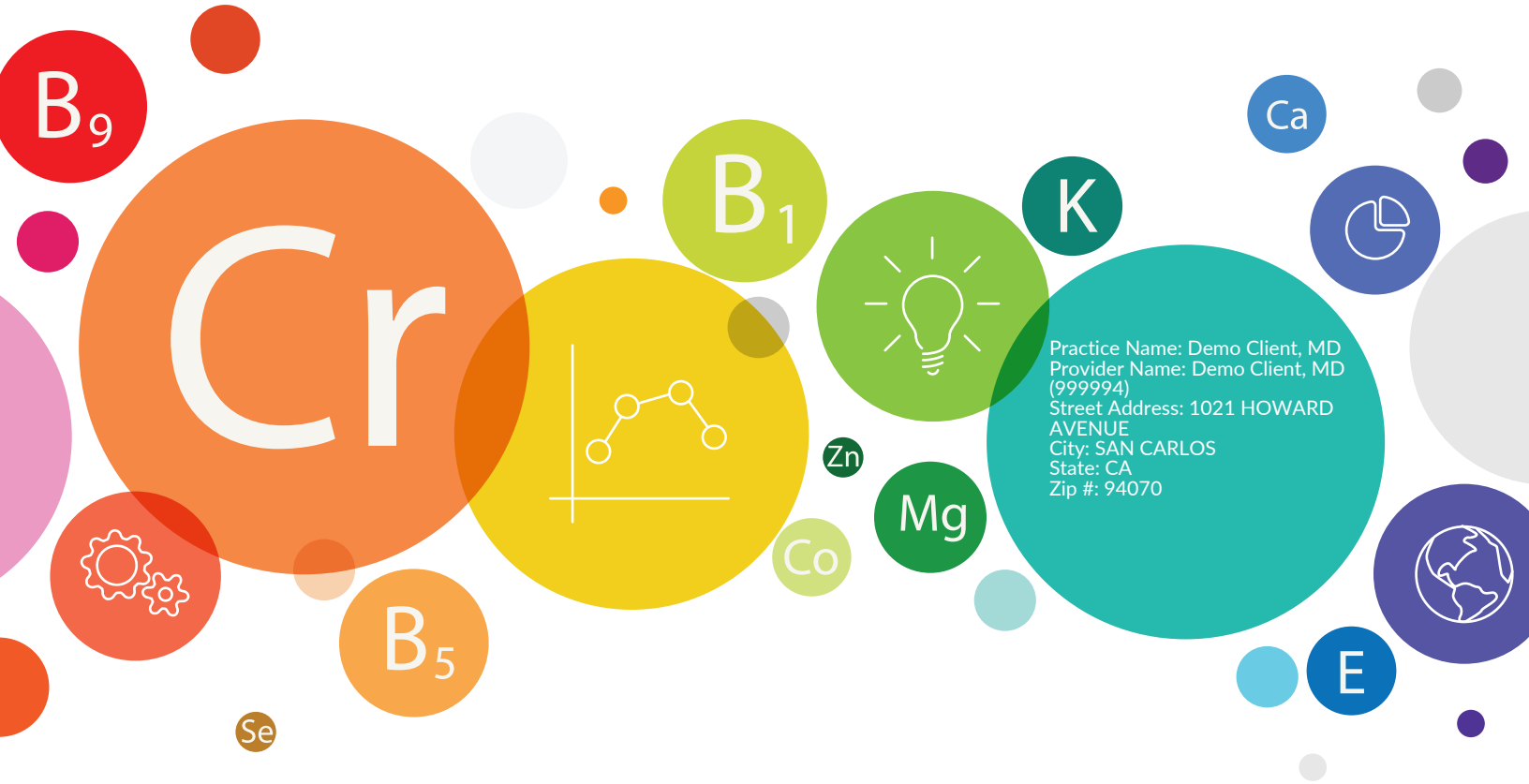


# MICRONUTRIENT

*Your guide to customized optimal nutrition.*

VibrantAmerica

1 (866) 364-0963

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1021 Howard Ave. Ste. B
San Carlos, CA 94070

MK-0053-01

| | | | |
|---|---|---|---|
| Final Report Date: | 02-12-2018 18:08 | Specimen Collected: | 11-30-2015 |
| Accession ID: | 1512010000 | Specimen Received: | 12-01-2015 00:00 |

| LAST NAME | FIRST NAME | MIDDLE NAME | DATE OF BIRTH | GENDER | PHYSICIAN ID |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | Female | 999994 |

## PATIENT

Name: PATIENT TESTNAME
Date of Birth: 1994-10-10
Gender: Female
Age: 23

Medical Record Number:
Telephone #: 866-364-0963
Street Address: 1021 HOWARD AVENUE SUITE B
City: SAN CARLOS
State: CA
Zip #: 94070

Email:

## PROVIDER

Practice Name: Demo Client, MD
**Provider Name: Demo Client, MD (999994)**
Phlebotomist:
Street Address: 1021 HOWARD AVENUE
City: SAN CARLOS
State: CA
Zip #: 94070
Telephone #: 1-800-842-7268
Fax #:

For doctor's reference

***Vibrant America*** is pleased to present to you micronutrient testing that provides a comprehensive extracellular and intracellular assessment of the levels of the most important vitamins, minerals, antioxidants, fatty acids, and amino acids to help you make healthy lifestyle choices in consultation with your physicians and dietitians.

***Testing Methodology:*** The blood sample is spun down so that the serum can be taken from the top and RBCs from the bottom. The remaining sample is processed to isolate PBMCs (Peripheral Blood Mononuclear cells). All three subsets are processed separately to isolate appropriate micronutrients for injection into mass-spectrometry. Micronutrients measured in RBCs include: folate, omega-3 and omega-6 fatty acids, and magnesium. Serum micronutrient measurements provide extracellular levels. WBC measurements are done and total WBC counts are taken on an automated cell counter. Intracellular WBC levels are normalized to the total WBC count in a patient's sample.

***Interpretation of Report:*** The test results of micronutrient levels are displayed in 3 columns – Serum, RBC and WBC. Black↑suggests higher than normal value compared to a reference population and Red↓ suggests lower than normal value compared to a reference population. Green suggests normal levels. WBC Measurements are reported as pg/MM WBC- picograms of micronutrient per Million White Blood Cells.

The statements in this report have not been evaluated by the Food and Drug Administration. Please consult your physician/dietitian for medication, treatment, or life style management. This product is not intended to diagnose, treat, or cure any disease.

***Please Note - It is important that you discuss any modifications to your diet, exercise, and nutritional supplementation with your physician before making any changes. To schedule an appointment with a Vibrant clinical dietitian please call: Toll-Free 866-364-0963***

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| LAST NAME | FIRST NAME | MIDDLE NAME | DATE OF BIRTH | ACCESSION ID |
|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

# SUMMARY

## Serum Micronutrient

| Abnormal | Recommended Daily Intake | Suggested supplementation | Provider Recommendation |
|---|---|---|---|
| Vitamin B3 ↓ | RDA: 20 mg/day | | |
| Iron ↑ | AI for iron varies by gender and age | | |

## WBC Micronutrient

| Abnormal | Recommended Daily Intake | Suggested supplementation | Provider Recommendation |
|---|---|---|---|
| Zinc ↓ | RDA: 8mg/day for women 11mg/day for men | Men: 11 mg/day Women: 8 mg/day | |
| Cysteine ↓ | There is currently no established RDA, AI, or UL for cysteine | | |

## RBC Micronutrient

| Abnormal | Recommended Daily Intake | Suggested supplementation | Provider Recommendation |
|---|---|---|---|
| LA ↓ | No recommended intake established | Supplementation usually not necessary | |

All supplement and dietary suggestions for specific micronutrients must be evaluated and approved by your provider. Suggested Supplementation is based off references provided at the end of this report. Please see detailed explanation for each micronutrient and follow your ordering providers' recommendation before using this as a therapeutic intake.

| LAST NAME | FIRST NAME | MIDDLE NAME | DATE OF BIRTH | ACCESSION ID |
|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

## What Do I Do With The Information From This Test?

*Your provider will discuss any nutrient deficiencies identified on the report.*

| Extracellular | Intracellular | Likely Interpretation |
|---|---|---|
| Normal | Normal | No action is required. |
| Deficient | Normal | The long term nutrient status is optimal, but short term needs improvement. Consider food sources and/or supplements recommended by your provider. Also consider if genetic SNPs or medications may have an affect on depletion. |
| Normal/Excess | Deficient | The short term status of micronutrients is optimal, but absorption may be a problem, as long as extracellular levels are not outside of normal levels. Recommend increasing dietary intake of the nutrient, or increasing supplementation dosage; consider a bioavailable version of the supplement if available. Consider additional follow up testing to identify your source of malabsorption. |
| Deficient | Deficient | Consider increasing dietary intake of food sources of the nutrient or increasing supplementation dosage; consider a bioavailable version of the supplement if available. Consider testing for genetic SNPs that affect nutrient status or assessing medication interactions. If retest shows that the nutrient levels are still not optimal, identify the source of malabsorption. |

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| LAST NAME | FIRST NAME | MIDDLE NAME | DATE OF BIRTH | ACCESSION ID |
|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

| | Micronutrient | Serum | | | WBC | | | RBC | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Previous | Ref | Current | Previous | Ref | Current | Previous | Ref |
| Vitamins | Vitamin A | 94.1 | 80.4 | 42.0~153.7 (mcg/dL) | 15.0 | 1.0 ↓ | 1.9~31.9 (pg/MM WBC) | | | |
| | Vitamin B1 | 78.2 | 25.1 | 2.2~107.3 (nmol/L) | 1.4 | 2.0 | 0.2~2.8 (pg/MM WBC) | | | |
| | Vitamin B2 | 120.8 | 189.1 | 9.9~261.7 (mcg/L) | 1.6 | 5.8 | 0.2~7.1 (pg/MM WBC) | | | |
| | Vitamin B3 | 2.5 ↓ | 17.1 | 2.6~76.8 (ng/mL) | 51.8 | 98.7 | 21.1~171.9 (pg/MM WBC) | | | |
| | Vitamin B6 | 1.1 | 1.6 | 0.7~447.6 (ng/mL) | 1.7 | 1.0 | 0.2~2.1 (pg/MM WBC) | | | |
| | Vitamin B12 | 975 | 750 | 232~1245 (ng/L) | | | | | | |
| | Vitamin B5 | 170.0 | 258.1 | 20.5~346.4 (mcg/L) | 4.1 | 2.1 | 0.5~6.7 (pg/MM WBC) | | | |
| | Vitamin C | 0.7 | 0.7 | 0.4~2.2 (mg/dL) | 4.8 | 2.1 | 0.8~5.4 (ng/MM WBC) | | | |
| | Vitamin D3 | 1.9 | 2.4 | 1.3~9.5 (ng/mL) | 49.1 | 80.1 | 17.5~129.0 (pg/MM WBC) | | | |
| | Vitamin D, 25-OH | 54 | 15 ↓ | ≥30 (ng/mL) | | | | | | |
| | Vitamin E | 17.8 | 17.5 | 7.1~43.1 (mg/L) | 198.2 | 105.4 | 34.8~652.6 (pg/MM WBC) | | | |
| | Vitamin K1 | 1.1 | 1.6 | 0.2~13.3 (ng/mL) | 0.08 | 0.14 | 0.02~0.23 (pg/MM WBC) | | | |
| | Vitamin K2 | 1.48 | 1.10 | ≥0.08 (ng/mL) | 0.07 | 0.04 | 0.02~0.27 (pg/MM WBC) | | | |
| | Folate | 2.8 | 17.0 | 1.5~20.6 (ng/mL) | | | | 89.1 | 95.1 | ≥71.4 (ng/mL) |

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|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

| | Micronutrient | Serum | | | WBC | | | RBC | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Previous | Ref | Current | Previous | Ref | Current | Previous | Ref |
| Minerals | Calcium | 9.3 | 9.2 | 8.9~10.6 (mg/dL) | 250 | 345 | 69~351 (ng/MM WBC) | | | |
| | Manganese | 1.8 | 0.9 | ≤2.2 (ng/mL) | 21 | 158 | 21~236 (pg/MM WBC) | | | |
| | Zinc | 1.0 | 0.8 | 0.7~1.6 (mcg/mL) | 4 ↓ | 10 | 5~12 (ng/MM WBC) | | | |
| | Copper | 0.7 | 1.0 | 0.7~1.8 (mcg/mL) | 1400 | 2700 | 878~3296 (pg/MM WBC) | | | |
| | Chromium | 0.1 | 0.2 | ≤0.3 (ng/mL) | 4 | 2 | ≤8 (pg/MM WBC) | | | |
| | Iron | 175 ↑ | 110 | 35~150 (mcg/dL) | | | | 111.4 | 127.4 | 96.1~133.4 (mg/dL) |
| | Magnesium | 1.9 | 2.0 | 1.6~2.6 (mg/dL) | | | | 5.0 | 2.9 ↓ | 3.6~7.7 (mg/dL) |
| | Copper to Zinc Ratio | 0.7 | 1.3 ↑ | 0.7~1.0 (0) | | | | | | |
| Metabolites | Choline | 10.7 | 14.8 | 8.6~24.1 (nmol/mL) | 2.3 | 1.4 | 0.3~4.0 (ng/MM WBC) | | | |
| | Inositol | 45.0 | 78.4 ↑ | 20.3~50.6 (nmol/mL) | 3.4 | 1.5 | 0.2~4.2 (ng/MM WBC) | | | |
| | Carnitine | 37.0 | 20.1 | 16.6~47.1 (nmol/mL) | 3.7 | 0.9 | 0.5~5.4 (ng/MM WBC) | | | |
| | MMA | <0.1 | 0.1 | ≤0.8 (nmol/mL) | 34.2 | 20.0 | ≤43.1 (pg/MM WBC) | | | |
| Electrolytes | Sodium | 140 | 141 | 136~145 (mmol/L) | | | | | | |
| | Potassium | 4.7 | 2.1 ↓ | 3.5~5.5 (mmol/L) | | | | | | |

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|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

| | Micronutrient | Serum | | | WBC | | | RBC | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Previous | Ref | Current | Previous | Ref | Current | Previous | Ref |
| Amino Acids | Asparagine | 81.4 | 74.1 | 37.8~131.8 (nmol/mL) | 1.1 | 0.4 | 0.2~1.6 (ng/MM WBC) | | | |
| | Glutamine | 678.7 | 589.2 | 295.3~721.8 (nmol/mL) | 10.4 | 5.5 | 3.6~13.3 (ng/MM WBC) | | | |
| | Serine | 114.1 | 79.1 | 58.0~139.6 (nmol/mL) | 12.1 | 7.9 | 1.4~13.9 (ng/MM WBC) | | | |
| Antioxidants | Coenzyme Q10 | 1.89 | 1.17 | 0.59~2.07 (mcg/mL) | 300.1 | 247.5 | 33.7~339.3 (pg/MM WBC) | | | |
| | Cysteine | 30.0 | 27.8 | 11.0~36.1 (nmol/mL) | 10.0 ↓ | 10.5 ↓ | 15.0~1009.3 (pg/MM WBC) | | | |
| | Glutathione | 1.4 | 1.0 | 0.5~1.9 (nmol/mL) | 440.5 | 700.1 | 111.9~1446.3 (pg/MM WBC) | | | |
| | Selenium | 187.0 | 169.0 | 168.0~276.3 (ng/mL) | 378 | 125 | 74~469 (pg/MM WBC) | | | |
| Fatty Acids: Omega-3 & 6 | EPA | | | | | | | <1.15 | <1.15 | 0.16~1.45 (%) |
| | DPA | | | | | | | <1.83 | <1.83 | 0.73~1.99 (%) |
| | DHA | | | | | | | 7.85 | 6.04 | 1.12~9.58 (%) |
| | Total Omega-3 | | | | | | | 10.21 | 1.48 ↓ | 1.89~12.82 (%) |
| | LA | | | | | | | 0.44 ↓ | 2.60 | 1.36~8.62 (%) |
| | AA | | | | | | | 12.60 | 1.20 ↓ | 3.10~20.23 (%) |
| | Total Omega-6 | | | | | | | 19.12 | 25.10 | 7.43~36.90 (%) |
| | Omega-3 Index | | | | | | | 20.00 | 307.00 | ≥8.01 (%) |

| LAST NAME | FIRST NAME | MIDDLE NAME | DATE OF BIRTH | ACCESSION ID |
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| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

## VITAMINS

### Physiological Function

Niacin is extensively involved in metabolic reduction reactions through NAD-NADPH pathways. Over 200 enzymes in the human body require niacin.

Other important major functions of niacin include: fatty acid synthesis, ATP synthesis, DNA repair, lower cholesterol/LDL, aids in circulation.

### How it gets depleted

Synthesized from tryptophan and uses iron, B6 and riboflavin as cofactors; deficiencies of these companion nutrients may be underlying causes.

Can be depleted by oral contraceptives and statin drugs.


### Clinical Manifestations of Depletion

Symptoms of niacin deficiency include:
vomiting, constipation, red tongue, headache, fatigue, and depression.

Severe deficiency of niacin is called pellagra. Pellagra is commonly accompanied by the following 4Ds: dermatitis, diarrhea, dementia, death.

### Food Sources

The most concentrated sources of niacin are in animal products (pork), peanuts/peanut butter, tofu, and eggs.

Also consider food sources high in tryptophan

*Enriched grains provide supplemental niacin.

### Supplement Options

- The RDA for niacin is 20 mg/day.
- The UL for niacin is 35 mg/day, but oral administration up to 6g per day has been used without side effects.
- Niacin is often recommended therapeutically for lipid management. Niacin has been shown to lower LDL cholesterol, lipoprotein(a), triglyceride, and fibrinogen levels, while raising HDL levels.
- Flushing can occur at high doses. Aspirin may help reduce flushing. Time release niacin or no-flush niacin is not recommended for therapeutic treatment.
- Monitor liver function carefully with high dose Niacin supplementation.

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# MINERALS

## Physiological Function

- Iron is required for the production of red blood cells (a process known as hematopoiesis), but it's also part of hemoglobin (that is the pigment of the red blood cells) binding to the oxygen and thus facilitating its transport from the lungs via the arteries to all cells throughout the body. Once the oxygen is delivered, the iron (as part of hemoglobin) binds the carbon dioxide which is then transported back to the lung, from where it gets exhaled. Iron is also involved in the conversion of blood sugar to energy.
- The production of enzymes (which play a vital role in the production of new cells, amino acids, hormones and neurotransmitters) also depends on iron, this aspect becomes crucial during the recovery process from illnesses or following strenuous exercise.
- The immune system is dependent on iron for its efficient functioning. Physical and mental growth require sufficient iron levels, particularly important in childhood and pregnancy, where the developing baby solely depends on its mother's iron supplies.

## How it gets depleted

Iron is lost by the body through a variety of ways including urination, defecation, sweating, and exfoliating of old skin cells. Bleeding contributes to further loss of iron which is why women have a higher demand for iron than men. If iron stores are low, normal hemoglobin production slows down, which means the transport of oxygen is diminished, resulting in symptoms such as fatigue, dizziness, lowered immunity or reduced ability for athletes to keep up with their training programs. Since our bodies can't produce iron itself, we need to make sure we consume sufficient amounts of iron as part of our daily diet.


## Food Sources

Mild iron deficiency can be prevented or corrected by eating iron-rich foods and by cooking in an iron skillet. Because iron is a requirement for most plants and animals, a wide range of foods provide iron. Good sources of dietary iron have heme-iron as this is most easily absorbed and is not inhibited by medication or other dietary components. Two examples are red meat, and poultry.

Non-heme sources do contain iron, though it has reduced bioavailability. Examples are lentils, beans, leafy vegetables, pistachios, tofu, fortified bread, and fortified breakfast cereals. Iron from different foods is absorbed and processed differently by the body; for instance, iron in meat (heme iron source) is more easily absorbed than iron in grains and vegetables (non-heme iron source) but heme/hemoglobin from red meat has effects which may increase the likelihood of colorectal cancer. Minerals and chemicals in one type of food may also inhibit absorption of iron from another type of food eaten at the same time. For example, oxalates and phytic acid form insoluble complexes which bind iron in the gut before it can be absorbed.

Because iron from plant sources is less easily absorbed than the heme bound iron of animal sources, vegetarians and vegans should have a somewhat higher total daily iron intake than those who eat meat, fish or poultry. Legumes and dark-green leafy vegetables like broccoli, kale and oriental greens are especially good sources of iron for vegetarians and vegans. However, spinach and Swiss chard contain oxalates which bind iron making it almost entirely unavailable for absorption. Iron from nonheme sources is more readily absorbed if consumed with foods that contain either heme- bound iron or vitamin C.

## Clinical Manifestations of Depletion

Symptoms of iron deficiency can occur even before the condition has progressed to iron deficiency anemia. Symptoms of iron deficiency are not unique to iron deficiency
Iron is needed for many enzymes to function normally, so a wide range of symptoms may eventually emerge, either as the secondary result of the anemia, or as other primary results of iron deficiency. Symptoms of iron deficiency include: fatigue, dizziness, pallor, hair loss, twitches, irritability, weakness, pica, brittle or grooved nails.

## Supplement Options

Frequently used forms of iron in supplements include ferrous and ferric iron salts, such as ferrous sulfate, ferrous gluconate, ferric citrate, and ferric sulfate. Because of its higher solubility, ferrous iron in dietary supplements is more bioavailable than ferric iron. High doses of supplemental iron (45 mg/day or more) may cause gastrointestinal side effects, such as nausea and constipation. Other forms of supplemental iron, such as heme iron polypeptides, carbonyl iron, iron amino-acid chelates, and polysaccharide-iron complexes, might have fewer gastrointestinal side effects than ferrous or ferric salts. Many medicinal herbs can offer iron boosting properties to those who suffer from iron deficiency. These medicinal properties can easily be assimilated into the bloodstream as a hot water infusion (tea). Iron enhancing herbs include yellow dock, red raspberry leaf, gentian, yellow root, turmeric, mullein, nettle, parsley, ginseng, watercress, and dandelion.

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## Clinical Manifestations of Depletion

- Zinc deficiency causes delayed growth and sexual development, decreased immune function, altered sense of taste, hair loss, pregnancy complications, and gastrointestinal distress.
- Loss of zinc from cell membranes impairs their function and increases the susceptibility of the membrane to oxidative damage.
- Loss of zinc through malabsorption increases susceptibility to infections through depressed immune function.
- Increased urination in individuals with diabetes mellitus may lead to marginal zinc deficiency.
- Individuals that may have higher risk of zinc deficiency include: pregnant and lactating women; patients receiving total parenteral nutrition (TPN); malnourished individuals; individuals with eating disorders such as anorexia nervosa; individuals with impaired intestinal absorption and/or persistent diarrhea such as celiac disease, Crohn's disease, and ulcerative colitis; alcoholics and individuals with liver disease; individuals over 65 years of age; strict vegetarians.

## Physiological Function

Zinc is critical for normal growth and sexual maturation. It plays a role in the immune system and is important to the proper function of at least 300 enzymes. Zinc plays a critical role in the structure of proteins and cell membranes.

Zinc also regulates gene function, influences cell signaling, hormone release, and nerve signaling.


## Food Sources

Oysters, beef and clams are rich sources of absorbable zinc.

Whole grains also contain zinc, but it is less available for absorption due to high phytic acid content of grains.

## How it gets depleted

Insufficient dietary intake, especially in populations that rely heavily on cereal grains for caloric intake, due to high levels of phytic acid impairing uptake of zinc.

While higher doses of supplementary zinc uptake impair the uptake of copper, intake of copper does not impair the uptake of zinc except when zinc status is already at least marginally deficient.

Supplementation of elemental iron may decrease absorption of zinc. For this reason, pregnant women and individuals with anemia that are supplementing iron may need to take supplemental zinc, separate from iron supplement.
.

## Supplement Options

- The RDA for zinc is 8mg/day for women and 11mg/day for men.
- The UL for zinc is 40mg/day. Long-term supplementation of zinc at levels of 60mg/day or greater interfere with absorption of copper.
- Zinc lozenges are commonly used to shorten the duration of the common cold.
- Zinc comes in the forms of: zinc acetate, zinc gluconate, zinc picolinate, zinc sulfate, zinc carnosine.
- Zinc carnosine has been used in combination therapies to aid in supporting the health of the epithelial linings of both the stomach and the intestines during times of physiological stress such as stomach ulcers and impaired intestinal barrier function.
- Zinc can be toxic when consumed in large doses, or when taken for prolonged periods of time in the absence of a zinc deficiency.
- Single doses of 200-450mg of zinc may induce vomiting and gastrointestinal distress.

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## ANTIOXIDANTS

### Physiological Function

- Cysteine has antioxidant properties itself, but is also a precursor molecule to glutathione production, the master antioxidant.
- Cysteine is also an important source of sulfide for iron-sulfide metabolism.
- Cysteine will bind metals easily to its thiol group, such as iron, nickel, copper, zinc, and heavy metals such as mercury and lead, which may confer some chelation benefits.
- Cysteine counteracts acetaldehyde effects from consumption of alcohol and can reduce hangovers.

### How it gets depleted

Cysteine can be synthesized endogenously as long as sufficient methionine is available in the diet. Depletion is extremely rare.


### Clinical Manifestations of Depletion

Depletion or deficiency of cysteine is not common, as cysteine can be made endogenously, but can conditionally be required in greater amounts due to its strong antioxidant and detoxification properties.

### Food Sources

Dietary sources of cysteine include: meat, poultry, eggs, dairy, red peppers, garlic, onions, broccoli, Brussels sprouts, oats, granola, wheat germ, and lentils.

### Supplement Options

- There is currently no established RDA, AI, or UL for cysteine.
- Cysteine is typically purchased in supplement form as N-acetyl-cysteine (NAC).
- Cysteine can be purchased as L-cysteine in powder form.
- For general antioxidant support, doses start at 500mg/day and can increase depending upon direction from medical provider.

AVOID: D-cysteine or D-cystine, which are toxic

| LAST NAME | FIRST NAME | MIDDLE NAME | DATE OF BIRTH | ACCESSION ID |
|---|---|---|---|---|
| TESTNAME | PATIENT | | 1994-10-10 | 1512010000 |

## FATTY ACIDS: OMEGA-3 & 6

### Physiological Function

Linolenic Acid is considered the "parent" omega-6 fatty acid. All other omega-6 fatty acids are synthesized from linolenic acid by desaturation and elongation reactions. Thus, linolenic acid must be consumed in the diet in order for all omega-6 fatty acids to be used and incorporated into the body's cells and cell membranes.

LA stimulates cell division and repair.

### How it gets depleted

Given the large quantities of vegetable oils in the typical western diet, depletion or low levels of LA are usually only seen in on a fat-free diet, a diet very restricted in dietary fat or in situations of fat malabsorption.


### Clinical Manifestations of Depletion

Inadequate LA may result in eczema-like skin manifestations or impaired wound healing.

Too much LA typically results from following a high fat diet, particularly high in refined vegetable oils.

High consumption of Linolenic Acid is associated with pro-inflammatory conditions and adverse health risks.

There are also correlations with increased risk for certain cancers: breast, colon and prostate, as excess amounts of this fatty acid can lead to abnormal cell division.

### Food Sources

Linolenic acid is found in high concentrations in vegetable oils. Corn, soybean, sunflower, safflower, canola, and peanut oil, provide the greatest amount of dietary linolenic acid. Other dietary sources include avocados, nuts, and seeds.

### Supplement Options

There is typically no need for supplementation of linolenic acid or any omega-6 fatty acid, as these fats are plentiful in the western diet.

Decreasing intake of refined vegetable oil (corn, soy, peanut, canola, safflower oil) and replacing with an alternative choice such as olive oil, coconut oil, avocado oil, fat from animal sources is the best way to LA levels

## Key Terms/Glossary

**AI**
Adequate Intake. A nutrient measure used when RDA cannot be determined due to insufficient data. AIs are approximations of nutrient needs and based on average intake in a healthy population.

**Antioxidant**
A chemical compound that serves to quench free radicals and other reactive species produced by the process of oxidation, thereby reducing cellular protein damage, as well as inflammation.

**Cofactor**
A substance that is required for the activity of an enzyme or another protein in a biochemical reaction.

**Conditionally Essential**
Nutrients that become essential only in certain situations: stress, drug interactions, illness, aging, etc.

**Enriched**
Refers to refined cereal grains that have had nutrients added back after processing removes the bran and the germ layers. In the United States, enriched grains have the B vitamins (thiamin, riboflavin, niacin, folic acid) and iron added in. Fiber is not added back to enriched grains.

**Essential**
Refers to a nutrient that is required for life and body function that the body cannot synthesize (produce) on its own. For dietary vitamins, minerals, fatty acids, and amino acids, many, but not all, are essential.

**RDA**
Recommended Daily Allowance. The estimated amount of a nutrient or calories per day set by the Food and Nutrition Board of the National Research Council. RDA intake level for a particular nutrient that will meet the needs for healthy individuals. RDAs are usually determined for different groups (male, female, children, elderly, pregnant, lactating, etc.) RDAs were originally developed during World War II for soliders' meal ratio's with the intention to prevent frank nutrient deficiencies. They do not take into consideration interactions/depletions from medications or lifestyle factors.

## Citations/Sources

[1] ConsumerLab.com, 2017, https://www.consumerlab.com/RDAs/. Accessed 27 Sept. 2017.
[2] Liska, Dan, David Jones, Robert Lerman, Jeffrey Bland, and Linda Costra. Clinical Nutrition A Functional Approach. 2nd ed., Gig Harbor, Washington, The Institute of Functional medicine, 2006.
[3] Orgen State University, 2017, lpi.oregonstate.edu/mic. Accessed 27 Sept. 2017.
[4] Houston, Mark C., and Stephen T. Sinatra. Clinical Nutrition A Functional Approach. CRC Press, 2015.

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## RISK AND LIMITATIONS

This test has been laboratory developed and its performance characteristics determined by Vibrant America LLC, a CLIA and CAP certified laboratory performing the test. The test has not been cleared or approved by the U.S. Food and Drug Administration (FDA). Although FDA does not currently clear or approve laboratory-developed tests in the U.S., certification of the laboratory is required under CLIA to ensure the quality and validity of the tests.

However, laboratory error can occur, which might lead to incorrect results. Some of them may include sample mislabeling or contamination, operational error, or failure to obtain data for certain micronutrients. Vibrant's laboratory may need a second sample to complete the testing. Vibrant America has effective procedures in place to protect against technical and operational problems; however, such problems may still occur. Examples include failure to obtain the result for a specific micronutrient due to circumstances beyond Vibrant's control. Vibrant may re-test a sample in order to obtain these results but upon re-testing the results may still not be obtained. As with all medical laboratory testing, there is a small chance that the laboratory could report incorrect results. A tested individual may wish to pursue further testing to verify any results.

All supplement and dietary suggestions for specific micronutrients must be evaluated and approved by your provider. Suggested Supplementation is based off references provided at the end of this report. Please see detailed explanation for each micronutrient and follow your ordering providers' recommendation before using this as a therapeutic intake.

A limitation of this testing is that most scientific studies have been performed in Caucasian populations only. The interpretations and recommendations are done in the context of Caucasian studies, but the results may or may not be relevant to tested individuals of different or mixed ethnicities. Please note that pediatric ranges have not been established for these tests. Interference studies have not been established for individuals on immunosuppressive drugs. Based on test results and other medical knowledge of the tested individual, health care providers might consider additional independent testing, or consult another health care provider.