



GOT SUPPLEMENTS?



THIS IS KNOWLEDGE YOU
NEED TO HAVE

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The longtime leader in safeguarding supplement products



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WHAT IS BSCG?



FOR MORE INFO, PLEASE VISIT BSCG.ORG

BSCG (Banned Substances Control Group) is a leading independent testing and certification provider for the dietary supplement, sports nutrition, and natural product industries. BSCG offers a complete suite of industry-leading programs and compliance services for brands, manufacturers, ingredient suppliers, and distributors. With its foundation in anti-doping and sport drug testing, BSCG offers the Olympic standard in analytical testing to companies as well as to teams, leagues, athletes and other consumers that want to verify their products and ingredients are legitimate and meet quality expectations. BSCG's rigorous programs help ensure products are not contaminated with drugs or other agents that can lead to

health concerns or positive drug tests.

The certification programs and testing services BSCG offers are the best way to protect the interests of both supplement companies and consumers. A product's safety and quality mean retailers can carry a product and elite athletes can take it with no threat to their health or career. BSCG certification demonstrates the quality of a product and allows brands to showcase that quality to athletes and consumers.

What follows is a history of how BSCG began, the people behind it and some insights into the ever-evolving supplement

industry from BSCG President Oliver Catlin, a thought leader in the field. There are important considerations every ingredient and supplement manufacturer and distributor needs to think about to protect athletes and everyday consumers—as well as boost a product's prospects and a company's bottom line.

If you're in the supplement game – either taking them or making them – this is what you need to know. And BSCG is the group you want protecting your products.



02

BSCG'S ORIGIN STORY

How Dr. Don H. Catlin took a stand
for integrity in sport



DON CATLIN
BSCG CHIEF
SCIENCE OFFICER
AND CO-FOUNDER



You're hardwired to compete. It could begin in the home where siblings squabble over the last piece of apple pie. Outside the home it could become landing that highly coveted dream job. Competition for everything is part of your DNA, as people try to satisfy unlimited wants with limited resources. It's long been one of the truths of being a human.

In sport, it might be competition for the sake of glory, spectacle, and the resources a victory can earn the winner. With so much at stake, the ancient Olympics were forged and even these early athletes created herbal concoctions said to provide a sporting edge.

A history of modern-day sports tells a similar tale. Stimulants and steroids and other performance-enhancing drugs, in some shape or form, have become a regular sideshow in top-level competition. Doping slanted the playing field and created winners who weren't necessarily the best at the sport but just had the best pharmacists. It was a form of cheating that risked making a mockery of competition, which came to a head during the 1980 Olympics in Moscow that the Australian Senate referred to as the Chemists' Games.

DR. CATLIN HAS BEEN CALLED "THE FATHER OF DRUG TESTING IN SPORT."

A GLADIATOR FOR FAIRNESS

Don H. Catlin, M.D., a chemistry professor at the University of California, Los Angeles, took a stand. In 1982, he founded the UCLA Olympic Analytical Laboratory, the first lab in the United States to test for performance-enhancing drugs in sports. It was created to handle the testing at the 1984 Summer Olympics in Los Angeles. Under Dr. Catlin's direction, the UCLA lab went on to become one of the world's most respected testing facilities for performance-enhancing drugs. The playing field slowly began to shift toward being more level.

The UCLA Analytical Laboratory he built went on to perform drug testing for three Olympic Games, the 1994 World Cup, the U.S. Anti-Doping Agency (USADA), National Collegiate Athletic Association (NCAA), the National Football League (NFL), the U.S. Military and Major League Baseball's minor leagues. The lab grew to become the

world's largest testing facility of performance-enhancing drugs, processing more than 50,000 samples per year. As a testament to his incredible intellect and leadership, Dr. Catlin remained the lab's director for a staggering 25 years.

With more than three decades of experience at the highest levels of sports anti-doping science, Dr. Catlin remains one of the most esteemed and influential scientists in the field. The groundbreaking testing techniques he helped develop continue to be used at the Olympic, professional, and collegiate levels of sport drug testing. His efforts earned him accolades and nicknames including 'the father of drug testing in sport,' 'pioneer of Olympic drug testing,' and, at one point, even the 'Tiger Woods of anti-doping scientists.'



THE TRUE INNOVATOR

Dr. Catlin was an intellectual Olympian who took up the global battle against performance-enhancing drugs in sports. He changed the world by creating new testing techniques and in the process authored more than 100 articles in scientific publications. The longest tenured member of the International Olympic Committee Medical Commission, Dr. Catlin is a professor emeritus of molecular and medical pharmacology at UCLA.

His incredible thirst for innovation saw him create a testing methodology that differentiates natural from artificial testosterone known as the Carbon Isotope Ratio (CIR) method. He also marveled the unveiling of the test to detect the blood booster medicine darbepoietin at the Salt Lake Olympic Games, busting three medalists in the process. His efforts put the world on notice about designer steroids like Superdrol, and his work even led to the arrests of the people involved in the BALCO scandal at the heart of doping allegations surrounding Barry Bonds and track-and-field stars Tim Montgomery and Marion Jones.

Dr. Catlin's contributions to the world of sport have been so great that the Chicago Tribune in 2002

named him Sportsman of the Year. There's no telling how many lives he's benefited by creating testing techniques that have discouraged sports people from taking dangerous performance enhancing drugs. He's a man whose actions revolutionized sport drug testing and helped establish a dedication to clean and fair competition protecting all realms of sport for years to come.

BRINGING THE OLYMPIC STANDARD TO SUPPLEMENTS

Dr. Catlin recognized that athletes who take legally sold dietary supplements are also at risk of positive drug tests. They brought the Olympic standard to the supplement industry. He learned in heart-wrenching hearings



over positive drug-test results how some athletes were caught unwittingly ingesting banned and dangerous substances in dietary supplements. Since then, he has sought to remove tainted products from the marketplace while offering support to legitimate supplement manufacturers and suppliers who take steps to protect those who consume their products. Dr. Catlin was responsible for identifying new compounds of concern in the supplement marketplace like Superdrol, 6-OXO and methylhexanamine (DMAA).

In 2004 the proactive efforts began when Dr. Catlin, along with his son Oliver Catlin and attorney Ryan Connolly, founded BSCG and in the process helped create a new industry focused on testing and certifying dietary supplement products to be free of banned substances in sport.

In 2005, as part of an effort to keep up with the continual introduction of new and ever-evolving performance-enhancing drugs in competition, Dr. Catlin and colleagues founded Anti-Doping Research (ADR), a non-profit organization/NGO dedicated to research and testing development. The Catlin Consortium, as the group of organizations came to be known, aims to address a range of issues related to doping in sports, including identifying and developing tests for new and evolved banned substances, conducting drug testing in human and equine sports and working to

build healthy sporting cultures for athletes. In addition to BSCG and ADR, the consortium includes the company Anti-Doping Sciences Institute and ADR- public initiative, Support Clean Sport.

DELIVERING REFINED SCIENCE

At BSCG, Dr. Catlin worked with Oliver to champion the idea of focusing the company's athlete-testing program on substances responsible for adverse analytical findings reported by WADA (the World Anti-Doping Agency) in addition to those listed on the WADA Prohibited List. BSCG's industry-leading testing menu now includes more than 287 compounds banned in sport, together covering more than 94% of WADA's adverse analytical findings in the last decade, more than any other provider in the dietary supplement certification industry.

As the longtime president and co-founder of BSCG, Oliver Catlin has embraced his father's legacy and become a thought leader in the field of sports nutrition and supplements. At BSCG, Oliver has led the way in developing the BSCG brand, expanding its sports-testing menu and adding 211 prescription and over-the-counter drugs to its testing menu that no other provider covers. Today the BSCG industry-leading testing menu covers nearly 500 substances in total, almost double what other third-party certification groups offer.

Oliver has developed BSCG's

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services to include label claim verification, contaminant testing, and GMP audits, and he led the effort to build the new BSCG Certified CBD program. BSCG certification and testing programs now include Certified Drug Free, Certified Quality, Certified GMP, Certified CBD and the Athlete Assurance Program. Oliver continues to expand BSCG's range of services and coverage across a variety of categories in order to provide trustworthy products to both elite athletes and everyday consumers.

PROTECTING THE INTEGRITY OF SPORT

Dr. Catlin truly revolutionized the science around sport drug testing and helped to level the playing field for athletes. Not only has he championed the idea of fairness in sport to put the athletes—not the chemists first—but he has also helped safeguard athletes from banned substances in a range of supplement products. His is a lifetime dedicated to public service through intellect, innovation and integrity. Dr. Catlin has always put the integrity of sport first, through deeds as well as words. He is a game changer, who helped usher in the modern Olympic era and truly changed the world of sport for good.



LESSON 1

Understanding the ambiguity of legal supplements



FOR MORE INFO, PLEASE VISIT BSCG.ORG

THE DEER ANTLER STORY

Deer antler has a long history of use in traditional Chinese medicine and has been used to decrease fatigue, improve sleep and appetite, and aid in stress management. It has been sold by herbalists and at various natural product stores in edible form for decades. In animal tests, deer antler has been shown to increase oxygen uptake in the brain, liver and kidneys, and increase red and white blood cell production. Traditionally, it is available in the form of antler slices, powders, and extracts. In the dietary supplement marketplace, where it has become popular over the last few decades, it is available in capsule form as an ingestible product and has been marketed as a spray or liquid product designed for liposomal absorption.

Ingestible deer antler products are made by grinding the actual deer antler velvet and antler into powder form and encapsulating it. These products tend to be marketed in line with traditional uses and applications. Another side of the deer antler industry focuses on the fact that deer antler naturally contains small amounts of insulin growth factor 1, or IGF-1, a hormone banned in sport. These products are typically available in a spray form or liquid form and advertise concentrated amounts of IGF-1. With names like IGF-1+, these products are

often marketed as anti-aging and/or performance-enhancing agents and are offered in different dosages of IGF-1. The liquid forms often carry claims that the IGF-1 is delivered to the body through liposomal absorption, meaning it would be absorbed through membranes in the mouth, as opposed to having to enter the body through ingestion and digestion.

THE LEGALITIES

In its natural ingestible form, deer antler velvet qualifies as a legal dietary ingredient under the 1994 Dietary Supplement Health and Education Act (DSHEA) in the U.S. This is due to it being a substance used to supplement the diet as part of traditional medical practices, a part of the food supply prior to 1994, and not chemically altered. In other countries like Australia and New Zealand, it has been reviewed as a therapeutic good and is sold more widely.

Whether the spray forms are legal is unclear. Research has shown that many of the sprays and liquids on the market are adulterated with human IGF-1 to bring the products up to the concentrated levels claimed. In the U.S., if human IGF-1 is added to a product, it would no longer be a legal dietary supplement, as it would be adulterated with an unapproved drug. But if deer antler velvet is somehow

concentrated to contain high levels of deer IGF-1, such a product may be legitimate.

The legal issues are fascinating and should be considered, as a large part of the deer antler liquid marketplace is likely driven by products that do not qualify as legal dietary supplements. We point this out but leave it to the FDA and other authorities to address. The confusing position deer antler occupies in the realm of drugs in sport is an interesting example of the issues that may be of concern to athletes and is the deeper issue we want to examine.

DEER ANTLER IN SPORT

The hoopla started with a spray form of deer antler called The Ultimate Spray, marketed by Sports with Alternative to Steroids (SWATS) that was involved in an NFL player David Vobora's positive drug test for the steroid methyltestosterone in 2009. Vobora had the spray he used tested, and it was found to be contaminated with methyltestosterone – which was not on the label. Vobora won a \$5.4 million ruling against the company. Two years later the spray was tested at our



nonprofit/NGO Anti-Doping Research as part of a media investigation for *The Washington Post* in 2011 and the test did not find methyltestosterone. This highlights an important point: that one batch of a product can be contaminated and another batch of the same product clean, something that athletes need to consider.

The case prompted MLB and NFL to issue warnings to players regarding the use of deer antler. Interestingly, the MLB warning did not focus on the IGF-1 issue but rather on the issue of methyltestosterone contamination. The NFL warning meanwhile concentrated more on the IGF-1 issue and questioned the appropriateness of its players or coaches representing a product that was marketed as an IGF-1 product.

The deer antler saga continued as high-profile athletes and teams were discovered to be using deer antler spray. The debate intensified when Ray Lewis in the NFL and the Alabama NCAA football team brought the issue front and center in collegiate sport. Professional golfer Vijay Singh admitted to using a deer antler spray, resulting in the

PGA accusing him of a doping violation. After years of legal maneuvering, this case was finally settled before trial.

IS DEER ANTLER BANNED?

The substance IGF-1 is banned in sport, but deer antler is not. However, if a deer antler product is adulterated with concentrated amounts of IGF-1 designed for liposomal absorption, it could constitute a doping violation or otherwise influence a drug test. This distinction is what causes confusion. The Alabama football team situation is likely the reason the NCAA is the only sporting group to include deer antler as an example of IGF-1 on its banned substance list. Whether deer antler is banned in sport in practice and whether its use could lead to a doping violation comes down to whether any IGF-1 that is present is absorbed and whether other drug contaminants like methyltestosterone are present.

Deer antler is not the only common food or supplement to naturally contain IGF-1. Many animal food products like red meat, eggs or milk and other common dietary supplement ingredients like whey protein or colostrum contain IGF-1 or other growth factors that are banned in sport yet consuming them does not result in doping violations.

When it comes to absorption of IGF-1, scientific publications have explored the topic with the results briefly summarized as follows. IGF-1 and other similar growth factors are absorbed intact by babies as an important

part of the growth process; however, adults do not absorb these hormones through ingestion as intact proteins. This has been demonstrated by radiolabeling IGF-1 and testing for it after ingestion. So, when IGF-1 is ingested in the form of deer antler, whey protein, colostrum or other foods, it is not absorbed by the body and should not lead to or be construed as a violation of drug-testing regulations. Therefore, ingestible deer antler products should be acceptable for athletes. Conversely, using a spray form of deer antler concentrated to contain certain amounts of IGF-1 that is delivered through liposomal absorption would likely constitute a doping violation, because if the product works as claimed, the banned substance IGF-1 would be absorbed by the body intact.

IS IGF-1 DETECTABLE?

Currently, there is no worldwide test for the detection of IGF-1 in sport drug testing, but this is not to say that the anti-doping community cannot detect it, as there are numerous publications that demonstrate the ability to do so. IGF-1 is used as an important

marker for human growth hormone detection in WADA testing. The challenge in creating an effective method to detect IGF-1 doping is in distinguishing exogenous, or foreign, IGF-1 from the endogenous, or natural, form in our bodies.

PROTECTING YOURSELF

The deer antler example illustrates how difficult it can be to interpret whether a dietary supplement is legal or illegal, based on a label review alone. With deer antler, an ingestible form is legal and legitimate while liquid forms are likely adulterated and could be interpreted as doping agents. This reality may not be apparent to an athlete or even to well-meaning qualified reviewers. Ultimately, label review does not protect against contaminants like methyltestosterone that may infiltrate supplements; only ongoing certification and testing can offer that protection.

As with all dietary supplements, it's recommended athletes only use batches or lots of products that have been certified by a reputable third-party to be free of banned substances. BSCG's cornerstone program, BSCG Certified Drug Free® conducts on-going testing of individual product lots to ensure they are free of banned and dangerous substances and acceptable for athletes to take. Programs like this have a searchable database

where you can input a product lot number from a package to make sure it has been tested. Checking to verify that your lot has been tested is one of the most important steps you can take as an athlete, even with products that carry a seal from a third-party. Products like deer antler emerge from the dietary supplement and natural product industries seemingly daily. Products based on traditional medicine or herbal extracts are growing in popularity as brands and manufacturers seek innovative new ingredients. As they do, issues over legality and acceptability for athletes and other consumers will continue to present themselves as they have with deer antler, geranium oil extract and more. As a leading third-party certification provider, BSCG is proud to do its part to help answer complex questions through its certification programs and discussions. Its various programs help differentiate reputable brands dedicated to quality control and consumer safety from others in the industry and help offer athletes and other consumers products they can trust.

Includes material previously published starting in 2013.





LESSON 2

Dietary supplements, performance-enhancing drugs and the gray areas

THE POWER OF NOOTROPICS

Many of us ask the question, “What will be the next doping agent to turn the world of sports upside down?” The answer may be hiding in plain sight in the form of noopept, an ingredient in nootropic supplements. Noopept is poised to become the next meldonium.

NOOPEPT IS POISED TO BECOME THE NEXT MELDONIUM.

A comparison between the substance noopept and meldonium supports our theory. Meldonium, which is suggested to improve blood flow, is approved for use as anti-ischemia medication in Eastern Europe and Russia. It is usually used to treat heart disease. Although clearly popular with athletes, based on the hundreds of positive drug tests for the drug since it was prohibited in early 2016, meldonium is not commonly found as a dietary supplement. Meanwhile, noopept, is patented by JSC LEKKO Pharmaceuticals, a Russian pharmaceutical company, in both the U.S. and Russia. It is commonly sold as a dietary supplement in the nootropic category around the world but is sold as a medication in Russia and Eastern Europe. Noopept is being studied for its potential to alleviate Alzheimer’s symptoms and treat other brain disorders. It is not an approved drug in the U.S. Noopept does not appear to be

a controlled substance in the U.S. or other countries, or at least that is what some nootropic sites claim. That does not mean it would be legal to sell as a supplement. It would likely qualify as an unapproved drug according to the U.S. FDA, or other international equivalents. As such, it may be OK to sell for research purposes, but not as a supplement marketed for human consumption. Given that noopept was patented in 1996, was not in the food supply prior to 1994, and is synthetic, it does not appear to qualify as a legal dietary supplement ingredient in the U.S., according to DSHEA (the Dietary Supplement Health and Education Act of 1994).

Despite noopept being a dubious, if not illegal, supplement



ingredient, it is commonly found packaged as a supplement and is available online at a wide range of distributors. Based on its prevalence in dietary supplements and on message boards, it seems it has become quite popular. With discussion on 'The Worlds Most Trusted Anabolic Website,' as far back as 2007, it appears that people who track performance-enhancing compounds have known about it for several years. In fact, noopept has become so popular that even Reddit, which thankfully realizes the concern, has a note on noopept in 'New Rules in Regards to Illegal/ Dangerous Compounds.' The note states, "Synthetic drugs (not DSHEA compliant) that have too little information on them to assess toxicity (Ex. Noopept or PRL-8-53)..., are in the gray area."

WHAT DOES NOOPEPT DO?

As mentioned, noopept is typically marketed as a nootropic, or in simple terms a brain stimulant. Nootropics are different than central nervous system stimulants but are suggested to have some psychostimulatory effects. Noopept's effect is often compared to piracetam, which

the Global DRO, a website anti-doping agencies make available for looking up substances to see if they are prohibited, does not consider banned in sport, and phenylpiracetam (carphedon, fonturacetam), which is prohibited in sport. An excerpt from Racetam.org compares phenylpiracetam to noopept as follows:

"Even though phenylpiracetam is considered 60 times more potent than piracetam, noopept is considered to be around 1000 times more effective. This is because it often works through the acetylcholinergic system in ways that are different from the other racetams. Structurally speaking, noopept is not the same family as racetams, but it is similar and definitely acts in similar ways."

So, noopept could perhaps be interpreted as prohibited in sport already based on the catch-all language used in the WADA (World Anti-Doping Agency) Prohibited List. Meldonium needed to be added to the list by name, where it now appears as a metabolic modulator. This is an important distinction, as there is

precedent for related substances being considered banned in sport and resulting in positive drug tests even before they are on the WADA Prohibited List. That was the case with DMAA when the first positive test was called in 2008, and it occurred again with higenamine early in 2016. The WADA Prohibited List stimulant category includes fonturacetam [4-phenylpiracetam (carphedon)] as a non-specified stimulant. The catch-all language at the end of the category prohibits "other substances with a similar chemical structure or similar biological effect(s)." Noopept may qualify as it is

described as having a similar biological effect and seems to have a similar structure, as shown in the image from Examine.com, which is a good source of information on noopept.

We note that if fonturacetam is prohibited in sport then piracetam could also qualify under catch-all language in our view, but it does not according to the Global DRO. So, interpretation does not seem clear as to whether something that appears to have a similar chemical structure and structure to fonturacetam is prohibited in sport. Would other more potent racetams like aniracetam be interpreted to be prohibited? We

believe they would be, but then noopept could be as well.

NOOPEPT IS HIDING IN PLAIN SIGHT AND COULD BE EXPOSED SOON AS THE NEXT CLANDESTINE DOPING AGENT

You can see why noopept could be the next big, banned substance in sport after meldonium. It is widely available, making it likely to be used by athletes. It could have the potential to enhance sports performance as it is described as having similar biological effects as phenylpiracetam, which is already banned in sport. It would likely satisfy the conditions for a drug to be considered for addition to the WADA Prohibited List.

1. Potential to enhance or enhances sports performance
2. An actual or potential health risk to the athlete
3. Use violates the spirit of sport (outlined in the Code)

WILL NOOPEPT BE BANNED?

With the 2020 Tokyo Olympics and 2022 Beijing Olympics

occurring within a seven-month span, we find ourselves wondering what drugs these athletes might be using. Noopept is hiding in plain sight and could be exposed soon as the next clandestine doping agent. Whether that holds true depends on if, or when, WADA interprets the substance to be prohibited. That could happen at any time if they see the situation as we do.

Noopept is just one example of the gray area with dietary supplements that are available and the hidden concerns they may present. Athletes and other drug-tested professionals need to be careful when considering the supplements they use as contamination with banned substances is a real risk.

Third-party certification programs, like the BSCG Certified Drug Free program, are available to protect athletes and other consumers from risks associated with supplement use and banned substances. Please make sure to look for certified lots in the BSCG database, or other third-party databases, to ensure protection is in place for the product or lot you are considering using.

A version of this piece was first published online in August 2016.



LESSON 3

The CBD story – Defining the legality and quality of CBD products

CANNABIS SCIENCE

The research is mounting about the many benefits that can be derived from cannabis and hemp plants as well as their derivatives such as CBD oil. Myths and mystery around cannabis can make it hard to know whether it's a mind-altering drug or a possible miracle treatment for many ailments. Here's the science behind what could be your most important recovery agent yet, CBD.

The cannabis plant itself is complex, naturally containing hundreds of compounds called cannabinoids. Each cannabinoid is unique and may have particular effects based on interaction with the endocannabinoid system in the human body. Cannabis, and also cannabinoids, comes in different forms. Delta-9 tetrahydrocannabinol (THC) is the cannabinoid responsible for the psychoactive

effects of cannabis. The marijuana form of cannabis has high levels of THC. Cannabidiol (CBD), however, is a non-psychoactive cannabinoid, so it doesn't make you high. CBD has a number of potential benefits, from pain relief, to increased focus, to recovery. Cannabis with high levels of CBD and very low levels of THC (<0.3% in the U.S. and <0.2% in the EU) is called hemp.

MARIJUANA AND THC VS. HEMP AND CBD

"Marijuana and hemp are both cannabis plants," explains Oliver Catlin, the president of BSCG and one of the world's leading experts in dietary supplement certification. "Marijuana forms of cannabis have been bred to be high in THC, which is the chemical that causes the psychoactive high users will feel. The hemp forms of the plant were primarily bred for industrial purposes like textiles, clothing, and seed production. More recently, hemp has been bred to be high in CBD and low in THC. These forms of hemp have been bred with a focus on producing high levels of non-psychoactive CBD. Under U.S. law, marijuana is a cannabis plant that contains more than 0.3% THC, while hemp is a cannabis plant that contains less than 0.3% THC. Hemp is defined to be of the cannabis sativa L. variety while marijuana comes in sativa, indica and also hybrid species."

WHAT IS CBD AND HOW DOES IT WORK?

To comprehensively describe CBD, it's wise to first reiterate the differences between marijuana and THC compared with hemp and CBD. "CBD is non-psychoactive and is prevalent in the hemp form of cannabis, which should be differentiated from THC, the psychoactive chemical prevalent in the marijuana form of cannabis," explains Catlin. "A number of athletes are exploring the benefits of CBD, while many of those same athletes would not be proponents of THC or marijuana." Everyone from seniors with chronic long-term illnesses, to competitive athletes and even our pampered pets are enjoying the benefits of this plant's healing properties that stem from CBD. "The body has an endocannabinoid system that is activated by the presence of cannabinoids," says Catlin. "The system is activated by two primary receptors called CB1 and CB2; CB1 is primarily associated with psychoactive activity while CB2 is generally associated with anti-inflammatory activity and immunomodulation but not psychoactive effects."



CBD products are made from hemp and are designed not to produce psychoactive effects. However, that doesn't mean all CBD products are the same. CBD products can be found in isolate (CBD only), broad spectrum (CBD plus supporting cannabinoids but no THC), or full spectrum (CBD, plus supporting cannabinoids and a small amount of THC). CBD products with different amounts of CBD or other cannabinoids may produce different results or effects. People in the CBD industry often discuss the 'entourage effect' in reference to increased benefits CBD or hemp extract may have if it also has other supporting cannabinoids present. Generally, the other supporting cannabinoids do not have psychoactive effects at the levels present in CBD products. Some cannabinoids, like Cannabinol (CBN) and delta-8 THC may have some degree of psychoactive effect in concentrated form but are not considered as strong as THC.

WHAT IS KNOWN ABOUT THE SAFETY OF HEMP EXTRACT AND CBD?

"CBD as a compound has been extensively studied and has a

good safety profile," says Catlin. "The toxicology and adverse events related to CBD were reviewed by the World Health Organization in 2017 with no major concerns noted. The UK also considered the data when setting a 70mg suggested daily limit on CBD." CBD has been approved as a cannabis-derived drug in the form of Epidiolex, with safety having to be demonstrated in the approval process. Dosing for the drug is suggested to be 5-20 mg/kg/day, which is 310-1,240 mg/day in an average 137-pound human; significantly less at 1-5 mg/kg/day is recommended for people with significant hepatic impairment.

Safety data for the approved cannabis drug, Epidiolex, has been considered by many scientists as they evaluate the safety of CBD and hemp extract supplements. Epidiolex is >99% CBD, so the

safety data generated did not consider the effects or presence of other cannabinoids in different amounts. So, safety of full spectrum or broad-spectrum CBD products has yet to be fully considered. The FDA and other regulators expect safety to be demonstrated for hemp extract in the form it will be sold as part of New Dietary Ingredient or Novel Food applications. We contend that the acceptable form of CBD must be properly outlined and defined first before the industry can do the necessary research. It is the classic chicken or egg scenario. Meanwhile, anecdotal evidence of safety is being demonstrated daily with countless consumers using hemp extract and CBD products in many different forms and dosages.

CAN AN ATHLETE WHO USES CBD FAIL A DRUG TEST?

While most people are interested in the possible benefits of CBD, the primary concern for athletes, or anyone subject to drug testing, is whether they can test positive when using a CBD product. The answer is complex due to the different types of CBD products on the market and inconsistent quality control in the industry. THC is the target in drug testing so the primary concern is how much THC you ingest daily when using a CBD product. If you use CBD isolate or broad-spectrum CBD products, the expectation is that no THC is consumed. If you use a full spectrum CBD product then you need to ensure you don't ingest too much THC. But you have to trust the brand and test results for the products you are using. According to Catlin, "It is all about the THC threshold in urine

that is relevant in the sport or workplace in question and how much THC you consume daily. Unfortunately, quality control challenges in the industry and differences in testing procedures can create an expectation that a CBD product would be acceptable for use when in reality it may present a concern. BSCG has built a third-party certification program for CBD products that limits the amount of THC by daily dose, which is designed to protect users from testing positive. The program also includes banned substance screening and complete quality control testing. We are very proud as this is the first program of its kind available to the CBD product industry."

CAN CBD OR THC ENHANCE PERFORMANCE?

The treatment of cannabis often comes down to its effect on performance, which can be very different between CBD and THC. CBD has no psychoactive effects and is used predominantly by athletes to aid in recovery or pain management or for anxiety relief. CBD is most commonly used in ingestible or topical form, while THC is most often used in the inhalable form of marijuana or vape products. The psychoactive effects and potential harm of inhalation are what sport has traditionally focused on when considering whether

to prohibit marijuana and THC. Some have argued that THC could be performance enhancing through anxiety relief, reduction in sensitivity to pain, or increased focus.

However, the jury is very much still out on whether it does much, if anything, to impact performance. One of the recent pieces of research to be published on the matter, in *The Journal of Science and Medicine in Sport*, found THC, at least, reduced performance and strength. So, while using marijuana to train might help you focus more or it might even motivate you more or help you push through pain, there's no evidence to suggest it could make you run faster or jump higher or hit the ball with heightened accuracy. CBD, on the other hand, may actually provide benefits to athletes that can reduce reliance of harmful opioid painkillers, pharmaceutical sleep aids, alcohol or other agents athletes may turn to manage the stress and pain of competition.

CAN YOU USE CANNABIS IF YOU'RE COMPETING?

Today, some sports organizations still treat cannabis in general as a performance-enhancing drug,



while the majority now treat it as a drug of abuse. Many sports realms now allow the use of CBD but still prohibit THC. That said, the prohibited list language used by the World Anti-Doping Agency and mirrored by others today still prohibits other supporting cannabinoids that may be present in CBD products. While these are not the focus of sport drug testing and should not cause a positive drug test, possession of CBD products that contain supporting cannabinoids may be interpreted strictly by some as possession of a prohibited substance. So, for THC and marijuana, the answer is still: No, you can't use it when competing. For CBD the answer is migrating towards yes. When considering CBD products, it is the amount of THC that may be ingested that is important to consider. THC is the focus of sport drug testing still today. Urine testing thresholds for THC in sport and workplace drug testing are as follows: DOD, DOT, NBA: 15 ng/ml; NCAA: 35 ng/ml, WADA, MLB, NFL, UFC, PGA, LPGA, ITF: 150 ng/ml. "WADA's prohibited list language now says CBD is acceptable; however, an athlete or drug-tested professional needs to make sure THC has been

removed from CBD products to the point where no positive drug test would occur," cautions Catlin. "You can't smoke, ingest, vape or otherwise use marijuana or THC in competition anywhere in sports, although in many realms it is now treated as a drug of abuse subject to lighter sanctions or treatment only. CBD products are now acceptable in some realms of sport but are still discouraged in the NCAA and are prohibited by the U.S. Department of Defense."

WHAT MIGHT THE INDUSTRY LOOK LIKE IN THE NEXT FIVE YEARS?

"I believe the CBD industry will continue to grow and that consumer demand will remain strong," says Catlin. "The industry is forecast to grow to over \$20 billion over the next several years. However, the lack of precision in the regulations and the unknowns as to what form of hemp extract or CBD may be approved in dietary supplements or nutrition products, threaten to inhibit growth and hamstring the industry. I worry that regulatory confusion and gaps will erode consumer confidence unless they are sorted out soon. We hope to be involved in helping to shape the industry more in the future through the application of our BSCG Certified CBD program. "We believe that the pathway to regulation simply requires appropriate interpretation of

the laws currently in place for dietary supplements with the addition of a set of specifications that can protect consumers and the interests of the pharmaceutical industry," says Catlin. "Even the most concentrated form of hemp extract – CBD isolate – seems to qualify as a legal dietary supplement ingredient as its specifications are different than cannabis-derived drugs. Cannabis was clearly in the food supply as an article used to supplement the diet prior to 1994 when DSHEA (the Dietary Supplement Health and Education Act in the U.S.) was passed. Cannabis has been consumed in edible form for hundreds of years in cultural medicine. Hemp seed oil, which

qualifies currently as a food or supplement ingredient, contains cannabinoids including CBD in a form not chemically altered just in a less concentrated form. Hemp seed oil isn't used with the expectation of significant presence of cannabinoids or their potential effect, but they are still present. This should allow more concentrated forms to be considered for dietary ingredient status under the current DSHEA regulations. Although we believe CBD and hemp extract qualify as legal food and supplement ingredients, under current law, we understand and recognize that the pharmaceutical industry also believes they have first rights to certain standardized forms of

CBD or other cannabinoids. To provide room for both industries to grow and expand requires a strategy along the lines we propose: namely, to differentiate the ingredient that can be used in dietary supplements from cannabis-derived drugs. We propose setting specifications on hemp extract supplement ingredients to be <99% CBD, <0.3% THC, and >0.1% other residual cannabinoids. This would separate and distinguish the article sold in dietary supplements from the cannabis-derived CBD drug Epidiolex and allow room for both the hemp-derived supplement and the pharmaceutical industry to expand and grow. We hope that a pathway like this is considered for regulating hemp extract and CBD supplements soon."

CERTIFIED CBD – DEFINING PREMIUM QUALITY CBD PRODUCTS

Quality can be widely variable in the world of CBD and other dietary supplements, so what can you do? Third-party certification provides consumers with assurance that products meet claims and are free of harmful contaminants or substances that could lead to a positive drug test. BSCG has been the gold standard in third-party certification for nutritional supplements for almost two decades, offering a complete suite of certification, testing

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and GMP compliance services to the dietary supplement and natural product communities. With a foundation in anti-doping and sport drug testing, BSCG offers the Olympic standard in analytical testing to finished product brands, ingredient suppliers, manufacturing facilities, teams, athletes, or other consumers who want to verify the quality of products and ingredients meet expectations and ensure they are not contaminated with drugs or other agents that can lead to health concerns or positive drug tests. If you're looking to supplement with absolute confidence, the BSCG seal is the stamp you need to see. The BSCG Certified CBD program is a one-of-a-kind program designed specifically for CBD products that includes cannabinoid profile testing to verify CBD claims and THC limits; contaminant testing to check for heavy metals, pesticides, solvents and microbiological agents; and screening for BSCG's industry-leading drug-testing menu covering nearly 500 substances. Supplements are not created equal; make sure yours are BSCG Certified!



THE NEXT LEVEL

How Oliver Catlin is leading the field of supplement certification and testing



OLIVER CATLIN
BSCG PRESIDENT
AND CO-FOUNDER

BSCG's head, Oliver Catlin, is considered a thought leader in the realm of nutrition supplement certification and testing as well as sports anti-doping science. The son of renowned anti-doping pioneer Don H. Catlin, M.D., Oliver has been working in these fields for almost two decades. Not long after graduating from the Haas School of Business at the

University of California, Berkeley with a minor in conservation and resource sciences, Oliver started his career at the UCLA Olympic Analytical Laboratory as the Director of Finance and Administration. In this position, he helped oversee the drug-testing programs for U.S. Anti-Doping Agency (USADA), the U.S. Olympic Committee (USOC), the National Football League (NFL), Major League Baseball's Minor League Drug Prevention and Treatment Program, and the National Collegiate Athletic Association (NCAA) program administered by Drug Free Sport,

as well as the U.S. military and other organizations and sports leagues.

After leaving the UCLA Olympic Lab, Oliver continued working with Dr. Catlin and their colleagues, including attorney Ryan Connolly, to found a number of organizations to address a range of issues relating to sport anti-doping science. Among other things, they sought to identify and develop tests for new and evolving banned substances, conduct drug testing in human and equine sports, help individual athletes by testing their supplement products, and work to build healthy sporting cultures for athletes. The Catlin Consortium group of organizations includes BSCG (Banned Substances Control Group), Anti-Doping Sciences Institute (ADSI), as well as the nonprofit/NGO Anti-Doping Research (ADR) and its public initiative Support Clean Sport (SCS).

At BSCG, Oliver has led the way in developing its Certified Drug Free program, growing its sports testing menu and including substances of concern to everyday consumers, as well as expanding the provider's certification and testing offerings. Under his stewardship, BSCG has added compounds of concern in equine and canine competition, certification for consumer protection, testing

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for contamination and label claims, GMP audits, and has expanded its coverage to a range of products, from natural products to topical creams. He is intimately involved with BSCG on a day-to-day basis, working closely with responsible manufacturers, ingredient suppliers, concerned athletes, and other interested parties to ensure their products are free of dangerous and banned substances and meet high quality standards.

Oliver often takes an unflinching look at the more nuanced aspects of drug testing in sport and the connections with the dietary supplement and natural product industries. Exploring the depths of the testing process and combining little-known facts with unvarnished opinions based on two decades of experience, Oliver has helped to lead not just his organizations but also the industry and make sport cleaner and supplements more trusted products. His leadership reflects a depth of understanding, a commitment to integrity, and a desire to make the industry work better for all concerned.

