LAB #: B000000-0000-0
PATIENT: Sample Patient
ID: PATIENT-S-00019
SEX: Female
AGE: 30

CLIENT #: 12345
DOCTOR:
Doctors Data, Inc.
3755 Illinois Ave.
St. Charles, IL 60174 USA

Fatty Acids; Erythrocytes

OMEGA 3 FATTY ACIDS	RESULT %/TOTAL	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Eicosapentaenoic (EPA) 20:5ω3	0.7	0.5- 5.0	
Docosahexanoic (DHA) 22:6ω3	3.9	3- 8.0	
OMEGA 6 FATTY ACIDS			
Linoleic 18:2ω6	11	7- 15	
Dihomo-γ-linolenic (DGLA) 20:3ω6	1.4	1.2- 4.0	
Arachidonic (AA) 20:4ω6	23	9- 19	
MONOUNSATURATED FATTY ACIDS			
Oleic 18:1ω9	14	12- 20	
Palmitoleic 16:1ω7	0.21	0.12- 0.65	
SATURATED FATTY ACIDS			
Palmitic 16:0	27	17- 28	
Stearic 18:0	19	14- 20	

TRANSISOMER FATTY ACIDS			68th 95th
Palmitelaidic 16:1ω7t	0.015	< 0.050	
Elaidic 18:1ω9t	0.2	< 0.4	

RATIOS

OMEGA 3 AND OMEGA 6 RATIOS	RESULT	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
AA/EPA	34	2- 28	
EPA/DHA	0.17	0.15- 1.2	
AA/DGLA	16	5- 14	
EPA/DGLA	0.5	0.2- 1.6	
DESATURASE ENZYME MARKERS			
Linoleic/DGLA (Δ6)	7.7	2.5- 10	
Stearic/Oleic (Δ9)	1.33	0.8- 1.40	
DGLA/AA (Δ5)	0.06	0.065- 0.16	

FATTY ACID DISTRIBUTION

	TOTAL	OMEGA 3	OMEGA 6	MONO	SATURATED	TRANS
Patient Distribution	4760 µmol/L	5 %	35 %	15 %	46 %	0.2 %
Average Distribution	5200 µmol/L	9 %	29 %	18 %	44 %	0.3 %

SPECIMEN DATA

Comments:
Date Collected: 5/16/2014
Date Received: 5/17/2014
Date Completed: 5/19/2014
Method: Gas Chromatography (GC)

<dl: less than detection limit

Erythrocyte Fatty Acids

This test measures the fatty acids (FAs) that are present as constituents of phospholipids in the membranes of erythrocytes (red blood cells). Each specific FA is reported as a percentage of total FAs measured. FAs are carboxylic acids that may be either unsaturated (one or more carbon-to-carbon double bonds) or saturated (no carbon-to-carbon double bonds). FAs may come from natural or synthetic sources. There are two families of essential FAs (EFAs), omega-3 and omega-6, all of which are poly-unsaturated FAs (PUFAs) meaning that they all have more than one C=C double bond.

FAs derived from the EFAs (or taken in via diet or supplements) are essential components of all cell membranes and appropriate membrane fatty acid content is pivotal for optimal membrane fluidity and cellular metabolism. The same FAs eventually give rise to hormone-like substances that are involved in the regulation of blood pressure, blood coagulation, lipid levels, immune response, tumor growth and inhibition, the inflammatory response to injury and infection, and may play a role in seizure disorders and dementias such as Alzheimer's disease. Fatty acid metabolism is very dynamic and proper balance among essential and non-essential FAs, as well as avoidance of harmful trans-FAs, is required for optimal health and wellness.

The American Heart Association's Nutrition Committee strongly advises these fat guidelines for healthy Americans over age 2:
- Limit total fat intake to less than 25-35 percent of your total calories each day; limit saturated fat intake to less than 7 percent of total daily calories
- Limit trans-fat intake to less than 1 percent (trace) of total daily calories; the remaining fat should come from sources of monounsaturated and polyunsaturated fats such as nuts, seeds, fish and vegetable oils
- Limit cholesterol intake to less than 300 mg per day, for most people. If you have coronary heart disease or your LDL cholesterol level is 100 mg/dL or greater, limit your cholesterol intake to less than 200 mg a day.
- Example: a sedentary female who is 31-50 years old needs about 2,000 calories each day. Therefore, she should consume less than 16 g saturated fat, less than 2 g trans- fat and between 50 and 70 grams of total fat each day (with most fats coming from sources of polyunsaturated and monounsaturated fats, such as fish, nuts, seeds and vegetable oils).

Arachidonic Acid Higher Than Expected

Arachidonic acid (AA) is higher than expected in this sample. Appropriate reduction of sources and/or precursors of AA should be considered. The ratios of AA/EPA and AA/DGLA should be reviewed.

Significance:
- AA is a precursor in the production of pro-inflammatory eicosanoids and the AA cascade. AA is a key inflammatory intermediate.
- Increased AA levels (pro-inflammatory) are associated with a responsive increase in anti-inflammatory tumor-necrosis factor-beta
- In response to increased levels of AA (either via natural processes or via supplementation) there may be a significant reduction of production and resting levels of pro-inflammatory IL-6 and IL-1
- Elevated AA may be associated with increased risk of heart disease

- Higher levels of AA in muscle tissue may correlate with improved insulin sensitivity
- AA may be a regulator of localized muscle inflammation and may stimulate the anabolic tissue-rebuilding response to intense weight training: used by some body builders to enhance muscle size and strength. AA may be marketed as an anabolic body building supplement.

Possible sources of excess AA:
- Excessive dietary intake of fatty red meats, organ meats, egg yolks and dairy products
- Synthesis from excessive linoleic acid (LA) supplementation.

Precautions:
- AA supplementation is not advised during pregnancy or lactation or for people with a history of injury, inflammatory disease or who are otherwise in poor health.
- AA supplementation increases AA concentration in breast milk.
- High AA levels may counteract the anti-inflammatory effects of omega-3 EFA supplementation
- Dietary supplementation of 849-2,000 mg per day of AA in healthy individuals for up to 50 days showed no increases in inflammation or related metabolic activity.
- Omega-6 supplementation should be avoided in seizure disorders

AA/EPA Ratio Higher Than Expected

The AA/EPA ratio in this sample is higher than expected. This means that there is an undesirable preponderance of omega-6 to omega-3 fatty acids. Synthesis of omega-3 FAs is competitively inhibited by the presence of their omega-6 analogues. Therefore omega-3 FAs can be incorporated into membranes more effectively when they are obtained directly from dietary sources or from supplementation, rather than relying solely on in vivo synthesis.

- High AA/EPA ratios are common in diets high in meat and corn oil - balance with (c)-3 fatty acids (e.g. fish oils)
-Lowering the ratio in inflammatory conditions may be of benefit (reduced availability of AA for pro-inflammatory eicosenoid production)
- Supplementation of omega-3 fatty acids (e.g. EPA) significantly reduces AA to EPA ratios; reduces triglyceride levels in healthy subjects but may not have a similar effect in subjects with CAD
- A high ratio may be associated with clinical symptoms of depression
- Children with ADHD appear to have higher AA to EPA ratios compared to normal controls. Lowering the ratio using purified fish oil high in EPA and DHA (omega-3 fatty acids) may improve symptoms of children with ADHD

AA/DGLA Ratio Higher Than Expected

The AA/DGLA ratio in this sample is higher than expected. High AA / DGLA ratios are consistent with a pro-inflammatory state.

The ratio may be high due to a relatively high level of AA (arachidonic acid) or a low level of DGLA (dihomo-gamma-linolenic acid). Check the individual levels of AA and DGLA. Increased levels of AA lead to increased pro-inflammatory eicosanoid production. Low levels of DGLA lead to decreased availability of the anti-inflammatory metabolites of DGLA.

DGLA/AA Lower Than Expedted

The DGLA/AA ratio in this sample is lower than expected.

Low DGLA/AA ratios are consistent with a pro-inflammatory state. The ratio may be low due to a relatively low level of DGLA (dihomo-gamma-linolenic acid)or a high level of AA (arachidonic acid). Check the individual levels of AA and DGLA. Low levels of DGLA lead to decreased availability of the anti-inflammatory metabolites of DGLA. Increased levels of AA lead to increased pro-inflammatory eicosanoid production.