

# Anti-Inflammatory Foods

## Nutrition Guidelines for People with Rheumatic Diseases

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## INTRODUCTION

### The Food & Inflammation Connection



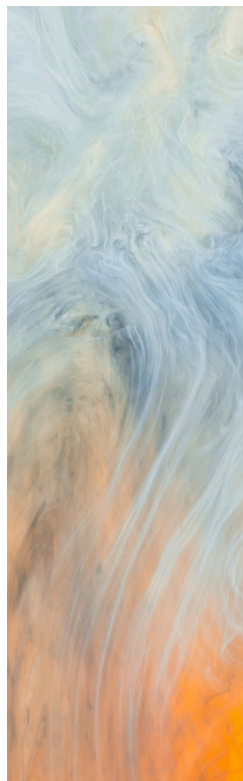
**There is no “one size fits all” diet**, but studies on nutrition and health show that most people can improve their health by eating a plant-based diet rich in a variety of foods from plants, including vegetables, fruits, whole grains, legumes, and nuts. Food will not cure your condition or reverse damage that has already occurred in your body, but it may reduce active inflammation, improve your symptoms, and decrease the risk of future disease flares.



**The information presented here is based on the best data available from biomedical research.** We have focused on the relationship between diet and two specific conditions—rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE)—but a lot of the information presented will be relevant for other rheumatic conditions. We recognize that outside of biomedical research there are many ways of understanding the link between nutrition and health, including other systems of medicine, healing traditions, and cultural/religious beliefs.

## Anti-Inflammatory Diets

There are many different definitions of an anti-inflammatory diet, and most diets that claim to be anti-inflammatory are not actually proven to decrease inflammation.<sup>1,2</sup> However, we know that certain food components and ingredients can increase or decrease inflammation by affecting blood sugar, antioxidant levels, and the bacteria that live in our gut. These helpful and harmful food components are discussed in the section called “General Nutrition Recommendations.” An example of a diet with anti-inflammatory properties is the Mediterranean diet, discussed in more detail below. On the other end of the spectrum, the Standard American Diet (or SAD diet), which contains large amounts of calorically-dense processed foods, saturated fat, and added sugar, is pro-inflammatory and associated with increased risk of cardiovascular disease and death.<sup>3-6</sup>



## Mediterranean Diet

The Mediterranean diet is a pattern of eating based on typical diets in countries near the Mediterranean Sea, such as Greece, Italy, and Spain. This diet contains lots of vegetables, fruits, olive oil, whole grains, and beans, as well as moderate amounts of fish, chicken, low-fat dairy, and nuts. The Mediterranean diet limits red meat, sugary drinks (including fruit juices), salt, processed foods, and processed meats. The American Heart Association provides a helpful and relevant summary



of this diet on their website: <https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/mediterranean-diet>

Two different randomized controlled trials have studied whether the Mediterranean diet decreases joint inflammation in people with RA. The first study found that the group eating a Mediterranean diet had a significant improvement in RA disease activity (reduced joint inflammation) after 12 weeks on the diet.<sup>7</sup> The amount of improvement in the Mediterranean diet group was large for a diet intervention and was about one-third the size of the benefit seen in trials of methotrexate for RA (the most common RA medication). This version of the Mediterranean diet included olive oil, canola oil, green vegetables, root vegetables, fish, fruit, low-fat yogurt, low-fat cheese, green tea, black tea, poultry, and sparing amounts of red meat. Notably, RA patients on the Mediterranean diet lost a significant amount of weight at the end of 12 weeks—about seven pounds—so it's possible that some of the improvement in RA symptoms was due to weight loss.

Another trial that tested a six-week Mediterranean-type diet for RA patients found that the group eating the Mediterranean diet had less pain and morning stiffness six months later, suggesting that it provided a long-lasting benefit.<sup>8</sup> The intervention included weekly Mediterranean diet cooking classes and provided recipes, written materials about the diet, and information about local access to affordable ingredients. The Mediterranean-type diet was high in fruit, vegetables, legumes (beans), and olive oil.



## General Nutrition Recommendations



### Fruits & Vegetables

**Cover at least half your plate with an abundance of non-starchy vegetables and fruits from the entire color spectrum.**

- Vegetables and fruits have high concentrations of polyphenols (antioxidants), carotenoids (antioxidants), and fiber.
- Examples of highly nutritious vegetables: lightly cooked dark leafy greens (spinach, collard greens, kale, and Swiss chard), cruciferous vegetables (broccoli, cabbage, Brussels sprouts, kale, bok choy, and cauliflower), carrots, beets, onions, peas, squash, sea vegetables, and washed raw salad greens.
- Examples of highly nutritious fruits: raspberries, blueberries, strawberries, peaches, nectarines, oranges, pink grapefruit, plums, pomegranates, blackberries, cherries, apples, and pears.



### Whole Grain Carbohydrates

**Choose low glycemic index carbohydrates rather than high glycemic index foods, and whole grains rather than refined grains.**

- The glycemic index (GI) is a value assigned to foods based on how quickly the body turns them into glucose (blood sugar). Foods low on the glycemic index scale tend to release glucose slowly, which gives your body steady energy. Foods high on the glycemic index release glucose rapidly. This website lists the glycemic index for many common foods: <https://www.health.harvard.edu/diseases-and-conditions/glycemic-index-and-glycemic-load-for-100-foods>





- Eat whole grains—grains that are intact or in a few large pieces—such as brown rice, basmati rice, wild rice, quinoa, and steel-cut oats.
- Limit products made from flour, especially white bread and sugary desserts.



## Choose Plant-Based Protein and Limit Red Meat



- People who eat a mostly vegetarian diet live longer. Furthermore, vegetarian diets have been associated with less severe symptoms in several inflammatory conditions, including rheumatoid arthritis.<sup>9,10</sup>
- Examples of vegetarian protein include beans, legumes, nuts, and whole soy foods.
- Fish is also a healthy source of protein and healthy fats (see above).



## Healthy Fats

**Eat healthy fats that are rich in monounsaturated and/or omega-3 polyunsaturated fatty acids.**



- Omega-3 fatty acids, commonly called “omega-3s”, have a number of anti-inflammatory properties.<sup>11</sup> Humans cannot make omega-3 fatty acids in the body, so they need to come from the diet. Fatty fish (for example, sardines, salmon, herring, and black cod), seeds (including hemp, chia, flaxseed oil, and freshly ground flaxseed), and nuts (especially walnuts) are important sources of omega-3 fatty acids.
- Use extra virgin olive oil, which is rich in monounsaturated fatty acids, for cooking and making salad dressings.
- Other sources of healthy fat include avocados, omega-3 enriched eggs, and whole-soy foods (e.g., tofu, tempeh, edamame).



## Season Your Food with Anti-Inflammatory Spices



- **Turmeric** (*Curcuma longa*) is a medicinal plant with a long history of usage in indigenous South Asian cultures and Ayurvedic medicine. The rhizome (rootstock) of turmeric contains curcumin, a bright yellow chemical with anti-inflammatory properties.<sup>12-14</sup> Turmeric is traditionally used as a spice in food preparation, an ingredient in topical applications, and as an extraction made with water, milk, or ghee.
- **Ginger** root is another plant commonly used in South Asian cooking that is known to have anti-inflammatory and anti-oxidative effects.<sup>15,16</sup> It has traditionally been used as an herbal supplement for the treatment of many chronic ailments, including asthma and arthritis. A study that looked at how ginger may be helpful for people with lupus found that one of its compounds—called 6-gingerol—helps to decrease the release of inflammatory substances from neutrophils, a type of blood cell.<sup>17</sup>

 Hydrogenated Oils

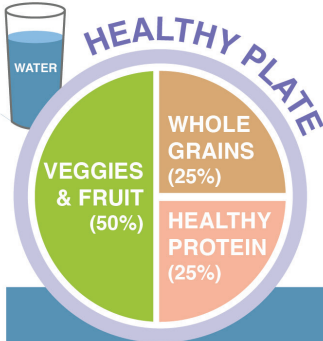
 Added Sugar

 Processed Meat

## Foods to Limit and Avoid

- Avoid any food containing hydrogenated or partially hydrogenated oils as ingredients.
- Avoid processed flour, added sugar, foods containing high fructose corn syrup, and high-fructose juices.
- Avoid or minimize red meat. Avoid all processed meat (e.g., hot dogs, pepperoni, bacon, packaged lunch meat).

# Anti-Inflammatory Food Pyramid



- 8 cups of water per day
- Avoid sugary drinks like juice and soda

**DESSERTS & WINE**

- Dark chocolate (sparingly)
- Red wine (limit to 1 glass/day for women & 2 glasses/day for men)

- Ginger, turmeric, garlic, cinnamon
- Green and oolong tea
- Select supplements (discuss with your doctor)

**OTHER PROTEIN**

- Organic low-fat dairy, eggs, skinless chicken breast

**EDAMAME, TOFU, TEMPEH**

**FISH, NUTS, SEEDS, AVOCADO, OLIVE OIL**

**WHOLE GRAINS, PASTA, BEANS**

**VEGETABLES**

**FRUIT**



## Frequently Asked Questions

### Should I eliminate gluten?

There is very little information on gluten, RA, and SLE from clinical trials. In one study, RA patients assigned to a vegan, gluten-free diet for one year had slightly better RA disease activity (less joint inflammation) at the end of the trial compared to those assigned to a non-vegan regular diet.<sup>9</sup> However, we don't know if the benefit the treatment group experienced was from being gluten-free, vegan, or both. The vegan, gluten-free diet included vegetables, nuts, fruit, buckwheat, millet, corn, rice, sunflower seeds, and sesame milk.

Another randomized trial tested a diet for RA patients with three different phases: fasting for 7-10 days, followed by a vegan/gluten-free diet for three months, and then nine months of a vegetarian diet.<sup>10</sup> During the fasting phase, dietary intake consisted of herbal teas, garlic, vegetable broth, a liquid extraction from potatoes and parsley, and juice from carrots, beets, and celery. No fruit juices were allowed. During the vegan/gluten-free phase, the diet excluded gluten, meat, fish, eggs, dairy, refined sugar, and citrus fruits. During the vegetarian phase, participants did not eat meat and fish, but they could eat gluten and dairy. After the first four weeks of the trial (which included the fasting phase and the vegan/gluten-free phase), patients with RA in the special diet group had fewer tender and swollen joints, lower pain scores, and less systemic inflammation (measured by erythrocyte



sedimentation rate and c-reactive protein) compared to the RA patients who continued to eat their normal diet. The improvement in RA symptoms lasted until the end of the trial, even after participants were back to eating gluten, suggesting that being vegetarian, as opposed to being gluten-free, was the main driver of improvement.

### Should I eliminate sugar?

Though the effect of sugar has not yet been studied in clinical trials of people with RA or SLE, there is a lot of research from the general population showing that long-term overconsumption of added sugars increases the risk of a wide range of health problems. Eating too much sugar is associated with increased risk of diabetes, heart disease, liver disease, certain cancers, and obesity. The link between sugar and obesity is particularly relevant for people with RA and SLE since obesity was associated with worse RA and SLE disease activity in several studies.<sup>18-20</sup> Finally, eating less added sugars reduces the risk of diabetes, which can be a problem for people with rheumatic diseases who are treated with high-dose or long-term prednisone.



### Should I eliminate dairy?

Clinical trials have not studied whether dairy can worsen RA or SLE symptoms. Vegan diets—which eliminate all animal products, including meat, fish, eggs, and dairy—have shown possible benefits for RA. For example, one trial found that RA patients improved after one year of adhering to a vegan, gluten-free diet<sup>9</sup>, as described under the FAQ for gluten. Another trial found that patients reported less joint pain and swelling after three months of an uncooked vegan diet.<sup>21</sup>



## Should I eliminate meat?

Please see FAQs for “gluten” and “dairy” for information about studies of vegan and vegetarian diets.

## Should I eliminate nightshades?

Nightshade vegetables include tomatoes, eggplants, bell peppers, and potatoes. These foods contain an alkaloid molecule called solanine (a glycoalkaloid), and some people believe that solanine in nightshade vegetables can cause inflammation in the gut (including increased intestinal permeability)<sup>22</sup>, but no research has shown that solanine has a direct effect on inflammation or arthritis pain. Furthermore, since nightshades include foods that are otherwise considered healthy (e.g., tomatoes), we do not recommend eliminating nightshades unless you have a food intolerance or food allergy to them.



## Literature Cited

1. Bustamante, M. F. et al. Design of an anti-inflammatory diet (ITIS diet) for patients with rheumatoid arthritis. *Contemp Clin Trials Commun* **17**, 100524, doi:10.1016/j.conctc.2020.100524 (2020).
2. Vadell, A. K. E. et al. Anti-inflammatory Diet In Rheumatoid Arthritis (ADIRA)-a randomized, controlled crossover trial indicating effects on disease activity. *Am. J. Clin. Nutr.* **111**, 1203-1213, doi:10.1093/ajcn/nqaa019 (2020).
3. Grotto, D. & Zied, E. The Standard American Diet and its relationship to the health status of Americans. *Nutr. Clin. Pract.* **25**, 603-612, doi:10.1177/0884533610386234 (2010).
4. Manzel, A. et al. Role of “Western diet” in inflammatory autoimmune diseases. *Curr. Allergy Asthma Rep.* **14**, 404, doi:10.1007/s11882-013-0404-6 (2014).
5. Rico-Campa, A. et al. Association between consumption of ultra-processed foods and all cause mortality: SUN prospective cohort study. *BMJ* **365**, l1949, doi:10.1136/bmj.l1949 (2019).
6. Srour, B. et al. Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Sante). *BMJ* **365**, l1451, doi:10.1136/bmj.l1451 (2019).
7. Skoldstam, L., Hagfors, L. & Johansson, G. An experimental study of a Mediterranean diet intervention for patients with rheumatoid arthritis. *Ann. Rheum. Dis.* **62**,

- 208-214, doi:10.1136/ard.62.3.208 (2003).
8. McKellar, G. et al. A pilot study of a Mediterranean-type diet intervention in female patients with rheumatoid arthritis living in areas of social deprivation in Glasgow. *Ann. Rheum. Dis.* **66**, 1239-1243, doi:10.1136/ard.2006.065151 (2007).
  9. Hafstrom, I. et al. A vegan diet free of gluten improves the signs and symptoms of rheumatoid arthritis: the effects on arthritis correlate with a reduction in antibodies to food antigens. *Rheumatology (Oxford)* **40**, 1175-1179, doi:10.1093/rheumatology/40.10.1175 (2001).
  10. Kjeldsen-Kragh, J. Rheumatoid arthritis treated with vegetarian diets. *Am. J. Clin. Nutr.* **70**, 594S-600S, doi:10.1093/ajcn/70.3.594s (1999).
  11. Lorente-Cebrian, S. et al. An update on the role of omega-3 fatty acids on inflammatory and degenerative diseases. *J. Physiol. Biochem.* **71**, 341-349, doi:10.1007/s13105-015-0395-y (2015).
  12. Amalraj, A. et al. A Novel Highly Bioavailable Curcumin Formulation Improves Symptoms and Diagnostic Indicators in Rheumatoid Arthritis Patients: A Randomized, Double-Blind, Placebo-Controlled, Two-Dose, Three-Arm, and Parallel-Group Study. *J. Med. Food* **20**, 1022-1030, doi:10.1089/jmf.2017.3930 (2017).
  13. Chandran, B. & Goel, A. A randomized, pilot study to assess the efficacy and safety of curcumin in patients with active rheumatoid arthritis. *Phytother. Res.* **26**, 1719-1725, doi:10.1002/ptr.4639 (2012).
  14. Tasneem, S., Liu, B., Li, B., Choudhary, M. I. & Wang, W. Molecular pharmacology of inflammation: Medicinal plants as anti-inflammatory agents. *Pharmacol. Res.* **139**, 126-140, doi:10.1016/j.phrs.2018.11.001 (2019).
  15. Grzanna, R., Lindmark, L. & Frondoza, C. G. Ginger--an herbal medicinal product with broad anti-inflammatory actions. *J. Med. Food* **8**, 125-132, doi:10.1089/jmf.2005.8.125 (2005).
  16. Mashhadi, N. S. et al. Anti-oxidative and anti-inflammatory effects of ginger in health and physical activity: review of current evidence. *Int. J. Prev. Med.* **4**, S36-42 (2013).
  17. Ali, R. A. et al. Antineutrophil properties of natural gingerols in models of lupus. *JCI Insight* **6**, doi:10.1172/jci.insight.138385 (2021).
  18. Liu, Y., Hazlewood, G. S., Kaplan, G. G., Eksteen, B. & Barnabe, C. Impact of Obesity on Remission and Disease Activity in Rheumatoid Arthritis: A Systematic Review and Meta-Analysis. *Arthritis Care Res. (Hoboken)* **69**, 157-165, doi:10.1002/acr.22932 (2017).
  19. Patterson, S. L., Schmajuk, G., Jafri, K., Yazdany, J. & Katz, P. Obesity is Independently Associated With Worse Patient-Reported Outcomes in Women with Systemic Lupus Erythematosus. *Arthritis Care Res. (Hoboken)* **71**, 126-133, doi:10.1002/acr.23576 (2019).
  20. Teh, P., Zakhary, B. & Sandhu, V. K. The impact of obesity on SLE disease activity: findings from the Southern California Lupus Registry (SCOLR). *Clin. Rheumatol.* **38**, 597-600, doi:10.1007/s10067-018-4336-3 (2019).
  21. Nenonen, M. T., Helve, T. A., Rauma, A. L. & Hanninen, O. O. Uncooked, lactobacilli-rich, vegan food and rheumatoid arthritis. *Br. J. Rheumatol.* **37**, 274-281, doi:10.1093/rheumatology/37.3.274 (1998).
  22. Iablokov, V. et al. Naturally occurring glycoalkaloids in potatoes aggravate intestinal inflammation in two mouse models of inflammatory bowel disease. *Dig. Dis. Sci.* **55**, 3078-3085, doi:10.1007/s10620-010-1158-9 (2010).

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