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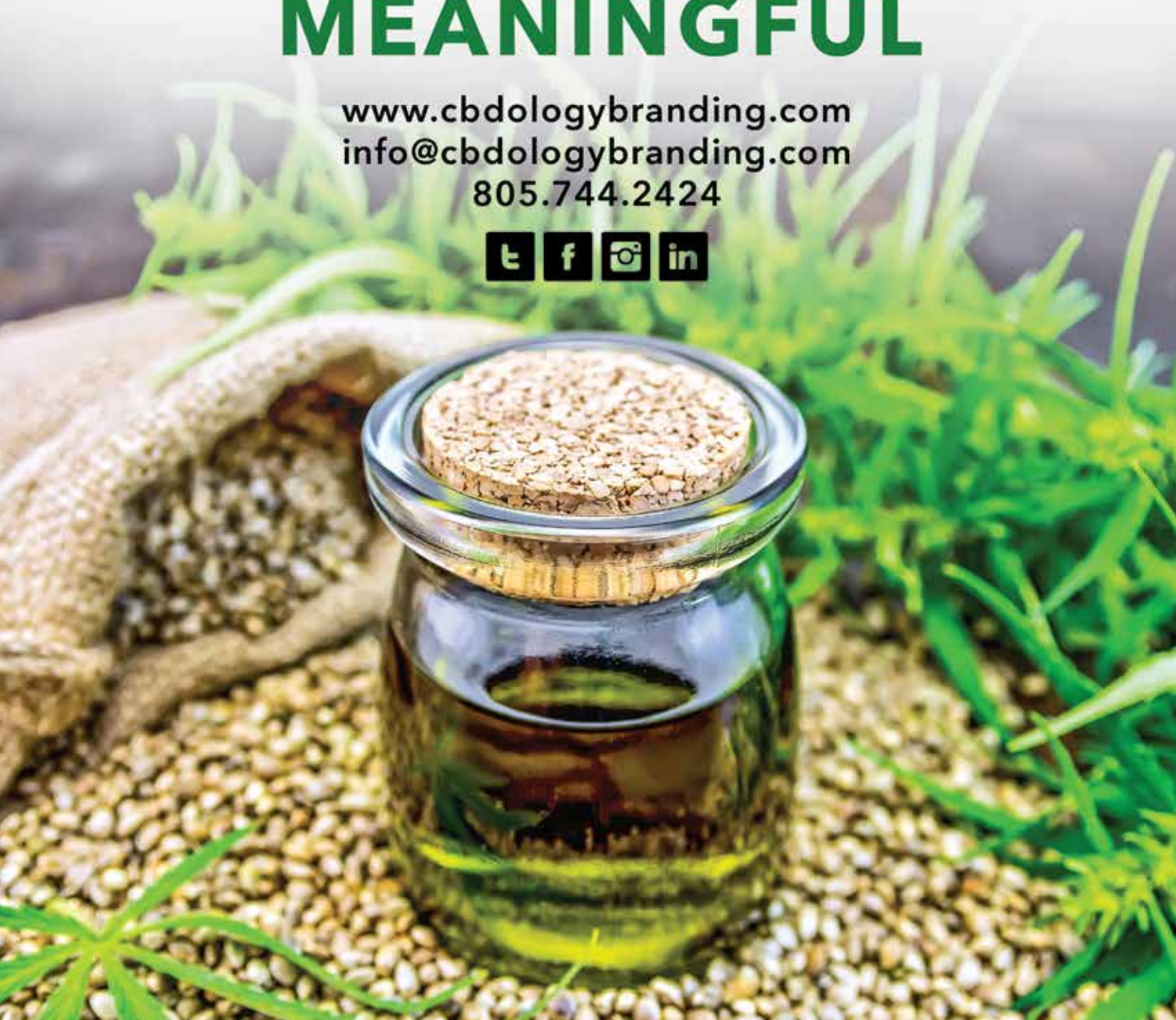
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Letter from the Team

Welcome to CBD Health and Wellness! We are so excited to unveil this first issue of what we believe will be one of the best reads arounds.

Our intent at CBD Health and Wellness is to uncover, research and inform the consumer, manufacturers and medical professionals not only about CBD but also the other cannabinoids used by our endocannabinoid system. We are passionate about what we do. We intend to tell both sides, good and bad, of what has been called “the next wonder drug”. Is it? Well, we don’t know just yet, but we plan to find out and we invite you on the journey with us.

What we can tell you is that we have first-hand experience with what CBD has done for people who suffer from MS, RA, anxiety, sleep disorders and more within our own crew here. That was enough to

make us believe in it and want to bring this publication to life.

If you are reading this at the unveiling location of CBD Expo West in Anaheim, we thank you for attending. We are working hard to make the CBD Expo Tour an informative one. If you are reading it at a physician’s office or anywhere else, please thank them for being a partner willing to help disseminate education. If you received it in your mailbox, then grab a cup of tea, kick back and relax.

CBD Health and Wellness is a bi-monthly publication of MACE Media Group, a company dedicated to publishing great content in the scientific and medicinal cannabis arena. This is what we do. It’s what we get up every day for. We hope you enjoy it.

The CBDH&W Team



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CBD Health & Wellness is a brand-new magazine focusing exclusively on the sale, production, and research of CBD and other cannabinoids. It is a MACE Media Group subsidiary and sister publication to the hugely successful Terpenes and Testing, Extraction Magazine, and Cannabis Packaging News. CBD Health & Wellness Magazine reflects the evolution of method, mind, and matter intrinsic to these industries. Each of these individual segments in the conglomerate of legal cannabis now have a voice through this dynamic publication.

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Doing Your Duty

Protecting Consumers by
Sourcing Ingredients from
Reputable Manufacturers.

Goal: Raising an awareness

You are a forward-thinking business owner who sees the potential in the pharmaceutical and cannabis industries joining forces. You've ventured into this field because your desire to promote wellness aligns with the bounty nature provides. The chemical virtues of the little cannabis plant helps fulfill that vision. You sympathize with a few outstanding needs of this world and want to use your hands to formulate solutions. Your experience so far in the world has placed certain tools in your hands and paradigms in your mind.

All of which amounts to a eureka moment: "I can help the world with a cannabis-based solution." The next step is to execute a plan from the concept stage to prototype [R&D] to final production. The R&D and production phases are dependent upon selecting what you consider to be the best ingredients and techniques—something cutting-edge in this forward-thinking market.



Do you ever wonder, however, what's the story behind your ingredients, such as carrier oils, fragrances, or phytonutrients? Your conception of ingredient sourcing may be similar to what's detailed in Figure 1. What characterizes the journey your ingredients took before they became a part of your prototype? Did that journey begin with ethical sourcing? Did it proceed with established policies and procedures (e.g. cGMP, ISO, ICH)? Did that journey get certified for reproducibility, traceability, change control, possible deviations, or CAPA (corrective and preventive action)? Did that journey conclude





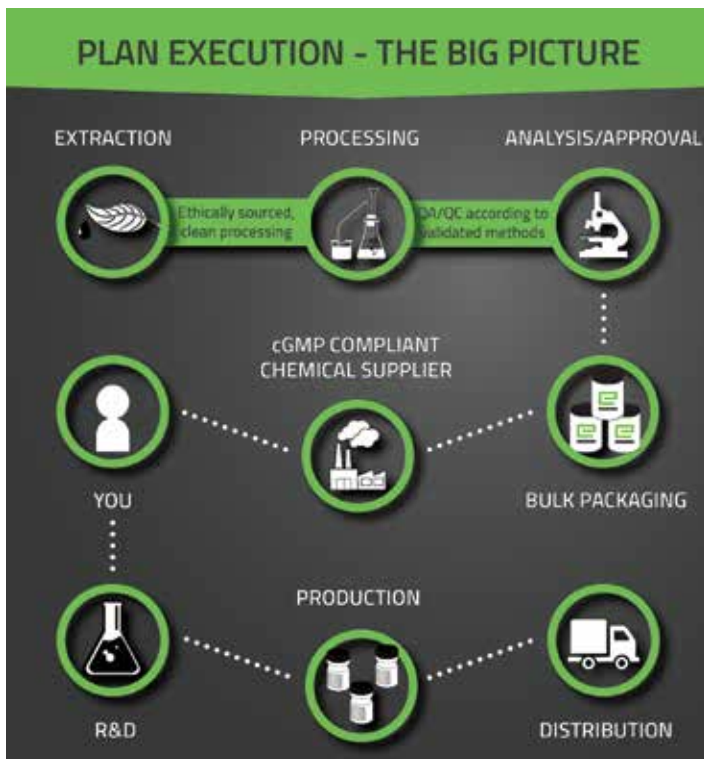
with analytical scrutiny before finally passing on to your hands?

A manufacturer must demonstrate control and reproducibility over their entire process, especially when dealing with something considered an active ingredient. Analysis at the final stage is the only way to truly verify composition of process success. Visual inspections alone can never substantiate molecular specifications. The laws of physics let us know that no process is perfect; there will always be systematic (e.g. machinery) and random (e.g. human) errors.

The questions listed above lay the foundation for vendor qualification. Vendor qualification is a two-pronged compliance effort to assess 1) a prospective manufacturer's ability to proficiently provide your ingredient, and 2) the journey that ingredient takes before it arrives at your doorstep. We bring up all these questions because, as a manufacturer of medicinal cannabis products, protecting the consumer is your #1 duty. Protecting your customer—via a quality management system (QMS)—must mandate your entire business practice.

By engaging in business for a cannabis-based wellness product, you've been entrusted with being a steward of your customer's health. Both ingested and topical products of this category have potential to harm when wrongfully applied. If you fail to protect your customers, then your business has failed. Regardless of FDA affiliation, the FD&C Act has granted the governance of ALL food, drugs, and cosmetics to the FDA. Therefore, taking proactive steps to qualify your vendors ensures that your wellness products maintain the standards of care expected of pharmaceutical manufacturers by the FDA. A worst-case scenario, nightmare situation for any product manufacturer would be having to issue a recall due to an adverse event or any substantial deviation from reported dosage which puts patients at risk.

Let's look at a typical tincture, normally comprised of a phytocannabinoid source, carrier oil, and sometimes additional nutraceuticals and terpenes. The production process might include weighing out ingredients, heating, stirring, and pouring into containers. Each of the above ingredients and steps represent a possible point of failure—that's a total of eight variables in this example. Where one failure might have been manageable, a multiplicity of deviations can arise in a worst-case scenario, leading to the necessity of a product recall. Take a look at Figure 2 for a more comprehensive depiction of your ingredient's journey.



Production and handling variables aside, do you have comprehensive support for your ingredients that would streamline a recall effort and ensuing quality investigation? You know the phrase “An ounce of prevention is worth a pound of cure”? Well in this case, “One thousand dollars of foresight is worth \$1 million of damage control.”

This is where a reputable manufacturer distinguishes themselves. Each new concept that comes to a chemical supply company presents an opportunity for them to help your vision come to life. A relationship with a customer like yourself should start even before you order ingredients and continue after your product has been formulated and distributed. A trustworthy supplier works on the customer’s behalf to protect their operations, and ultimately consumers, by proactively scouting and qualifying vendors who distribute the individual reagents required to assemble the final product.

Working with a reputable chemical supply company can be more expensive than buying the cheapest available reagents from a publicly available marketplace yourself. But a supply company worth its salt will pay off in the long run many times over the difference in price. From ensuring the ingredients are sourced only from the highest-quality, most environmentally-friendly places, to in-house lab testing that confirms the integrity of the results, to logistical and—if it comes down to it—recall support, a good chemical supply company does it all. Establishing a trusting relationship with one may be the only thing standing between you and the next level in your business.

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5 Potential Benefits of CBD for Athletes

By Brock Cannon

It was bad. Really bad. After running twelve of the tallest peaks in the Wasatch Mountains in Utah, my body was hurting. The inflammation in my knees, my back, my feet—it was all painful. What are most of us taught to do when we are in pain? Ibuprofen in any of its pill forms. Yet, just taking two pills didn't seem to do the trick with the torture I was putting my body through. At one point in the summer of 2016, I was taking twelve ibuprofens per day. The outcome of my liver would eventually be revealed in dire fashion, so I began opening up to other forms of pain relief.

Growing up very conservative in Utah, I didn't know much about cannabis or hemp in any of its forms other than that I was supposed to “stay away” from it. The research began, and I was blown away by the number of individuals who were experiencing real life pain relief from using this medication.



I began taking cannabis in edible and oil forms post-runs only to see if it would aid with my recovery. The results were astonishing, and in less than one week I weaned myself entirely off of ibuprofen.

Now, two years later, as an ultramarathon runner, cannabis and particularly CBD oil is a part of my daily regime. I take a small dose each morning to reduce the aches and pain in my knees and swollen muscles, and at night after longer runs (anything over two hours typically) I take a second dose of oil. We all have different needs depending on our body type, sport of choice, duration and exertion levels, but I'd like to highlight just a handful of the major benefits that athletes have reported to experience from CBD consumption.

1. Faster Recovery Time

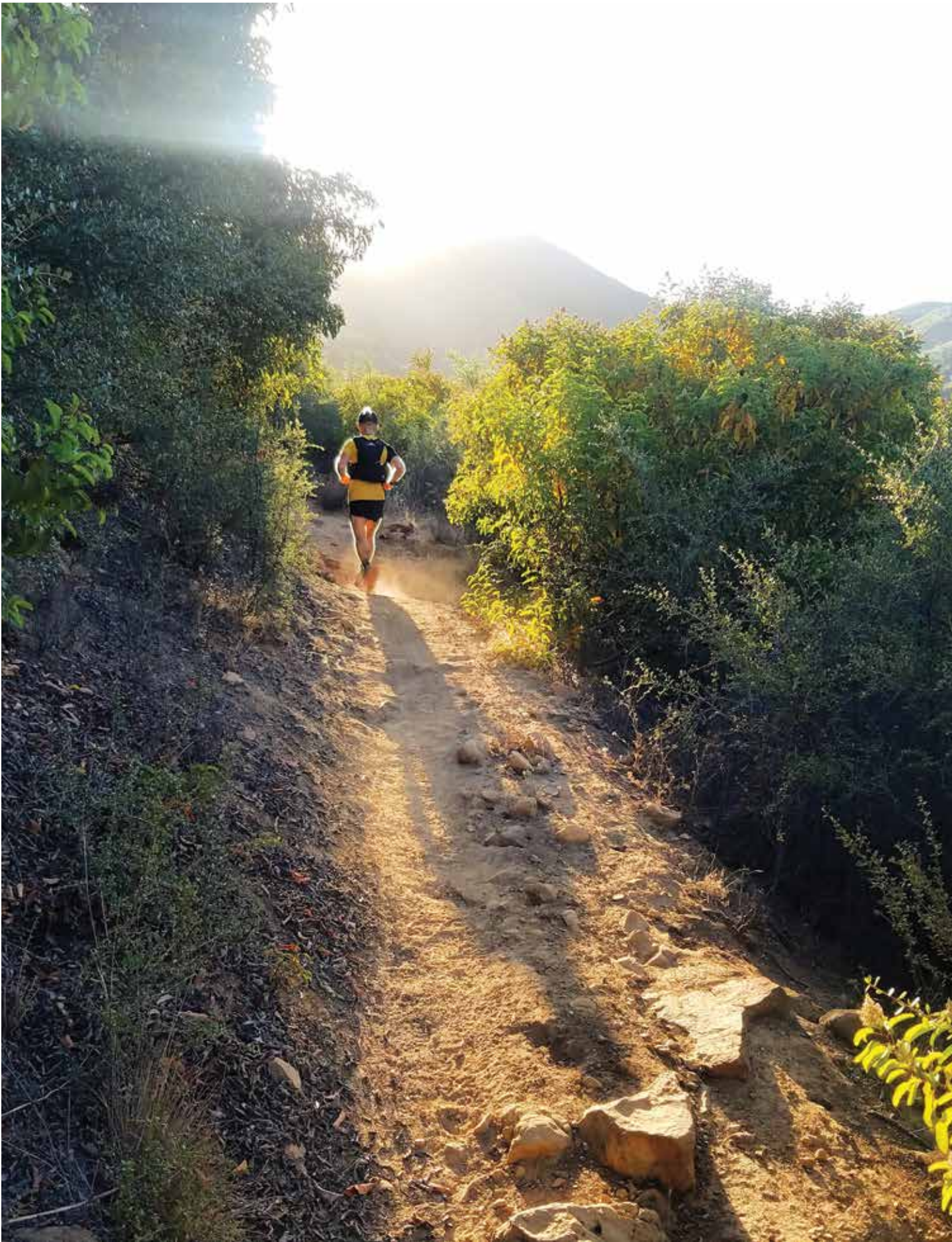
As athletes, we know that if we can recover more quickly, we can get back to training quicker to continue to build our endurance, strength, and muscles. CBD has been reported to help athletes recover more quickly from injuries and between workouts. While limited human studies have been completed on the recovery effects of athlete's muscle inflammation specifically, there is research that is promising [1].

2. Better Sleep

Better sleep affects nearly all areas of our lives, but for athletes who lie down at night and feel like their legs are still moving from the day's activity, they may particularly benefit from CBD and its calming effect. CBD may aid athletes in calming down and sleeping better. Many athletes are reporting waking up more refreshed than ever and without the aches and pains previously experienced when regularly dosing CBD.

3. Less Anxiety Around Performance

Game day jitters. Pre-race nerves. Most athletes have reported some type of nerves around competition and even difficult training sessions. CBD has been reported to calm nerves and reduce anxiety [2].





4. Increased Appetite and Less Nausea

CBD is given to cancer patients to increase their appetite and reduce the nausea brought on by chemotherapy. It may help athletes in similar ways. Cannabis has long been known to give people ‘the munchies,’ and when athletes report feeling sick to their stomachs or being “not hungry” when they have had a high impact workout, CBD may aid in helping them regain their appetite and keeping down their food [3].

5. Immune Support

Many athletes supplement their diets with immune-boosting aids such as Vitamin C, Lysine, and Zinc, but CBD may be an additional booster that athletes should consider in helping keep sickness at bay. Overtraining is a common concern among top athletes, and CBD may be one way to help keep the body and immune system strong while continuing to train hard [4]. As always, be sure to consult with your doctor before adding anything new to your regimen, and start small with your dosage to see how your body feels. It’s best to add CBD to your training routine long before taking it prior to a race, game, or competition; listen to your body and see how it reacts.

Organizations like the World Anti-Doping Agency (WADA) are making exceptions for CBD use in sport, and it’s very possible other sports organizations will follow suit. There are hundreds of testimonials and personal accounts of athletes having fantastic results with CBD use, and hopefully as legislation and law turns more favorably towards cannabis in general, we will see more human studies that scientifically demonstrate that same effect. It’s a very exciting time to be a cannabis athlete!

Brock Cannon is a former elite mountain bike racer turned ultra-marathon runner and the co-founder Prevail Botanicals. Brock is a vocal advocate of responsible cannabis use for athletes and is founder of the social group The Cannabis Athlete. He resides in Santa Barbara, CA.

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FDA and Clinical Trials

By Lauren Hylle

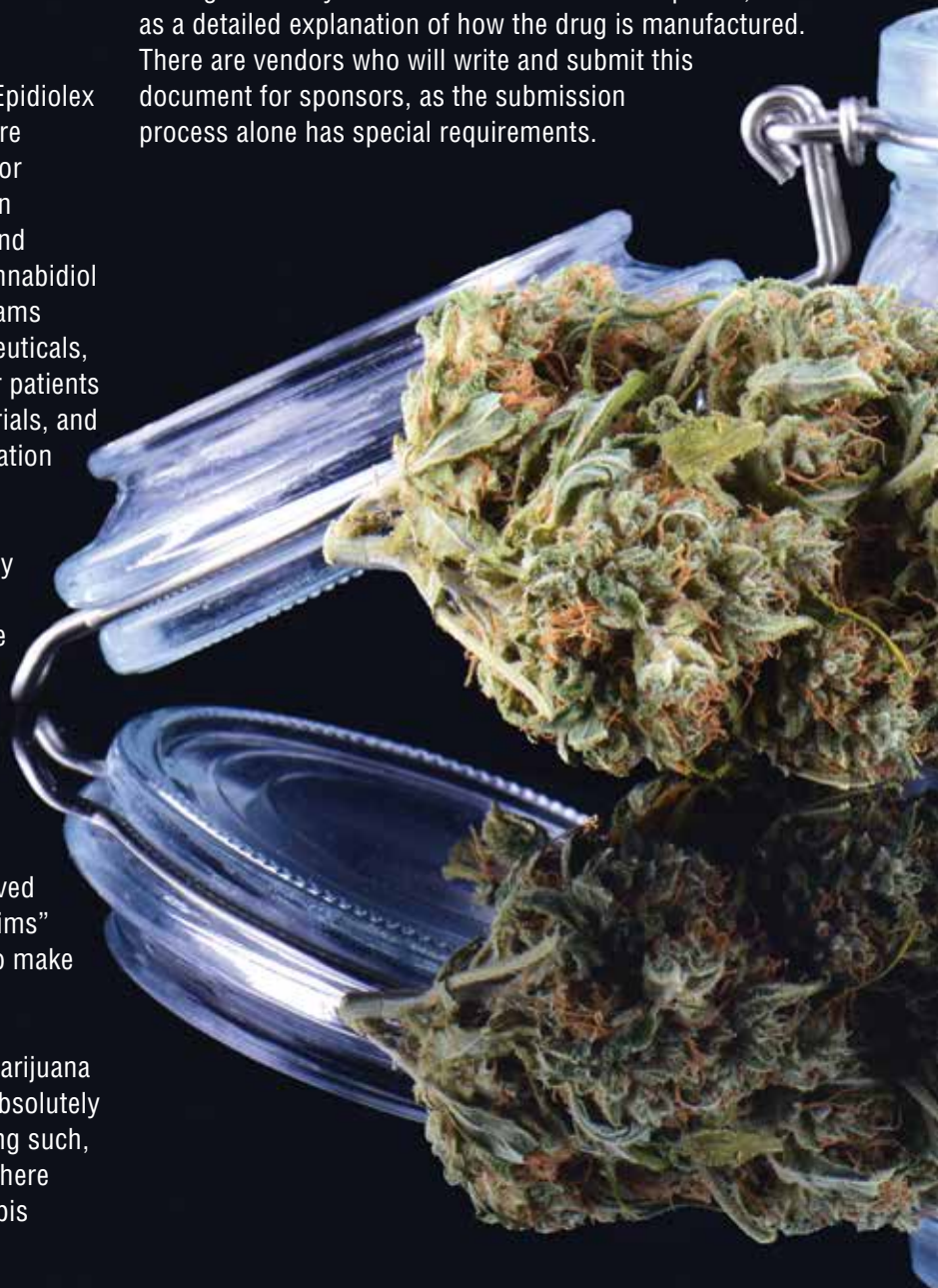
The path to approval for new drugs by the FDA has never been simple or easy. Cannabidiol, as a derivative of marijuana, faces a particularly challenging path forward. FDA approval of Epidiolex by Greenwich Bioscience, a subsidiary of English pharmaceutical GW Pharmaceuticals, serves as a beacon of hope beyond the challenges presented by the FDA, DEA and NIH. FDA commissioner Scott Gottlieb released a statement to that effect on June 25th of this year.

Gottlieb made a point of acknowledging the impact Epidiolex would have on the lives of patients suffering from rare and severe forms of epilepsy, and opened the door for the potential approval of various cannabidiol forms in other indications. He highlighted that clinical trials and pharmaceutical development programs involving cannabidiol can take advantage of the same FDA “benefit” programs available to those developing conventional pharmaceuticals, including approval of expanded access programs for patients in severe need who do not qualify for open clinical trials, and the accelerated approval and “breakthrough” designation processes.

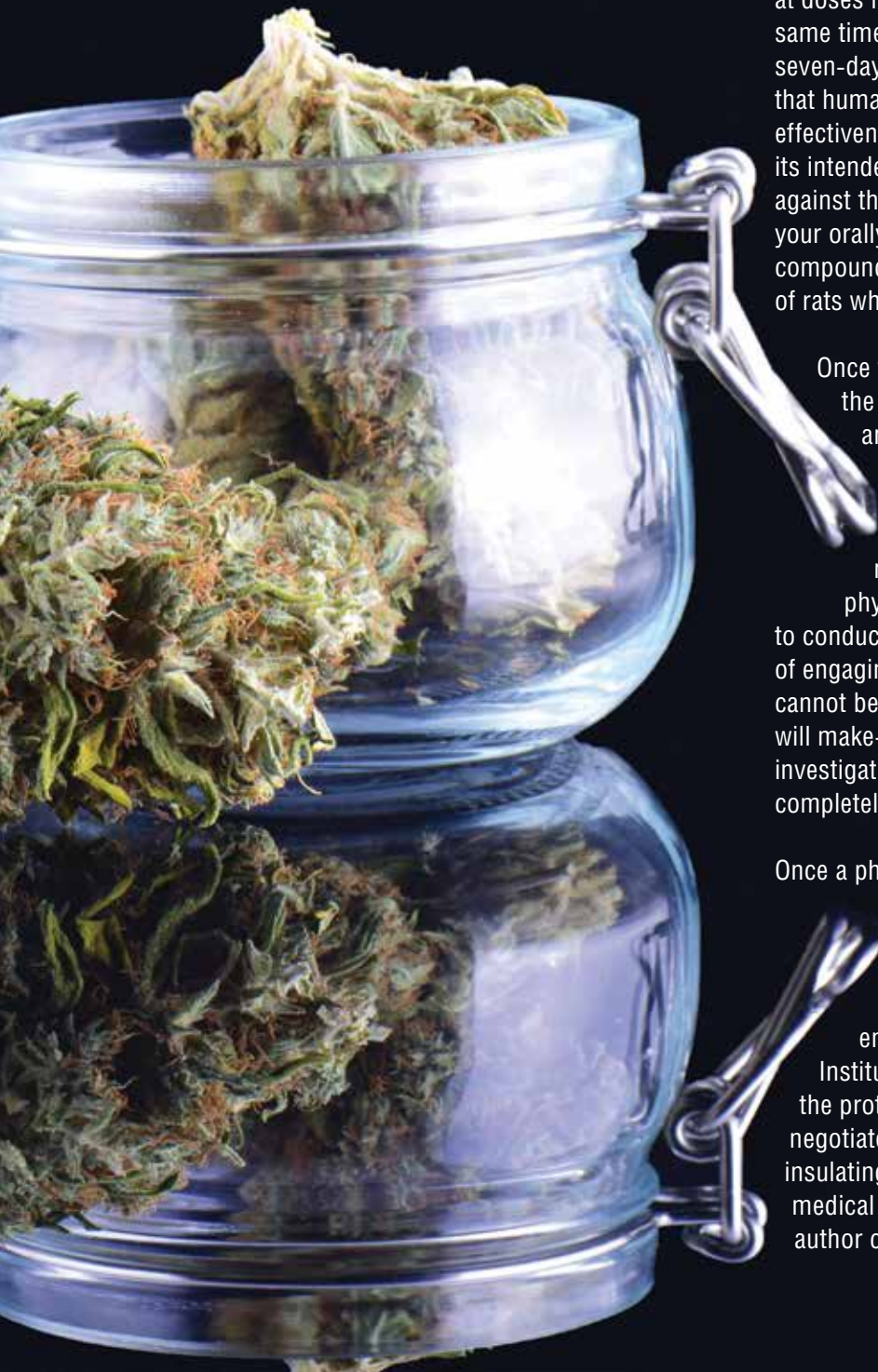
While many of us in the medical cannabis community celebrated the approval, some took note of the shot across the bow FDA made with that statement. While Gottlieb extended this invitation to participate in the drug approval process, he made very clear that marijuana derivatives must be held to the same standards of any other drug when statements of effectiveness are made, particularly in the treatment of serious and life-threatening diseases. He made special mention of the “illegal marketing of unapproved CBD-containing products with unproven medical claims” and the FDA’s recent actions against companies who make such claims.

The bottom line is that the FDA wants the medical marijuana community to play by the FDA’s rules and they are absolutely willing to come after those who do not. By demanding such, they’ve initiated the normalization of medical CBD. There is little doubt that they expect other medical cannabis endeavors to follow suit.

The road to FDA approval is arduous, but the way forward is clear: clinical research. In order to conduct a clinical trial, the sponsor must file an Investigative New Drug (IND) application with the FDA along with a clinically and statistically sound protocol. An IND is a massive document outlining the rationale for pursuing approval, the preclinical findings of safety and effectiveness of the compound, as well as a detailed explanation of how the drug is manufactured. There are vendors who will write and submit this document for sponsors, as the submission process alone has special requirements.



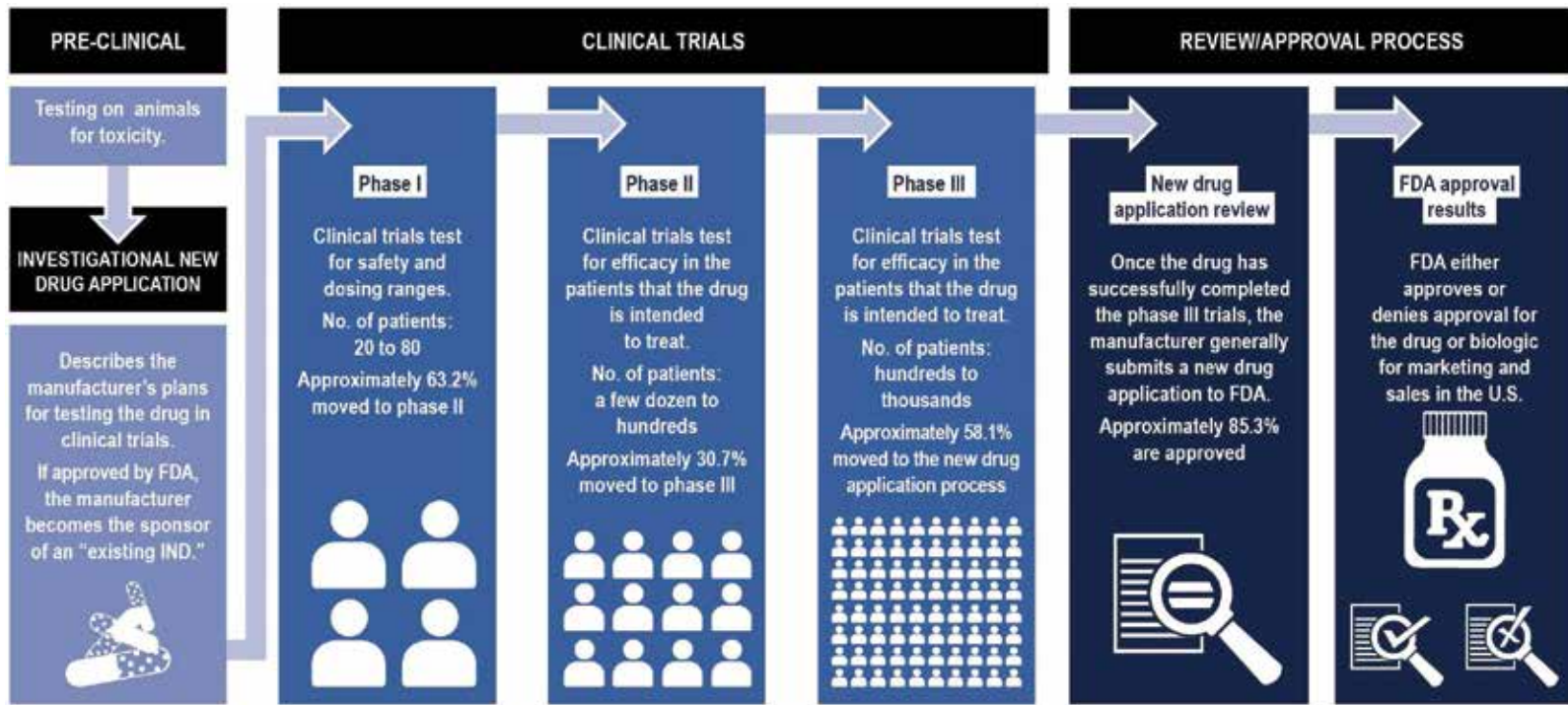
FDA APPROVED



Preclinical safety and effectiveness is the keystone for an IND. It involves conducting animal studies showing that the compound you intend to use does not harm the animals at doses higher than the intended human dose over the same time period. Showing the compound is not toxic in a seven-day dose administration will not convince the FDA that humans could use the drug for a month. The study of effectiveness needs to show the FDA that the compound, in its intended administration, confers a measurable benefit against the index disease. For instance, if the claim is that your orally administered compound is a cancer treatment, the compound would need to significantly reduce the tumor size of rats when given orally.

Once the FDA approves an IND, the race is on to get the drug into clinical trials. This involves agreements among the sponsor organization and physician investigators and their employers. For early trials, investigators should be opinion leaders in their fields. This translates to partnering with academic medical centers, as these institutions employ physicians with the technical and scientific knowledge to conduct high-stakes studies in humans. The importance of engaging qualified, experienced, enthusiastic investigators cannot be overstated. Engaging the right investigators will make-or-break a clinical trial; choosing the wrong investigators could destroy the chances of FDA approval completely and forever.

Once a physician investigator has voiced an interest, their employer must be engaged to approve the trial. Often, this step proves the most time consuming and frustrating in study start-up. For these institutions, conducting an external entity's protocol comes with great expense and risk. Institutions convene scientific review boards to evaluate the protocol for merit, while their clinical research office negotiates the contract and budget, all with the intent of insulating the institution from litigation and expense. Some medical centers retain attorneys who solely review and author clinical trial agreements.



Source: GAO analysis of FDA data and a 2016 collaborative study by Biotechnology Innovation Organization, Biomedtracker, and Amplion.* | GAO-17-564

The institution's evaluation of risk is multilayered. Once a scientific review board approves the protocol, it is sent to a more formal committee for review: the Institutional Review Board (IRB). This internationally-recognized and federally-required review is the offspring of deliberate scrutiny resulting from atrocities committed during World War II in the name of science. The IRB is comprised of subject matter experts, lay-people from the community, and other physicians and researchers. It must evaluate each protocol as well as every piece of material that the subjects see. This regulatory body is tasked with ensuring that studies conducted at their institutions are safe, honest with the patients, and as minimally invasive as possible.

Once the necessary agreements and approvals are in place and investigators are enrolling patients, the clinical trial takes on a life of its own. The protocol becomes a living document, that can change as the challenges of its implementation come to light. Changing the protocol requires approval by the FDA and the IRBs, which requires management resources. Additionally, the data collected must be monitored to ensure that it's accurate: poor data will serve a deathblow to any promising compound. What's more, if a clinical trial subject is hospitalized or dies, these events must be reported to the sponsor and the IRB. Also, the FDA expects annual reports on the safety of the compound as evaluated by the trial. The work involved in running a clinical trial clearly requires a whole team of experienced, detail-oriented people.

The journey to FDA approval is not for the faint of heart. But resources exist to smooth the way. So-called 'Tox' houses

will design and perform animal studies in the preclinical stages. Vendors exist to write and submit INDs. Contract research organizations, or CROs, will manage each step of the clinical trial process. The entire process from treatment concept to patient enrolment comes with considerable expense. Pharmaceutical companies cite the total capital investment that goes into each of these steps as their key justification for exorbitant drug pricing.

GW Pharmaceuticals believed in their compound and confronted the challenge of FDA approval head on. The approval of Epidiolex has shown the medical cannabis community that CBD compounds can be approved by the FDA, and Scott Gottlieb has invited us to play. Rising to meet the challenge is beset with its own set of challenges, but as GW showed us, it can be done. By securing funding and engaging in the clinical trials process, companies will be able to get their CBD compounds to the patients who need them most. I look forward to the advances in treatment that cannabinoids will bring.

Lauren Hylle has been involved in clinical research for the past 10 years, serving as a research coordinator for multiple sites, Clinical Research Manager for Dignity Health, and now a consultant for an oncology drug development company. She recognizes the medical potential of cannabis and is honored to serve the medical cannabis community.

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Cannabinoids, CBD, and Pain Management

By Kristy Redmon, R.Ph.

Chronic pain affects as many as 1.5 billion people around the world every day. This includes over 100 million patients in the US alone. The total cost of medical care and loss of productivity in the US due to pain is estimated to be as high as \$635 billion annually [1]. While pain is one of the primary reasons people see their healthcare providers [2], only 49% of chronic pain sufferers feel they have control over their pain [1]. These numbers reflect the scope of this issue as well as the challenges healthcare providers face when treating pain.

As the legalization of medical cannabis spreads across the nation and CBD goes mainstream, both consumers and clinicians are curious to know if cannabinoid pharmacotherapy is a viable treatment option. Studies indicate that cannabinoids are definitively involved in pain modulation and could play a significant role in managing nociceptive, neuropathic, and inflammatory pain conditions in the future.

Cannabinoids and Pain Modulation

The endocannabinoid system (ECS) is a physiological neurotransmitter system that helps the body maintain homeostasis. The ECS consists of protein receptors, called cannabinoid receptors, that regulate many of the body's physiological processes when activated by either endogenous or exogenous compounds, known as cannabinoids [3].

The body's own endogenous cannabinoids, anandamide (AEA) and 2-arachidonoylglycerol (2-AG), are also known as endocannabinoids. Compounds such as THC and CBD are derived from Cannabis sativa plants and are called phytocannabinoids. Cannabinoids exert an effect on the body's two main cannabinoid receptors, CB1 and CB2, leading to the direct reduction of pain, the modulation of pain signals, and the lessening of inflammatory processes. Cannabinoids have been found to act at additional receptor and non-receptor sites to reduce pain and inflammation as well [3].

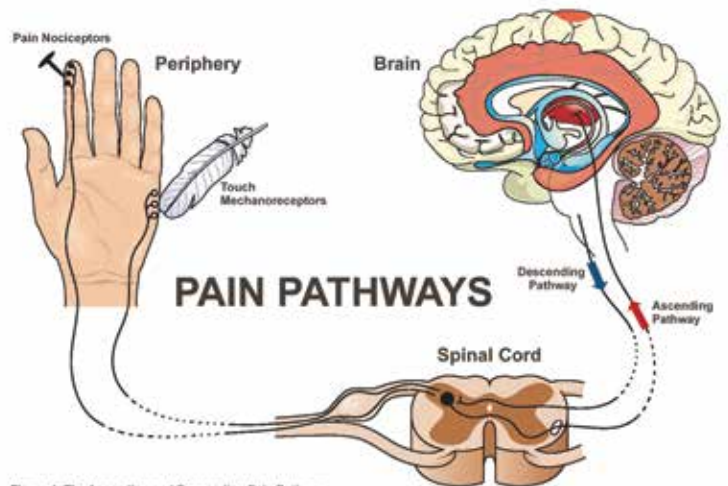


Figure 1. The Ascending and Descending Pain Pathways

CB1 Receptors- CB1 receptors are located primarily on neurons in the brain but are also found in the spinal cord, peripheral nervous system, and some non-neuronal tissue. Many of the CB1 receptor locations in both the central and peripheral nervous systems are expressed in areas known as pain pathways (Figure 1) where they participate in receiving, processing, and modulation of pain signals. It is believed that the primary function of activated CB1 receptors is to reduce neuronal cell hyperexcitability causing a decrease in neurotransmitter release which results in reduced pain perception and inflammation [4].

CB2 Receptors- CB2 receptors are situated predominantly on cells in the immune system but are also in the brain, spinal cord, intestinal tract, and skin cells. CB2 receptor activation leads to the inhibition of pro-inflammatory signaling molecules induced by immune cells, neurons, and microglial cells when there is tissue injury, chronic inflammation, or nerve damage. This inhibition results in a reduction of pain sensitivity and pain perception as well as a reduction in inflammation [5]. The activation of CB2 receptors also stimulates the release of the body's own endorphins which then act on opioid receptors to reduce pain [6].

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TRPV1 Receptors- TRPV1 receptors (Vanilloid receptors) are part of a class of ion channels found in both the central and peripheral nervous systems. These receptors are concentrated along the pain pathways and are known to mediate inflammation and pain perception as well as regulate body temperature. It is theorized that CBD, like capsaicin, activates the TRPV1 receptor causing its desensitization. This is followed by a reduction in inflammatory mediator release leading to a decrease in pain perception and inflammation [7].

Opioid Receptors- Cannabinoid and opioid receptors reside near each other along the pain pathways and are often located on the same neurons. While their mechanisms for anti-nociception are different, animal models show that they enhance each other's activity. When low doses of opioids and cannabinoids are given together, they are effective for decreasing pain, yet when these low doses are given separately, no reduction in pain is noted [6].

Endocannabinoid Enhancement- CBD enhances the body's own endocannabinoid signaling system by inhibiting the reuptake and decelerating the breakdown of anandamide at the cellular level. Anandamide then activates CB1 and CB2 receptors leading to reduced pain perception and inflammation [7,8].

CBD Products and Pain

CBD specifically has been shown to modulate a number of processes involving pain. It amplifies the body's own cannabinoids, enhances THC's activity in treating pain, lessens THC's adverse effects, modulates opioid pain receptors, and regulates inflammation mediators on its own [8]. It has few side effects and an excellent safety profile. With the added benefit of being non-psychoactive, these characteristics make CBD an essential part of cannabinoid pharmacotherapy for the management of pain.

THC and CBD products in a 1:1 ratio have been shown in studies to be the most effective combination for the treatment of pain [8]. For this reason, a product containing





equal amounts of THC and CBD might be considered the preferred therapeutic option in states where cannabis is legal.

CBD dominant products contain primarily CBD with very low amounts of THC. These preparations may be a good choice when a non-psychoactive product is preferred or if the patient lives in a state where medical cannabis isn't legal. CBD dominant products are also an ideal place to start if the patient has never used THC before and will be titrating up to a 1:1 THC/CBD product in the future.

CBD single-molecule products contain no THC. While studies demonstrate that whole plant extracts work better than single molecule products alone [9], there may be specific situations where CBD isolate products are necessary. For example, some pain management programs may require abstinence from THC based products or workplace drug screens may be required.

Cannabinoids present a very exciting addition to the clinician's toolbox when it comes to pain management because one cannabinoid-based product has the potential to replace or reduce pharmaceuticals across several drug classes. Using fewer prescription drugs or lowering medication dosages could decrease side effects, reduce drug interactions, lessen the risk of opioid dependence, and perhaps, provide doctors and patients a safer and more effective overall pain management regimen.

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Genetic Editing Will Be the Most Disruptive **Technology** in the **Cannabis Industry**

By Jon Cooper

Cannabis cultivators, processors, and branders need to pay attention. Investors and regulators need to know what is coming.

For millennia, humans have influenced genetic traits in plants through selective breeding. It is seen everywhere: in orchards and vineyards, massive farm fields, backyard gardens—and in the previously underground world of cannabis cultivation.

As the scientific community gains a better understanding about how cannabinoids and terpenes interact with each other and the human body, this will have a profound impact on everything from medical applications to targeted mood enhancement, not to mention the ways cannabis is utilized in food production and manufacturing.

This all ties to plant genetics, which we have been deeply exploring for the past several years at ebbu, a cannabinoid research and biotech company based in Colorado.

What if cannabis plants that grow only a specifically desired cannabinoid could be created, such as CBC or CBG? And what if the yield of these compounds could be increased by a factor of 3x to 10x? It would most likely make many of

people involved rethink the types of products they create, their manufacturing process and their capital outlay on production. In many ways, it could call into question the capital investments already made in this industry overnight.

Pretty soon, CRISPR-Cas9 technology [1] and related genetic editing tools that biotech companies, like ebbu, are utilizing will turn those what-ifs into realities—and it's going to radically alter the way the legal cannabis industry operates.

It's time to imagine a future where we say goodbye to the flower-dominant marketplace. This is a point that most of those in the industry can agree upon. This technology will disrupt all levels of cultivation and manufacturing, and the products available to consumers will be vastly different and highly specific.

When ebbu started down the cannabinoid pharmacologic discovery pathway in 2014, it became apparent to our team of biochemists and plant biologists that in order to make the desired formulations, we needed access to more than just tetrahydrocannabinol (THC) and cannabidiol (CBD). We needed cannabichromene (CBC), cannabigerol (CBG) and other rarer cannabinoids that most cannabis varieties don't



produce at commercial levels or commercial costs. That was a problem alone and we needed to figure out a way to produce cannabinoid-rich plants with specific terpene profiles.

Cross-breeding takes a long time and traditional genetic modification (GM) techniques didn't line up with ebbu's vision for producing natural, safe, plant-based compounds. We needed something that would eliminate concerns around creating a genetically modified organism (GMO), while providing the ability to efficiently and quickly produce designer cannabis varieties.

Jon Cooper is the CEO of ebbu, a multi-platform cannabinoid technology company that is redefining cannabis cultivation, transforming the supply line and designing lab-tested medicinal and adult-use product formulations. ebbu is an industry leader working to elevate cannabis into the mainstream, by solidifying consumer trust through strategic business partnerships that will enable the next generation of sophisticated cannabis companies to become recognizable, trustworthy brands.

Enter CRISPR-Cas9

CRISPR-Cas9 [1] is a powerful genetic editing tool that enables scientists to modify gene function by altering specific DNA sequences without inserting a foreign gene, which is how GMOs are typically produced.

CRISPR, which stands for Clustered Regularly Interspaced Short Palindromic Repeats, and similar systems can be programmed to locate specific stretches of genetic code in any organism and edit DNA at those precise locations. Think of CRISPR as the guide, and Cas-9 as the scissors. CRISPR tells Cas-9 which DNA sequence to target, and Cas-9 creates an opening to tweak the existing DNA sequence. Researchers can use these systems to permanently modify the genes in living cells and organisms, making it possible to correct specific mutations and other undesirable traits.

The difference in the techniques is important. Whereas conventional GM techniques introduce foreign DNA into plants to create new traits, CRISPR tweaks the plants' existing genome by replacing specific DNA sequences with those same sequences from related plants, thus creating a new plant with no identifiable elements of genetic modification.



technology to do things like create plants that only produce specific compounds and specific terpenes. The technology could also be used to create fast-growing, trichome-dense, pest-resistant cannabis plants that produce flowers with longer shelf lives. Or perhaps this technology will be used to create plants suited to grow in different conditions and climates.

Most cannabis products available today focus on THC and CBD, largely because cannabis does not currently produce many other cannabinoids in large enough volumes to be commercially useful. But genetic editing will turn that on its head. It has been predicted that those growing cannabis will be capable of producing four times the volume of cannabinoids like CBN, CBG, CBC and others within 24 months. This will exponentially increase the types of products we will be able to produce for both the medical and adult-use markets.

Already, this technology is prompting us to reevaluate how we do business. As the application of CRISPR technology becomes more widespread in the industry, we will begin to see major shifts in the types of varieties that people are consuming and the types of experiences they can come to expect.

The cost of producing cannabis and cannabinoids will be dramatically reduced through the use of genetic editing technology. This reduction in production costs, combined with market trends toward non-flower products, will quickly call into question the viability of existing cultivation infrastructures and infrastructures currently being built today.

CRISPR and related genetic editing technology will have a greater impact on the cannabis industry than anything that's come before. Within the next five to 10 years, it is suspected that the majority of mainstream cannabis products will be coming from genetically edited plants.

This will be revolutionary.

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This is crucial because the U.S. government has decided not to regulate CRISPR-modified plants that leave no trace of genetic disruption.

CRISPR modification simply acts as a way to speed up the process of selective breeding and therefore is considered a much safer alternative to GM processes. Regarding the regulatory decision, U.S. Department of Agriculture Secretary, Sonny Perdue, said the "USDA seeks to allow innovation when there is no risk present." Crops engineered through genetic editing "could avoid the stigmas surrounding GMOs entirely," according to MIT Technology Review.

A Game-Changer for Cannabis

Until recently, selective cross breeding was the best method for creating cannabis plants with specific desirable traits such as high levels of certain cannabinoids. But this process of cross breeding [3] takes years or perhaps decades before achieving a desirable genotype and stabilizing the genetics.

CRISPR acts like the find-and-replace function on computers. Instead of a long, drawn-out process of selective cross breeding, we are now able to turn on or off the specific traits we want in an existing plant structure. It used to take us many months and considerable resources to go from computer model to plant test. Using CRISPR, it takes just two weeks and costs almost nothing.

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The application of CRISPR technology to cannabis genetics and expression platforms will have a dramatic effect on the industry. Soon, scientists will be able to use genetic editing



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Former NFL Lineman Marvin Washington's Take on Legalized Cannabis

Interview conducted by Tamir E. Bresler and Jason S. Lupoi, Ph.D.

Everyone, by now, knows or should know of the potential physical dangers of playing in the National Football League (NFL). While it's plausible that football is the nation's *real* pastime, what is *known* is that the dangers of the sport to players are real and life-threatening. We may think we know the physical capacity it takes to compete in the NFL and what toll playing takes on players bodies. But, it's doubtful that our speculation reflects the true nature of what a player needs to properly recuperate from a grueling day in the NFL's trenches.

For this article, the publications *Terpenes and Testing and CBD Health & Wellness* collaborated and conducted the first joint interview in either magazine's respective histories. The interviewee was Marvin Washington, a long-time NFL defensive lineman-turned-entrepreneur and cannabis activist. Marvin is involved with Isodiol International, a multi-dimensional company that most recently earned notice for their advancement of the science behind isolating cannabinoids like cannabidiol (CBD) from hops. Marvin is also a member of *Athletes for a Cure*, a group committed to furthering the understanding, diagnosis, and treatment of diseases like Chronic Traumatic Encephalopathy (CTE), which has recently been shown to affect nearly all past NFL players. [1]

But Marvin is not just speaking about or vending cannabinoid-based therapeutics. He is also actively self-medicating with CBD. Like most medications, Marvin takes his CBD every day. He's seen an overall reduction in the aches and pains so prevalent in his daily routine as a result of playing 11 seasons in the NFL. "On a scale of 1 to 10, with CBD, my pain is probably a 3," Marvin explained. Other players—like Mike James, who began using CBD for treating

a concussion—can benefit from reductions in their pain, whether incurred from their training regimen or on the field. "You can't put this genie back in the bottle," Marvin said. "We've got to keep getting the word out." When pointing out that professional athletes have a large soapbox from which to influence the wider American public, Marvin responded that "sports can help lead the way since a lot of people are watching. The NFL needs to realize that players can [use cannabis and] still be responsible."

That last remark could be applied in nearly any situation regarding the removal of the debilitating stereotypes so pervasive in and around the cannabis industry. "Too many people" Marvin opines, "have received their education about cannabis from the propaganda, the *Reefer Madness* days. We're trying to do outreach, not to preach to the choir of like-minded people, but to help spread the word about this wonderful plant." Marvin is also involved with a group of people that have enacted a lawsuit against Attorney General of the United States Jeff Sessions. With the discussion of re-scheduling CBD in light of several recent developments, including the FDA's approval of the CBD-based drug Epidiolex™ by GW Pharmaceuticals, and the upcoming Farm Bill that seeks to legalize the growing of industrial hemp, we were curious as to how any type of legalization might affect their case and cause.

"People need a combination of CBD and THC. So, even if CBD goes federally legal, we'll still fight on."

Ask anyone in the business why they became involved in the cannabis industry and you'll likely hear a compelling personal tale. For most people who are involved, the growth of this industry represents hope for a better quality of life.





“I wanted to be involved when I heard about the patent that the US Government had,” Marvin explained. He is referring to the Patent “Cannabinoids as antioxidants and neuroprotectants,” which was granted to the U.S. Department of Health and Human Services (HHS) in 2003. [2] He had been investigating different prevention supplements that could increase neuroprotection against CTE when he came across the patent. This convinced him that regardless of any demonization that exists, cannabinoid-based therapies could work.

So, for Marvin, CBD-advocacy was a matter of helping fellow teammates and friends achieve a more pain-free, happier lifestyle *after* playing in the NFL. Unfortunately, this advocacy can come at a price, as friends and family must acknowledge that they know someone encouraging and working in the cannabis industry. We asked Marvin about this. Had he endured any backlash from people he knows, the media, or other companies? “Everyone has been very receptive,” Marvin answered. “My friends applaud me. I’m helping my ex-teammates and friends get off of opioids.”

And now, Marvin can hopefully set his sights on helping *current* players. When asked if he foresaw the NFL coming to terms with players actually being permitted to use cannabis, Marvin mentioned that the league is developing a sensible cannabis policy, obviously a historic occurrence in its own right. The recent decision by the World Anti-Doping Agency (WADA) to remove CBD from the Banned Substances List has paved the way for major sports organizations like the NFL to remove restrictions on CBD use for their own current players. [3] With advocates like Marvin Washington leading the march towards sensible legislative reform, there is little doubt that it is only a matter of time until NFL players and the American public at large, can begin treating with, or continue to heal with CBD.

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CBD The Balancing Act

By Lyle Bogorad and Annmarie James

With so many contrarian voices in the media, it is easy to get the actual legality of cannabidiol (CBD) confused. Ever wondered whether CBD is actually legal to sell and distribute nationwide? Why is CBD from medical cannabis programs only legal within state limits, but CBD from hemp seems to be sold online to anyone who wants it? In this legal review, we hope to shed some light on the peculiar current legal state of CBD.

CBD's Legal Ambiguity

A legal conundrum overshadows the reemergence of CBD in the United States, thrusting it into a pivotal point politically, socially and economically. The question becomes whether CBD derived from hemp and/or cannabis is legal. The answer is mired in numerous complexities since any response is contingent upon several factors. Industrial hemp ("hemp") and cannabis (in legal documents, "marihuana") are both of the species *Cannabis sativa*, and are sources of CBD. However, both are statutorily and genetically different, based on numerous factors including their levels of tetrahydrocannabinol (THC).

Generally, CBD is illegal per se and classified as a Schedule I drug. However, under the Controlled Substances Act (CSA) and the 2014 Farm Bill Sec. 7606, exceptions exist. The CSA defines "marihuana" as:

... all parts of the plant *Cannabis sativa L.*, whether growing or not; the seeds thereof; the resin extracted from any part of such plant; and every compound, manufacture, salt, derivative, mixture, or preparation of such plant, its seeds or resin...

The CSA distinguishes the exempt parts of the cannabis plant, which can be grown in states where the law allows them to, by stating that the CSA definition of "marihuana":

... include the mature stalks of such plant, fiber produced from such stalks, oil or cake made from the seeds of such plant, any other compound, manufacture, salt, derivative, mixture, or preparation of such mature stalks (except the resin extracted therefrom), fiber, oil, or cake,

or the sterilized seed of such plant which is incapable of germination. Title 21 U.S.C. sec. 802(d) (16)

Accordingly, products derived from the exempt cannabis materials, including CBD, are not only legal per se, but also outside the DEA's jurisdiction and should not be considered a Schedule 1 drug.

Accordingly, products derived from the exempt parts, including CBD, are legal and not a Schedule 1 drug, and are therefore outside the Drug Enforcement Administrations' (DEA) jurisdiction. Pursuant to the Farm Bill, hemp and its derived products such as CBD are legal if they comply with the statute which defines hemp as:

...the plant *Cannabis Sativa L.* and any part of such plant, whether growing or not, with a delta-9 tetrahydrocannabinol concentration of not more than 0.3 percent on a dry weight basis. [1]

The December 18, 2015 Spending Bill, which essentially prohibits federal funds from interfering with the cultivation of hemp within or outside the State where the hemp was legally cultivated, [2] bolstered the Farm Bill.

CBD's Quest for Unambiguous Legality: HIA v. DEA

Although cannabis-derived and industrial hemp-derived CBD are legal per se, ambiguity surrounding their legality persists. The DEA's Interpretive Rules and the "Marihuana Extract Rule" (MER) are exemplary of the DEA's jurisdictional overreach and raises ambiguity over CBD's legality. The legal battles before the Ninth Circuit Court between Hemp Industries Association (HIA) and the DEA are illustrative.

In *HIA v. DEA II*, petitioners challenged the DEA's October 9, 2001 "Interpretive Rule" classifying hemp-derived CBD products as Schedule 1 drugs and banning the sale or possession of such products even if they contained only non-psychoactive traces of naturally-occurring THC. In this case, the judge drew on the Legislative Intent and opined that "any THC occurring naturally within *Cannabis* is banned only if it falls within the Schedule 1 definition of "marihuana." The judge further stated:



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... Congress knew what it was doing and its intent to exclude non-psychoactive hemp from regulation is entirely clear. The DEA's Final Rules are inconsistent with the unambiguous meaning of the CSA definitions of marijuana and THC, and the DEA did not use the appropriate scheduling procedures to add non-psychoactive hemp to the list of controlled substances. . . The Final Rules therefore may not be enforced with respect to THC that is found within the parts of the Cannabis plants that are excluded from the CSA's definition of "marihuana" or that is not synthetic. [3]

The Court concluded that the DEA had no authority to regulate products that are not Scheduled and permanently enjoined the DEA from regulating non-psychoactive hemp-CBD.

The "Marihuana Extracts Rule"

One would assume that shutting down the "Interpretive Rule" would have been it, but soon after, the DEA's "Marihuana Extracts Rule" (MER) sparked another legal saga between HIA and the recalcitrant DEA, notably, the DEA's December 14, 2016 Final Rule that created drug code number (7350) for "marihuana extract." The MER defined "marihuana extract" as "an extract containing one or more cannabinoids derived from any plant of the genus *Cannabis*, other than the separated resin ... obtained from the plant." [4] It stated that: "... CBD, and all cannabinoids derived from *Cannabis Sativa L.* qualify as "marihuana extract," and require separate, distinct identification and tracking by DEA agents than other forms of 'marihuana.'" Thus, it concluded that "all CBD products are illegal as they constitute 'marihuana' per the Controlled Substances Act and will therefore "continue to be treated as Schedule 1." [5]

Expressly, the MER included "all cannabinoids derived from *Cannabis Sativa L.*," which seemed to be over-broad, especially from the perspective of CBD derived pursuant to the Bill and the CSA's exempt cannabis materials. As a

result, the HIA challenged the MER's definition before the Ninth Circuit Court.

The Office of the Federal Registry supported the DEA, however, and explained that the new drug code for "marihuana extract" was administratively necessary to create uniformity with the provisions of the United Nation Convention on Narcotic Drugs. Essentially this would allow the DEA to track materials separately from "marihuana." [6]

To combat the DEA, HIA reprised the CSA's definitions of legally exempt materials and byproducts of cannabis and further argued the unambiguous parameters of the Bill, even in the event that miniscule amounts of naturally-occurring THC would be present. The HIA raised these salient facts, which caused the DEA to recant its generalized MER definition by issuing a clarification that stated:

The new drug code (7350) established in the Final Rule does not include materials or products that are excluded from the definition of marihuana set forth in the Controlled Substances Act (CSA).

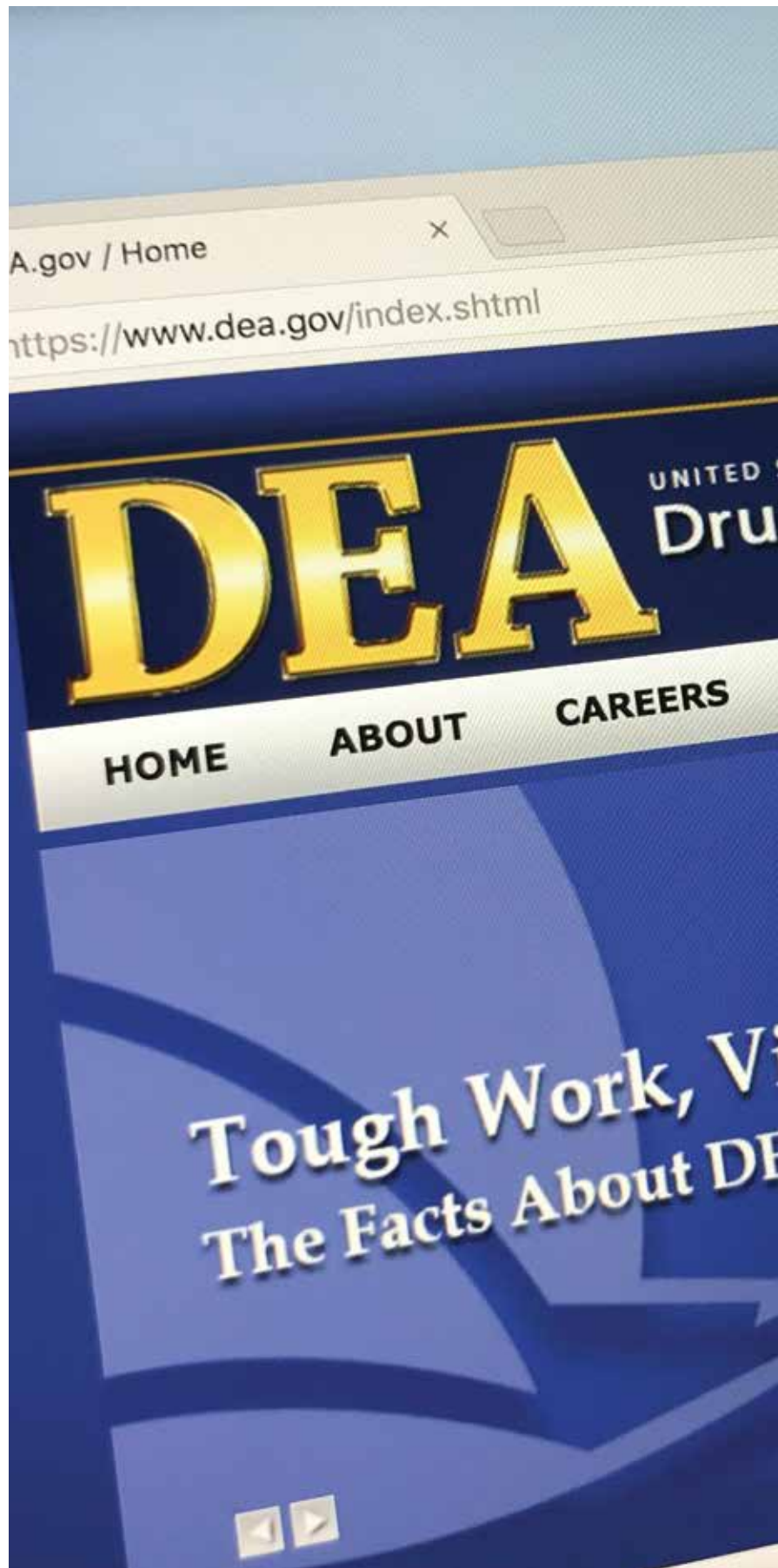
The new drug code includes only those extracts that fall within the CSA definition of marihuana.

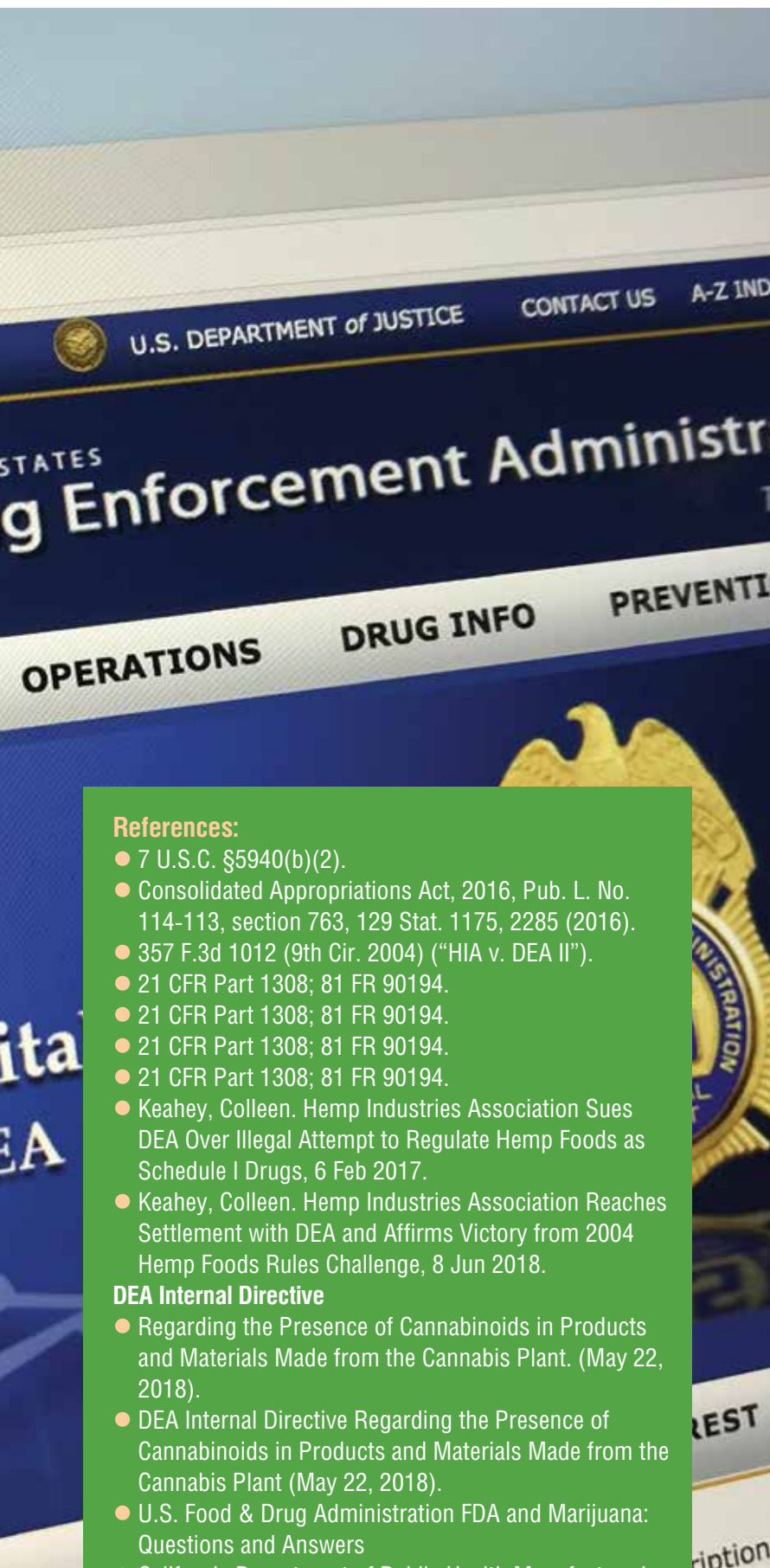
If a product consisted solely of parts of the cannabis plant excluded from the CSA definition of marihuana, such product would not be included in the new drug code (7350) or in the drug code for marihuana (7360). [7]

Undoubtedly, the DEA should have been cognizant of its jurisdictional limitation and the possible repercussions that its actions could have had against CBD businesses, such as enforcement actions by the authorities. Colleen Keahey, HIA's Executive Director stated emphatically "we will not stand idly by while the DEA flouts the will of Congress, violates the Ninth Circuit order, and harasses honest hemp producers ..." [8] On February 6, 2017, HIA filed a motion to show cause why the DEA should not be found in contempt of court for violating the Ninth Circuit's order prohibiting the DEA from regulating hemp products as Schedule 1 controlled substances." [9] As a result, a negotiated settlement was reached between the HIA and the DEA.

CAUTION: PERUSE STATE LAW FOR CBD GREENLIGHT

In sum, CBD's legality is dependent on the respective





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DEA Internal Directive

- Regarding the Presence of Cannabinoids in Products and Materials Made from the Cannabis Plant. (May 22, 2018).
- DEA Internal Directive Regarding the Presence of Cannabinoids in Products and Materials Made from the Cannabis Plant (May 22, 2018).
- U.S. Food & Drug Administration FDA and Marijuana: Questions and Answers
- California Department of Public Health Manufactured Cannabis Safety Branch

state laws and the source of the CBD, which is pursuant to either the 2014 Farm Act or the CSA, with respect to the exempt materials of “marihuana.” Nonetheless, on May 22, 2018, the DEA’s Internal and External Directives to Federal Agencies provided guidance that “the mere presence of cannabinoids is not itself dispositive as to whether a substance is within the scope of the CSA; the dispositive question is whether the substance falls within the CSA’s definition of marihuana.” [10] The DEA’s directive further stated:

Products and materials that are made from the cannabis plant and which fall outside the CSA definition of marihuana (such as sterilized seeds, oil or cake made from the seeds, and mature stalks) are not controlled under the CSA. Such products may accordingly be sold and otherwise distributed throughout the United States without restriction under the CSA or its implementing regulations. [11]

While the DEA’s Directives represent a slight victory for qualifying CBD, CBD producers and enthusiasts must however, remain cautious as other governmental guidelines such as the Federal Drug Administration (FDA) and some state laws remain at a standstill regarding CBD in general. For instance, while the FDA approved the CBD epileptic drug, Epidiolex, its website warns against the use of food with active CBD ingredients, and it prohibits CBD from entering interstate commerce or being sold as a dietary supplement. [12] Similarly, the California Department of Public Health (CDPH) and Manufactured Cannabis Safety Branch (MCSB) also warns that the use of hemp-derived CBD is not permitted in food. [13] Still positive steps in the right direction for CBD cannot be underestimated such as the Senate’s overwhelming approval of the 2018 Farm Bill and the fact that many powerful politicians, such as Republican Cory Gardner, and former Speaker of the House of Representative, John Boehner, among others, are rallying behind this burgeoning industry, signaling hope for the unfettered legalization for CBD.

In the next issue of CBD Health & Wellness, we will explore where CBD legislation may turn to in the future, as all but one state in the Union creates medical cannabis programs, and the majority of Americans now believe it is time to legalize cannabis once and for all.



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Hemp Protein is the Healthier Option

by Christopher Pascale

Hemp is among the most incredible plants we can utilize for food and medicine, but for years it has remained illegal to cultivate. Not only can it be eaten (the main basis of this article), but builders are constructing homes with hemp bricks, and a recently designed Lotus was made with hemp. Food-wise, hemp might be one of the most important substances we could eat. Dr. Joel Fuhrman, author of *Eat to Live and The End of Heart Disease*, advises his readers to incorporate hemp into their diets because it is an incredible source of protein and healthy calories. In addition to merely being fuel, hemp seed is very nutrient dense.

I am not a doctor or nutritionist. With the exception of field safety courses in the military, I have no medical expertise. Rather, I'm an aging father and husband searching for the healthiest options for my family, particularly since my four daughters all have unique dietary needs ranging from vegetarianism to gluten intolerance. The reason for this disclosure is because it needs to be clear that what I know about hemp comes from reliable sources like Harvard's School of Public Health [1], or the report from Purdue discussed below. [2]

Harvard and Purdue Studies on Hemp

The Harvard study on protein consumption notes that the more heart-healthy choices of protein often come from vegetables. [1] This is confusing for many consumers since unlike meat, peas, romaine lettuce, and other plants are not associated with having protein.

The Harvard article specifically notes that a good first step for a healthy and satisfying breakfast would be to add hemp seeds to yogurt. This is a good choice for people who want to enjoy their breakfast. Alternatively, a small glass of whole milk mixed with a protein powder added to 2-4 cooked eggs can provide all the nutrition needed in the morning, and can satisfy hunger well into the afternoon.

The Purdue article is much more detailed. [2] Keeping it simple, the most important parts are condensed below with regards to the nutritional content of hemp:

Tocopherols: Tocopherols are antioxidants from the vitamin E group. They are essential, and when derived from hemp are believed to be desirable for human health.

Protein: Hemp seeds are 25–30% protein, and contain all eight essential amino acids. You can get higher concentrations of protein from soybeans, but soy products are dangerous because of the effects on estrogen. [3] Hemp offers more protein than wheat and barley.

In the past, getting hemp into one's diet was difficult because it was illegal to grow in most states. However, the 2018 Farm Bill has a provision to take hemp off of the controlled substances list. This means that hemp will not only be more readily available, but also should be more affordable than ever.

All Vegetarian Diets Need Hemp

Hemp has what most human herbivores are missing - the essential nutrients found in meat. When a nutrient is termed essential, it means we do not produce it in our bodies naturally. While birds and dogs can produce vitamin C, humans cannot, so we must eat citrus fruits and vegetables like bell peppers and oranges. The great thing, though, is that we can go without meat and be healthy. While it may be necessary for some athletes and other active people to get the calories they need, the majority of us can just as easily enjoy a balanced diet provided we include hemp.

Comparing Hemp to Whey

Those who are lactose intolerant need to avoid whey protein. Those who care about the environment may not like it, either.

Christopher Pascale is an author, accountant and adjunct professor from Long Island. He is the former CFO of Portfolios with Purpose. His finance writing has been featured on the AIPCA's "Tax Matters" page, WealthyJoe.com, and others. He is also the author of a book of poetry, and is working on a novel due to be released in 2019

And those who want 40% more protein per gram will ultimately end up consuming hemp.

Hemp is:

- Easier to digest
- Full of the good fats our cells need [4]
- Safer for those with food allergies
- Completely natural

Contrastingly, whey, while fine for most people, is less safe and less healthy:

- Harder to digest, which leads to cramping
- Lacks good fats, so is less healthy
- Processed from dairy
- Contains added sugar and artificial colors/flavors

For the lactose intolerant, consuming whey before or after a workout will be horrible, since the dairy and sweeteners added to whey powders are thought to be the cause of athletes feeling sick after a workout. [5] Of the alternatives to whey, Men's Health suggests hemp specifically, and also recommends other natural sources, like egg whites and brown rice. [6] The latter choice lacks the full amino acid profile, however. Another food (not a powder) that should be included in all diets is romaine lettuce, which is more protein dense per calorie than beef. Comparing whey to hemp is like comparing baby formula to breast milk. The former will get you through in a pinch while promoting gassiness, bloating, and a lack of nutritional value. The latter is what we're supposed to have. Whey protein is processed protein with fillers like sugar and lactose. Hemp protein is plant-derived with no additives. Whey products have added flavors you may enjoy, but the same can be said for gummy vitamins, which are less healthy, mostly because of the added sugar.

Bringing Hemp into Our Diet

Hemp powder can be added to yogurt or spread into a peanut butter sandwich. I've tried making drinks with it, but haven't



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and no essential fatty acids.

ALLERGENIC

Unsuitable for anyone with lactose intolerance.

REFINED

Many products use sugar, artificial colors, and artificial flavors.

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succeeded. Attempts have included a milk or water base with varying amounts of additives like honey, coffee, sunflower butter, peanut butter, and fruit. After a number of attempts, I settled on just having it with a small glass of whole milk. The milk fat staves off hunger during the morning, and acts as a reliable delivery system that leaves minimal sediment at the bottom of the glass.

For those who want to get more creative with their hemp intake, consider visiting the website of Trinity's Conscious Kitchen for recipes including hemp.

It cannot be overstated that hemp protein is superior to other sources of protein. Commercial hemp protein powders may not taste very good, but neither does the commercially available cricket protein, many of the whey drinks, or other protein powders and bars. The big difference is that hemp has what most foods do not - a full amino acid profile.

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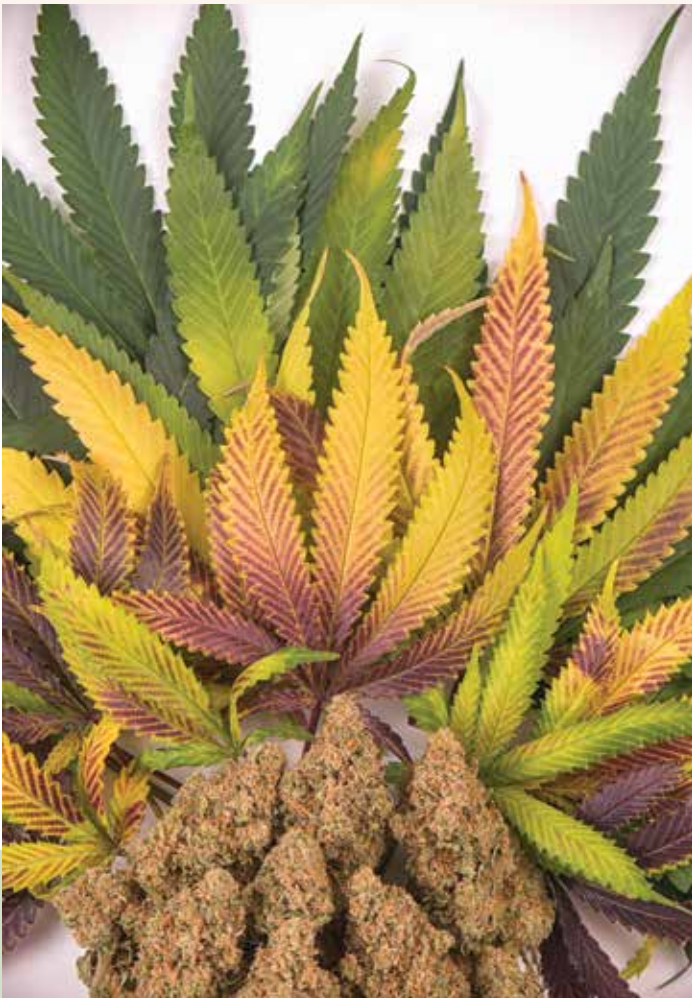
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What's Stopping CBD from Skyrocketing? Digital Advertising

Discriminatory ad policies leave CBD startups with few options for growth despite lofty industry projections.

by Mike Zielinski, Founder & Owner, Kono Naturals



One year ago my cannabidiol (CBD) supplement company launched. After experiencing it's benefits firsthand, and just like many other entrepreneurs in the cannabis industry have, it's hard to not believe in CBD's promising future. We've only begun to scratch the surface of CBD's medicinal applications and how it can be used to promote physical and mental wellness – potentially in lieu of dangerous and addictive prescription drugs.¹

There is also the promise of a lucrative future for CBD growers, manufacturers and retailers. As legalization becomes more widespread, there are more opportunities than ever before. Hemp Business Journal predicts consumer sales will grow sevenfold² in the next few years. With figures like this, it's hard not to buy into the hype.

But reward doesn't come without risk. Despite projections on par with the dot-com boom,³ new pro-cannabis laws do not make the cannabis industry much easier for startups to navigate. Many retailers are wary of carrying a cannabis extract regardless of its legal status, and most payment processors won't touch a cannabis-adjacent business. However, the biggest hurdle cannabis businesses have to overcome is digital advertising.

Digital advertising is an effective tool for virtually every business to reach its customers. And it's an essential for any e-commerce businesses to stay afloat.



DIGITAL MARKETING

“For CBD startups, digital advertising is a powerful marketing tool that is missing from our tool belts.”

Google and Facebook are the biggest players in the digital ad space. They make up the foundation of most businesses’ marketing strategies. These two juggernauts offer business owners a reliable way to drive targeted traffic to their websites, allowing them to scale quickly and affordably. Unfortunately, both Google and Facebook classify CBD as a “dangerous product”⁴⁵ in alignment with the DEA’s federal classification. As a result, these platforms can (and will) shut down any account attempting to advertise CBD content. In fact, almost every ad platform – from Amazon to Twitter and countless others – have similar restrictions on CBD, leaving CBD brands with limited advertising options.

While research suggests CBD is far from a dangerous product,⁶ it’s understandable that ad platforms would err

on side of caution when marketing medical products or information. But that’s not the case. Google and Facebook welcome pharmaceutical advertisers with open arms.⁷⁸ Even therapeutic products that do not require FDA approval, like essential oils, are allowed to advertise. CBD extracts are just about the only legal product that cannot advertise online.

“These advertising policies have curtailed e-commerce sales industry-wide. As a result, 97 percent⁹ of cannabis startups fail in their first year compared to just 20 percent of all other small businesses.”

Of course, there are ways to work around the red tape. One option is to use a cannabis ad network. These smaller platforms allow CBD brands to run traditional display ads on a short list of pro-cannabis media sites. However, display ads almost always have a lower click-thru rate than search ads or social ads, which means more precious ad dollars for fewer



results. Another drawback to these networks is the media sites are predominantly geared toward a THC-audience and not necessarily an audience interested in CBD. And because of the limited options available to brands, it's a crowded space with competitive bids. While CBD marketers debate if the return is worth the investment, it's the surest alternative to Google and Facebook ads. Other cannabis advertisers turn to "cloaking" to circumvent the restrictions. Cloaking is a way of advertising that directs some web traffic to one landing page, and other web traffic to an entirely different page. The reason advertisers do this is to send people they suspect are Google's or Facebook's moderators to a landing page that complies with its advertising guidelines (aka a CBD-free landing page.) This way CBD brands are able to advertise on the major ad networks without getting shut down. However, cloaking is not a feasible option for most advertisers. Manually cloaking ads is time consuming, paying for a cloaking service is costly and violating the networks' guidelines is risky. Plus, risky advertising in an already high-risk industry will not forge a path for more CBD-friendly advertising guidelines.

Years ago, marketers predicted the advertising landscape would become more navigable for the cannabis industry. However, little has improved. Even as laws and public opinion are shifting in favor of cannabis, we are seeing more cannabis startups that are stunted by laggard advertising regulations. Hopefully one day Google, Facebook and other ad networks open up their platforms to CBD advertisers so that we can grow our small businesses the way other health and wellness products can.

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Helping Deconstruct the Triangle of Failure: **An Interview with Christopher Hussey of Isodiol**

by Tamir Bresler and Jason S. Lupoi, Ph.D

It's apparent from the first few minutes of meeting Christopher Hussey that he is not a man of few words. Gregarious and introspective, with passion and an inborn curiosity, the Marketing Director of Isodiol is not limited in his understanding of the past, his grounding in the present, or his vision for the future.

“We provide the highest quality CBD to the industry.”

Chris is a self-described “serial entrepreneur.” He spent a significant portion of the past decade developing a method to extract cannabinoids from hops, cannabis’ botanical cousin and a major flavoring reagent of the craft beer-making process. That led to a discussion of many other plants that have been shown to create their own cannabinoids, or at least, molecules that behave like cannabinoids, as with *Echinacea*. [1] And even though Chris humbly admits that he was “not heavily involved in the science side of the extraction,” it’s clear he has a firm grasp on the topic.

But Chris isn’t only an entrepreneur. He’s also a historian, pointing out in extraordinary detail the agricultural conditions in American Colonial times. The Virginia crop rules required that all farmers who intended to grow food also dedicate a certain portion of their acreage to the cultivation of *hemp*—which he mentions as an example of his voracious study of history. He is one of the few decision makers in the cannabis industry that can frame the current status of cannabis legalization in its historical context.

When speaking about the present, Chris describes Isodiol as a “Grassroots organization at its roots,” by which he meant that it was an organization that grew organically as a way of addressing a specific problem, a certain need.

In this case, the need was the lack of access to high-quality information and sources of medical cannabis. Chris

describes this process as the simultaneous “Triangle of Opportunity and Failure.” The first piece is the caregivers, which encompasses concerned parents as well as physicians and clinicians. They are the ones dealing with people who are suffering without available relief and are in need of a solution.

Deciding to look into using cannabis as an alternative treatment, the caregivers turn to business owners and experts in the cannabis field, who represent the second corner of the Triangle. These people believe, genuinely or otherwise, that their cannabis products can deliver X, Y, and Z clinical results for the caregiver’s patients and loved ones.

Turning to the available literature, the final point of failure is the collective lack of clinical research, case studies, empirical evidence, and legal and political support that encourages







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the growth and dissemination of this information relating to cannabis treatments.

So, how does the Triangle of Failure all work out? Educated caregivers and physicians are unwilling to consider cannabis treatments because of the lack of quality scientific sources. Seeking to approve a cannabis treatment, they turn to the scientific literature and discover a severe lack of clinical data. Worst, the basic medical research that is available is preliminary, or inapplicable. Societal and legal pressures dissuade parents from pursuing demonstrably safe and effective treatments with cannabis.

This in turn prevents the engineers, scientists, and business leaders who have identified a medical problem that they are determined can be solved with cannabis products from convincing the caregivers that their clinical outcomes can be achieved. The lack of trust prevents the generation of current, relevant clinical data. And on-and-on it goes.

What Chris sees for the future of Isodiol is a breaking down of this Triangle of Failure and replacing it with total integration and tools for success. He says that Isodiol is many things to many different people, and it all depends on what "vertical" of the company you come in contact with.

When asked where Isodiol is going in the next year, Chris eloquently states:

"We are and will be involved in every single vertical of each specialty CBD sector of the cannabis industry."

Chris says that Isodiol will be "an even greater force" in moving the CBD conversation forward. Isodiol had the foresight to recognize the burgeoning importance of CBD, as they had the first hemp in the ground in California, once it was made legal.

Interestingly, Isodiol owns their own coffee roaster. Thus, one of the newest Isodiol products to hit markets in South Florida is a cannabis-infused coffee, called Pot-O-Coffee. An analogous tea (Pot-O-Tea) has also been released to Winn-Dixie grocery stores on the East Coast.

But enough about Isodiol. We concluded our discussion by asking Chris to scrutinize his crystal ball and pontificate on the future. Where is the cannabis industry headed? "The public is ready", Chris discussed. "Within 12 to 24 months, the dominoes will continue to fall, and cannabis will be legal in America." A delightfully bold prediction indeed, but what exactly is the public ready for? Are current ingestion methods, or marketing terms and gimmicks, preventing cannabis from grasping America? We live in a time when smoking cigarettes is not exactly as cool as the camel once indicated. Educated people are taking over their health, as nuggets of knowledge are only a few clicks away.

Chris felt that smoking cannabis was definitely not the future of the industry. In fact, he felt that smoking has inhibited cannabis from further grasping a hold in America. "Is vaping *really* going to get the soccer mom to use cannabis as a medication?", Chris asked. Maybe...maybe not. When you see someone on the street vaping, does it look like they are medicating?

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Vaping, though, is quite in-vogue these days, as users find the convenience, ability to discretely medicate, and the lack of combustion to be convincing advantages. Many soccer moms had perhaps quit smoking cigarettes by migrating to vaping nicotine, so perhaps vaping will continue to be a popular ingestion method for the modern cannabis user.

Given the surge of interest in cannabis-infused beverages and other edible delivery matrices, or in medicinal, but unsexy capsules, are people journeying to even more discrete yet familiar methods of medicating? Isodiol thinks so, as Chris discussed his view that more people would consider incorporating cannabis into their preventative and medicinal customs if only extracting the medicine didn't always look like they were getting high.

It's hard to argue with this, when considering the popularity of cannabis edibles and beverages. And when you consider some of the more trendsetting entities in the cannabis industry, these are the avenues they are continuing to explore. While vape cartridges may be fashionable now, Isodiol believes they have seen the future, and are continuing to forge ahead towards that horizon, armed with their tools for botanical alchemy.



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