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The thrifty ways of nature

Then God said, "Let the land produce vegetation: seed-bearing plants and trees on the land that bear fruit with seed in it, according to their various kinds." And it was so.

Genesis 1:11

In this essay we'd like to mention a few interesting cannabinoid connections that we didn't get to cover in more detail. The subtitle for *The Cannabis Papers* points to our emphasis as a "guidebook." We realized early on that we were ignorant about cannabinoids. Then we realized pretty much everyone was. Then we realized that was no longer a problem in the 21st century – we had PubMed, for example. Time was the problem, mainly the lack thereof. So we created this guidebook for ourselves as much as for you.

A guidebook is designed for the misguided. It helps you get to your destination – in this case, an understanding of cannabinoids. Along the way we saw this natural pattern: ***cannabinoid modulation is thrifty***. To explain this pattern we will use the three headings Hempy, Healthy and Happy.

Hempy

There is little variance in the many translations of Genesis 1:11. The point is always the same: a Creator made seeds, not us. Cannabis is a ***seed-bearing plant*** and has been for millions of years. It is organic and a part of nature, just like us. To make it this far, the plant developed a thrifty persona. It needs little. It grows in ditches and other inhospitable places. Thrift is part of its nature. Thrift is how it survived.

Herbal and synthetic cannabinoids have a simple structure that facilitates stability and use. They store well and are easily metabolized. Thrift is found in the molecular structure of fatty acids and cannabinoids. Both are formed by a specific number of carbon, hydrogen and oxygen atoms connected together. The thriftiness of the CS is exhibited in its ability to work with many different chemicals. For example, fatty acids are a vital source of fuel. When metabolized they produce large quantities of ***adenosine triphosphate (ATP)*** – known as the "***molecular unit of currency***." Here are three omega fats that produce ATP. We have listed their molecular formulas and corresponding acids:

Omega-3	$C^{18}H^{30}O^2$	Linolenic, DHA, EPA
Omega-6	$C^{20}H^{30}O^2$	Arachidonic
Omega-9	$C^{18}H^{34}O^2$	Oleic, Stearic

This shows three fatty acids with slightly different molecular formulas. Now look at these three cannabinoids, two herbal and one synthetic, with the *same* molecular formula:

Delta-9 THC	$C^{21}H^{30}O^2$
Cannabidiol	$C^{21}H^{30}O^2$
Marinol	$C^{21}H^{30}O^2$

Then add this interesting intricacy:

Progesterone is $C^{21}H^{30}O^2$

So one could ask – *You mean to tell me the most notorious cannabinoid of them all, the one they don't allow anywhere, not even in Hempmilk, even though it kills cancer, you're trying to tell me that molecule looks exactly like the hormone Progesterone?*

Yeah, it does. That is an example of thrift in nature, where the same good works differently in different life forms. There's also another thrifty thing nature is good at – **mimicry**, which is the behavior of copying another life form. Mimicry is fundamental to the connections we have to other humans; just watch a mother, father and child for a few interactions and you'll witness mimicry.

Our friends at Cayman Chemical have also noted this behavior. In the 2011 research essay *Cannabinoid Signaling: The Original Retrograde Signaling Pathway*, they have a section heading titled **CB Mimetics and Related Compounds**. Here's what they have in mind. Examine these three endocannabinoids and you'll notice they don't look that much alike:

Anandamide	$C^{22}H^{37}NO^2$
2-AG	$C^{23}H^{38}O^4$
Oleamide	$C^{18}H^{35}NO$

All three *endos* vary slightly yet work together in modulation of the CS. Anandamide and oleamide need a nitrogen atom to exist, whereas 2-AG doesn't. All three have oxygen atoms, yet at varying numbers. Oleamide stands out for being the only cannabinoid listed in this section that doesn't have at least two oxygen atoms.

It appears that nature designed the CS to be thrifty, a quality needed to modulate a lifetime of experiences.

Healthy

It's hard to place a value on a good night's sleep, some psychic space for the mind to unwind, or the ability to eat without nausea. Difficult to understand a woman's post-partum depression or a soldier's post-traumatic stress disorder. Getting back to healthy is

not always easy. A person in pain or suffering or looking to modulate their consciousness deserves the right to cannabinoid supplements. They shouldn't be illegal. Well, not all of them are.

The Black Hole Appetite Enhancement Formula is a legal supplement. Its label proudly proclaims a love for “*Cannabinomimetic Alkylamides.*” Their product guide delights in Black Hole's ability to activate *both* cannabinoid receptors:

The next step was to look for herbs that contained these alkylamides that mimic the structure of cannabinoids. The two herbs that showed the greatest promise were Echinacea Purpurea and Spilanthes Acmella. Both of these herbs contain many different alkylamides, but recent clinical information has suggested that there are 3 in particular that have a high affinity for binding to both the CB1 and CB2 receptors. Dodeca-2E,4E,8Z,10Z/E-tetraenoic acid isobutylamide and dodeca-2E,4E-dienoic acid isobutylamide from the Echinacea herb and undeca-2E,7Z,9E-trienoic acid isobutylamide from the Spilanthes herb, found in a precise blend in Black Hole, could be used to mimic the herbal cannabinoids, and more importantly, the endogenous cannabinoids found in the human body, including anandamide. Not only does the clinical information suggest that they can mimic them, but they can even bind to the receptors for a longer period of time than can the other two types.

Legal binding to “*both the CB1 and CB2 receptors*” at an online supplement store near you! Here we've been portraying cannabinoid prohibition as absolute. That is no longer true. The Black Hole Appetite Enhancement Formula has beaten prohibition! It is legally attempting to activate the CS for health effects. That makes it an interesting sign. It shows instability in the logic of prohibition. It also shows the logic of cannabinoids is winning.

Winning isn't victory though: for that we need a *thrifty* peace – one recognizing a citizen's right to herbal cannabinoid supplementation. We'll have a better name as well, something like The Green Plant Appetite Enhancement Formula.

Happy

In discussions while writing this book, some of us talked at length about how today's “*always on the go*” culture makes contentment nearly impossible. One finds that they are always doing, going and looking for more no matter how much doing, going and looking they've already done. The CS, by design, allows us the ability to step outside the world of constant movement and notice a kind of happiness in the present. One writer mentioned how you can reduce the constant impulse to go out (just for the sake of going out) with cannabinoid supplementation.

Well-known cannabinoids have a more in-depth research database to draw on. The less-known cannabinoids are now drawing the attention of researchers. Here are three to keep track of:

Cannabigerol	$C^{21}H^{32}O^2$
Cannabichromene	$C^{21}H^{30}O^2$
Tetrahydrocannabivarin	$C^{19}H^{26}O^2$

Cannabigerol (CBG) is found in plants with little THC. This would be your common “ditch weed” that grows throughout America. THC’s leading role in cannabinoid history has also allowed it to dominate research. CBG is drawing more attention because of its dynamic receptor activity. It has strong activity at *adrenergic receptors*, moderate modulation of *serotonin 5HT-1 receptors*, and low affinity for *CB1*. Cannabigerol also activates *CB2 receptors*; to what strength and action is still being researched.

Cannabichromene (CBC) also has the seemingly ever-present molecular formula of $C^{21}H^{30}O^2$. Its role in the CS was thought to be as an entourage. CBC has anti-inflammatory effects that improve with the addition of THC. Its future is likely to change soon. One issue in researching CBC has been its receptor activity. It didn’t seem to activate CB1 or CB2. With the recent discovery of the CB3 receptor, our understanding of the activity of this cannabinoid is likely to improve.

Tetrahydrocannabivarin (THCV) is considered special for its “high” content: some varieties of cannabis are more than 50% THCV. It is a CS antagonist for CB1 receptors and is in clinical trials at GW Pharmaceuticals as a treatment for type 2 diabetes.

Thrifty implies economical and frugal, industrious and thriving, and even prosperous. *The word also describes a thriving plant growing vigorously.* That’s definitely our weed, always growing with vigor.

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Search terms

Genesis 1:11; fatty acids *arachidonic* (ARA), *docosahexaenoic* (DHA), *eicosapentaenoic* (EPA), *linolenic*, *oleic*, and *stearic*; ATP; cannabigerol; cannabichromene; tetrahydrocannabivarin; cannabinoid mimetics; DHA/EPA Omega-3 Institute.

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