talking about people doing that, like putting oil, for example, in a capsule so you consume it, there's no oil residue left in your mouth and you get the full effect of the medical cannabis and it doesn't show up in a saliva test.

Nyck: Complex stuff indeed.

We'll just come to some of these texts quickly that you've sent in, folks. Thanks for that. Someone's written in a little while ago: "Great. About time. This has been known for many aeons", and the question is: "So is BayFM going to support this medicine ...". I think probably overall most people in this station would support the proper use of medicinal cannabis, I'm sure, "... and sponsorship announcements and stop supporting the neurotoxin, alcohol and playing sponsorship announcements for such." I'm not sure where we do alcohol stuff, but perhaps that happens occasionally, so thanks for that. Another text said: "The blocking of cannabis by closed-minded political members, I believe, is the pollied getting off on their self-righteousness. Those pollied might open their minds to truly research the benefits if their loved one were life threateningly sick. These pollied should suck on lemons, it might make them sweeter." You'd certainly be more awake if you suck on lemons.

Dr. Steven Booth: There was an example of someone in a high ranking position that had family affected and had been in support, but just not publicly, and actually spoke out against cannabis, which is really disappointing and confounding.

Nyck: Yes, indeed.

We were talking about cancer prevention. There's no direct proof of that as Steve was elucidating before, but as someone has written and said: "It's probably more of a cancer prevention, because if the oil helps the body to have less pain and sleep better, then that's a win-win." Of course, that's true.

Steve: Yes, I think that's quite true, and one of the other things that came out over the weekend is that cannabis has a neuroprotective effect, which is very interesting.

Nyck: Indeed. Someone has said: "Also, don't forget the world is flat." Thank you for that. And we were talking about the little harm that generally was presented at the conference—and when I say 'little harm', there was certainly research to suggest that in certain situations, and we touched on a couple of those today, that if you have a psychological problem, particularly if you're young, it might exacerbate a pre-existing condition, so that's clear, and there are others but generally speaking, the research was incredibly positive—but someone's written in: "Actually that's not quite true. There is a medically diagnosed allergy to cannabis called cannabinoid hyperemesis that leads to profuse vomiting for days." A client of this person has had it. "Great show, though."

Steve: Yes, that's true. Of course, they are isolated conditions and we're talking in very general terms.

Dr. Steven Booth: The immediate treatment for that as well is to use black peppercorns or the extract from peppers.

Nyck: I love the peppercorn terpene, an exciting component. I love that because I love black pepper myself.

I just have a slide in front of me, just randomly here, about an autism patient: "Our child had a 30% improvement with cannabis. We have never had this success with conventional medication. The improvement was apparent to both the special needs teacher and the teacher aid and he got along really well with his cousins at a family outing and had no impulsive outbreaks." I mean, seriously, this is a big movement here in these kind of really serious issues of our time.

Steve: It is interesting, and in those sorts of behavioural conditions, interestingly, the general feeling that you have when you consume cannabis is that everything slows down and everything is kind of more chilled. That is the result of synaptic changes whereby the endocannabinoids are moderating the neurotransmitters which might normally create an excited condition that causes somebody to act impulsively. With the use of medical cannabis, the whole system is just being stabilised and slowed down in the case of things like autism and ADHD.

Dr. Steven Booth: And what an improvement in the quality of life, not just for the patient, but everyone around as well.

Nyck: Someone has also just written in about impairment, and this is a good point: "We can learn a lot from impairment approaches that are implemented by the US and Colorado police." We'll have to look into that; thanks for that. No doubt they are a lot further along than we are.

Nyck: You're tuned to *Future Sense* with myself, Nyck Jeanes, Steve McDonald, and our special guest, Dr Steven Booth. We're in the last few moments, talking today about medicinal cannabis. One other text has come in; a very important question, too: "Tuning in late so maybe you've covered it, but what about youth brain being damaged by THC? Also that youth will likely take too much. With a child, this is my concern." Good question.

Steve: Yes, what I'm going to do is just read from some slides that were presented by Dr. Donald Abrams, who's a Professor of Clinical Medicine at the *University of California, San Francisco*, and certainly from a developmental psychology point of view—a Gravesian point of view—it is fair to say that during those teenage developmental years, it is predictable that both males and females will have difficulty moderating behaviours because that moderation capacity comes from the final development of the frontal lobes, which doesn't usually occur until into the 20s, so it's normal for kids to be overdoing things and not know when to stop and not think about cause-and-effect. Certainly they need guidance around that, there's no doubt.

Dr. Steven Booth: Just on that question, it sounded like it might have been about recreational use as well, not medicinal use, and a lot of personal use is for even very young children who might have epilepsy.

Steve: That's right, and you also have to distinguish between the potential biological impact, in terms of impact on the biological functioning, versus social impact. If somebody's smoking weed, then they're probably just going to feel like sitting around and relaxing, right? They're not going to be rushing out and being too social. That's a behavioural issue, it's not retardation of development issue, necessarily.

A few quick facts from slides here in the last few moments of the show. A lot of the science was presented in the context of there being really limited evidence for a lot of the common arguments which are put out there in terms of damage to development and those sorts of things, and science being science, true science is never finished—science is always an open question—and all we can say is, okay, right at the moment, the evidence that we have so far is that there's limited evidence; there's not much evidence at all to support some of these ideas. In the area of prenatal, perinatal and neonatal outcomes, smoking cannabis during pregnancy is linked to lower birth weight in the infant—usually that birth weight is recovered quite quickly after birth—and the relationship between smoking cannabis during pregnancy and other pregnancy and childhood outcomes is unclear. In other words, there's no clear evidence.

Nyck: There was a study from Jamaica, I think, with 12,000 pregnant women, that looked at this and, as you said, reported a smaller birth weight, but that was caught up within, I think, three months. The interesting thing is, longer-term, those children whose mothers had smoked cannabis during pregnancy tended to have a slightly higher IQ later on in life, so that's rather, sort of contraindication to that.

Don't jump out and start smoking though, just on that.

Dr. Steven Booth: Some of the systematic reviews had to exclude some of that data because the person overseeing it, the supervisor, said that they were 'earth mothers'—you couldn't count those mothers because they're not the average population.

Nyck: Oh, earth mothers. God bless them.

Steve: Quickly back to my list of things—psychosocial stuff:

- Recent cannabis use impairs the performance in cognitive domains of learning, memory and attention—I think we all probably have a general idea that that happens. Recent use may be defined as cannabis use within 24 hours, and of course, that's not a lasting effect, it's just a temporary effect.
- A limited number of studies suggest there are impairments in cognitive domains of learning, memory and attention in individuals who have stopped smoking cannabis, so that's kind of interesting. I guess the thing here is don't stop smoking cannabis.

- Cannabis use during adolescence is related to impairments in subsequent academic achievement and education, employment and outcome, and social relationships and social roles. Again, I'd suggest that they are probably behavioural issues that result from the impact of being high, in terms of not wanting, not bothering to study, not wanting to sit and focus and those sorts of things, if you're high.

Dr. Steven Booth: That's also a reason why some people use it, is to improve their studying, improve their capacity and lateral thinking, or movement ability. I know people go to the gym using it.

Steve: Absolutely, and we know and we talk regularly on the show about the usefulness of altered states in terms of bringing different perspectives.

- Mental health—there is substantial evidence of a statistical association between cannabis use and the development of schizophrenia or other psychoses, with the highest risk amongst the most frequent users. As we said before, they did make the point at the conference that this is related to some kind of pre-existing but not evident condition in the individual, and the fact that the cannabis use can make it come out. So they're not saying that it's creating these conditions in people, but just that it's likely to make it emerge if it hasn't emerged yet.

How are we going for time, Nyck?

Nyck: That's it, really.

Steve: Ah, so much material.

Nyck: But we'll post a lot of these things on our *Twitter* account @futuresenseshow, and various other places. You'll be able to listen to the podcast in a couple of days too, but lots more to talk about. We are, no doubt, not finished talking about this subject in the future anyway.

Steve: I'm sure we'll mention it again.

Nyck: Yes, we will. Thanks very much, Steve McDonald, and our special guest, Steven Booth.

Dr. Steven Booth: Thanks for having me back.

Nyck: Any time at all, my friend. Any time at all. We'll see you soon. See you next week. Bye bye.

Steve: Cheers.

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