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Krill Oil Offers Protection for Several Hallmarks of Aging

Analysis by Dr. Joseph Mercola ✔ Fact Checked | December 26, 2022

STORY AT-A-GLANCE

- Omega-3 fats help lower inflammation, which is the hallmark of nearly all diseases; new data using krill oil show it works through several mechanisms to mitigate the physical and biological hallmarks of aging
- Marine-based omega-3 fats effectively reduce triglyceride levels, which are associated with heart disease. Levels of omega-3 are a good predictor of all-cause mortality and omega-3 helps ameliorate a variety of psychiatric illnesses and degenerative brain disorders
- If you notice that your skin is rough and dry, you likely need more omega-3 fatty acids, which help regulate oil production in the skin, reduce inflammation, balance hydration and minimize the effect of sun damage and aging
- Avoid the temptation to assume your omega-3 index is sufficient because you're eating fish or taking a supplement. Instead, take a simple omega-3 index blood test at home and use the information to determine the dose needed to raise your level to your target

Chronic inflammation is a hallmark of virtually all diseases, including cancer, obesity and heart disease. Your diet plays a significant if not primary role in a chain of events that lead to chronic inflammation. Your body requires certain nutrients to help balance the inflammatory response and maintain optimal health.

Inflammation also plays a role in aging. A research paper[1] published in November 2022 evaluated evidence that lipids from Antarctic krill could intervene in the basic aging

mechanism and therefore enhance healthy longevity. Krill oil contains omega-3 fatty acids, which your body needs to balance your intake of omega-6 fats.

Antarctic krill is rich in long-chain omega-3 fatty acids, choline and astaxanthin. The human diet once had an omega-3 to omega-6 ratio of 1-to-1. Today that ratio is closer to 20-to-1 or even higher.[2] Data show this imbalance parallels the increase in overweight and obesity and suggests it is a major contributor to systemic inflammation.

Both omega-3 and omega-6 fatty acids are essential for good health. However, unlike omega-6 fatty acids that are found in high amounts throughout the Western diet, most people do not eat enough omega-3 fats. It is important to note that an omega-3 supplement may help, but it can never overcome a diet high in vegetable oils and processed foods, which contain significant amounts of omega-6 fats.

To attain optimal health, you must reduce your intake of foods high in omega-6 while increasing your intake of omega-3 fats. While aging is a biological process, the featured study[3] found that krill oil can promote healthy aging through several mechanisms that mitigate the physical and biological hallmarks of aging.

Krill Oil Rewires Genetic Expression to Attenuate Aging

The researchers analyzed how krill oil could affect aging by targeting the evaluation of several hallmarks affected by krill oil rather than just one. Although many researchers have studied marine-based omega-3 fats, the underlying molecular mechanisms have not been fully understood.

In this study[4] the researchers used human cells and C. elegans, a 1-millimeter-long nematode that lives in the soil. Using a model of Parkinson's disease in the nematode, they showed that krill oil protects dopaminergic neurons from degeneration, improves dopamine-dependent behavior and decreases alpha-synuclein aggregation, which is a process found in neurodegenerative diseases such as Parkinson's disease and dementia.[5]

These neuroprotective qualities have the effect of slowing down the visible hallmarks of aging. Loss of viability and increasing fragility associated with aging also may affect the onset of many major diseases. Evidence from the study suggests that interfering with this process could prolong a healthy life.

However, the researchers also acknowledge that many cellular processes are involved in aging and while this study showed krill oil as an antiaging supplement could attenuate many of the hallmarks, it is not the only nutrient you need to maintain your health as you age. The way you get your omega-3 fatty acids is also important.

Krill oil is high in long chain omega-3 acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). One difference between fish oil and marine-based krill oil is that fish oil is only bound to triglycerides and krill oil is mainly bound to more bioavailable phospholipids.

DHA and EPA are water-insoluble, which means they cannot be transported in their free form in the blood and must be packaged into a lipoprotein such as phospholipids. This is the primary reason why the bioavailability of krill oil is higher than fish oil.

Marine Omega-3 for Cardiovascular and Neurological Health

The featured study sought to evaluate the effect krill oil had on aging hallmarks, but studies have also found that supplementation can affect the skin, tumor growth, cytokine storm and the neurological and cardiovascular systems. Heart disease is the primary cause of death for men and women in the U.S.[6]

Research published in January 2022,[7] analyzed data from two randomized clinical trials and found omega-3 fatty acids derived from krill oil could reduce triglyceride levels effectively and were safe and well tolerated by the participants. While triglyceride levels are a necessary fat, in excess they can increase your risk for heart disease.[8]

Another study[9] supported by the National Institutes of Health[10] suggested that the omega-3 index may be a good predictor of overall health and all-cause mortality.[11] This

index is a measure of the amount of EPA and DHA in the membranes of your red blood cells and is expressed as a percent of your total RBC fatty acids.[12]

The index has been validated as a stable, long-term marker and reflects your tissue levels of EPA and DHA. An index greater than 8% is associated with the lowest risk of death from heart disease while an index below 4% places you at the highest risk of heart disease-related mortality.

Two papers analyzed the use of omega-3 after an ischemic stroke in an animal model and found neurological benefits with the administration of omega-3 fatty acids that helped improve brain cell survival and brain remodeling,[13] which benefited the restoration of white matter and microglial responses,[14] all of which improved long-term functioning.

Evidence also shows that marine-based omega-3 fats help ameliorate a variety of psychiatric illnesses and degenerative brain disorders, including Alzheimer's disease.[15] Low levels of DHA are linked to age-related cognitive decline, which some studies[16] suggest may potentially be reversible with sufficient administration of DHA.

EPA may be beneficial in the treatment of depression.[17] A stumbling block has been getting enough into the brain. One 2019 paper[18] discovered that by using a lysophospholipid form of EPA they could significantly raise the EPA level in the brain of mice and increase levels of DHA in the brain, which researchers suggested may help in the treatment of neuroinflammatory diseases such as Alzheimer's disease.

Omega-3 Fats Promote Skin Health

If you notice that your skin is rough and dry, you likely need more omega-3 fatty acids, which helps to regulate oil production in the skin, reduce inflammation, balance hydration and minimize the effect of sun damage and aging. As I've discussed in the past, many American diets have an overabundance of omega-6 linoleic acid (LA) which, like omega-3, is integrated into your cell membranes.

However, unlike omega-3, LA impairs your cell function and increases your risk of sunburn. To protect your skin and your overall health, you will want to eliminate as much LA from the diet as possible, while increasing your omega-3 intake.

You can accomplish this by avoiding all seed oils. These are found in most processed foods, restaurant foods, condiments and pastries. Conventionally raised chicken and pork are also high in LA since the animals are fed grain which is incorporated into the meat. Instead, cook at home with butter, ghee, beef tallow or coconut oil.

You can raise your levels of omega-3 fats by eating wild-caught Alaskan salmon, verified wild-caught sockeye salmon, sardines, mackerel, anchovies and herring. Canned Alaskan salmon is a less expensive alternative than salmon steaks. As a general recommendation, try to get two servings of fatty fish each week. Be sure to avoid farm-raised salmon since it is highly contaminated and has 5.5 times the amount of LA as wild-caught salmon.[19,20]

Combination Therapy Could Reduce Tumor Growth by 67%

Research[21] presented in April 2022 at the annual Experimental Biology meeting in Philadelphia demonstrated that omega-3 fatty acids could help to promote cancer-fighting activities of immunotherapy and anti-inflammatory therapy in an animal model. Immunotherapy is a biological treatment that prompts the immune system to attack cancer cells.[22]

The research sought to determine the impact of nutrition on tumor activity after treatment with immunotherapy and anti-inflammatory therapy.[23] At the time of the study, immunotherapy was approved for use in the treatment of cancer, but anti-inflammatory therapy was still under clinical investigation.

The evidence showed that mice consuming a diet high in omega-3 fats and receiving both cancer treatments had a 67% reduction in tumor growth when compared to the group of mice eating a normal diet and receiving no treatment. By comparison, cancer

cell growth increased in the mice who ate the high omega-6 diet and were given immunotherapy.

The researchers believe the results indicated there could be synergistic activity between omega-3 fatty acids and immunotherapy and anti-inflammatory therapy for cancer. Abigail Kelly from Harvard Medical School Beth Israel Deaconess Medical Center presented the research and commented on the results in a press release:[24]

> *"We demonstrated, for the first time, that the combination of immunotherapy and anti-inflammatory treatment (sEHi) was more effective when mice were fed diets enriched with omega-3 fatty acids. This is very promising because dietary supplementation is easy to implement for cancer patients and can be added for patients already on immunotherapy."*

Omega-3 Could Directly Influence Cytokine Storm

One of the lethal effects of the SARS-CoV-2 virus that causes COVID-19 is the ability to trigger a cytokine storm. One of the ways to suppress this event is with omega-3 fats DHA and EPA. An opinion paper published in June 2020,[25] in the journal Frontiers in Physiology, expounded on the known effects these fats have on biological pathways that "may have direct influence in the outcome of COVID-19."[26]

Although not mentioned in this paper, DHA has also been known to prevent thrombosis (a blood clot within a blood vessel) by decreasing platelet aggregation.[27] Evidence also shows that hypercoagulation is another complication of severe COVID-19 infection that can have lethal consequences.[28] **Omega-3 is also known to**:

- Lower your risk of lung dysfunction
- Protect against lung damage
- Protect against secondary bacterial infection
- Improve mitochondrial function

How to Test and Know Your Level

Avoid the temptation to assume your omega-3 index is sufficient because you're eating fish or taking a supplement. Only cold-water fatty fish have high omega-3 levels, and many fish oil supplements are synthetic with questionable efficacy.

GrassrootsHealth, a nonprofit public health research organization, has several cost-effective testing options available as part of its consumer-sponsored nutrient research projects,[29] the aims of which are to establish population-based nutrition recommendations based on science-backed data. There are four test options to measure omega-3:

- Omega-3 index test kit
- Vitamin D and Omega-3 test kit
- Vitamin D, Magnesium and Omega 3 test kit
- Vitamin D, Magnesium and Omega 3 PLUS Elements test kit — This kit includes measurements of essential minerals (magnesium, selenium, zinc and copper) as well as harmful heavy metals (cadmium, lead and mercury)

Your blood sample is mailed to GrassrootsHealth and you fill out a quick online health questionnaire. Your test results will be emailed to you roughly 10 to 20 days after your samples are received.

Based on your index result, use GrassrootsHealth's omega-3 index calculator[30] to determine the dosage you may require to raise your current level to your chosen target level.

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