

Zn

# **AICRO.NUTRIENT**

•

Driven by Science. Inspired by You.

Patient: **Doe, Jon** Accession ID: 000000000 Provider: Sample Provider, MD

Α

Order Status: Complete



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**B12** 

PATIENT		SPECIMEN		PROVIDER	
NAME Doe, Jon	AGE <b>31</b>	ACCESSION ID 000000000	DATE COLLECTED 03/06/2019	Account ID 00000000	CLIENT NAME Sample Provider, MD
DOB <b>8/22/1987</b>	Gender <b>Male</b>	ORDER ID 0000-0000000000-000000	DATE RECEIVED 03/07/2019	Address 123 S. Any Street ANYWHERE, TX 77000	
Patient ID 00-000-00000			DATE REPORTED 03/23/2019		

# Welcome to your Micronutrient Profile, Jon!

Your body is unique and your story is too. Virtually all metabolic and developmental processes that take place in the body require micronutrients and strong evidence suggests that subtle vitamin, mineral, and antioxidant deficiencies can contribute to degenerative processes. These cellular deficiencies may suggest the underlying cause of a myriad of unwanted symptoms and, if corrected, can optimize physical and mental health performance.

# The SpectraCell Advantage Superior insights, earlier interventions, customized treament plans.



We measure the functional level and capability of nutrients present within your white blood cells, where metabolism takes place and where micronutrients do their job.

Long-term

This test measures intracellular micronutrient

function over a period of 4-6 months, extending

beyond static serum measurements.



Only SpectraCell offers the patented Spectrox<sup>®</sup> (reflects antioxidant capacity) and Immunidex (an overall measure of immune function).

## What we measure:

We have measured the functional levels of 31 micronutrients, from vitamins and minerals to fatty acids and metabolites, as well as an overall measurement of antioxidant capacity and immune function to provide you with a powerful tool for optimal health, performance, and insight into any health condition. We provide your unique nutrient status in the following areas:



#### **VITAMINS & MINERALS**

Discover your body's unique vitamin and mineral requirements and the disparities that exist within your makeup.



**ENERGY, FAT AND METABOLISM** Know how well your body is metabolizing micronutrients for energy production.



AMINO ACIDS Learn how well your amino acids, the building block of protein, are functioning within your cells.



#### **ANTIOXIDANT STATUS & IMMUNE FUNCTION** Understand your body's ability to manage

oxidative stress and your immune response to infections and disease.

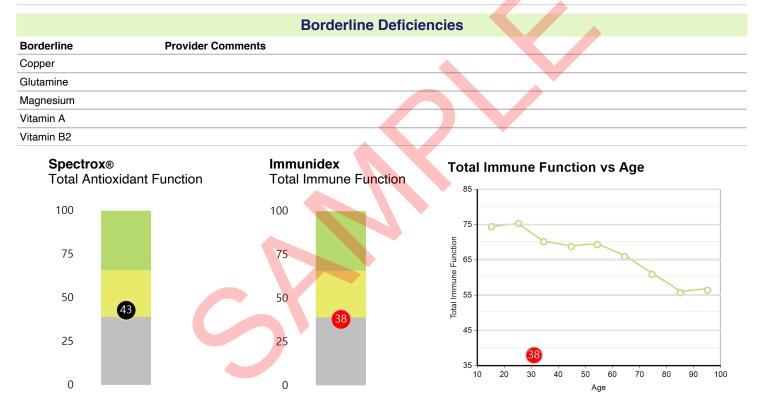
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# Results At-A-Glance

Functional Deficiencies					
Abnormal	Suggested Supplementation *	Provider Comments			
Chromium	200 mcg daily of chromium nicotinate or glycinate for 90 days				
Glucose-Insulin	Replace foods with high glycemic index (sugar, white flour) with whole foods (fruit, vegetables, and whole grains).				
Glutathione	600 mg b.i.d. (1200 mg daily) of N-Acetylcysteine (NAC) Take each dose with a meal				
Immunidex	Address individual micronutrient deficiencies.				
Vitamin B1	50 mg daily				
Vitamin B3	100 mg b.i.d. (200 mg daily) of Niacin				

\* The RDA (Recommended Daily Allowance) was first published in 1968 primarily for use in nutritional labeling of packaged foods. The DRI (Dietary Reference Intake), published in 1997, serves as replacements for the former RDA, although the actual values are generally within an order of magnitude, and are also primarily for use in nutritional labeling and fortification of packaged foods. In most cases, neither the RDA nor the DRI will be adequate to replete a nutrient in people who demonstrate a functional cellular deficiency of said nutrient. An evidence based approach was used to develop clinically relevant repletion recommendations, consisting of data from published studies and clinician expertise. However, the information presented is not intended nor implied to be a substitute for professional medical advice, diagnosis or treatment.



Deficient Values in this range indicate a poor growth response. Cell function is compromised and likely requires nutrient repletion.

Cell function is not yet optimal and may require nutrient

repletion.

Total Antioxidant Function is a measurement of overall antioxidant function. The patient's cells are oxidatively challenged and the cells' ability to resist damage is determined.

#### Immunidex

Average Values in this range indicate an average growth response

Total Immune Function is an indication of how well a person's T-lymphocytes are functioning by measuring their response to mitogen stimulation (ability to grow). Since lymphocyte function is widely considered a systemic measure of general health, a healthy (stronger) response is desired. A less-thanoptimal response may improve with nutrient repletion.

Strong

Values in the range indicate a stronger than

average growth response. Cells are functioning well.

**Spectrox**®

ENT: Doe, Jon P	Doe, Jon PROVIDER: Sample Provider, MD		PORTED: 03/23/2019	ACCESSION ID: 000000000	
Micronutrients	Patient Res	ults	Reference Range	Patient Result	Interpretation
<b>B-VITAMINS</b>					
Vitamin B1			>>78%	73	Deficient
Vitamin B2			>>53%	56	Borderline
Vitamin B3			>>80%	75	Deficient
Vitamin B6		0	>>54%	70	
Vitamin B12		0	>>14%	20	
Folate		0	>>32%	50	
Pantothenate		0	>>7%	27	
Biotin			>>34%	45	
AMINO ACIDS	AND METABOLITES				
Serine			>>30%	37	
Glutamine		•	>>37%	41	Borderline
Asparagine		0	>>39%	51	
Choline			>>20%	30	
Inositol			>>58%	73	
Carnitine			>>46%	59	
Oleic Acid			>>65%	72	
OTHER VITAN	MINS & MINERALS				
Vitamin D3			>>50%	67	
Vitamin A		•	>>70%	72	Borderline
Vitamin K2			>31-85%	70	
Manganese			>>50%	77	
Calcium			>>38%	48	
Zinc		0	>>37%	50	
Copper		•	>>42%	44	Borderline
Magnesium		•	>>37%	39	Borderline
CARBOHYDR	ATE METABOLISM				
Fructose Sensitiv	<i>v</i> ity		>>34%	45	
Glucose-Insulin I	nteraction		>>39	33	Deficient
Chromium			>>40%	34	Deficient
ANTIOXIDAN	rs				
Glutathione	•		>>42%	34	Deficient
Cysteine			>>41%	57	
Coenzyme Q10			>>86%	97	
Selenium			>>74%	80	
Vitamin E			>>84%	92	
Alpha Lipoic Acio	i –		>>81%	90	
Vitamin C		0	>>40%	73	

The reference ranges listed in the above table are valid for male and female patients 12 years of age or older.

**Deficient** Values in this area represent a deficiency and may require nutrient repletion or dietary changes



Borderline Values in this area represent a borderline deficiency and may indicate a need for nutrient repletion or dietary changes



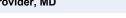
Normal Values in this area represent a normal result

## SpectraCell Laboratories Science + Health + Solutions

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Values in this area represent a deficiency and may

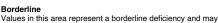
require nutrient repletion or dietary changes



Borderline

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indicate a need for nutrient repletion or dietary changes

90

80

70

60

50

40

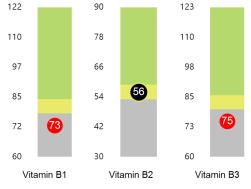
73

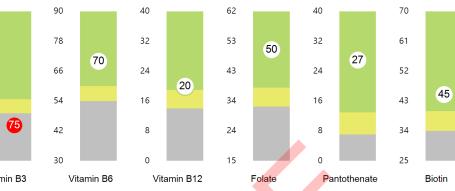
Inositol

Normal Values in this area represent a normal result

## **B-Complex Vitamins**

Deficient





72

64

56

47

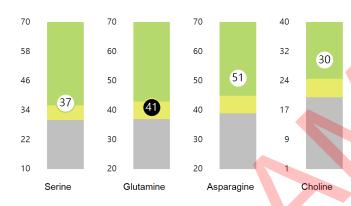
39

31

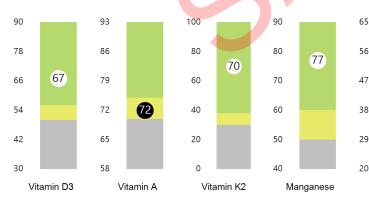
59

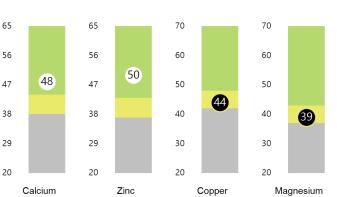
Carnitine

### **Amino Acids & Metabolites**



#### Other Vitamins & Minerals





95

85

75

65

55

45

72

Oleic Acid

73

Vitamin C

98

82

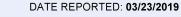
66

50

34

18

#### PATIENT: Doe, Jon PROVIDER: Sample Provider, MD



100

94

88

82

76

70

Alpha Lipoic Acid

90

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Values in this area represent a deficiency and may

Borderline

Values in this area represent a borderline deficiency and may indicate a need for nutrient repletion or dietary change

100

94

88

82

76

70

Vitamin E

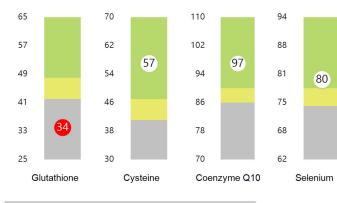
92



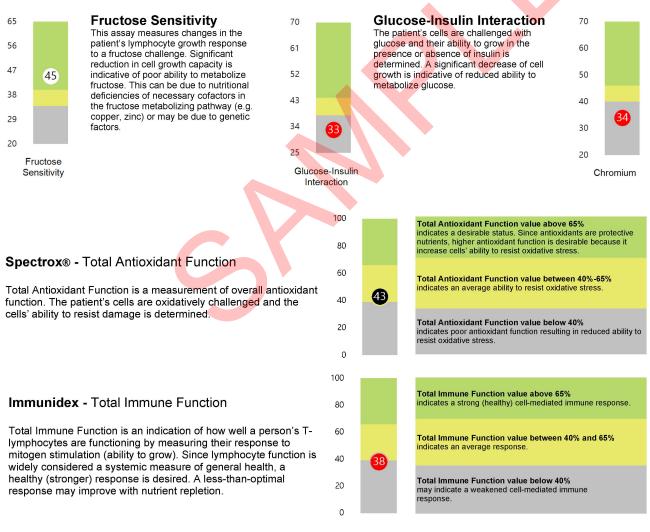
### Individual Antioxidants

require nutrient repletion or dietary changes

Deficient



## Carbohydrate Metabolism

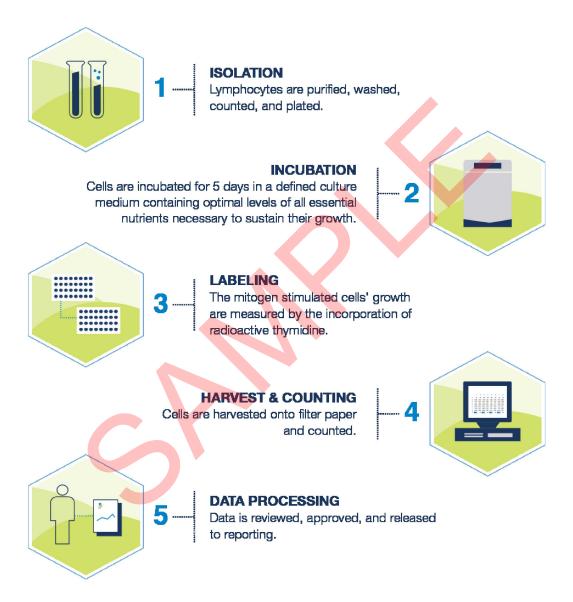




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## Overview of Test Methodology Cellular Function = Performance, Not Just Potential

## Lymphocyte Proliferation Assay

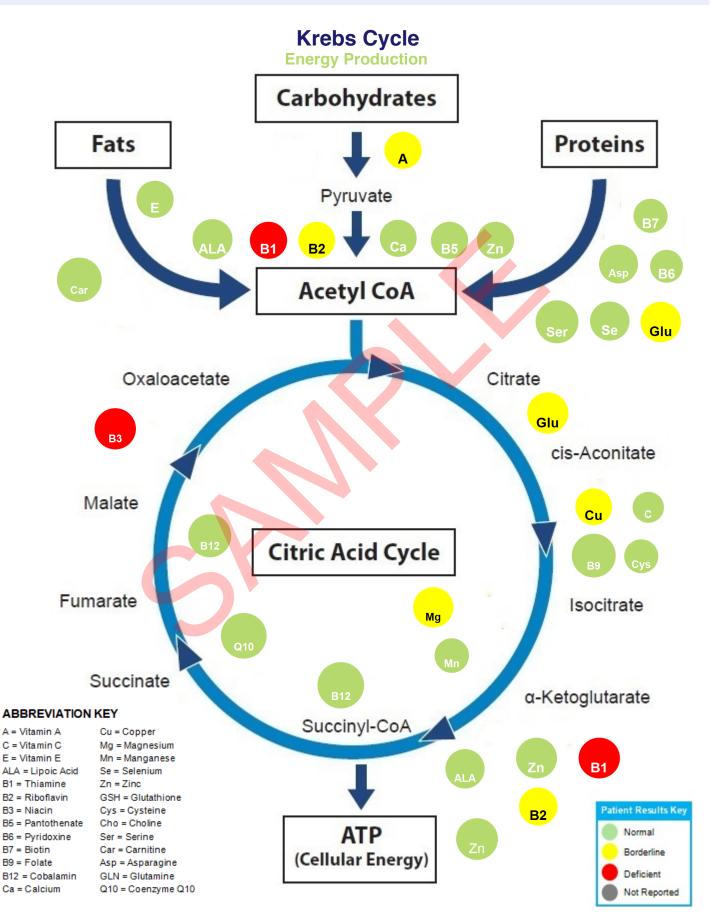


Routine turnaround time for the Micronutrient assay is 10-14 business days.



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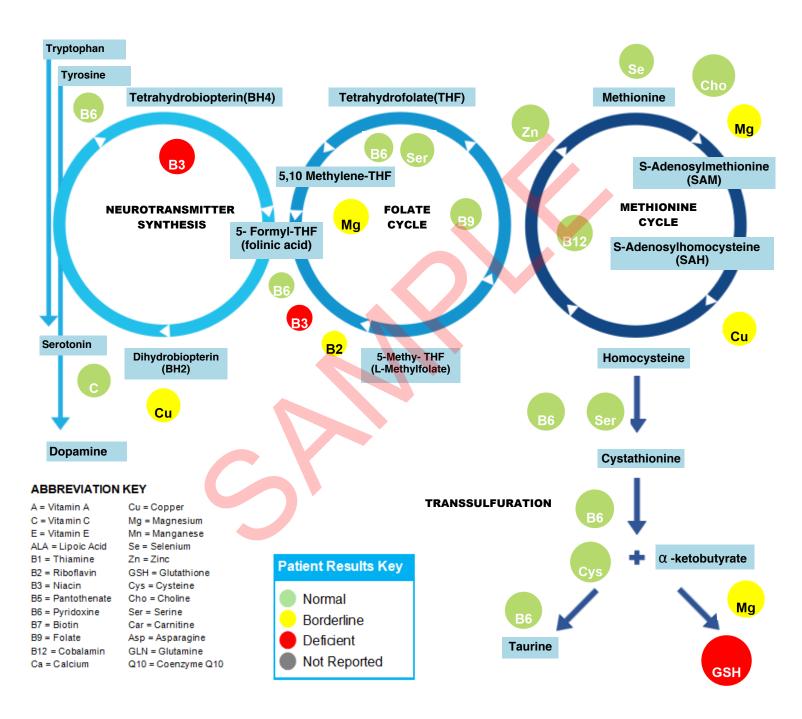


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# Methylation Cycle

Detoxification, Cellular Adaptability, Gene Regulation





**Chromium** 

DATE REPORTED: 03/23/2019 ACCESSION ID: 000000000

# Supplemental Information Cellular Function = Performance, Not Just Potential

#### PHYSIOLOGICAL FUNCTION

Chromium is an essential trace mineral that plays an important role in optimizing insulin function and the regulation of blood glucose levels. Chromium may also be anti-atherogenic and assist in lowering cholesterol. Following food intake, blood glucose levels rise causing insulin to be secreted by the pancreas. Insulin lowers blood glucose levels by increasing the rate at which glucose enters a person's cells. Chromium is believed to facilitate the attachment of insulin to the cell's insulin receptors. Studies also indicate that chromium participates in cholesterol metabolism, suggesting a role for this mineral in maintaining normal blood cholesterol levels and preventing atherosclerosis. Chromium also plays a role in nucleic acid synthesis.

#### DEFICIENCY SYMPTOMS

Due to processing methods that remove most of the naturally occurring chromium from commonly consumed foods, dietary deficiency of chromium is believed to be widespread in the U.S. Chromium deficiency may increase the likelihood of insulin resistance which can lead to elevated blood levels of insulin (hyperinsulinemia) and elevated blood levels of glucose, which can ultimately cause heart disease and/or diabetes. Deficiency of chromium is associated with metabolic syndrome. Metabolic syndrome represents a constellation of symptoms, including hyperinsulinemia, high blood pressure, high triglyceride levels, high blood sugar levels, and low HDL cholesterol levels. These symptoms increase one's risk for heart disease. Low levels of chromium are also associated with an increased risk of coronary artery disease incidence and mortality. Chromium deficiency correlates with depressed nucleic acid synthesis. Chromium is essential for maintaining the structural stability of proteins and nucleic acids and animal studies have found that this element is also vital for healthy fetal growth and development.

#### FOOD SOURCES\*

Food	Serving	(µg)	Food	Serving	(µg)
Broccoli	1/2 cup	11.0	Beef	3 oz.	2.0
Grape Juice**	1 cup	7.5	Apple	1 whole	1.4
Garlic, dried	1 tsp	3.0	Green beans	1/2 cup	1.1
Potatoes	1 cup	2.7	Banana	1 whole	1.0
Basil, dried	1 cup	2.7	Red wine	5 oz.	1-13

\*The chromium content has been measured accurately in relatively few foods.

\*\*It is also important to note that foods high in simple sugars promote chromium loss.

### **REPLETION INFORMATION**

In 2001, the Institute of Medicine at the National Academy of Sciences conducted a thorough review of the chromium research and concluded that excessive intake of chromium from foods or supplements is not associated with any adverse effects. However, people with liver or kidney disease may be more susceptible to adverse effects from excessive intake of chromium, and such individuals are cautioned to avoid taking more than 200 micrograms of chromium picolinate supplementation at levels greater than 200 micrograms per day may also be hazardous to chromosome integrity and should be avoided.



**Glucose-Insulin** 

Interaction

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# Supplemental Information Cellular Function = Performance, Not Just Potential

#### PHYSIOLOGICAL FUNCTION

A stimulation of lymphocyte growth by insulin may indicate a functional deficiency of insulin in vivo, or a metabolic defect in glucose utilization. At suboptimal glucose concentrations, supplementation of lymphocyte cultures with insulin exerted a sparing effect. This means that insulin addition makes uptake or utilization of glucose and amino acids more efficient, producing more cellular energy, and thus, a greater growth response. At optimal concentrations of glucose, insulin does not exert a sparing effect in healthy persons.

#### **DEFICIENCY SYMPTOMS**

Preliminary evidence suggests that persons with abnormal Glucose-Insulin Interaction exhibit hypoglycemia or hyperglycemia based on glucose tolerance testing. Morbidly obese persons with abnormal Glucose-Insulin Interaction may indicate insulin resistance. Thus, deficiency symptoms include fatigue, headaches, nausea, disorientation, dizziness, cold hands and feet, glucose intolerance.

#### **FOOD SOURCES**

Dietary suggestions are to replace, as much as possible, refined carbohydrates (table sugar, corn syrup, white flour, products made predominantly with white flour and/ or sugar) with whole-food, unrefined carbohydrates (whole grain products, legumes, fruits). Reduce intake of foods with a high glycemic index.

### **REPLETION INFORMATION**

If clinically indicated, it is suggested that further laboratory testing of glucose and insulin metabolism be conducted (glucose tolerance test, glycosylated hemoglobin).

Since chromium status is closely linked with insulin function and glucose tolerance, a chromium deficiency is one possible reason for abnormal Glucose-Insulin Interaction.



Glutathione

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# Supplemental Information Cellular Function = Performance, Not Just Potential

#### PHYSIOLOGICAL FUNCTION

Glutathione is implicated in many cellular functions including antioxidant protection and detoxification. It is also essential for the maintenance of cell membrane integrity in red blood cells. Intracellular glutathione concentrations are principally derived by intracellular synthesis, as few cells directly uptake glutathione from the surrounding extracellular fluid. The high concentration of glutathione in virtually all cells clearly indicates its importance in metabolic and oxidative detoxification processes. Glutathione may be considered the preeminent antioxidant.

#### DEFICIENCY SYMPTOMS

A wide range of human conditions such as aging, cancer, atherosclerosis, arthritis, viral infections, AIDS, cardiovascular, neurodegenerative diseases and pulmonary diseases may be produced, or made worse, by "free radicals". Their treatment or prevention often includes antioxidants such as vitamin C, vitamin E, carotenoids and selenium. Glutathione is an essential component of the antioxidant defense system: producing a "sparing effect" for both tocopherol and ascorbate by reducing the oxidized forms, and by eliminating hydrogen peroxide by reacting with glutathione peroxidase. Cellular glutathione functions to decrease the formation of oxidized LDL, implicated in the development of AIDS which impairs immune function. Glutathione is also required for the synthesis of some prostaglandins from n-3 and n-6 polyunsaturated fatty acids which are important in the inflammatory response. Patients with adult respiratory distress syndrome are favorably affected by treatments that increase cellular glutathione.

#### FOOD SOURCES

Unprocessed (raw) whey protein contains large amounts of the glutathione precursor, cysteine, in a form that is bioactively capable of being converted into functional glutathione.

Glutathione-rich foods include asparagus, avocado and walnuts. Glutathione is synthesized endogenously so foods that support glutathione function may raise intracellular levels. This includes the following:

- · Cruciferous vegetables (cabbage, broccoli, brussels sprouts, cauliflower)
- Unprocessed citrus (lemon, lime, orange)
- Limonene-rich herbs (dill, caraway)

### **REPLETION INFORMATION**

Glutathione is poorly absorbed from the gastrointestinal tract and foods rich in glutathione do not appear to contribute to increases in intracellular glutathione levels. Cysteine appears to be the limiting amino acid in the intracellular synthesis of glutathione and supplementation with up to 2000 mg daily ofN-Acetyl-L-Cysteine appears safe. Supplementation with cysteine is not recommended as it may be poorly tolerated by many patients. In addition, it may be rapidly oxidized to L-cystine, a less usable form for the synthesis of glutathione.



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# Supplemental Information

Cellular Function = Performance, Not Just Potential

#### PHYSIOLOGICAL FUNCTION

#### What Does the Immunidex Measure?

A patient's Immunidex score is one measurement to evaluate a person's cellmediated immune system performance. Specifically, it measures T-cell lymphocyte proliferation. Since immune function is a systemic measure of general health, a higher Immunidex score is generally desired since it means a person can respond efficiently not only to exogenous threats such as pathogens or allergens, but also to endogenous threats like tumors. The immune system, comprised of both cell mediated (Th1) and humoral (Th2) components, when balanced and performing optimally, affords us critical protection and promotes health and wellness.

#### How is the Immunidex Performed?

A patient's lymphocytes are isolated from whole blood and introduced to a protein that stimulates growth. The protein mitogen used to trigger mitosis, or cell division, is PHA (phytohemagglutinin), which stimulates T-lymphocytes to proliferate. The proliferative response is measured by the incorporation of radioactive thymidine into newly synthesized DNA. Your patient's response is compared to responses of a reference population and results are reported to you as an Immunidex score.

#### What Affects the Immunidex Result?

Micronutrient deficiencies will undermine a person's immune function, and thus lower the Immunidex. Since the highly

complex immune system is dependent on the intracellular availability of vitamins, minerals and antioxidants, correcting specific micronutrient deficiencies typically raises the Immunidex and contributes to tangible clinical benefits, such as reduced infections and may assist in achieving Th1/Th2 balance.

#### How Does the Immunidex Correlate with Antioxidant Function?

In general, the higher the antioxidant score (Spectrox<sup>®</sup>), the higher the Immunidex score. Antioxidant function plays an important role in promoting optimal T-cell (lymphocyte) function. It is important to find out if a patient has deficiencies in specific antioxidant nutrients so they can supplement wisely. But it is also important to measure a total antioxidant function because the metabolic pathways in which antioxidants are involved are highly complex, sometimes redundant and often overlapping. Research confirms that taking excess antioxidants that are not needed (i.e. where no deficiency exists) can actually cause them to become pro-oxidants and decrease antioxidant function.

#### How is Immunidex Related to Aging?

As we age, our immune function typically decreases as seen in the figure below. Although many factors are involved in this complicated process of decline, the Immunidex is one of many relevant aging biomarkers since age diminishes the ability of a person's lymphocytes to respond to challenges. The effects of both good and poor antioxidant function on the Immunidex is shown and emphasizes the importance of testing for antioxidant function (Spectrox<sup>®</sup>) and individual antioxidant deficiencies.

#### How Do You Order Immunidex?

The Immunidex is part of SpectraCell's Micronutrient Testing panel. There is no additional charge for this calculated test result. Ordering instructions are the same – same kit, same blood draw instructions.

IMMUNIDEX Total Immune Function



**B1** 

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# Supplemental Information

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## PHYSIOLOGICAL FUNCTION

Thiamin is used by cells to help make energy from foodstuffs. Thiamin pyrophosphate is a cofactor for dehydrogenase enzymes with key roles in cellular energy production. Thyamin pyrophosphate is required for transketolase activity, which is a component of the pentose phosphate pathway, the sole source for the synthesis of ribose used in synthesis of the nucleic acids (DNA and RNA). These reactions also produce the major source of cellular NADPH (used in fatty acid biosynthesis and other pathways). Thiamin triphosphate is localized in nerve cell membranes, and plays roles in transmission of nervous impulses and acetylcholine synthesis.

## **DEFICIENCY SYMPTOMS**

Early thiamin deficiency leads to clinical signs of:

Loss of Appetite
Irritability

Fatigue

- Constipation
   Mental Depresentation
  - Mental Depression
- Nausea
- Peripheral Neuropathy

Loss of Fine Motor Control

Inherited Thiamin-Responsive

Metabolic Disorders

- Clinical signs of more severe thiamin deficiency (Wemicke-Korsafoff Syndrome):
- Mental Confusion
   Loss of Eye Coordination

Those at risk for thiamin deficiency include: Patients suffering from Malnutrition, Starvation or Malabsorption Syndromes

Gastric partitioning surgery

- Alcoholics
- Patients on restricted diets
- Prolonged hemodialysis
- Elderly
  Metabolic disorders

### **FOOD SOURCES**

Serving	(mg)	Food	Serving	(mg)
1 tbsp	3.0-6.0	Pecans	1 oz.	0.19
1 cup	1.9	Lentils	1/2 cup	0.17
3 oz.	0.74	Orange	1 whole	0.11
1 oz.	0.28	Cantelope	1/2 melon	0.10
1/2 cup	0.21	Spinach	1/2 cup	0.09
1 cup	0.19			
	1 tbsp 1 cup 3 oz. 1 oz. 1/2 cup	1 tbsp         3.0-6.0           1 cup         1.9           3 oz.         0.74           1 oz.         0.28           1/2 cup         0.21	1 tbsp3.0-6.0Pecans1 cup1.9Lentils3 oz.0.74Orange1 oz.0.28Cantelope1/2 cup0.21Spinach	1 tbsp         3.0-6.0         Pecans         1 oz.           1 cup         1.9         Lentils         1/2 cup           3 oz.         0.74         Orange         1 whole           1 oz.         0.28         Cantelope         1/2 cup           1/2 cup         0.21         Spinach         1/2 cup

## **REPLETION INFORMATION**

Excessive ingestion of certain raw fresh-water fish and shellfish, tea, coffee, blueberries and red cabbage should be avoided, as these foods may contain anti-thiamin factors. There is no evidence of thiamin toxicity form oral administration, except for development of sensitivity in very rare cases.



**B**3

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# Supplemental Information

**Cellular Function = Performance, Not Just Potential** 

## **PHYSIOLOGICAL FUNCTION**

Niacinamide is needed to metabolize foodstuffs into energy. Niacinamide is converted into the coenzymes nicotinamide adenine dinucleotide (NAD) and NADP, which function in oxidation reduction reactions essential for release of energy from carbohydrates, fats, and proteins. Niacin can also be synthesized by the body from tryptophan, although with low efficiency.

#### DEFICIENCY SYMPTOMS

Clinical signs of early niacinamide deficiency include anorexia, muscular fatigue, indigestion, depression, insomnia, headaches, glossitis, and skin lesions. Severe deficiency may lead to pellagra, with dermatitis, dementia, diatThea (the "3 D's of pellagra), tremors and sore (black) tongue. Deficiencies ofthiamin, riboflavin, and pyridoxine commonly accompany (or can cause) niacinamide deficiency.

#### **FOOD SOURCES**

Food	Serving	(mg)	Food	Serving	(mg)
Nutritional yeast	1 tbsp	11-38	Beef	3 oz.	4
Turkey	3 oz	10	Peanuts	1 oz.	4
Tuna (canned)	3 oz.	9	Lentils/peas	1 cup	2
Chicken (light meat)	3 oz.	9	Lima beans	1 cup	2
Salmon	1/2 cup	0.21	Potatoes	1 cup	2

### **REPLETION INFORMATION**

Dietary sources of niacinamide are expressed as niacin equivalents, taking into account tryptophan's contribution. Niacinamide has no observed toxicity for intakes up to 3-9 gms daily, and is the prefen-ed form of niacin supplementation. Niacin (nicotinic acid) may cause flushing (redness and itching of the skin around the face and neck) at doses above 50 mg. Other side effects are possible at higher doses of niacin, which should be used under supervision of a physician.