

# Essential and Metabolic Fatty Acids Analysis (RBCs)



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Walk-In Lab  
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## Omega 3 Fatty Acids

| Analyte                           | (cold water fish, flax, walnut) | Reference Range  |
|-----------------------------------|---------------------------------|------------------|
| $\alpha$ -Linolenic (ALA) 18:3 n3 | 0.20                            | $\geq 0.09$ wt % |
| Eicosapentaenoic (EPA) 20:5 n3    | 2.80                            | $\geq 0.16$ wt % |
| Docosapentaenoic (DPA) 22:5 n3    | 2.18                            | $\geq 1.14$ wt % |
| Docosahexaenoic (DHA) 22:6 n3     | 5.2                             | $\geq 2.1$ wt %  |
| <b>% Omega 3s</b>                 | 10.3                            | $\geq 3.8$       |

## Omega 9 Fatty Acids

| Analyte           | (olive oil) | Reference Range |
|-------------------|-------------|-----------------|
| Oleic 18:1 n9     | 12          | 10-13 wt %      |
| Nervonic 24:1 n9  | 3.8         | 2.1-3.5 wt %    |
| <b>% Omega 9s</b> | 16.2        | 13.3-16.6       |

## Saturated Fatty Acids

| Analyte                 | (meat, dairy, coconuts, palm oils) | Reference Range |
|-------------------------|------------------------------------|-----------------|
| Palmitic C16:0          | 20                                 | 18-23 wt %      |
| Stearic C18:0           | 19                                 | 14-17 wt %      |
| Arachidic C20:0         | 0.27                               | 0.22-0.35 wt %  |
| Behenic C22:0           | 0.79                               | 0.92-1.68 wt %  |
| Tricosanoic C23:0       | 0.16                               | 0.12-0.18 wt %  |
| Lignoceric C24:0        | 2.3                                | 2.1-3.8 wt %    |
| Pentadecanoic C15:0     | 0.07                               | 0.07-0.15 wt %  |
| Margaric C17:0          | 0.34                               | 0.22-0.37 wt %  |
| <b>% Saturated Fats</b> | 42.3                               | 39.8-43.6       |

Methodology: GCMS

## Omega 6 Fatty Acids

| Analyte                                    | (vegetable oil, grains, most meats, dairy) | Reference Range  |
|--------------------------------------------|--------------------------------------------|------------------|
| Linoleic (LA) 18:2 n6                      | 15.7                                       | 10.5-16.9 wt %   |
| $\gamma$ -Linolenic (GLA) 18:3 n6          | 0.07                                       | 0.03-0.13 wt %   |
| Dihomo- $\gamma$ -linolenic (DGLA) 20:3 n6 | 0.82                                       | $\geq 1.19$ wt % |
| Arachidonic (AA) 20:4 n6                   | 12                                         | 15-21 wt %       |
| Docosatetraenoic (DTA) 22:4 n6             | 1.09                                       | 1.50-4.20 wt %   |
| Eicosadienoic 20:2 n6                      | 0.36                                       | $\leq 0.26$ wt % |
| <b>% Omega 6s</b>                          | 29.6                                       | 30.5-39.7        |

## Monounsaturated Fats

| Omega 7 Fats        | Reference Range       |
|---------------------|-----------------------|
| Palmitoleic 16:1 n7 | 0.21 $\leq 0.64$ wt % |
| Vaccenic 18:1 n7    | 1.08 $\leq 1.13$ wt % |

## Trans Fat

|                  |                       |
|------------------|-----------------------|
| Elaidic 18:1 n9t | 0.25 $\leq 0.59$ wt % |
|------------------|-----------------------|

## Delta - 6 Desaturase Activity

|                                   | Upregulated | Functional | Impaired |               |
|-----------------------------------|-------------|------------|----------|---------------|
| Linoleic / DGLA 18:2 n6 / 20:3 n6 |             |            |          | 19.3 6.0-12.3 |

## Cardiovascular Risk

| Analyte                    | Reference Range |
|----------------------------|-----------------|
| Omega 6s / Omega 3s        | 2.9 3.4-10.7    |
| AA / EPA 20:4 n6 / 20:5 n3 | 4 12-125        |
| Omega 3 Index              | 8.0 $\geq 4.0$  |

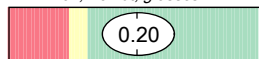
The Essential Fatty Acid reference ranges are based on an adult population.

## Essential Fatty Acid Metabolism

### Omega 3 Family

$\alpha$ -Linolenic Acid

*flax, walnut, grasses*



Stearidonic acid

Eicosatetraenoic acid,  
ETA

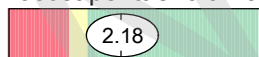
Eicosapentaenoic Acid

*cold water fish*



Anti-inflammatory  
Eicosanoids

Docosapentaenoic Acid



Docosahexaenoic Acid

*cold water fish*



### Omega 6 Family

Linoleic Acid

*grains, vegetable oils*



$\gamma$ -Linolenic Acid

*evening primrose, borage, black currant*



Dihomo- $\gamma$ -Linolenic Acid



Series 1 Prostaglandins  
Anti-inflammatory

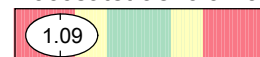
Arachidonic Acid

*animal fats*



Pro-inflammatory  
Eicosanoids

Docosatetraenoic Acid



#### Delta-6 Desaturase

Vitamin and Mineral Cofactors:

FAD (B2), Niacin (B3)  
Pyridoxal-5-phosphate (B6)  
Vitamin C, Insulin, Zn, Mg

#### Elongase

Vitamin and Mineral Cofactors:

Niacin (B3)  
Pyridoxal-5-phosphate (B6)  
Pantothenic Acid (B5)  
Biotin, Vitamin C

#### Delta-5 Desaturase

Vitamin and Mineral Cofactors:

FAD (B2), Niacin (B3)  
Pyridoxal-5-phosphate (B6)  
Vitamin C, Insulin, Zn, Mg

#### Elongase

Vitamin and Mineral Cofactors:

Niacin (B3)  
Pyridoxal-5-phosphate (B6), Biotin  
Pantothenic Acid (B5), Vitamin C

#### Elongase

#### Delta-6 Desaturase

Vitamin and Mineral Cofactors:

FAD (B2), Niacin (B3)  
Pyridoxal-5-phosphate (B6), Biotin  
Vitamin C, Zn, Mg, Carnitine  
Pantothenic Acid (B5)

This test was developed and its performance characteristics determined by Genova Diagnostics, Inc. It has not been cleared by the U.S. Food and Drug Administration.

Commentary

The **Reference Range** is a statistical interval representing 95% or 2 Standard Deviations (2 S.D.) of the reference population. One Standard Deviation (1 S.D.) is a statistical interval representing 68% of the reference population. Values between 1 and 2 S.D. are not necessarily abnormal. Clinical correlation is suggested. (See example below)

Result within Ref Range, but outside 1-SD

