SpectraCell Laboratories
Science + Health + Solutions

LABORATORY REPORT

Account Number: 264914

Consultation Account - Micronutrient
Mail Results to Physician
,
United States

Name: **Lila Ojeda**
Gender: Female DOB: 10/31/1975

Accession Number: P92340
Requisition Number:

Date of Collection: 05/16/2016
Date Received: 05/17/2016
Date Reported: 05/26/2016

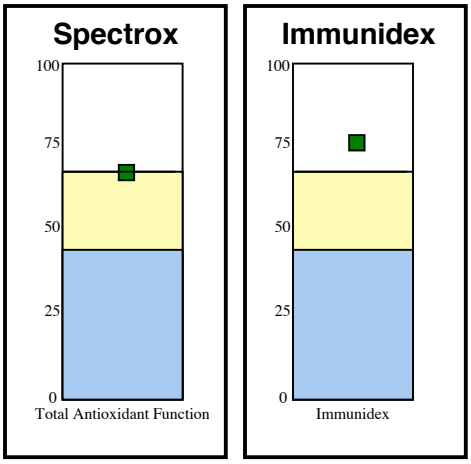
Summary of Deficient Test Results

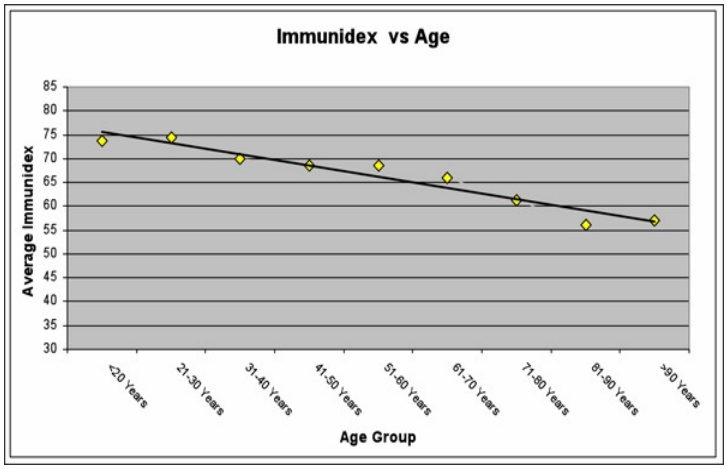
Testing determined the following functional deficiencies:

Vitamin D3 Vitamin K2

Borderline deficiencies include:

Vitamin B12 Folate Pantothenate Vitamin A
Chromium Vitamin E





James W. Jacobson, Ph.D.
Laboratory Director

CLIA# 45D0710715

All tests performed by SpectraCell Laboratories, Inc. * 10401 Town Park Drive Houston, TX 77072
Tel (713) 621-3101 * Toll-free (800)-227-LABS(5227) * Fax (713) 621-3234 * www.spectracell.com

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 (H2O2) 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. Vitamin D3 (Cholecalciferol)	1000 IU daily of Cholecalciferol (Vitamin D3-1-alpha 25-dihydroxyvitamin D)
2. Vitamin K2	100 mcg vitamin K1 (K2 precursor) daily

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.

Micronutrients	Patient Results (% Control)	Functional Abnormals	Reference Range (greater than)
B Complex Vitamins			
Vitamin B1 (Thiamin)	88		>78%
Vitamin B2 (Riboflavin)	60		>53%
Vitamin B3 (Niacinamide)	87		>80%
Vitamin B6 (Pyridoxine)	60		>54%
Vitamin B12 (Cobalamin)	17	Borderline	>14%
Folate	35	Borderline	>32%
Pantothenate	11	Borderline	>7%
Biotin	42		>34%
Amino Acids			
Serine	45		>30%
Glutamine	44		>37%
Asparagine	55		>39%
Metabolites			
Choline	27		>20%
Inositol	66		>58%
Carnitine	57		>46%
Fatty Acids			
Oleic Acid	74		>65%
Other Vitamins			
Vitamin D3 (Cholecalciferol)	49	Deficient	>50%
Vitamin A (Retinol)	72	Borderline	>70%
Vitamin K2	29	Deficient	>30%
Minerals			
Calcium	54		>38%
Manganese	68		>50%
Zinc	44		>37%
Copper	56		>42%
Magnesium	49		>37%
Carbohydrate Metabolism			
Glucose-Insulin Interaction	55		>38%
Fructose Sensitivity	47		>34%
Chromium	45	Borderline	>40%
Antioxidants			
Glutathione	52		>42%
Cysteine	52		>41%
Coenzyme Q-10	92		>86%
Selenium	78		>74%
Vitamin E (A-tocopherol)	87	Borderline	>84%
Alpha Lipoic Acid	85		>81%
Vitamin C	51		>40%
SPECTROX™			
Total Antioxidant Function	67		>40%
Proliferation Index			
Immunidex	73		>40%

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

Adequate
Borderline
Deficient

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

Borderline: Values in this area represent a borderline and may require nutrient repletion or dietary changes.

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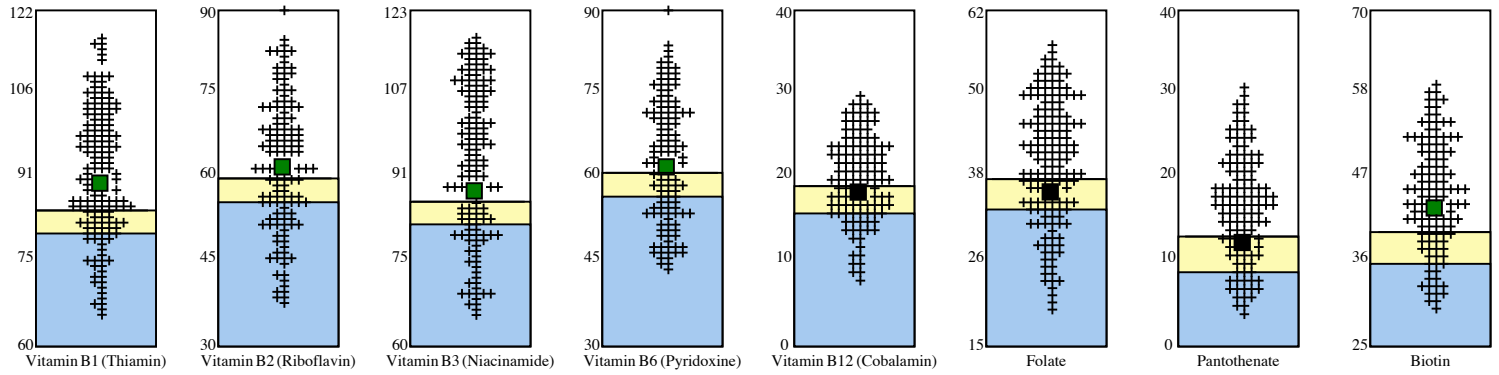
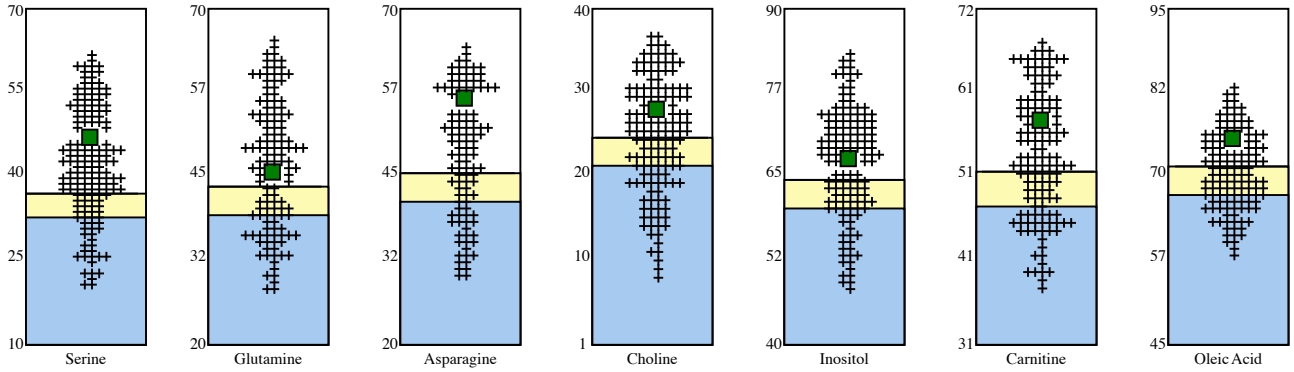
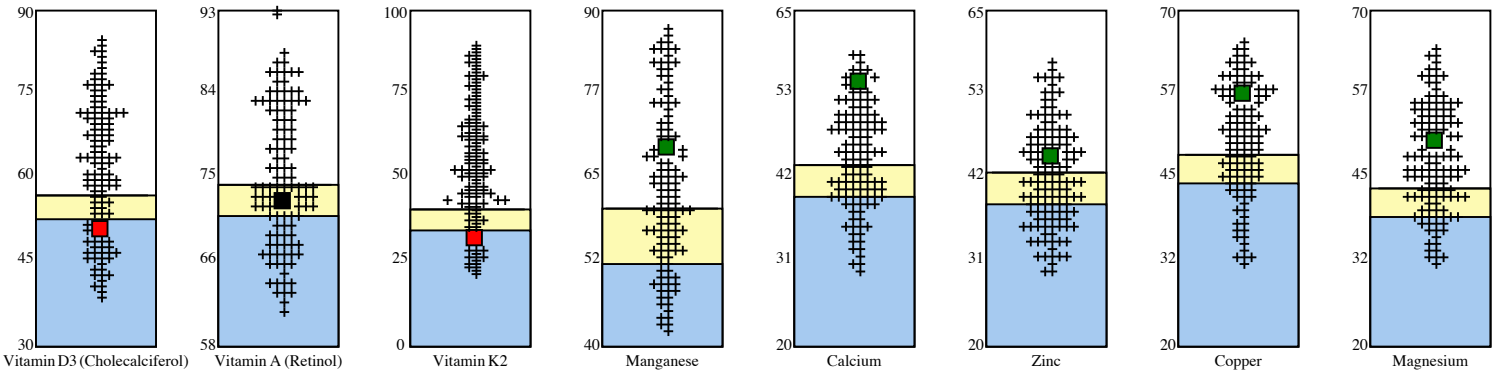
B Complex Vitamins



Amino Acids & Metabolites



Other Vitamins & Minerals



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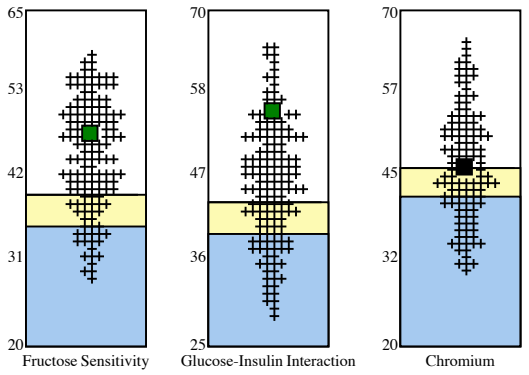
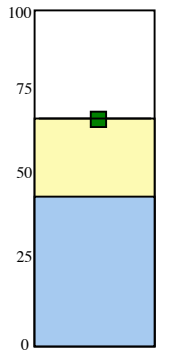
Carbohydrate Metabolism



Spectrox

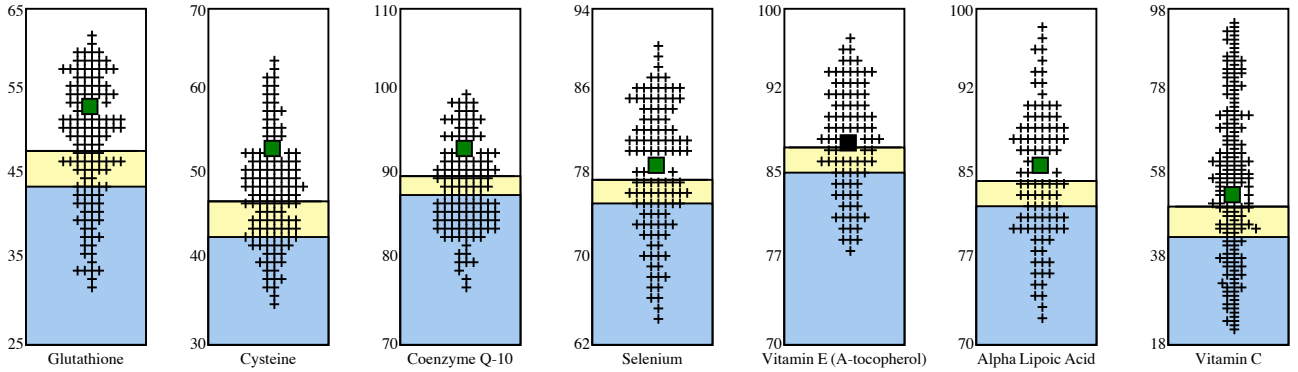


A Spectrox value above 65%-
indicates a desirable status for apparently healthy individuals. Since antioxidants are protective nutrients, the most desired status would be the greatest ability to resist oxidative stress.

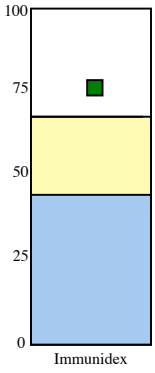
A Spectrox value between 40% and 65%-
indicates an average antioxidant function for apparently healthy individuals. An average status means the ability to resist oxidative stress similar to the majority of persons. However, average status is not ideal, nor is it clearly deficient.

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

Individual Antioxidants



Immunidex



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.

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SUPPLEMENTAL INFORMATION

Name: **Lila Ojeda**
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Date Received: 05/17/2016
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Vitamin D3 (1, 25 dihydroxy cholecalciferol) (Calcitriol)

Status:

The patient's lymphocytes have shown a deficient status for vitamin D3.

Function:

Vitamin D3 is the principle regulator of calcium homeostasis in the body. It is essential for skeletal development and bone mineralization. Vitamin D is a prohormone with no hormone activity. It is converted to a molecule that has biological activity. The active form of the vitamin is 1,25-dihydroxyvitamin D, usually referred to as vitamin D3. It is synthesized in the skin from 7-dehydrocholesterol via photochemical reactions requiring UV light (sunlight). Inadequate exposure to sunlight contributes to vitamin D deficiency. Vitamin D deficiency in adults can lead to osteoporosis. This results from a compensatory increase in the production of parathyroid hormone resulting in bone resorption. Increasing evidence is accumulating that vitamin D may also contribute to antioxidant function by inhibiting lipid peroxidation. The mechanism of the antioxidant effect is unknown. Vitamin D is also needed for adequate blood levels of insulin. Vitamin D receptors have been identified in the pancreas.

Deficiency Symptoms:

Osteoporosis results from an imbalance between bone resorption and bone formation. Decreased vitamin D levels result in decreased production of the active vitamin form, vitamin D3. Vitamin D enhances the efficiency of calcium absorption. Chronic vitamin D deficiency results in decreased calcium absorption and secondary hyperparathyroidism.

Vitamin D3 has been found to have anticarcinogenic activity, inducing apoptosis in many types of cancer cells including breast, colon and prostate cancers. It has also been useful in the treatment of psoriasis when applied topically. Vitamin D appears to demonstrate both immune-enhancing and immunosuppressive effects.

Repletion Information:

Supplemental vitamin D is available as vitamin D2 (ergocalciferol) or vitamin D3 (cholecalciferol). The supplementation with vitamin D3 is considered the more biologically active form of the vitamin and at this time is the form most commonly used for repletion.

Our repletion recommendation is 1000 IU daily (25 micrograms) if a moderate functional deficiency is identified, twice daily if indicated. These recommendations are higher than in the past due to recent research linking mild vitamin D deficiency with a wide variety of health problems.

Dosages over 5000 IU per day should be recommended and monitored by the ordering physician. The prolonged ingestion of excessive vitamin D and the accompanying hypercalcemia can result in metastatic calcification of soft tissues, including kidney, blood vessels, heart and lungs.

Vitamin K

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Status:

The patient's lymphocytes have shown a deficient status for vitamin K2.

Function:

The primary function of vitamin K is to aid in the formation of clotting factors and bone proteins. It serves as a cofactor in the production of six proteins that regulate blood clotting, including prothrombin. In addition, it helps to form osteocalcin, a protein necessary for the mineralization of bone. Vitamin K also aids in the formation of glucose into glycogen for storage in the liver. In addition, it promotes the prevention and reversal of arterial calcification, plague progression and lipid peroxidation. Deficiency may increase the risk of calcification of arterial walls, particularly in individuals on vitamin D supplementation (Vitamin D promotes calcium absorption). Vitamin K exists in three forms: K_1, a natural form found in plants (phylloquinone); K_2, which is synthesized in the intestine (menaquinone); and K_3, a synthetic form that must be activated in the liver (menadione).

Deficiency Symptoms:

Excessive bleeding, a history of bruising, appearance of ruptured capillaries or menorrhagia (heavy periods) are the most common clinical symptoms of overt vitamin K deficiency, although subclinical deficiency may not affect clotting mechanisms. Due to its critical role in bone formation, long-term vitamin K deficiency may impair bone integrity and growth, eventually predisposing a person to osteoporosis. Anticoagulants such as Coumadin and other warfarins can deplete vitamin K by blocking the activation of prothrombin. **Excess vitamin K will not adversely affect clotting function for patients. However, patients on warfarin or other blood anticoagulants should not supplement with vitamin K unless specifically recommended and approved by their physician.** Other causes of deficiency include celiac disease, liver disease, certain medications (i.e. aspirin, Dilantin), very high doses of vitamins A and E (over 600 IU) and gastrointestinal disorders associated with the malabsorption of fats, such as bile duct obstruction, pancreatitis or inflammatory bowel disease.

Repletion Information:

The RDA for vitamin K is 1 microgram (mcg) per 2.2 pounds of body weight, with 80 mcg per day (males) and 65 mcg per day (females) being the officially recognized amount, although therapeutic doses range from 100 to 500 mcg per day. No Tolerable Upper Intake Level for vitamin K has been established. The liver secures the amount of vitamin K required for the saturation of clotting factors. Supplementation with vitamin K1 is recommended as it is the precursor of vitamin K2. As a result patients should receive benefits of both K1 and K2. Vitamin K is a fat soluble vitamin so ingestion with fats or oils significantly increases absorption. Since up to 50% of the vitamin is manufactured by bacteria in the gut, the balance of intestinal microflora is important in maintaining adequate endogenous production of vitamin K. Antibiotic usage can upset this balance. Exogenous food sources particularly rich in vitamin K include kale, green tea, turnip greens, spinach, and broccoli. Other sources include lettuce, cabbage, beef liver, asparagus, watercress, cheese, oats, peas, and whole wheat.