

# Why Reducing PUFA Intake During Pregnancy Is Crucial for the Health of Your Children

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## STORY AT-A-GLANCE

- › Consuming the right types of dietary fats is crucial for cell membrane construction and overall health, particularly during pregnancy, as it significantly affects the health and development of your offspring
- › High intake of linoleic acid (LA) during pregnancy can negatively impact fetal development, influencing motor, cognitive, and verbal abilities in children, and may harm the placenta and have adverse effects on fetal organ development
- › LA, which constitutes 60% to 80% of omega-6 fats in modern diets, has detrimental effects on your mitochondrial function and metabolism, and need to be drastically reduced for optimal health
- › Too much omega-3 can also be problematic, as they too are PUFAs, and since most women are eating many times more LA than is ideal to begin with and are then told to significantly increase their omega-3 intake during pregnancy without radically lowering LA, all they're doing is radically raising their PUFA load. Elevated LA intake also inhibits the availability of omega-3
- › Limiting LA intake to below 5 grams (ideally 2 grams) per day, avoiding adulterated oils, and choosing meats low in LA are recommended to prevent chronic diseases and support healthier pregnancy outcomes

**Fats** — which are water-insoluble biological molecules also known as lipids<sup>1</sup> — are the primary building block of your cell membranes. This is one of the reasons why eating the

right types of fat is so important for your health and longevity.

Your choice of dietary fats during pregnancy is also crucial for the health of your offspring, as evidenced by research published in August 2023.

## **High Linoleic Acid During Pregnancy Puts Offspring at Risk**

The scientific review,<sup>2,3</sup> “Linoleic and Arachidonic Fatty Acids and Their Potential Relationship with Inflammation, Pregnancy, and Fetal Development,” highlights the neuro-, cardio, and hepato-toxic effects of polyunsaturated fats (PUFAs) – linoleic acid (LA) in particular – on offspring when consumed in high amounts during pregnancy:

*“A healthy maternal diet must consider an appropriate supply of long-chain polyunsaturated fatty acids (LCPUFAs) precursors to ensure adequate growth and development of the fetus.*

*In this regard, n-6 PUFAs, predominantly linoleic (C18:2 n-6, LA) and arachidonic acid (C20:4 n-6), have a central role in the development of the central nervous system because they are part of the membrane structure and participate in the metabolism and signal transduction of cells.*

*Nevertheless, they can also be transformed into inflammatory metabolites promoting the pathogenesis of cardiovascular diseases, cancer, and autoimmune or inflammatory conditions.*

*In modern westernized societies, there is a high dietary consumption of foods rich in n-6 PUFAs which could have detrimental consequences for the fetus and neonate due to excessive exposure to these fatty acids (FAs) ...*

*An elevated intake of n-6 PUFA, specifically LA, during pregnancy [negatively] influences children's motor, cognitive, and verbal development during infancy and early childhood. Similarly, they could harm the placenta and the development of other fetal organs such as the fat tissue, liver, and cardiovascular system ...*

*Maternal diet, specifically LA intake, could have significant repercussions on fetal development and long-term consequences in the offspring, including the possibility of future metabolic and mental diseases. It would be necessary to focus on the prevention of these alterations through timely dietary interventions in the target population."*

Other research has shown that a high-PUFA diet during pregnancy can increase estrogenic signaling, resulting in a higher risk of aggressiveness, alcoholism, and early puberty in female offspring.<sup>4</sup>

Other studies have linked high PUFA intake, especially LA, from infant formula to a higher risk of acute lymphoblastic leukemia in children. Interestingly, while the study was observational, the authors suggest it may be causative.<sup>5</sup>

## **LA Is the Most Pernicious Toxin in the Modern Diet**

LA makes up 60% to 80% of omega-6 fats in the modern diet, and as I've stated many times, it needs to be radically limited if you want to be optimally healthy, as it destroys your mitochondrial energy production and metabolism.

To be clear, you do need some LA (as well as other omegas), but when consumed in the excessive quantities we now see, it ends up having a toxic influence, and that's what they're talking about here.

Unfortunately, LA is still considered an "essential" fat, which is why it's so difficult to get people to realize its dangers. "Essential fatty acids" (EFAs) is a term referring to the PUFAs that scientists believe are crucial for health and that your body cannot produce. Hence, you have to get them from your diet. Currently only two types of fats are considered "essential":

- Omega-3 (EPA, DHA and ALA)
- Omega-6 fat (LA)

The reality is you need very small amounts of LA, and because it's found in most foods, it's virtually impossible to become deficient. Moreover, modern research has shown that up to 10 generations of animals can be raised without any LA in their diet whatsoever and remain perfectly healthy.

## **High LA Intake Suppresses Omega-3 Conversion**

Research has also shown that when you have a large amount of LA in your diet, an enzyme called delta 6-desaturase – which converts the plant-based omega-3 fat, ALA, to the long-chain fats DHA and EPA – is inhibited.

So, consuming high amounts of LA increases your dependence on seafood as a source of preformed EPA and DHA. This is important, as DHA and EPA are indeed essential and provide a range of health benefits.

One of the most important benefits of DHA is lowering inflammation, which is a factor in most chronic and degenerative diseases. EPA, meanwhile, is important for heart and cardiovascular health.<sup>6,7</sup>

## **Excessive Omega-3 Intake Can Be Just as Problematic as High LA Intake**

That said, too much omega-3 can be just as problematic as too little, and since most women are eating many times more LA than is ideal to begin with and are then told to significantly increase their DHA and EPA intake during pregnancy without radically lowering LA, all they're doing is radically raising their PUFA load.

Many also believe that if you have a distorted omega-3 to omega-6 ratio, the solution is simply to consume more omega-3, but again, that's a serious mistake, as omega-3 is also a PUFA.

When consumed in excessive quantities, omega-3 will cause metabolic damage similar to that of omega-6 LA, as it too breaks down into dangerous metabolites known as ALEs

(advanced lipoxidation end products).

So, one key take-home here is that if you're pregnant and have a very low omega-3 index, necessitating raising your omega-3 intake, it is absolutely CRUCIAL that you lower your LA intake from seed oils and processed foods. Simply upping your omega-3 intake is not going to do you or your baby any favors.

As one 2020 animal study<sup>8</sup> discovered, pregnant mice fed a diet high in LA significantly raised the amount of LA and total omega-6 in the placenta while simultaneously lowering the total omega-3 present. In this study, "high" LA intake was 6.21% of daily calories, which is actually low in terms of modern human dietary standards.

## **Average LA Intake Is FAR Above Ideal**

Before 1866, the Western world for the most part only consumed animal fats. Tallow, suet, lard and butter are examples of these fats. Eastern societies used cold-pressed fats like coconut and palm oil. Seed oils like we know them today simply did not exist.

The single-greatest change to the human diet was the introduction of industrially processed seed oils around 1866.<sup>9</sup> At that time Procter & Gamble used a newly invented hydrogenation process to convert surplus unusable cotton seeds into a synthetic seed oil, sold to this day under the name Crisco.

Shortly after that, margarine, which is made from seed oils, was introduced. In recent years the company has largely converted to using palm, soy and canola oil for its Crisco, but cottonseed oil is still very much in use for cooking, especially in restaurants for their fryers.<sup>10</sup>

So, historically, we can see that seed oil use increased from approximately 2 grams per day in 1865, to 5 grams per day in 1909, to 18 grams a day in 1999. As of 2008, the average consumption was 29 grams a day. In terms of percentages, seed oils accounted for approximately 1/100th of total calories in 1865 and increased to more than 1/4th of total calories by 2010 – a 25-fold increase!

## **Foods You Might Not Suspect Are High in LA**

Many other foods that were never a significant source of LA before are now also primary sources, simply because they're fed high-LA feed. Chicken and pork are prime examples. Because they're fed grains loaded with LA, their meat (and [eggs](#)) is also high in LA.<sup>11</sup> And this is true whether they're fed organic grains or not. Most chicken and pork have over 25% LA.

Ruminant animals such as cows, buffalo, sheep, lamb, goats, deer, elk and many other game animals have low LA content in their milk and meat, no matter what they eat, thanks to the fact that they have multiple stomachs with bacteria that can convert the high LA fat they eat into saturated and monounsaturated fats. So, your best option is to get most of your animal protein from ruminants and avoid or limit all chicken and pork.

Farm-raised salmon is also high in LA, as they too are fed grains. They also have the additional drawback of containing only half the omega-3 of wild salmon,<sup>12,13,14</sup> and one-fourth the vitamin D,<sup>15</sup> while having more than 5.5 times the amount of omega-6.<sup>16,17</sup> Farmed salmon are also routinely exposed to antibiotics and pesticides. So, while salmon is a superior source of omega-3s, it must be wild-caught.

## **Evidence Supporting Elevated PUFA Intake During Pregnancy Is Lacking**

As noted by bioenergetic medicine researcher Georgi Dinkov,<sup>18</sup> the idea that PUFAs are "essential" to life stems from "a single, never-replicated study<sup>19</sup> from the 1930s." A 2015 paper on PUFAs and fetal brain development also highlighted the lack of scientific support for the recommendation to increase PUFA intake during pregnancy, stating:<sup>20</sup>

*"The claim that polyunsaturated fatty acids help improve fetal brain and eye development has been made for more than a decade. Unfortunately, it is not supported by evidence-based science."*

*Long-term studies have failed to show such effects. Implying to women that using these products will improve the brain development of their children is unwarranted and misleading ...*

*The randomized trials we reviewed focused on the effects of maternal PUFA supplementation on the neurocognitive and retinal development in the child; they found very limited, if any, benefits to supplementation.*

*Even in the studies that found statistically significant differences between the treatment and control groups, the differences were small and of little potential clinical importance ...*

*Thus, in considering the results of these studies, a recommendation to supplement all expecting mothers with PUFAs to improve infant neurodevelopment is not currently supported by the existing data ...”*

## **How PUFAs Undermine Good Health**

The main reason why excess LA causes disease is that it prevents your mitochondria from working well. 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,<sup>21</sup> which triggers the creation of damaging free radicals.<sup>22</sup> These, in turn, give rise to ALEs<sup>23</sup> and in the case of omega-6 fats, OXLAMs.<sup>24,25</sup> These ALEs and OXLAMs then go on to cause mitochondrial dysfunction, which is a hallmark of most all chronic disease. In addition to oxidation, inflammation and mitochondrial dysfunction, processed seed oils can also:

**Damage the cells lining your blood vessels**

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**Cause memory impairment and increase your risk of Alzheimer’s disease (canola oil, in particular, has been linked to Alzheimer’s)**

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Strip your liver of glutathione thereby lowering your antioxidant defenses

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Inhibit delta-6 desaturase (delta-6), an enzyme involved in the conversion of short-chained omega-3s to longer chained omega-3s in your liver

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Impair your immune function and increase mortality

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Make your fat cells more insulin sensitive, thereby causing insulin resistance

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Inhibit cardiolipin, an important fat in the inner membrane of your mitochondria

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According to some research, PUFAs may also be carcinogenic, in part by increasing estrogenic signaling,<sup>26</sup> and in part by releasing toxic aldehydes when heated during cooking.<sup>27</sup>

## **The Importance of Cardiolipin**

The inhibition of cardiolipin in the inner mitochondrial membrane explains much of the damage caused by LA. The cristae of the inner membrane of the mitochondria contains a fat called cardiolipin,<sup>28</sup> and its function is dependent on the type of fat you get from your diet.

Cardiolipin is important because it influences the structure of the cristae inside your mitochondria, which is the area where energy production occurs. If cardiolipin is damaged, then the complexes will not be close enough together to form supercomplexes and thus the mitochondrial energy production will be impaired.

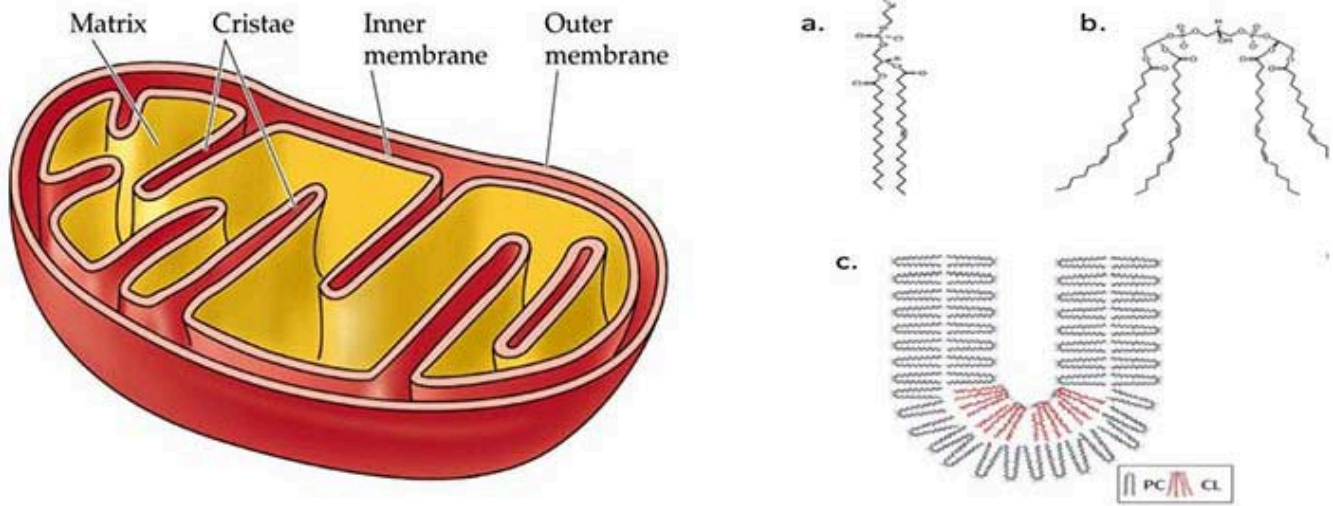
Cardiolipin also works like a cellular alarm system that triggers apoptosis (cell death) by signaling caspase-3 when something goes wrong with the cell. If the cardiolipin is damaged from oxidative stress due to having too much LA, it cannot signal caspase-3, and hence apoptosis does not occur.

As a result, dysfunctional cells are allowed to continue to grow, which can turn into a cancerous cell. The type of dietary fat that promotes healthy cardiolipin is omega-3 fat,



and the type that destroys it is omega-6, especially LA.

The image below illustrates a typical mitochondrion on the left. Figure C shows how the folds cause cardiolipin to provide the curve in the mitochondrial cristae. The folding causes the super complexes in the electron transport chain to get closer together and more efficiently transfer electrons to produce ATP.



The good news is that dietary changes can improve the composition of fats in your cardiolipin in a matter of weeks, or even days. So, even though it will take years to lower your total body burden of LA, you will likely notice improvements well before then.

## **Foods to Avoid Before, During and After Pregnancy**

The primary sources of LA include seed oils used in cooking, processed foods and restaurant foods made with seed oils, condiments, seeds and nuts, most olive oils and avocado oils (due to the high prevalence of adulteration with cheaper seed oils), and animal foods raised on grains such as conventional chicken and pork.

Ideally, consider cutting LA down to below 5 grams per day, which is close to what our ancestors used to get. 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. Anything over 10 grams of LA is likely to cause problems. Healthy fat replacements include tallow, butter or ghee, all of which are excellent for cooking.

The table below provides a fairly comprehensive list of the most commonly consumed oils and their approximate LA content.<sup>29,30,31</sup> In general, the lowest LA-containing fats – butter and beef tallow – would be the fats of choice. These excellent cooking fats would not only be the lowest in LA, but will 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.

<b>COOKING OILS</b>	<b>% LINOLEIC ACID (LA)</b> 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%

## Go Easy on the Olive Oil

Also use olive oil and avocado oil with caution. Consumption of olive oil has increased more than 10-fold in the U.S. over the past 35 years.<sup>32</sup> Olives and olive oil are well-known

for their health benefits, especially for your heart, but using olive oil adulterated with cheap seed oils loaded with LA will not do your health any favors.

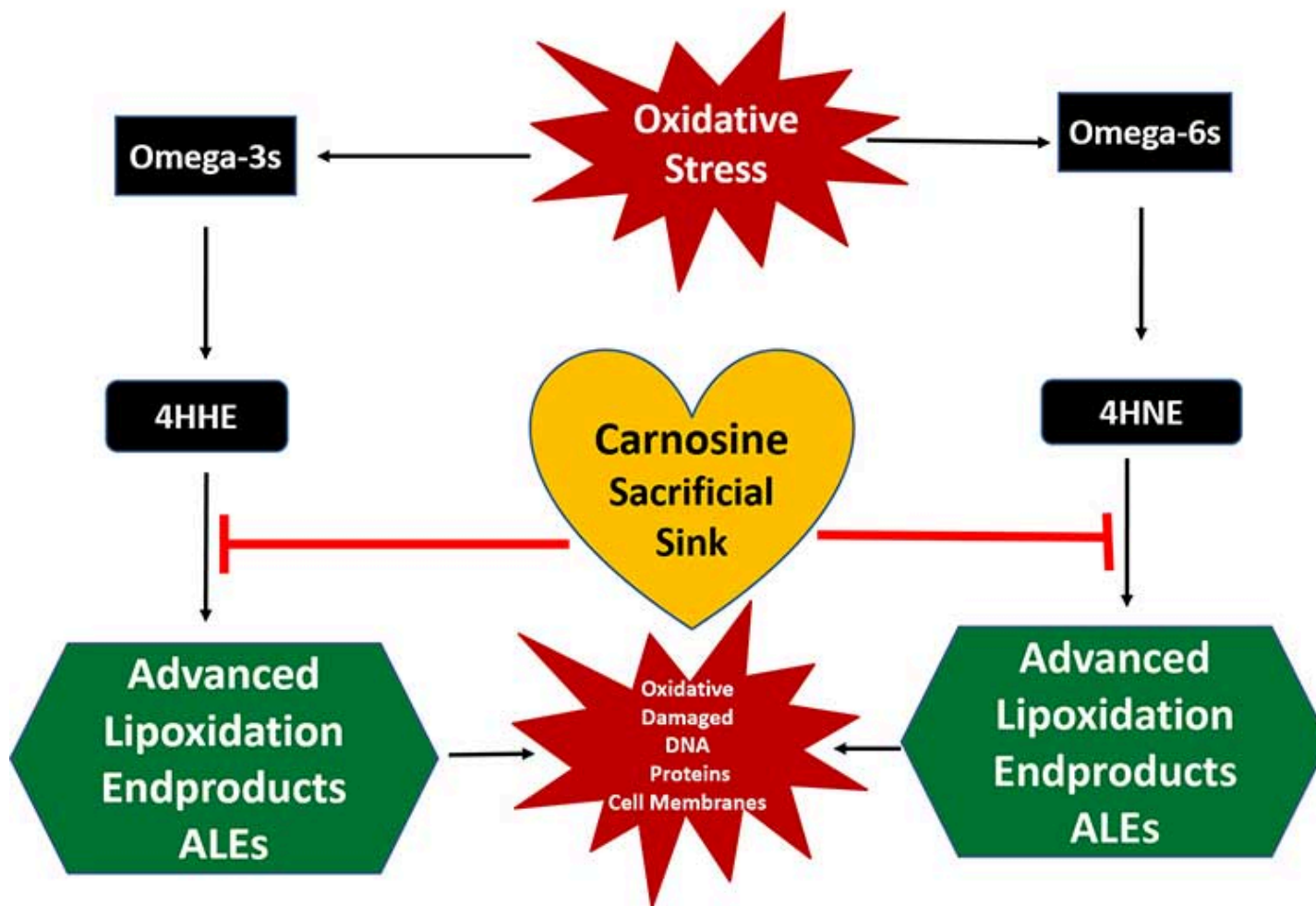
Tests have revealed that anywhere from 60% to 90% of the olive oils sold in American grocery stores and restaurants are adulterated with cheap, oxidized, omega-6 vegetable oils, such as sunflower oil or peanut oil, or nonhuman-grade olive oils, which are harmful to health in a number of ways.<sup>33</sup>

Chances are, you've been eating poor-quality olive oil so long – or you've never tasted a pure, high-quality olive oil to begin with – you don't even realize there's something wrong with it. The same applies to avocado oil. Many believe avocado oil is as healthy as olive oil, but this is simply not the case. A 2020 study showed that 82% of avocado oil is also adulterated, mislabeled or of poor quality.<sup>34</sup>

## **Carnosine Can Help Reduce LA-Induced Oxidative Damage**

While your body will slowly eliminate stored LA over time, provided you reduce your intake, a peptide supplement called carnosine can help reduce the oxidative damage caused by LA while your body is cleaning itself out.

Carnosine consists of two amino acids, beta-alanine and histidine. It serves as a sacrificial sink for reactive oxygen species (ROS) and ALEs, meaning it lets these damaging molecules destroy it rather than your mitochondria, DNA or proteins, as depicted in the image below.



Carnosine is found in meats, and eating animal protein is known to efficiently raise carnosine levels.<sup>35</sup> It's not found in any plant foods. Alternatively, you could use a supplement. In this case, beta-alanine is a superior choice, as it's the rate limiting amino acid in the formation of carnosine and raises carnosine levels more efficiently. It's also far less expensive than carnosine.

## Be Sure to Add in Collagen Too

Don't overdo it on red meat either though. Ideally, your protein would be around 15% of your daily calories, but one-third of that (about 5% of calories) needs to be collagen. So, if meats make up a majority of your protein intake, don't go over 10% of daily calories.

While collagen will not provide any carnosine, or raise it through some other mechanism, collagen is crucial for healthy fetal development in its own right. Collagen provides

structural integrity to the extracellular matrix of many tissues, which is essential for proper organ and skeletal development in the fetus. It's also necessary for the formation of skin, bones, and connective tissues.

Collagen is also crucial for the development of the vascular system. It helps in forming stable blood vessels, which are essential for supplying nutrients and oxygen to the developing fetus.

Deficiencies in collagen or disruptions in its production can potentially lead to developmental abnormalities. Deficiencies are also associated with recurrent miscarriage, diabetes and preeclampsia.<sup>36</sup>

## **Restrict PUFA Intake for a Healthier Family**

Do yourself and your family a favor and embark on a journey of eliminating all seed oils from your diet today to ward off virtually all chronic degenerative diseases – especially if you're pregnant or planning a pregnancy.

This means avoiding all seed oils, and even fruit oils like olive oil and avocado oils as they are frequently adulterated with cheap seed oils. Cook with ghee, butter or beef tallow, and avoid all processed foods, as they are typically loaded with seed oils.

Also avoid eating in restaurants, as nearly all use massive amounts of seed oils to cook with and put it in their sauces and dressings. Lastly, avoid chicken and pork, and stick to bison, lamb and other ruminants as your primary meat sources.

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