AN OPEN TEACHING

The Living Materia Medica

Five Plants, from the Historical Record to the Body's Own System

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The Levels of This Work

This is a free teaching, and it is complete in itself. Five plants, each carried from the old hand that first wrote it down to the modern chemistry that characterizes it now, and each set beside the body's own endocannabinoid system, the signaling network many plants and many foods speak to. Read it and you will know something true about five plants and about the discipline of pharmacognosy that studies them.

It is also a map. The work is offered at levels, and it is honest to name them, so that you finish knowing not only these five plants but where the work goes deeper and how to walk in at your own readiness.

The Commons. The open teaching, given freely and without gate: the plants, the lineage, the method, taught plainly. This gift is the Commons, and the Commons is meant to be worth keeping on its own.

The Circle. The community. Within the Alkemist Mother lives the Rooted Legacy Healing Collective, where the teaching becomes belonging: the ancestral knowledge of Indigenous and seasonal food systems, food as medicine, and a circle of people learning together through the turning year rather than alone.

The Lineage. The practice. The Apprenticeship, for those who mean to carry this into scholarly or professional practice, in a lineage of clinical botanical and endocannabinoid study, with a certification track by request or invitation.

The Frontier. The research itself, the open questions at the edge of what is known, which the community and the practice point toward and which the deeper studies investigate. This gift names its frontiers where they appear, and marks them as doors, not rooms. That is not a withholding of value. It is the honest shape of real inquiry, and it is the reason the levels exist.

The Circle and the Lineage are two doors, not one staircase. A mother drawn to food as medicine and a clinician seeking botanical depth enter differently, at their own level. Both open off this same open teaching, and both point toward the same frontier.

A word of register before we begin. Everything here is education, not medical advice, and none of it is a protocol, a dose to follow, or a promise of an outcome. Where a plant touches pregnancy, medication, or a health condition, the entry says so and sends you to qualified care. This is a teaching of plants and of method, and it names no formulation.

Part One: Understanding the Endocannabinoid System

Why this matters

Most people have never heard of the system inside them that keeps the rest in balance. It has no daily headline and no household name, yet it

touches nearly every process that keeps a body steady: how you sleep, how you feel pain, how you digest, how you respond to stress, and how your immune system decides when to act and when to stand down.

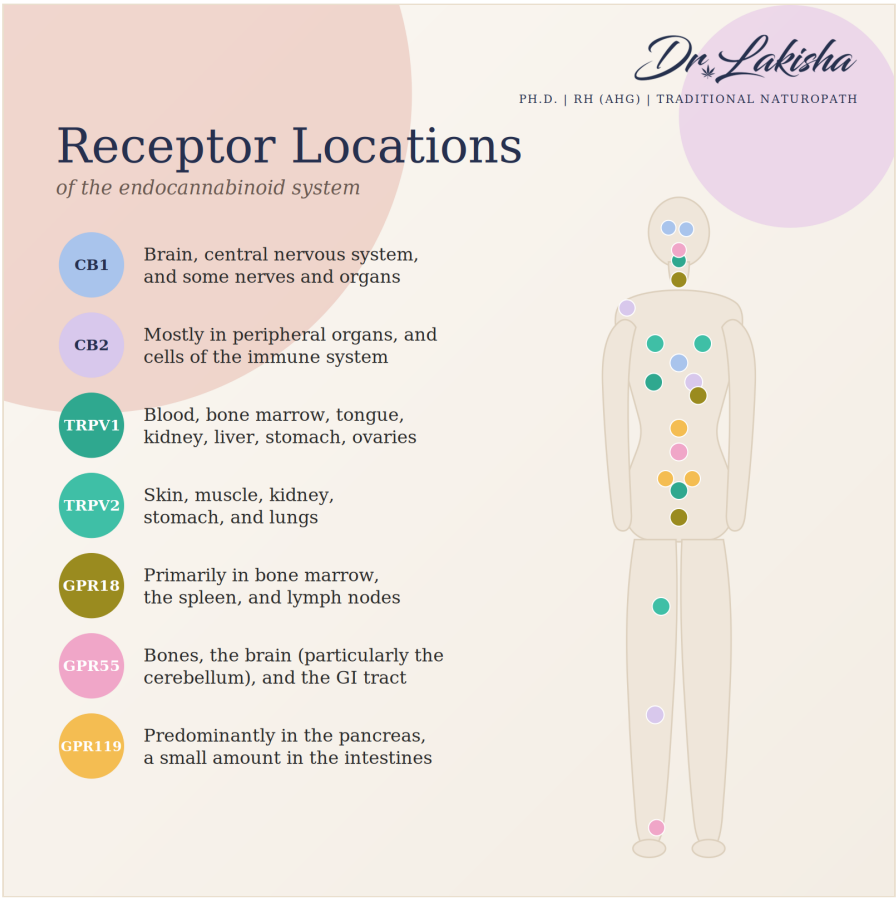
It is called the endocannabinoid system. Understanding it changes how we think about health, about plants, and about the kind of evidence medicine should require before it decides who gets care. This is a plain-language introduction to what the system is, what it does, and why it sits at the center of my work in pharmacognosy and novel botanical drug discovery.

What the endocannabinoid system is

The endocannabinoid system, often shortened to the ECS, is a signaling network that runs throughout the body. Think of it less as an organ and more as a communication layer, a set of messengers and receivers that helps your cells stay coordinated. It has three working parts.

The messengers. Your body makes its own cannabinoid molecules, called endocannabinoids. The two best understood are anandamide and 2-AG, produced on demand rather than stored in advance.

The receivers. These messengers dock onto receptors on the surface of cells. The two most studied are CB1, concentrated in the brain and central nervous system, and CB2, found mostly in immune cells and peripheral organs. A wider family, including TRPV1, GPR55, GPR18, and GPR119, extends the system's reach into blood, bone, skin, kidney, liver, and the gut.



Receptor locations of the endocannabinoid system across the body.

The recyclers. A set of enzymes builds these messengers when needed and breaks them down when the signal is complete, so the system can respond and then reset.

What it does: the work of balance

Scientists describe the ECS with one word above all others: homeostasis, the body's drive to hold itself in a stable, workable middle.

When something pushes a system too far in one direction, the ECS is one of the mechanisms that helps bring it back.

Because its receptors are distributed so widely, its influence is broad. It participates in the regulation of mood and stress, sleep, appetite and digestion, pain perception, and inflammation and immune balance. It is not a single switch. It is a network that helps many systems talk to each other and settle. This is why a system most people cannot name may matter so much.

When the system runs low: a question worth studying

One of the most important ideas in this field is that the ECS itself can become under-resourced, a state researchers have described as clinical endocannabinoid deficiency. The hypothesis is that when the body does not produce or maintain enough endocannabinoid signaling, a range of conditions may become more likely or more severe.

I want to be precise. This is an active area of research, not a settled diagnosis. It deserves rigorous, community-anchored study rather than either dismissal or overclaiming. It is part of why the Kiona Foundation's IRB-registered research, KF-ECS-2025, examines endocannabinoid system function across general, clinical, and medically authorized populations, with informed consent offered in English, Spanish, and Haitian Creole.

Where plants come in

This is where pharmacognosy, the study of medicines derived from natural sources, enters. Certain plant compounds can interact with the

same receptors your endocannabinoids use. These plant compounds are called phytocannabinoids.

Cannabis sativa, or C. Sativa L., is the most famous source, producing a large family of cannabinoids alongside aromatic compounds called terpenes. But it is not the only plant that speaks this language, and the deepest connection of all runs through food. Your body builds its own endocannabinoids from the fats you eat: anandamide and 2-AG are made from dietary polyunsaturated fatty acids, and the balance of omega-6 and omega-3 fats in the diet measurably shifts the levels of these endocannabinoids in the body's tissues (Alvheim et al., 2012; Watson et al., 2021). Ordinary botanicals reach the system directly as well: beta-caryophyllene, found in black pepper and its African cousin, cloves, oregano, and hops, is a selective activator of the CB2 receptor, and the scientists who characterized it called it, plainly, a dietary cannabinoid (Gertsch et al., 2008). What is on the plate helps set the tone of the body's own signaling.

The important shift is how we treat the plant. Not as a folk remedy, and not as a single isolated molecule, but as a complex, characterizable botanical worthy of the full rigor of drug discovery. That is what novel botanical drug discovery means, and it is why the FDA Botanical Drug Development pathway matters: it lets a botanical be developed and evaluated as a genuine therapeutic, held to a recognized standard of evidence and quality.

Why the standard is the point

It would be easier to make bold promises. I do not, and I will not. The value of this science depends on the standard we hold it to. Evidence generated with the communities most affected, and held to a recognized regulatory bar, is how botanical medicine earns a permanent place in the

systems that decide who receives care. Health equity, agricultural equity, and Indigenous knowledge are not an afterthought to that science. They are the reason for the standard.

Part Two: The Five Plants

Now to the plants themselves. Five botanicals, each carried from the old hand that first wrote it down to the modern chemistry that characterizes it now, and each set beside the system you have just met. They are arranged as a deliberate teaching, moving from the plant that does not touch the system, through those that reach a receptor or a channel, to the seed that feeds the system at its very root. Along the way they draw on the materia medica of many peoples, European, Indigenous North American, African, and Caribbean, because this knowledge belongs to no single continent.

One: Stinging Nettle

Urtica dioica L., leaf and aerial part. Family Urticaceae.

Nettle opens this teaching for a reason that will become clear: it is the plant that teaches honesty. Not every plant of the tradition speaks the endocannabinoid language, and a materia medica worth trusting is one that says so. It is also the plant that shows this knowledge is not the property of one continent: the same nettle was food, medicine, and fiber to peoples across Europe, North America, and Africa.

The plant. A herbaceous perennial, up to two meters, with opposite, coarsely serrated leaves and a stem and foliage bearing stinging hairs. Those hairs are the identity feature: fine hollow trichomes that break on contact and inject their irritant contents, producing the sting. Drying and cooking neutralize it, which is why the culinary and medicinal leaf is always handled processed. A precise identity matters, because the leaf, the aerial part, and the root carry different compounds and are treated as distinct botanicals; this entry is the leaf and aerial part.

From the European record. Nettle is among the oldest continuously documented food-and-medicine plants of the Western tradition, recorded in the classical materia medica of Dioscorides and Pliny as a food, a diuretic, a plant for joint complaints applied by urtication, and a fiber. It has no ancient Egyptian attestation, a search of the full Ebers Papyrus does not find it, and the honest entry says so rather than reaching; its secure deep history there runs through the Greco-Roman record.

From there it is carried by hand after hand, each cited in its own words. K'Eogh, *An Irish Herbal* (1735):

> *STINGING NETTLE (Urtica major vulgaris urens). It has a hot dry nature. The seed mixed with honey and taken internally, cleanses the lungs of phlegm; it is also good for shortness of breath and whooping cough. A gargle of the juice of the leaves is useful for a fallen womb, and about half a pint of this juice taken internally stops vomiting and spitting of blood, and all haemorrhages and flows.*

Wilson, *Botanic Materia Medica*, marking nettle Pectoral and Tonic:

> *NETTLE FLOWERS, ROOT. Urtica dioica. Pec. Ton. The properties of the flowers and root do not materially differ. Useful in gravel, hemorrhage, jaundice and incipient consumption. At the present time seldom employed.*

Sayre, *A Manual of Organic Materia Medica and Pharmacognosy* (1917), the plant entering the pharmacognosy era proper:

> 1. *URTICA. NETTLE. STINGING NETTLE. The herb of Urtica dioica Linné. Tonic, astringent, and a valuable diuretic. As an astringent it is chiefly used in uterine hemorrhages.*

Two nineteenth-century botanic-eclectic witnesses corroborate the same picture: Matteson records nettle as a spring blood-food and respiratory remedy, the young shoots "boiled like other green table vegetables"; Younger lists it "Antiscorbutic, Astringent, Styptic" and closes with the homely detail that his mother "brewed a beverage from Nettles and Dandelion, which was fit for a king to drink."

Across the Atlantic world: Indigenous North American and African hands. The nettle is not only a European plant, and it is only honest to say so in a materia medica offered by an Indigenous American author of African lineage. Among Indigenous North American peoples the same plant was food, medicine, and fiber. The Dakota, who call it *ichahpe hu*, and the Ojibwe, who call it *mazaan*, cook the young leaves like greens for the table, rub the fresh plant on the skin to ease joint inflammation and pain, which is urtication by another name and the same practice Dioscorides recorded, and take the tea as a strengthening and cleansing medicine; the plant is also a fiber for cordage and textiles, and many peoples make an offering of tobacco in thanks before they harvest it (NATIFS; Moerman, *Native American Ethnobotany*). In southern Africa, Andrew Smith's *A Contribution to South African Materia Medica* (1895) records a small native nettle, distinct from the introduced European species, whose leaf-paste "is of great value for its healing properties," used among other things where "the eyelids are red all over," a plant so esteemed that settler families "handed down a knowledge of its value in healing as a family tradition." (Smith's colonial-era text is cited here for the botanical observation only; its vernacular naming used language this work does not reproduce.)

Across all of these hands, on three continents, the same threads recur: the respiratory use, the styptic use, the diuretic use, the nutritive spring-tonic use, and the topical healing paste. Two honest modern correlates sit alongside them without overclaiming: the styptic reputation beside the plant's documented vitamin K content, and the antiscorbutic reputation beside its vitamin C and mineral content. Tradition, on every continent, mapping onto characterized chemistry is exactly the lineage this teaching is built to show.

The chemistry. The leaf is characterized by flavonoids (quercetin, kaempferol, isorhamnetin), phenolic acids (chlorogenic and caffeic acids, and the marker caffeoylmalic acid), a dense mineral and nutritive fraction (iron, calcium, magnesium, potassium, silicon), vitamins C, K1, and the carotenoids, and sterols (beta-sitosterol). The stinging-hair fraction, carrying histamine, serotonin, and formic acid, is a safety and identity feature, not a therapy.

The body's own system. Here nettle sets the standard by what it is not. Nettle's documented action is anti-inflammatory and nutritive signaling: inhibition of the pro-inflammatory transcription factor NF-kB, suppression of the cytokines TNF-alpha, IL-1beta, and IL-6, action on the eicosanoid pathways, and antioxidant effects. It is not an established ligand of the CB1 or CB2 receptors. The honest connection is at the level of inflammation resolution, a terrain the endocannabinoid system helps regulate and that nettle reaches by other, well-characterized routes. So nettle is named as acting on the broader signaling relevant to the model, with the direct endocannabinoid link stated as not established rather than implied. That discipline, reserving the endocannabinoid claim for the plants where the chemistry earns it, is the teaching point of this first entry.

Safety and cautions. Nettle leaf has a long record as a food and tea and is generally well tolerated. In the traditional increased-urine use, adequate fluid intake is advised, and it is not appropriate where edema is due to impaired cardiac or renal function. Its vitamin K may theoretically oppose warfarin-type anticoagulants, and additive effects are plausible with blood-pressure, diuretic, and glucose-lowering medicines, all matters to coordinate with a prescriber. Use is generally not recommended in pregnancy and lactation for want of safety data,

and family and maternal use routes to qualified clinical oversight. The fresh plant stings; drying and cooking neutralize it.

Sources: K'Eogh (1735); Wilson; Sayre (1917), entry 113; Matteson; Younger; Stokes (1812), Vol. IV, genus 853; Dioscorides and Pliny for the classical record; NATIFS and Moerman's Native American Ethnobotany for the Dakota and Ojibwe record; Andrew Smith, A Contribution to South African Materia Medica (1895), for the native South African nettle; and the modern reviews of Kregiel (2018), Đurović (2024), and Taheri (2024), with Riehemann (1999) on NF-kB.

Two: Black Pepper

Piper nigrum L., the dried fruit. Family Piperaceae.

If nettle teaches that not every plant speaks the endocannabinoid language, black pepper teaches the opposite and larger surprise: a spice on every kitchen shelf speaks it directly, and so does its African cousin.

The plant. A perennial woody climbing vine native to the Malabar Coast of South India, bearing small fruits that ripen from green to red. Black pepper is the whole fruit picked green to nearly ripe and dried, when it shrivels and darkens; white pepper is the same fruit with the outer layer removed. The pungency and aroma are its sensory identity.

From the historical record. Black pepper carries a quiet lesson in its history: it is largely absent from the old Western herbals, and that absence is itself instructive. It is not attested in the ancient Egyptian record, reaching Egypt only through trade. And it does not appear as an entry in the early-modern botanic herbals either. K'Eogh's "Pepper" is the native water pepper, not this plant; Wilson carries not black pepper but its relatives, "BIRD PEPPER, Capsicum baccatum" and "CUBEBS, Piper cubeba"; Younger and Matteson name only cayenne. The botanic physicians reached for the peppers of the Americas and the East Indian cubeb, not the culinary spice.

The plant enters the record most properly through pharmacognosy, in Sayre's *A Manual of Organic Materia Medica and Pharmacognosy* (1917), entry 89:

> 1. *PIPER. PEPPER. BLACK PEPPER. The dried unripe fruit of Piper nigrum Linné. Constituents: The aromatic and stimulant properties of pepper depend upon its volatile oil, but the pungent taste and medicinal activity are mainly due to a soft, pungent resin, chavicin; a neutral principle, piperine, is also present. Action and uses: Stimulant and carminative, its principal use being as a condiment.*

Notice what the 1917 pharmacognosist already names: the volatile oil and piperine, the very constituents modern chemistry confirms.

The African kin: West African black pepper. There is a pepper of Africa's own, and it belongs in this teaching. *Piper guineense*, the West African black pepper, known as *uziza* or *oziza* among the Igbo and *iyere* or *ata-iyere* among the Yoruba, is native to the tropical forests of Central and West Africa, where its leaves and fruits have long seasoned and doctored the cooking pot, valued in carminative and warming preparations and in the traditional foods of new mothers. It is not a poor relation of the Indian spice. Chemically it is a near-twin: *Piper guineense* carries roughly five to eight percent piperine, the same pungent alkaloid, and, notably, large amounts of beta-caryophyllene, the very sesquiterpene that carries the endocannabinoid story below. So the African pepper reaches the body's own system by the same door as the Indian one. The endocannabinoid conversation this work traces is not a European or an Asian possession; it runs through the botany of Africa as surely as anywhere, and an African pepper is one of its clearest voices.

The chemistry. Two constituents matter here, and a rigorous entry does not conflate them. Piperine, the principal alkaloid, is the pungent marker and a well-studied enhancer of the absorption of other compounds. Beta-caryophyllene is a bicyclic sesquiterpene in the volatile oil, and it is the constituent that carries the endocannabinoid story. Piperine is the identity marker; beta-caryophyllene is the one that engages the system. Both are present in the Indian and the African pepper alike.

The body's own system. Beta-caryophyllene is a selective activator of the cannabinoid CB2 receptor. In the foundational characterization it bound CB2 with high affinity and acted as a full CB2 agonist, while showing no meaningful affinity for the CB1 receptor. Because it engages CB2 and not CB1, it touches the endocannabinoid system without any intoxicating effect. And here is the thesis of this whole teaching made concrete: beta-caryophyllene is a common dietary constituent, an approved flavoring agent, present in black pepper, its African cousin, cloves, oregano, hops, and Cannabis alike. That a spice on every kitchen shelf contains a selective CB2 activator is the point. The endocannabinoid system is a language many plants and many foods speak, and Cannabis is one voice in that botanical conversation, not the sole one.

Safety and cautions. Black pepper as a food and spice has a long record of safe use. Cautions rise with concentrated preparations. The most practically important is the piperine interaction: concentrated pepper or isolated piperine can raise the levels of other medicines taken with it, which is exactly why a practitioner must know the constituent, not just the plant. Concentrated extracts and the essential oil warrant the usual cautions in pregnancy, lactation, and pediatric use, and in anyone on medicines with a narrow therapeutic window.

Sources: Sayre (1917), entry 89, the verbatim anchor; Wilson (Bird Pepper and Cubebs) and K'Eogh (water pepper) for the honest absence; the scholarly reviews of Piper guineense as the West African black pepper (including the American Chemical Society volume on its chemistry and traditional uses, 2013, and the review literature on uziza) for the African kin and its piperine and beta-caryophyllene content; and the modern primary literature of Gertsch (2008), which characterized beta-caryophyllene as a dietary cannabinoid, with Aly (2019) and Gorgani (2017) on piperine.

Three: Garlic

Allium sativum L., the bulb. Family Amaryllidaceae.

Garlic is the deep-history plant of this teaching, documented continuously from the Bronze Age to the present, and a plant whose oldest uses and whose 1917 chemistry both land where the modern mechanism does.

The plant. A bulbous perennial, the bulb a compound of several cloves in papery scales. Its identity is chemical as much as morphological: the intact bulb is nearly odorless, and its pungency appears only when the tissue is crushed, when the enzyme alliinase acts on the stored constituent alliin. That crush-activated chemistry is the plant's signature and the key to handling it.

From the historical record. Garlic is one of the plants where the deepest antiquity can be filled honestly, because it is securely attested in the ancient Egyptian record. It appears repeatedly in the Ebers Papyrus (c. 1550 BCE), across internal, gynecological, and topical use. From Bryan's translation:

> *[Against Debility:] Herbs-of-the-Field, and Garlic, cooked in Goose-oil and swallowed for four days against Debility.*
>
> *[Topical:] a liniment composed of Bullock's fat, Yeast-of-Wine, Garlic, Saltpetre-from-the-South, Poppy-berries, and Oil-of-Myrrh. "Do not let it dry."*

So three and a half thousand years ago garlic was already a strengthening internal remedy taken over a course of days and a topical

application. One discipline governs this deepest layer honestly: ancient Egyptian plant names carry scholarly uncertainty, and garlic, though among the more securely identified, is presented as an identification supported by scholarship, not a settled equation. The lineage then runs unbroken through Hippocrates, Dioscorides, and Pliny, and Herodotus reports garlic and onion as rations of the pyramid workers.

It continues through the early-modern and pharmacognosy hands. K'Eogh (1735): "GARLICK, manured (Allium sativum). It is a great antidote to poison, and good for diseases of the mouth and lungs. Galen, the Prince of Physicians, called it the Poor Man's Treacle. It is good for coughs, asthma and bowel conditions." Wilson marks it Stimulant, Expectorant, Emmenagogue. And then the hinge of the whole braid, Sayre (1917), entry 66:

> *ALLIUM. GARLIC. The bulb of Allium sativum Linné. Official in U.S.P. 1890. The peculiar odor and taste are due to volatile oil, composed of the sulphide and oxide of allyl. Stimulant and expectorant, also diaphoretic and diuretic.*

Writing in 1917, the pharmacognosist already names the allyl sulphur compounds as the seat of garlic's activity, the very chemistry modern science resolves into allicin and the diallyl sulfides. Tradition reaches chemistry here explicitly, a century before the mechanism was mapped.

In the Caribbean bush-medicine tradition. Garlic did not stay in the old world's pharmacopoeias. Carried across the Atlantic, it became a mainstay of Caribbean home and bush medicine, a common household remedy for colds, chest complaints, and high pressure, and it is documented in that living tradition by the applied ethnobotany of the TRAMIL network, whose scholars have surveyed and scientifically evaluated the home remedies actually used across the Caribbean,

including in Jamaica (Picking et al., 2015). Garlic belongs to the Caribbean kitchen-and-medicine tradition as much as to any, and a materia medica with Caribbean ties records it there too.

The chemistry. Garlic is defined by its organosulfur compounds and the reaction that generates them. The intact bulb stores alliin; on crushing, alliinase converts it to allicin, the pungent, active thiosulfinate responsible for most of garlic's characteristic activity and odor. This is the single most important fact about the plant: the active principle is generated on crushing, not stored, so preparation determines chemistry. Allicin then degrades to the more stable ajoenes and the diallyl sulfides. Raw, cooked, dried, and aged garlic differ chemically for exactly this reason.

The body's own system. Garlic's pungent principle engages a channel that sits inside the extended endocannabinoid system. Allicin is a documented activator of the TRPA1 and TRPV1 ion channels, and TRPV1 is widely recognized as part of the endocannabinoidome, directly activated by the endocannabinoid anandamide and often described as a cannabinoid-adjacent receptor. So garlic's active constituent engages the same signaling network the model is built around, by a characterized route. The precision matters: allicin is not a CB1 or CB2 ligand, and its established point of contact is at TRPV1 and TRPA1. Read against the first two plants, garlic completes a deliberate set: nettle, whose endocannabinoid link is not established; black pepper, whose beta-caryophyllene activates CB2; and garlic, which engages the endocannabinoidome at a channel. Three plants, three honest and different relationships to the same system.

Safety and cautions. Garlic as food is safe and long-eaten; in concentrated preparations its cautions are real. It inhibits platelet aggregation, so concentrated preparations carry a bleeding caution and

are conventionally discontinued before surgery and coordinated with anticoagulant or antiplatelet medicines. It can affect the metabolism of medicines, notably reducing blood levels of the antiretroviral saquinavir by roughly half. Raw garlic and allicin can blister the skin, so the ancient "do not let it dry" liniment is a caution as well as a curiosity. Culinary amounts in pregnancy are considered acceptable; concentrated doses route to qualified clinical oversight.

Sources: Bryan, The Papyrus Ebers (1930), for the antiquity; K'Eogh (1735), Wilson, and Sayre (1917), entry 66, for the continuous record; Dioscorides, Pliny, and Herodotus for the classical anchor; the TRAMIL applied-ethnobotany network and its Jamaica survey (Picking et al., 2015) for the Caribbean tradition; and the modern literature of Batiha (2020), with Macpherson (2005) and Bautista (2005) on allicin at TRPA1 and TRPV1.

Four: Hops

Humulus lupulus L., the strobile. Family Cannabaceae.

Hops is the plant that meets the endocannabinoid system and women's health in a single strobile, and it is Cannabis's closest cultivated relative.

The plant. A rough, twining perennial of the Cannabaceae, dioecious, its male and female flowers on separate plants. The medicinal part is the female inflorescence, the cone-like strobile, studded at the base of its bracts with lupulin, the yellow resinous glands in which the bitterness, aroma, and activity concentrate. That the medicinal part is specifically the female strobile is worth marking at the outset, because it foreshadows the plant's distinctive endocrine pharmacology. Older pharmacopoeias placed hops in the Urticaceae or Moraceae; its current placement is the Cannabaceae, alongside Cannabis, a kinship that is both taxonomic and, as it turns out, pharmacologically suggestive.

From the historical record. Hops carries its own honest lesson, the mirror of black pepper's. Where pepper is an Old World spice absent from the American and African herbals, hops is an Old World temperate plant with little tradition among Indigenous American, African, or Caribbean peoples; it belongs to the cool north. Its documented use begins not in antiquity but in the medieval monastic tradition, where it entered both the brewhouse and the medicine chest, and Hildegard of Bingen noted it in the twelfth century. A materia medica that respects lineage says where a plant comes from rather than borrowing it a heritage it does not have. Four early-modern and pharmacognosy hands carry it here.

K'Eogh (1735): "HOPS, manured (Lupulus sativus). The flowers are of a hot, dry nature. They open obstructions of the liver, spleen and kidneys, and purge the blood through the urine." Wilson marks hops Anodyne, Tonic, Astringent, useful "in dyspepsia, wakefulness," and lupulin "tonic and moderately narcotic ... it tends to remove pain and produce sleep." Younger records the plant's oldest folk sedative: "A pillow stuffed with hops is said to produce sleep when other means have failed." And Sayre (1917), entry 110:

> *HUMULUS. Hops. The strobiles of Humulus lupulus Linné, carefully dried, bearing the whole of their natural glandular coating. Small yellow grains of lupulin, upon which the value of hops depends. Constituents: Lupulin, volatile oil, resin, choline, and tannin. Action and uses: Tonic, anodyne, and slightly narcotic.*

The hands converge on two threads: hops as a nervine and sleep aid, and hops as a bitter digestive tonic. But there is an honest asymmetry worth teaching. The property for which hops is now most scientifically remarkable, its potent estrogenic activity, is barely visible in these old entries. The tradition knew hops as a sleep-and-bitters herb; modern chemistry revealed that the female strobile also carries one of the most potent phytoestrogens known. The one place the old record points toward it is botanical: every hand describes the female strobile, the very tissue in which that chemistry sits. This is a case, unlike garlic, where modern science did not confirm the tradition so much as extend it.

The chemistry. Hops chemistry sits in three families, concentrated in the lupulin: the bitter acids (the alpha-acids, chiefly humulone, and beta-acids, chiefly lupulone); the essential oil, rich in myrcene, humulene, and beta-caryophyllene; and the prenylflavonoids, including xanthohumol and, most notably, 8-prenylnaringenin, the constituent

responsible for the estrogenic activity. A sedative degradation product, 2-methyl-3-buten-2-ol, forms as the bitter acids age, which is one reason fresh and aged hops differ.

The body's own system. Hops touches the model in three distinct and honestly separable ways. First, the endocannabinoid touch: by lineage, Humulus sits in the Cannabaceae, Cannabis's own family; and by chemistry, the hop essential oil contains beta-caryophyllene, the same selective CB2 activator that runs through the black pepper entry. Second, the nervine pharmacology: the traditional sedative use has a modern basis under study, with modulation of GABA-A signaling among the proposed mechanisms, and hops is frequently paired with valerian for sleep. Third, the endocrine layer, and this is what modern science added: 8-prenylnaringenin is among the most potent phytoestrogens yet identified, a strong agonist at the estrogen receptor, and its presence in the female strobile is the basis for hops being studied for menopausal symptoms, and the modern explanation for the long-observed menstrual disturbances in female hop-pickers who absorbed the compound handling the plant. These are three separate stories, by different receptors, and the teaching keeps them apart. Conflating them would be exactly the imprecision this work exists to avoid.

Safety and cautions. Hops promotes sedation, so it can add to the effects of alcohol, sedative medicines, and other central depressants. The estrogenic caution is the important one: because 8-prenylnaringenin is a potent phytoestrogen, concentrated hops preparations warrant caution in hormone-sensitive conditions, including estrogen-receptor-positive breast cancer, endometrial conditions, and endometriosis, and are generally avoided in pregnancy and lactation. That caution is the reverse face of the same property that makes hops of interest for

menopausal symptoms: it is estrogenically active, and that cuts both ways. Such use routes to qualified clinical oversight.

Sources: K'Eogh (1735), Wilson, Younger, and Sayre (1917), entry 110, for the historical record; Hildegard of Bingen for the medieval note; and the modern literature of Koetter and Biendl (2010), Gertsch (2008) on beta-caryophyllene and CB2, Possemiers (2006) and Chadwick (2006) on 8-prenylnaringenin.

Five: Hemp Seed

Cannabis sativa L., the seed and its fixed oil. Family Cannabaceae.

The teaching closes with the seed of Cannabis, and it closes here on purpose. This is the plant that makes the whole argument of this work plain: an agricultural commodity and a food, whose relationship to the body's own system runs through the plate, not through a pharmacy. It touches the endocannabinoid system in the most upstream way of all five. And it is where this open teaching reaches its frontier, and marks the door.

The plant, and the argument. Cannabis sativa is one of humanity's oldest crops, grown for millennia for fiber, food, and oil. Its seed is a food. The intoxicating constituents of the plant, the cannabinoids, are made in the glandular resin of the flowering tops, which are the separately regulated part, and they are essentially absent from the seed, which carries only trace amounts, chiefly as surface contamination. To speak of this plant only as a drug is to mistake one part, the resinous flowers, for the whole agricultural plant, and to overlook the seed entirely. The seed is grain. It has fed people, and songbirds, and livestock, for as long as the plant has been sown. This teaching meets the plant where its oldest and broadest use actually lies: in the field and on the plate.

From the historical record. Hemp is among the oldest cultivated plants of the human record, and the seed among the oldest foods. Its deepest secure documentation is in ancient China, where Cannabis sativa was a staple crop and the seed was counted among the ancient

grains and used as a gentle, moistening food-medicine, entering the classical Chinese materia medica. That agrarian lineage, the seed as food first, is the deep-history anchor.

The record is carried by two hands that both, tellingly, treat the seed as distinct from the resinous flowers. K'Eogh (1735): "HEMP, manured (Cannabis sativa). It has a hot dry nature. The seed encourages flatulence, and, pounded and taken in white wine, cures jaundice. It is good for removing obstructions of the liver and easing old coughs." And Sayre (1917), who separates the seed from the flowering tops explicitly:

> *112a. CANNABIS SEMEN. Hemp Seed. These have been used in the form of emulsion as demulcent and anodyne, depending upon the fixed oil which they contain. 112b. OLEUM CANNABIS. Oil of Hemp. Used as a demulcent and protective. Neither it nor the seed are thought to have any narcotic action.*

That last clause, written in 1917, is the historical proof of the framing: the pharmacognosist had already established that the seed and its oil are a food-grade demulcent with no narcotic action, wholly apart from the flowering tops. The tradition understood what modern law re-learned, that the seed is the safe, nourishing part.

An African and diaspora plant. It is only right, in a work of these lineages, to say that Cannabis is deeply an African and a diaspora plant as well as an Asian one. Across southern Africa it is an old cultivated plant with indigenous names, recorded in the nineteenth-century materia medica of the region as a common crop of gardens and cultivated ground. In the Caribbean it stands at the center of a living food-and-livity tradition, where the plant and its provision are held within an Ital ethic of clean, natural food as medicine, a tradition of direct kinship to the ancestral and spiritual lineages this collective honors. The seed as

food, the plant as crop: this is the plant's truest and broadest life across the Black Atlantic, and it is the life this entry teaches.

The chemistry. Hemp seed is characterized as a food, and a nutritionally dense one. Its fixed oil, roughly thirty percent of the seed, is predominantly polyunsaturated fatty acids in a favorable balance: linoleic acid (omega-6) as the major component, alpha-linolenic acid (omega-3), and, less commonly among seed oils, gamma-linolenic acid, with the omega-6 to omega-3 ratio near the often-cited 3 to 1. Its protein, roughly a quarter of the seed, is a complete protein dominated by the globulin edestin. It carries fiber, magnesium, iron, zinc, and vitamin E. Its cannabinoid content is negligible, which is what makes everything here a nutritional story.

The body's own system. Hemp seed touches the endocannabinoid system through nutrition, without a receptor and without any intoxication, and this is the honest, teachable core of the entry, and the clearest proof of this work's whole thesis. Recall the introduction: the body builds its own endocannabinoids, anandamide and 2-arachidonoylglycerol, from dietary omega-6 linoleic acid, and the balance of dietary omega-6 to omega-3 fats tunes the tone of the system. Hemp seed is precisely a food rich in those fats, in a balance long regarded as favorable. Dietary linoleic acid has been shown to raise tissue levels of both endocannabinoids, and the regulation of the system by dietary polyunsaturated fats, including those of hemp oil, is an established area of study. So hemp seed supplies and helps balance the very substrate from which the endocannabinoids are made. It does not act on the system as a drug; it feeds and tunes it, from the ground up, as food. Of the five plants here, this is the deepest and most upstream point of contact: nettle does not touch the system, pepper and hops reach a receptor, garlic reaches a channel, and hemp seed

nourishes the molecules the system runs on. Dietary modulation of the endocannabinoid system is not a theory to argue; it is the ordinary biology of eating well, and this seed is one of its plainest examples.

The frontier. Beyond that nutritional relationship lies a deeper question, and here the open teaching reaches its edge and names the door. Two published facts set it up. First, the endocannabinoid system is a documented regulator of melanogenesis, the making of melanin: in the skin, a CB1-mediated, keratinocyte-dependent endocannabinoid signal negatively regulates melanin synthesis, and ultraviolet light drives cutaneous endocannabinoid production. So the system does not only get fed by dietary fats; it can turn the making of melanin up or down. Second, neuromelanin is not the pigment of the skin. It is the dark pigment that accumulates in specific neurons of the brain, chiefly the dopamine neurons of the substantia nigra and the noradrenaline neurons of the locus coeruleus, arising in the metabolism of those neurotransmitters, in circuits where the endocannabinoid system is densely present. The frontier is the question that sits between those two established facts: whether and how the endocannabinoid regulation of melanogenesis reaches neuromelanin, and what nourishing the endocannabinoid system may mean there. That question is the subject of Dr. Lakisha's ongoing research and a forthcoming book. It is named here as a door, not walked through. This teaching gives you the published science in full, and marks the neuromelanin question as where the deeper studies go. The door held open, and not opened here, is the honest shape of real inquiry, and it is a fair preview of what the frontier of this work looks like.

Safety and cautions. Hemp seed is a food, and the safest plant in this teaching. As a whole food and pressed oil it is well tolerated and not intoxicating. Large intakes of the oil are calorically dense and can be

mildly laxative, and the oil is best kept from high-heat cooking. A very high polyunsaturated-fat intake has a theoretical, mild antiplatelet tendency, relevant only to coordinate with a prescriber alongside anticoagulants. Properly processed seed carries only trace cannabinoids; clean, hulled product addresses the rare drug-screen concern. At culinary intake in pregnancy it is not a concern; concentrated supplementation routes to qualified clinical oversight.

The plant and the standards. Hemp seed's regulatory story is the argument in miniature. The recognized monographs that address the resinous flowering tops treat them as a controlled botanical, while the seed is recognized as a food: hulled hemp seed, hemp seed protein, and hemp seed oil are regulated as foods, and in the United States received Generally Recognized as Safe status in 2018. Modern agriculture has followed, with hemp returning as a food and fiber crop across the Americas, Africa, and beyond. The lesson is the one this whole teaching has built toward: one plant, understood narrowly as a drug, is the same plant that, understood rightly, is a grain and an oilseed that nourishes the body's own regulatory system. The narrow lens is not just incomplete. It misses the food.

Sources: the ancient Chinese food-and-medicine tradition for the deep history; K'Eogh (1735) and Sayre (1917), entries 112a and 112b, for the record; Andrew Smith, A Contribution to South African Materia Medica (1895), and the Caribbean Ital food tradition for the African and diaspora lineage; and the modern literature of Callaway (2004), Farinon (2024), Alvheim (2012), and Watson (2021) on the seed and the endocannabinoid substrate. The published foundation for the frontier is the endocannabinoid regulation of melanogenesis in the skin (Magina 2011; Videira 2013); the translation of that regulation to neuromelanin is the subject of Dr. Lakisha's ongoing research.

After the plants: where to go from here

You have reached the end of the open teaching, and you know these five plants now in a way that is true. You also know something about the shape of the work: that it treats plants as foods and living botanicals rather than narrow drugs, that it draws on the materia medica of many peoples rather than one, and that it goes all the way to a frontier a whole research program is built to explore.

If this teaching served you, here is where it leads, at whatever level is yours.

Stay in the Commons. Join the mailing list, and the open teaching keeps coming: the monthly writing, the next plants, the primer on the endocannabinoid system. The Commons stays free.

Enter the Circle. Come into the Alkemist Mother and the Rooted Legacy Healing Collective, and learn food as medicine in a circle, through the turning seasons, in the company of people doing the same. This is where studying alone becomes belonging.

Walk the Lineage. Inquire about the Apprenticeship, for those called to carry this into scholarly or professional practice. Certification is available by request or invitation.

Support the Frontier. The deeper studies, the research at the edge of what is known, are the work the whole ecosystem points toward. For those moved to fund it, there is a way to give.

Wherever you are, the first step is always open. Take the one that is yours.

About Dr. Lakisha

Dr. Lakisha Jenkins-Samuels, Ph.D., is a Traditional Naturopath and Clinical Herbalist, a Registered Herbalist with the American Herbalists Guild (RH, AHG), and the Founder and President of the Kiona Foundation. She is the Principal Investigator on the Foundation's IRB-registered endocannabinoid research, and her work centers on pharmacognosy, novel botanical drug discovery, and the study of how plants and diet modulate the body's own endocannabinoid system. This teaching is offered in that spirit: rigorous, freely given, and held to a real standard.

What RH (AHG) Means

The Registered Herbalist credential of the American Herbalists Guild, a peer-reviewed professional standard

1. **800 hours of botanical medicine education**
   coursework, independent study, or both, across the human sciences, materia medica, pharmacognosy, botany, and ethics
2. **400 hours of clinical experience**
   100 hours supervised and 300 hours of independent practice
3. **A caseload of 80 individual clients**
   logged within a five-year period
4. **A working materia medica of 150 herbs**
   demonstrated knowledge, chosen from the guild's list
5. **3 clinical case studies**
   each with a minimum of two follow-up sessions
6. **2 letters of recommendation**
   from former teachers or herbal colleagues
7. **3 practitioners in your referral network**
   local health-care providers you refer clients to
8. **Your top 10 herbal reference texts**
   the working library you rely on in practice

Criteria verified against the American Herbalists Guild, 2026.

Dr. Lakisha

American Herbalists Guild
REGISTERED HERBALIST MEMBER

The Registered Herbalist standard behind this work.

A small glossary

Materia medica. The body of knowledge about the medicinal and nutritional substances a tradition uses, and the written record of it, plant by plant. This teaching is a small materia medica.

Pharmacognosy. The scientific study of medicines and nourishment derived from natural sources, especially plants: their identity, their constituents, their quality, and their action. It is the discipline this work is built on.

Constituent. A defined chemical compound present in a plant, such as an alkaloid, a fatty acid, or a terpene. A plant is a community of constituents, not a single one.

Endocannabinoid system (ECS). The body's own widespread signaling network that helps regulate mood, stress, sleep, appetite, digestion, pain, and the resolution of inflammation. It runs on molecules the body makes for itself.

Endocannabinoids. The signaling molecules the body makes for this system, chiefly anandamide and 2-arachidonoylglycerol (2-AG). The body builds them from dietary fats.

CB1 and CB2. Two receptors of the endocannabinoid system. CB1 is abundant in the brain and nervous system; CB2 sits largely on immune and peripheral tissues. A compound that engages CB2 without CB1 acts on the system without intoxication.

Endocannabinoidome. The broader system beyond the two classic receptors, including related channels such as TRPV1 and the enzymes that build and break down the signaling molecules.

TRPV1. An ion channel involved in pain, heat, and inflammation, recognized as part of the wider endocannabinoid system and activated by the endocannabinoid anandamide. Garlic's allicin activates it.

Phytocannabinoid, and dietary cannabinoid. A plant compound that engages the endocannabinoid system. Beta-caryophyllene, common in the spice rack, is called a dietary cannabinoid because it activates CB2 and is an ordinary part of food.

Beta-caryophyllene. A sesquiterpene (a class of aromatic plant compound) found in black pepper and its African cousin, cloves, oregano, hops, and Cannabis, and a selective activator of the CB2 receptor.

Alkaloid. A class of nitrogen-containing plant compounds, often pungent or potent. Piperine, the pungent principle of pepper, is an alkaloid.

Demulcent. A substance that soothes and coats irritated tissues. Hemp seed oil was recorded as a demulcent.

Nervine. A plant that calms or supports the nervous system. Hops is a traditional nervine.

Phytoestrogen. A plant compound that acts at the body's estrogen receptors. Hops carries 8-prenylnaringenin, one of the most potent known.

Urtication. The old practice of applying stinging nettle to the skin to bring blood to an aching joint. Recorded from Dioscorides to the Dakota.

GRAS. Generally Recognized as Safe, a United States food-safety status. Hulled hemp seed, its protein, and its oil received it in 2018, as foods.

Neuromelanin. The dark pigment that accumulates in particular neurons of the brain, distinct from the melanin of the skin. It marks a frontier of this work and is not taught in the open teaching.

The Living Materia Medica is an open teaching. It is education, not medical advice, and it is not a protocol, a dose, or a promise of an outcome. It teaches plants and method, and it names no formulation. For anything touching your own health, medication, pregnancy, or a health condition, consult a qualified provider.