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Advancing the Science of Wellness
Rocky Mountain Analytical

Collection Date: 03-Sep-2013
Collection Time(s): 12:00 am
Sample Received: 06-Sep-2013
Reported On: 26-Nov-2013

Fatty Acid Profile

Accession Number : 222222

Provider:

Phone:
Fax:

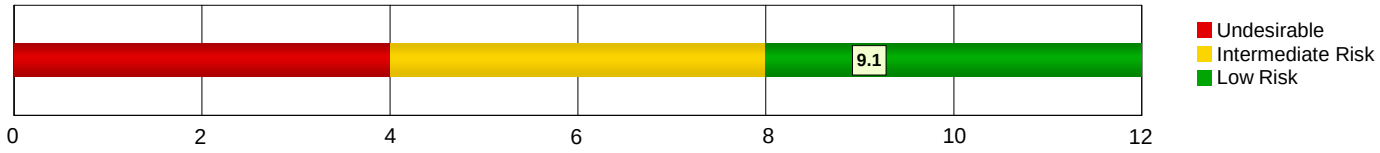
Client:
Jane Doe

Phone:

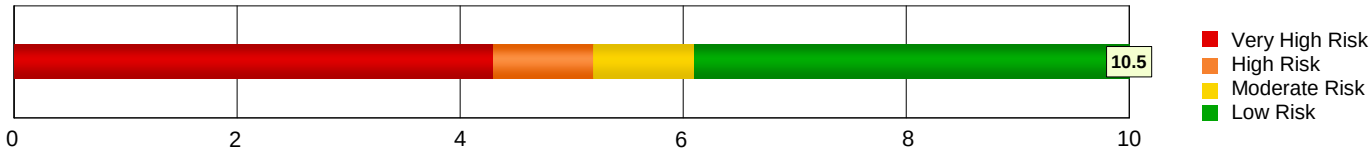
Age: 46
DOB: 01-Sep-1966
Gender: F

Fatty Acid	Status	Result	Units	Comments
Omega-3 Index (DBS)	Lowest risk SMI	9.1	% by weight	> 8% = lowest risk sudden MI
Whole Blood Omega 3 Score	Lowest risk	10.5	% by weight	> 6.1% = lowest risk sudden death
AA:EPA Ratio	Optimal	4.1		Low ratio = less inflammation

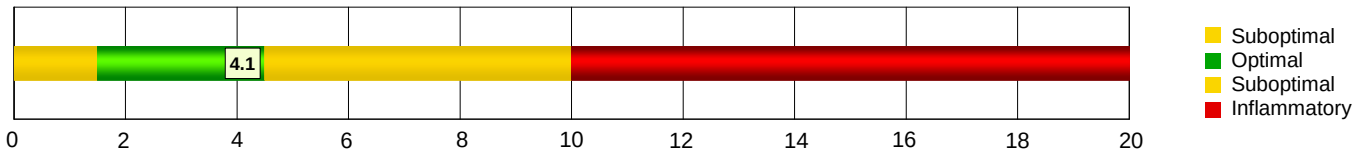
Omega-3 Index (% by weight)



Whole Blood Omega-3 Score (% by weight)



AA to EPA Ratio



Tested at OmegaQuant, Sioux Falls, SD

George Gillson MD, PhD
Medical Director

a division of LifeLabs LP
CPSA Accreditation #L0154200

Omega 3 Fatty Acids	Result	5th to 95th percentile	Units
Alpha-linolenic acid (ALA)	0.30	0.15 - 0.57	% w/w
Eicosapentaenoic acid (EPA)	2.8	0.3 - 2.66	% w/w
Docosapentaenoic acid n-3 (DPA n-3)	2.3	1.23 - 2.65	% w/w
Docosahexaenoic acid (DHA)	5.4	2.02 - 6.28	% w/w
TOTAL Omega-3 Fatty Acids	10.8	***4.32 - 11.54***	% w/w

Omega-6 Fatty Acids	Result	5th to 95th percentile	Units
Linoleic acid (18:2 n6)	16.7	12.74 - 21.97	% w/w
Gamma-linolenic acid (GLA)	0.10	0.09 - 0.37	% w/w
Eicosadienoic acid (20:2 n6)	0.20	0.21 - 0.47	% w/w
Dihomogamma-linolenic acid (DGLA)	1.3	1.27 - 2.84	% w/w
Arachidonic acid (AA)	11.6	9.95 - 16.9	% w/w
Docosatetraenoic acid (22:4 n6)	1.1	1.1 - 3.24	% w/w
Docosapentaenoic acid n-6 (DPA n-6)	0.20	0.19 - 0.77	% w/w
TOTAL Omega-6 Fatty Acids	31.2	***30.48 - 40.23***	% w/w

Fatty Acids Ratios	Result	5th to 95th percentile	Units
Omega-6:Omega-3	2.9	2.72 - 8.86	% w/w
AA:EPA Ratio	4.1	4.25 - 47.27	% w/w

cis-Monounsaturated Fatty Acids	Result	5th to 95th percentile	Units
Palmitoleic acid (16:1 n7)	0.40	0.22 - 1.35	% w/w
Oleic acid (18:1 n9)	16.6	13.15 - 18.94	% w/w
Eicosenoic acid (20:1 n9)	0.30	0.12 - 0.33	% w/w
Nervonic acid (24:1 n9)	0.50	0.04 - 0.27	% w/w
TOTAL Mono-Unsaturated Fatty Acids	17.8	***13.88 - 20.35***	% w/w

Saturated Fatty Acids	Result	5th to 95th percentile	Units
Myristic acid (14:0)	0.50	0.35 - 1.02	% w/w
Palmitic acid (16:0)	25.0	20.7 - 25.76	% w/w
Stearic acid (18:0)	13.2	12.5 - 16.36	% w/w
Arachidic acid (20:0)	0.30	0.08 - 0.27	% w/w
Behenic acid (22:0)	0.30	0.09 - 0.42	% w/w
Lignoceric acid (24:0)	0.30	0.07 - 0.33	% w/w
TOTAL Saturated Fatty Acids	39.6	***36.66 - 41.14***	% w/w

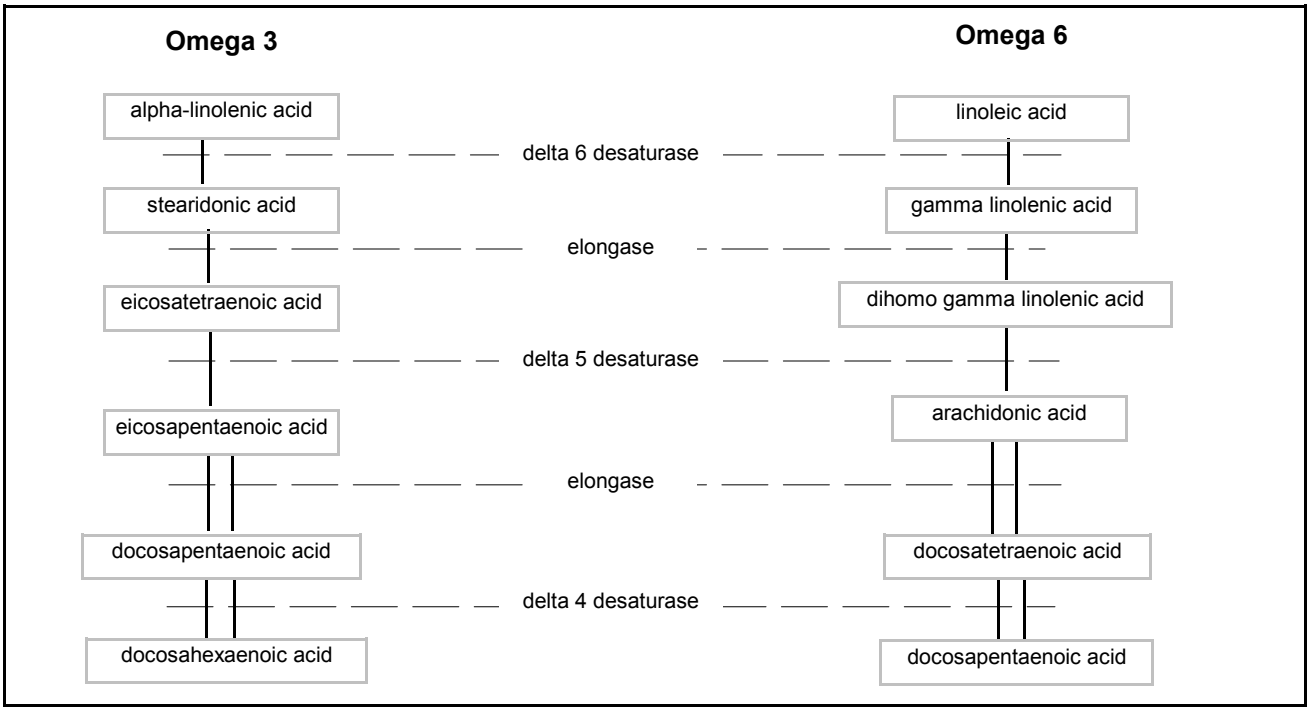
Trans Fatty Acids	Result	*5th to 95th percentile*	Units
Trans-Palmitoleic acid (16:1 n7t)		*0.07 - 0.23*	% w/w
Trans-Oleic (18:1 t)	0.40	*0.47 - 1.45*	% w/w
Trans-Linoleic (18:2 n6tt)	0.20	*0.3 - 0.92*	% w/w
TOTAL Trans-Fatty Acids	0.60	***0.98 - 2.33***	% w/w

Fatty Acid Distribution

	Median Population Value*	5th to 95th percentile Range**	Your Result
Total Omega-3 Fatty Acids	6.49	4.32 - 11.54	**10.8**
Total Omega 6 Fatty Acids	36.13	30.48 - 40.23	**31.2**
Omega-6:Omega-3	5.61	2.72 - 8.86	**2.9**
AA:EPA Ratio	18.62	4.25 - 47.27	**4.1**
Total Monounsaturated Fatty Acids	16.48	13.88 - 20.35	**17.8**
Total Saturated Fatty Acids	38.94	36.66 - 41.14	**39.6**
Total Trans-Fatty Acids	1.49	0.98 - 2.33	**0.60**

*Median Population Value refers to the 50th percentile: half of all results are above this number, and half are below it. Note: this does not necessarily reflect optimal values, only the average distribution in a large population.

** Range: 5th to 95th percentile values are based on analysis of over 20,000 blood spot samples. Again, this reflects the average distribution in a large population, not necessarily what is optimal for an individual.



THE OMEGA 3 INDEX is 9.1 %
The omega-3 index is an estimate of the amount of EPA + DHA in red blood cell membranes expressed as a percentage of the total weight of fatty acids in red blood cell membranes. (Note: This index was not derived from direct measurements on red blood cells, but was derived from a validated correlation to whole blood data.)

The following quote is taken from the conclusion of a 2007 review article summarizing the research on the omega-3 Index:

"We think that the omega-3 index is a highly discriminative risk factor for sudden cardiac death. This risk factor can be modified by intake of EPA and DHA. The standard dose of 1 g/day EPA and DHA recommended by the cardiac societies, however, is probably far from ideal for everybody, since not only this standard dose, but also diet, individual genetic background, body mass index, intake and disposal of calories, and other factors all taken together probably determine the omega-3 fatty acid status of a given person. We suggest therefore that the omega-3 index acts not only as a risk factor for sudden cardiac death, but at present also, at above 8%, as a treatment goal for treatment with EPA and DHA."

Cardiovascular risk and the omega-3 index. von Schacky C, Harris WS. J Cardiovasc Med (Hagerstown) 2007;8 Suppl 1:S46-9.

THE OMEGA 3 WHOLE BLOOD SCORE is 10 %
The omega 3 whole blood score is the sum of the major omega 3 fatty acids in whole blood (expressed as percentage by weight). Individuals with a score in the range 6.15 to 10.2% have been shown to have an 80% lower risk of sudden cardiac death compared to individuals with a score in the range 2.1% to 4.3%, based on prospective and retrospective data. Supplementation with oils containing omega 3 fatty acids will raise the score.

Blood levels of long-chain n-3 fatty acids and the risk of sudden death. Albert CM et al. N Engl J Med 2002;346:1113-1118.

Dietary intake and cell membrane levels of long-chain n-3 polyunsaturated fatty
acids and the risk of primary cardiac arrest. Siscovick DS et al. JAMA 1995;274:1363-1367.

THE RATIO OF AA TO EPA IS 4.1
A ratio greater than or equal to approximately 4.5 is considered to carry higher risks as outlined below.

A 2002 review by Simopoulos states that humans evolved on a 1:1 dietary ratio of AA to EPA. Current research suggests the optimal ratio likely varies depending on the disease under consideration, but that most diseases show significant improvement when the ratio of AA to EPA is less than 4.5 to 1. The benefits related to this ratio can be attributed to reduced inflammation.

The omega 6 pathway contains arachidonic acid (AA), which is the precursor for the inflammatory prostaglandin 2 series (PG2) molecules (anti-inflammatory drugs like ibuprofen act by inhibiting the conversion of AA to PG2). The omega 3 fatty acid pathway contains eicospentaenoic acid (EPA). EPA and AA compete for the same enzymes. EPA uses these enzymes to make PG3, which is a class of heart healthy prostaglandins, while AA uses the same enzymes to make the inflammation causing prostaglandin 2 series. Since AA can be used to make inflammatory prostaglandins, and EPA competes with AA to use the same enzymes to make heart-healthy PG3, an excess of AA over EPA generally promotes a more inflammatory state. A high ratio of AA to EPA has been associated with a number of inflammatory diseases including: rheumatoid arthritis, psoriasis, asthma and some cancers. High ratios of AA to EPA have also been associated with heart disease and diabetes. The following strategies may be used to reduce the ratio of AA to EPA:

1. Lower levels of AA by decreasing consumption of trans-fats, saturated fats, hydrogenated vegetable oils and cereal grains. Meats should be from animals that are free range (grass fed) and organically grown.
2. Raise EPA levels by increasing fish intake or by taking fish oil capsules (high in EPA)
3. Raise EPA levels by taking alpha-linolenic acid, an omega 3 fatty acid found in flax seed oil, which can also be converted to EPA. About 2.7% of alpha-linolenic acid per day is converted to EPA, so two tablespoonsful of

flaxseed daily generally results in adequate EPA. However, some people may lack enough of the cofactors required to make the conversion. Therefore, use of fish oils may be preferable in patients on multiple medications or those with chronic diseases.

Although a lower ratio of AA to EPA is generally desirable, lowering the ratio to less than 1.5 may be associated with a moderately increased risk of disease. Ideally, for optimal control of inflammation the ratio should remain in the range 1.5 to 4.5.

GLA/DGLA LOW END OF RANGE
Both GLA and DGLA (downstream metabolite) are close to or below the 5th percentile. Supplementation with GLA may reduce arachidonic acid and may exert a beneficial effect on chronic inflammation, atherosclerosis and tumour growth (Wang). GLA has been effective in the treatment of Rheumatoid Arthritis (Zurier). Sources of GLA include Evening Primrose Oil and Borage Oil, but Borage Oil contains 3 to 5 times more GLA (20 to 40% GLA vs 5-7%).

Wang X, Lin H, Gu Y. Multiple roles of dihomo-?-linolenic acid against proliferation diseases. Lipids Health Dis. 2012 Feb 14;11:25. doi: 10.1186/1476-511X-11-25.

Zurier RB et al. gamma-Linolenic acid treatment of rheumatoid arthritis. A randomized, placebo-controlled trial.Arthritis Rheum 1996 Nov;39(11):1808-17.

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