AVAZERA

Avazera
Suite 600
3250 Bloor Street West
Toronto, Ontario, Canada M8X 2X9

Name: Test Sample
Contact: Test Sample

OmegaScore®
Whole Blood OmegaScore® Report

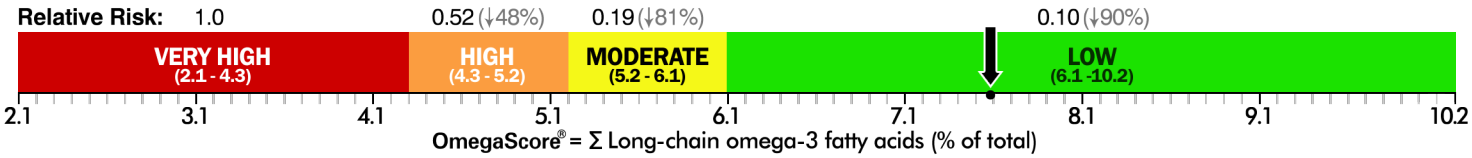
Sample ID: Test Sample
Analysis Date: 8/16/2019

Your OmegaScore® is the summed percentage of the long chain omega-3 fatty acids (EPA, eicosapentaenoic acid + DPA, docosapentaenoic acid + DHA, docosahexaenoic acid) as a percentage of the total fatty methyl esters as measured in your whole blood sample.*

Your OmegaScore® is a very strong indicator of the risk for sudden cardiac death based on published studies from the Harvard School of Public Health in the New England Journal of Medicine. A high OmegaScore® is related to a reduced risk for "sudden cardiac death[1]", "all-cause mortality[2]" and "cognitive deterioration with aging[3]".

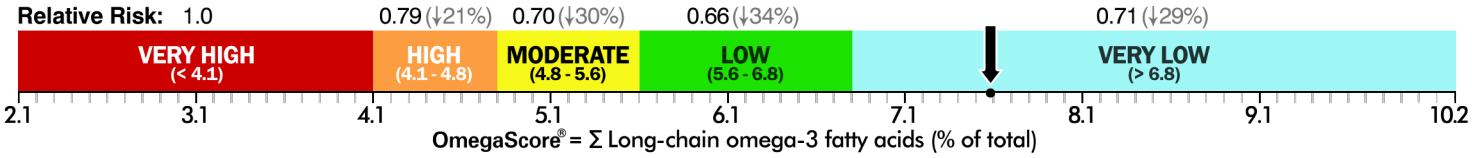
Your Whole Blood OmegaScore®
7.58

Risk of Sudden Cardiac Death: Low Risk



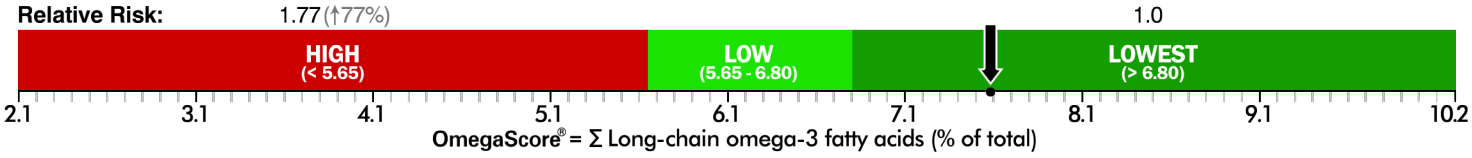
The omega-3 fatty acids were measured in apparently healthy subjects who were followed for up to 17 years. As seen in the accompanying chart, those subjects who had the highest scores had a 90% lower risk for sudden cardiac death as compared to those with the lowest scores who were at the highest risk for sudden cardiac death.[1]

Risk of All-cause Mortality: Very Low Risk



Participants in the Framingham Heart Study had their omega-3 fatty acids measured at baseline and were then followed for a median period of 7.3 years. As seen in the accompanying chart, those subjects who had the higher scores had a 29-34 % lower risk for all-cause mortality (e.g. cardiovascular disease, cancer, or other causes) as compared to those having the lowest scores who were at the highest mortality risk.[2]

Risk of Age-related Cognitive Deterioration: Low Risk



Analysis of omega-3 fatty acid status in elderly subjects indicated a strong relationship between omega-3 fatty acid levels in blood and cognitive status. Subjects within the two low-risk zones based on their OmegaScore® exhibited a significantly lower prevalence. Subjects within the high risk zone (OmegeScore® < 5.6%) exhibited a much higher prevalence (by 77% overall) as compared to those with higher scores with respect to cognitive impairment.[3]

- Studies show that higher levels of EPA and DHA omega-3 help contribute to increased longevity and reduce the risk for cardiac death and a variety of serious ailments.
- In adults, higher blood levels of EPA and DHA omega-3 have been associated with a significantly lower risk for psychological distress, depression, cognitive impairment, age-related dementia, certain cancers, and various other disorders.

Further evidence-based information with references from medical and nutritional journals on the various benefits of long-chain omega-3 fatty acids as EPA plus DHA for human health throughout the life cycle and for disease prevention/management can be found at www.dhaomega3.org.

AVAZERA

Avazera
Suite 600
3250 Bloor Street West
Toronto, Ontario, Canada M8X 2X9

The term omega-3 (or n3) fatty acids refers to long chain polyunsaturated fatty acids with 18 – 22 carbons in chain length and which have 3 - 6 double bonds (unsaturation sites) within the fatty acid structure. The term omega-3 (n3) refers to the position of the first of multiple double bonds being 3 carbons away from the methyl end of the molecule.

- The predominant omega-3 fatty acid in our typical diet is ALA, alpha-linolenic acid (a 18-carbon fatty acid with 3 double bonds referred to as a shorter chain fatty acid) which is consumed mainly via plant-based sources (vegetable oils such as soybean and canola oils or foods containing them.)
- The so-called long-chain omega-3 fatty acids which we can consume are predominantly EPA (eicosapentaenoic acid with 20 carbons in chain length and 5 double bonds) and DHA (docosahexaenoic acid with 22 carbons in chain length and 6 double bonds.)

Since EPA and DHA are found mostly in fish/seafood, our low intake of such in North America (in contrast to Japan as an example) results in low levels of these in our body tissues and in our blood. While ALA can be converted to EPA and DHA in the liver, the conversion efficiency in humans is extremely limited. Thus, the most effective way to improve EPA plus DHA levels in the body is to consume them preformed from fish/seafood and/or via supplements derived from fish and algal oils enriched in EPA and DHA.

It is well established that EPA and DHA levels in the blood represents a risk factor for cardiovascular disease and other health/disease conditions. Higher levels in the body, as measured by blood measures, have been associated with a significantly lower risk for earlier all-cause mortality, certain cancers, age-related cognitive deterioration, and other chronic conditions. These beneficial effects resulting from a better EPA and DHA status in the circulation/body are mediated via several physiological and biochemical mechanisms.

Omega-3 Fatty Acids:	Chemical Formula	% By Weight
Alpha-Linolenic acid (ALA):	C18:3n3	1.83
Stearidonic acid (SDA):	C18:4n3	12.29
Eicosatrienoic acid (ETE):	C20:3n3	1.40
Eicosatetraenoic acid (ETA):	C20:4n3	16.09
Eicosapentaenoic acid (EPA):	C20:5n3	5.05
Heneicosapentaenoic acid (HPA):	C21:5n3	25.76
Docosapentaenoic acid (DPA), Clupanodonic acid:	C22:5n3	1.26
Docosahexaenoic acid (DHA):	C22:6n3	1.26

The term omega-6 (or n6) fatty acids refers to long-chain polyunsaturated fatty acids with 18–22 carbons in chain length and 2–5 double bonds (unsaturation sites within the fatty acid structure.) The term omega-6 (n6) refers to the location of the first of the multiple double bonds being 6 carbons away from the methyl end of the molecule.

The predominant omega-6 fatty acid in the diet is LA, linoleic acid (having 18 carbons in chain length and 2 double bonds). It is consumed mainly via certain vegetable oils (eg., corn and safflower oils) and animal-based food sources (meats, etc).

Another dietary omega-6 fatty acid of interest is AA (arachidonic acid) which is 20 carbons in chain length along with having 4 double bonds within the molecule. Both LA and AA are found in significant amounts in the blood and in various body tissues. LA is known to support skin function along with other effects (including the potential to moderately ower blood cholesterol levels). AA omega-6, along with DHA omega-3, are found in high concentrations in the brain and nerve tissue.

Omega-6 Fatty Acids:	Chemical Formula	% By Weight
Linoleic acid (LA):	C18:2n6	1.70
Gamma-linolenic acid (GLA):	C18:3n6	0.00
Eicosadienoic acid:	C20:2n6	3.01
Dihomo-gamma-linolenic acid (DGLA):	C20:3n6	1.48
Arachidonic acid (AA, ARA):	C20:4n6	12.09
Docosadienoic acid:	C22:2n6	0.92
Adrenic acid:	C22:4n6	0.00
Osbond acid:	C22:5n6	0.00

The human diet contains high levels of saturated fatty acids (derived mainly from animal-based food sources such as meats and dairy products) and monounsaturated fatty acids from mixed food sources (vegetable oils including olive oil and animal-based food sources.)

The levels of saturated and monounsaturated fatty acids in the circulating blood and body tissues partly reflects the corresponding dietary intakes of these fatty acid types. Unlike the omega-3 and omega-6 fatty acids which are essential in our diet for optimal health (referred to as ‘essential fatty acids’,) the saturated and monounsaturated fatty acids are referred to as ‘non-essential fatty acids’ because the human body has the synthetic enzymic capacity to produce these in various tissues.

AVAZERA

Avazera
Suite 600
3250 Bloor Street West
Toronto, Ontario, Canada M8X 2X9

There is some evidence that lower ratios of AA/EPA and omega-6/omega-3 may offer various health benefits in part because of the pro-inflammatory effects of omega-6 fatty acids (particularly AA) in contrast to the anti-inflammatory and resolving effects of the omega-3 fatty acids (particularly EPA). Increasing the OmegaScore® as needed via the consumption of fish/seafood or supplements enriched in EPA and DHA is the most effective way to lower the AA/EPA and omega-6/omega-3 ratios.

Summary - Fatty Acid Results:	% By Weight
% Saturated Fatty Acids:	0.65
% Monosaturated Fatty Acids:	15.22
% Polyunsaturated Fatty Acids:	84.13
Σ Omega-3:	64.94
Σ Omega-6:	19.19
Σ Omega-6/Σ Omega-3 Ratio:	3.38
AA/EPA Ratio:	2.39
Eicosapentaenoic acid (EPA):	5.05
Docosahexaenoic acid (DHA):	1.26
Docosapentaenoic acid (DPA):	1.26
OmegaScore®	**7.58**

References:

*** The Omega-3 Index: a new risk factor for death from coronary heart disease?**
- (Prev Med. 2004 Jul;39(1):212-20.) Harris WS1, Von Schacky C.

[1] Blood Levels of Long Chain n-3 Fatty Acids and the Risk of Sudden Cardiac Death
- As studied by the Harvard School of Public Health and Division of Preventive Medicine, Brigham & Women's Hospital, Boston, MA, USA.
- Ref.: Albert et al., N. Engl. J. Med. 346(15):1113-1118, 2002

[2] Blood Levels of Long Chain n-3 Fatty Acids and the Risk of All-cause Mortality
- As studied by the Harvard School of Public Health and Division of Preventive Medicine, Brigham & Women's Hospital, Boston, MA, USA.
- Ref.: Harris et al., J. Clin. Lipidol. 12(3):718-727, 2018

[3] OmegaScore® Testing for Risk of Cognitive Deterioration with Aging
- Ref.: Lukaschek et al., Dement. Geriatr. Cogn. Disord. 42(3-4):236-245, 2016

LAL-SOP-5 - OmegaScore®
Determination of weight percentage of DHA, EPA and Omega-3 Fatty Acid Compositon in Whole Blood by GC-FID via DBS Cards

- As analyzed in a controlled environment using an Agilent GC 7890A/B GC System by Flame Ionization Detection.
- These results only relate to the sample as received.

This OmegaScore® report is not intended as a medical report or advice to individuals from Lipid Analytical LLC, it is solely a measurement and calculation of various fatty acids based on the samples provided. "Risk Levels" are intended as a quick reference of these measurements as compared to current research, but should be interpreted by a licensed medical professional for advice on any dietary changes and/or supplementation that may be required.

As prepared and authorized by:

Andrew Jenkins, MSc.,
Laboratory Director

Lipid Analytical Laboratories
University of Guelph Research Park Centre
50 Research Lane, Unit 100
Guelph, Ontario, Canada N1G 4T2