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The Ultimate Guide to Anti-Inflammatory Plant-Based Foods and Nutrients

endometrix



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About Endometrix

The idea for Endometrix sparked at a Design Thinking course in 2017. That philosophy still pumps steadily through our veins. Since that day, we have used the Design Thinking framework to ensure that we are always listening to and learning from the endometriosis community. There's no such thing as having a final product by us because every detail of our app continues to be focused on and tested by our users' adapting needs.

Both our app and our team is constantly learning from the information shared by our users. Most companies will tell you that they have the answer. We know that the answers you seek are already within you, we just want to give you the tools to help you find them.

Our Philosophy

Chronic period pain is not normal and the culture surrounding "period pain" is hurting all uterus carriers. We believe the normalization of "period pain" contributes to the prevalence of misdiagnosis and the seven-year-long average time to diagnosis experienced by people with endometriosis.

Ultimately, our mission is to empower past and present uterus carriers everywhere to receive the healthcare they deserve. We believe awareness, whether it's within ourselves about how our body functions or throughout the healthcare system, helps achieve this. We want to drive this awareness with data to help our users understand and better communicate their needs with those they seek care from.

Executive Summary

According to today's research, known factors that influence the pathogenesis of endometriosis are genetic, environmental, immunological, and inflammatory. Diet may play a role in this. The main ways in which food influences endometriosis is through its impact on hormone levels and inflammation.

Endometriosis is an estrogen-dependent condition that may be affected by diet due to its influence on steroidal hormones. While food can influence problematic imbalances in hormone levels, it also has the potential to improve the hormonal conditions within the body.

The strong relationship between inflammation and endometriosis makes it worth considering a reduction in inflammatory foods to help alleviate endometriosis symptoms. In this report, we explore the plant-based foods that have anti-inflammatory properties and the specific nutrients that support these properties.





Word Bank

Cytokines:

Any of a number of substances, such as interferon, interleukin, and growth factors, which are secreted by certain cells of the immune system and have an effect on other cells

Estrodial:

A major estrogen produced in the ovaries

Etiology:

The cause, set of causes, or manner of causation of a disease or condition

Globulin:

Any of a group of simple proteins soluble in salt solutions and forming a large fraction of blood serum protein

Isoflavones:

A crystalline compound whose derivatives occur in many plants, often as glycosides

Pathogenesis:

The manner of development of a disease

Phytochemicals:

Any of various biologically active compounds found in plants

A Diet's Influence on the Pathogenesis of Endometriosis

Globally, the leading risk factor of early death is diet (1), and diet also remains the leading risk factor among chronic disease (2). There are factors that influence disease risk that cannot be controlled, such as genetics, but there are also factors that can be influenced by individual behavior and environment. When discussing prevention and management of any chronic disease, diet is an important risk factor to investigate, particularly because it is modifiable. Consideration of dietary factors could yield beneficial outcomes for individuals both at risk of endometriosis (all people who menstruate) and for symptom management for those who already live with the condition.

Known factors that influence the pathogenesis of endometriosis are genetic, environmental, immunological and inflammatory. These are all currently supported by scientific evidence, and other factors continue to be explored. Lifestyle factors are among those that may be influential to the etiology of endometriosis. Diet may play a role in the pathogenesis of endometriosis through its relation to steroid hormones, inflammation and food contaminants. When it comes to endometriosis, diet can play a role in the risk of development of the disease as well as contribute to pain management for patients (3).





Balancing Hormones With Food

Foods that interfere with the regulation of hormones can have negative implications for people living with endometriosis (3). Endometriosis is an estrogen-dependent condition that may be affected by diet due to its influence on steroidal hormones. Foods have the ability to influence the hormone levels in the body, and the consumption of animal products may have an impact on the risk of endometriosis as they affect steroid hormone levels (4). When the hormones are out of balance, it becomes more difficult for ovulation to occur and menstruating people may experience issues with fertility and pelvic pain.

Just as food can influence problematic imbalances in hormone levels, it also has the potential to improve the hormonal conditions within the body (5).

Diet is a tool that can help balance the level of hormones in the body. Research supports that a diet high in fiber and low in fat keeps the hormones of menstruating people at a healthier and more balanced level. Better balanced hormones can reduce the risk of breast cancer, and aid those who suffer from other hormone-related problems, such as endometriosis.

Studies from Tufts University, UCLA and the American Health Foundation found that people who controlled the fat and fiber content in their meals reduced their estradiol levels by 10 to 25 percent. Other hormones, estrone and testosterone, were also reduced through this measure (5). A further study was conducted in Italy in which post-menopausal people were observed. Of the 115 participants, 58 were asked to reduce their consumption of meats, dairy products, and animal fat and to choose plant-based foods. The other 57 participants maintained their normal diets. While no increased fiber intake was observed among either group, the estrogen excreted in urine samples showed that those who switched to plant foods over animal foods reduced the estrogen levels in their bodies by forty percent (5).

Hormones that start in the ovaries and adrenal glands get turned into male and female hormones in fat cells, and they control a person's basic biology. A body with more fat will have greater hormone production that can lead to imbalances which interfere with fertility.

This interference is exemplified in Harvard Nurses' Health Study II, in which fertility among a large group of menstruation people was examined. The study found that as body fat content went up, so did issues with fertility. The explanation for this is that fat cells produce extra male and female hormones that get released into the bloodstream (5). Body fat also lessens the amount of sex hormone binding globulin (SHBG) in the blood, something that binds to sex hormones and keeps them inactive until they are needed. At the same time, there is a point at which a lack of body fat can also be problematic. When body mass index (BMI) falls below around 18kg/m^2 , estrogen levels may be too low and infertility can become a problem for these individuals. With too little estrogen being released into the bloodstream, the ovaries struggle to function and can shut down (5).

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Excess and unwanted hormones can be removed from the body. The liver is constantly working to make that happen. It sends hormones, along with other unwanted things in the body like toxins and medications, to the bile duct and eventually to the intestinal tract. The unwanted hormones get flushed away, but this process requires the assistance of fiber. Fiber is plentiful in plant products, but there is none in animal products. Without enough healthy sources of fiber in the body, the unwanted hormones cannot be absorbed and flushed away. Instead, they end up back in the bloodstream. Reaching a hormone equilibrium can be challenging, but doing so has proven to help those who struggle with hormone-related issues, endometriosis included. Attaining the proper hormone balance can be better done by adopting a diet high in fiber and low in fats (5).

Inflammation Alleviating Properties in Food

People who suffer from endometriosis experience a chronic state of inflammation. However, it is not apparent whether the inflammation causes the endometriosis or if the endometriosis results from existing inflammation (1). The strong relationship between inflammation and endometriosis makes it worthwhile to consider reduction in inflammation as a means to alleviate outcomes of endometriosis (1). Some foods contain components that are effective in mitigating inflammation, while others promote it. Foods that promote inflammation and can contribute to painful symptoms include alcohol, red meat, caffeine, gluten, and saturated and trans fat (3).

Contemporary literature promotes the consumptions of certain foods that are deemed anti-inflammatory. Inflammation fighting foods that are recommended by experts in nutrition include fruits, vegetables, whole grains, beans, nuts, fatty fish, and spices (1).



Edible plants contain phytoestrogens, which include compounds like isoflavones that alleviate inflammation. This is done through various mechanisms, including by decreasing the production of inflammatory molecules. Research supports that people with endometriosis can reduce their risk of developing advanced endometriosis by consuming isoflavones. Puerarin is a particular isoflavone that has demonstrated anti-inflammatory function in the cells of endometriosis patients (6).

Just as foods can contribute to pain, they also play a role in easing it. There is plenty of nutrition out there that fights against inflammation, and to do so, the best way is to consume a well-balanced and nutrient dense diet. Food that is plant-based and vitamin and mineral rich is best for reducing inflammation. Such items include fibrous foods, iron-rich foods, and foods rich in essential fatty acids. It is also important to include foods rich in antioxidants, which is found in colorful fruits and vegetables (3).

Pain Management Capabilities Of Increased Vitamin Intake

Food has the ability to protect and heal us, but even with a well-balanced and nutrient-dense diet it can be difficult to get the right concentration of some vitamins. A careful consideration of vitamin intake is particularly important for those who live with endometriosis. People who have endometriosis are reported to have a lower intake of vitamin A than those who do not have it.

Pro-vitamin A nutrients are found in fruits and vegetables that contain alpha-carotene, beta-carotene, and beta-cryptoxanthin. A prospective cohort study conducted between 1991 and 2013 that assessed diet through validated food frequency questionnaires and laparoscopically confirmed endometriosis found a non-linear inverse association between higher fruit intake and the risk of endometriosis.



Citrus fruit consumption was strongly associated with a decreased risk in endometriosis, as those who consumed ≥ 1 serving of citrus fruit per day had a 22 percent lower risk of endometriosis (7). People with endometriosis may be able to manage their pain with vitamin intake. Supplementation of vitamin E and C have shown a reduction in chronic pelvic pain and decreased inflammation among endometriosis patients. Curcumin, the anti-inflammatory part of turmeric, is also known to help with endometriosis management by inhibiting endometrial cells through reducing the estradiol production (3). Vitamin intake may provide relief, and micronutrients could play a role in the lesions of endometriosis patients. In a study done on mice, resveratrol reduced the size of the lesions of models of endometriosis. Resveratrol is a polyphenol that is found in grapes, peanuts, pistachios, and berries (6). Although this study was conducted on mice, the results of resveratrol having an impact on endometriosis model could be transferable to humans (6).



Foods to Pursue

Across the board, a diet abundant in plants has health benefits. Plants contain effectively no cholesterol and they are high in fiber. The fiber in plants makes it easier for the body to shed unwanted toxins and hormones. High fiber diets prove to be protective in that they reduce estrogen in the body while fat increases estrogen. With a change to a whole food, plant-based diet, there is a possibility to improve fertility among endometriosis patients. Within plant foods, there are four main groups of food that can help maximize health. These include vegetables, fruits, legumes, and grains (5). Vegetables are great for obtaining fiber and keeping fats low.

Leafy greens also provide calcium to the body, without doing harm to the hormone balance as dairy products do. They are also rich in iron, and many greens even contain protein. Broccoli is nutrient dense, as it provides iron and its calories are about one third protein (5). Leafy greens are a great way to load up on iron and protein without the harms of meat products. Vegetables also contain cancer-fighting micronutrients and antioxidants that also help with mood regulation (5). Fruits are full of vitamins that are health promoting, and just like vegetables, they are high in fiber and low in fat.

The vibrant colors of fruits are nature's way of attracting our eyes and informing us that these are foods rich in antioxidants. Antioxidants are good to stock up on because they eliminate oxidizing agents that are potentially damaging. These are mostly found in vitamins C and E (5).

Legumes come in the form of beans, peas, and lentils and are full of protein and calcium. Contrary to animal sources of protein and calcium, legumes lower cholesterol and blood pressure, and they are rich in fiber. The fiber in beans makes them filling, but it can also cause gassiness which may perpetuate already existing pelvic pain. For this reason, people who have endometriosis may need to slowly ease beans into their eating routine by starting with smaller portions that are thoroughly cooked (5).

Grains are common across societies for providing energy, protein and fiber. They are a healthful form of a complex carbohydrate and they contain no animal fat or cholesterol. While all grains are a superior alternative animal foods, whole-grains are the natural form of

grains that still have the outer bran coating. It is in that coating where the fiber that helps balance hormones is found (5).

To maximize health and arm the body to fight disease, it is beneficial to eat various and abundant plant foods. People who have endometriosis may want to consider a diet heavy in iron rich foods like dark leafy greens, broccoli, beans, fortified grains, nuts, and seeds. Consuming foods rich in essential fatty acids is also beneficial to endometriosis patients. This includes walnuts, chia seeds and flax seeds (3). A lessened risk of endometriosis is associated with a higher total consumption of fruits and vegetables (7). Compared to people who consume ≤ 2 servings per day of fruits and vegetables, those who consume 3, 4, 5, and ≥ 6 servings per day reduce their risk of endometriosis by 9%, 10%, 18%, and 12% respectively (7). Foods that are high in fiber, like vegetables, fruit, whole grain, beans are beneficial to people who have endometriosis (5).





Food For Thought

Animal products can present a variety of concerns to human health. Among which, there are sometimes pollutants found in farmed animal products that may also contribute to a heightened risk of endometriosis. The degree of contamination can vary among animal products, however most animal products are subject to environmental insults (2). Research suggests that the consumption of red meat (processed or not) is associated with an increased risk of endometriosis. Similarly, the risk of endometriosis can be greater along with an increased intake of poultry, though not to the same extent as with red meat. Relative to red meat, intake of fish, shellfish and eggs yields a lower endometriosis risk (2).

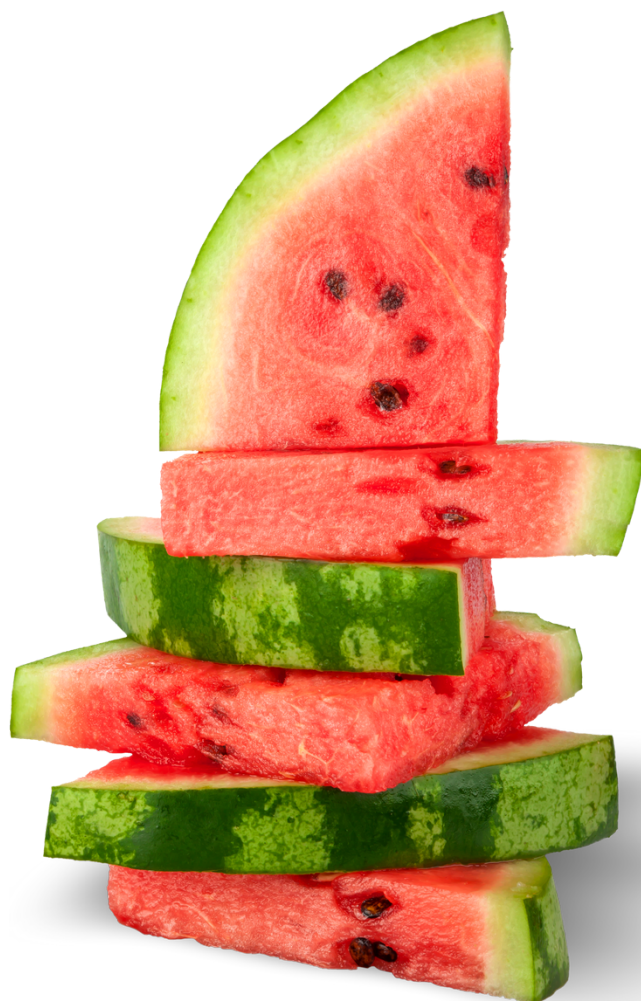
The increased risk of endometriosis with red meat consumption was found through a comparison of people whose intake was ≥ 2 servings per day compared to those whose intake was ≤ 1 serving per week.

Dairy products contain large amounts of fat, with the average cheese containing seventy percent fat (5). The fat content and the lack of fiber in dairy has been shown to contribute to hormone imbalances in the body that has the potential to lead to problems with fertility. In addition to the high fat content in dairy products, the process by which they are made contributes to traces of estrogen in the food.

Cows are consistently artificially impregnated, which means they are fed estrogen that is carried through to their milk and the dairy products that are made from it. Cheese contains higher traces of estrogen as the traces of estrogen become more concentrated though the process of turning milk into cheese (5).

The sugar that is found in milk, called lactose, could also be harmful to the ovaries. A study by Dr. Daniel Cramer at Boston's Brigham and Women's Hospital in 1994 observed that uterus carriers who drank more milk experienced a faster decline in fertility. When comparing individuals from different countries with varying traditions around milk consumption, it was found that the decline in fertility from the late twenties to late thirties was significantly higher in places where higher milk consumption is traditional (5). The problem may potentially be related to lactose, which breaks down into glucose and galactose, two smaller molecules. Galactose, which is plentiful in milk and ice cream, damages germ cells that turn into eggs, and in turn can be damaging to the ovaries.

Choosing products that are lactose-free may seem like a solution, but it is not. Milks that are lactose-free still contain the glucose and galactose; they have simply already broken down the lactose (5). An alternative to dairy milk is plant milks such as oat milk, almond milk, soy milk, or cashew milk. Plant products are naturally lactose-free, with no galactose. However, traces of galactose can be found in dates, papayas, bell peppers, tomatoes, and watermelon (5).



Case Study

Katherine Lawrence Ireland

As an individual who served in Iraq in the US Air Force for five years, Katherine returned to the United States after her service craving the food she missed while she was away. With a diet heavy in rich and fatty foods, Katherine continued to gain weight as she began to experience severe abdominal pain. The pain was present around her menstrual cycle, but persisted throughout the month. Over about eight months, she continued to be misdiagnosed with Crohn's disease, colitis, and primarily with digestive disorders (5). After being told by doctors that the problem was all in her head, an OBGYN finally diagnosed her with stage four endometriosis, and said that some of it was wrapped around in her intestinal organs. She was told that her endometriosis was at a stage that put her at a great risk for



endometrial cancer, and she would need to get a hysterectomy. Cheese and meat were heavy components of Katherine's diet prior to and during the time that she got sick, and her diet was not something that was discussed by her doctors at the time. However, collaboration with a nutritionist encouraged her to eliminate oil and animal products from her diet for five or six weeks prior to the procedure. When the surgery came, Katherine's doctor began the procedure, but decided not to do the hysterectomy because the endometrial tissue had significantly reduced. Also, her blood pressure and cholesterol had fallen. Katherine never needed to have the hysterectomy, and she was able to continue managing her endometriosis through her dietary changes.



Discussion and Concluding Remarks

While intake of plant foods is beneficial to reduce the risk and manage the pain of endometriosis, some vegetables have a positive association with endometriosis symptoms. This is potentially related to gastrointestinal symptoms that are present in endometriosis-related pain. Vegetables contain the nutrients and phytochemicals that have been confirmed to demonstrate health benefits, however, they can be more difficult for the body to digest. Such challenges with digestion may exacerbate irritable bowel syndrome symptoms, which are highly common among people with endometriosis. The presentation of those symptoms is often what leads to the diagnostic process, so vegetable consumption and increased abdominal pain may yield a diagnosis of endometriosis that could have otherwise gone undiscovered (7).

More in-depth research needs to be done on humans with endometriosis to better understand how diet can influence the condition. Many studies around this use animal models (2), and may not always translate directly to human outcomes. There are few studies conducted on humans that explore the relationship between food and endometriosis, so there is more work to be done to untangle the conflicting results. Most of the studies that exist today are based on mouse models. While these provide insight about how certain nutrition components influence the processes in the body related to endometriosis, we cannot directly translate the results of studies on mice to humans. Obtaining a better understanding of the ways in which diet, a modifiable lifestyle factor, can be used to benefit people with or at risk of endometriosis will help to develop clinical strategies that can improve the quality of life for those who suffer from this disease.

The existing information around diet and endometriosis is lacking. It can be difficult to navigate what little scientific information is out there as some pieces can be contradictory. This emphasizes the need to promote more exploring of this topic to better support the 10% of uterus carriers who suffer from endometriosis, and to consider biases in the studies by understanding from where the funding for the research comes. This is an important topic to explore because diet is a modifiable risk factor for endometriosis, both in terms of onset and management. This is a critical area that needs to be explored in more depth.

For those who suffer from endometriosis, who may be at risk of developing endometriosis, or who have any other inflammatory or hormone related condition, it can be useful to take note of how the body reacts to certain foods, and journaling symptoms may even be helpful. There is no single method that works the same for everyone, and it can be helpful to meet with a registered dietitian to discuss a personalized lifestyle and meal plan that is most suitable.

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About the Author

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Charlotte Myers is a master's student studying Public Health Sciences at Karolinska Institutet in Stockholm, Sweden. She has a bachelor's degree in Global Studies with minors in Spanish and Public Health. She is passionate about human and ecological wellness, and aspires to engage in community health initiatives that enable a sustainable positive change that creates opportunities for all humans to thrive.