

## Heart-Healthy Food Number 1: Extra Virgin Olive Oil

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He that takes medicine and neglects diet wastes the skill of the physician.

—Chinese proverb

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Consume 2 tablespoons of extra virgin olive oil every day, making this your main, and preferably your sole added fat.

Companion foods Rx: avocado and natural, dry-roasted almonds

Primary disease-fighting bioactive compounds:

- Monounsaturated fatty acid—oleic acid
- Polyphenol compounds—hydroxytyrosol, tyrosol, oleuropein
- Vitamin E

The centerpiece of the Mediterranean style of eating is olive oil. A golden elixir that's full of flavor and nutrients, olive oil is truly the secret to the Mediterranean passion for cooking nutritious foods that taste great. Not to mention the fact that olive oil may be a key factor in protecting against heart disease.

In the fat-phobic 1990s, nutritionists in the United States often recommended a low-fat diet for heart patients. Today the recommendations have reversed because we now know that “good” fats are vital for pleasing the palate and taming inflammation in the arteries. It’s not how much fat, but *what kind* that makes all the difference. Case in point: In the 1950s and 1960s, inhabitants of the Greek island of Crete had an unusually high fat intake—at least 40 percent of total calories—primarily in the form of olive oil.<sup>1</sup> Butter and other animal fats or hydrogenated fats were virtually unknown in the southern Mediterranean region at that time. Add to this the islanders’ low intake of saturated-fat-rich meat, modest amounts of dairy (flavorful cheeses and yogurt), and the almost exclusive use of monounsaturated fat in the form of olive oil and you have a vivid account of how this population maintained such a low rate of heart disease.<sup>2</sup> Sadly, with the demise of the traditional Mediterranean lifestyle and the move toward Western dietary and inactivity habits, disease rates in this region have climbed exponentially.

### WHAT IS OLIVE OIL?

Olive oil is actually a fruit juice because it is made from crushing and pressing a whole fruit (olive)—pits and all—as opposed to a seed (such as rapeseed, the source of canola oil) or a vegetable (corn). In fact, it is the most widely consumed “fruit juice” in the world. Because olives are a fruit, they provide a large amount of plant antioxidants called polyphenols, which are scarce in other oils derived from seeds or vegetables. The minimal processing of extra virgin olive oil makes for a healthier fat because of the more natural state of the plant oil and the lack of excess heat and chemicals used to process it. Moreover, olive oil is one of the few oils that retain the natural flavor, antioxidants, vitamins, minerals, and other healthful components of the vegetable or seed, or, in this instance, the ripe olive fruit.

## ORIGIN OF OLIVE OIL

The olive (*Olea europaea*) is a tree crop native to the Mediterranean basin and therefore is well adapted to the region's poor soil, hilly terrain, and arid climate. Carbon dating at a site in Spain shows olive seeds found there to be eight thousand years old. For the more than 750 years that ancient Rome ruled the Mediterranean, wheat, barley, figs, olives, grapes, and various fruits and vegetables—most of the foods we associate with the traditional Mediterranean diet—were established as part of the diet because of great demand from the Roman people.<sup>3</sup> For these reasons olive oil became the principal source of fat in all Mediterranean-style diets and for centuries has remained a staple in the Mediterranean style of eating. Currently, about 95 percent of the world's olive trees are located in the Mediterranean countries.

## HEALTH BENEFITS OF THE KING OF FATS

Hippocrates called olive oil “the great therapeutic.” Homer referred to it as “liquid gold.” Olive oil's myriad health benefits can be attributed to three key compounds: monounsaturated fat (oleic acid), polyphenol antioxidant compounds, and the antioxidant vitamin E. So let's take a closer look at each of these miraculous olive oil ingredients.

### **Monounsaturated fat**

Olive oil is made up of triglycerides that contain a large percentage of monounsaturated fatty acids. Up to 80 percent of olive oil is monounsaturated, primarily the omega-9 fatty acid known as oleic acid. The high monounsaturated fatty acid content of olive oil is extremely cardioprotective—it cuts your “bad” LDL cholesterol level, helps stabilize vulnerable plaque by preventing LDL from becoming oxidized (a key step in perpetuating atherosclerosis), and

can bump up your level of HDL, the “good” cholesterol.<sup>4</sup> In fact, the monounsaturated fatty acids in olive oil are more effective in raising HDL than the polyunsaturated fatty acids found in high concentrations in vegetable oils.<sup>5</sup> Clearly, olive oil should be a staple in any diet geared toward treating and reversing heart disease.

#### OLIVE OIL AS SOLE FAT SLASHES HEART ATTACK RISK

A study out of Greece compared 700 men and 148 women with diagnosed heart disease to a similar group of healthy people. Results from the Cardio2000 study found that even when researchers adjusted for other variables such as smoking and high blood pressure, subjects who used olive oil exclusively cut their risk of having a heart attack by 49 percent compared to those who rarely consumed olive oil. (Consuming other types of fats and/or oils provided no protection.)

A similar study out of Spain compared the diets of 171 patients hospitalized with a recent heart attack with age-matched controls. This time, results showed that patients consuming the greatest amount of olive oil (approximately 3 tablespoons per day) had a whopping 82 percent reduced risk of a heart attack compared to those who rarely consumed olive oil.

The message? A habitual high intake of extra virgin olive oil—used as your primary source of fat—will provide you with a continual supply of potent disease-fighting antioxidants and oxidation-resistant fat, which can mediate and reverse plaque buildup in your arteries and cut your risk of a second heart attack by at least half and maybe more.

*Sources:* M. D. Kontogianni et al., “The impact of olive oil consumption pattern on the risk of acute coronary syndromes: The Cardio2000 case-control study,” *Clinical Cardiology* 30 (2007): 125–129; and E. Fernández-Jarne et al., “Risk of first non-fatal myocardial infarction negatively associated with olive oil consumption: A case-control study in Spain,” *International Journal of Epidemiology* 31, no. 2 (2002): 474–480.

Olive oil is not the only food rich in monounsaturated fat. Both avocado and almonds contain a nice quantity of this “good” fat, so add these foods to your diet too. Although in the kitchen many people think of avocados as a vegetable, botanically speaking, they

are a fruit—and what a fruit! Avocados are loaded with potassium, a mineral that combats high blood pressure, antioxidant vitamins C and E, and bioactive phytochemicals as well as folate and fiber. Try spreading avocado on your sandwich as a delicious and healthful alternative to saturated-fat-laden mayonnaise.

### **Polyphenols**

*Phytochemicals* is the term used to describe the thousands of nutrients found in edible plants that play a major role in preventing, halting, and reversing the process of atherosclerosis. Phytochemicals (*phyto-* comes from the Greek word for “plant”) are found in fruits, vegetables, grains, and other plant foods. Polyphenols are the largest and most biologically active group of phytochemicals and the most abundant antioxidants in the diet. Polyphenols carry extraordinarily salutary effects, especially for the heart. Plants produce polyphenols to protect themselves against the elements: ultraviolet (UV) light damage and invasion by bacteria, fungi, and viruses. Polyphenols are therefore how the plants respond to stress damage and are what they use to heal themselves, in effect, natural antibiotics. As you probably guessed, certain types of olive oil contain an abundance of health-promoting phytochemicals, especially the major class of phytochemicals, the spectacular polyphenols.

### **EXTRA VIRGIN, EXTRA PHENOLS, EXTRA HEALTH**

When surveying the crowded oil section of your supermarket aisle, note that there *is* a difference between “olive oil,” “refined olive oil,” “pure olive oil,” “pomace olive oil,” “virgin olive oil,” and “extra virgin olive oil.” Olive oil comes in different grades, with quality standards set by the International Olive Oil Council (IOOC). Make sure to choose a bottle with the words *extra virgin*. Extra virgin is the label awarded by the IOOC to only the purest and best of olive oils, those obtained from the first pressing of the

olives and containing an acidity level below 0.8 percent (less than 0.8 grams of free oleic acid per 100 grams of oil). Plus, the oil must have been extracted mechanically without the use of excess heat or chemicals.

Italian scientists set out to prove that to obtain maximum heart health benefits, it really does matter what type of oil you ingest. In their study involving twelve healthy men, the researchers administered subjects one of three varieties of oil: extra virgin olive oil (polyphenol rich), virgin olive oil (negligible polyphenols), or corn oil (devoid of polyphenols), then proceeded to analyze the men's blood, measuring markers of inflammation and oxidative stress.<sup>6</sup> The results came back loud and clear: Extra virgin olive oil was the *only fat* that tamed inflammation and raised the antioxidant capacity of the subjects' blood. This is because the phenol compounds are lost in the processing of other grades of olive oils and because there are no antioxidant polyphenols at all in corn oil.

And what's so great about those polyphenols? The most abundant polyphenols in olive oil, hydroxytyrosol and oleuropein, are particularly useful in the treatment of heart disease because they can be absorbed by the LDL cholesterol particle, further increasing its resistance to oxidation (the process that instigates plaque formation in the arteries). Another advantage of these special olive oil antioxidants is that they contribute to taming oxidative stress, the physiological state that promotes inflammation and plaque growth right where it counts, *inside* the inner wall of your arteries. Olive oil antioxidants can disarm those damaging free radical molecules, the ones that perpetuate the process of atherosclerosis and are hidden within the subterranean intima—the spot where plaque buildup occurs—as opposed to other types of antioxidants, which are restricted to scavenging free radicals circulating in the bloodstream.<sup>7</sup> You should know that oxidative stress must be tempered to effectively reverse your disease. So what exactly is oxidative stress? It is an imbalance between free radical production and your body's in-

ternal antioxidant capacity. Free radicals form as a by-product of normal metabolism and through environmental factors such as X-rays, UV light, and pollution. The best strategy for controlling free radical formation, thereby slowing and reversing plaque buildup, is to maintain a balance between oxidants and antioxidants—promoting an optimal physiological state. Consuming extra virgin olive oil (EVOO) is one daily medication you should take to tip this balance in your heart’s favor. Hence, this ability of olive oil polyphenols to obstruct oxidation of plaque-building components deep within the arterial wall is akin to a firefighter pouring water on flames—it calms the inflammation, which is key to reversing atherosclerosis.

#### GO SPANISH FOR MAXIMUM ANTIOXIDANT POWER

If your supermarket carries extra virgin olive oil that has been derived from the Picual variety of olives, purchase that one. One study has shown that the Picual variety demonstrates an unusually high antioxidant activity. Picual olive oils come from Jaén province in the south of Spain, representing approximately 25 percent of the world’s olive oil production. In fact, Spain is the top producer and exporter of olive oil, with close to five million acres of olive trees. The darker varieties also are a better choice, because black olives have a much greater concentration of antioxidant phenolic compounds than green olives. But don’t pour on the tasty antioxidant-rich olive oil with complete abandon or you will pay at the scale . . . olive oil, just like all other fats and oils, still adds 120 calories per tablespoon to your total daily calorie count.

Sources: C. Samaniego Sánchez et al., “Different radical scavenging tests in virgin olive oil and their relation to the total phenol content,” *Analytica Chimica Acta* 593, no. 1 (2007): 103–107; and R. W. Owen et al., “Olives and olive oil in cancer prevention,” *European Journal of Cancer Prevention* 13 (2004): 319–326.

## Vitamin E

Extra virgin olive oil is an excellent food source of vitamin E, a major dietary antioxidant vitamin. Getting in your daily dose of

olive oil will elevate the level of vitamin E circulating in your bloodstream. This is important, because low levels of vitamin E in the blood are associated with a significantly higher frequency of heart disease as well as increased occurrence of *stenotic* plaque (the hard, thick, calcium-filled plaque that tends to clog the coronary arteries).<sup>8</sup> Because vitamin E is fat soluble, it also incorporates into the LDL cholesterol particle, offering your LDL cholesterol particles another avenue of protection against free radical attack. Vitamin E can retard the development and progression of atherosclerosis not only by protecting LDL from oxidation but also with its unique ability to stifle arterial smooth muscle cells from multiplying and contributing to plaque formation. (Recall from Chapter 2 that smooth muscle cells play a large role in providing the structure of plaque and in the evolution of the innocuous fatty streak to the dangerous type of rupture-prone vulnerable plaque.)

### **FDA HEALTH CLAIM FOR OLIVE OIL**

So strong is the science supporting the cardioprotective effect of consuming olive oil that in 2004 the U.S. Food and Drug Administration (FDA) issued a qualified health claim for olive oil that reads something like this: There is limited but not conclusive evidence suggesting that consuming about two tablespoons (23 grams) of olive oil a day may reduce the risk of coronary heart disease because of the monounsaturated fat in olive oil.<sup>9</sup> (*Note:* We have since learned that the health benefits of olive oil stem from much more than just the monounsaturated fat content.)

One additional advantage of using olive oil in the kitchen is that it is loaded with flavor and encourages the consumption of large amounts of vegetables and legumes—antioxidant and fiber-rich foods that many Americans find difficult to fit into their diet.

Because it is unclear whether it is the olive oil alone or that the notable health benefits are associated with a combination of olive oil and vegetables, legumes, and fish, you would be wise to make olive oil your main fat and use it liberally in combination with the other foods outlined in this book. In salads or in cooking, the exquisite taste of olive oil can complement any dish. Add in flavorful herbs and spices and you have an antioxidant powerhouse that will bring to life the Mediterranean way of eating, rich in grains, legumes, vegetables, and fruits and a generous amount of liquid gold—extra virgin olive oil.

### **DAILY HEART DISEASE REVERSAL STRATEGY: OLIVE OIL'S CONTRIBUTION**

#### **Strategy 1. Boost total antioxidant capacity**

Consuming your daily dose of extra virgin olive oil will contribute to raising your body's total antioxidant capacity (TAC), the primary means by which your body fights off harmful free radicals. Free radicals wreak havoc in the body, enabling LDL cholesterol to fuel inflammation, plaque growth, and atherosclerosis. Olive oil is a simple and surefire way to increase TAC and combat free radicals—and research proves it's quick, as it takes only two hours for a person's total antioxidant capacity to escalate after consuming extra virgin olive oil.<sup>10</sup>

Some other scientifically proven strategies for raising your TAC:

1. Consume a large range of antioxidants in the foods you eat throughout the day, such as those containing powerful, plant-derived polyphenols (like extra virgin olive oil), along with food-derived antioxidant vitamins E and C and provitamin A. These antioxidants are all potent anti-inflammatory agents.
2. Perform a daily bout of antioxidant-boosting exercise.

Disease reversal works via consistently maintaining a high level of antioxidants in your bloodstream, because your ability to scavenge free radicals is the first line of defense against artery-damaging oxidative stress. Hence, the Prevent a Second Heart Attack plan is designed to *maximize your total antioxidant capacity* on any given day by having you consume the wide spectrum of antioxidant-rich foods recommended in this book—including olive oil—and perform the exercise that stimulates your body’s production of natural antioxidant enzymes.

### **Strategy 2. Immunize LDL against free radical attack**

Consuming your daily dose of extra virgin olive oil will supply your body with both monounsaturated fatty acids and antioxidants. These two olive oil components each protect the LDL particle (although in different ways).

Monounsaturated fat has a stable molecular structure and when it incorporates into the wall of LDL cholesterol, it strengthens it against oxidation, ultimately thwarting plaque formation. Polyunsaturated fat, in contrast, is weaker and prone to oxidation, especially the omega-6 type of polyunsaturated fat discussed in depth in Chapter 10. Excess consumption of certain types of polyunsaturated fat can contribute to the plaque-building process—hence this is the primary reason why you should make stable monounsaturated-rich EVOO your main fat. The antioxidant phenols (including vitamin E) in extra virgin olive oil work hand in hand with monounsaturated fat to protect the LDL particles by scavenging free radicals *inside* the arterial wall (intima), which is where LDL oxidation occurs.

### **Strategy 3. Control cholesterol**

Consuming your daily dose of extra virgin olive oil provides a dual benefit—it both raises good HDL cholesterol and lowers bad LDL. (Remember, you want to try to achieve those “ideal” choles-

terol levels discussed in Chapter 1: LDL less than 70 mg/dL and HDL greater than 60 mg/dL.) But it also has a third benefit: Extra virgin olive oil can actually increase the *size* of LDL particles—enlarging them so they are less likely to pierce the arterial wall and become oxidized.<sup>11</sup> Recall that small and heavy LDL particles are the dangerous kind because they accelerate the development of atherosclerosis. Change their shape and you take an additional step in fighting your disease.

HDL cholesterol particles are the garbage trucks that scoop up cholesterol from the arterial wall and drop it off at the liver, where it is excreted. Hence, the higher your HDL value, the better. Relatively few foods have a major impact on raising your HDL, but thankfully, olive oil is one of them. Once again, go for the extra virgin olive oil to get maximum cholesterol benefits—studies show that EVOO has a much greater HDL-boosting effect than refined olive oil.

#### **Strategy 4. Fight inflammation**

Consuming your daily dose of extra virgin olive oil will soothe inflammation of your arteries by stimulating your cells' production of anti-inflammatory agents.<sup>12</sup> When your arteries' endothelial cells are exposed to LDL particles enriched with oleic acid (the monounsaturated fat in olive oil), they sprout fewer adhesion molecules—those sticky Velcro-like molecules that attract white blood cells and grow from endothelial cells once they become “activated.” By making the walls of your arteries less sticky, olive oil effectively nips inflammation in the bud. The olive oil-enriched LDL particles no longer tell white blood cells to stick to the endothelium, and the phenols in the olive oil itself thwart endothelium activation, making olive oil a fantastic remedy for inflammation.

One ingredient of olive oil that we haven't discussed is oleocanthal, which has been discovered and isolated only recently. What's interesting about oleocanthal is that scientists discovered that it

relieves pain and lowers inflammation to the same degree as the familiar over-the-counter anti-inflammatory medication ibuprofen (Motrin or Advil).<sup>13</sup> So forget about aspirin; EVOO is the new wonder drug for this millennium!

### **Strategy 5. Lower blood pressure**

If I haven't yet convinced you of olive oil's miraculous powers, here's one more benefit to add to the list: Consuming your daily dose of extra virgin olive oil will lower your blood pressure.

But how? Olive oil contains two ingredients that dampen the squeeze on your blood vessels. Scientists believe that olive oil's blood-pressure-lowering action is highly related to the "good," heart-healthy monounsaturated fat (oleic acid) content of olive oil.<sup>14</sup> The propensity for oleic acid to incorporate into the cell membranes of arteries changes the cells' physiology—reducing the amount of a certain protein in cells that promotes constriction of blood vessels. Reduce the amount of the protein that squeezes the vessels, and you automatically relax them and blood pressure drops. In the body, oleic acid also lowers blood pressure via another route. It is transformed into the other kind of heart-healthy, good fat, omega-3. The olive oil–derived omega-3 fatty acid is called trienoic acid, which also has a relaxing effect on the arteries—causing them to dilate and thereby reduce blood pressure.<sup>15</sup>

High blood pressure is a great concern for people with heart disease, because it is related to dysfunction of the endothelium, hence contributing to instability of plaque and the likelihood of a second cardiac event. You *must* control your blood pressure to protect against a second heart attack. Consuming extra virgin olive oil is an excellent (and tasty) complement to your blood pressure medication in helping you achieve this goal.

### **Strategy 6. Improve blood sugar; prevent and treat diabetes**

Consuming extra virgin olive oil daily will also help prevent and treat diabetes. People with diabetes, especially uncontrolled diabetes, are

at great risk for plaque buildup, because the extra sugar in the bloodstream fuels endothelial dysfunction and plaque growth. (As noted previously, most people with diabetes will die of heart disease.)

The monounsaturated fat found in olive oil helps lower the insulin requirement (via improved insulin sensitivity) of people with diabetes, and it even improves glucose metabolism in healthy individuals.<sup>16</sup> Any way you look at it, olive oil is good medicine for stabilizing blood sugar and for preventing and treating this dangerous disease.

#### **OLIVE OIL CUTS BLOOD PRESSURE, REDUCES MEDICATION DOSAGE**

An Italian study found that administering a daily dose of olive oil to people previously diagnosed with high blood pressure not only lowered their pressure but also allowed them to reduce their medication dosage. Twenty-three people with diagnosed high blood pressure were administered either sunflower oil or olive oil in addition to their usual diet (three to four “spoonfuls” of oil per day) over six months. Only the olive oil group showed a significant reduction in blood pressure and daily blood pressure drug requirement (in fact, eight subjects in the olive oil group were able to go off their blood pressure medication entirely). The authors stated that this phenomenon occurred because of the ability of olive oil polyphenols to stimulate endothelial cells’ production of nitric oxide—the substance that causes arteries to relax and dilate—thereby reducing blood pressure and easing inflammation.

*Source:* L. Aldo Ferrara et al., “Olive oil and reduced need for antihypertensive medication,” *Archives of Internal Medicine* 160 (2000): 837–842.

#### **Strategy 7. Promote an anti-clotting milieu in the blood**

Additionally, incorporating extra virgin olive oil into your diet will render the blood less likely to clot by interfering with the ability of platelets to stick to one another.<sup>17</sup> This is important because blood platelets stimulate growth of plaque by adhering to the endothelial

layer of the arterial wall (refer to Chapter 2); therefore, platelets are a participant in vulnerable plaque remodeling. Furthermore, recall from Chapter 2 that heart attacks are most often caused by a blood clot sealing off the artery once a vulnerable plaque has ruptured. Thin the blood and you lessen your chances of either of these scenarios occurring.

Italian researchers at the University of Milan studied an extract of the olive oil antioxidant polyphenol hydroxytyrosol in their lab and found that the olive oil phenol extract completely inhibited blood platelets' ability to stick together and form a clot.<sup>18</sup>

### **Strategy 8. Balance omega-6:omega-3 ratio**

Using extra virgin olive oil instead of other oils will decrease your intake of omega-6 fat and, more specifically, your intake of a polyunsaturated fatty acid called linoleic acid (LA). LA is ubiquitous in the foods typically consumed in the Western diet. It is the main fat in vegetable oils such as corn oil, safflower oil, and sunflower oil. The problem is that LA accounts for 90 percent of the fatty acids in the LDL particle—and because it is polyunsaturated, it is highly susceptible to free radical attack and oxidation, making LA a pro-inflammatory food.<sup>19</sup> Replacing oils loaded with LA with extra virgin olive oil will ultimately help you balance your omega-6:omega-3 ratio (more on this later), as well as generate oxidation-resistant LDL particles—thereby blocking inflammation and fighting the progression of heart disease.

### **TIPS FOR GETTING IN YOUR DAILY DOSE OF OLIVE OIL**

- Keep a small opaque bottle of extra virgin olive oil on your kitchen counter (and the rest in a sealed, airtight metal tin in the refrigerator). Grab the bottle and use it for any and all types of cooking. Refill the small bottle on a weekly basis from the re-

refrigerated container and let it warm to room temperature before using.

- Eat salads at lunch and dinner and dress with an easy-to-make and always delicious olive oil vinaigrette. Mix three parts olive oil with one part balsamic vinegar (another antioxidant-rich food), lemon juice, herbs, and a touch of Dijon mustard (see Chapter 16 for the specifics on preparing a quick, healthy, and delicious olive oil vinaigrette seasoned with fresh herbs).

- Pour a liberal amount of olive oil on fish before grilling.
- Coat vegetables generously before roasting or grilling.
- Drizzle olive oil over your plant foods to enhance their flavor: potatoes, bean soups, grains, and steamed vegetables.
- Routinely fill a small dish with a flavorful olive oil to use for dipping whole-wheat breads and other foods.
- Cut the top off an entire head of garlic, drizzle generously with olive oil, wrap in tinfoil, and bake—then use it as a spread for a crusty piece of whole-grain bread.
- Open a can of cannellini beans, rinse thoroughly, and purée with olive oil and garlic; season and serve as a dip.

## THE FATS OF LIFE: MAKE YOURS OLIVE OIL

In the end, it is not the amount of fat in the diet that dictates the health of your arteries, but the type. In the countries that border the Mediterranean, people have historically consumed a high-fat diet, yet their rates of chronic disease are exceptionally low. But where are they getting all this “good fat”? They harvest it from the fruits of Mother Nature’s splendid gift to humankind, the truly life-giving olive tree.

Extra virgin olive oil is unique and superior to all other fat for two distinct reasons. It contains a large concentration of heart-protective monounsaturated fat as well as a remarkable amount of disease-fighting antioxidants—the only fat that contains this high a

level of antioxidant potency. The synergy between the monounsaturated fatty acids and phytochemicals makes olive oil truly a super food for the heart and king of all fats. So be sure to take in a good daily dose of extra virgin olive oil on your salads, fish, vegetables, and pasta and its delicate taste will surely satisfy your taste buds as well as soothe your arteries.