inflammation guide

be social, not stressed • omega-3s over 6s • forget frying, go fresh
laugh more, mope less • live simply, stay lean

FIGHT THE FIRE

understanding inflammation in your body
WHAT IS INFLAMMATION?
Many of us point to it as the culprit behind achy joints or a painful cut—and it often is. But, this condition also has many more implications.

INFLAMMATION-TAMING HABITS
Smart diet and lifestyle changes can help keep inflammation in check.

ANTI-INFLAMMATORY NUTRIENTS
From fatty acids to vitamins and minerals, a list of the best tools to maintain a healthy inflammatory response.

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FOODS AND RECIPES
The best foods and recipes to maintain healthy inflammation response.

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Many of us point to inflammation as the culprit behind achy joints or a painful cut—and it often is. But, this condition also has many more implications, associated issues that we may not even think of when we hear the word “inflammation.” Over time, chronic inflammation weakens cardiovascular, respiratory, and neurological systems—often without noticeable symptoms.

The good & the bad

You’re probably wondering … is inflammation always evil? And, somewhat surprisingly, the answer is no. Experts point out that inflammation is also a vital part of immunity, forming the first line of defense against harmful germs, injury, and disease by transporting protective white blood cells to parts of the body in need. Break an ankle and it may start to look like a tree trunk. Unsightly, yes, but this external swelling (inflammation) is a vital part of healing. But what happens when inflammation is internal, ongoing, and undetected? Low-level inflammation is one of the greatest health threats facing Americans, warn experts, and you may not even know you have it.

Chronic inflammation occurs when the immune system becomes hyperactive in response to irritants—from smoking, stress, or a poor diet—and no longer switches off its efforts to heal the body. These factors stimulate the release of chemicals that activate the immune system’s inflammatory response in an effort to undo the stresses placed on the body, says Samer Koutoubi, MD, PhD, professor in the Department of Nutrition and Exercise Science at Bastyr University.

Hence, in order for inflammation to work in the productive way that it should, there needs to be a balance between:

The need for inflammation to stimulate the repair
And
The need to limit the inflammation because of additional damage it causes.

Inflammation defined | “The succession of changes which occurs in a living tissue when it is injured provided that the injury is not of such a degree as to destroy its structure and vitality.” — Journal of Inflammation
Inflammation-taming habits

Smart diet and lifestyle changes can help support a healthy inflammation response. Follow these four simple guidelines.

**Taming tip 1:**
Decrease omega-6s, increase omega-3s.

**The problem:** Omega-6 fatty acids found in cheap, ubiquitous vegetable oils, such as corn, soy, safflower, and sunflower oils, are the precursors for compounds that turn on the inflammatory response. Omega-3 fatty acids, such as those in cold-water fish, turn it down, says Barry Sears, MD, author of *Toxic Fat: When Good Fat Turns Bad* (Nelson, 2008).

“Most Americans consume way too much omega-6 compared to omega-3 fats,” Sears says.

**What to do:** Limit processed, packaged, and fast foods, which are often high in omega-6s. Instead focus on foods rich in inflammatory-neutral monounsaturated fats such as olive oil and nuts, and anti-inflammatory long-chain omega-3s found in sardines, rainbow trout, and mackerel. Sears encourages a daily purified omega-3 fish oil supplement (1,000 mg); vegans can incorporate two tablespoons of omega-3 rich chia, flax or hemp seeds, and algae-derived omega-3 supplements to help manage inflammation.

Inflammation is linked to:

- Alzheimer’s disease
- Diabetes
- Arthritis
- Autoimmune disease
- Neurological disease
- Cancer
- Cardiovascular disease
- Arthritis
- Metabolic disorders
**Taming tip 2:**

**Reduce red meat.**

**The problem:** A 2009 study found that among 880 middle-aged adults, those who ate the most red meat had higher markers of inflammation. One reason may be that the arachidonic acid found in red meat stimulates the inflammation process, says Jessica Butcher, RD, a registered dietitian in Grand Haven, Michigan.

**What to do:** Butcher recommends eating tofu, tempeh, lentils, beans, and fish more often. “When you do eat red meat, choose game meats and grass-fed organic beef since these tend to have less arachidonic acid and more inflammation-busting omega-3 fats,” says Butcher. The industry norm of feeding livestock corn and soy increases arachidonic acid levels in meat.

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**Taming tip 3:**

**Avoid foods cooked at high temperatures.**

**The problem:** Acrylamide is a potentially carcinogenic compound formed when starchy foods are cooked for extended periods of time at temperatures greater than 250 degrees. This includes potato chips, French fries, muffins, donuts, and processed cereals (even otherwise healthy Os and flakes). Scientists from Poland reported recently that people who ate 160 grams (a little under 6 ounces) of acrylamide-rich potato chips daily for a month saw their CRP levels nearly double and their oxidized LDL cholesterol rise.

**What to do:** Cut back on all fried and baked goods. Acrylamide is not created by boiling, and few uncooked foods contain worrisome amounts. “In general, foods closest to their natural state such as fruits, vegetables, and whole grains will generate the least amount of inflammation,” says Butcher. Anti-inflammatory curcumin, an antioxidant in turmeric (found in many curry mixes), may reduce the damaging effects of acrylamide. Use it to brighten up
Taming tip 2:
Get a handle on stress.

The problem: According to the American Psychological Association, a third of all Americans are living with extreme stress—with money and work being leading culprits. When stress becomes persistent, it can contribute to disease-provoking inflammation by turning on the pro-inflammatory machinery in the body. In fact, in 2008 the European Heart Journal reported that people with significant work stress were 68 percent more likely to suffer heart disease than those who had less anxiety. Moreover, people who say they are alone or have little social support are more likely to suffer chronic inflammation and heart disease, say scientists.

What to do: Scientists have shown that laughter induced by 30 minutes of humorous TV can significantly reduce markers of inflammation. A good chuckle breaks patterns of negativity and helps you let go, says stress expert Debbie Mandel, author of Addicted to Stress (Jossey-Bass, 2008). Mandel also recommends relaxation rituals including aromatherapy, drinking a cup of herbal tea, or listening to music, plus changing up your daily routine, engaging supportive friends, and exercising regularly as effective ways to handle what life sends your way. To break out of your hermit ways, Mandel encourages seeking out healthy and meaningful social activities that involve like-minded people. “Cooking classes, exercise clubs, and community gardening are great ways to make new friends and promote a healthy, inflammation-fighting lifestyle,” she says.

More inflammation culprits:

Excess weight. Carrying extra pounds contributes to chronic inflammation because fat encourages the production of pro-inflammatory cytokines. According to a University of Vermont study, obese women who lost an average of 39 pounds also reduced their inflammation levels by 32 percent.

Gum disease. Chronic bacterial infection of the gums, also known as periodontal disease, has been found to trigger the production of CRP and other proteins that inflame and promote the formation of blood clots in the arteries, according to the Journal of Peridontology (Journal of Peridontology, 2001, vol. 72, no. 9).
In addition to the lifestyle tips and key supplements we’ve outlined, try these delicious meals, which highlight key nutrients that help support a healthy inflammation response.

**TART CHERRIES**

Tart cherries are top anti-inflammatory agents, and do double duty when combined with omega-3-laden walnuts. A daily bite or two of antioxidant-rich dark chocolate (at least 70 percent cacao) is also a worthy anti-inflammatory treat.

**CHERRY-WALNUT BITES**

This raw-food treat combines top anti-inflammatory agents, including tart cherries and omega-3-laden walnuts. A daily bite or two of antioxidant-rich dark chocolate (at least 70 percent cacao) is a worthy anti-inflammatory treat.

*Serves: 24 people  Calories per serving: 96

2 cups dried sour cherries  
8 medjool dates (pitted)  
3/4 cup walnut pieces  
2 tablespoons fresh orange juice  
1/2 teaspoon ground cinnamon  
6 tablespoons dark chocolate chips  
4 tablespoons unsweetened shredded coconut, plus more for rolling

1. Finely chop dried cherries, dates, and walnuts and combine in a large mixing bowl. Add orange juice, cinnamon, chocolate chips, and coconut. Mix together with hands, working into a sticky mass. Mixture should hold together; if necessary, add another chopped date or a little more juice.

2. With clean, slightly wet hands, roll mixture into walnut-shell-size balls. Roll in excess shredded coconut, if desired. Gently place into an airtight container and refrigerate. They will become firmer as they cool.
FOODS AND RECIPES TO SUPPORT WHOLE HEALTH, FROM HEAD TO TOE

*TURMERIC*

An Ayurvedic spice used for centuries, turmeric has a range of traditional therapeutic uses, plus lends robust flavor to dishes as a culinary spice. Various pieces of research have helped support its use for maintaining healthy inflammation response.

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**SPICY COCONUT FISH CAKES**

*Serves: 8 people  Calories per serving: 168*

This aromatic treat is a favorite in Southeast Asian (Peranakan) restaurants and hawker stalls, where it’s called otak-otak. You can grill this tangy appetizer the traditional way—wrapped in banana leaves—or simply bake it in the oven. Otak-otak can be served hot or cold as a snack. Follow the additional instructions for a creamy tofu version of this recipe.

**Ingredients**

- 2-inch piece of ginger, peeled and sliced
- 2-inch piece of turmeric root, peeled and sliced
- 6 Thai (bird) chiles, or small jalapeños (remove seeds for less heat)
- Zest of 1 lemon
- 10 shallots or 2 onions, peeled and sliced
- 1 tablespoon ground coriander
- 1 (14-ounce) can light coconut milk
- 1 tablespoon natural cane sugar
- 1 1/2 teaspoons salt
- 2 tablespoons all-purpose flour
- 1 egg, beaten
- 1 1/3 pounds deboned haddock, cod, mackerel or any other white, flaky fish
- Banana leaves, for wrapping (optional)

1. Place ginger, turmeric, chiles, lemon, onions and coriander in a blender or food processor and purée. Add a little water if needed.
2. Place ground spices in a skillet or wok and cook 2 minutes, just enough to release spicy flavor. Turn off heat and allow mixture to cool. Stir in coconut milk. Add sugar and salt to mixture, and stir.
3. Add flour and beaten egg. Stir thoroughly.
4. Preheat oven to 350°. Remove center vein of kaffir lime leaves and mince finely, or substitute lime zest. Add to spicy coconut mixture.
5. Chop raw, deboned fish into small chunks. Stir into spicy coconut mixture.
6. Pour fish mixture into an 8-inch cake pan. Bake in 350° oven for 25-30 minutes until edges are golden brown and mixture has set. Cool slightly and cut into squares and serve. To make small, round fish cakes, pour mix about 1 1/2-inches deep into muffin tins and bake for 15-20 minutes. Or, spoon about 5 tablespoons of the mixture into 6-inch x 12-inch banana leaves, wrap like a tamale, and secure ends with toothpicks or skewers. Grill over hot coals for 10-15 minutes, or until mixture has set.

*To substitute tofu for fish: Use 18 ounces of firm tofu. Chop into cubes and prepare recipe as indicated, but instead of using fish, place tofu and vegetable egg mixture into blender or food processor and purée until smooth. Bake or grill as indicated. PER SERVING: 168 cal, 6g fat, 70mg chol, 13g carb, 17g protein*
**SALMON**

**Steamed Salmon with Asparagus**

*Serves: 4 people  Calories per serving: 200*

Look for wild rather than farmed salmon; it's higher in anti-inflammatory omega-3 fats and lower in possible contaminants. Rosemary contains an antioxidant called carnosol that targets inflammation. Steaming avoids the creation of advanced glycation end-products (AGEs), chemicals that result when meats and fats are cooked at high heat; research implicates AGEs as a major food-based inflammation trigger.

1 pound fresh salmon fillet  
2 teaspoons capers  
1/2 medium red onion (thinly sliced)  
1 medium tomato (seeded and coarsely chopped)  
1 clove garlic (finely chopped)  
2 tablespoons lemon juice  
¾–1 pound asparagus (tough ends trimmed)  
2 fresh rosemary sprigs  
2 teaspoons olive oil  
Lemon wedges

1. Preheat oven to 400°. Place salmon on a large piece of parchment paper or heavy-duty aluminum foil with at least 2 inches to spare on each end and enough room on the sides to fold over entire fish.

2. In a medium bowl, combine capers, onion, tomato, and garlic. Spoon over salmon. Drizzle with lemon juice and sprinkle with salt and pepper. Top with asparagus spears and rosemary sprigs. Drizzle with olive oil.

3. Wrap paper or foil securely around salmon with edges at the top (secure paper with metal paper clips if necessary). Place on a baking sheet and cook for 20–25 minutes or until cooked through. Be careful when opening the package; clips and escaping steam will be quite hot. Serve with lemon wedges.

**LEGUMES**

**Red Lentil Soup with Chard**

*Serves: 8 people  Calories per serving: 216*

Powerful, lean-protein beans and legumes contain anti-inflammatory antioxidants called flavonoids. Pair with kombu, a sea vegetable, that contributes valuable minerals like magnesium.

1 tablespoon olive oil  
2 leeks, washed well and sliced  
3 cloves garlic, minced  
1 stalk celery, chopped  
4 cups low-sodium vegetable broth  
2 cups water  
2 bay leaves  

2 cups red lentils, washed  
1 small strip (1x3 inches) kombu  
1 tablespoon lemon zest  
Juice of 1 lemon  
1 bunch red chard (12 ounces), stems removed, leaves chopped  
½ cup minced fresh parsley  
Lemon wedges, for garnish
FOODS AND RECIPES TO SUPPORT WHOLE HEALTH, FROM HEAD TO TOE

*SWEET POTATO

Roasted Sweet Potato Sticks with Basil-Tofu Dip

Dark vegetables like sweet potatoes are especially anti-inflammatory. Roast in olive oil for added nutrition: Olive oil’s numerous healthy compounds include oleocanthal, which works like ibuprofen to quell inflammation.

3 organic sweet potatoes (unpeeled)
3 tablespoons olive oil (divided)
BASIL-TOFU DIP (makes ½ cup)
1 large clove garlic
1 green onion
6 fresh basil leaves
4 ounces medium or soft tofu (drained)
1 tablespoon olive oil
1 teaspoon umeboshi vinegar

1. Preheat oven to 450°. Halve sweet potatoes lengthwise; cut each half into four long sticks. Brush with 2 tablespoons olive oil. Place skin side down in a 9x13-inch baking dish coated with 1 tablespoon oil. Roast on lower rack for 15–20 minutes, until fork tender.

2. While potatoes cook, make dip: Mince garlic, green onion, and basil in a food processor. Add tofu, oil, and vinegar. Blend well. Serve with sweet potato sticks.

*QUINOA

Toasted Quinoa with Kale and Pine Nuts

Unlike processed grains, whole grains and seeds such as quinoa digest slowly, avoiding inflammatory blood sugar spikes. Dry-toasting quinoa and starting its cooking with boiling water help grains to cook up fluffy and separate.

1 cup quinoa (washed and drained)
1/2 teaspoon sea salt
2 tablespoons olive oil (divided)
1 3/4 cups boiling water
3 cloves garlic (minced)
4 cups lightly packed chopped kale leaves
1 tablespoons fresh lemon juice
1/3 cup pine nuts (toasted)

1. Dry-toast quinoa in a medium saucepan, stirring until golden and fragrant, about 6 minutes. Add salt, 1 tablespoon olive oil, and boiling water. Reduce heat to low, cover, and simmer 20 minutes. Let stand 5 minutes; then fluff with a fork.

2. In a skillet over medium-high heat, add remaining olive oil and garlic; sauté 30 seconds. Add kale; sauté until deep green and tender, 3–4 minutes. Stir in cooked quinoa, lemon juice, pine nuts, and salt and pepper to taste.

*SARDINES

Sardine and Sun-Dried Tomato Salad

Sardines contain the same inflammation-taming fats as salmon but are less expensive. Try pairing sardines with tuna (like in the recipe below). Tuna tones down their concentrated flavor; adjust the ratio if you like a pronounced taste.

1/4 cup canola mayonnaise
1/4 cup chopped sun-dried tomatoes in oil (drained)
2 tablespoons minced red onion
2 tablespoons minced flat-leaf parsley
1 medium clove garlic (minced)
Pinch of cayenne pepper
1 (6-ounce) can solid white tuna (drained well and flaked)
1 (4- to 5-ounce) can boneless, skinless sardines (drained and chopped)
1 cup arugula leaves
4 cups mixed salad greens
2 small Roma tomatoes (chopped)
1/2 cup chopped walnuts (toasted)

1. In a medium bowl, combine mayonnaise, sun-dried tomatoes, onion, parsley, garlic, and cayenne pepper. Gently stir in tuna and sardines; season with salt and pepper.

2. In another bowl, toss arugula, greens, and tomatoes. Divide among four plates. Top with fish salad and walnuts.

*SWISS CHARD

Sautéed Chard with Almonds and Dried Apricots

Deep-colored chard is a tasty way to fight inflammation. Pair with good-fat almonds; or add crushed red pepper flakes (chile peppers are also anti-inflammatory).

1 large bunch (about 12 ounces) red or green chard
2 tablespoons extra-virgin olive oil
1 small red onion (halved and cut crosswise into thin slices)
4 cloves garlic (minced)
¼ cup finely chopped dried apricots
¼ cup sliced almonds (toasted)

1. Remove stems from chard. Chop stems into ¼-inch pieces. Stack leaves and cut crosswise, about ½ inch wide.

2. In a large skillet, heat oil over medium-high heat. Add onion and chard stems and sauté for 2–3 minutes, until just tender. Add chard leaves.

3. Add garlic and apricots. Sauté for 3–5 minutes, until chard is bright green and just tender. Transfer greens to a serving dish. Sprinkle with toasted almonds and serve.