Fatty Acids; Erythrocytes

The typical Western diet contains too many carbohydrates and saturated fats, and is often imbalanced with respect to essential and nonessential fatty acid intake. Erythrocyte fatty acid analysis is used to assess levels of and balance among the essential and non-essential fatty acids required for optimal health and wellness. Essential fatty acids regulate cell membrane integrity, blood pressure and coagulation, lipid levels, immune response, tumor growth and inhibition, and the inflammatory response to injury and infection. Erythrocyte Fatty Acid analysis aids in developing the most efficacious dietary and supplemental treatment program to restore appropriate ratios among fatty acids.

Turnaround Time

3 to 5 days

Analytes Tested

Analyte	CPT	ABN Required
Arachidonic acid; RBC	82492	Yes
Dihomo-g-linolenic acid; RBC	82492	Yes
Docosahexaenoic acid; RBC	82492	Yes
Eicosapentaenoic acid; RBC	82492	Yes
Elaidic acid; RBC	82492	Yes
Linoleic acid; RBC	82492	Yes
Oleic acid; RBC	82492	Yes
Palmitelaidic acid; RBC	82492	Yes
Palmitic acid; RBC	82492	Yes
Palmitoleic acid; RBC	82492	Yes
Stearic acid; RBC	82492	Yes

This test is useful for

- ADD/ADHD
- Alzheimer's Disease
- Autism Spectrum Disorders
- Blood Pressure
- Cardiovascular Health
- Coagulation
- Lipid/Lipoprotein Levels
- Immune Response
- Inflammatory Response to Injury and Infection
- Seizure Disorders
- Tumor Growth and Inhibition

Detailed Information

Fatty acids (FAs) are primarily derived from triglycerides in the food and oils that we consume. Non-essential FAs are also biosynthesized in the body, especially during times when carbohydrate intake exceeds the body's needs for glucose and glycogen repletion. Non-essential FAs are most commonly recognized as an important source of energy, and when caloric intake exceeds expenditure, these FAs are stored in adipose tissue as triglycerides. However, FA metabolism is much more complex and it is well established that appropriate balance among essential and non-essential FAs, as well as avoidance of harmful trans-FAs, is required for optimal health and wellness.

FAs are monocarboxylic acids that may be either saturated (no C=C double bonds) or unsaturated (one or more C=C double bonds). Humans make saturated fatty acids and a monounsaturated fatty acid with a double bond at the omega-9 position but do not have the enzymes necessary to introduce a double bond at the omega-3 (ω-3) or omega-6 (ω-6) positions. The essential fatty acids (EFAs) linoleic acid (18:2) and α-linoleic acid (18:3) are polyunsaturated fatty acids (PUFAs) that are precursors of the ω-6 and ω-3 fatty acid series, respectively. The ω-6 and ω-3 FAs compete for desaturase and elongation enzymes that produce longer-chain, more highly unsaturated FAs. The typical Western diet contains an undesirable preponderance of ω-6 fatty acids that impedes elongation and desaturation of ω-3 FAs. FAs derived from EFAs or taken in via diet or supplements are essential components of cell membrane phospholipids, and appropriate membrane fatty acid content is pivotal for optimal membrane fluidity, receptor activity and cellular metabolism. The same FAs eventually give rise to hormone-like substances (eicosanoids) that are involved in the regulation of blood pressure and coagulation, lipid levels, immune response, tumor growth and inhibition, and the inflammatory response to injury and infection, and may play a role in seizure disorders and dementias such as Alzheimer's disease.

Appropriate balance of membrane phospholipid EFAs is important because the biological effects of the ω-3 and ω-6 FAs metabolites are mediated by their mutual interactions.

This test measures the primary ω-6 and ω-3 PUFAs, and monounsaturated, saturated and trans FAs that are present as constituents of phospholipids in the membranes of erythrocytes. Each FA is reported as a percentage of the total FAs measured and important FA ratios are presented. Commentary is provided for results exceeding reference intervals.