

Thank you for your interest in the **Omega-3 Whole Blood Test!** This innovative test provides exceptional information about your current risk markers and how to make changes to support your health. We hope you enjoy your experience!

Why measure the fatty acids in your blood?

It is very well documented that circulating levels of certain essential fatty acids (*essential = those that must be obtained through diet*) have strong associations with the risk of cardiovascular disease, major adverse events, and related chronic conditions. This report focuses on levels of long chain omega-3 fatty acids and the balance between omega-3 and omega-6 fatty acids in your blood.

An individual's ability to absorb and metabolize essential fatty acids can vary from person to person depending on a number of factors. Even if an individual's intake was known, each person is unique, with differences in digestion, absorption, tissue distribution, and cellular metabolism. Variations in diet, body weight, and genetics will also influence levels in circulation.

The **Omega-3 Whole Blood Test** report tells you the amount of essential fatty acids circulating in your bloodstream before, during or after supplementation with high quality products available at Life Extension. Knowing these levels will help guide you in the best possible preventive health strategy, and will determine whether your current nutritional and supplement habits are working effectively. When the daily oral intake of long chain omega-3 fatty acids is increased, it takes 4-6 weeks to see significant increases in blood levels.

Why measure fatty acids in whole blood?

The **Omega-3 Whole Blood Test™** measures fatty acids in a sample of *whole blood*, and we believe in the importance of this approach. Fatty acids are not exclusively carried by any one component of whole blood. They are present in erythrocyte (red blood cell) membranes, leukocyte (white blood cell) membranes, platelets and lipoproteins. Thus, measurement of long chain omega-3 fatty acids *as a percent of whole blood* fatty acids (by weight) provides a more complete assessment than by measuring levels in any one component. The **Omega-3 Whole Blood Test** provides a real-time snapshot of how your body has metabolized fatty acids from your diet.

How will this document help?

The purpose of this document is to provide you with a detailed explanation of how to interpret your **Omega-3 Whole Blood Test** results. Each fatty acid in your report is provided as a percentage of *all* fatty acids in your blood sample. Each graph on the **Omega-3 Whole Blood Test** Report is explained in detail, and you are provided with background information for each "Optimal Level" noted in the Report. We have also provided you with dietary guidance and additional information wherever possible.

We wish you the best in your continued efforts to achieve the best possible health and wellness!

If your Omega-3 Whole Blood Test report indicates that your levels of omega-3 are low, or that your levels of omega-6 and saturated fatty acids are high – don't worry! You are in the same boat as many North Americans.

This is easily changed with diet and supplementation, in as little as four weeks. Increasing your omega-3 intake and decreasing your intake of omega-6 and saturated fats will significantly improve your health.

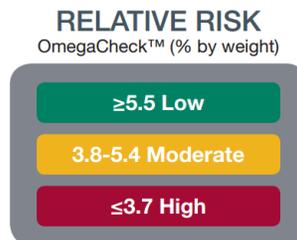
*You CAN change your risk of heart disease.
The Omega-3 Whole Blood Test is a great step!*



“Whole blood levels of EPA, DPA and DHA over 5.5% (by weight) are associated with decreased risk of sudden death compared to individuals with levels below 3.7%.”

The risk categories for OmegaCheck™ are based on the top (75th percentile) and bottom (25th percentile) quartiles of the reference population. Consumption of foods rich in omega-3 fatty acids or supplements containing omega-3 fatty acids (EPA, DHA and/or DPA) may increase omega-3 fatty acid levels measured by OmegaCheck™, and **decrease risk of sudden death due to cardiovascular disease.**

The totality of the scientific evidence demonstrates that when consumption of fish oils is limited to 3 g/day or less of EPA and DHA, there is no significant risk for increased bleeding time beyond the normal range. A daily dosage of 1 gram of EPA and DHA lowers the circulating triglycerides by about 7-10% within 2 to 3 weeks.



The OmegaCheck™ was developed and validated at Cleveland HeartLab with the support of Nutrasource Diagnostics, Inc.

OmegaCheck™ is a trademark of the Cleveland HeartLab.

Omega-3 Serum Equivalence Score

“An Omega-3 Serum Equivalence Score ≥7.2 is associated with a 32% reduction in heart disease compared to a score of <5.0.”

This score is the sum of all omega-3 fatty acids as measure in *whole blood*, and *derived by validated calculations to yield the equivalent sum in serum*. Your overall **risk for developing heart disease** can be estimated from the **Omega-3 Serum Equivalence Score**. Based on work by researchers at the Department of Veteran Affairs Medical Center in San Francisco, this score provides a simple two-way assessment of an individual's overall risk for heart disease. When this value is greater than 7.2% of total fatty acids in a serum sample, there is an associated reduction in risk of heart disease as compared to levels below 5.0%. Your score is plotted on a graph indicating your current risk category for development of heart disease. If your levels fall in the **Low Risk** zone, this reflects a desired reduction in risk of heart disease by 32% compared to the **Risk** category.

EPA + DHA Serum Equivalence Score

“An EPA + DHA Serum Equivalence Score ≥ 4.6 is associated with a 70% reduced risk of death from fatal ischemic heart disease as compared to a score of < 3.5 .”

This score is the sum of EPA and DHA as measure in *whole blood*, and derived by validated calculations to yield the equivalent sum of EPA and DHA in serum. Your **risk of dying from ischemic heart disease** (heart attack) can be estimated from the **EPA+DHA Serum Equivalence Score**, which represents the total percent of fatty acids comprised of EPA and DHA in serum. This score is based on research from the Cardiovascular Health Research Unit at the University of Washington in Seattle. They found a significant reduction in the risk of death from heart attack for people with total EPA and DHA values of 4.6% or greater, when compared with those whose total values were less than 3.5%. If your levels fall in the **Low Risk** category on the colored scale, this reflects a desired reduction in risk of fatal ischemic heart disease by 70% compared to the **Risk** category.

Omega-3 Red Blood Cell Equivalence Score (Omega-3 Index)

“An RBC omega-3 value of 8-11% offers the greatest protection against sudden myocardial infarction.”

Your **risk of having a sudden myocardial infarction** (heart attack) can be estimated from the **Omega-3 Index Red Blood Cell Equivalence Score** (also known as the Omega-3 Index). This score is the sum of EPA and DHA as measured in *whole blood*, and derived by validated calculations to yield the equivalent sum of EPA and DHA in red blood cell membranes. Based on research from the Lipid and Diabetes Research Center, Mid America Heart Institute at the University of Missouri Kansas City School of Medicine, this test takes into account the fact that red blood cell fatty acid composition reflects intake of EPA + DHA *over time* (analogous to the way that hemoglobin A1c reflects long-term blood sugar levels). Researchers found that people whose total Omega-3 Index was greater than or equal to 8% had the greatest degree of protection against sudden myocardial infarction, whereas an Index of less than or equal to 4% was associated with the least. If your Omega-3 Index falls in the **Low Risk** zone, you have achieved the greatest level of protection against sudden myocardial infarction.

Total Omega-3

Omega-3 fatty acids are related to beneficial health outcomes and are known to combat cardiovascular disease through a host of mechanisms – including the suppression of pro-inflammatory molecules and reductions in triglycerides and harmful lipoprotein molecules. In regions where seafood consumption is relatively high and rates of cardiovascular disease are relatively low (such as Japan and Greenland), people often have total omega-3 levels of over 15% of their total fatty acids. **A healthy level of total omega-3 fatty acids is 10% or more.**

Total Omega 6

Although omega-6 fatty acids are essential to our health, they occur in extreme excess in a typical North American diet. Vegetable oils such as corn, soy, and safflower (and processed foods that include them) are very high in linoleic acid, which is converted in the body to the longer chain omega-6 arachidonic acid (AA). Having an excess amount of circulating AA promotes a pro-inflammatory environment. **Levels of total omega-6 fatty acids should be less than 38% of total fatty acids. AA in particular is optimally lower than 9% of total fatty acids.**

Omega 6: Omega-3 Ratio

The optimal ratio of omega-6 to omega-3 fatty acids in circulation is less than 4:1. This ratio in blood and cell membranes strongly influences cardiovascular disease risk factors. The higher the amount of omega-3 relative to omega-6 fatty acids, the more one's health can benefit.

AA: EPA Ratio

The AA: EPA ratio provides a more specific indicator of the balance between omega-6 and omega-3 fatty acids in circulation. When this ratio is higher, there is preferred incorporation of AA into membranes over EPA, leading to a pro-inflammatory environment. While both of these fatty acids are essential to human health, **the optimal ratio of AA: EPA is around 1.7.**

Dietary Guidance

If your personalized profile indicates that certain fatty acids are out of range of desired levels, the chart below will help guide dietary choices to either increase or decrease these levels accordingly.

Fatty Acid	Dietary Sources (Highest Listed First)
Saturated Fats	Primary Sources: Animal Fats
Myristic	Coconut Oil, Palm Kernel Oil, Butter, Cow's milk & dairy products
Pentadecanoic	Butter fat, Heavy cream, Beef products
Palmitic	Cocoa butter oil, Palm oil, Shortening, Butter, Lard, Milk chocolate, Fatty meats, Pork and Beef products, Game meats, Cashews, Eggs
Stearic	Cocoa butter oil, Grain-based desserts, Pork products, Beef products, Lard, Chocolate, Eggs, Butter
Arachidic	Macadamia nuts/oil, Peanuts/oil, Rice bran oil, Sesame oil, Shortening, Mayonnaise
Docosanoic	Peanut oil, Peanuts, Peanut butter, Sunflower seeds, Soybean oil, Mayonnaise
Lignoceric	Peanut oil, Peanuts, Peanut butter
Monounsaturated	Primary Sources: Vegetable Oils
Myristoleic	Fatty beef products, Nutmeg seed oil
Palmitoleic	Macadamia nuts/oil, Fatty beef Products, Eggs
Oleic	Safflower/Olive/Canola oils, Hazelnuts, Shortening, Eggs, Game meats
Eicosenoic	Pacific Mackerel, Pacific Herring, Canola oil
Nervonic	Bluefin tuna, Southern black cod, Pacific mackerel
Omega-3 (Polyunsaturated)	Primary Sources: Nuts, Seeds, Cold water fish, Algae
ALA (α -linolenic)	Flaxseed/Canola/Soybean/Vegetable Blend oils, Tofu, Walnuts
Eicosatrienoic	Beef liver, Eggs, Skipjack tuna
EPA (Eicosapentaenoic Acid)	(Wild) Mackerel, Salmon, Tuna, Herring, Sardines, Trout, Crab, Oysters, Lobster
DPA (Docosapentaenoic Acid)	(Wild) Trout, Salmon, Crab, Tuna, Herring, Oysters, Sardines
DHA (Docosahexaenoic Acid)	(Wild) Salmon, Mackerel, Bluefin tuna, Herring, Sardines, Crab, Trout, Tuna, Oysters, Some omega-3 enriched grocery products
Omega-6 (Polyunsaturated)	Primary Sources: Nuts, Seeds, Animal meats, Vegetable Oils
LA (Linoleic)	Safflower oil, Cottonseed oil, Soybean oil, Sunflower oil, Pine nuts, Corn oil, Pecans, Game meats, Eggs
Eicosadienoic	Pine nuts, Pork products, Lard
Docosadienoic	Ark shell (Clam), Topshell meat, Japanese Abalone
Docosatetratenoic	Beef products, Pork Products
GLA (γ -linolenic)	Hemp seed, Herring, Borage seed oil, Evening primrose/Black currant seed oils, Spirulina
DGLA (Dihomo- γ -linolenic)	Beef liver, Eggs, Skipjack Tuna
Arachidonic	Fatty sections of pork/chicken/turkey, Red meats, Tilapia fish, Eggs, Dairy
DPA (Docosapentaenoic, n-6)	Eggs, Mackerel

Don't forget: Fats are good for you! The importance is in selecting the best types of fat for our diet and keeping a balanced intake of complex carbohydrates and protein. *The majority of the fat in our diet should come from monounsaturated and polyunsaturated fatty acids.*

Here are some practical tips to help control the balance of these fats in your circulation.

Tips on healthy fat choices at home:

- ✦ Cut down the amount of oil used in cooking. Common vegetable oils (e.g., corn, sunflower, safflower) are high in omega-6 fatty acids, as are many fried, packaged, and processed foods.
- ✦ **Choose whole, fresh foods as often as you can!** **Whole foods** are unprocessed or minimally processed fruits, vegetables, grains and proteins in their freshest, most natural state. Think of fresh fruits and vegetables from the produce aisle, lean whole cuts of meat with no additives or preservatives, eggs, whole grain rice and quinoa as examples.
- ✦ **Enjoy seafood frequently**, and opt for leaner cuts of meat. When using meat as an ingredient, try cooking it separately and draining off excess fat before adding other ingredients. Take the skin off of your chicken and trim away visible fat after cooking. Choosing free range, organic meats and grass fed meats over grain fed meats may also increase the amount of omega 3 fatty acids in your diet.
- ✦ Opt for lower fat content in milk and yogurt – 1% or fat-free instead of 2% or homogenized.
- ✦ Using beans, chickpeas, lentils and hearty vegetables like sweet potatoes and zucchini are nice alternatives to meats in dishes like chili or lasagna. Tomato-based pasta sauces are lower in saturated fats than creamy or cheesy sauces.
- ✦ **Always read labels!** There can be a large difference in saturated fat content in prepared and frozen foods. Remember that serving size may vary between products, and the serving size is often much smaller than the amount you would typically consume in one sitting.
- ✦ When roasting potatoes, try cutting them in larger pieces to allow you to use less oil. Spices like turmeric, cumin, rosemary, and red pepper flakes can all help to create great flavour while reducing the need for extra fat and salt.
- ✦ Opt for baked chips instead of fried whenever possible. Thicker cut, straight fries are also a better choice than thinner or crinkle cut because they have less surface area for fat and oil to cling to.
- ✦ Grilled bacon tends to have less fat than fried bacon. Try choosing a lean cut or back bacon. Turkey or chicken bacon also makes for a nice alternative!
- ✦ Grating cheese instead of slicing it will help you use less. Also, remember when choosing cheese, a little goes a long way – opting for more flavourful varieties like real parmesan or asiago can help you use less because you only need a little to achieve potent flavour. These are also great additions to mashed potatoes.
- ✦ Try poaching or boiling eggs rather than frying them in oil or butter. Salsa is a fantastic way to add flavour to your eggs.

Not all fish are created equal!

Surprisingly, individuals who consume high quantities of fish may also suffer from sub-optimal omega-3 status. Our increasingly industrialized food chain now produces a substantial portion of its harvest from mega fish-farms, where the unnatural diet of soy and grain meal the fish are given greatly diminishes the omega-3 content of their flesh. Fish obtain and concentrate omega-3 fatty acids by consuming natural sources of these fats. The original source of EPA and DHA is from marine algae and phytoplankton. Small fish consume the algae and phytoplankton, then larger fish consume them, then even larger fish consume them and thus the EPA and DHA become concentrated at higher levels of the food chain. Farmed fish are completely dependent on their feed—if it does not contain EPA and DHA, the fish will not contain it in the levels found in wild fish.

Disturbingly, it seems more and more farm raised fish are coming up short in quantities of important EPA and DHA fatty acids. According to a 2008 sampling survey of farmed fish, tilapia (the fastest growing and most widely farmed fish) and catfish have much lower concentrations of omega-3s, very high ratios of omega-6 to omega-3, and high saturated and monounsaturated fat to omega-3 ratios. The study's authors noted that "marked changes in the fishing industry during the past decade have produced widely eaten fish that have fatty acid characteristics that are generally accepted to be inflammatory by the health care community."

The following list provides dietary choices of fish which are relatively high in the long-chain omega-3 polyunsaturated fatty acids, EPA and DHA:

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|--------------------------|-------------------------|--|
| 🌿 Bluefin Tuna | 🌿 Pink Salmon (Wild) | 🌿 Coho Salmon (Wild) |
| 🌿 Pacific Herring | 🌿 Mackerel (Canned) | 🌿 Sardines (Canned) |
| 🌿 Atlantic Herring | 🌿 Sockeye Salmon (Wild) | 🌿 Albacore <i>or white</i> Tuna (Canned) |
| 🌿 Atlantic Salmon (Wild) | 🌿 Rainbow Trout (Wild) | 🌿 Sea Bass |

