

Two Simple Food Hacks That May Help Ease Inflammation and Pain

Analysis by [Dr. Joseph Mercola](#)

November 1, 2026

STORY AT-A-GLANCE

- Glycine, a simple amino acid, and cutting linoleic acid (LA) to less than 2% of your daily calories share an overlapping list of reported benefits, including less inflammation and pain, with plausible links to fewer migraines and better tolerance to the sun
- In animal studies, glycine opens a chloride channel on immune cells that blocks the calcium surge they need to launch an inflammatory attack. Oxidized LA byproducts do the opposite, triggering calcium signals in pain nerves and immune cells. The same calcium-blocking mechanism may also help protect against electromagnetic fields from wireless devices
- Research in mice suggests that a glycine receptor in the spinal cord works as a brake on pain. Prostaglandin E2, made from arachidonic acid, which your body makes from LA, can switch that brake off. Two recent animal studies also suggest LA can drive a destructive type of cell death in joint cartilage, and glycine can block that type of cell death in rat cartilage
- A randomized trial that cut LA to 1.8% of calories or less, while adding omega-3 fats, reduced headache days by four a month, twice the benefit of adding omega-3s alone
- Your body makes only about 3 grams of glycine a day and may fall roughly 10 grams short of what it needs. The two hacks: take about 10 grams of glycine daily, and keep LA under 2% of your calories

I recently listened to a podcast on glycine, and I was struck by how much its benefits overlapped with something I've been writing about for years. The guest described glycine lowering inflammation, easing pain, reducing migraines, and even helping people burn less easily in the sun.

That list sounded very familiar. It's nearly the same list of improvements I've seen when people bring their LA intake below 2% of their daily calories. LA is the omega-6 fat that dominates seed oils, and lowering it is the dietary change I consider most important for your health.

I'm a firm believer that when two very different interventions produce similar results, there's usually a shared mechanism hiding underneath. So I went to the scientific literature, including studies published in 2026, to see whether I could find it. I did. And the explanation turns out to be more interesting than simply "both reduce inflammation."

The Brake and the Accelerator

Here's the big picture before we get into the details. Many of the cells that drive inflammation and pain, including immune cells and pain-sensing nerves, are controlled by how much calcium flows into them. More calcium means they fire. Less calcium means they stay calm.

The studies I found point the same way. Glycine acts like a brake on these cells. Oxidized byproducts of LA act like an accelerator. The evidence comes from different cells and different experiments, so it isn't one tidy proof. But the pattern is consistent, and in animal studies, the two pathways converge on the very same pain switch in the spinal cord. That may be why taking more glycine and eating less LA seem to produce such similar results. In effect, you're pressing the brake and easing off the gas.

It also helps to understand how much LA the average American now carries. A systematic review found that LA in the body fat of U.S. adults rose by 136% over the last half century, closely tracking the rise in seed oil consumption.¹ In my own review

published in *Nutrients*, I explained why this matters: Excess LA generates oxidized LA metabolites that damage your mitochondria, and its half-life in your tissues is about two years, so the damage lingers long after you change your diet.²

How Glycine Calms Immune Cells

The first piece of the puzzle was discovered in the late 1990s at the University of North Carolina. Researchers found that in rats, Kupffer cells, the liver's resident immune cells, contain a glycine-gated chloride channel. This is essentially the same type of receptor glycine uses in the nervous system.³

When these immune cells were exposed to bacterial toxin, the calcium inside them spiked. Glycine prevented that spike almost completely. It did this by letting chloride flow into the cell, which shifted the cell's electrical charge and made it much harder to activate. The cells then produced significantly less tumor necrosis factor-alpha, one of the body's master inflammatory signals.⁴

The same team then found this channel in rat lung immune cells. Glycine blunted the calcium rise in a dose-dependent way and cut the production of superoxide, a damaging free radical, by about half at very low concentrations.⁵ Interestingly, taurine, another amino acid, works through this same channel and cuts tumor necrosis factor-alpha production by more than 40%.⁶

The channel isn't limited to immune cells. Researchers found it in cells that line blood vessels, where glycine again blocked calcium entry and slowed the growth and movement of those cells in lab dishes.⁷ And a 2026 study in *Circulation Research* found in mice that glycine activates a glycine receptor in artery linings that increases nitric oxide and relaxes blood vessels. In a group of patients, higher blood glycine was linked to lower blood pressure.⁸

Glycine has another protective trick. When cells die under inflammatory stress, they can burst and spill their contents, which fuels even more inflammation. Glycine blocks a protein called NINJ1 that drives this bursting, which limited the release of inflammatory

signals in mice.⁹ A 2022 study pinpointed how: glycine stops NINJ1 from clustering in the cell membrane, which keeps the cell from rupturing.¹⁰

And a 2026 animal study found that glycine lowered tumor necrosis factor-alpha in mice given a toxic chemotherapy drug.¹¹

How Linoleic Acid Pushes the Other Way

Now look at the LA side. When LA in your tissues oxidizes, it forms compounds with names like 9-HODE and 13-HODE.

In 2010, researchers at the University of Texas found that heat generates these oxidized LA metabolites in the skin of mice and rats. They then activate TRPV1, the receptor on nerves that detects painful heat, the same receptor that makes hot peppers burn. When the researchers blocked these compounds, heat sensitivity and pain dropped substantially.¹² In other words, in these animals, the body's own oxidized LA was part of what made pain nerves fire.

There's a second route. 9-HODE activates a receptor called G2A, which is found on immune cells called macrophages. In cells carrying this receptor, 9-HODE triggered a rise in calcium.¹³ Mice lacking G2A developed less pain sensitivity after the chemotherapy drug oxaliplatin, because G2A normally makes the TRPV1 pain receptor more sensitive.¹⁴ So glycine drives chloride in and keeps calcium out, while oxidized LA triggers calcium signals. Opposite directions on the same kind of switch.

The 2026 research adds more reasons for concern about excess LA. In patients with acute-on-chronic liver failure, a LA byproduct called 9,10-DiHOME was the only one of 98 lipid signals measured that was elevated, and it impaired their immune cells' ability to fight infection.¹⁵ Another 2026 study found that in mice with a viral infection, LA lowered the mitochondrial mass and energy of natural killer cells, the immune cells that hunt down viruses and tumors, even though it boosted their killing ability in lab tests.¹⁶

Where They Meet Head-On: Your Spinal Pain Brake

This is the finding that convinced me the overlap was no coincidence. In your spinal cord, glycine is one of the main signals that dampens pain. One specific glycine receptor, called the alpha-3 subtype, sits right where pain signals enter the spinal cord. In 2004, a landmark study in *Science* showed that prostaglandin E2 shuts this receptor off. Mice lacking the receptor developed much less of the heightened pain sensitivity that inflammation normally causes.¹⁷

Why does that matter here? Prostaglandin E2 is made from arachidonic acid, and your body makes arachidonic acid from LA. So the glycine pain brake and the LA pathway converge on the very same receptor, from opposite sides. A 2026 study supported this receptor's role in pain: a compound that activated it relieved pain in mice, while blocking it made pain worse.¹⁸

To be clear, no one has yet tested whether eating less LA or taking glycine changes this spinal receptor in people. But the pathway itself is well-established in animal research.

A 2026 study in the *Journal of Clinical Investigation* showed the LA-to-prostaglandin pathway at work elsewhere in the body. In obese mice, LA and arachidonic acid piled up in injured tissue and fed prostaglandin E2 production, driving abnormal bone growth in soft tissue, a condition that causes joint stiffness and pain.

When the researchers fed an equally fatty, equally fattening diet that was simply low in LA, the abnormal bone growth was reduced. The fat composition, rather than the obesity alone, drove the abnormal bone growth.¹⁹

The Migraine Evidence

The strongest human evidence comes from migraine. In 2021, Dr. Christopher Ramsden and colleagues at the National Institutes of Health and the University of North Carolina published a randomized controlled trial in *The BMJ* with 182 adults who had frequent migraines.²⁰ Participants were assigned to one of three diets for 16 weeks:

- A control diet with typical American intake: LA at about 7% of calories and very little omega-3
- A diet with more omega-3 fats (1.5 grams a day of EPA and DHA), with LA still at about 7%
- A diet with the same omega-3 boost, plus LA cut to 1.8% of calories or less

Both omega-3 diets reduced headaches. But the group that also cut LA had about four fewer headache days a month compared with the control group, twice the reduction seen with omega-3 alone. The difference between the two omega-3 groups was about two headache days a month, which the authors said suggests an added benefit from lowering LA.²¹

To be fair, the diets didn't significantly improve the headache quality-of-life questionnaire that was one of the study's main measures, and blood prostaglandin E2 didn't change. What did change were the fats in participants' blood and several of the pain-related fat byproducts made from them, which points to the oxidized-fat pain pathway described above.²² Notice that 1.8% figure. That's right in line with the under-2% target I've been recommending.

I want to be honest about the glycine side: I couldn't find a clinical trial testing glycine for migraine. The connection there is mechanistic, through the pain and inflammation pathways described above, rather than proven in migraine patients.

Why Sunburn Fits the Pattern

Sunburn is an acute inflammatory reaction, and the fats in your skin are at the center of it. A study in 32 healthy people found that ultraviolet B light set off a sequence of inflammatory compounds made from skin fats, including prostaglandin E2, which accompany the redness for the first one to two days.²³

Changing the fats in your skin changes that response. In one trial of 13 people with a sun-sensitivity condition, three months of fish oil raised the ultraviolet dose needed to redden the skin by about 70%, and sharply lowered prostaglandin E2 in sun-exposed skin.²⁴

That trial added omega-3s rather than removing LA, so it doesn't prove that cutting LA prevents sunburn. But the underlying principle is the same: The fats you eat become the fats in your skin, and they shape how strongly your skin reacts to the sun. Lowering LA may reduce some of the raw material for that reaction. It's worth noting that this study is included to illustrate the mechanism, not as an endorsement of fish oil, which has its own drawbacks as a concentrated source of easily oxidized fats.

I'll be candid here too. I found no human sunburn study using glycine. Its plausible role is through the glutathione and cell-protection pathways I describe next.

Fuel and Firewall: Ferroptosis

There's one more shared pathway, and it may be the most important for chronic pain. Ferroptosis is a type of cell death driven by oxidized fats. A landmark 2016 study showed that ferroptosis is driven by the oxidation of polyunsaturated fats at their most vulnerable spot. When the researchers used polyunsaturated fats reinforced at that spot, cells were protected.²⁵ LA is the most abundant polyunsaturated fat in the American diet, making it a major potential fuel.

The cell's firewall against ferroptosis is an enzyme called glutathione peroxidase 4, which needs glutathione to work. And glycine is one of the three building blocks of glutathione. Two 2026 studies, published within weeks of each other, show this playing out in the same tissue:

- A study in Nature Communications found that LA builds up in the blood, joint fluid, and cartilage of older adults and people with osteoarthritis. It directly triggered ferroptosis in cartilage cells and accelerated osteoarthritis in male rats.²⁶

- A study in Cellular Signalling found that glycine blocked ferroptosis in rat cartilage cells. It raised glutathione-related defenses, including glutathione peroxidase 4, and when injected into the joint, it reduced cartilage damage in rats with osteoarthritis.²⁷

LA supplies the fuel. Glycine helps build the firewall. A 2026 review even proposed that this same ferroptosis-inflammation loop may help drive the chronic pain of fibromyalgia, though the authors note it hasn't yet been confirmed in patients.²⁸

Human data support the glutathione connection. In a small, randomized trial of 24 older adults, 16 weeks of glycine combined with N-acetylcysteine, a form of the amino acid cysteine, corrected their glutathione deficiency in the treated group. It also improved oxidative stress, mitochondrial function, inflammation, and physical function.²⁹ The lead researcher's review explains that older adults are deficient in glycine and cysteine, which limits how much glutathione they can make.³⁰

Note: These findings are from research conducted in both laboratory or animal research and in clinical settings. Results may not apply directly to human health or to all individuals.

Just Like Methionine

This parallels something many of you already know about methionine, the amino acid concentrated in muscle meat. When you eat a lot of methionine, your liver clears the excess with an enzyme called glycine N-methyltransferase, which uses up glycine in the process. A 2026 study showed how tightly this enzyme regulates your body's methylation balance.³¹ Because that enzyme uses up glycine, high methionine intake is thought to raise your need for it.

The effect on lifespan was modest but real. In a large U.S. aging study, mice fed a diet that was 8% glycine lived 4% to 6% longer, in both males and females. The researchers chose glycine partly because it can offset methionine's toxicity.³²

LA follows the same logic. A high LA load generates oxidized fats and toxic aldehydes, which your body neutralizes with glutathione. All of that cleanup raises your demand for glutathione's building blocks, glycine and cysteine. The more LA you eat, the more glycine you're likely to need.

Your Body Can't Make Enough Glycine

Glycine is officially classified as a nonessential amino acid, because your body can make it. I believe that label is misleading for nearly everyone in the U.S.

A detailed metabolic analysis found that the human body makes only about 3 grams of glycine a day, and the typical diet adds just 1.5 to 3 grams more. That can fall about 10 grams a day short of what a 70-kilogram adult needs for all of glycine's jobs, including building and repairing collagen. The authors concluded that glycine should be taken as a supplement to guarantee a healthy metabolism.³³

About one-third of the amino acids in collagen are glycine. Traditional diets in many Asian cultures included plenty of collagen, from bone broths, skin, cartilage, and tendons. Few people in the U.S. eat that way today, which is why I believe most people here would benefit from supplementing.

The 2026 research supports raising your glycine levels. A review of 22 trials found that glycine and collagen supplements generally raise blood glycine, and all three trials of glycine for sleep reported a benefit on at least one sleep measure.³⁴ And a large 2026 analysis of UK Biobank data found that people with higher blood glycine were biologically younger, an association partly explained by lower inflammation and better antioxidant balance.³⁵

A Bonus Hypothesis: Could Glycine Help with EMFs?

After working through this research, I realized the glycine mechanism may matter for another exposure I've warned you about for years: electromagnetic fields (EMFs) from cellphones, Wi-Fi, and other wireless devices.

The leading explanation for how low-level EMFs harm you comes from Martin Pall, Ph.D., professor emeritus of biochemistry at Washington State University. He argues that these fields act on the voltage sensor of voltage-gated calcium channels, flooding cells with calcium. His strongest evidence is that in about two dozen studies, calcium channel blockers blocked the effects of EMF exposure.³⁶ That calcium surge, he explains, then drives excess nitric oxide, peroxynitrite, and oxidative stress.³⁷

Look at how well that lines up with everything above. Glycine's chloride channel makes the inside of the cell more negative, which makes voltage-gated calcium channels harder to open. That's how glycine blunted the calcium spike in liver immune cells.³⁸ In theory, it raises the bar the field has to clear.

Glycine may also help further downstream, by supplying the glutathione that neutralizes oxidative damage. And low LA matters here too, because LA in your cell membranes is a prime target for the peroxynitrite this calcium surge produces. Less LA means less raw material for damage.

I want to be clear about the limits. No one has tested glycine against EMFs. I searched the medical literature and found no studies. Glycine-gated chloride channels exist only on certain cells, and Pall's calcium model, while supported by many studies, is still rejected by regulatory panels that recognize only heating effects. So this is a hypothesis, not a proven protection.

But it's an inexpensive hypothesis, and an easy one to test. Expose calcium channel-rich cells to pulsed EMFs, with and without glycine, and measure the calcium inside them. It's a study I'd love to see done.

What About the Critics?

You'll see headlines claiming LA is harmless or even anti-inflammatory. A 2026 analysis of more than 2,000 people found that those with higher blood LA had lower levels of inflammatory markers.³⁹ A 2026 review went further, declaring that concerns about seed oils are "without scientific foundation."⁴⁰

But look carefully at what these studies measure. The first is a snapshot of blood levels at one point in time. It can't show cause and effect, and it doesn't measure the oxidized LA byproducts that activate pain receptors. The review focuses mainly on heart disease. While it rejects the claim that LA raises inflammation, it relies on human outcome studies and doesn't address the pain-receptor pathways described here.

The studies I've highlighted are different. They change LA directly and measure what happens. When the National Institutes of Health team cut LA to 1.8% of calories, headache days fell beyond what omega-3s alone achieved.⁴¹ When researchers fed mice an equally fattening diet low in LA, abnormal bone formation after injury dropped.⁴² That's the kind of evidence I weigh most heavily.

Hack No. 1: Take About 10 Grams of Glycine a Day

Unless you eat collagen-rich foods every day, I recommend supplementing with about 10 grams of glycine daily. That matches the shortfall the metabolic research identified.⁴³ If you're pregnant or nursing, take prescription medication, or have a chronic health condition, check with your health care provider before starting.

- **Use pure glycine powder** — It's inexpensive, mildly sweet, and dissolves easily in water, tea, or coffee.
- **Split your dose** — Take part of it during the day and about 3 grams before bed, a common dose in glycine sleep research.
- **Collagen is a food source, not a substitute** — Collagen powder and bone broth help, but by weight, collagen is only about 20% glycine. You'd need roughly 45 to 55 grams of collagen to get 10 grams of glycine. Pure glycine is far more practical for meeting that target. Collagen still matters in its own right, though. I recommend that about one-third of your protein come from collagen.
- **Start lower if your stomach is sensitive** — Begin with 3 to 5 grams and work up over a week or two.

- **Pair it with cysteine if you're older** — The glutathione trial in older adults used glycine together with N-acetylcysteine.⁴⁴ Check with your doctor first if you take nitroglycerin or other nitrates, blood thinners, or have a bleeding disorder, asthma, upcoming surgery, or are pregnant or nursing.

Hack No. 2: Keep Linoleic Acid Below 2% of Your Calories

On a 2,000-calorie diet, 2% of your calories is just 40 calories. Since fat has 9 calories per gram, that's only about 4 to 5 grams of LA a day. A single tablespoon of soybean or corn oil contains about 7 grams, more than your entire daily budget. Here's how to get there:

- **Eliminate seed oils completely** — That means soybean, corn, canola, sunflower, safflower, cottonseed, grapeseed, rice bran, and peanut oil. Check labels, because they're in nearly every processed food.
- **Avoid restaurant and fast food as much as possible** — Almost all restaurants cook with seed oils, and fried foods are the worst offenders. If you do eat out, The Templeton List (templetonlist.com) can help you find restaurants that avoid seed oils.
- **Cook with healthy saturated fats** — Use grass fed butter, ghee, beef tallow, or coconut oil, which are all naturally very low in LA.
- **Choose ruminant meats** — Beef, bison, and lamb are naturally low in LA. Conventional chicken and pork are high because the animals are fed corn and soy. That carries into their fat.
- **Avoid nuts and seeds** — They're concentrated sources of LA. A single ounce of walnuts has more than 10 grams. That's why I don't recommend them.
- **Limit olive and avocado oil** — They're lower in LA than seed oils, but they still contain roughly 8% to 13%, and many commercial brands are cut with cheaper oils. Olive oil is also high in oleic acid, which can interfere with glucose metabolism, so

use it only in moderation.

- **Track your intake for a few weeks** — The Food Buddy feature in the Pax app, with its Seed-Oil Sleuth tool, will show you how much LA you're eating. Most people are shocked the first time they see the number.
- **Be patient** — Because LA has a half-life of about two years in your tissues, it takes time to clear.⁴⁵ Many people notice changes within months, but your stores keep improving for years.

The Bottom Line

When I first heard about glycine's benefits, I suspected they weren't a coincidence. The research supports that hunch. Glycine and LA push on the same kinds of switches in opposite directions: the calcium gates on immune cells and pain nerves, the glycine pain brake in your spinal cord, and the ferroptosis pathway that can damage cartilage in animal studies.

That means you can work both sides at once. Supplementing with about 10 grams of glycine a day may help strengthen the brake, and cutting LA below 2% of your calories takes your foot off the accelerator. Both are simple, inexpensive, and entirely within your control.

This article is for informational purposes only and does not constitute medical advice. Consult a qualified health care provider before making changes to your health regimen.

Sources and References

- ¹ [Adv Nutr. 2015;6\(6\):660-664](#)
- ^{2, 45} [Nutrients. 2023;15\(14\):3129](#)
- ^{3, 4, 38} [Am J Physiol. 1997;272\(6 Pt 1\):G1581-G1586](#)
- ⁵ [Am J Physiol. 1999;277\(5\):L952-L959](#)
- ⁶ [J Leukoc Biol. 1998;64\(5\):615-621](#)
- ⁷ [J Gastroenterol Hepatol. 2007;22\(Suppl 1\):S62-S64](#)
- ⁸ [Circ Res. 2026](#)

- ⁹ eLife. 2025;12:RP91329
- ¹⁰ eLife. 2022;11:e78609
- ¹¹ BMC Neurosci. 2026
- ¹² J Clin Invest. 2010;120(5):1617-1626
- ¹³ J Biol Chem. 2005;280(49):40676-40683
- ¹⁴ Sci Rep. 2017;7(1):446
- ¹⁵ Hepatology. 2026
- ¹⁶ Immunology. 2026
- ¹⁷ Science. 2004;304(5672):884-887
- ¹⁸ Neurosci Lett. 2026
- ^{19, 42} J Clin Invest. 2026
- ^{20, 21, 22, 41} BMJ. 2021;374:n1448
- ²³ FASEB J. 2009;23(11):3947-3956
- ²⁴ J Invest Dermatol. 1995;105(4):532-535
- ²⁵ Proc Natl Acad Sci U S A. 2016;113(34):E4966-E4975
- ²⁶ Nat Commun. 2026
- ²⁷ Cell Signal. 2026
- ²⁸ Clin Immunol. 2026
- ^{29, 44} J Gerontol A Biol Sci Med Sci. 2023;78(1):75-89
- ³⁰ J Nutr. 2021;151(12):3606-3616
- ³¹ J Biol Chem. 2026
- ³² Aging Cell. 2019;18(3):e12953
- ^{33, 43} J Biosci. 2009;34(6):853-872
- ³⁴ J Diet Suppl. 2026
- ³⁵ Free Radic Biol Med. 2026
- ³⁶ Rev Environ Health. 2015;30(2):99-116
- ³⁷ Curr Alzheimer Res. 2022;19(2):119-132
- ³⁹ J Nutr. 2026
- ⁴⁰ Crit Rev Food Sci Nutr. 2026