

Whole Food Omega-3 DHA/EPA Complex Phospholipids – Hydrolyzed Peptides



Key Points:

- Clinically Proven
- Biologically Active Form as Found in Nature
- Only 1 to 2 Tablets Daily
- Patented Extraction Process
- No Heat
- No Chemicals

Key Applications:

- Cardiovascular Health
- Brain Function
- Cellular Health
- Anti-Aging

VECTOMEGA®

Up to 50 Times More Effective Than Fish Oils

The Only Pure Natural Form of Omega-3 Fatty Acids From Fish

EuroPharma

Vectomega® is the first nutritional supplement that carries long-chain polyunsaturated fatty acids (PUFAs) of the omega-3 family to tissues with considerable metabolic requirements.

Vectomega®, an excellent omega-3 carrier (DHA and EPA), quickly restores the omega-6/omega-3 balance to the whole body.

French Biotech Innovation

Vectomega®, a natural whole food omega-3 fatty acid bound to phospholipids and peptides, is the end result of a French governmental research project. In 2001, the French government solicited researchers to investigate potential uses of omega-3 fatty acids and phospholipids. Vectomega® is an extract of marine phospholipids complexed with EPA and DHA from salmon, the result of the research work by three world-renowned scientists in the field of phospholipids and essential fatty acids.

Vectomega® was created through the perfection of a patented process by a team of French researchers. It is extracted from Atlantic salmon by hydrolysis, without the use of solvents or high temperatures, thus respecting the quality and proportions of its natural composition. The end result is a whole food omega-3 DHA/EPA complex with phospholipids, hydrolyzed peptides and amino acids.

Vectomega® is extracted using a patented enzymatic and pure water innovation that extracts naturally occurring marine phospholipids with the omega-3 fatty acids, EPA and DHA. The extraction is carried out in less than an hour in an inert atmosphere at a temperature lower than 60°C. The omega-3 fatty acids, EPA and DHA can be extracted maintaining their position on the triglyceride chain using this patented process and keeping their natural proportions and composition. This patented innovation, called vectorization, uses a gentle, cold water and enzyme process avoiding heat, solvents, and chemical modifications that are utilized to process all other fish oils. This patented process provides an excellent

advantage for the consumer, as the finished phospholipid complex is in tablet form, requiring only one tablet per day, with no regurgitation or fishy aftertaste.

Composition of Vectomega®

Molecularly different from other omega-3s on the market, Vectomega® is said to be up to 10 to 50 times more absorbable across cellular membranes, using Caco-2 analysis, than other EPA/DHA products.

Vectomega® contains 60 percent of phospholipids that are naturally occurring in Salmon. These marine phospholipids are amphiphilic, meaning they contain a polar water-soluble group attached to a water-insoluble hydrocarbon chain (EPA or DHA omega-3 fatty acid). The phospholipid's amphiphilic properties aid in transporting EPA and DHA cross the hydrophilic cellular membrane barriers for superior bioabsorption compared to "neutrally-charged" commercial fish oils on the market today.

There are five types of marine phospholipids in Vectomega® that are extracted from the salmon heads: phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine, phosphatidylinositol, and sphingomyelin. These marine phospholipids are molecules of specific cellular membrane structures therefore they exhibit affinity and are able to transport EPA and DHA to specific cells or tissues.

Phospholipids carry long-chain PUFAs, 32 percent DHA and 8 percent EPA in the sn-2 position, resulting in greater bioavailability. Within the phospholipids the PUFAs are functional elements in cellular membrane architecture, maintaining fluidity, trophicity, information transfer to the nucleus and inter-cellular language.

Marine lecithins restore balance to lipid metabolism and protects omega-3 from oxidation.

Hydrolyzed peptides and amino acids give Vectomega® additional high metabolic content, solubility and tolerance.

TYPE OF PHOSPHOLIPID (PL)	VECTOMEGA® PL %	ACTION IN BRIEF
Phosphatidylcholine (PC) or Marine Lecithin	68.00%	Assists in the introduction of DHA into the heart muscle. Protects the mitochondrion from oxidative damage, decreasing the impact of auditory and visual aging.
Phosphatidylethanolamine (PE)	11.00%	Combined with PC helps in the building of the myelin sheath.
Phosphatidylserine (PS)	9.00%	The most widespread of all membrane PLs, protects from ischaemic attacks or age-related dementias.
Phosphatidylinositol (PI)	5.00%	Acts on the regulation of cellular calcium. Has shown its effectiveness on OCDs, panic attacks, depression, manic depression and Alzheimer's disease.
Sphingomyelin (Sph)	5.00%	Its pro-apoptotic activity decreases the risk of coronary heart disease and cancer of the bowel (colon). Decreases parietal cell toxicity of bile salts. Sphingolipids are mostly present in the myelin sheathes.

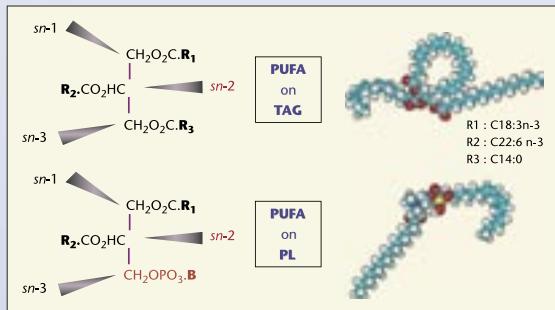
Superior Bioavailability

Vectomega® surpasses all other EPA/DHA products in terms of bioavailability, absorption and efficacy. Much of the value is lost in fish oils currently on the market because they are highly refined, distilled and deodorized by the use of extraction processes that use high temperatures, solvents and chemical modifications. Vectomega® is the only whole food omega-3 complex that is extracted from salmon in a natural process.

Most marketers of fish oil products are convinced that a high content of PUFAs omega-3 means a very effective product. In the United States, we are programmed to believe that more provides greater benefit. French researchers have proven this notion to be incorrect. Fish oil in the market today has been so greatly processed that it is no longer in its natural form and therefore is less absorbable by the human body.

Vectomega®: Carbon Positioning for Enhanced Bioabsorption and Stability

Natural oils found in fresh salmon have a non-random carbon distribution of omega-3 fatty acids on the triglyceride (TAG) form of the molecule. The EPA and DHA found in fresh salmon oil are predominantly in the sn-2 (mid) position. When fish oil is processed and refined, this results in a random redistribution of fatty acid, generally increasing the amount of unsaturated FA's at the sn-1/sn-3 (terminal) positions of the carbon chain. However, the enzyme vectorization of Vectomega® has no effect on the oil's natural sn-2 carbon position. **This is significant** because when DHA or EPA fatty acids are attached to the glycerol (TAG) mid position (sn-2) is more stable and less prone to oxidation than those attached to the terminal position sn-1 or sn-3.



Comparative structure of TAG and PL

Omega-3 oil's sn-2 position is also significant in regards to bioabsorption. Clinical studies have shown that the composition and position of fatty acids in TAGs affect both bioavailability and digestibility of fats and oils in both infants and adults. Vectomega's® phospholipid vectorization has been clinically demonstrated to have superior bioavailability compared to other fish oils. Research has shown that because the marine phospholipids contain DHA and EPA in a specific location on the carbon chain (Sn-2 on the glycerol-TAG), Vectomega® is 50 times more absorbable via cell membranes.

Purity and Safety

Vectomega® is tested along many parameters to ensure purity and safety. We measure lipid and peptide composition, mineral composition, microbiological characteristics, and toxicology. Toxicity studies have been conducted and show no harmful effects at very high dose.

Tolerance

The chemical structure of Vectomega® makes it extremely well tolerated. Unlike other fish oils, Vectomega® has no fishy aftertaste or regurgitation.

Open Clinical Study

Assessment of biological and clinical effects among healthy volunteers.

- The primary objective of this study is to evaluate the effect of a treatment of VECTOMEGA® through a plasmatic lipid profile and changes in the quality of life.
- The secondary objective is to assess clinical and biological tolerance.

VECTOMEGA® is a natural nutritional supplement made up of a phospholipid peptide complex extracted from the heads of *Salmo salar* (Atlantic salmon) by hydrolysis at low temperature. This complex carries polyunsaturated fatty acids of the omega-3 family incorporated in the phospholipids, towards organs with high demand (brain, eye, liver, heart muscle, etc.).

- Study population: 40 healthy volunteers, divided into 23 women and 17 men, aged from 18 to 75, were followed for 60 days.
- Exclusion criteria: subjects suffering from a psychiatric abnormality and subjects being treated with hypolipidaemics.
- The product is packaged in blisters of 740 mg dose tablets, to be swallowed. Administration: 2 tablets a day (1 in the morning and 1 at lunch).
- The study duration was 60 days.
- The food habits of the subjects were not modified.
- Biological criteria was gathered on day 0 and day 60.
 - Plasmatic lipid profile: total cholesterol (TC), triglycerides (TG), HDL-c, LDL-c
 - Coagulation constants: platelets, bleeding time, Quick's test and prothrombin time ratio.
 - Membrane fatty acids profile of red blood cells.
 - Visual analogue scales allowed self-assessment in terms of quality of life at day 0, day 30 and day 60.

Results

1. Compliance: 100 percent
2. Principal Biological Criteria

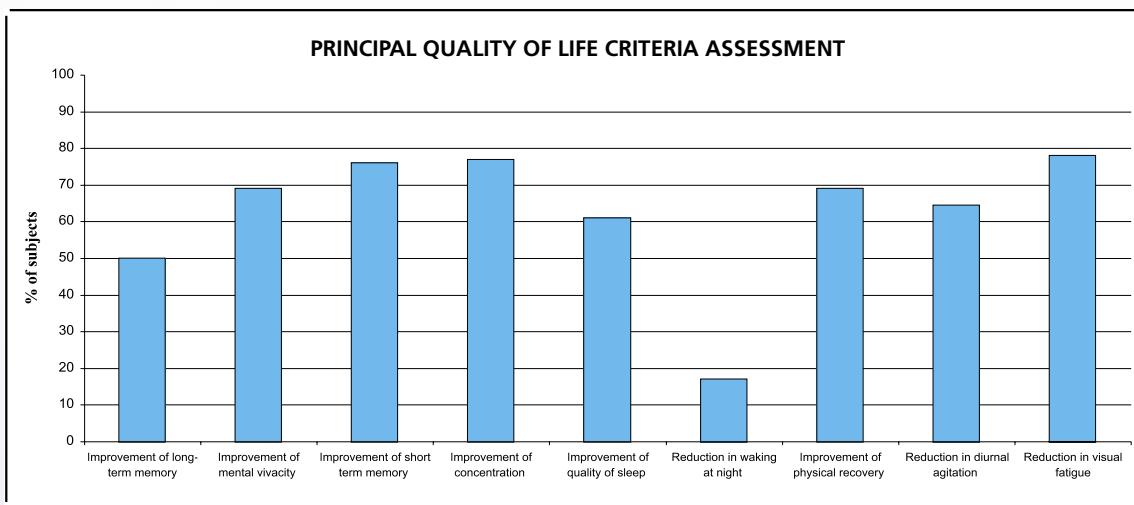
Following the initial assessment on day 0, the population studied was divided into two groups.

- One group with a total cholesterol (TC) < 2.2 g/l - group 1
- One group with a TC > 2.2 g/l - group 2

Vectomega's® resistance to Oxidation

DHA and EPA are vectorized by the phospholipids and are protected from oxidation. They are also naturally combined with Vitamin E and astaxanthin contained in the salmon.

Results of Vectomega® Open Clinical Studies



The VECTOMEGA® actions in group 1:

- 17 percent average reduction in the triglycerides ratio (TG) in 60 percent of subjects.
- 13 percent average increase in the level of HDL-c in 60 percent of subjects.

The VECTOMEGA® actions in group 2:

- 10.6 percent average reduction in TC in 61 percent of subjects, and in an equivalent manner on the HDL and LDL fractions.
- 16 percent average reduction in TG in 77 percent of subjects.

3. Principal Quality of Life Criteria

9 Criteria Were Self-assessed by Subjects:

- Long-term memory was improved in 50 percent of subjects.
- Mental vivacity was improved in 69 percent of subjects.
- Short-term memory was improved in 76 percent of subjects, from the first month and in a significant way.
- Concentration was improved in 77 percent of subjects, from the first month.
- The progressive improvement over two months of the quality of sleep was observed in 61 percent of subjects.
- A reduction in waking at night was observed in 17 percent of subjects.
- Physical recovery was improved in 69 percent of subjects.
- A reduction in diurnal agitation (in patients subject to this kind of disorder) was observed in 64.5 percent of subjects.
- 78 percent of subjects showed a reduction in visual fatigue.

4. Clinical Tolerance

This was excellent. No side effects were recorded; specifically, no eructation, no reflux of fish smells, 100 percent compliance. Did not cause hypertension.

5. Biological Tolerance

No modification of coagulation parameters, no contraindication to its use with oral anticoagulants or platelet suppressive agents.

VECTOMEGA® phospholipids rapidly enter cells with high membrane renewal (The brain tissue renews 10 percent of its phospholipids a day). This appetite of the cerebral and hepatic cells for phospholipids has been demonstrated *in vitro* (Inserm Nancy-France, Inra Rennes-France). This is why their entering of the membrane of the red blood cells is not significant.

Conclusion

Through this study, VECTOMEGA® shows its positive activity in several areas.

Biologically, it fits into an overall approach of preventing cardiovascular risk, by reducing cholesterol, triglycerides and increasing HDL-c in a healthy population.

Clinically, its quick effectiveness (from the first month), connected with its bioavailability and the speed at which it enters the target cells, is remarkable. Any cell with heightened requirements in phospholipids within a context of membrane repair, will find VECTOMEGA® to be an essential supplement.

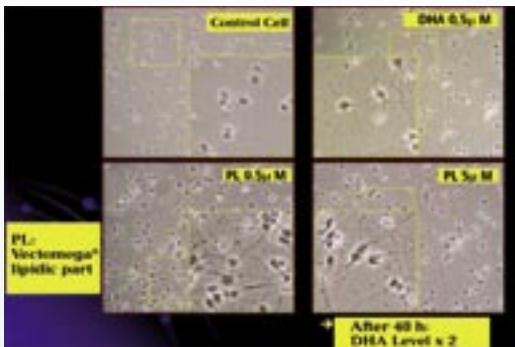
The criteria studied within, make it possible to envision wide fields in which VECTOMEGA®'s phospholipids can act.

- Prevention of cellular aging, particularly cerebral and ophthalmic.
- Disorders linked to short-term memory.
- Nocturnal recovery and sleep quality disorders.
- Agitations, against which there are few natural methods of fighting.
- Improvement of physical recovery, including among athletes and the over-fifties.

VECTOMEGA®, in the correct dosage, through its optimal bioavailability and its respect for cellular physiology, is destined to hold a prime position in the fight against aging.

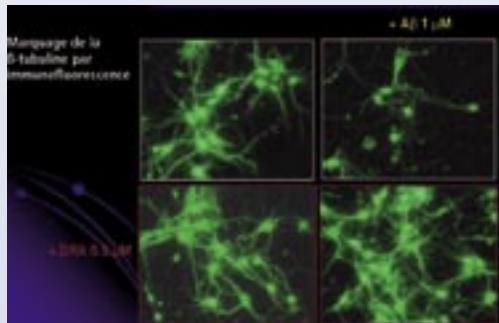


Application in Human Neurons in Culture



1. Control picture : human neurons in a standard media culture
2. DHA 0,5µ M : after enrichment in DHA under triglycerid form : little exchanges
3. PL 0,5µ M : after enrichment with Vectomega's phospholipids : important increase of the number and the quality of connections between the neurons, for an identical quantitative contribution
4. With a ten times bigger concentration of Vectomega : no additional profit. Right amount – Right effect

Vectomega® DHA and Neuronal Resistance to Soluble Aβ Protein Toxicity



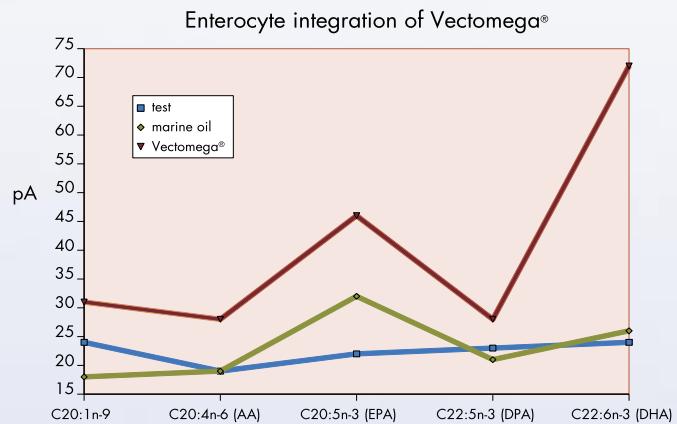
1. Control neurons
2. Neuronal death following the action of protein Aβ
3. Control neurons in culture enriched in Vectomega's DHA
4. Protection carried out by Vectomega's DHA against the introduction of the protein Aβ: neuronal by apoptosis is not visible anymore.

PUBLISHED and REALIZED by Team MTM-INSEMR NANCY – FRANCE – 2005

SCIENTIFICALLY PROVEN EFFECTIVENESS – COMPARATIVE STUDY PUFA INCORPORATION IN CACO-2 CELLS

An in vitro study assessed the metabolism of Vectomega compared to common fish oil (30 percent omega-3 PUFA, 18 percent EPA, 12 percent DHA). Caco-2 is a common measurement test used to reproduce human digestion conditions.

- Study results showed Vectomega has superior absorption for DHA and EPA because they are bound to phospholipids and hydrolyzed peptides which enable them to be more biologically active to penetrate the cellular membranes.
- Vectomega's composition and bioavailability increase the cellular status of the whole PUFA-Ic group (omega-3, -6 and -9).



Yee S. In vitro permeability across Caco-2 cells can predict in vivo absorption in man. Pharm. Res. 1997 Jun; 14(6): 763-6

Additional Studies:

Study confirms benefits of DHA for neurological health:
J Neurochem. 2006 Jan;96(2):385-95. Epub 2005 Nov 21.
Docosahexaenoic acid prevents neuronal apoptosis induced by soluble amyloid-beta oligomers.

Comp Biochem Physiol B Biochem Mol Biol. 2003 Feb;134(2):335-48. Polyunsaturated fatty acid profiles of whole body phospholipids and triacylglycerols in anadromous and landlocked Atlantic salmon (*Salmo salar L.*).

Omega-3 Fatty Acids bound to Phospholipids has Potential Benefit for Attention-Deficit Hyperactivity Disorder (ADHD)

While several studies have reported beneficial effects of omega-3 in hyperactivity, French researchers have hypothesized that Vectomega® could have specific positive effects on impulse control.

Vectomega Delivers the Best Omega-3 Protection

At least 50 times more powerful—milligram for milligram—than any other fish oil supplements, Vectomega takes fish oil supplements to a whole new level. The use of food grade salmon and a patented low heat process has resulted in an exceptional supplement of remarkable quality. This product introduces guaranteed purity, improved stability, and greatly enhanced bioavailability. It accomplishes all this with a small, easy-to-swallow tablet, that doesn't cause stomach upset, belching, or fishy breath.

In a human clinical trial, people taking two Vectomega tablets per day, with a combined total of only 43.2 mg of omega-3, achieved results in the reduction of triglycerides and cholesterol comparable to those achieved by people taking approximately 78 times that dosage of a typical fish oil product (3,370 mg). Vectomega is up to 50 times more effective than fish oil. This is because the vectorized EPA and DHA fatty acids are up to 50 times more absorbable via cell membranes than typical fish oil supplements.

In-vitro tests with Vectomega showed an increase in the number and quality of connections between human neurons, and also the protection of neurons from protein toxicity. In another Vectomega clinical trial, healthy people reported improvements in their memory, mental vivacity, concentration, and quality of sleep. There was also a reduction in agitation and in visual fatigue. These studies point to the need for more thorough tests of effectiveness for treating neurological and mental disorders.

There are five phospholipids in Vectomega. Two of them are familiar: phosphatidylcholine (PC) and phosphatidylserine (PS). PC is the most abundant phospholipid in Vectomega at 68 percent. Besides carrying the EFAs, the phospholipids convey some benefits of their own. For example, PC assists in bringing DHA into the heart muscle. It protects the energy-producing mechanisms in the cells free radical damage. This reduces auditory and visual aging. Together, the phospholipids in the preparation may have additional benefits, especially in protecting nerves.

Vectomega® A Pure, Whole Food, Natural Form of Omega-3

- Delivers DHA/EPA to the cells, resulting in greater health benefits.
- Patented, chemical-free process, using natural enzymes and cold water flush.
- In a biological form as it naturally occurs in nature – not chemically altered or spiked.
- Absorbed up to 50 times greater than other fish oils.
- Cholesterol-free.
 - 1 to 2 tablets daily.
 - No fishy aftertaste.



Safety Data:

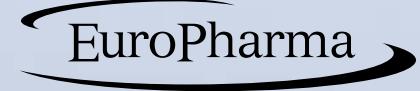
Vectomega is a safe and pure product, which exceeds all government guideline levels for safety. Heavy metal analysis is conducted on every batch using ICP-MS method.

Heavy Metal Analysis

Arsenic (As)
Beryllium (Be)
Cadmium (Cd)
Lead (Pb)
Mercury (Hg)
Nickel (Ni)

Method: ICP-MS

Complies
Complies
Complies
Complies
Complies
Complies



www.EuroPharmaUSA.com