



**Introduction to
Cannabigerol (CBG)**

What is CBG?

Cannabigerol (CBG) is one of hundreds of cannabinoids derived from cannabis and is well-known for its critical role in cannabinoid synthesis^[1]. Therapeutically, it elicits **no psychoactive** effects which makes it a potential agent for several therapeutic indications including (but not limited to) pain, inflammation, cancer, and neurodegenerative conditions^[2-5].

CBG is dominantly abundant in its acidic form cannabigerolic acid (CBGA), where it serves as a precursor to synthesize other cannabinoids. CBGA specifically undergoes catalysis via a series of enzymatic reactions to become other well-known compounds including THC, CBD, and CBC (see Figure 2.)^[6]. In fact, without CBGA, these other cannabinoids would not exist.

Cannabinoids are converted from their acidic form (inactive state) to decarboxylated form (i.e. active state) through heating^[6]. The active form, CBG, can then bind to various human receptors to illicit a response.

Chemical and Physical Properties

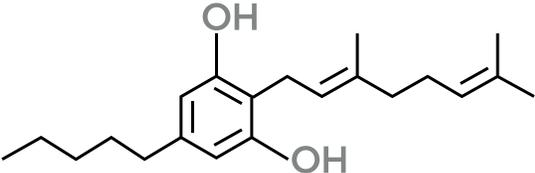
Structure	
Molecular Formula	C ₂₁ H ₃₂ O ₂
Molecular Weight	316.5 g/mol
Appearance	White crystalline powder
IUPAC name	2-[(2E)-3,7-dimethylocta-2,6-dienyl]-5-pentylbenzene-1,3-diol

Figure 1. Chemical and Physical Properties of CBG

Avicanna's genetic breeding program has shown ~15% CBG expression in the cannabis flower. Our leading research supports key properties such as:

- Higher affinity receptor properties in comparison to CBD
- Increased anti-inflammatory effects
- Strong pharmaceutical potential

CBG and other rare cannabinoids are **now available for purchase through American Hempseed**

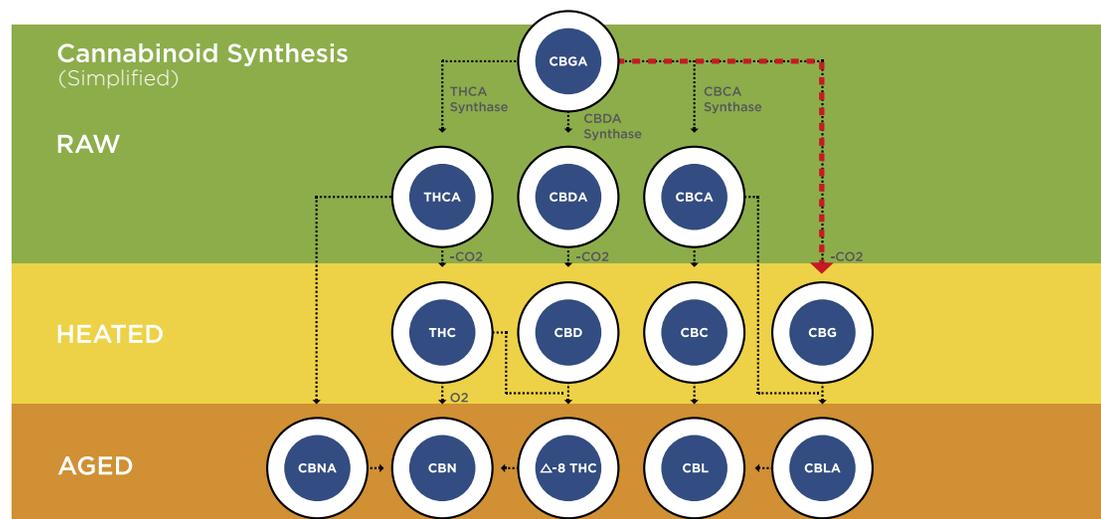


Figure 2. Cannabinoid Synthesis Pathway

Acronym	Full Name	Catalyst
CBGA	Cannabigerolic acid	-
THCA	Tetrahydrocannabinolic acid	THCA-synthase (enzyme)
CBDA	Cannabidiolic acid	CBDA-synthase (enzyme)
CBCA	Cannabichromenic acid	CBCA-synthase (enzyme)
THC	Delta-9-Tetrahydrocannabinol	Decarboxylation (heat)
CBD	Cannabidiol	Decarboxylation (heat)
CBC	Cannabichromene	Decarboxylation (heat)
CBG	Cannabigerol	Decarboxylation (heat)
CBN	Cannabinol	Oxidation (air)
CBNA	Cannabinolic acid	Oxidation (air)
Δ-8 THC	Delta-8-Tetrahydrocannabinol	Isomerization
CBL	Cannabicyclol	Irradiation (UV)
CBLA	Cannabicycloic acid	Irradiation (UV)

Pharmacology

According to recent investigations, CBG has similar receptor properties to CBD, acting as a competitive partial agonist for Cannabinoid Receptor 1 (CB₁) and Cannabinoid Receptor 2 (CB₂) that dominate the peripheral nervous system (PNS) and immune cells; and the central nervous system (CNS) respectively^[2,7]. CBG affects endocannabinoid signalling and has been shown to promote GABA accumulation more strongly than CBD and THC, therefore could mediate proper cell function, immunity and muscle spasticity^[2]. Specifically, CBG has been shown to promote natural endocannabinoid production, while lowering GABA reuptake in the brain and serotonin receptor activation^[2,8]. These characteristics impact a number of physiological phenomenon including improvements in sleep, muscle function, mood, appetite and anxiety^[2,7,8].

Therapeutic Applications and Possible Uses

CBG use for therapeutic indications is in its infancy, however scientific institutions are beginning to shift their attention toward lesser-known cannabinoids. The current state of knowledge for CBG use is outlined below:

Pain: Preliminary investigations of CBG have demonstrated stronger analgesic capabilities at lower concentrations than THC^[2,9]. The combination of receptor targeting in the CNS and PNS respectively make these, and other cannabinoids, an interesting target for the development of analgesic interventions^[9].

Cancer: CBG interacts with a number of known receptors involved in the formation of certain cancers^[4]. Specifically, CBG blocks transient receptor potential (TRP) channels and serotonin receptor types (5-HT_{1A}), while promoting endocannabinoid accumulation in order to facilitate cancer cell death and tumor reduction^[4].

Neuroprotective (Huntington's Disease): CBG specifically has demonstrated a number of neuroprotective effects in models exhibiting neurodegeneration including preservation of striatal neurons, abrogation of microgliosis, reduction of proinflammatory marker accumulation and overall improvement of motor function^[5].

Antibiotic: Many cannabinoids, including CBG, demonstrate potent antibacterial activity^[10]. Although this chemotype has not yet been well defined, it may likely be due to the structural framework that is characteristic to all major cannabinoids (phenol structures themselves have been independently shown to exhibit similar effects)^[10]. Further analysis of CBG also suggests its effectiveness toward antibiotic-resistant bacteria^[10].

Inflammatory Bowel Disease (IBD)/Colitis: Preliminary investigations have demonstrated a reduction in symptoms associated with IBD following CBG intervention, including reduction of colon length and overall inflammation. Currently IBD is an incurable condition in which symptomatic treatment is the current regime^[11].

Ocular tension: CBG (as well as THC) has been demonstrated to reduce intraocular pressure after a single exposure, with more dramatic effects after chronic use^[12].

Expected consumer and medical applications

- Dermatology – Dermatitis, Eczema, Psoriasis, and Acne
- Gastrointestinal Health - IBD/Irritable Bowel Syndrome (IBS), Colitis
- Mood - Anxiety and Depression



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