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Iron and Vegetable Oil Are a Deadly Combo

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STORY AT-A-GLANCE -

- Researchers found a connection between the intake of iron and seed oils high in omega-6 polyunsaturated fatty acids (PUFAs) with diabetic peripheral neuropathy (DPN) in people with Type 2 diabetes
- Both high dietary iron intake and an elevated iron/PUFA ratio were associated with DPN
- While the study evaluated PUFA intake of omega-6 and omega-3 together, it was the ratio of iron/omega-6 that showed a significant association with DPN
- One way to help stop the oxidative damage caused by iron intake in the presence of too many omega-6s is to take carnosine or its primary precursor, beta-alanine
- Many chronic diseases appear to be the result of a catastrophic cascade of health declines triggered by the long-term consumption of omega-6 seed oils
- To protect your health, it is vital that you reduce your intake of industrially processed seed oils as much as you can, which includes virtually all processed foods and fast foods that contain them

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The evidence continues to accumulate that avoiding toxic industrially processed seed oils, often referred to as "vegetable oils," is essential to protecting your health, and

recent research adds dietary iron to the increased health risks as well, particularly for those with Type 2 diabetes.[1]

Examples of seed oils high in omega-6 polyunsaturated fatty acids (PUFAs) include soybean, cottonseed, sunflower, rapeseed (canola), corn and safflower.[2] Omega-6 is considered to be proinflammatory because of the most common variety, linoleic acid, which will radically increase oxidative free radicals and cause mitochondrial dysfunction.[3]

But all seed oils have linoleic acid, even "healthy" ones like avocado and olive oil, both of which have the majority of commercially available products adulterated with other seed oils that have even higher levels of linoleic acid. So, only purchase trusted and tested brands and once you have them put the oil in the fridge. The linoleic acid will remain liquid. Simply pour that oil in the trash and your olive or avocado oil will be healthier.

The intake of omega-6 seed oils may also promote inflammation through arachidonic acid by increasing the production proinflammatory compounds. Further, as researchers noted in the journal Nutrients, "In addition, a few studies suggested that omega-6 PUFA is related to chronic inflammatory diseases such as obesity, nonalcoholic fatty liver disease and cardiovascular disease."[4]

Iron, meanwhile, while necessary for oxygen delivery, mitochondrial electron transport, DNA synthesis and more, can generate oxidative stress that leads to tissue damage, and previous research has found dietary iron intake may be associated with the risk of diabetes. Now, researchers have demonstrated a connection between the intake of iron and PUFAs with diabetic peripheral neuropathy (DPN) in people with Type 2 diabetes.[5]

Link Found Between PUFAs, Iron Intake and DPN

Diabetic peripheral neuropathy is a form of nerve damage that may occur in people with diabetes. The damage occurs, most often, in your legs and feet and is a significant cause of falls and fractures in this population. In addition to long-term diabetes, other risk factors for DPN include insulin resistance, high blood pressure, obesity and high blood sugar, and oxidative stress is believed to be a key contributing factor.[6]

For the featured study, Korean researchers looked into the association of iron intake and the ratio between iron intake and PUFA intake (iron/PUFA) with DPN in 147 people with Type 2 diabetes. Both high dietary iron intake and an elevated iron/PUFA ratio were associated with DPN, suggesting "the importance of the dietary pattern of iron and PUFA intake in individuals with type 2 diabetes."[7]

Iron overload has previously been found to make oxidative stress injury in neurons worse in the presence of high sugar concentrations, and the researchers suggested that insulin resistance and pancreatic beta cell dysfunction, which are caused by oxidative stress, could be behind the association between iron and DPN.[8]

The study had limitations, however, particularly in regard to PUFAs, as it did not interpret the study results in relation to omega-6 and omega-3 separately. Omega-3s have an antioxidant and anti-inflammatory role that's been linked to many health benefits.

Most people get far too much omega-6 and too little omega-3, thus ending up with a lopsided ratio, and this ratio is what impacts health. Ideally, this ratio would be close to 1-to-1. The key, however, is not necessarily to increase omega-3, but to decrease omega-6 to improve the ratio. The featured study evaluated PUFA intake of omega-6 and omega-3 together, but noted that it was the ratio of iron/omega-6 that showed a significant association with DPN:[9]

> *"Considering the PUFA-related antioxidant effect observed in an iron-related, pro-oxidant environment, we calculated the iron/PUFA ratio and found that a higher iron/PUFA ratio was associated with a higher OR (odds ratio) of DPN. This finding suggests that the ratio of iron to PUFA might be an important marker of DPN and can be used as an indicator to screen for or prevent DPN in individuals with type 2 diabetes.*
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> *In addition, even though the ratio iron/omega-6 PUFA, rather than the ratio iron/omega-3 PUFA, showed a statistically significant association with DPN after adjusting for confounders, we need to be cautious in interpreting these data. A relatively small amount of omega-3 PUFA compared with omega-6 PUFA might bring about these non-significant results."*

The Importance of Carnosine, Especially if You're Vegan

One way to help stop the oxidative damage caused by iron intake in the presence of too many omega-6s is to take carnosine or its primary precursor, beta-alanine. Carnosine is a dipeptide composed of two amino acids: beta-alanine and histidine. It's a potent antioxidant, the highest concentrations of which are found in your muscles and brain.

If you're a vegetarian or vegan, you will have lower levels of carnosine in your muscles. This is one reason why many strict vegans who do not properly compensate for this and other nutritional deficiencies tend to have trouble building muscle. Carnosine itself is not very useful as a supplement as it is rapidly broken down into its constituent amino acids by certain enzymes. Your body then reformulates those amino acids back to carnosine in your muscles.

A more efficient alternative is to supplement with beta-alanine, which appears to be the rate limiting amino acid in the formation of carnosine. Eating beef is known to efficiently raise carnosine levels in your muscle,[10] which is why if you're a vegetarian or vegan this supplement may be particularly important.

Chronic Disease Rooted in Long-Term Consumption of Seed Oils

Many chronic diseases appear to be the result of a catastrophic cascade of health declines triggered by the long-term consumption of seed oils (omega-6). For instance, Dr. Chris Knobbe, an ophthalmologist and the founder and president of the Cure AMD Foundation, a nonprofit dedicated to the prevention of age-related macular degeneration (AMD), believes age-related macular degeneration (AMD) should be called diet-related macular degeneration instead.

Knobbe has studied the toxic aldehydes that result from omega-6 fats. When you consume an omega-6 fat, it first reacts with a hydroxyl radical or peroxide radical, producing a lipid hydroperoxide.

This lipid hydroperoxide then rapidly degenerates into toxic aldehydes, of which there are hundreds, which in turn lead to cytotoxicity, genotoxicity, mutagenicity

carcinogenicity and more, along with being obesogenic, at very low doses. Knobbe explained the complex process in his presentation at the ALLDOCS annual 2020 meeting:[11]

> *"Here's what excess omega-6 does in a westernized diet: induces nutrient deficiencies, causes a catastrophic lipid peroxidation cascade, is what this does … This damages … a phospholipid called cardio lipid in the mitochondrial membranes. And this leads to electron transport chain failure … which causes mitochondrial failure and dysfunction.*
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> *And this leads first to reactive oxygen species, which feeds back into this peroxidation cascade. So, you're filling up your fat cells and your mitochondrial membranes with omega-6, and these are going to peroxidize because of the fact that they are polyunsaturated.*
>
> *All right, next thing that happens, insulin resistance, which leads to metabolic syndrome, Type 2 diabetes, nonalcoholic fatty liver disease. When the mitochondria fail you get reduced fatty acid, beta oxidation, meaning you can't burn these fats properly for fuel.*
>
> *So now you're … carb dependent and you're heading for obesity. So, you're feeling tired. You're gaining weight. Your mitochondria are failing to burn fat for fuel … this is a powerful mechanism for obesity.*
>
> *So, the energy failure at the cellular level leads to nuclear mitochondrial DNA mutations, and this leads to cancers. Three weeks on a high-PUFA diet causes heart failure in rats — three weeks. And this also leads to apoptosis and necrosis. And of course, that's how you get disorders like AMD, Alzheimer's."*

The Problem With Linoleic Acid

At the root of the harmful biochemical reactions triggered by seed oils is linoleic acid, which is an 18-carbon omega-6 fat. As mentioned, linoleic acid is the primary fatty acid found in PUFAs and accounts for about 80% of the fatty acid composition of vegetable

oils. Omega-6 fats must be balanced with omega-3 fats in order not to be harmful, but this isn't the case for most Americans.

To make matters even worse, most of the omega-6 people eat has been damaged and oxidized through processing. "Most of this linoleic acid, when it oxidizes, it develops lipid hydroperoxides and then these rapidly degenerate into … oxidized linoleic acid metabolites," says Knobbe.[12]

OXLAMs (oxidized linoleic acid metabolites) create a perfect storm, as they are cytotoxic, genotoxic, mutagenic, carcinogenic, atherogenic and thrombogenic, according to Knobbe. Their atherosclerosis and thrombogenic actions are especially concerning because they can produce strokes and clots, however metabolic dysfunction can also occur.

During the lipid peroxidation cascade caused by the excess consumption of omega-6 seed oils, PUFAs accumulate in your cell membranes, leading to a peroxidation reaction. As mentioned, because there are so many reactive oxygen species it leads to the development of insulin resistance at the cellular level.

Dr. Paul Saladino, a physician journalist, in a podcast, also explained that linoleic acid "breaks the sensitivity for insulin at the level of your fat cells,"[13] essentially making them more insulin sensitive — and, since your fat cells control the insulin sensitivity of the rest of your body by releasing free fatty acids, you end up with insulin resistance.

Unfortunately, even eating conventionally raised chicken, which are fed corn, is problematic, as the meat becomes high in omega-6 linoleic acid.[14] As Saladino points out, eating a lot of chicken adds to your vegetable oil consumption and further skews your omega-6 to omega-3 ratio.

Avoiding Processed Seed Oils Will Protect Your Health

To protect your health, it is vital that you reduce your intake of industrially processed seed oils as much as you can. This means eliminating all of the following oils:

Soy	Corn
Canola	Safflower
Sunflower	Peanut

Even too much organic, biodynamic olive oil can shift your ratio in the wrong direction, as olive oil is also a source of omega-6 linoleic acid, so be sure you use the trick I described above to lower the LA content of olive oil. It's also important to avoid nearly all processed foods and fast foods, as virtually all of them contain these toxic oils. The easiest way to do this is to prepare the majority of your food at home so you know what you are eating.

If you want to know how much linoleic acid you're eating, simply go to **cronometer.com** and enter your food, making sure that it is accurately weighed. For optimal health, try to get your intake under 10 grams per day.

Sources and References

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