



Discover why CBG (Cannabigerol) is creating so much buzz in personal care



Introducing Creo

Creo is an ingredients technology company that focuses on one of the world's fastest growing ingredient classes – cannabinoids – which it produces using the natural process of fermentation. Founded in 2016 and headquartered in California, Creo's mission is to enable the creation of value-added cannabinoid products that help people everywhere, at scale and in a more environmentally sustainable way, using advanced biology instead of the cannabis plant.

Creo's technology partner and major shareholder is industry-leading biotechnology firm Genomatica. Creo operates legally in the US on both a federal and state level. Its products contain no THC, are not regulated by the DEA, and are not considered as "drugs" by the FDA.

Capture your next big opportunity in the fast-growing cannabinoids market with CBG: the mother cannabinoid

Cannabinoids have become a natural health, wellness and beauty phenomenon. One of the more common cannabinoids, cannabidiol (CBD), has already gone mainstream through national resellers. Cannabigerol (CBG) is the new CBD. And like CBD, it's not intoxicating. CBG is known as the mother cannabinoid since other cannabinoids like CBD, CBC and THC are derived from it.

According to a recent study by the Brightfield Group, consumer awareness of CBG is rapidly increasing. Already at least eight million US adults are likely to buy products

containing CBG. CBG buyers represent an attractive consumer segment, more likely to be millennial, financially successful and well educated. Social media conversations concerning minor cannabinoids are focusing on CBG as the next wellness and beauty ingredient.

Indeed, a growing number of companies have been launching products containing CBG, with applications ranging from cosmetics and skincare to beverages, foods and supplements.

Recently, the European Commission added CBG to the Cosmetic ingredient database (CosIng), which approves its inclusion as an ingredient in personal care and cosmetics within the European Union.



A breakthrough in biotechnology creates a new market opportunity

In order to realize their true potential, cannabinoids need to be available to product manufacturers at commercial scale with consistent specification and high purity at an attractive and stable price, while holding clear and favorable legal status. Creo has pioneered an approach that meets all these needs through the natural process of fermentation, combined with advanced biology. Creo is now able to supply bioidentical CBG that is safe and more sustainable, at scale.

Fermentation for a more sustainable future

Many cannabinoids occur naturally in only small quantities in plants, and their production and extraction can have a significant environmental footprint. In contrast, the natural process of fermentation when used to produce cannabinoids requires potentially less water, energy, and land resources than plant-based approaches. This gives you, our customers, the ability to develop innovative new products without causing unnecessary harm to the planet. And Creo's ingredients are of the highest quality, containing none of the contaminants often associated with plant-derived cannabinoids.



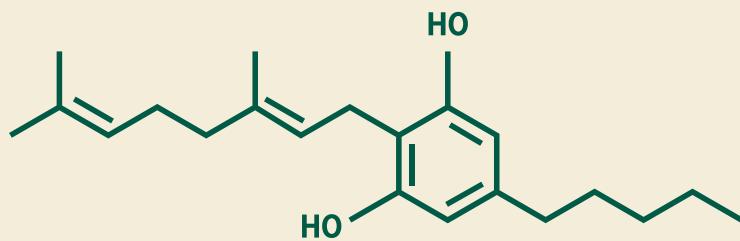
Creo CBG: product details

- Science-backed
- THC-free
- High potency and quality
- Assurance of purity, independently verified
- No heavy metals or pesticides
- Vegan
- Gluten-free
- Cruelty-free
- cGMP compliant
- Kosher
- Consistent supply at scale
- Global regulatory advantages
- Made in the USA
- Made in an FDA-registered facility

Creo CBG: your next hero ingredient

Entering the cosmetic ingredient database

In 2021, the EU Commission approved cannabigerol (CBG) into the Cosmetic Ingredient Database (CosIng) as a safe cosmetic and personal care ingredient. Research surrounding CBG's beneficial effects on the skin is ongoing, with Creo taking a leading role in understanding CBG's efficacy for potential cosmetic and personal care formulations.



Creo's CBG research

Creo is taking a leading role in understanding CBG's efficacy for potential cosmetic and personal care formulations. Creo's research has found that CBG affects genes involved in:

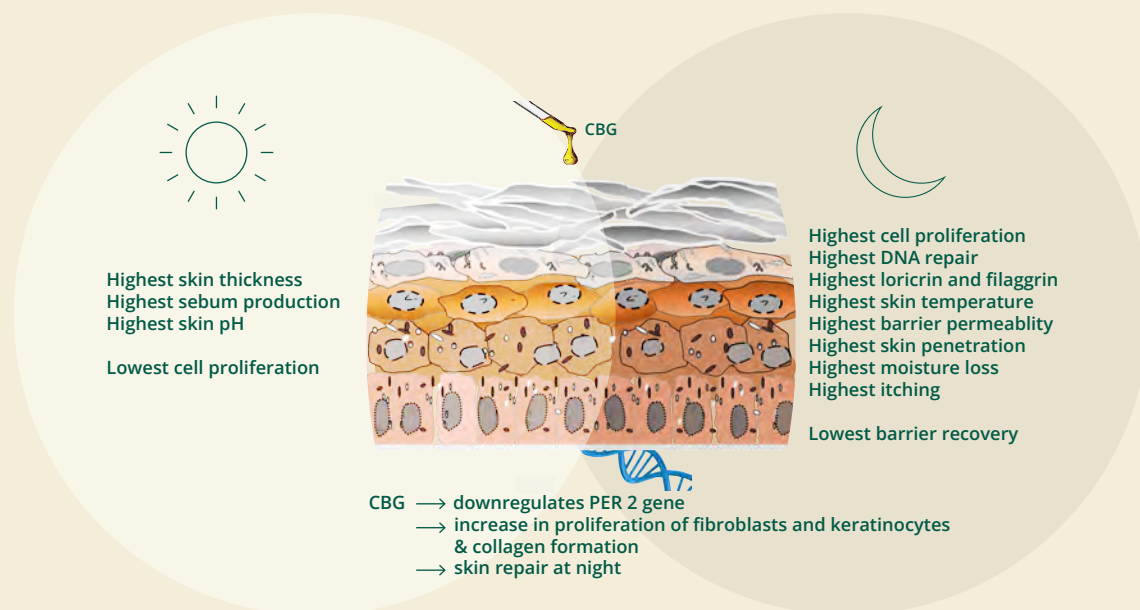
- The skin's circadian rhythm
- Skin irritation
- The skin's barrier
- Skin tone

Skin and the circadian rhythm

Our bodies' internal clock regulates many different aspects of our physiology, including our sleep – wake cycle, hormone production and digestion – all of which influence our skin's health. Faced with the process of aging and exposure to various environmental aggressors – like extreme temperatures, light exposure, humidity and air pollution – our skin repairs itself through our bodies' circadian rhythm. At night our body recharges itself, giving our skin a break from standing guard from outside stressors all day.

Creo has found that CBG downregulates the expression of gene markers like PER 2, as a result of which there is an increase in proliferation of fibroblasts and keratinocytes and collagen downregulation. These effects at night allow the skin to **repair** and **re-charge**.

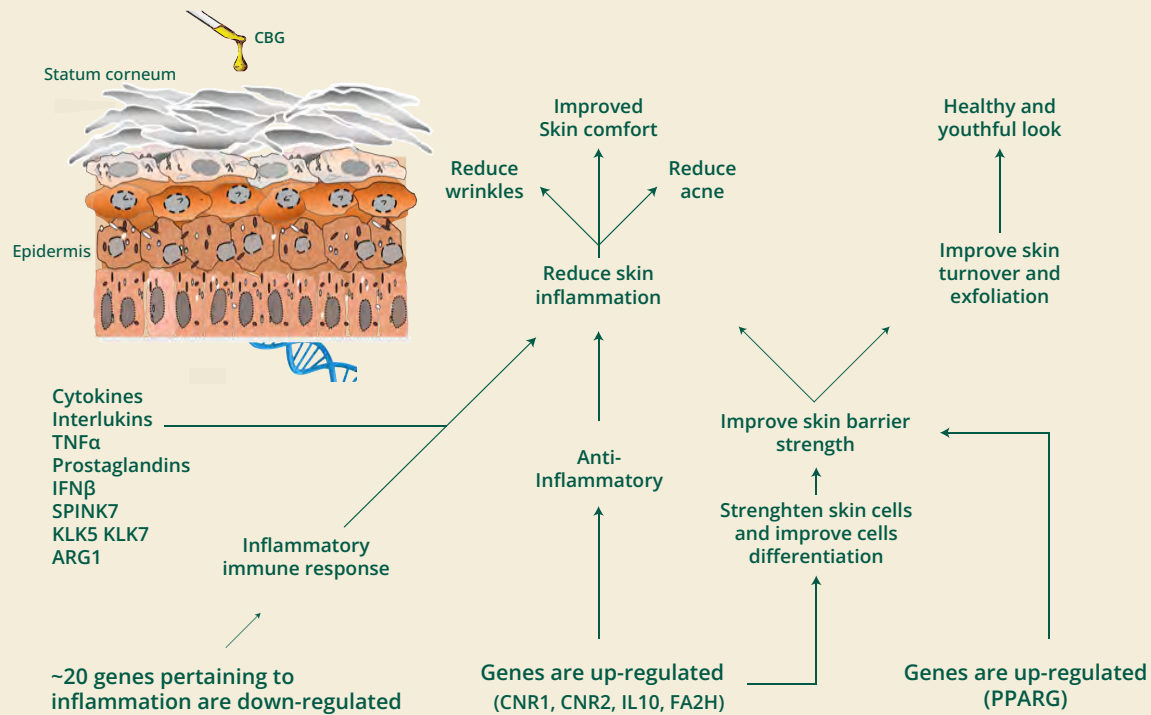
How circadian rhythm influences the skin - day and night



Reducing irritation and strengthening skin's barrier

When seeking to understand CBG's relationship to skin health, Creo pays particular attention to genetic markers that are involved in reducing irritation, improving skin texture and sustaining a healthy glow.

Creo has found that CBG regulates a multitude of genes involved in reducing inflammation and strengthening the skin's barrier function and turnover, thus promoting **healthy**, more **youthful** looking skin that feels **calm** and **comfortable**. Furthermore, antioxidants like CBG play a vital role in **protecting** the skin from environmental damage.



CBG was found to regulate genes in a way that could lead to reduction in inflammation by:

Blocking production of mediators involved in inflammatory responses, including:

- Interleukin 23 Subunit Alpha
- Prostaglandin-Endoperoxide Synthase 3
- Hornerin
- Colony Stimulating Factor 2
- C-C Motif Chemokine Ligand 2

Increasing expression of genes involve in reducing inflammation, including:

- IGFL3
- CNR2
- FA2H
- IL10
- CNR1

CBG was also found to regulate genes in a way that promotes skin strength and barrier function by:

Reducing the expression of genes that promote the breakdown of collagen and other skin strengthening components and weaken the skin, including:

- MMP10
- SERPINB3/B4

Promoting the expression of genes that stimulate the production of proteins and the growth of skin cells involved in strengthening the skin and improving the barrier function, including:

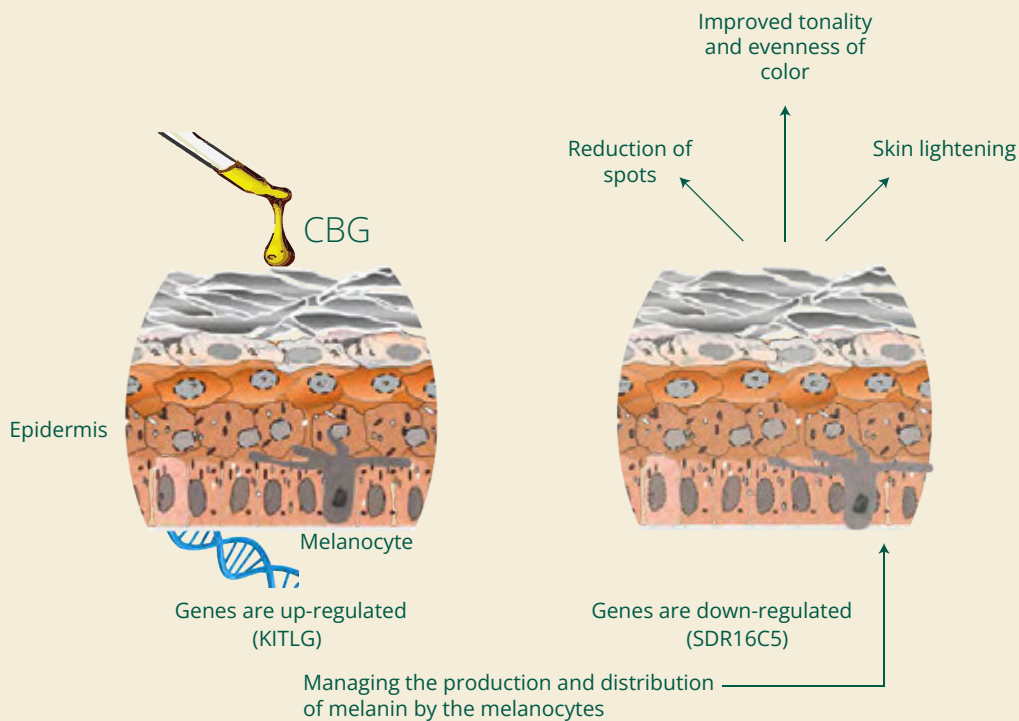
- LAMA3
- PPARGC1A
- CTSV
- PPARGC1A
- SERPINH1
- COL1A1

Promoting even skin pigmentation

Ongoing studies are exploring how CBG interacts with the genes responsible for improving skin tone. Creo has found that CBG regulates key genes involved in melanin production in a way that supports more **visibly even** pigmentation.

Genes such as KITLG and SDR16C5 have a significant relationship with melanin. When KITLG is upregulated and SDR16C5 is downregulated, melanin production and distribution is reduced, which is attributed to lightening skin.

Other genes found to be affected by CBG include EDNRB that is required during pigment cell development, and SDR16C5 that down regulates differentiation and proliferation of melanocytes. QPCT is one of the genes involved in regulating skin pigmentation, whilst downregulating the NRG1 gene inhibits melanocyte growth. Upregulation of KITLG lightens an individual's color, and the MITF gene provides instructions for making a protein that helps control the development and function of pigment-producing melanocytes.

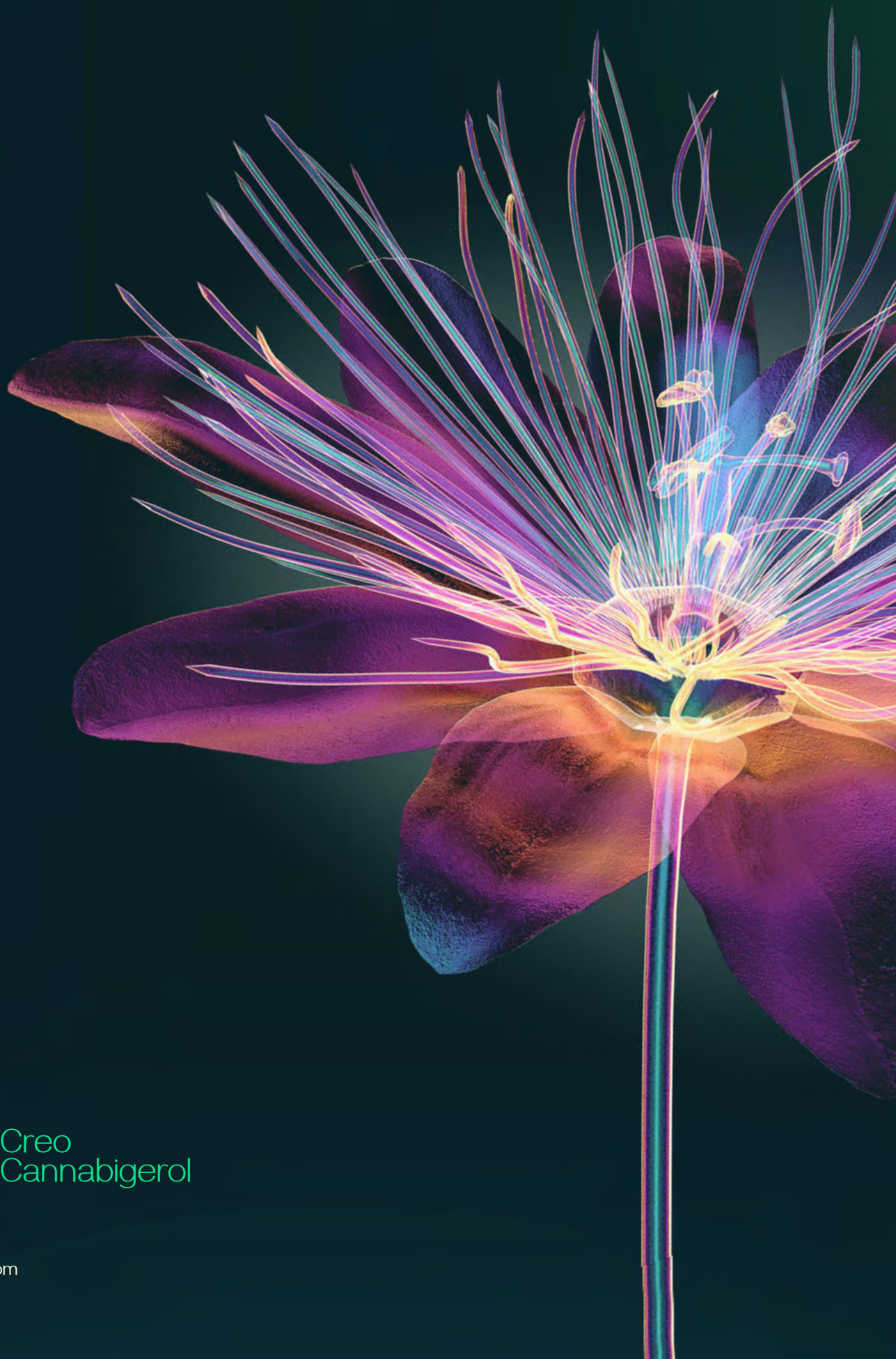


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Contact Creo
+1.817.609.2033
info@creoingredients.com
creoingredients.com