

# LABORATORY REPORT

Account Number: 264914

Consultation Account - Micronutrient  
Mail Results to Physician  
Houston, TX 77072  
United States

Name: **Michale Hartte**

Gender: Female      DOB: 10/24/1967

Accession Number: Q55060

Requisition Number:

Date of Collection: 11/22/2016

Date Received: 11/23/2016

Date Reported: 12/06/2016

## Summary of Deficient Test Results

Testing determined the following functional deficiencies:

Carnitine

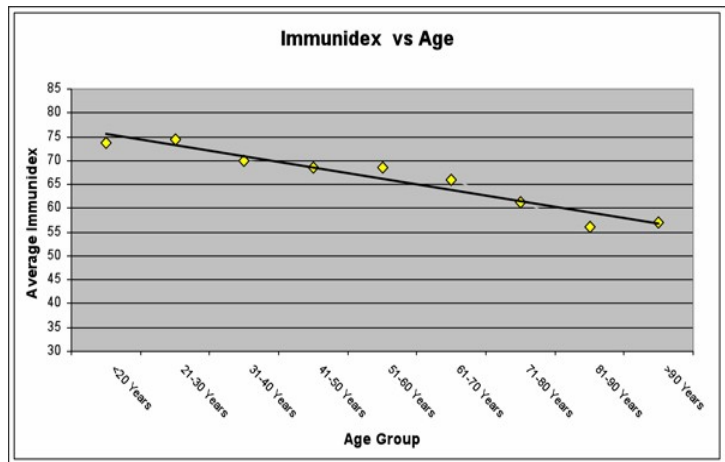
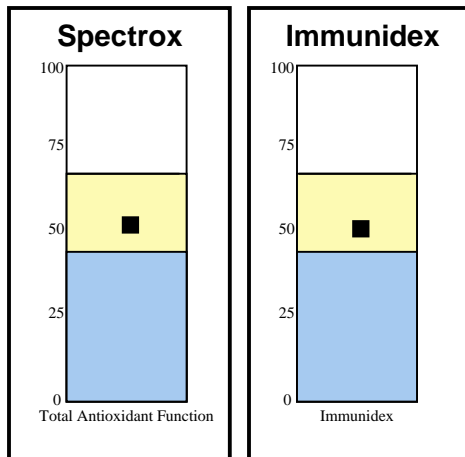
Borderline deficiencies include:

Folate  
Lipoic Acid

Oleic Acid  
Spectrox

Coenzyme Q-10  
Immunindex

Selenium



James W. Jacobson, Ph.D.  
Laboratory Director

CLIA# 45D0710715

## OVERVIEW OF TEST PROCEDURE

1. A mixture of lymphocytes is isolated from the blood.
2. These cells are grown in a defined culture medium containing optimal levels of all essential nutrients necessary to sustain their growth in cell culture.
3. The T-lymphocytes are stimulated to grow with a mitogen (phytohemagglutinin) and growth is measured by the incorporation of tritiated (radioactive) thymidine into the DNA of the cells.

The growth response under optimal conditions is defined as 100%, and all other growth rates are compared to this 100% level of growth.

For example – we remove vitamin B6 from the medium and stimulate the cells to grow by mitogen stimulation. Growth is measured by DNA synthesis and the rate of growth is dependent only upon the functional level of vitamin B6 available within the cells to support growth. For Vitamin B6 a growth rate of at least 55% of the growth rate observed in the optimal (100%) media is considered normal. Results less than 55% are considered to indicate a functional deficiency for Vitamin B6. Each nutrient has a different reference range that was established by assaying thousands of apparently healthy individuals.

## BREAKING DOWN THE REPORT

### 1. TEST RESULT (% CONTROL)

This column represents the patient's growth response in the test media measured by DNA synthesis as compared to the optimal growth observed in the 100% media.

### 2. FUNCTIONAL ABNORMALS

An interpretation is provided for those nutrients found to be deficient.

### 3. REFERENCE RANGE

This column represents how this patient's result compares to thousands of patients previously tested. A patient's result is considered deficient when it is less than the reference range.

### 4. GRAPHS

The abnormal range of results is noted in the blue area. Abnormal results are indicated in red. The gray cross hatch area is a representation of the range of test results found in a random selection of subjects.

## SPECTROX® – TOTAL ANTIOXIDANT FUNCTION

SPECTROX® is a measurement of overall antioxidant function. The patient's cells are grown in the optimal media, stimulated to grow, and then increasing amounts of a free radical generating system (H<sub>2</sub>O<sub>2</sub>) are added. The cell's ability to resist oxidative damage is determined. The increasing levels of peroxide will result in diminished growth rates in those patients with poor antioxidant function capacity.

## INDIVIDUAL ANTIOXIDANT LEVELS

In the tests for individual antioxidants, it is determined which specific antioxidants may be deficient and thus affecting the SPECTROX® antioxidant function result. For these tests, the patient's cells are preincubated with one of the nutrient antioxidants, i.e. selenium, and then the Spectrox® test is repeated to determine if the addition of selenium improves the patient's antioxidant function. This process is repeated for each individual antioxidant.

Antioxidants tested with this process:

Glutathione, Cysteine, Coenzyme-Q10, Selenium, Vitamin E, Alpha Lipoic Acid, and Vitamin C.

## Repletion Suggestions

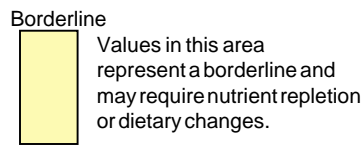
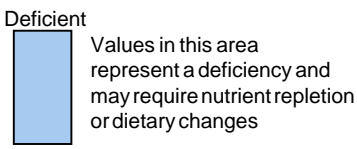
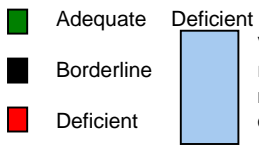
1. Carnitine 1000 mg daily L-Carnitine or Acetyl L-Carnitine

***Please note: Supplementation is usually required for four to six months to effect the repletion of a functional deficiency in lymphocytes***

*Suggestions for supplementation with specific micronutrients must be evaluated and approved by the attending physician. This decision should be based upon the clinical condition of the patient and the evaluation of the effects of supplementation on current treatment and medication of the patient.*

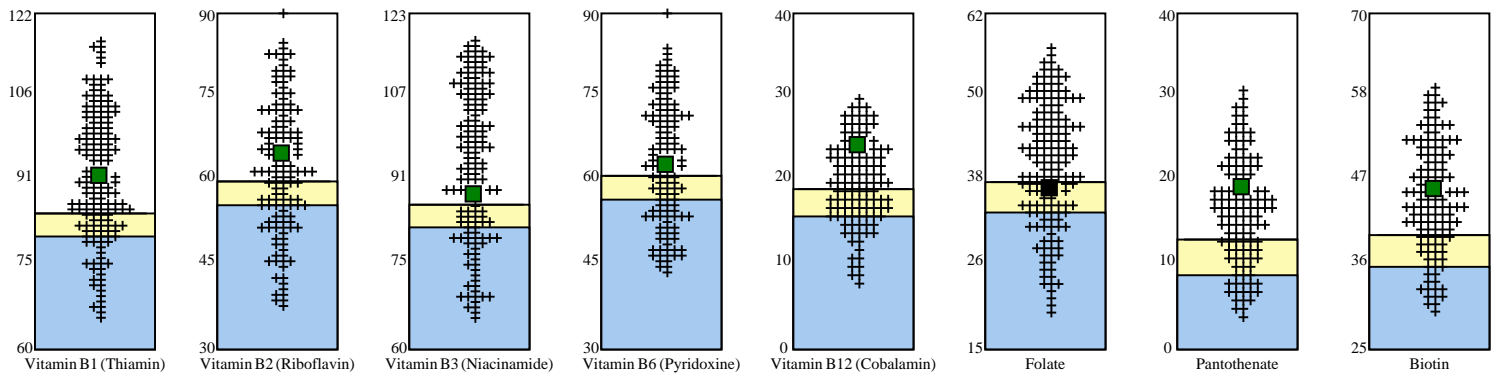
<b>Micronutrients</b>	<b>Patient Results (% Control)</b>	<b>Functional Abnormals</b>	<b>Reference Range (greater than)</b>
<b><u>B Complex Vitamins</u></b>			
Vitamin B1 (Thiamin)	90		>78%
Vitamin B2 (Riboflavin)	63		>53%
Vitamin B3 (Niacinamide)	87		>80%
Vitamin B6 (Pyridoxine)	61		>54%
Vitamin B12 (Cobalamin)	23		>14%
Folate	36	Borderline	>32%
Pantothenate	18		>7%
Biotin	45		>34%
<b><u>Amino Acids</u></b>			
Serine	44		>30%
Glutamine	46		>37%
Asparagine	51		>39%
<b><u>Metabolites</u></b>			
Choline	26		>20%
Inositol	68		>58%
Carnitine	45	Deficient	>46%
<b><u>Fatty Acids</u></b>			
Oleic Acid	70	Borderline	>65%
<b><u>Other Vitamins</u></b>			
Vitamin D3 (Cholecalciferol)	59		>50%
Vitamin A (Retinol)	76		>70%
Vitamin K2	43		>30%
<b><u>Minerals</u></b>			
Calcium	49		>38%
Manganese	63		>50%
Zinc	44		>37%
Copper	54		>42%
Magnesium	52		>37%
<b><u>Carbohydrate Metabolism</u></b>			
Glucose-Insulin Interaction	46		>38%
Fructose Sensitivity	45		>34%
Chromium	46		>40%
<b><u>Antioxidants</u></b>			
Glutathione	51		>42%
Cysteine	48		>41%
Coenzyme Q-10	87	Borderline	>86%
Selenium	77	Borderline	>74%
Vitamin E (A-tocopherol)	88		>84%
Alpha Lipoic Acid	84	Borderline	>81%
Vitamin C	53		>40%
<b><u>SPECTROX™</u></b>			
Total Antioxidant Function	52	Borderline	>40%
<b><u>Proliferation Index</u></b>			
Immunidex	48	Borderline	>40%

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

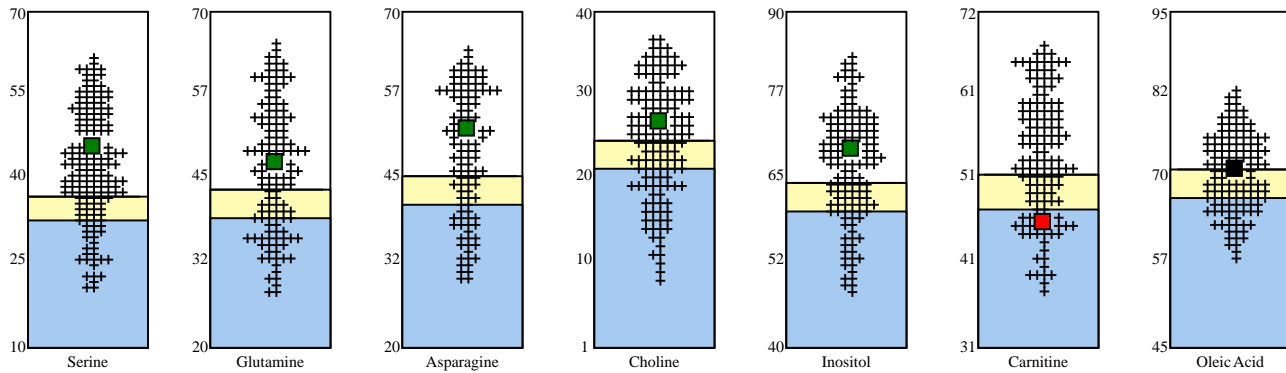


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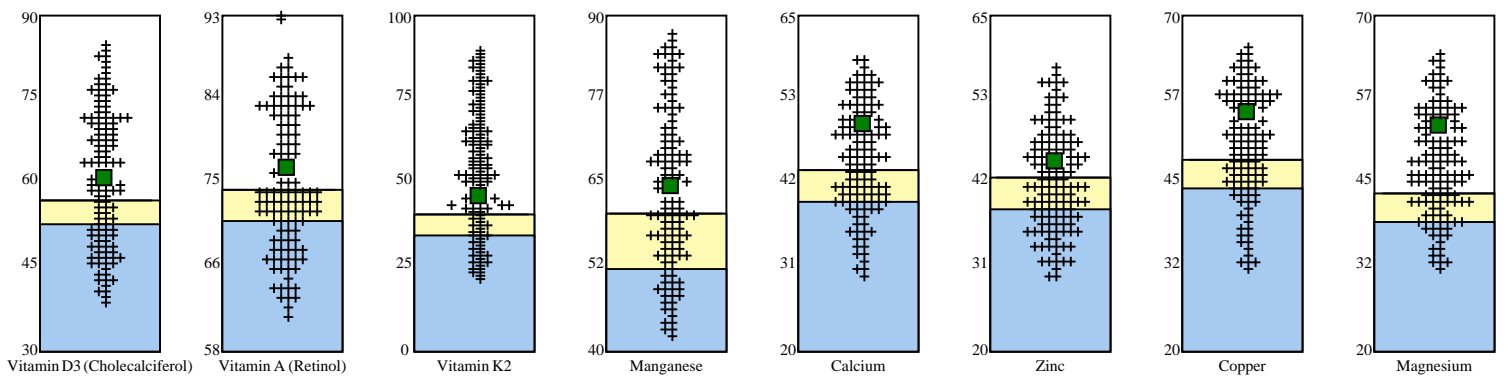
### B Complex Vitamins

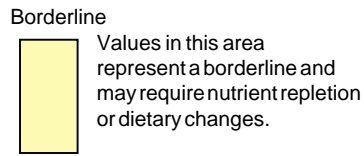
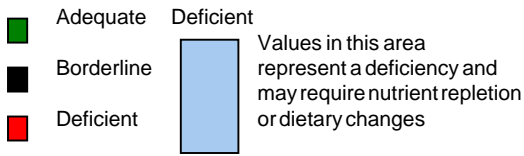


### Amino Acids & Metabolites

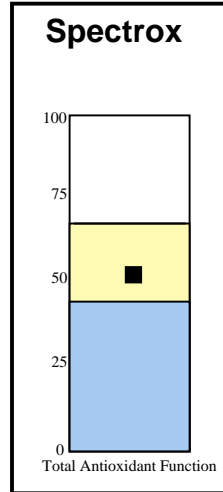
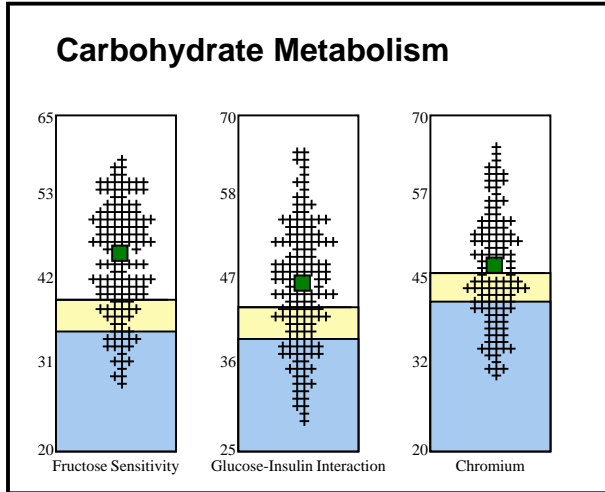


### Other Vitamins & Minerals





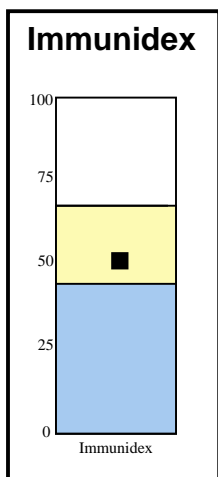
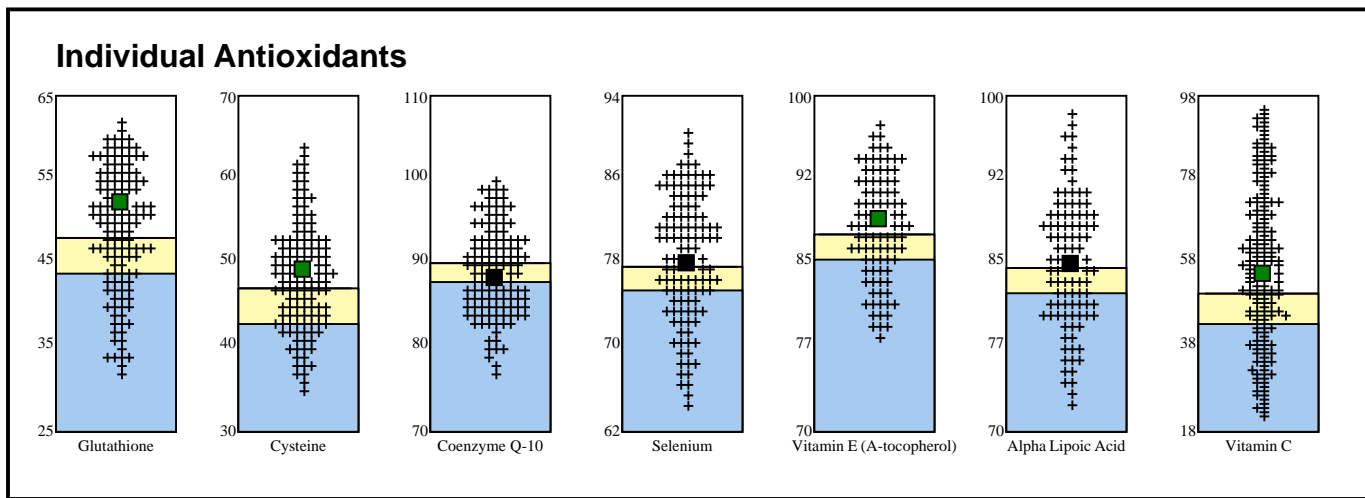
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**A Spectrox value above 65%-** indicates a desirable status for apparently healthy individuals. Since antioxidants are protective nutrients, the most desired status would be the greatest ability to resist oxidative stress.

**A Spectrox value between 40% and 65%-** indicates an average antioxidant function for apparently healthy individuals. An average status means the ability to resist oxidative stress similar to the majority of persons. However, average status is not ideal, nor is it clearly deficient.

**A Spectrox value below 40%-** indicates a deficient antioxidant function resulting in a decreased ability to resist oxidative stress or an increased antioxidant load.



The Immunidex is an indication of the patient's T-Lymphoproliferative response to mitogen stimulation relative to the response of a control population. An average or weakened immune response may improve with correction of the nutritional deficiencies determined by the micronutrient testing.

**An Immunidex above 65%-** indicates a strong response, a measurement of cell-mediated immune function.

**An Immunidex between 40% and 65% -** indicates an average response.

**An Immunidex below 40%-** may indicate a weakened cell mediated immune response.

## **SUPPLEMENTAL INFORMATION**

Name: **Michale Hartte**  
Gender: Female DOB: 10/24/1967  
Accession Number: Q55060

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United States

## **Carnitine (L-carnitine)**

### ***Status:***

The patient's lymphocytes have shown a deficient functional intracellular status for L-carnitine.

### ***Function:***

L-carnitine is an amino acid derivative of the essential amino acids L-lysine and methionine. The conversion to carnitine requires niacin (B3), vitamins B6 and C, and iron. It is found in nearly all cells of the body but chiefly in the liver and kidney. Carnitine is essential for the transportation of long-chain fatty acids across the inner mitochondrial membranes in the mitochondria, where they are metabolized by beta-oxidation to produce biological energy in the form of adenosine triphosphate (ATP).

L-Carnitine also is required to remove short- and medium-chain fatty acids from the mitochondria. This removal optimizes energy production by maintaining coenzyme A at optimal levels for normal metabolism and energy production.

### ***Deficiency Symptoms:***

Deficiencies of carnitine may result from: 1) deficiencies of essential amino acids lysine and methionine, 2) deficiencies of cofactors (B3, C, B6 and iron), 3) defective gastrointestinal function, 4) increased requirement because of high-fat diet, metabolic stress or disease. The consequences of carnitine deficiency are impaired lipid metabolism and lipid accumulation in skeletal muscles, heart, and liver. Patients usually exhibit muscle weakness and fatigue.

Normal heart function depends on adequate concentrations of carnitine. While the normal heart stores more carnitine than required, if the heart does not have a good oxygen supply, carnitine levels quickly decrease. This lack of oxygen leads to decreased energy production and increased risk for angina and heart disease. Carnitine benefits blood lipids by lowering triglycerides and total cholesterol, while increasing HDL. L-acetylcarnitine (LAC) may be useful in the treatment of Alzheimer's disease, senile depression and age-related memory loss.

### ***Repletion Information:***

There have been no reports of toxicity from L-carnitine supplementation. The biologically active form of carnitine is the L- isomer. DL-carnitine should be avoided. Usual dosages found in capsules and tablets range from 250 to 1000 mg in a variety of chemical formulations: L-acetylcarnitine, L-carnitine, and the HCl, tartrate and fumarate salts. Carnitine, Coenzyme Q10 and pantothenate (B5) appear to work synergistically.