CELLULAR NUTRITION ASSAYS

ALCATTEST

Provider Information

UPDATED 2024

The next generation of **Functional Nutrition Testing.**

You're unique. Eat like it. - **Personalized nutrition** is the key to feeling your best!

"If we could give every **individual the right amount** of nourishment and exercise, not too little and not too much, we would have the **safest way to health**."

Hippocrates

Content

"A *randomized observational analysis examining the correlation between patients' food sensitivities, micronutrient deficiencies, oxidative stress response and immune redox status.*"

CONCLUSION:

This study suggests that high food sensitivity is associated with a higher nutrient deficiency, a stronger oxidative stress response and a lower immune redox status.

Publication 3/2020

Citation: Steele I, Allright D, Deutsch R; A randomized observational analysis examining the correlation between patients' food sensitivities, micronutrient deficiencies, oxidative stress response and immune redox status. **Functional Foods in Health and Disease**. 2020; 10(3): 127- 138. DOI: https:/doi.org/10.31989/ffhd.v10i3.695

Message from our founder and CEO

Background of the Cellular Nutrient Assays

My interest in food as medicine goes back almost 50 years. I spent a great deal of time outdoors in my youth and was enchanted by what I saw as the perfection and beauty of the natural world, which gave me the conviction that good quality food could create health and happiness; and conversely, poor quality food could slowly kill.

That conviction eventually drew me to undertake the project of perfecting the method of the ALCAT Test, to identify which foods are good for any particular person and which are not. Food quality is essential; but, every bit as critical is the compatibility of the food for each and every individual.

That project began in 1986 and I have continued it to this day. For those of you who may not know, the ALCAT Test is an automated way to determine how an individual's peripheral immune cells (i.e., live, white blood cells in the blood) react or do not react when confronted with a food, chemical, medicinal herb, drug; or, other substance. Testing is conveniently performed outside the body, that is, "ex vivo".

This method was already confirmed in the 1930's and 40's through clinical studies conducted by allergists such as Theron Randolph, Herbert Rinkle, and others. Randolph, particularly, took lengthy and extensive histories on each of the patients that came to his Chicago practice during the 1930's and concluded:

"Usually, neither the patients nor their physicians have suspected food allergy as the root of their problem because most food allergy, by its very nature, is masked and hidden. It is hidden from the patient, hidden from his or her family, and hidden from the medical profession in general. [...] In the case of food allergy, the source of the problem is literally in front of you, in the form of some commonly eaten substance that is bringing on and perpetuating chronic symptoms. *

Please note that what **Dr. Randolph referred to as, "food allergies" we now call food sensitivities, or, intolerances.*

So, the concept and crude methodology for evaluation of leukocyte reactions to foods, ex vivo, already existed when I entered the field.

What we did was automate the process, making it more reliable and build a structure to deliver it economically. I'm happy with the outcomes. Many hundreds of thousands of people from around the world have been profoundly helped by this technology. I cannot think of a better answer to our health care crisis than the implementation of this technology on a broader scale.

Along the way I heard about a lab that was doing something similar. They were looking at a sub set of white blood cells (the lymphocytes) to see if the specific memory cells would undergo a favorable proliferative response, when stimulated to do so, in the presence of different alterations of the micronutrient content (basically, vitamins, minerals, amino and essential fatty acids) in the culture medium, also ex vivo.

It should be mentioned that there are basically two broad types of immune system cells: innate immune cells, which are the first line of defense; and cells of the specific or "adaptive" branch of the immune system.

The ALCAT Test for Food and Chemical Sensitivities looks at both categories; but it is mainly the innate immune system cells that underlie food and chemical ***sensitivities.*** They are by far the more numerous, respond more quickly, and live for a shorter period of time. The specific immune cells, which are the lymphocytes, only become activated when the innate immune cells need an extra boost, be that through antibody production or the ability to directly kill infected cells.

The specific immune cells are pathogen specific, meaning, they recognize only one pathogen, hence the name; and are capable of dividing into exact replicas of themselves in order to buttress the attack. However, once the threat has passed, they go back to their resting state and reduce in number.

Their ability to divide or "proliferate" determines how quickly we quell the pathogen next time it comes around. And that ability to do so is dependent upon its intracellular nutrient stores.

Hence, measurement of cell proliferation, when stimulated to do so (by a mitogen, i.e., "mitosis generator") can provide a functional measurement of not only the lymphocytes' respective individual micronutrient stores but also reflect the nutritional status of all somatic cells.

I found this approach fascinating and I learned that the inventor of this test, **Dr. William Shive**, worked at Experimental Sciences, University of Texas in Austin.

Since I lived in Austin I reached out to see if he would entertain a visit. We met shortly thereafter and had numerous follow up meetings to discuss how our methods of cellular measurement might improve his assay; and, toward that end, we began collaboration. This continued until Dr. Shive's untimely death. We have since continued our efforts over the past 20 years and have finally succeeded in bringing about a test that is broader, less time consuming, more accurate, and more economical.

We hope you find it beneficial.

For this I honor the important pioneering work performed by Dr. Shive and his collaborators and am grateful for the extraordinary achievements of my research and nutrition teams, and thank them for their untiring work.

Roger Deutsch, CEO
Cell Science Systems, Corp.

N.B.
I still strongly believe in meeting our nutritional requirements through consumption of wholesome, fresh, organically produced food; however, in today's world one may greatly benefit by taking appropriate supplements; and, this test can offer valuable guidance as to which supplements to take.

The ALCAT test for food and chemical sensitivities and the Cellular Nutrition Assays for assessment of micronutrient insufficiencies and individually protective antioxidants, go hand in hand. They both measure a different functional response of the immune system; one test telling you what not to eat; and, the other, telling you what you should eat.

However, some gastrointestinal disorders can impair absorption of nutrients, even if adequately consumed. For this reason, we have created a test panel to assess genetic risk for Crohn's and celiac disease, along with markers to assess current disease states. It's called the CICA (Celiac, IBS, and Crohn's Array) and can be ordered along with an ALCAT test at a reduced cost.

"That which can be treated by diet should be treated by diet." - Maimonides

But which diet? It is impossible to say what the best diet is by only looking at the characteristics of the food; one must foremost consider the characteristics of the person eating the food.

"I believe that no two individuals are exactly alike chemically any more than structurally."

Archibold Garrod, "The Father of Chemical Genetics"

Personalized diet – scientific assessment

By using the Alcat Test for food and chemical sensitivities, along with the Cellular Nutrition Assays, it is now possible to scientifically determine what any particular **individual should and should not eat and which specific micronutrients are particularly beneficial.**

The next generation of functional cellular nutrition testing

In order to address patients' nutritional needs at the functional cellular level we have developed three assays that can provide patients with comprehensive information regarding nutrient insufficiencies, overall antioxidant function, and antioxidants that may be particularly beneficial:

CNA CMA (CELLULAR MICRONUTRIENT ASSAY)

→ 55 nutrients tested

CNA REDOX / APA (ANTIOXIDANT PROTECTION ASSAY)

→ Overall antioxidative capacity

→ 49 antioxidant/anti-inflammatory items tested if particularly beneficial for that individual

Who will benefit?

Are your cells getting the nourishment they need? Many individuals are exceeding energy (caloric) needs but not meeting micronutrient (essential vitamin and mineral) requirements.

- Nutritional and health status optimization with a tailored food and supplement plan
- Women's health; fertility, pregnancy, lactation, perimenopause, menopause, and others
- High performance and/or severe stress
- Sports nutrition
- Pre- and post-surgery
- Weight management, obesity
- Burnout, fatigue, depression, mood swings, low vitality
- Chronic conditions, and/or metabolic syndrome (increased blood pressure and blood sugar, excess body fat, abnormal cholesterol)

"[…] the majority of Americans do not follow a healthy eating pattern.

Together with physical inactivity, eating an energy-rich, nutrient-poor diet predisposes one to many chronic diseases, including type 2 diabetes mellitus, cardiovascular disease, cancer, osteoporosis, and especially obesity.

Decades of public health messages to eat a balanced diet have not resulted in behavior change. […]"

Linus Pauling Science Center
Oregon State University

".... improvement of immune functions by foods can normalize the physical state of allergic patients or cancer patients and may reduce the risk of diseases in healthy individuals. Therefore, it is valuable to assess the immune-modulating abilities of foods."

Dr. Shuichi Kaminogawa, Dr.Masanobu Nanno (Modulation of Immune Functions by Foods, Annals of Oncology, Vol. 1 #3)

Introduction

Personalized assessment of nutrient needs

Most conventional laboratory tests' target values are set using population averages. Therefore, the established ranges tend to be broad and do not take into consideration various individual factors.

However, nutrient requirements are unique to each individual. Stress, genetics, high energy output in sports, pregnancy, recent infection, toxic burden, sleep patterns, age, gender, etc. all play a role.

The Cellular Nutrition Assays by Cell Science Systems are exactly calibrated according to the individual's need and how the patient's immune cells respond to the addition of each test item.

- Our tests use a patient specific "control" for each nutrient tested.

Mimicking *biological* processes

Patients serve as their own control. That is, **the individual's baseline is the measurement of their own level of cellular metabolism.**

- **Measurement of metabolic activity**
  reflects cellular activation and proliferation rate, when stimulated with a mitogen.

Single nutrients are added - one at a time - to the culture: and the changes in metabolic activity are compared to the patient's baseline level. Thus, the isolated variable is the single nutrient being tested.

- An **increase in metabolic activity** of the cells following a nutrient addition in vitro, can be reasonably assumed to reflect a functional insufficiency of that nutrient.

- Currently 55 micronutrients, 49 antioxidant nutrients and enzymes.

Test options: Full Array (CNA, Redox/APA)

- **CMA** (Cellular Micronutrient Assay)
  Micronutrient insufficiencies

- **Redox/APA**
  Overall antioxidative capacity and Antioxidant Protection Assay (particular beneficial antioxidants)

References and links

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❶ CMA (Cellular *Micronutrient* Assay)

Micronutrient insufficiencies

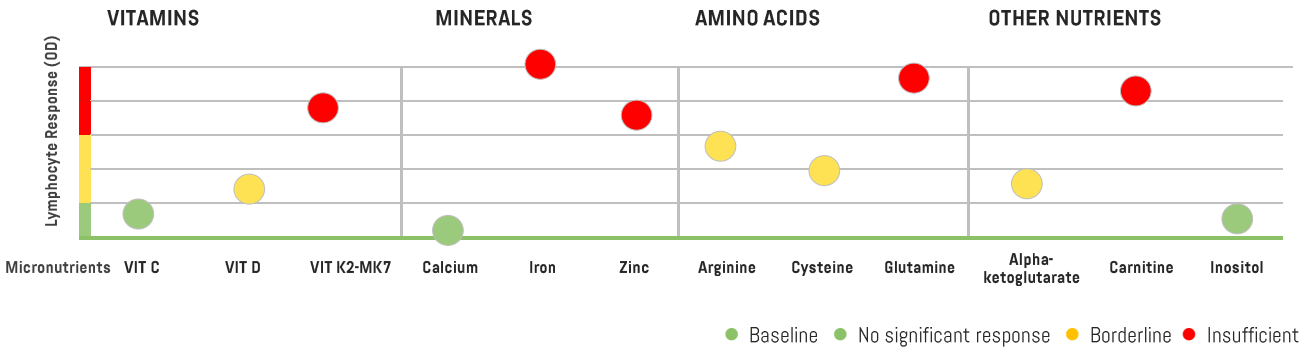
The CMA (Cellular Micronutrient Assay) directly measures the effect of specific micronutrients on the ability of T and B lymphocytes to reproduce when stimulated with a mitogen (i.e., mitosis generator).

When the body has an infection, it increases production of the T and B lymphocytes (memory cells) that "recognize" and combat that specific invader. The faster these cells reproduce the faster infection is overcome.

The ability of these cells to multiply is driven by our nutrient stores. Cells need nutrients to grow and multiply. Those nutrient requirements are individual and are impacted by many factors. Stress, genetics, and other conditions, for example, high energy output in sports, pregnancy, recent infection, toxic burden, sleep patterns, etc., all play a role.

Measurement of the effect of nutrients on your immune function can be more revealing than just knowing if your blood serum levels of a vitamins, minerals, and amino acids, fall within "normal" ranges.

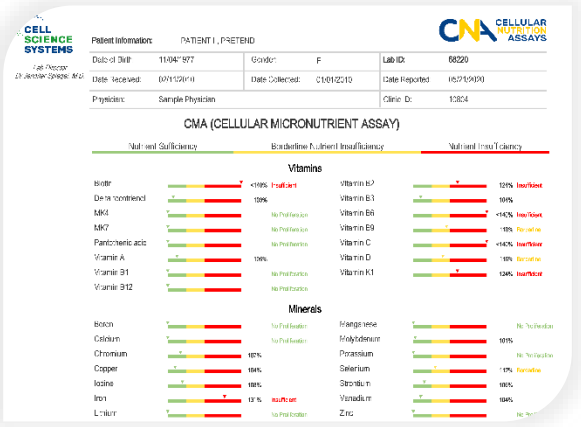
Metabolism happens WITHIN the cells. Serum nutrient measurement is only a "SNAPSHOT" of nutrient status. Cellular activity gives insight into LONG TERM nutrient status.



How does the test work?

Lymphocytes are isolated from the whole blood of patients. This mixture is diluted with minimal media to the targeted concentration and grown in the presence of different micronutrients.

1) The lymphocytes' growth rate stimulated by the mitogen, without the addition of micronutrients, is defined as the patient's baseline.
2) Micronutrients are added one at the time to the lymphocytes.
3) The enhancement of the mitogen induced proliferation rate occurs with the addition of the nutrients the patient needs (insufficiency).
4) Each individual essential micronutrient is assessed and compared against the patient's baseline.



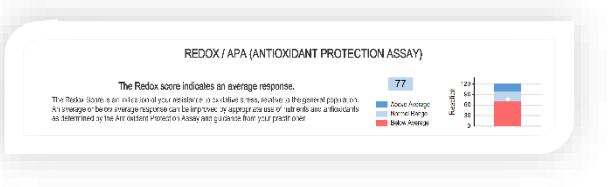
The nutrients that restored the cellular functional response to the mitogenic stimuli is reported as "insufficient."

❷ Redox / APA (Antioxidant *Protection* Assay)

Overall antioxidant function

Redox is a measurement of overall antioxidant function of patient's immune system.

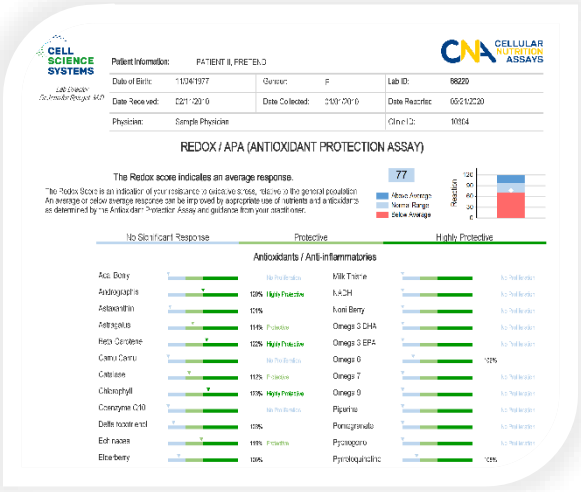
The cells stimulated to grow in minimal media do not include any additional external nutrients. A free radical generating system (H202) is added to the cells. The cells' ability to resist oxidative damage is determined. The peroxide will diminish cells' growth rates depending on antioxidant function capacity of the tested cells.



The ability of the patient's immune cells to resist effects of oxidative stress is compared to the average normal ranges of the population.

Specific antioxidants that may be *particularly beneficial*

Cell Science Systems has developed the cellular test that determines patient-specific nutrients that may be particularly protective in resisting oxidative stress and restoring efficient antioxidant function.

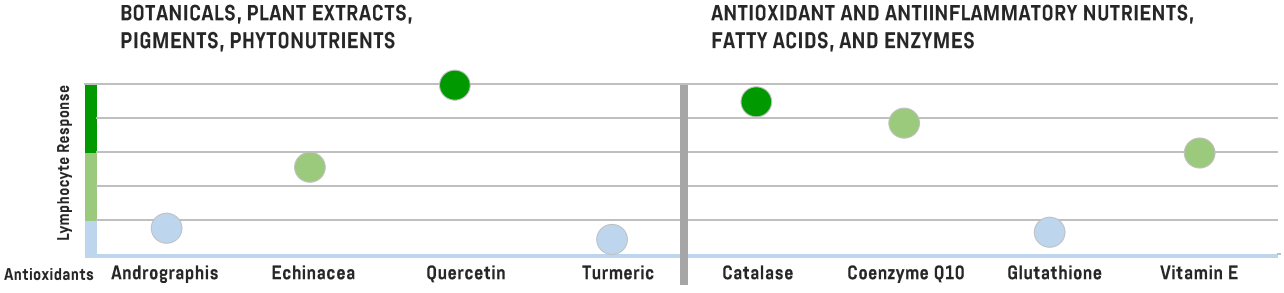


Antioxidants are molecules which can safely interact with free radicals and terminate the chain reaction before vital molecules are damaged. Although there are several enzyme systems within the body that scavenge free radicals, certain micronutrient antioxidants are required for proper function of the body's antioxidant enzyme systems. The body cannot manufacture these micronutrients so they must be supplied in the diet.

In the tests for individual antioxidants, it is determined which specific antioxidants may be beneficial and thus supporting patient's immune cells to resist oxidative stress. For these tests, single antioxidants are added to the patients' cells and their serum in the presence of oxidative stress molecules.

Specific antioxidants that significantly improve patients' antioxidant function to recover and resist the effect of the oxidative stress are reported. This process is repeated for each individual antioxidant.

● Baseline ● No significant response ● Protective ● Highly Protective



Panel contents

104 test items

CMA I Cellular Micronutrient Assay

CMA | Micronutrient insufficiencies – 55 test items

VITAMINS

Thiamine (vitamin B1)
Riboflavin (vitamin B2)
Biotin
Cobalamin (vitamin B12)
Folate (vitamin B9)
Nicotinamide (Niacin, vitamin B3)
Pantothenic Acid
Pyridoxine (vitamin B6)
Vitamin C
Vitamin A
Vitamin D
Vitamin E (Delta-tocotrienol)
Vitamin K1
Vitamin K2-MK7
Vitamin K2-MK4

MINERALS

Boron
Calcium
Chromium
Copper
Iodine
Iron
Lithium
Magnesium
Manganese
Molybdenum
Selenium
Strontium
Vanadium
Zinc

AMINO ACIDS

Arginine
Asparagine
Cysteine
Glutamine
Glycine
Histidine
Isoleucine
Leucine
Lysine
Methionine
Phenylalanine
Serine
Taurine
Threonine
Tryptophan
Tyrosine
Valine

OTHER NUTRIENTS

Carnitine
Choline
Coenzyme Q10
Docosahexaenoic acid (DHA)
Eicosapentaenoic acid (EPA)
Glutathione
Inositol
Lipoic Acid
Oleic acid (omega 9)

APA I Antioxidant Protection Assay

APA | Individually beneficial antioxidants – 49 test items

BOTANICALS, PLANT EXTRACTS, PIGMENTS, PHYTONUTRIENTS

Acai Berry
Andrographis
Astaxanthin
Astragalus
Bilberry
Boswellia
Camu Camu
Chlorophyll
Cinnamon
Echinacea
Elderberry
Garlic
Ginger
Gingko biloba
Goji Berry
Grape Seed
Green Tea
Lavender
Lycopene
Maitake mushroom
Mangosteen
Melatonin
Milk Thistle
Moringa
Noni Berry
Piperine
Pomegranate
Pycnogenol
Quercetin
Resveratrol
Rhodiola Root
Shiitake mushroom
Sulforaphane
Turmeric
Wild Cherry Bark
Zeaxanthin

ANTIOXIDANTS AND ENZYMES:

Beta-carotene
Catalase
Coenzyme Q10
Glutathione
Lipoic Acid
Lutein
NADH
Pyrroloquinoline
Selenium
Super Oxide Dismutase (SOD)
Vitamin C
Vitamin E (Delta tocotrienol)
Zinc

CELL SCIENCE SYSTEMS

"North American Food Intolerance Testing Company of the Year" (Frost & Sullivan)

Functional Laboratory Testing aimed at personalized nutrition and prevention of chronic inflammation and autoimmune disease.

Cell Science Systems Corp. (CSS) is a specialty clinical laboratory that develops and performs testing in immunology, serology, cell biology, and other specialties supporting the personalized treatment and prevention of chronic disease.

CSS operates a CLIA-certified laboratory and is an FDA inspected and registered, cGMP medical device manufacturer meeting ISO EN13485:2012 standards.

- CLIA-ID#10D0283906
- State of California Lab ID: 00800633
- Reagents and instruments are CE marked for the international market

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Clinical Laboratory Improvement Amendments

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