

# ECS:

*the body's  
master system*



Understanding the endocannabinoid system's role in overall health

# ECS 101

**We're constantly in pursuit of the fountain of youth, a magic bullet, that one thing that is going to make us feel like our very best selves.**

But today, we know that a "quick fix" is nothing more than a fallacy and that true health takes a holistic approach—and a deep understanding of how our bodies work. You probably understand the basics of how your cardiovascular system functions, and the buzz sparked by media attention to gluten or probiotics may have deepened your grasp of your digestive system. But your body has another system you may not be familiar with—and it might just be the one that rules them all:

*The endocannabinoid system (ECS).*





## THE ENDO-WHAT?

The more research reveals about our health, the more we learn how everything in our body is connected. The key to that connection—and to better health—may just lie in the ECS. The ECS helps to balance many of our physiological systems and supports the body. It impacts just about everything: appetite, immune response, calorie burn, pain and inflammation and even cellular health. But its most important overall function is what scientists call homeostasis—or what regular folks like us call “balance,” according to Jonny Bowden, an author and nutrition expert who holds a PhD in holistic nutrition and is board-certified by the American College of Nutrition. Bowden notes that imbalance is what leads to many common health conditions. Hence, why experts are increasingly supporting the idea that nourishing and modulating the ECS is critical to health and wellness.

Though the ECS hasn’t been on scientists’ radars for long, as more and more information about the power and potential of the ECS emerges, education is beginning to spread about the enormity of what this system does—and its enormous healing potential. Knowing the basics can empower you to better take control of your own health and support healthy sleep, manage stress and address digestive issues.

## Wondering how it works? Read on ...

Right now, your body’s cranking out new chemical messengers (called neurotransmitters, if you were curious) that relay communications between cells throughout our body. Endocannabinoids are a type of neurotransmitter that our bodies make (“endo” means “within”). These compounds don’t come from the cannabis plant, though part of their name does because they were discovered during cannabis research when phytocannabinoids, phyto compounds found in hemp and other plants, were discovered and named. When we consume phytocannabinoids, such as CBD, they act similarly upon the ECS as the (endo)cannabinoids we make ourselves.

CBD works throughout our bodies. It acts upon two types of cannabinoid receptors called CB1 and CB2. These receptors are found everywhere from our organs, nervous system, brain and connective tissue, to the skin on our elbows. CBD acts like the endocannabinoids that our bodies make. How? Think of them like locks and keys. Phytocannabinoid and endocannabinoid “keys” act upon receptor “locks” to help activate the system.



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### RECEPTORS



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## THE ECS FOR FINDING BALANCE

What does the ECS do? Well, a lot. It essentially influences how we react and adapt to the environment, the foods we eat and more. It also impacts our psychological functioning. In each type of tissue, the system performs different specific jobs, but the goal is always the same: homeostasis, also known as balance. Our body is self-regulating. Like a tightrope walker, it's constantly shifting to stay balanced and healthy. Think of the ECS, and the endocannabinoids and phytocannabinoids that support it, like the tightrope walker's pole, a powerful force constantly acting to help keep the body's systems from tumbling and crashing.

Endocannabinoids and cannabinoids help maintain homeostasis at every level of biological life, from within each cell, to between different networks of cells. Sort of like the "cell" phones of biology, they support communication and coordination between different cell types in places where our body's different systems connect.

*With its complex actions in our immune system, nervous system and all of the body's organs, the ECS is a bridge between body and mind.*

This homeostasis-balancing function is key to how our body regulates conditions. "The endocannabinoid system is involved in a huge number of disease states—mostly as a protective system," says pioneering ECS researcher, Hebrew University medicinal chemistry professor Raphael Mechoulam, PhD. According to 2013 research review published in the *Federation of European Biochemical Society Journal*, keeping the ECS in balance can positively impact nearly all human conditions, from weight and inflammation to gut, liver and skin issues.

# The key

*to addressing overall health*

Because the ECS modulates all physiological functioning, and helps the body adapt to changing environmental conditions (including all types of stress), making sure the ECS is healthy is key to systemic health.

## **CARING FOR AND FEEDING THE ECS**

Just as it impacts other systems, researchers theorize that modern life's double punch of stress and imperfect diet can affect our ECS and reduce our ability to produce endocannabinoids. People may also have genetic issues that reduce their ability to produce endocannabinoids. More and more research is linking endocannabinoid deficiency to a range of health issues, reinforcing the importance of CBD supplementation.







Nourishing the ECS is important not just for people fueled by processed food or people with health conditions, it's key for healthy people, too. Athletes, especially, need to support their ECS. This is because the ECS may play an important part in recovery and repair during and after workouts that cause stress to athletes' bodies. In addition to phytocannabinoid supplements, there are other ways we can support our ECS. "Anything you can do to keep your life in balance—like getting enough sleep—is like putting money in your ECS bank account. Bumping up your omega-3 intake, developing strong social networks, exercising regularly, eating lots of antioxidant and anti-inflammatory green vegetables, taking CBD hemp oil—all of these help your endocannabinoid system work well," says Bowden.

### CBD FOR THE ECS

After Mechoulam and his team identified both THC (psychoactive) and CBD (non psychoactive) in cannabis in the mid 1960s, their ensuing studies brought the many potential benefits of CBD to light.

CBD helps the ECS in an indirect way. Our body creates a neurotransmitter called anandamide (AEA), also known as the bliss molecule. The more AEA, the happier our ECS. But we don't create a store of AEA to save for when the body needs it, like we do with fat. Instead, our body makes AEA and another compound that stimulates receptors called 2-arachidonoyl glycerol (2-AG) on demand. When needed, they're created, work and disappear within seconds. What makes them disappear? The fatty acid amide hydrolase (FAAH) breaks down AEA. CBD works like a missile defense system, interrupting FAAH, the bad guys, before they can break down the AEA and 2-AG, the good guys.



## More ways to support the ECS



**Consuming polyunsaturated fatty acids** like omega-3s, whether through diet or supplements, is essential to ECS functioning.



**Complementary alternative therapies** such as massage and acupuncture can also help—a lot, according to a 2014 clinical review of interventions that boost ECS performance.<sup>1</sup>



**Stress reduction** through activities such as exercise can also significantly support the ECS. Turns out "runner's high" may be an ECS-induced reward for hitting the ground running!<sup>2</sup>



<sup>1</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3951193>

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CBD is helpful in other ways, too. According to *CBD: A Patient's Guide to Medicinal Cannabis* (North Atlantic Books, 2017), it binds to various other receptors in the brain, including serotonin 5HT1A (contributing to its antidepressant effect), TRPV1 (contributing to its anti-psychoactive effect), the nuclear receptor PPAR-gamma (regulating immune response) and the orphan receptor GPR55 (contributing to its osteo-protective effects) among others.

And this is likely just the beginning, says Bowden. "With the growing interest in the medical benefits of cannabinoids, and the growing acceptance of cannabis in general, I'm expecting you'll see an explosion of research on specific cannabinoids (such as CBD) on specific conditions." Bowden notes that we already have significant reason to believe in and understand CBD's benefits. "What we have with CBD is a powerful compound that the existing and emerging research says has positive effects on a number of conditions and symptoms. We have a compound that we know for a fact stimulates the ECS."

### THE SCIENCE SHINES

Researchers are exploring CBD's effect on at least a dozen different health conditions. Note that dietary supplements play under a different set of rules than drugs, so they cannot claim to diagnose, treat, cure or prevent any disease. That means that even if there's science on the ingredient as it relates to diseases, these cannot be discussed in a health food store setting or by brands because these are diseases, which are out of bounds for dietary supplements. What we do know, though, is that CBD is one of the most powerful ingredients to help support the ECS—and that it is increasingly being used for everything from managing stress and sleep issues to helping alleviate pain and support performance.



## Big, wide world of cannabinoids: better together



While scientists have identified 111 phytocannabinoids, we only know some of the pharmacological effects of 10 percent of them. The research community is working on it, however. In the past decade, PubMed has published more than six thousand peer-reviewed papers on phytocannabinoids and entocannabinoids. There's so much more to learn. One thing we do know is that cannabinoids work like a symphony, where lots of musicians combine to create a sound more powerful than single instruments. For yet-to-be-explained reasons, the components in cannabis work better together than they do as single ingredients. This synergistic process is called the entourage effect.



## ECS SUPPORT THAT'S RIGHT FOR YOU

Everybody's ECS is different, so the amount of CBD taken, how it is taken and how it works can vary from person to person. Different from pharmaceutical drugs delivered in specific doses, CBD is highly individualized. There are no researched potency standards, delivery systems or dosages that physicians can consistently rely on.

With CBD, dosage can be as unique as the patient, write Leonard Leinow and Juliana Birnbaum in *CBD: A Patient's Guide to Medicinal Cannabis*. You can put drops of a tincture or oil blend under your tongue, take capsules, add oils to food such as smoothies, smoke it, vaporize and inhale it, rub salves and lotions onto your skin or apply transdermal patches. You can even use a CBD suppository. These options give people the power to create personalized wellness solutions that work best for them.

Reactions to CBD can vary greatly from person to person, depending on factors like strain, dose, potency, delivery format, time of day taken and even what's in your stomach. Consult with your health care practitioner and keep detailed records of usage and effects to help you refine the best way CBD can enhance your general health or specific conditions.

## CHOOSING A CBD PRODUCT

You can buy CBD supplements at natural retail stores. To maximize the benefits of CBD and harness the power of the entourage effect of phytocannabinoids, choose a product that includes "full-spectrum" hemp oil derived from the stalk and stem of the plant, not isolated or synthetic compounds. Additionally, isolates are considered drugs by FDA and DEA, and illegal to market in dietary supplements.

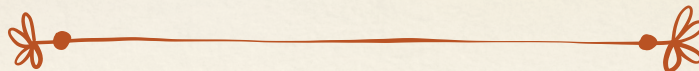
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## CBD Extraction



**Two common ways manufacturers extract CBD is by using carbon dioxide or using ethanol. Both have benefits. The most important thing is to find companies that are committed to transparent business practices and invest in third-party testing.**

In carbon dioxide extraction (CO<sub>2</sub>), plants are filtered through a series of temperature and pressure-controlled chambers, which uses pressurized carbon dioxide to pull cannabinoids and other phytochemicals from the plant. Carbon dioxide is a common food additive (think soda) and has been used by food companies for years to extract things like caffeine. The cannabinoids that result are highly potent, with minimal risk of contaminants.

The other method is ethanol extraction, which uses alcohol as a solvent to extract the phytochemicals. The FDA classifies ethanol as "Generally Regarded as Safe," or GRAS, meaning that it is safe for human consumption. Alcohol is made via plant fermentation and is a by-product of plants themselves. It is the only solvent that maintains the original ratios of healthy terpenes and other plant compounds contained in the whole plant (remember, the "entourage effect"?).

