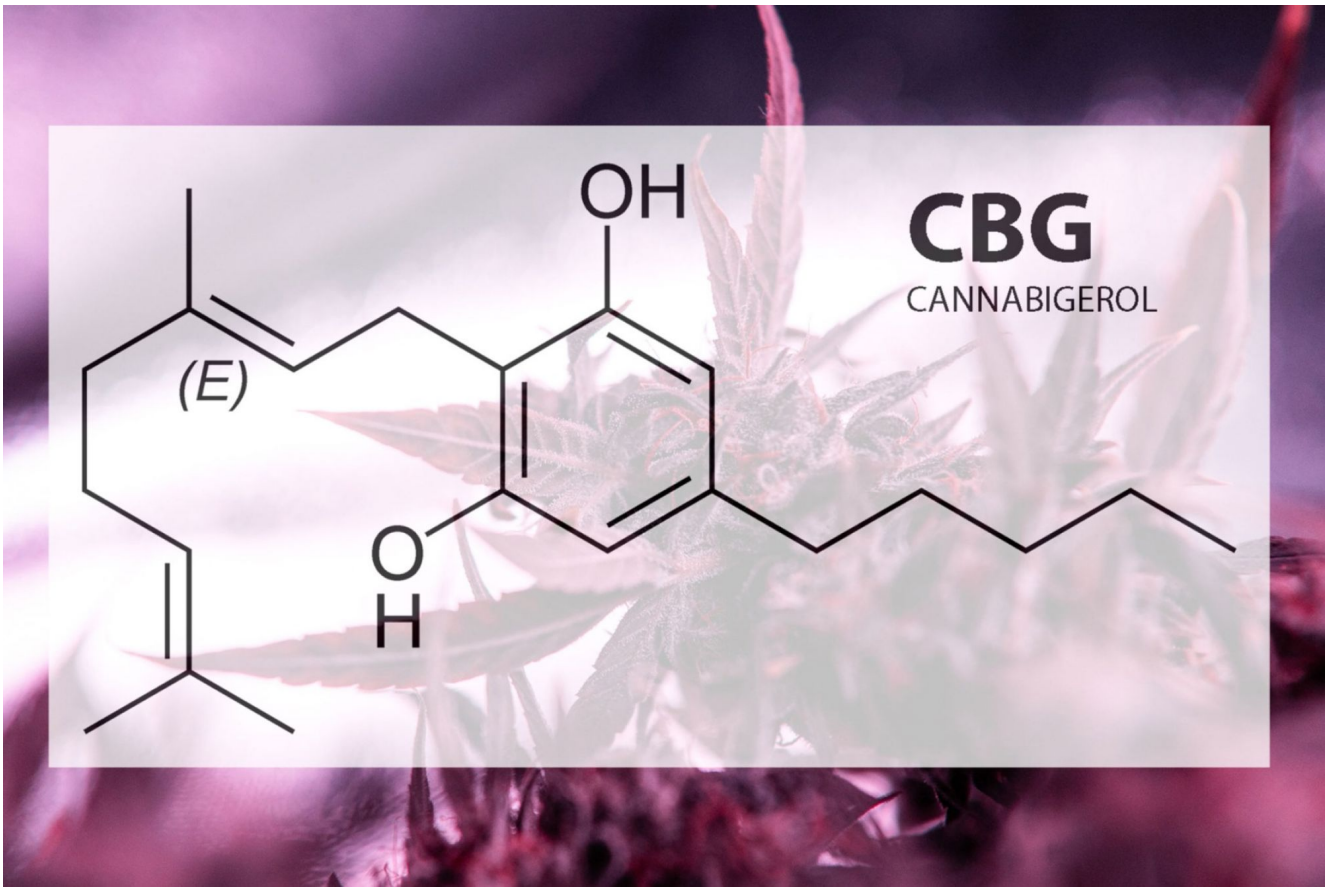
So What Is CBG, Anyway?



The cannabinoid is being touted as the next big thing.

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Although cannabis is a complex plant with more than 400 chemical entities, the weed industry has — for the most part — remained fixated on two particular cannabinoids: THC and cannabidiol (CBD). But other cannabinoids are starting to emerge into the spotlight.

One of these so-called minor cannabinoids is cannabigerol (CBG), which is gaining attention for its proclaimed anti-bacterial, anti-microbial, and anti-inflammatory properties. While CBG has yet to match the mainstream appeal of CBD, this cannabinoid may soon play a starring role in everyday consumer products as it quietly demonstrates a wide array of highly intriguing medicinal benefits.

“The pharmacological effects of CBG described in the scientific literature include: anti-fungal, anti-insect and anti-inflammatory activity; neuroprotective activity; stimulation of appetite, and enhancement of the death process of cancer cell,” Dr. Itzhak Kurek, CEO and co-founder of Cannformatics, a Northern California biotech company that uses bioinformatics (a combination of biology, computer science, and mathematics, among other scientific disciplines) to improve medical cannabis.

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Following the passage of the 2018 Farm Bill, which legalized industrial hemp production and established a THC limit of 0.3%, the industry is starting to realize the potential value that CBG presents from a medicinal standpoint. However, over the last few decades, scientists have left a paper trail of research that shows just how fruitful this relatively unknown cannabinoid could be.

What Science Says About CBG

CBGA is the chemical precursor to THCA and CBDA, playing a pivotal role in the biochemistry of the cannabis plant. During the flowering cycle, cannabigerolic acid (CBGA) can be converted into tetrahydrocannabinolic acid (THCA), the precursor of tetrahydrocannabinol (THC), and cannabidiolic acid (CBDA), the precursor of CBD, by enzymes. Once this phase is complete, the plant only contains trace amounts of CBGA, which can be decarboxylated into CBG.

CBG interacts with both the CB1 and CB2 receptors, potentially inhibiting the intoxicating effects of THC. CBG has also demonstrated an ability to increase anandamide, commonly referred to as the “bliss molecule,” an endogenous cannabinoid that helps regulate a wide range of bodily functions, including appetite, sleep, mood, and the immune system.

This minor cannabinoid also functions outside of the endocannabinoid system (ECS), and has shown itself to be an agonist to the serotonin 1A receptor. However, according to Tristan Watkins, Ph.D., Chief Science Officer at LucidMood, a Boulder, Colorado-based brand of proprietary terpene and botanical formulations, there's not enough evidence showcasing how CBG actually affects the human serotonin system.

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"When you look and see what serotonin 1A does, it's like all laundry list of potential actions," he explained. "So, we can't narrow it down and say it will cause this particular effects, because there haven't been enough behavioral studies on CBG to get to that stage."

More research is needed to fully understand what CBG has to offer from a medicinal standpoint, but existing studies have already presented several reasons to be optimistic about the therapeutic potential of CBG.

- **Antibacterial Properties: CBG has been identified as having remarkable antibacterial and antimicrobial properties. For instance, in a 2008 study published in the Journal of Natural Products, researchers found that CBG could be a potential treatment for methicillin-resistant Staphylococcus aureus (MRSA), a type of staph infection that is highly resistant to certain antibiotics.**
- **Glaucoma**: In a 1990 study, published in the Journal of Ocular Pharmacology and Therapeutics, researchers were examining how THC and CBG could help lower intraocular pressure in the eyes of cats. The findings concluded that CBG and related cannabinoids may provide therapeutic benefits to patients suffering from glaucoma.
- **Inflammation**: In a 2007 study published in the Journal

of Dermatological Science, researchers found that CBG, along with other cannabinoids, has the potential to treat inflammation caused by psoriasis, a chronic skin condition caused by an overactive immune system. In a 2013 animal studypublished in Biochemical Pharmacology, CBG also demonstrated the ability to reduce colon inflammation in rats, suggesting that CBG may be an effective treatment for inflammatory bowel disease (IBD) symptoms.

- **Neurodegenerative Condition**s: In a 2015 study conducted on lab mice published in Neurotherapeutics, researchers discovered that CBG was "extremely active as neuroprotectant," and also increased the levels of antioxidant defense. The findings suggest that CBG could be a viable treatment for certain neurodegenerative conditions such as Huntington's disease.
- **Anti-Tumor Growth:** Several studies have also found that CBG could inhibit the growth of cancer cells and, as one 2016 study on lab rats published in a German journal discovered, could act as an appetite stimulant, which could translate into a beneficial treatment for chemotherapy patients. In a 2016 study published in the Journal of Neuroimmune Pharmacology, researchers concluded that "non-psychoactive plant-derived" cannabinoids, including CBG, could act as direct inhibitors of tumor progression. Those findings are supported by a 2014 study in Carcinogenesis, which reached a similar conclusion that CBG could hinder tumor growth in colon cancer, as well a 2006 study in The Journal of Pharmacology and Experimental Therapeutics.that found CBG may be an effective treatment for breast cancer.

How is CBG Being Used?

Judging from what's available on the market, it appears that the antibacterial and antimicrobial properties of CBG are what

the industry sees as most promising.

Thus far, most of Axim Biotechnologies, a New York-based cannabinoid pharmaceutical company, has successfully filed for numerous patents involving CBG and CBD, including a patent to develop cannabis-infused toothpaste and mouthwash, as well as a topical cream containing both CBD and CBG, which is intended to reduce symptoms associated with atopic dermatitis, or eczema. Additionally, the company was recently granted a patent for anti-microbial compositions including cannabinoids, and plan to create a CBG-based powder to treat symptoms of athlete's foot and fungus.

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Aside from the medical approach taken by Axim, other cannabinoid-centric companies are starting to use CBG bolster the effects of adult-use products. LucidMood, for instance, has integrated this minor cannabinoid into its Party vape pen line. According to Watkins, the company added CBG as an ingredient because of its apparent ability to inhibit the uptake of anandamide, which could help reduce THC withdrawal and lethargy, making for a more social experience.

To test the CBG-infused Party pen, LucidMoon threw an actual party and had subjects come to socialize after completing a full workday. To keep track of the attendees' sociability and energy levels, LucidMood gave out coded push pins to place on a large mood board.

"What what was really intriguing is you saw that people's energy levels and sociability levels actually shot up right after use, and then really maintained for about three hours of consistent use," Watkins said. "Generally, even with THC, you expect lethargy to start kicking in after about two hours."

Watkins openly admits that this study shouldn't be submitted to a peer-reviewed journal, but does serve as a "real-world

experiment” that give an idea of how CBG may work in weed products.

“CBG is very interesting and I can’t wait to see what else it does,” Watkins continued.

CBG Presently Too Costly

As for whether CBG will ever reach the immense hype that CBD or THC has experienced, one of the deciding factors is whether the price point of CBG will drop. According to Huemoeller, CBG costs upwards of $20,000 per 2.2 pounds, or 1 kilogram, while the same amount CBD is priced around $3,600, making CBG five to six times more expensive.

“The reason why I don’t think a lot of people are playing around with it is because the cost of CBG,” he explained.

Another deterrent that prevents growers from focusing on CBG is that plants have to be cut early in order to maximize the harvestable amount this cannabinoid. With CBD and THC in such high-demand, most hemp or marijuana growers aren’t willing to harvest their plants early and forgo other cannabinoids in favor of CBG, Huemoeller said. That could very well change as interest in CBG increases.

“I think there are some breeders that are starting to figure out how to breed some of those seeds so that you can get a higher CBG percentage,” Huemoeller said. “I expect that’s going to change at some point.”

In a 2005 study conducted by GW Pharmaceuticals, a British biopharmaceutical company responsible for developing Epidiolex, a CBD-based drug designed to treat childhood epilepsy, researchers analyzed a southern Italian hemp plant that showcased a heavily CBG-dominant profile.

As more studies are conducted on these minor cannabinoids, consumers should expect to find CBG in more of their cannabis

products. However, for now at least, there’s little reason to believe that one of these minor cannabinoids will usurp THC as the industry’s cash crop.

“With these trace cannabinoids, their primary action is outside of the endocannabinoid system and it kind of makes sense why humans have been selecting THC,” Watkins said. “Because THC actually gives you a strong sense of euphoria, rather than selecting from these some of these other trace cannabinoids because they just don’t seem to have that strong of a perceivable effect.”

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