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Migraines Strongly Associated With High Estrogen and Low Thyroid

Analysis by Dr. Joseph Mercola | May 20, 2024

STORY AT-A-GLANCE

- Migraines impact 12% of Americans and are the second leading cause of disability worldwide, affecting 1 billion people globally and ranking as the third most prevalent illness
- Excess estrogen and inadequate progesterone, along with high linoleic acid (LA) intake, are key factors in migraines. Lowering LA and estrogen can eliminate most migraines
- Estrogen enhances pain signals by sensitizing cells around the trigeminal nerve and blood vessels in the head. Research has also found that progesterone — a natural estrogen blocker — is protective against migraines
- Balancing your estrogen-progesterone levels involves choosing natural products, limiting pesticide exposure, avoiding plastic, supporting liver health, maintaining a healthy weight, and considering trans mucosal progesterone for its estrogen-blocking effects
- High LA intake and estrogen dominance are also key culprits in hypothyroidism, as PUFAs inhibit T3, and those with a history of migraines are also at increased risk for hypothyroidism. Migraine sufferers who manage their hypothyroidism effectively often report improvements in migraine frequency and severity, which is another indication that thyroid hormone balance plays a role in migraine

Migraines affect an estimated 12% of the American population and is the second leading cause of disability worldwide.[1] Worldwide, as many as 1 billion people are affected,[2] making migraine the third most prevalent illness in the world.

They can strike both young and old, but most sufferers are women. According to research,[3] migraine prevalence begins to rise around puberty and continues to rise until 39 years of age, after which it decreases again. Menopause frequently offers migraine relief for women, which hints at the role of estrogen.

Unfortunately, despite their prevalence, researchers still struggle to understand exactly how and why migraines occur.

Few understand that excess estrogen and inadequate progesterone is a key factor, or that high linoleic acid (LA) intake exacerbates the situation. If you lower LA and estrogen, most migraines vanish without further intervention. Thyroid function also plays an important role, which makes sense considering high LA intake is a primary causative factor of hypothyroidism as well.

Estrogen Is a Major Player in Migraines

Migraines are thought to be a disorder of your central nervous system, most likely originating in your brain stem.[4] While most brain regions do not register or transmit pain signals, the trigeminal nerve network does.

Pain is relayed through the trigeminal network to an area in your brain stem called the trigeminal nucleus. From there, it is conveyed to the sensory cortex in your brain that is involved in awareness of pain and other senses. As it turns out, estrogen is a major factor in this chain of events.

> **“Estrogen sensitizes cells around the trigeminal nerve and connected blood vessels in the head, thereby augmenting pain signals.”**

The late Ray Peat, a pioneer in bioenergetic medicine, argued that estrogen is a major cause of migraines, and in 2018, research[5,6,7] was published that offered fresh support

for that view. Researchers found that estrogen sensitizes cells around the trigeminal nerve and connected blood vessels in the head, thereby augmenting pain signals.

Estrogen, of course, is at its highest during women's reproductive years, which also helps explain not only the gender difference in prevalence but also the age range at which migraines are most common.

Additionally, the study in question not only implicated estrogen as a causative factor in migraines, but also stated that progesterone is protective. This makes sense if estrogen is causative, as progesterone is an estrogen blocker.

How to Improve Your Estrogen-Progesterone Balance

If you struggle with migraines, avoiding estrogen replacement therapy (including bioidentical estrogen), birth control pills and xenoestrogens from plastics will be paramount. As I've noted in previous articles, estrogen dominance is nearly as dangerous as excessive LA intake when it comes to destroying your mitochondrial function.

Nearly 1,000 everyday items contain estrogenic compounds, so avoiding xenoestrogens may be easier said than done. However, making a concerted effort can go a long way. Here are some common-sense strategies that can help you limit your exposure and lower your estrogen load:

Avoid synthetic estrogens — Minimize exposure to synthetic estrogens, such as those found in hormone replacement therapy and oral contraceptives. Consult with a qualified health care professional about alternative treatments and/or contraceptive methods with lower estrogen content.

Choose natural products — Opt for natural and organic personal care products, including makeup, skin care, and hair care items, to reduce exposure to synthetic chemicals like parabens and phthalates, which have estrogenic properties.

Limit pesticide exposure — Choose organic produce whenever possible to reduce exposure to pesticides, many of which have estrogenic effects. Washing fruits and vegetables thoroughly can also help remove pesticide residues.

Rethink your household products — Many household cleaning products, laundry detergents and air fresheners contain chemicals with estrogenic properties. Swap them out for natural, nontoxic alternatives or make your own cleaning solutions using vinegar, baking soda and essential oils instead.

Avoid plastic containers and cutting boards — Minimize the use of plastic containers and food packaging, which can leach estrogenic compounds (xenoestrogens) into food and beverages. Instead, opt for glass or stainless-steel containers for food storage and water bottles. Also, never microwave plastics, as heat leaches the chemicals into your food. Use glass or ceramic containers for microwaving.

Filter your tap water and avoid water bottled in plastic — If you need to buy bottled water, opt for glass bottles. Also make sure the filter you use to purify your tap water can filter out microplastics, which have estrogenic properties.

If you have hard tap water, consider boiling it before using it for cooking or drinking, as hard water traps more microplastics. Recent research shows boiling hard tap water for five minutes removes up to 90% of the microplastics in the water.[8]

Maintain a healthy weight — Aim for a healthy weight and body composition through a balanced diet and regular exercise. Excess body fat, particularly around the thighs, hips, and buttocks, can contribute to higher estrogen levels.

Support liver health — Support liver function, as the liver plays a crucial role in metabolizing and eliminating excess estrogen from the body. Eat a nutrient-rich diet, limit alcohol consumption, and consider incorporating liver-supporting herbs and supplements, such as milk thistle or dandelion root.

Promote hormonal balance — Explore natural approaches to promote hormonal balance, such as consuming foods rich in cruciferous vegetables (such as broccoli,

cauliflower and kale) and flaxseeds, which contain compounds that help support estrogen metabolism and detoxification.

Reduce stress — Manage stress through relaxation techniques like meditation, deep breathing exercises, yoga or spending time in nature. Chronic stress can disrupt hormone balance, including estrogen levels, so prioritizing stress reduction is essential.

Progesterone Counteracts Estrogen Dominance

Another effective strategy that can help counteract estrogen excess is to take trans mucosal progesterone (not oral or transdermal), which is a natural estrogen antagonist. Progesterone is one of only four hormones I believe many adults can benefit from. (The other three are thyroid hormone T3, DHEA and pregnenolone.)

As a general recommendation, I recommend taking 25 to 50 mg of bioidentical progesterone per a day, taken in the evening one hour before bed, as it can also promote sleep. For optimal bioavailability, progesterone needs to be mixed into natural vitamin E. The difference in bioavailability between taking progesterone orally without vitamin E and taking it with vitamin E is 45 minutes versus 48 hours.

You can make your own by dissolving pure USP progesterone powder into one capsule of a high-quality vitamin E, and then rub the mixture on your gums. Fifty milligrams of powdered progesterone is about 1/32 teaspoon.

You can purchase pharmaceutical grade bioidentical progesterone as Progesterone Powder, Bioidentical Micronized Powder, 10 grams for about $40 on many online stores like Amazon. That is nearly a year's supply, depending on the dose you choose.

Do not use synthetic vitamin E (alpha tocopherol acetate — the acetate indicates that it's synthetic). Natural vitamin E will be labeled "d alpha tocopherol." This is the pure D isomer, which is what your body can use.

There are also other vitamin E isomers, and you want the complete spectrum of tocopherols and tocotrienols, specifically the beta, gamma, and delta types, in the effective D isomer. As an example of an ideal vitamin E you can look at the label on our vitamin E in our store. You can use any brand that has a similar label.

If you are a menstruating woman you should take the progesterone during the luteal phase or the last half of your cycle which can be determined by starting two weeks after the last day of your period and stopping the progesterone when your period starts.

If you are a male or non-menstruating woman you can take the progesterone every day for 4-6 months and then cycle off for one week. The best time of day to take progesterone is 30 minutes before bed as it is has an anti-cortisol function and will increase GABA levels for a good night's sleep.

I do not recommend transdermal progesterone, as your skin expresses high levels of 5-alpha reductase enzyme, which causes a significant portion of the progesterone you're taking to be irreversibly converted primarily into allopregnanolone and cannot be converted back into progesterone.

Please note that when progesterone is used transmucosally on your gums as I advise, the FDA believes that somehow converts it into a drug and prohibits any company from advising that on its label. However, please understand that it is perfectly legal for any physician to recommend an off-label indication for a drug.

In this case progesterone is a natural hormone and not a drug and is very safe even at high doses. This is unlike synthetic progesterone called progestins that are used by drug companies, but frequently, and incorrectly referred to as progesterone, which are dangerous and should never be used by anyone.

Migraines Are a Clear Sign of Mitochondrial Dysfunction

An even more foundational cause of migraines is mitochondrial dysfunction. As such, any strategy that helps improve your mitochondrial function is likely to be helpful.

The most important of these strategies is to limit your intake of LA, an omega-6 polyunsaturated fat (PUFA), as it acts as a mitochondrial toxin when consumed in excess. I published a paper together with Christopher D'Adamo on the detrimental health effects of LA in July 2023, which you can **read for free**.[9]

In summary, the main reason why excess LA causes so many health problems — including migraines — is that it prevents your mitochondria from working properly. Mitochondria are subcellular organelles responsible for producing most of your cellular energy in the form of ATP, and without ATP, your cells cannot function and repair themselves normally.

PUFAs such as LA are easily damaged by oxygen in a process called oxidation,[10] which triggers the creation damaging free radicals.[11] These, in turn, give rise to advanced lipoxidation end-products (ALEs)[12] and oxidized linoleic acid metabolites (OXLAMs).[13,14] These ALEs and OXLAMs are what cause mitochondrial dysfunction, which is a hallmark of most all chronic disease, including migraines.

Migraines and Low Thyroid Function

As detailed in "**Your Thyroid Is the Regulator of Your Entire Existence**," high LA intake and estrogen dominance are also key culprits in hypothyroidism (low thyroid function), as PUFAs interfere with your cell's ability to use active thyroid hormone (T3).

To maintain or increase energy production, your cells must be able to access T3. Studies have demonstrated that PUFAs function as competitive inhibitors of T3 action,[15] and LA is the most potent inhibitor of T3.[16]

Not surprisingly, research has indicated a potential link between migraines and hypothyroidism.[17] For example, a 2013 study[18] highlighted that 3% of migraine sufferers also had hypothyroidism, with a significant majority finding out about their thyroid condition after the onset of migraines.

More strikingly, a 2016 study[19] reported a 41% increased risk of hypothyroidism in individuals with a history of migraines. Further research[20] conducted in India in 2021

with 100 participants found that those suffering from migraines were more likely to have a thyroid disorder, especially hypothyroidism.

Migraine sufferers who manage their hypothyroidism effectively often report improvements in migraine frequency and severity, which is another indication that thyroid hormone balance plays a role in migraine.[21]

Radically Reduce Your LA Intake to Avoid Migraine Attacks

Ideally, you'd want to keep your LA intake below 2% of your daily calories, but even 5% would be a significant improvement since most people consume far more than that.

If you're not sure how much you're eating, enter your food intake into **Cronometer** — a free online nutrition tracker — and it will provide you with your total LA intake. Cronometer will tell you how much omega-6 you're getting from your food down to the 10th of a gram, and you can assume 90% of that is LA. The primary sources of LA that need to be radically limited are:

Seed oils for cooking. Healthy fat replacements include tallow, butter or ghee	Most processed foods, including condiments
Any restaurant food cooked in seed oil rather than butter	Most nuts and seeds
Most olive oil and avocado oil, due to the high prevalence of adulteration with cheaper seed oils	Conventionally raised chicken and pork, due to being fed LA-rich grains

LA Content of Common Cooking Oils

The table below provides a relatively comprehensive list of the most commonly consumed oils and their approximate LA content.[22,23,24]

In general, the lowest LA-containing fats — butter and beef tallow — would be the fats of choice. These excellent cooking fats also provide the fat-soluble vitamins, A, D, and K2. Coconut oil is also very low in LA but doesn't provide the important fat-soluble vitamins that tallow and butter contain.

COOKING OILS	% LINOLEIC ACID (LA) AVERAGE VALUE (RANGE IN PARENTHESES)
SAFFLOWER OIL	70%
GRAPE SEED OIL	70%
SUNFLOWER OIL	68%
CORN OIL	54%
COTTONSEED OIL	52%
SOYBEAN OIL	51%
RICE BRAN OIL	33%
PEANUT OIL	32%
CANOLA OIL	19%
OLIVE OIL	10% (3% - 27%)
AVOCADO OIL	10%
LARD	10%
PALM OIL	10%
TALLOW (CAFO)	3%
GHEE/BUTTER (CAFO)	2%
COCONUT OIL	2%
TALLOW (GRASS FED)	1%
BUTTER (GRASS FED)	1%

Aspirin for the Prevention and Treatment of Migraines

In addition to lowering your estrogen burden and LA intake, several nutritional supplements, medications and alternative remedies can be employed. Aspirin is one inexpensive and readily available option.

As reported in a 2019 paper in The American Journal of Medicine, properly dosed aspirin can safely and effectively abort a migraine attack when taken early enough, and may also be used preventatively in lower doses:[25,26]

> *"The totality of evidence, which includes data from randomized trials, suggests that high-dose aspirin, in doses from 900 to 1300 mg, taken at the onset of symptoms, is an effective and safe treatment option for acute migraine headaches.*
>
> *In addition, the totality of evidence, including some, but not all, randomized trials, suggests the possibility that daily aspirin, in doses from 81 to 325 mg, may be an effective and safe treatment option for the prevention of recurrent migraine headaches.*
>
> *The relatively favorable side effect profile of aspirin and extremely low costs compared with other prescription drug therapies may provide additional options for primary healthcare providers in the treatment of both acute and recurrent migraine headaches."*

Helpful Supplements

Other supplements that can help reduce migraine frequency and/or severity include:

Magnesium — Which can affect both serotonin receptor function and the production and use of neurotransmitters — has also been shown to play an important role in the prevention and treatment of migraines, and migraine sufferers are more likely to suffer from magnesium deficiency than non-migraineurs.[27]

Since magnesium administration is both easy and safe, researchers have noted that empiric treatment with a magnesium supplement is justified for all migraine sufferers.[28] As a prophylactic, be prepared to boost your magnesium intake for at least three months to experience results.

In many cases, receiving a high dose of magnesium can also abort an attack in progress. The most effective way to administer magnesium for migraine would be to get an intravenous (IV) infusion. I used to regularly administer magnesium IVs for those with acute migraines and it seemed to work for most patients to abort the headache.

Barring that option, magnesium threonate may be your best option for an oral supplement, as its superior ability to cross the blood-brain barrier makes it more likely to have a beneficial effect on your brain.

B vitamins — Other vitamin deficiencies linked to migraines include riboflavin (B2), B6, B12 and folic acid. One 2009 study[29] evaluated the effect of 2 mg of folic acid, 25 mg vitamin B6 and 400 micrograms (mcg) of vitamin B12 in 52 patients diagnosed with migraine with aura. Compared to the placebo group, those receiving these supplements experienced a 50% reduction in migraine disability over a six-month period.

Previous studies[30] have also reported that high doses of riboflavin can help prevent migraine attacks. In one study, patients who took 400 mg of riboflavin per day experienced a 50% reduction in migraine frequency after three months.

CoQ10 — Ubiquinol — the reduced form of CoQ10 — plays a vital role in ATP production, which is the basic fuel for your mitochondria. Your body does produce ubiquinol naturally; in fact, it is the predominant form in most healthy cells, tissues and organs. However, with rampant pollution and poor diet, mitochondrial dysfunction has become increasingly common, warranting supplementation with either ubiquinol or CoQ10.

One study published in the journal Neurology[31] found that CoQ10 was superior to a placebo in preventing migraines and reducing severity. Of the patients who received 100 mg of CoQ10 three times a day, 50% reported significantly reduced frequency of headaches compared to only 14% of those who took the placebo.

GABA — Migraine is one of several common symptoms of **GABA deficiency**.

Carbon dioxide — Migraines can also be addressed with CO_2. In some cases, migraines can be triggered by overbreathing, causing a lack of CO_2 that constricts the blood vessels in your brain. Exogenous CO_2 delivery methods include:

- Breathing into a small paper bag about 6 inches by 15 inches. If it's too small or too large, it won't work. Also never use a plastic bag as you can suffocate
- Drinking carbonated water and other carbonated beverages
- CO_2 baths
- A special suit into which CO_2 is pumped
- Hyperbaric administration
- Taking small amounts of baking soda in your drinking water
- Rectal insufflation — This was the preferred administration method in the 1800s and 1900s. A 1-liter bag or 1-quart bag filled with CO_2 gas, attached to a rectal catheter is used here; and it's something that is relatively easy to do at home, provided you have the right equipment. For more details, see "**The Underappreciated Role of Carbon Dioxide in Health**."

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