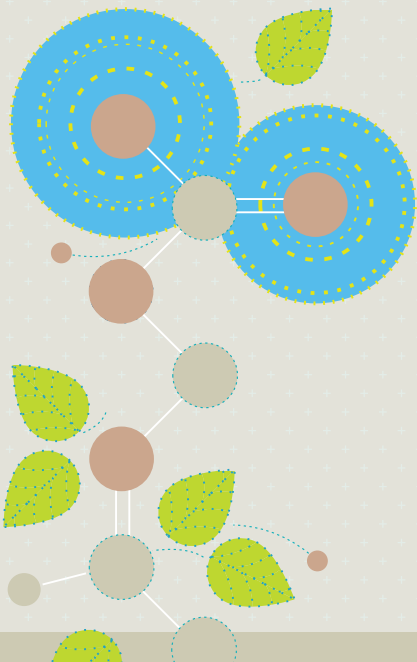




# AvestaDHA<sup>TM</sup>

100% VEGETARIAN DHA

AvestaDHA<sup>TM</sup> is 100 % vegetarian source of omega three fatty acid derived from a microalgae isolated from the marine milieu. It has the goodness of fish oil but free from pollutants, metals and other impurities. It is beneficial for the heart, developing brain and good and long lasting vision.



**Origins:** AvestaDHA<sup>TM</sup> is the result of almost a decade of intensive and laborious research. The story began with the thraustochytrids isolated on the beaches in Goa, India, with a resolve to deliver a 100% vegetarian DHA.



*It is beneficial for the heart, developing brain and good, long lasting vision*

## AvestaDHA<sup>TM</sup>: An Essential Nutrient for the Body

Long chain polyunsaturated fatty acids (LC-PUFAs) such as Docosahexaenoic acid (DHA) are essential components of the cell membranes of various tissues and organelles such as retina and brain and cardiac tissues. DHA makes up 15 to 20% of the cerebral cortex and 30 to 60% of the retina, and is produced in the body in limited quantities, therefore it needs to be supplemented through a diet.

DHA is essential for the growth, functional development and healthy maintenance of brain function and is required throughout life from infancy through aging. Increased intake of DHA has been shown to be beneficial in inflammatory disorders, arteriosclerosis, myocardial infarction, thrombosis, and some cancers.

## AvestaDHA<sup>TM</sup>: How DHA works

Docosahexaenoic acid (DHA) is a  $\omega$ -3 polyunsaturated fatty acid (PUFA) with 22 carbons and 6 double bonds.

DHA is the longest and most unsaturated PUFA found commonly in biological systems in the membrane phospholipid components of the photoreceptor outer segments of the retina. The unique biophysical and biochemical properties of DHA, including its imparting 'fluidity' to retinal membranes, render it an essential structural component thereby mediating a faster response to stimulation. The optimal functioning of rhodopsin, the photo pigment necessary for initiating visual sensation, is considered to be supported by the presence of DHA in the retinal membranes<sup>1-6</sup>.

DHA is most highly concentrated in Photoreceptors, Brain, and Retinal Synapses and displays beneficial actions in Neuronal development, Cancer, and Inflammatory Diseases. DHA constitutes more than 30% of the total phospholipid composition of plasma membranes in the brain, and thus it is crucial for maintaining membrane integrity and, consequently, neuronal excitability and synaptic function.

Dietary DHA is indispensable for maintaining membrane ionic permeability and the function of transmembrane receptors that support synaptic transmission and cognitive abilities.

Omega-3 fatty acids also activate energy-generating metabolic pathways that subsequently affect molecules such as brain derived neurotrophic factor (BDNF) and insulin-like growth factor 1 (IGF1). IGF1 can be produced in the liver and in skeletal muscle, as well as in the brain, and so it can convey peripheral messages to the brain<sup>7</sup> (Fig1).

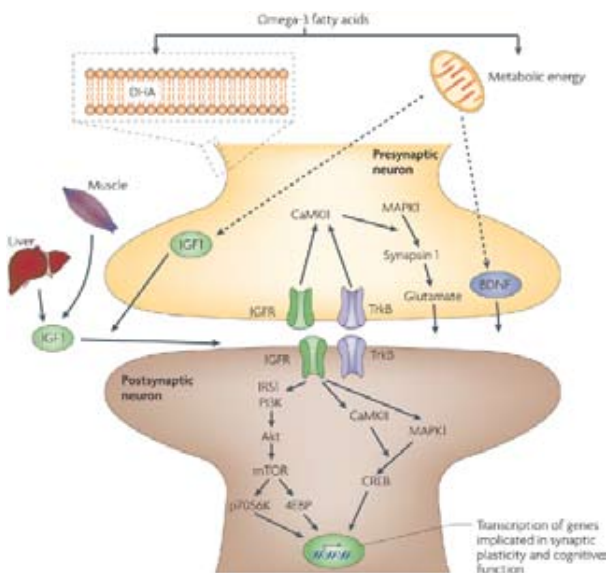


Fig 1: DHA Function<sup>7</sup>

## AvestaDHA™ : Quality

Avesthagen's innovative technology allows commercial production of superior quality, 100% vegetarian DHA from the non genetically modified microalgae.

All the Carbon and nitrogen sources used for the cultivation of the algae are plant derived. Even the material used for encapsulation is plant derived making the process completely vegetarian.

Fatty Acids	Result (%)
14:0 (Myristic Acid)	1.64
16:0 (Palmitic Acid)	45.92
18:0 (Stearic Acid)	0.87
18:1 (n-9)	0.48
18:2 (n-9)	NA
20:4 n-6 ARA	0.17
20:5 n-3 EPA	1.87
22:5 n-6 DPA	0.09
22:6 n-3 DHA	41.82
Others	NA

Table 1: AvestaDHA™, Fatty acid Profile by GC-MS

*AvestaDHA™ is produced at HACCP and GMP facilities using ecofriendly and safe processes of extraction and maintaining a stringent quality consistency.*

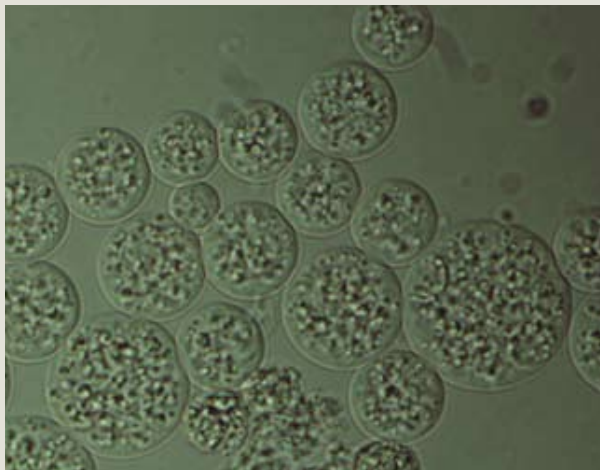


Fig 2: Schizochytrium Limacinum (SC-1) in various stages of development and showing oil globules.

## AvestaDHA™ : The Production Process

DHA is naturally found in different types of fish oil and marine plankton. Fish oils require extensive purification to enrich for DHA, have unpleasant tastes and odors, and are subject to environmental bioaccumulation of heavy metal contaminants and fluctuations in availability. As an alternative to fish oil, DHA can also be produced from microbial algae source.

AvestaDHA™ is produced from marine algae *Schizochytrium Limacinum* (Fig 2). These microalgae cultures are grown initially in test tubes, flasks and later scaled up in large fermentors under strict controlled condition.

Product Description	
Docosahexaenoic acid	41.82%
Free fatty acids	0.2%
Peroxide value meq/Kg	0
Appearance	Light yellow to orange colour oil

Table 2: Product Description

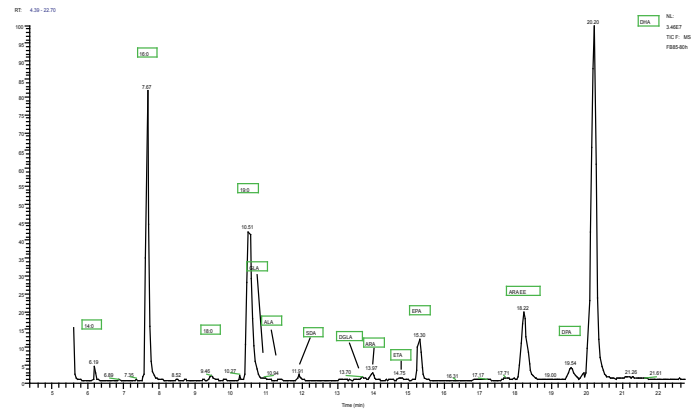


Fig 3: GC-MS spectrum of AvestaDHA™

## Recommendations<sup>8</sup>

Daily Dose (mg)	For Whom	Benefits
600	<ul style="list-style-type: none"> <li>› Expecting Mothers</li> <li>› Nursing Mothers</li> </ul>	<ul style="list-style-type: none"> <li>› Brain and eye development for child</li> <li>› Increased gestational age (length of pregnancy)</li> </ul>
200	<ul style="list-style-type: none"> <li>› Ages 6-13 (Young child to early teens)</li> </ul>	<ul style="list-style-type: none"> <li>› Brain, eye and heart health</li> <li>› Improved blood lipid profile for children with high cholesterol</li> <li>› May improve attention and potential intellectual performance</li> </ul>
600	<ul style="list-style-type: none"> <li>› Ages 13+</li> <li>› Young adult</li> <li>› Mature adult</li> <li>› Seniors</li> </ul>	<p><b>GENERAL</b></p> <ul style="list-style-type: none"> <li>› Brain, eye and heart health</li> <li>› Structural and reparative support</li> <li>› Anti-inflammatory effects</li> <li>› DHA is the only Omega-3 to readily accumulate in important neural tissues</li> </ul> <p><b>HEART</b></p> <ul style="list-style-type: none"> <li>› Lowered triglycerides</li> <li>› Lowered LDL (Bad Cholesterol)</li> <li>› Increased HDL (Good Cholesterol)</li> <li>› Stabilises heart rhythm</li> <li>› Improves vascular reactivity</li> </ul> <p><b>EYES</b></p> <ul style="list-style-type: none"> <li>› Decreased risk of ARMD</li> <li>› Decreased risk of glaucoma</li> <li>› Decreased risk of DES</li> </ul> <p><b>BRAIN</b></p> <ul style="list-style-type: none"> <li>› Increased cognitive activity</li> <li>› Decreased risk of dementia or memory loss</li> <li>› May slow the progression of Alzheimer's disease</li> <li>› May support cognitive function throughout life</li> </ul>

Table 3: Recommended Dosages are 300 mg per day, with a meal (before or after)