

# Best Anti-Inflammatory Nutrients

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✓ Fact Checked

October 16, 2023

## STORY AT-A-GLANCE

- › Inflammation is your body's built-in emergency response to assaults resulting in injury or infection. If the inflammation is not resolved, it becomes chronic, which can result in serious disease states such as rheumatoid arthritis, liver disease and heart disease
- › There are many anti-inflammatory nutrients, and if you make a habit of including enough of them in your diet, you can keep inflammation in check relatively easily
- › Nutrients known for their potent anti-inflammatory properties include omega-3 fats EPA and DHA, which are also crucial for the functionality of your cell membranes and the membranes of your mitochondria, and ginger, which has been shown to bolster immune system function and ameliorate autoimmune diseases such as lupus and rheumatoid arthritis
- › Curcumin, a compound found in turmeric, has antibacterial, anticancer, anti-inflammatory, antimalarial, antioxidant, antiparasitic, antiproliferative, pro-apoptotic and wound healing properties. Conditions responsive to curcumin include certain types of cancer, high blood pressure, heart disease and blood clots, intestinal and bowel issues, neurodegenerative conditions and glaucoma
- › Other potent anti-inflammatory nutrients include chondroitin, glucosamine, MSM, vitamin E, glycine, bromelain, boswellic acid and green tea extract

**Inflammation is your body's built-in emergency response to assaults resulting in injury or infection. In the acute state, inflammation is an important and vitally necessary part of your body's healing mechanism.**

However, if the inflammation is not resolved, it becomes chronic, which is profoundly destructive and plays a role in nearly every chronic degenerative disease.

While anti-inflammatory drugs may be helpful in some situations, they can have undesirable side effects and are rarely an ideal solution in the long run. To prevent and treat chronic inflammation, dietary nutrients, either from whole food or a nutritional supplement, are typically your best option.

The good news is there are many anti-inflammatory nutrients out there, and if you make a habit of including enough of them in your diet, you can keep inflammation in check relatively easily. Below, in no particular order, I'll review some of the nutrients known for their anti-inflammatory powers.

## **Vitamin E**

Vitamin E prevents LA stored in your tissues from being oxidized into dangerous toxic byproducts. Since most people are walking around with LA scores that are 10 times higher than normal, and since excess LA is likely one of the primary contributors to chronic disease, it can be a good idea to take vitamin E regularly until you [get your LA down to healthy levels](#), which may take up to six years for most people.

**“ Vitamin E also prevents LA stored in your tissues from being oxidized into dangerous toxic byproducts.”**

Vitamin E can almost miraculously prevent most of the damage done by LA, and it can also reverse or prevent many of the issues associated with excess estrogen. This is important because LA has remarkable parallels to excess estrogen in terms of its metabolic and anti-health effects. You see, when you eat excess PUFA or LA, you increase your body's production of estrogen.

So, when you increase LA, estrogen levels go up – and that's not a good thing. Both LA and estrogen interestingly increase the flow of calcium from outside the cell to inside because the concentration of calcium outside as well is 50 times higher than inside. So, the excess as LA will cause the influx of calcium inside the cell, which causes nitric oxide and superoxide to increase inside the cell.

When you do this, with this magical combination, you increase a very pernicious reactive nitrogen species called peroxynitrite, and that causes pervasive damage to tissues in your body.

Both LA and estrogen also increase a potentially dangerous process in your body called lipolysis, which is simply the liberation of fatty acids from your fat cells into your bloodstream where they are mobilized. This then increases the oxidation or, simply, the burning of fats in your mitochondria, which is precisely what you want to avoid as ideally you want to be burning glucose in your mitochondria, not fatty acids.

Fortunately, vitamin E can help neutralize this damaging effect of LA. Vitamin E also directly inhibits the activity of an enzyme called aromatase. This is an enzyme that converts the male hormones like testosterone and DHEA into estrogens.

Even better, it serves as an estrogen antagonist, meaning it binds to the estrogen receptor to block it from binding to estrogen. This dramatically lowers the damage from excess estrogen.

Vitamin E works very similarly to the drug tamoxifen, which is used to treat estrogen receptor-positive breast cancers. For these reasons, I firmly believe nearly everyone needs to be getting vitamin E in their diet. However, due to the high LA burden, very few people are able to get enough vitamin E from their diet to suppress this oxidative destruction from excess LA in their tissues.

The good news is that since the supplementation is short term, you're not going to need it the rest of your life.

If you can keep your LA intake to below 5 grams a day for three years, it's likely you may not even need it at all, or at most, only a few times a month. However, if for whatever reason, during this time, or when the LA in your tissues are low or normal, and you go out and binge on a meal that's very high in LA, I would strongly recommend taking a vitamin E capsule to protect yourself from this exposure.

Vitamin E also protects against free radical damage and the normal effects of aging. It's particularly important for brain health, and studies have found it can help delay the loss of cognitive function in people with Alzheimer's disease by preventing cell membrane damage and neuronal death.<sup>1</sup>

## **How to Pick a Good Vitamin E Supplement**

Most vitamin E supplements are synthetic. This is a major clue that it is different from the vitamin E you're getting from real food. How can you tell a vitamin E supplement is synthetic? Well, all you must do is read the label. Fortunately, they make it pretty simple.

Synthetic vitamin E is called alpha tocopherol acetate. The acetate is the key. If the label says tocopherol acetate, it's screaming that it is synthetic. Next, you need to pay attention to the orientation of the optical isomer. Most vitamin supplements are racemic, or they have left- and right-hand isomers. This is a problem as most biological molecules have optical isomers that are right-handed. They're usually called D and L isomers for right and left.

When you have both left and right isomers present, it's called racemic. Biologically, there's usually only one optical isomer that works well, and with vitamin E it is the D isomer that works in your body, while the L isomer is useless. Yet in synthetic supplements, 50% of the vitamin E in the supplement is the useless L isomer.

To make matters even worse, many synthetic versions use an ester of vitamin E, which only has about 50% of the activity of the natural product. So, the total activity of many vitamin E supplements is reduced by 75%.

So, the first step in identifying healthy good vitamin E supplements is to make sure you're getting real vitamin E and not synthetic. What you're looking for is "d alpha tocopherol." This is the pure D isomer, which is what your body can use.

Many vitamin E brands will use vitamin E from sunflower oil, which has a very high percentage of LA. Not to worry, though, as the LA in the capsule is an insignificant amount, probably less than 50 or 100 milligrams.

Your goal is to keep LA intake under 5,000 milligrams, so it really won't negatively impact your LA intake at all. As for dose, you don't really need more than 100 mg a day.

There are also other vitamin E isomers, and you want the complete spectrum of tocotrienols, specifically the beta, gamma and delta types of vitamin E, in the effective D isomer. It's important to get this right, and nearly everyone watching this would benefit from taking the appropriate vitamin E supplement, which is why I'm spending so much time on it.

## **Omega-3 Fats**

Omega-3 fats play a crucial role in the health and functionality of your cell membranes and the membranes of your mitochondria. June 25, 2023, I posted an [interview with Nils Hoem](#), Ph.D., in which we took a deep dive into this.

Membranes are lipid structures made of phospholipids and other constituents. The foods you eat provide the raw material substrate that is then assembled into the mitochondrial and cellular membranes, which is why the type of fats you consume is so important.

If you're eating any processed foods, you're likely getting far too much omega-6 linoleic acid (LA), which damages your mitochondrial machinery and reduces your body's ability to convert the 18-carbon omega 3 fat ALA into the 20-carbon fat EPA and 22-carbon fat DHA.

If you reduce your LA intake to historical norms – about 2% of your daily calories – and get enough omega-3 ALA (found in chia seeds, walnuts, beans and seaweed), then you can make substantial amounts of DHA and EPA and may not need supplementation. You can probably also forgo supplements if you eat fatty fish like wild-caught salmon, mackerel, sardines and anchovies on a regular basis.

That said, most people who are not strict enough about reducing their LA intake and don't eat these kinds of fish might benefit from a DHA/EPA supplement. If you decide to take an omega-3 supplement, I believe krill oil is superior to most fish oil supplements, which are synthetically produced ethyl esters. The omega-3 in krill, on the other hand, is just the way it is in nature, and is attached to phospholipids that increase its absorption, which means you need less of it.

Krill oil also contains almost 50 times more astaxanthin, a potent antioxidant, than fish oil, which prevents the highly perishable omega-3 fats from oxidizing before they're integrated into your cellular membranes.

While LA is highly inflammatory, the omega-3s are anti-inflammatory and help protect your bones, muscles, joints and connective tissues from damage, and repair any damage that has already occurred.

A 2019 animal study<sup>2</sup> that compared the analgesic and anti-inflammatory activity of Neptune krill oil and fish oil concluded that while both reduced severe inflammation and pain, the Neptune krill oil was the most effective.

## **Ginger Root**

Ginger, which is easy to grow at home, has been shown to bolster immune system function and ameliorate autoimmune diseases such as lupus and rheumatoid arthritis by making neutrophils (a type of white blood cell) more resistant to neutrophil extracellular trap (NET) formation, which is known to propel inflammation and contribute to autoimmune diseases. As reported by CU Anschutz Medical Campus in September 2023:<sup>3</sup>

*"In a clinical trial, the researchers found that daily intake of a ginger supplement for seven days (20 mg of gingerols/day) by healthy volunteers boosted a chemical inside the neutrophil called cAMP. These high levels of cAMP then inhibited NETosis (neutrophil extracellular trap formation) in response to various disease-relevant stimuli.*

*'Our research, for the first time, provides evidence for the biological mechanism that underlies ginger's apparent anti-inflammatory properties in people,' said senior co-author Jason Knight, MD, PhD, associate professor in the Division of Rheumatology at the University of Michigan."*

Ginger also has antibacterial, antiviral, antioxidant and anticancer properties that protect against disease, both acute and chronic. The National Library of Medicine has the following to say about ginger:<sup>4</sup>

*"The exact mechanism is not understood entirely, but several active compounds of ginger have been shown to have biological activity.*

- *Gingerol and gingerol-related compounds: Antioxidant activity, anti-tumor activity via induction of apoptosis and modulation of genetic activity, anti-inflammatory and anti-analgesic activity, antimicrobial activity, and hepatoprotective activity*
- *Paradol: Antioxidant, anti-cancerous, and antimicrobial properties*
- *Shogaol: Antioxidant, anti-inflammatory, anti-cancerous activity via inhibition of cell invasion, reduction of matrix metalloproteinase-9 expression, and anti-proliferation activity*
- *Zingerone: Antioxidant activity, anti-inflammatory, and anti-bacterial properties*
- *1-Dehydro-10-gingerdione: Regulation of inflammatory genes*
- *Terpenoids: Induction of apoptosis via activation of p53*
- *Ginger flavonoids: Antioxidant activity*

*... Ginger has been shown to play a vital role as an antimicrobial agent. Several active components have been shown to be active against E coli, Salmonella*

*typhi, Bacillus subtilis, Candida albicans, M. avium, and M. tuberculosis ...*

*Antioxidants help free the body of free radicals and reduce oxidative stress. The imbalance between reactive oxygen species (ROS) production and antioxidative defense mechanisms can induce oxidative stress ...*

*Ginger is a source of numerous antioxidants and plays a role in reducing lipid oxidation and ROS formation. Studies have shown ginger root's active compounds' ability to scavenge superoxide anion and hydroxyl radicals and inhibit lipid peroxidation in vivo.*

*Inflammation is an important immune response mechanism to damage and can be mediated via interleukin-1 (IL-1), tumor necrosis factor (TNF), and anti-inflammatory cytokines ... In vivo studies have shown ginger's ability to suppress pro-inflammatory cytokines and down-regulate induction of inflammatory genes."*

## **Turmeric Extract**

Besides giving Indian curries their rich golden color, turmeric contains a polyphenol called curcumin, which exhibits more than 150 potentially therapeutic actions.

With thousands of studies performed,<sup>5</sup> researchers have shown curcumin has antibacterial, anticancer, anti-inflammatory, antimalarial, antioxidant, antiparasitic, antiproliferative, pro-apoptotic and wound healing properties. Scientists investigating curcumin's biological activities had this to say about the extent to which it plays a vital role in supporting your health:<sup>6</sup>

*"Modern science has shown that curcumin modulates various signaling molecules, including inflammatory molecules, transcription factors, enzymes, protein kinases, protein reductases, carrier proteins, cell survival proteins, drug resistance proteins, adhesion molecules, growth factors, receptors, cell-cycle regulatory proteins, chemokines, DNA, RNA and metal ions."*



Given its antioxidant and anti-inflammatory properties, conditions shown to be responsive to curcumin include<sup>7</sup> certain types of cancer<sup>8,9</sup> (by blocking blood supply to tumors and modulating signaling pathways involved in cancer), high blood pressure, heart disease and blood clots, intestinal and bowel issues<sup>10</sup> (by stimulating bile production), neurodegenerative conditions,<sup>11</sup> and glaucoma<sup>12</sup> (by limiting oxidative damage in the eye and lowering intraocular pressure).

While turmeric is widely available in powdered form, it contains a very small amount of curcumin, which is also known to be poorly absorbed through your gastrointestinal tract. For these reasons, you'll receive more health benefits from a curcumin extract. Because it's a lipophilic (fat-loving) molecule, many curcumin preparations include some sort of oil or fat to improve its absorbability and bioavailability.

## **Glucosamine, Chondroitin and MSM**

Glucosamine and chondroitin are compounds found in human cartilage, while MSM<sup>13</sup> (methylsulfonylmethane) is a sulphur-rich compound found in certain plants, fruits and vegetables.

Research suggests glucosamine and chondroitin work synergistically when paired, and MSM can further boost their effects by enhancing cell penetration. All three have anti-inflammatory properties and are commonly used in the treatment of arthritis symptoms.

Alone or together, glucosamine and chondroitin help relieve arthritis-related pain by slowing the degradation of collagen and cartilage and improving the function of your joints. As explained by Center TRT:<sup>14</sup>

*"Glucosamine and chondroitin are two essential components of cartilage that play a crucial role in maintaining joint health. Glucosamine is a vital building block for glycosaminoglycans, which are essential for the formation and repair of cartilage.*

*Chondroitin, on the other hand, is a structural component of cartilage that helps it retain water, thereby providing the necessary lubrication and shock absorption*

*for joints to function smoothly.*

*Together, glucosamine and chondroitin work synergistically to support healthy joints. While glucosamine promotes the growth and repair of cartilage, chondroitin helps maintain its integrity and flexibility. This is why glucosamine and chondroitin supplements are often recommended for individuals experiencing joint pain or stiffness resulting from age-related wear and tear, injury, or arthritis.*

*Moreover, research has shown that the combination of glucosamine and chondroitin can help slow down the progression of joint damage in individuals with osteoarthritis,<sup>15</sup> which is a common degenerative joint disease characterized by the breakdown of cartilage."*

## **Other Anti-Inflammatory Nutrients**

Other anti-inflammatory nutrients you may want to consider include:

- **Glycine** – Glycine exerts potent anti-inflammatory effects by inhibiting activation of immune cells and suppressing the production of pro-inflammatory cytokines. It acts on inflammatory cells like macrophages to block the signaling of the NLRP3 inflammasome.

Glycine also reduces TNF $\alpha$ , IL-6, and other cytokine levels in macrophages, and counteracts LPS-induced inflammatory responses. Furthermore, glycine acts on neutrophils to inhibit CXCR2 signaling and recruitment, as well as blocking ICAM-1 expression and limiting endothelial adhesion.

- **Bromelain** – Bromelain is an enzyme found in pineapples. It can reduce inflammation, joint pain and joint degradation, improve gut function and digestive health, and aid in the metabolism of amino acids. There's also evidence suggesting it can help to prevent respiratory issues and heart disease, and bolster immune function.<sup>16</sup>

- **Boswellic acid** – Boswellic acid, extracted from the boswellia serrata tree, has a long history of use in traditional medicine. It can reduce pain and inflammation throughout the body, including arthritis pain.<sup>17</sup>
- **Green tea extract** – Green tea extract contains a potent antioxidant catechin called EGCG, which combats inflammation, relieves joint and muscle soreness, and prevents future oxidative stress and damage. It can also improve the function of your brain, heart and blood vessels, and help your immune system fight off various diseases.<sup>18</sup>

## Sources and References

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