

THE TOP 10 ANTI-AGING *superfoods*



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Simply put, if you're not dead, you're aging at the cellular level (a process known as "senescence"), which can affect how you look, feel (i.e., energy levels, feelings of well-being), and perform.

This process of aging influences the health of every organ and organ system in the body including the skin, brain and nervous system, heart and cardiovascular system, joints and muscles, immune system, GI system, endocrine system and hormones, and more, including body fat. Along those lines, cellular senescence is associated with changes in how fat is stored, with an increase in visceral (i.e., abdominal fat) and ectopic (e.g., liver, kidneys, and heart) storage, which are considered to be more detrimental to health than subcutaneous fat stores.¹

It is estimated that by the year 2050 the elderly (aged 65 or older) population will double the population of children (aged 0-14) for the first time in history. According to researchers from Johns Hopkins University, **"We face a looming global epidemic as the world's population ages."**²

In order to alleviate health care costs and increase the quality of living in the aging population, it is crucial to explore methods that may slow or reverse the deleterious effects of aging. Fortunately, two of the primary factors that contribute to aging are arguably within in your control, as they can be directly influenced by your lifestyle choices, including the foods you do (or don't) eat.

Excessive oxidative stress and persistent unhealthy levels of inflammation (often referred to as "inflammaging") directly contribute to and accelerate senescence, or biological aging.³

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In fact, an abundance of scientific data suggests that one of the most important factors mediating the deleterious effects of aging is oxidative stress, which is defined as “a disturbance in the balance between the production of reactive oxygen species (i.e., free radicals) and antioxidant defenses.”^{4,5} Oxidative stress has long been thought to play a central role in biological aging (i.e., cellular senescence) and the aging of various tissues.^{6,7}

Antioxidants slow down the aging process in the body by binding to and neutralizing free radicals that can damage cellular structures. The body’s antioxidant defense system is markedly effective at scavenging free radicals, which steal electrons from other molecules through a process called oxidation.

In order to operate at top form, the body’s antioxidant defense system is highly dependent upon a continuous dietary supply of nutrient-dense, antioxidant-rich foods. Not surprisingly, researchers have repeatedly found that high fruit and vegetable intakes are positively correlated with antioxidant intake and healthy aging.⁸

Problems arise, however, when the body’s production of free radicals exceeds its ability to neutralize them as well as when the defense system is running on low-quality fuel like that of Standard American Diet, which is composed of more than 70% processed foods with a heavy emphasis on refined carbohydrates, simple sugars, and industrial vegetable oils.⁹

These “foods” contribute to oxidative stress (and inflammation) directly and secondarily through *dietary displacement*. In other words, if you’re eating a diet that’s composed of 70% processed foods, you’re **not** eating a diet that’s rich in nutrient- and antioxidant-dense foods (e.g., vegetables, fruits, fiber, beneficial bacteria).

Where there’s oxidative stress there is also typically persistent unhealthy levels of inflammation, which wreaks havoc throughout the body. In fact, a growing body of evidence indicates that increases in systemic markers of inflammation are associated with age-related declines health. Along these lines, there’s a wealth of observational

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studies in elderly populations consistently indicating an association between higher inflammatory levels and lower cognitive levels and higher risk of cognitive impairment over time.¹⁰

Numerous lifestyle and dietary factors seem to influence the body's inflammatory response, and as you might have guessed, the same contemporary diet that promotes oxidative stress also contributes to chronic inflammation. For instance, diets rich in industrial vegetable oils (i.e., high omega-6 fatty acid consumption), refined carbohydrates and simple sugars, trans fatty acids, and artificial ingredients—along with low intakes of omega-3 fatty acids, vitamins, minerals, antioxidants, and beneficial bacteria—contribute to the inflammation “plague” by fanning the inflammatory flames.¹¹

Along these lines, experts estimate that throughout human history the optimal ratio for consumption of omega-6 fatty acids (e.g., linoleic acid) to omega-3 fatty acids (e.g., alpha linolenic acid, DHA, EPA) was about 1:1. With the contemporary diet, this ratio has shifted dramatically in favor of omega-6 fatty acids to 20:1.¹²

Researchers attribute this imbalanced intake of omega fatty acids to an increase in virtually all inflammation-related conditions including mood disorders, mental illnesses, obesity, and cardiovascular disease.¹³ What's more, excess omega-6 intake has also been shown to be associated with shorter telomere lengths and accelerated aging.^{14,15} On the contrary, diets rich in omega-3 fatty acids are associated with a reduced rate of telomere shortening.¹⁶

As a normal cellular process, telomere length shortens with age. However, accelerated telomere shortening is associated with early onset of many age-related health problems, including coronary heart disease, heart failure, diabetes, increased cancer risk, osteoporosis, and decreased lifespan.¹⁷

That's right, despite the fact that we've been fed the advice to opt for refined vegetable oils rich in omega-6 polyunsaturated fatty acids for the past half century, research now shows that this advice is misguided, leading to increased rates of death from all causes,

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coronary heart disease, and cardiovascular disease.¹⁸

While there are multiple explanations for this heavy imbalance of omega fatty acids—including a decrease in omega-3 fatty acid consumption from freshwater fish—researchers attribute this in large part to the ubiquity of refined vegetable oils (e.g., soybean, safflower, sunflower, and corn oil) present in the Western diet.¹⁹ It's not just the vegetable oils found rampant in processed foods. Also contributing to the omega imbalance is the consumption of meat from farm animals raised on oil seeds rich in omega-6 fats (e.g., corn, soy).^{19,20}

Inflammatory stress can also result from excess body fat. That's right, body fat is much more than an innate depot for excess energy storage. It is a dynamic tissue that secretes a large number of hormones and chemicals (e.g., cytokines), many of which have a pro-inflammatory effect and favor an inflammatory environment.^{21–23} As a result, obesity is commonly recognized as a state of increased oxidative stress and inflammation, and obesity is directly related to accelerated aging.²⁴ Not surprisingly, waist circumference is also inversely associated with telomere length, providing more evidence that excess body fat correlates with accelerated aging.¹⁴

In addition to excess body fat, excess calorie consumption (which is inherently associated with increasing body fat stores) and poor food choices (typical of the Standard American Diet and Western eating habits, which tend to be characterized by high amounts of heavily processed and refined carbohydrates and low-quality, refined oils) also promote both acute and sustained inflammatory stress.^{25–27}

As mentioned, this pattern of eating and its associated dietary composition lead to an overproduction of free radicals, which results in oxidative stress and inflammatory stress. On the other hand, diets rich in fruits and vegetables—which are abundant in antioxidants—are inversely associated with inflammatory stress.²⁸

While inflammation is an overused “buzzword” with a negative connotation, it should be pointed out that inflammation is the normal, protective, and (usually) *temporary*

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response of the immune system to pathogens and injury. In other words, a normal, healthy, and acute inflammatory response is not only a good thing, it's imperative to optimal human health and function. However, it's when there's recurrent stimuli or poor regulation of the system that chronic inflammation—and problems—ensue.

Another factor that may accelerate senescence (i.e., the aging process) is the formation of advanced glycation end-products, which are aptly abbreviated as AGEs. AGEs are the result of the addition of carbohydrates to proteins or lipids (i.e., fat), and they can be formed both inside and outside the body. For instance, AGEs can be formed during cooking, and they can also be formed by the body after exposure to high levels of blood sugar, which results from regular consumption of simple sugars and refined carbohydrates.²⁹

AGEs can wreak havoc on the body's tissues. For instance, AGEs can impact the mechanical properties of cartilage, and as a result, increase joint stiffness, increase joint fatigue, and inhibit the building of new, healthy joint tissue.³⁰ What's more, AGEs increase free radical formation, impair antioxidant defense systems, increase oxidative stress, and promote inflammation.³¹

SKIN: THE MOST VISIBLE INDICATOR OF AGING

The integumentary system, which is largely comprised of the skin (as well as hair and nails), composes approximately one-sixth of your entire body weight, and while it serves numerous critical functions, it represents the most visible indicator of aging.³² Skin aging is a complex, biological phenomenon divided into two components: extrinsic and intrinsic aging.³³

Extrinsic aging is caused by environmental factors and is more commonly referred to as photoaging due to the fact that UV exposure is the principal cause of extrinsic aging. On sites of the skin that are exposed (e.g., face, hands), aging involves changes in cellular biosynthetic activity that leads to important disorganization in the dermal matrix.³⁴

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Extrinsically aged skin is characterized by photo damage as wrinkles, pigmented lesions, patchy hypopigmentations, actinic keratoses, and even pervasive dryness and itching.

Important extrinsic and environmental factors that can accelerate skin aging include: sun/UV ray exposure, air pollution, temperature and humidity, smoking, alcohol abuse, certain medications, poor nutrition, repetitive muscle movements (e.g., squinting, frowning), sleeping position, and more.^{35,36}

Intrinsic aging, the natural aging process, is genetically determined (e.g., ethnicity, skin pigmentation) and represents an inevitable change attributable to the passage of time, characterized by physiologic alterations of the skin structure. In human dermis, intrinsic aging is characterized by three features: dermal atrophy due to collagen loss, degeneration in the elastic fiber network, and loss of hydration.³⁷ Various expressions of intrinsic aging include smooth, thinning skin with exaggerated expression lines.³⁴ Hormonal changes, particularly thyroid, testosterone, and estrogen, can impact intrinsic skin aging.³⁸ It is very important to note that one's intrinsic rate of skin aging can be dramatically influenced by personal and environmental factors such as those cited above.³⁶

Thus, one's skin can change in many important ways with age. It can become thinner, begin to sag, and lose its elasticity and smoothness. You may notice this as bags underneath your eyes, crow's feet wrinkles, less definition around your cheekbones, and even sagging skin on your neck. What's more, pigmented age spots appear on areas of the skin that are overexposed to UV radiation (e.g., face, hands). All of these unattractive changes are important concerns for many people.

The great news is that nutrition can have a potent impact on skin health. In fact, skin can be a direct reflection of the quality (or lack thereof) of one's dietary make-up. Research has shown that certain micronutrients, polyphenols, and a variety of plant extracts possess potent antioxidant properties and can effectively prolong youthful skin appearance, and among these nutrients include:³⁹

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- Vitamin C
- Vitamin E (tocopherols)
- Carotenoids (e.g., vitamin A, β -carotene, lycopene, astaxanthin, retinol)
- Vitamin D
- Polyphenols found in tea, coffee, and red wine
- Pre- and probiotics
- Omega-3 fatty acids

In one study published in the *American Journal of Clinical Nutrition*, researchers examined the association between nutrient intakes and skin aging among 4025 women (40–74 y) using data from the first National Health and Nutrition Examination Survey (NHANES). Skin-aging appearance was defined as having a wrinkled appearance, senile dryness, and skin atrophy. They found that higher intakes of vitamin C and essential fatty acids (e.g., omega-3 fats) were associated with better skin-aging appearances. Interestingly, they found that every 50-gram increase in carbohydrate intake increased the likelihood of wrinkles and skin atrophy.⁴⁰

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With all of that in mind, you might already have an idea of the types of foods that possess anti-aging properties.

Before we delve into the list of top anti-aging foods, we feel that it's important to remind you that, in the grand scheme of things, looking, feeling, and performing your best are all contingent on your entire body of “nutrition work”—not an individual food or single meal. In other words, there's no “magic bullet.” Instead of viewing foods in isolation as “good” or “bad,” think about weight management and “deep health” as the product of practicing healthy eating habits, creating a positive food environment, and choosing high-quality, nutritious foods in appropriate amounts relative to your goals and activity levels **regularly** and **consistently** over time. Good nutrition takes practice, and just like getting better and mastering anything in life, it's about progress—not perfection.

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Start where you are and make small changes that you are ready, willing, and able to take on; focus on **mastering** those new behaviors one step at a time.

Also, keep in mind that any food sensitivity—including aversions to otherwise “healthy” foods—could accelerate aging through activation of the immune system and unhealthy levels of inflammation. While not everyone has food sensitivities, there are some common offenders, including grains (e.g., wheat), soy, dairy, shellfish, FODMAP-containing foods, nightshades, and histamine-containing foods.

Not everyone has a food sensitivity nor does this mean that everyone needs to avoid these categories of foods. Rather, this is simply meant to raise awareness that a variety of foods—even foods that are frequently viewed as healthy—may be an issue for some folks. While consuming a diet of whole, minimally-processed foods is a huge step in the right direction, a more personalized approach may be necessary for some people, and that involves identifying and eliminating suspect foods. This is why the arguable top habit of good nutrition is to practice **awareness** and **mindfulness** and figure out what works best for **you**.

1. OLIVE OIL

Extra-virgin olive oil is naturally abundant in a polyphenol called oleocanthal, which has been shown to promote a healthy inflammatory response. Specifically, oleocanthal acts as a “natural anti-inflammatory compound” by inhibiting the activity of cyclooxygenase (COX) enzymes, a property it shares with the highly-recognizable NSAID ibuprofen.^{41,42}

“By inhibiting these enzymes, inflammation and the increase in pain sensitivity associated with them is dampened,” says Dr. Paul Breslin, co-author of a recent



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study published in the *Journal of Neuroscience* in which researchers identified the unique mechanism underlying the oral stinging sensation shared by oleocanthal and ibuprofen.⁴³

Along those lines, researchers have found that a Mediterranean diet, which is rich in olive oil, confers a number of health benefits, some of which seem to overlap those attributed to NSAIDs.^{44,45}

In addition to oleocanthal, there are a number of other polyphenols (e.g., oleuropein, hydroxytyrosol) in extra-virgin olive oil that provide antioxidant activity and promote a healthy inflammatory response.⁴⁶ In fact, Italian researchers have found that oleuropein, a compound that is similar in structure to oleocanthal, exerts anti-inflammatory effects.⁴⁷

In a study published in the journal *Atherosclerosis*, researchers examined the antioxidant and anti-inflammatory effects of extra-virgin olive oil. Healthy participants were divided into three groups, each one receiving a meal with a different type of oil: Extra-virgin olive oil (EVOO), olive oil (OO), or corn oil (CO). The researchers found that only when the folks consumed meals with EVOO (not OO or CO), they experienced significant decreases in inflammatory markers (e.g., TXB2, LTB4) along with increases in markers of antioxidant capacity within two hours of the meal.⁴⁸ While the EVOO and OO had nearly identical fatty acid compositions, the EVOO contained nearly 38 TIMES more health-promoting polyphenols.

In terms of extra-virgin olive oil consumption, the evidence suggests that around 3 tablespoons or so may be needed daily to derive the research-backed benefits. While this may come as somewhat of a surprise, it should be noted that Mediterranean diets typically provide up to 40% of total calorie intake from fats—up 50% of which comes from monounsaturated fats (predominantly extra-virgin olive oil).⁴⁹

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7. BERRIES AND CHERRIES

Cherries, blueberries, strawberries, and other berries get their dark, deeply-colored hues from their concentrations of potent polyphenols called anthocyanins.⁵⁰⁻⁵² Research has shown that these potent polyphenols promote a healthy inflammatory response by inhibiting the activity of a class of enzymes in the body called cyclooxygenase (COX) thereby promoting a healthy inflammatory response. The COX inhibitory activity of the anthocyanins from cherries and other berries has been shown to be comparable to that of commonly-used NSAIDs.⁵³



A number of studies have shown that berry consumption has been associated with reduced markers of systemic inflammation. In one study published in the *Journal of the American College of Nutrition*, researchers from Harvard examined the dietary habits of nearly 27,000 women as part of the Women's Health Study. They found that women who consumed two or more servings of strawberries per week (about 16 strawberries) were 14% less likely to have elevated levels of CRP, a marker of inflammatory stress.⁵⁴

Strawberries are also an excellent source of vitamin C, which is a key, potent antioxidant, protecting cells throughout the body from free radical damage. Vitamin C also plays a crucial role in the formation of collagen, which helps keep skin healthy, firm, and tight. In fact, vitamin C has been shown to provide skin anti-aging effects, help repair damaged, photoaged skin, and provide wrinkle relief.

In two separate studies, researchers from the Department of Food Science and Nutrition at Laval University in Quebec found that folks who consumed a low-calorie cranberry juice cocktail daily for 4 – 12 weeks showed reduced levels of selected pro-inflammatory markers.^{55,56} In one of the studies, the men who drank the cranberry juice cocktail daily for 12 weeks demonstrated a 36% reduction in levels of matrix metalloproteinases (MMPs), which are enzymes involved in the breakdown of a variety of tissues in the

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body and are thought to play a pivotal role in joint degradation.⁵⁷

Researchers from Texas Women's University recently demonstrated that the polyphenols in blueberries might play a significant role in reducing body fat, which secretes a number of hormones and chemicals that favor an inflammatory state. Specifically, the researchers found that blueberry polyphenols inhibited the formation of fat cells.⁵⁸ By reducing body fat, one can reduce inflammatory stress as well as decrease the physical stress on joints associated with extra body weight.

Blueberries may also help by fighting free radicals and directly promoting a healthy inflammatory response. In one study published in the journal *Applied Physiology, Nutrition, and Metabolism*, researchers from Appalachian State University found that athletes who consumed about 2 cups of blueberries daily for 6 weeks showed reduced levels of oxidative stress and an increase in anti-inflammatory molecules.⁵⁹

In a study published in the *Journal of the International Society of Sports Nutrition*, researchers from New Zealand found that consumption of blueberries may also accelerate recovery, soreness, and decrease oxidative stress when combined with exercise. Specifically, folks who consumed a blueberry smoothie before and after exercise experienced reduced muscle soreness and accelerated recovery of strength, which translates to more frequent exercise and improved performance.⁶⁰

In a study published in the *Journal of Nutrition*, researchers from the University of California-Davis found that men and women who consumed 45 Bing sweet cherries daily for 28 days demonstrated significantly reduced levels of inflammatory markers.⁶¹ On average, the participants' circulating levels of the inflammatory marker CRP decreased by 25%.

Overall, berries contain a number of compounds that support the body's antioxidant defense systems, promote a healthy inflammatory response, and support weight management. With that in mind, it's a good idea to consume a wide variety of berries on a regular basis to support healthy aging.

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3. ORGANIC MEAT AND DAIRY FROM GRASS-FED ANIMALS

Put simply, it's all about protein. Meat and dairy are excellent sources of protein, and while optimizing protein intake throughout one's lifetime is key to looking, feeling, and performing one's best, consuming optimal amounts of protein is absolutely crucial as you age.



Unfortunately, as folks age, there tends to be a slow and inevitable age-related decline in skeletal muscle mass, accompanied by a decline in strength, which has tremendous consequences for mobility and physical function and is associated with a greater incidence of falls in the aging population. What's more, the age-related losses in muscle mass also contribute to a number of age-related health conditions that can reduce independence and lessen the quality of life.⁶²

Although we will all lose muscle mass as we age—beginning around the age of 40 – 50 years old at a rate of about 0.6% per year⁶³—there are a number of factors (within your control) that can affect the rate of muscle loss. For instance, inactivity or immobilization can accelerate the rate at which muscle is lost. In other words, “use it or lose it.” Conversely, resistance training (i.e., weight lifting) is the most potent stimuli for staving off age-related losses in muscle mass.⁶⁴

What's more, nutritional factors can also influence the rate of muscle loss. For instance, older adults tend to consume a suboptimal protein intake, which contributes to age-related muscle loss.⁶⁵ On top of that, it appears that, as we age, we have a reduced sensitivity to the effects of dietary protein. In other words, *more* dietary protein is needed to help build and maintain skeletal muscle mass as we age.^{66,67} In fact, it may take up to 67% more protein per meal for older adults to stimulate muscle protein synthesis to a comparable level as young adults.

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While it's beyond the scope of this report to delve into protein consumption in the depth it deserves, generally speaking, an abundance of emerging evidence suggests that consuming about 0.7 – 0.9 grams of protein per pound of bodyweight per day is optimal.

When it comes to choosing beef, your best bet is to invest in the best and highest quality that you are able to fit into your budget. In a recent systemic review and meta-analysis published in the *British Journal of Nutrition*, a group of researchers critically analyzed data from 67 different studies comparing the composition of organic (i.e., grass-fed, pasture-raised) and non-organic (i.e., conventional) meat products. They found that the beef from pasture-raised animals contained 47% more omega-3 fatty acids than conventional meat products.⁶⁸

In addition to a much healthier omega-3 fatty acid profile, research also shows that grass-fed beef is one of the best dietary sources of conjugated linoleic acid (CLA), as it contains an average of 2 to 3 times more than conventional beef.⁶⁹ CLA possesses antioxidant activity, and research has shown it to reduce body fat, increase lean body mass, and improve body composition.⁷⁰

Likewise, when choosing dairy, it's a good idea to opt for organic. In a recent systemic review and meta-analysis published in the *British Journal of Nutrition*, researchers reviewed the results of 170 published studies comparing the nutrient composition of organic (i.e., grass-fed, pasture-raised) to conventional (i.e., grain/commodity-fed) dairy.⁷¹

Compared to conventional dairy, the researchers found that dairy from pasture-raised cows was 56% higher in omega-3 fats (EPA, DHA, DPA), which help promote a healthy inflammatory response. What's more, organic dairy contained 69% more CLA, which, as mentioned above, has been shown to preferentially modulate body composition, enhance immunity, and promote a healthy inflammatory response.⁷²

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4. WILD SALMON AND OTHER COLD WATER FISH

Wild salmon and other coldwater fish are abundant in the *essential* omega-3 fatty acids EPA and DHA. They are considered essential because the body cannot produce them, and they must be consumed through dietary sources. Unfortunately, the modern food supply is largely void of these important healthy fats due to overconsumption of vegetable oils, which are rich in omega-6 fatty acids (e.g., soybean, safflower, sunflower, corn, etc.), meat from feedlot animals (that consume abundant amounts soy and corn), and reductions in healthful seafood consumption.



This is important for a number of reasons, especially when it comes to promoting a healthy inflammatory response. For example, omega-3 fatty acids have anti-inflammatory effects (e.g., suppress IL-1 β , TNF- α , and IL-6) whereas omega-6 fatty acids do not.⁷³ In fact, studies show that omega-6 fats promote inflammation, particularly when they are consumed in excess of omega-3 fats.¹¹

Omega-3 fatty acids get incorporated into the body's cell membranes, which keeps them more "fluid." This ultimately allows for better communication (e.g., hormones, neurotransmitters) and nutrient uptake (e.g., protein synthesis, glycogen synthesis). However, omega-3 fatty acids compete with omega-6 fatty acids (and other fats) for "parking spots" within the cell membrane.⁷⁴ Thus, increasing omega-3 fatty acids (via EPA and DHA)—and subsequently decreasing omega-6 fatty acids—tends to promote a healthy inflammatory response and lead to improvements in a variety of health parameters.

In a study published in the *European Journal of Clinical Nutrition*, French researchers assessed the effects of a 10-week diet modification to decrease the ratio of omega-6 to omega-3 fats in healthy subjects on various health parameters, including inflammatory

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markers.⁷⁵ The researchers found that the diet intervention (i.e., decreased omega-6 and increased omega-3 fatty acids) resulted in significant reductions in TNF- α and “multiple favorable effects on the metabolic and inflammatory profiles.”

As mentioned above, the modern food supply is rife with industrial vegetable oils rich in pro-inflammatory omega-6 fatty acids (e.g., soybean, safflower, sunflower, corn, etc.), and an increase in omega-3 fatty acids (e.g., freshwater fish, fish oil supplements) and a concomitant decrease in omega-6 fatty acids appears crucial in promoting a healthy inflammatory response and supporting healthy aging. In fact, excessive consumption of omega-6 fatty acids coupled with a deficiency of omega-3 fats is connected to a decrease in telomere length (a sign of accelerated aging) and an increase in all age-related conditions characterized by inflammatory stress.^{13,76}

In one study, Australian researchers found that improving the ratio between omega-6 and omega-3 fatty acids through EPA and DHA supplementation (i.e., 4 grams total per day) resulted in a substantial decrease in the pro-inflammatory compounds IL-1 β and TNF- α thereby promoting a healthy inflammatory response.⁷⁷

It is important to stress that choosing wild-caught fish tends to be a better choice than farmed fish. For instance, farmed salmon are typically fed commodities like soy and corn, which have dramatically higher concentrations of omega-6 fats compared to omega-3 fats, and as a result, the fatty acid profiles of the farmed salmon are significantly different than wild-caught salmon, which feed on other omega-3-rich fish (e.g., sardines, anchovies) lower on the food chain.

The ratio of omega-3 to omega-6 fats (i.e., more omega-3 fats, fewer omega-6 fats) in wild-caught salmon is upwards of 266% higher than that of farmed salmon, which is lower in omega-3 and higher in omega-6 content.⁷⁸ But that's not all; farmed salmon also contain high concentrations of potentially health-damaging contaminants (e.g., PCBs, dioxins, chlorinated pesticides). PCBs can compromise the integrity of the intestinal lining and disrupt the integrity of the blood-brain barrier.^{79,80}

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Even more, exposure to PCBs may negatively influence memory and learning as well as be an independent risk factor for depressive symptoms.⁸¹ Numerous studies have found connections between PCBs and multiple adverse human health outcomes including reproductive, developmental, immunologic, and neurologic effects.⁸⁰

With all of that in mind, you'd be well-advised to consume wild coldwater fish on a regular basis to reap the anti-aging benefits; many experts recommend consuming at least 4 ounces several times per week. In addition to supplementing with a high-quality fish oil supplement daily, the following are the best sources of fish rich in EPA and DHA:

- Anchovy
- Herring
- Mackerel
- Sardine
- Salmon
- Trout
- Tuna

5. BRAZIL NUTS & WALNUTS

Brazil nuts are one of the most concentrated sources of the micronutrient selenium, which serves a critical role in the body's antioxidant defense systems, and studies have shown that Brazil nut consumption can significantly improve antioxidant status and increase the activity of glutathione peroxidase, a family of enzymes whose main task is to reduce oxidative stress.⁸²⁻⁸⁴



Selenium protects the skin from UV radiation-induced oxidative stress by stimulating the activities of selenium-dependent antioxidant enzymes, including glutathione peroxidase. In fact, selenium supplementation has been shown to be effective in improving

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psoriasis, and selenium deficiency is associated with an increased risk of skin cancer.⁸⁵

A number of studies have suggested that health benefits of nuts may be due their supply of antioxidants and the role that they play in reducing oxidative stress. Of the tree nuts, walnuts and pecans are among the plant-based foods with the highest content of total antioxidants.⁸⁶ Nuts are among the best sources of vitamin E, a well-known antioxidant.

Walnuts are also one of the better plant-based sources of omega-3 fatty acids, specifically alpha linolenic acid (ALA), which is considered to be the “parent” omega-3 fatty acid to EPA and DHA. It should be noted that ALA must be converted (in the liver) into EPA and DHA, however, the human body has only a very limited capacity to do so, as the conversion rate is relatively poor (e.g., 5%).⁸⁷

Researchers have found that when rats are fed walnuts daily, they reverse brain aging and improve cognitive and motor performance.⁸⁸ In a study published in the *British Journal of Nutrition*, researchers from Tufts University found significant cognitive improvements in rats when they were fed a diet of 6% walnuts, which would be equivalent to consuming about 1 ounce of walnuts per day.

In a study published in the *Journal of Health, Nutrition & Aging*, researchers from UCLA examined the diets of thousands of folks from the National Health and Nutrition Examination Survey (NHANES) to determine whether a connection exists between walnut consumption and measures of cognitive function. They found that cognitive function was consistently greater in study participants who consumed walnuts.⁸⁹

Walnuts have also been shown to boost levels of melatonin, a hormone that plays an intricate role in sleep. Short sleep duration is associated with shorter telomere length (i.e., accelerated aging), and sleep deprivation is also correlated with reduced skin health and accelerated skin aging.^{90,91} What’s more, in a study published in the journal *Science*, researchers from the Department of Neurosurgery at the University of Rochester discovered that, during sleep, the brain clears out potential “neurotoxic” waste that builds up during the day.⁹²

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Because of their array of antioxidants, vitamins, and minerals, it's a good idea to consume a variety of nuts on a regular basis to benefit from their anti-aging properties.

6. EGGS

Like beef and dairy, eggs are also a very good source of high-quality protein, and they are one of the few excellent sources of choline—nearly all of which is located in the yolk. A lesser-known nutrient that supports brain health and nervous system function, choline is the main building block of the neurotransmitter acetylcholine, and its significance in nervous system function cannot be overstated.



When researchers from the University of North Carolina supplemented the diets of rat pups with choline, they found that their brain function changed for the better, resulting in life-long memory enhancement.⁹³

In a study published in the *American Journal of Clinical Nutrition* in 2011, researchers from the Boston University School of Medicine set out to determine the relationship between dietary choline intake and cognitive function amongst nearly 1,400 men and women with an average age of 61. Not surprisingly, the researchers found that higher choline intake was associated with better cognitive performance.⁹⁴

In addition to their protein and choline content, eggs are also rich in the potent antioxidants lutein and zeaxanthin, which fight oxidative stress and free radical damage. In one study, a research team from the Human Nutrition Center on Aging at Tufts University found that lutein and zeaxanthin can improve cognitive function in the elderly.⁹⁵

These findings spawned the research team to conduct a study on the effects of daily

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egg consumption on cognitive function in the elderly. Although the study is currently ongoing, the researchers hypothesize that “there will be a significant increase in cognitive function measures in older adults provided with meals containing 2 eggs per day at the end of 6 months.”

What’s more, when you choose pasture-raised eggs (which are laid by hens that get to spend their days outside on fresh pastures—not cooped up in small cages or huddled by the thousands in cage-free barns), you’ll get the added benefit of eggs higher in the same omega-3 fats found in wild salmon.

Research from *Mother Earth News* demonstrated that eggs from pasture-raised hens provide a significantly improved nutrition profile compared to standard store-bought eggs, including 2 TIMES more omega-3 fatty acids.⁹⁶ In the same series of studies, the researchers found that pasture-raised eggs contained SIX times more vitamin D than traditional eggs. Vitamin D plays a critical role in skin health and promoting a youthful skin appearance, and higher vitamin D levels are associated with longer telomere length (i.e., healthy aging).^{39,97}

You may be asking yourself, “What about cholesterol? Isn’t that ‘bad’ for you?” We’ve been led to believe that dietary cholesterol leads to increased levels of blood cholesterol (more appropriately, the lipoproteins LDL and HDL that *carry* cholesterol) and an increased risk of heart disease. This is more commonly referred to as the “lipid hypothesis,” which has been called into question, picked apart, and largely discredited in recent years.^{98,99}

In a cross-over study published in the *International Journal of Cardiology*, researchers from Yale Prevention Research Center assessed the effects of egg consumption on endothelial function (FMD), a reliable index of cardiovascular risk. 49 healthy men and women consumed two eggs per day for 6 weeks. At the end of the study, the researchers found that daily egg consumption did not affect total cholesterol, LDL, or FMD, providing clear evidence **“that dietary cholesterol may be less detrimental to cardiovascular health than previously thought.”**¹⁰⁰

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In one study published in the journal *Nutrients*, researchers from Wayne State University found that **students who ate eggs for breakfast (providing 400mg of cholesterol) 5 days per week for 14 weeks experienced no negative impact on blood lipids** (e.g., total cholesterol, LDL).¹⁰¹

In general, observational studies have not found a connection between egg consumption and risk of cardiovascular disease in otherwise healthy individuals. In a study published in the *Journal of the American Medical Association*, researchers from Harvard University's Department of Nutrition assessed whether there was any connection between egg consumption and coronary heart disease (CHD) among over 117,000 otherwise healthy men and women over the course of 14 – 18 years. The researchers found **“no evidence of an overall significant association between egg consumption and risk of CHD or stroke in either men or women.”**¹⁰²

In a study published in the journal *Medical Science Monitor*, researchers assessed the dietary patterns of nearly 10,000 adults (aged 25 – 74) to examine the association between egg consumption and risk of cardiovascular disease. They found that consumption of more than 6 eggs per week did not increase the risk for cardiovascular disease compared to eating none.¹⁰³

In a recent study published in the *European Journal of Clinical Nutrition*, researchers from Spain set out to assess whether there was any connection between egg consumption and the risk of cardiovascular disease (CVD) among over 14,000 men and women (ages 20 – 90) who followed a Mediterranean-style diet. Once again, the researchers found **no association between egg consumption and cardiovascular disease (CVD) risk** when comparing folks with the highest to lowest egg consumption.¹⁰⁴

Perhaps most interesting are the results from a study recently published in the journal *Metabolism* where researchers from the University of Connecticut compared the effects of eating 3 whole eggs per day versus an equivalent amount of yolk-free egg substitutes on blood lipids and insulin sensitivity. After 12 weeks, the researchers found that the participants who ate the whole eggs experienced significantly greater increases in HDL

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cholesterol and large HDL particles (i.e., the “good” forms of cholesterol), as well as reductions in total VLDL and medium VLDL particles. What’s more, the egg eaters also experienced significant improvements in insulin sensitivity and increases in HDL and LDL particle size (i.e., more large, fluffy particles).¹⁰⁵ Particle size is noteworthy because small, dense particles are considered more detrimental than large, fluffy particles.¹⁰⁶

Taken together, egg consumption does not seem to be a concern for otherwise healthy individuals, although this may be an issue for “hyper-responders” and diseased populations.^{107,108}

7. BEETS & POMEGRANATES

Beets—and in particular, beetroot juice—are a rich source of naturally-occurring nitrates, compounds that can increase the body’s production of nitric oxide (NO), which is a potent vasodilator. More simply put, nitrates help “open up” the diameter of blood vessels and increase blood flow. As a source of dietary nitrates, beets provide a natural strategy for increasing NO availability, and as a result, may help promote cardiovascular health.¹⁰⁹



Along those lines, nitrates from beets may help lower blood pressure. In a series of studies published in the journal *Hypertension*, a group of researchers from The Barts and The London School of Medicine found that daily consumption of beetroot juice for 4 weeks resulted in significant improvements in blood pressure.^{110,111} Additionally, research has shown that beetroot juice may improve exercise and athletic performance by increasing time to exhaustion, improving power output, reducing perceived level of exertion (i.e., how hard activity feels), and increasing exercise tolerance.^{112–114}

Beets are also a unique source of phytochemicals called betalains, particularly betanin and vulgaxanthin, which have both been shown to possess potent antioxidant and

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anti-inflammatory properties as well as provide detoxification support. This has sparked interest in a possible role for beetroot in the management of age-related conditions characterized by excessive oxidative stress and persistent unhealthy levels of inflammation.¹¹⁵

One means by which beetroot exerts its antioxidant effects is through increased glutathione (GSH) activity. Glutathione is the body's "master antioxidant," boosting the body's natural defenses against stress and dangerous toxins and bolstering the immune system. Glutathione concentration is found to be greatest in the liver, the organ involved in the detoxification and elimination of toxins.¹¹⁶

In addition, beets are a rich source of a number of phytochemicals, including ascorbic acid (i.e., vitamin C), carotenoids, phenolic acids, and flavonoids, all of which have been shown to play a prominent role in promoting a longer lasting youthful skin appearance.³⁹

Pomegranates and pomegranate juice are potent sources of antioxidants; in fact, pomegranate juice has been shown to have higher antioxidant activity, content, and protective benefits than red wine, green tea, white tea, orange juice, acai berry juice, or blueberry juice.¹¹⁷ Like beets, pomegranate juice has also been shown to increase and enhance NO activity.¹¹⁸

8. SPINACH & LEAFY GREENS

Spinach is commonly regarded as one of the most nutrient-dense foods and for good reason. It is rich in a number of vitamins and minerals as well as copious phytochemicals. In fact, spinach is an excellent source of:

- Vitamin K
- Vitamin A



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- Manganese
- Folate
- Magnesium
- Iron
- Copper
- Vitamin B2
- Vitamin B6
- Vitamin E
- Calcium
- Potassium
- Vitamin C
- Fiber
- Phosphorus
- Vitamin B1
- Zinc
- Choline



As previously mentioned, both vitamin C and vitamin E play an important role in skin health. In fact, vitamins C and E act synergistically to protect the body against ultraviolet (UV) radiation and oxidative stress.³⁹

Zinc and copper have an important role in skin health. For instance, zinc functions (along with vitamins C and E) to protect the skin against photodamage by absorbing UV radiation. Likewise, copper also serves as an antioxidant, protecting the skin from damage that is caused by a UV light-induced increase in free radicals. What's more, copper stimulates the formation of mature collagen, and as a result, it is critical in improving skin elasticity and thickness.⁸⁵

Spinach is also a rich source of vitamin A and carotenoids, which are highly effective antioxidants that have been shown to possess photoprotective properties. Human skin is enriched with the carotenoids lycopene and β -carotene, which is known as a “photoprotector” and found in high concentrations in spinach.¹¹⁹

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Spinach is also an excellent source of fiber, and research has positively correlated telomere length with fiber intake.¹⁴ In other words, folks who eat more fiber tend to have slower rates of aging.

9. RED WINE

Over the last several years, the health benefits of moderate red wine consumption have become increasingly clear, and among the myriad advantages appears to be anti-aging effects. Like many of the other dark, rich-colored fruits already discussed, red wine is a rich source of antioxidant polyphenols, including anthocyanins.¹²⁰



One of the best-known polyphenols found in red wine is resveratrol. A number of studies have demonstrated the anti-inflammatory activity of resveratrol and its ability to promote a healthy inflammatory response.¹²¹ Like oleocanthal and a number of the other polyphenols already mentioned, resveratrol seems to exhibit its anti-inflammatory activity mostly through inhibition of the COX enzymes, which has the potential to promote a healthy inflammatory response.¹²² Resveratrol also seems to modulate the body's inflammatory response by reducing both the production of inflammatory molecules as well as the formation of free radicals.¹²³

Another means by which resveratrol may exert its anti-aging prowess is by downregulating the receptors for advanced glycation end products (RAGEs).^{124,125} As you may recall from the introduction, AGEs play a role in accelerating the aging process.¹²⁶ One of the means by which they do this is through interaction with RAGEs. Along those lines, resveratrol mitigates the effects of AGEs via downregulation of RAGEs.

While resveratrol seems to be the most popular antioxidant associated with red wine, the beneficial effects of red wine cannot be solely accounted for by this polyphenol due

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to its low concentration and bioavailability.¹²⁷ In a recent study published in the journal *PLoS One*, researchers from Hungary demonstrated that malvidin, the most abundant anthocyanin polyphenol in red wine, possesses potent antioxidant and anti-inflammatory activity, and the effects of malvidin “at least partially account for the positive effects of moderate red wine consumption.”¹²⁸

This is important to note because it highlights that a combination of red wine polyphenols—not a single compound—may be needed to derive the touted health benefits. Thus, moderate amounts of red wine—1 glass (i.e., 5 ounces) per day for women and 1 – 2 glasses per day for men—may be optimal. It’s important to note, however, that drinking alcohol in excess appears to increase the body’s production of pro-inflammatory molecules, according to researchers from the University of North Carolina.¹²⁹

10. GREEN TEA & COFFEE

Green tea is loaded with beneficial polyphenols called catechins, which have noteworthy anti-inflammatory and antioxidant properties. Amongst the most powerful catechins is epigallocatechin-3-gallate (EGCG), which has been shown to dampen the expression of pro-inflammatory cytokines.¹³⁰



Correlational studies have examined the relationship between green tea and cognitive function. In a study published in the *American Journal of Clinical Nutrition*, Japanese researchers collected data on the frequency of green tea consumption of over 1,000 individuals over the age of 70. They found that a higher consumption of green tea was associated with a lower prevalence of cognitive impairment.¹³¹

In another observational study published in the *Journal of Clinical Nutrition*, researchers

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from Singapore obtained comparable results investigating the association between green tea consumption and cognition in 2,501 Chinese people aged over 55 years. They found that the intake of green tea was significantly related to a significantly lower risk of cognitive impairments and decline.¹³² Recently, researchers at the University of Basel in Switzerland found that drinking green tea directly enhances cognitive function, specifically memory performance.¹³³

Coffee is one of the world's most consumed drinks, yet despite its popularity, coffee seems to have an undeserved bad reputation. Fortunately, there's a bounty of research to suggest the opposite, as there are a multitude of health benefits associated with regular coffee consumption, and among them are numerous brain and anti-aging benefits.

Research over the past several years suggests that coffee consumption may protect against type 2 diabetes, Parkinson's disease, liver cancer, and liver cirrhosis. It's important to point out that studies suggesting these benefits are observational in nature, which means that they don't necessarily prove that coffee caused the effects. Here's a sampling of some of the healthy aging benefits associated with regular coffee consumption:

- Research suggests that regular coffee consumption is associated with a substantially lower risk of type 2 diabetes.¹³⁴
- Some studies have shown an inverse relationship between coffee consumption and Alzheimer's disease, suggesting that coffee may have protective benefits against dementia.¹³⁵
- Recent reports estimate that moderate coffee consumption may lower the risk of Alzheimer's by as much as 20%.¹³⁶ In a study that appeared in the *Journal of Alzheimer's Disease*, Finnish researchers found that folks who consumed 3 – 5 (six-ounce) cups of coffee per day had a 65% decreased risk of developing dementia.¹³⁷
- Studies have shown that coffee drinkers have a significantly lower risk of developing Parkinson's disease.¹³⁸

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- Recent research on coffee and mortality performed by scientists from the Harvard School of Public Health found that people who regularly drank coffee had a lower risk of death from cardiovascular disease than those who rarely drank coffee.¹³⁹

Generally speaking, researchers attribute coffee's brain health benefits to its unique combination of caffeine and polyphenols. In the case of the latter, coffee is loaded with antioxidants. In fact, coffee is the single greatest dietary source of antioxidants—outweighing even fruits and vegetables—among many cultures.¹⁴⁰

Researchers from the University of California-Davis published a study in the *Journal of Agricultural and Food Chemistry* in which they concluded that “brewed coffee contains many antioxidants and consumption of antioxidant-rich brewed coffee may inhibit diseases caused by oxidative damages.”¹⁴¹

According to research and Coffee & Health, the institute for scientific information on coffee, moderate coffee consumption is defined as 3 – 5 six-ounce cups per day. Generally speaking, for healthy adults with no medical issues, it is agreed upon that 300 – 400mg of caffeine can be safely consumed daily without adverse effects.¹⁴²

While there are many benefits associated with regular, moderate coffee consumption, it's important to assess and consider your tolerance to caffeine. Individual differences in caffeine metabolism apply, and genetically, some folks are “slow” caffeine metabolizers, which makes them more sensitive to the stimulatory effects (e.g., jitters, feeling wired). Lastly, it goes without saying that caffeine is not a sleep aid, and it is generally recommended to avoid caffeine consumption after 2pm, or at the latest, within 6 hours of bedtime.

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