Eating to Reduce Inflammation

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Whether you scrape your knee, strain your ankle, or develop a sore throat, your body responds with inflammation. The pain, warmth, redness, and swelling of inflammation is the immune system's first response to an injury or infection. Taking an Advil or other anti-inflammatory medication can reduce the symptoms, and the inflammatory response stops when the injury or infection heals. Sometimes, however, inflammation becomes chronic, persisting even when there is no longer a discernible cause.[1] When inflammation becomes chronic, this process, meant to help heal the body, now causes harm. It damages cells throughout the body and increases the risk of developing a number of chronic diseases. To help reduce chronic inflammation, try reaching into your kitchen rather than into the medicine cabinet. A dietary pattern that includes an abundance and variety of anti-inflammatory foods can decrease chronic inflammation and your risk of illness.

Causes and Consequences of Chronic Inflammation

Although there is no single obvious cause of chronic inflammation, it has been associated with unresolved infections and exposure to environmental toxins as well as lifestyle factors such as high levels of stress, lack of exercise, and poor dietary choices. [1,2] The risk of developing chronic inflammation increases with increasing age and body weight. Chronic inflammation causes nonspecific symptoms including fatigue, insomnia, depression, gastrointestinal disorders, and frequent infections.[2] And it is linked to chronic diseases, including heart disease,

cancer, obesity, and diabetes, which are significant causes of death worldwide. [2] Unfortunately, laboratory tests that quantify inflammation do not distinguish the cause of inflammation or whether it is chronic or acute.[3]

Diet and Inflammation

The foods you include in your diet can increase or decrease chronic inflammation.[4] Some have a direct effect on inflammation and others increase the risk of conditions such as obesity, diabetes, and heart disease that are associated with inflammation.[5,6] To assess the impact of diet on chronic inflammation, research has examined the effects of specific nutrients and food components as well as whole foods and dietary patterns.

The types of fats and carbohydrates in your diet can affect inflammation. For example, the saturated fatty acids found in red meats can increase inflammation, while monounsaturated fatty acids, which are plentiful in olive oil and nuts, have anti-inflammatory effects.[6] And while a diet high in omega-6 polyunsaturated fatty acids, such as those found in corn and safflower oils, can increase inflammation, balancing these with higher intakes of omega-3 fatty acids, found in foods such as salmon, walnuts, and flax and chia seeds, will keep inflammation at bay. [7,8] A diet high in fiber, found in whole grains and fresh fruits and vegetables, is associated with low levels of inflammation, whereas a diet high in added sugars, such as those in sugar-sweetened beverages and baked goods, increases inflammation.[6] In the long term, a diet high in added sugars can also promote the development of obesity, which in itself increases inflammation. [6,8] Several minerals, including magnesium, zinc, and iron, also impact inflammation. For example, magnesium and zinc help regulate immune function and low magnesium status and zinc deficiency are associated with elevated levels of inflammation.[9]

Nutrients and phytochemicals that function as antioxidants can reduce inflammation by preventing the oxidative tissue damage that triggers inflammation. For example, vitamin C is an antioxidant that reduces levels of free radicals before they cause oxidative damage. Polyphenols, phytochemicals found in foods including blueberries, Brussels sprouts, and broccoli, and spices such as

turmeric and ginger, also protect against inflammation due to their antioxidant properties.[10, 11]

Each of the nutrients and phytochemicals discussed above can influence the level of inflammation, but our diet is made up of foods, not individual nutrients. A diet that includes whole grains, fruits, vegetables, and dairy products has been demonstrated to help reduce inflammation.[6] This is due in part to the combinations of nutrients in, and antioxidant properties of, these food groups. It may also be related to their effect on the population of microbes that live in the gastrointestinal tract, known as the gut microbiome. An imbalance between helpful and potentially harmful bacteria in the microbiome can trigger inflammation. Whole grains, fruits, and vegetables are useful sources of fiber, which provide food for a healthy microbiome and fermented dairy products such as yogurt and kefir, add living healthy bacteria. [1,6]

Build an Anti-inflammatory Dietary Pattern

Chronic inflammation can be reduced by choosing a dietary pattern such as the Mediterranean diet that includes foods that reduce inflammation and limits those that promote it. This pattern is based on whole grains, fruits, vegetables, and legumes. It generally includes dairy products, fish and other lean proteins, and healthy fats while limiting red meats and foods high in added sugars (See table). Vegetarian and other plant-based dietary patterns, which further limit animal products, are also associated with lower levels of inflammation.[6,12]

To see how close your current intake is to these recommendations, start by asking how many sugar-sweetened beverages you drink, how many fruits and vegetables you eat each day, and how often you opt for steak or a hamburger when dining out. You can improve your diet by making small changes and building on them. Replace one soda a day with water. Have a bowl of berries for dessert. Choose fish or a plant-based protein for at least two meals a week. Replace some chips with nuts to limit fried foods. Switch to canola and olive oil to increase your anti-inflammatory fats. Make your meals more interesting with antioxidant spices such as pepper, garlic, or turmeric. Need a treat? Enjoy some dark chocolate – it is an anti-inflammatory food. Do not forget regular exercise; it also reduces chronic

inflammation. And enjoy what you eat! No one food will make or break your diet – it is the overall pattern of intake that determines its effect on inflammation.

Build an Anti-Inflammatory Dietary Pattern Daily Recommendations		
Food groupings	**Suggested Servings (serving size)**	**Tips for increasing anti-inflammatory foods**
Fruits & vegetables	5 to 10 (1/2 cup)	▪ Enjoy a bowl of berries for dessert to add vitamin C and fiber ▪ Mix leafy greens like spinach or kale into your salad to increase anti-inflammatory magnesium ▪ Toss some peppers and onions in with your eggs
Grains, breads, and starchy vegetables	5 to 10 (½ cup or one slice)	▪ Increase your fiber with whole grain bread ▪ Try new grains: barley, couscous, quinoa or bulgar ▪ Enjoy starchy vegetables such as corn, peas, squash, and potatoes in stews and casseroles
High protein foods	5 to 7 (3 oz meat, one egg, ½ cup beans, 2 Tbsp nut butter)	▪ Bake some salmon to boost omega-3s ▪ Choose a plant-based burger to reduce saturated fats ▪ Grab a good old a peanut butter sandwich
Dairy or dairy substitutes	3 (1 cup, 1 oz cheese)	▪ Choose low fat or nonfat dairy to limit saturated fat intake ▪ Try a plant-based milk if you do not want dairy ▪ Add a slice cheese to your sandwich
Nuts and seeds	3 (¼ cup)	▪ Snack on walnuts for anti-inflammatory omega-3s ▪ Choose raw, unsalted, or dry roasted nuts ▪ Have a nut allergy – try sunflower and pumpkin seeds
Fats and oils	3-5 (1 Tbsp)	▪ Choose a soft margarine ▪ Add avocados and olives to your salad ▪ Rely on olive and canola oils
Beverages	To quench thirst (About 64 oz per day)	▪ Limit sweet teas and fruits drink - they have added sugars ▪ Drink water – it keeps you hydrated without calories or additives ▪ Sip coffee and tea – they reduce inflammation
Baked goods & snack foods	Occasional treats	▪ Limit your portion by measuring chips into a bowl rather than munching from the bag ▪ Making cookies, add some healthy nuts ▪ You do not have to skip them just limit them

Editor's comment- your expanding waistline at the level of your navel may be indicative of increased inflammation within your body. Waistline circumference coincides with visceral fat (intraabdominal fat). Visceral fat cells are biologically active and produce more inflammatory molecules with potentially more harmful health effects. [13]

References

1. Mayo Clinic Chronic inflammation: What it is, why it's bad, and how you can reduce it. Mayo Clinic. June 14, 2024. Accessed August 27, 2024. https://mcpress.mayoclinic.org/dairy-health/chronic-inflammation-what-it-is-why-its-bad-and-how-you-can-reduce-it/.
2. Pahwa R, Jialal I, Goyal A. Chronic Inflammation. NIH.gov. Published June 4, 2019. https://www.ncbi.nlm.nih.gov/books/NBK493173/
3. Ross Y, Ballou SP. Reliability of C-reactive protein as an inflammatory marker in patients with immune-mediated inflammatory diseases and liver dysfunction. Rheumatology Advances in Practice. 2023;7(2). doi:https://doi.org/10.1093/rap/rkad045
4. Eatrightpro.org. Published 2023. https://www.eatrightpro.org/news-center/practice-trends/what-is-an-anti-inflammatory-diet
5. Rohm TV, Meier DT, Olefsky JM, Donath MY. Inflammation in obesity, diabetes, and related disorders. *Immunity*. 2022;55(1):31-55. doi:https://doi.org/10.1016/j.immuni.2021.12.013
6. Grosso G, Laudisio D, Frias-Toral E, et al. Anti-Inflammatory Nutrients and Obesity-Associated Metabolic-Inflammation: State of the Art and Future Direction. *Nutrients*. 2022;14(6):1137. doi:https://doi.org/10.3390/nu14061137
7. Djuricic I, Calder PC. Beneficial Outcomes of Omega-6 and Omega-3 Polyunsaturated Fatty Acids on Human Health: An Update for 2021. *Nutrients*. 2021;13(7):2421. doi:https://doi.org/10.3390/nu13072421
8. 5 Top Foods That Cause Inflammation. Cleveland Clinic. https://health.clevelandclinic.org/foods-that-can-cause-inflammation
9. Weyh C, Krüger K, Peeling P, Castell L. The Role of Minerals in the Optimal Functioning of the Immune System. *Nutrients*. 2022;14(3):644. doi:https://doi.org/10.3390/nu14030644
10. Hussain T, Tan B, Yin Y, Blachier F, Tossou MCB, Rahu N. Oxidative Stress and Inflammation: What Polyphenols Can Do for Us? *Oxidative Medicine and Cellular Longevity*. 2016;2016(7432797):1-9. doi:https://doi.org/10.1155/2016/7432797
11. Kocaadam B, Şanlier N. Curcumin, an active component of turmeric (Curcuma longa), and its effects on health. *Critical reviews in food science and nutrition*. 2017;57(13):2889-2895. doi:https://doi.org/10.1080/10408398.2015.1077195
12. Haghighatdoost F, Bellissimo N, Totosy de Zepetnek JO, Rouhani MH. Association of vegetarian diet with inflammatory biomarkers: a systematic review and meta-analysis of observational studies. *Public Health Nutrition*. 2017;20(15):2713-2721. doi:https://doi.org/10.1017/s1368980017001768
13. Yu J, Choi W, Lee H, Lee J, MD. Relationship between inflammatory markers and visceral obesity in obese and overweight Korean adults. Medicine (Baltimore). 2019 Mar; 98(9): e14740. doi: 10.1097/MD.0000000000014740