

# Krill Oil 500 mg Softgels



## Product Summary:

Krill oil is used as a source of the omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These fatty acids cannot be manufactured in the body and must be consumed in our diets, which is why they are called “essential” fatty acids. Supplementing with krill oil ensures the dietary supply of these two central fatty acids, which help maintain cardiovascular health, support cognitive health and brain function, and play a role in normal growth and development.

## Properties/Uses:

The claim as approved by the *Natural Health Product Directorate* (NHPD): Source of omega-3 fatty acids, including EPA and DHA, for the maintenance of good health.



CARDIOVASCULAR



## Pharmacology:

Krill is a shrimp-like crustacean that lives deep in the ocean. They are free of almost all impurities including mercury. Orally, krill oil is used for many of the same uses as fish oil, with the advantage that it contains fewer impurities. Krill oil contains significant amounts of the omega-3 fatty acids eicosapentanoic acid (EPA) and docosahexaenoic acid (DHA). Though the concentration of these fatty acids in krill oil products is usually less than in fish oil products, it is possible that the fatty acids are more bioavailable.<sup>1</sup> It contains phospholipids primarily consisting of phosphatidylcholine, with smaller amounts of phosphatidylethanolamine and lysophosphatidylcholine. Krill oil also provides triglycerides, vitamin A, vitamin E (alpha-tocopherol), marine derived tocopherol (alpha-tocomonoenol), astaxanthin, and a unique flavonoid.

Omega-3 fatty acids have long been associated with healthy brain function and cardiovascular health, including healthy blood circulation and healthy triglyceride levels. The principal reason people supplement with krill or fish oil is to increase the intake of ready made omega-3 EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), by-passing their natural endogenous production from alpha-linolenic acid. EPA and DHA are the most physiologically important members of the omega-3 family of fatty acids.<sup>2</sup> These fatty acids seem to have different physiologic effects than their precursor alpha-linolenic acid, a plant-derived omega-3 fatty acid.

Dominance of omega-6 fatty acids over omega-3 fatty acids in North American diets is recognized as a major contributing factor to leading health problems.<sup>3,4</sup> Three cascade fatty acids, dihomo-gamma-linolenic acid, arachidonic acid (AA), and eicosapentaenoic acid (EPA), give rise to three series of regulatory eicosanoids. The flow chart (see Figure 1) illustrates how these are derived through the actions of cyclooxygenase and lipoxygenase.

The optimal dietary ratio between the essential fatty acids is thought to be 2:1 ranging to 4:1, in favour of omega-6.<sup>4,5</sup> Omega-6 linoleic acid is supplied in all of the common polyunsaturated and monounsaturated oils consumed in North America, while omega-3 linolenic acid is supplied only in soy, canola, and flaxseed oils, as well as in walnuts. Unfortunately, the dietary ratio for most North Americans is estimated to be closer to 14 to 20 parts of omega-6 to 1 part of omega-3.<sup>3,4</sup>

Any accumulative dietary imbalance in the optimal ratio of the essential fatty acids eventually translates into eicosanoid imbalance as dysregulation that causes or exacerbates pathophysiological processes. When omega-6 is consistently consumed in excess of the optimal ratio with omega-3, then so called "bad" Series 2 prostaglandins, leukotrienes, and thromboxanes are over expressed, leading to health problems. Prime examples of Series 2 eicosanoid over expression are pro-thrombotic states and pro-inflammatory states. Leading causes of death and life-altering disabilities in North America relate to coronary thrombosis, cerebral thrombosis, and pulmonary embolism,





and a growing body of evidence implicates generalized inflammation as a major contributor to health problems including heart attack risk and Alzheimer's Disease.<sup>6,7</sup>

Getting ready-made EPA and DHA from krill oil ensures they will be well represented in cell membrane phospholipids, and that EPA will sufficiently balance the presence of arachidonic acid (AA). Membrane EPA competes with arachidonic acid for access to cyclooxygenase and lipoxygenase. By overtly increasing EPA in membranes through supplementation, a competitive inhibition increases the probability that the Series 3 eicosanoids derived from EPA will dominate the Series 2 eicosanoids, lowering the risk for inappropriate thrombus and inflammatory mayhem, or any other excessive expression of Series 2 eicosanoids associated with "bad" outcomes. Remember that bad is relative because blood clotting is good sometimes.

Some people in general seem unable to begin with dietary linolenic acid and arrive at sufficient EPA and DHA. These same people likely will have problems in converting linoleic acid to arachidonic acid, which is also important in phospholipid composition on the omega-6 side. This presents a possible lifetime struggle to obtain adequate EPA, DHA, and AA, and the health enhancement tied to these fatty acids. This situation in particular may characterize the older person who suffers from age-related metabolic decline. The problem arises from a compromised ability to form the first metabolic derivatives past the linoleic acid and linolenic acid starting points. For these people, krill oil will make a greater difference than just supplementing with flaxseed oil as an omega-3 source. Similarly, using omega-6 Evening Primrose oil as a source of gamma-linolenic acid may give better results than just increasing more linoleic acid sources.

#### *Where does DHA fit in?*

DHA is very important to the brain, retina, testes, and adrenal glands for facilitating optimal functioning. Both EPA and DHA are important in brain tissue and function exclusively via cell membranes, in which they are anchored by phospholipid molecules. DHA is proven essential to pre- and postnatal brain development, whereas EPA seems more influential on behavior and mood.<sup>8</sup>

Inadequate DHA in the brain is thought to be an important contributing factor in many neurological functional problems. Intriguing brain research has drawn a possible connection between DHA and arachidonic acid (AA) and some of the childhood learning and behavioural problems including *dyslexia*, *attention deficit disorder* (ADD), and *attention deficit hyperactivity disorder* (ADHD). Parents and teachers are challenged to provide effective learning and to shape appropriate behaviour. This brain research is pointing to new nutritional ways to address these difficult learning and behavioural problems with neurologically active DHA and omega-6 gamma-linolenic acid (GLA) and arachidonic acid (AA).<sup>2</sup>

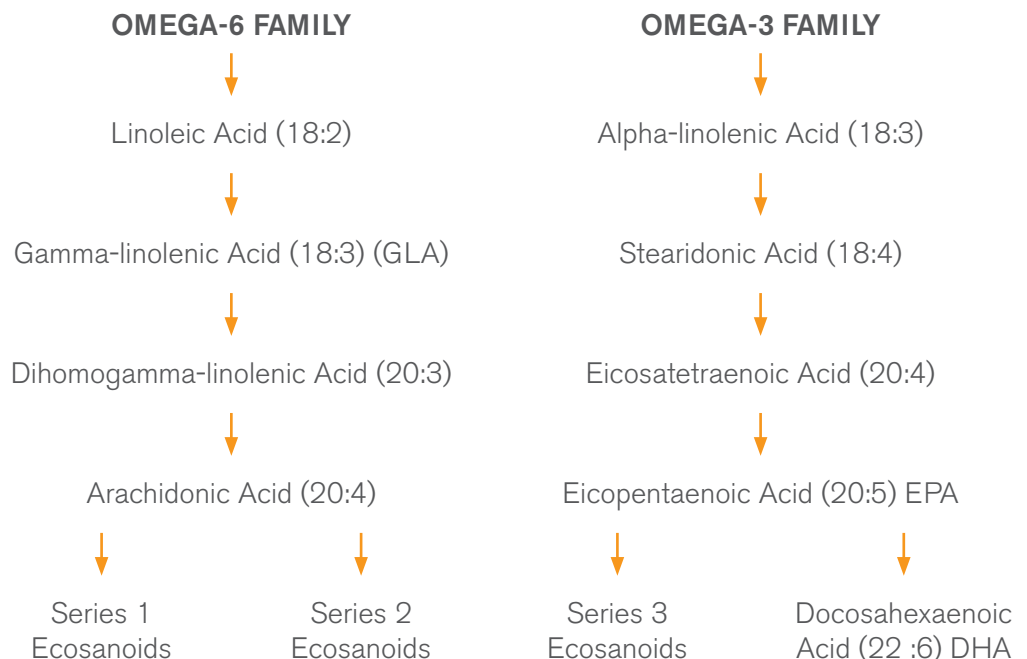
Researchers have found that the fatty acids DHA and AA are highly concentrated in the synaptic membranes, the juncture where neurons exchange and process information, and where learning and behaviour are forged.<sup>9</sup> Researcher Laura J. Stevens, PhD, and





her fellow scientists at Purdue University have shown that DHA levels in the blood of 53 boys suffering from ADHD was significantly lower than DHA levels found in 43 matched boys without ADHD. This has been interpreted to mean that ADHD sufferers may not make DHA well enough to facilitate optimal construction of synaptic membranes, thereby impairing the brain's control over responses to environmental stimuli, leading to hyperactivity, inattentive, and impulsive behaviour. The researchers concluded that supplementing with DHA and AA may be useful in treating or managing ADHD. However, there is also the possibility that a genetic defect exists in the synthesis of incorporation enzymes; so cascade-derived DHA cannot be adequately incorporated. Increasing the available amount of DHA may facilitate better incorporation.

British researcher Jacqueline Stordy, PhD, found that supplying DHA to young adults with dyslexia improved learning disabilities.<sup>10</sup> Parents can use brain-active DHA, and AA from food sources (such as egg yolks), to address learning and behavioural problem.





## Manufactured product information:

**Manufacturer:**

WN Pharmaceuticals® Ltd.

**Size/UPC:**

60's ..... 7 77747 10307 2

**NPN:**

80022006

**Expiry Date:**

24 months from date of manufacture

**Active Ingredient:**

Each softgel contains:

Krill Oil (Body oil from <i>Euphausia superba</i> ) .....	500 mg
Total Omega-3 .....	100 mg
Eicosapentaenoic Acid (EPA) .....	52.5 mg
Docosahexaenoic Acid (DHA) .....	25 mg

**Non-Medicinal Ingredients (in descending order):**

Softgel capsule (gelatin, glycerin, purified water, ethyl vanillin), flaxseed oil, vitamin E, ascorbyl palmitate, rosemary extract.

**Appearance:**

Dark red oil encapsulated in an oval, clear soft gelatin capsule.

**Packaging:**

175 cc white round bottle with safety seal under a 38 mm white induction sealed cap with vented interior seal and a label applied to the bottle. Lot number and expiry date are printed on label applied to exterior of bottle.

**Storage:**

Store in a cool, dry place Protect against light, heat and humidity.





## Dose:

The daily dose of combined EPA and DHA for children 1-8 years old is 100 – 1500 mg; for adolescents 9-13 years old is 100 – 2000 mg; for adolescents 14-18 years old is 100 – 2500 mg; and for adults (>18 yrs) is 100 – 3000 mg.<sup>11</sup> The daily does of krill oil should not exceed 4.1 g per day.<sup>12</sup>

## Directions:

**(Adults):** 2 softgels, 2 times daily or as recommended by a physician.

## Caution:

The caution as approved by the *Natural Health Products Directorate* (NHPD): KEEP OUT OF THE REACH OF CHILDREN. Consult a physician prior to use if you are pregnant or breastfeeding. Hypersensitivity/allergy has been known to occur with shellfish; if this occurs, discontinue use. STORE AT ROOM TEMPERATURE IN A DARK, DRY PLACE. DO NOT USE IF SEAL UNDER CAP IS BROKEN OR MISSING.

## Deficiency Symptoms:

It is recognized that the human body requires a large variety of nutritional substances necessary for optimal growth and development. Among these crucial elements, omega-3 fatty acids are termed 'essential' because they are necessary for good health. Since the human body cannot make them on its own, omega-3 essential fatty acids must be supplied in the diet. A deficiency in omega-3 can lead to a host of health issues including cardiac and circulatory disorders, disorders of the skin (eczema), disorders of the kidneys and liver, with various inflammatory problems, arthritis, weight disorder and failure of the immune system.

## Drug Interactions /Contraindications:

Consult a physician prior to use if you are pregnant or breastfeeding.

*Anticoagulant/antiplatelet drugs:* Fish oils may increase the risk of bleeding. Monitor patients.<sup>12</sup>





*Blood thinners:* EPA in a high dose range may present an additive effect with other natural products known to be blood thinners. Other common mild natural blood thinners include garlic, MSM, grape seed extract, cayenne, ginkgo biloba, and perhaps vitamin E >400 IUs.

*Surgery:* Krill oil has antiplatelet effects. Supplementation of krill oil should be discontinued for at least two weeks before surgery.<sup>12</sup>

## Toxicity/Adverse Reactions:

Orally, krill oil would be expected to cause side effects similar to other omega-3 fatty acids such as fish oil. Some of these include halitosis, heart burn, fishy taste, dyspepsia, nausea, and loose stools. However, in clinical trials using krill oil, adverse reactions were not assessed or reported.<sup>12</sup> Theoretically, some people who are allergic to seafood might also be allergic to krill oil supplements.<sup>12</sup>





## Allergen Content/Ingredient Sensitivity:

NO	YES
Artificial Colors	Sulphites
Artificial Flavors	
Artificial Sweeteners	
Corn Products	
Egg Products	
Fish	
Gluten	
Hydrolyzed Plant Protein	
Lecithin	
Milk Products	
Peanuts	
Preservatives	
Sesame Products	
Shellfish	
Soy Products	
Starch/Modified Starch	
Tartrazine	
Tree Nuts	
Wheat Products	
Yeast	

### NOT ACCEPTABLE FOR THE FOLLOWING DIETARY RESTRICTIONS:

Free of animal products

Kosher







## References;

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4. Simopoulos, Artemis P., Robinson, Jo. *The Omega Plan*, HarperCollins Publishers, New York, 1998.
5. Jones, Peter J.H., Stanley, Kubow. "Lipids, sterols, and Their Metabolites" in *Modern Nutrition in Health and Disease*, Maurice E. Shils et al, editors, Ninth edition, Lippincott Williams & Wilkins, New York, 1999.
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8. Kidd PM. Omega-3 DHA and EPA for cognition, behavior, and mood: clinical findings and structural-functional synergies with cell membrane phospholipids. *Altern Med Review* 2007 Sep; 12(3):207-27.
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12. Health Canada, Krill Oil Monograph, Accessed February 4, 2011 [Available from: <http://www.hc-sc.gc.ca>]
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