Amino Acids (Plasma)

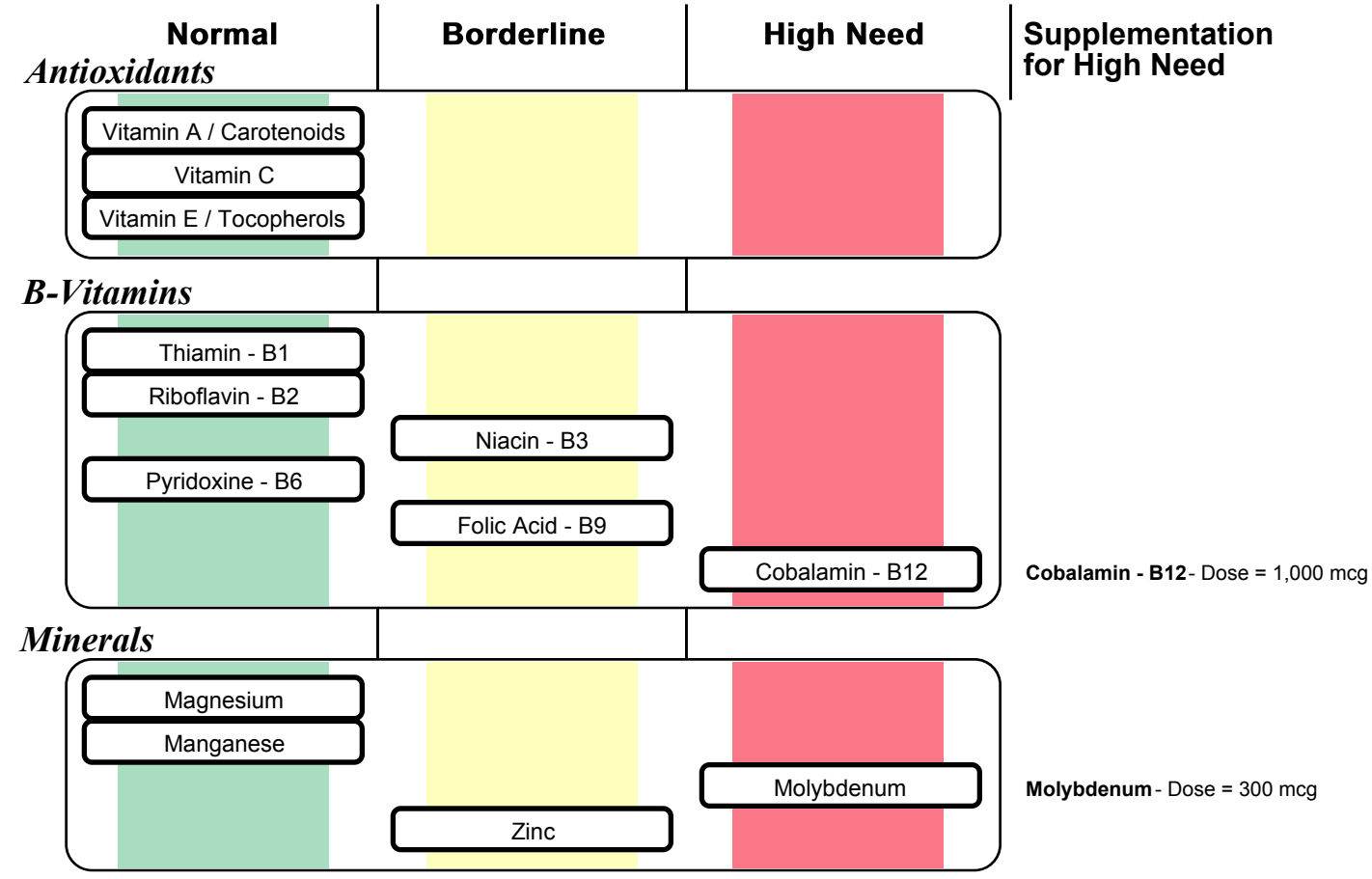
Physician Copy

GENOVA DIAGNOSTICS

63 Zillicoa Street
Asheville, NC 28801

Patient: **JANE**
DOE
DOB:
Sex:
MRN:

Results Overview



SUGGESTED SUPPLEMENT SCHEDULE

Supplements	Daily Recommended Intake (DRI)	Patient's Daily Recommendations	Provider Daily Recommendations
Antioxidants			
Vitamin A / Carotenoids	2,333 IU	3,000 IU	
Vitamin C	75 mg	250 mg	
Vitamin E / Tocopherols	22 IU	100 IU	
B-Vitamins			
Thiamin - B1	1.1 mg	10 mg	
Riboflavin - B2	1.1 mg	10 mg	
Niacin - B3	14 mg	30 mg	
Pyridoxine - B6	1.5 mg	10 mg	
Folic Acid - B9	400 mcg	800 mcg	
Cobalamin - B12	2.4 mcg	1,000 mcg	
Minerals			
Magnesium	320 mg	400 mg	
Manganese	1.8 mg	3 mg	
Molybdenum	45 mcg	300 mcg	
Zinc	8 mg	20 mg	
Digestive Support			
Pancreatic Enzymes		0 IU	

Amino Acid	mg/day	Amino Acid	mg/day
Arginine	0	Methionine	87
Asparagine	0	Phenylalanine	79
Cysteine	0	Serine	0
Glutamine	0	Taurine	0
Glycine	0	Threonine	0
Histidine	0	Tryptophan	125
Isoleucine	228	Tyrosine	0
Leucine	129	Valine	24
Lysine	0		

Recommendations for age and gender-specific supplementation are set by comparing levels of nutrient functional need to optimal levels as described in the peer-reviewed literature. They are provided as guidance for short-term support of nutritional deficiencies only.

The Suggested Supplemental Schedule is provided at the request of the ordering practitioner. Any application of it as a therapeutic intervention is to be determined by the ordering practitioner.

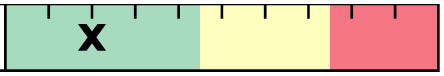
Key Normal | Borderline | High Need

Amino Acids, Plasma Interpretation At-A-Glance

Nutritional Needs

Antioxidants

Vitamin A / Carotenoids

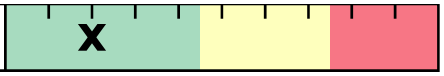


- Beta-carotene & other carotenoids are converted to vitamin A (retinol), involved in vision, antioxidant & immune function, gene expression & cell growth.
- Vitamin A deficiency may occur with chronic alcoholism, zinc deficiency, hypothyroidism, or oral contraceptives containing estrogen & progestin.
- Deficiency may result in night blindness, impaired immunity, healing, & tissue regeneration, increased risk of infection, leukoplakia, or keratosis.
- Food sources include cod liver oil, fortified cereals & milk, eggs, sweet potato, pumpkin, carrot, cantaloupe, mango, spinach, broccoli, kale & butternut squash.

Vitamin C

- Vitamin C is an antioxidant (also used in the regeneration of other antioxidants). It is involved in cholesterol metabolism, the production & function of WBCs and antibodies, and the synthesis of collagen, norepinephrine and carnitine.
- Deficiency may occur with oral contraceptives, aspirin, diuretics or NSAIDs.
- Deficiency can result in scurvy, swollen gingival, periodontal destruction, loose teeth, sore mouth, soft tissue ulcerations, or increased risk of infection.
- Food sources include oranges, grapefruit, strawberries, tomato, sweet red pepper, broccoli and potato.

Vitamin E / Tocopherols



- Alpha-tocopherol (body's main form of vitamin E) functions as an antioxidant, regulates cell signaling, influences immune function and inhibits coagulation.
- Deficiency may occur with malabsorption, cholestyramine, colestipol, isoniazid, orlistat, olestra, and certain anti-convulsants (e.g., phenobarbital, phenytoin).
- Deficiency may result in peripheral neuropathy, ataxia, muscle weakness, retinopathy, and increased risk of CVD, prostate cancer and cataracts.
- Food sources include oils (olive, soy, corn, canola, safflower, sunflower), eggs, nuts, seeds, spinach, carrots, avocado, dark leafy greens and wheat germ.

Key

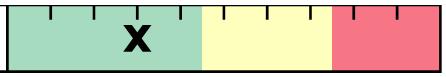
- Function
- Causes of Deficiency
- Complications of Deficiency
- Food Sources

Amino Acids, Plasma Interpretation At-A-Glance

Nutritional Needs

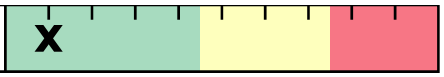
B-Vitamins

Thiamin - B1



- B1 is a required cofactor for enzymes involved in energy production from food and in the synthesis of ATP, GTP, DNA, RNA and NADPH.
- Low B1 can result from chronic alcoholism, diuretics, digoxin, oral contraceptives and HRT or large amounts of tea & coffee (contain anti-B1 factors).
- B1 deficiency may lead to dry beriberi (e.g., neuropathy, muscle weakness), wet beriberi (e.g., cardiac problems, edema), encephalopathy or dementia.
- Food sources include lentils, whole grains, wheat germ, Brazil nuts, peas, organ meats, brewer's yeast, blackstrap molasses, spinach, milk & eggs.

Pyridoxine - B6

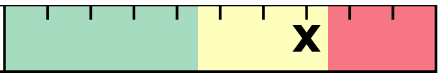


- B6 (as P5P) is a cofactor for enzymes involved in glycogenolysis & gluconeogenesis and synthesis of neurotransmitters, heme, B3, RBCs and nucleic acids.
- Low B6 may result from chronic alcoholism, long-term diuretics, estrogens (oral contraceptives and HRT), anti-TB meds, penicillamine, L-DOPA, or digoxin.
- B6 deficiency may result in neurologic symptoms (e.g., irritability, depression, seizures), oral inflammation, impaired immunity or increased homocysteine.
- Food sources include poultry, beef, beef liver, fish, whole grains, wheat germ, soybean, lentils, nuts & seeds, potato, spinach and carrots.

Riboflavin - B2

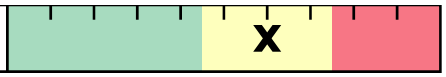
- B2 is a key component of enzymes involved in antioxidant function, energy production, detoxification, methionine metabolism and vitamin activation.
- Low B2 may result from chronic alcoholism, some anti-psychotic medications, oral contraceptives, tricyclic antidepressants, quinacrine or adriamycin.
- B2 deficiency may result in oxidative stress, mitochondrial dysfunction, low uric acid, low B3 or B6, high Homocysteine, anemia or oral & throat inflammation.
- Food sources include milk, cheese, eggs, whole grains, beef, chicken, wheat germ, fish, broccoli, asparagus, spinach, mushrooms and almonds.

Folic Acid - B9



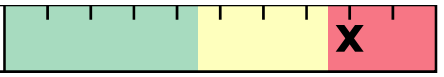
- Folic acid plays a key role in coenzymes involved in DNA and SAMe synthesis, methylation, nucleic acids & amino acid metabolism and RBC production.
- Low folate may result from alcoholism, high-dose NSAIDs, diabetic meds, H2 blockers, some diuretics and anti-convulsants, SSRIs, methotrexate, trimethoprim, pyrimethamine, triamterene, sulfasalazine or cholestyramine.
- Folate deficiency can result in anemia, fatigue, low methionine, increased homocysteine, impaired immunity, heart disease, birth defects and CA risk.
- Food sources include fortified grains, green vegetables, beans & legumes.

Niacin - B3



- B3 is used to form NAD and NADP, involved in energy production from food, fatty acid & cholesterol synthesis, cell signaling, DNA repair & cell differentiation.
- Low B3 may result from deficiencies of tryptophan (B3 precursor), B6, B2 or Fe (cofactors in B3 production), or from long-term isoniazid or oral contraceptive use.
- B3 deficiency may result in pellagra (dermatitis, diarrhea, dementia), neurologic symptoms (e.g., depression, memory loss), bright red tongue, or fatigue.
- Food sources include poultry, beef, organ meats, fish, whole grains, peanuts, seeds, lentils, brewer's yeast and lima beans.

Cobalamin - B12



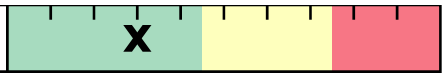
- B12 plays important roles in energy production from fats & proteins, methylation, synthesis of hemoglobin & RBCs, and maintenance of nerve cells, DNA & RNA.
- Low B12 may result from alcoholism, malabsorption, hypochlorhydria (e.g., from atrophic gastritis, H. pylori infection, pernicious anemia, H2 blockers, PPIs), vegan diets, diabetic meds, cholestyramine, chloramphenicol, neomycin or colchicine.
- B12 deficiency can lead to anemia, fatigue, neurologic symptoms (e.g., paresthesias, memory loss, depression, dementia), methylation defects or chromosome breaks.
- Food sources include shellfish, red meat poultry, fish, eggs, milk and cheese.

Amino Acids, Plasma Interpretation At-A-Glance

Nutritional Needs

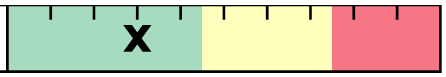
Minerals

Manganese



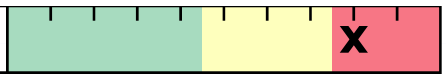
- Manganese plays an important role in antioxidant function, gluconeogenesis, the urea cycle, cartilage & bone formation, energy production and digestion.
- Impaired absorption of Mn may occur with excess intake of Fe, Ca, Cu, folic acid, or phosphorous compounds, or use of long-term TPN, Mg-containing antacids or laxatives.
- Deficiency may result in impaired bone/connective tissue growth, glucose & lipid dysregulation, infertility, oxidative stress, inflammation or hyperammonemia.
- Food sources include whole grains, legumes, dried fruits, nuts, dark green leafy vegetables, liver, kidney and tea.

Magnesium



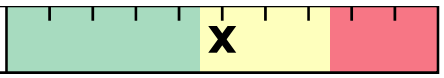
- Mg is involved in >300 metabolic reactions. Key areas include energy production, bone & ATP formation, muscle & nerve conduction and cell signaling.
- Deficiency may occur with malabsorption, alcoholism, hyperparathyroidism, renal disorders (wasting), diabetes, diuretics, digoxin or high doses of zinc.
- Low Mg may result in muscle weakness/spasm, constipation, depression, hypertension, arrhythmias, hypocalcemia, hypokalemia or personality changes.
- Food sources include dark leafy greens, oatmeal, buckwheat, unpolished grains, chocolate, milk, nuts & seeds, lima beans and molasses.

Molybdenum



- Molybdenum is a cofactor for enzymes that convert sulfites to sulfate, and nucleotides to uric acid, and that help metabolize aldehydes & other toxins.
- Low Mo levels may result from long-term TPN that does not include Mo.
- Mo deficiency may result in increased sulfite, decreased plasma uric acid (and antioxidant function), deficient sulfate, impaired sulfation (detoxification), neurologic disorders or brain damage (if severe deficiency).
- Food sources include buckwheat, beans, grains, nuts, beans, lentils, meats and vegetables (although Mo content of plants depends on soil content).

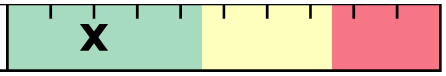
Zinc



- Zinc plays a vital role in immunity, protein metabolism, heme synthesis, growth & development, reproduction, digestion and antioxidant function.
- Low levels may occur with malabsorption, alcoholism, chronic diarrhea, diabetes, excess Cu or Fe, diuretics, ACE inhibitors, H2 blockers or digoxin.
- Deficiency can result in hair loss and skin rashes, also impairments in growth & healing, immunity, sexual function, taste & smell and digestion.
- Food sources include oysters, organ meats, soybean, wheat germ, seeds, nuts, red meat, chicken, herring, milk, yeast, leafy and root vegetables.

Digestive Support

Need for Pancreatic Enzymes



- Pancreatic enzymes are secreted by the exocrine glands of the pancreas and include protease/peptidase, lipase and amylase.
- Pancreatic exocrine insufficiency may be primary or secondary in nature. Any indication of insufficiency warrants further evaluation for underlying cause (i.e., celiac disease, small intestine villous atrophy, small bowel bacterial overgrowth).
- A high functional need for digestive enzymes suggests that there is an impairment related to digestive capacity.
- Determining the strength of the pancreatic enzyme support depends on the degree of functional impairment. Supplement potency is based on the lipase units present in both prescriptive and non-prescriptive agents.

Amino Acids (Plasma)

All analytes reported in micromoles per deciliter unless stated otherwise.

Nutritionally Essential Amino Acids

Amino Acid		Reference Range
Arginine	11.4	7.0-13.5
Histidine	8.5	7.7-11.5
Isoleucine	4.70	5.20-9.00
Leucine	9.8	9.5-16.5
Lysine	22.5	15.5-26.0
Methionine	2.5	2.4-4.6
Phenylalanine	4.71	4.70-8.40
Taurine	6.49	5.00-8.50
Threonine	16.64	6.70-15.00
Tryptophan	2.74	3.20-6.40
Valine	20.8	19.0-33.0

Nonessential Protein Amino Acids

Amino Acid		Reference Range
Alanine	31	27-59
Asparagine	8.0	4.3-7.5
Aspartic Acid	0.25	0.20-0.50
Cyst(e)ine	8.7	4.6-8.0
γ-Aminobutyric Acid	0.08	<= 0.02
Glutamic Acid	1.3	0.5-6.5
Glutamine	75	47-70
Proline	11	10-30
Tyrosine	5.6	4.5-9.0

Markers for Plasma Representativeness

		Reference Range
Glutamine/Glutamate	57.17	>= 8.00
Ammonia	1.0	<= 6.5
Asparagine/Aspartate	32.57	>= 6.00

		Reference Range
Plasma Representativeness Index	10	5 - 10

Intermediary Metabolites

B Vitamin Markers		Reference Range
α-Aminoadipic Acid	4.46	<= 0.65
α-Amino-N-butyric Acid	2.01	1.25-3.50
β-Aminoisobutyric Acid	<dl	<= 0.25
Cystathionine	0.17	<= 0.03
3-Methylhistidine	0.37	<= 0.65

Urea Cycle Markers		
Ammonia	1.0	<= 6.5
Citrulline	4.8	2.8-5.6
Ornithine	6.68	3.75-10.00
Urea	507	320-920

Glycine/Serine Metabolites		
Glycine	37	22-49
Serine	14.4	8.5-16.5
Ethanolamine	1.20	0.45-1.00
Phosphoethanolamine	0.27	0.15-0.45
Phosphoserine	0.16	0.31-0.74
Sarcosine	<dl	<= 0.15

Dietary Peptide Related Markers

		Reference Range
1-Methylhistidine	0.60	<= 1.45
β-Alanine	0.3	<= 0.4

The performance characteristics of all assays have been verified by Genova Diagnostics, Inc. Assays are considered for Research Use Only.