

Foundational nutrition and metabolic laboratory testing

Being able to accurately and scientifically target each patient's needs has always been a challenge. **Laurent Bannock**, MSc, CISSN, clinical director of **NutritionGeeks**, introduces a new testing profile incorporating urine, saliva and fingerprick blood samples that will also help practitioners select specific supplements.

Functional lab tests are not new, but a specialized package of tests to help determine foundational metabolic and nutritional information on each and every patient without a blood draw is very new. The Designs for Health Comprehensive Metabolic Profile Plus (CMP+) from Metametrix Clinical Laboratories gives practitioners the tools to evaluate a patient's complete nutritional and metabolic health from convenient urine, saliva and BloodSpot finger-prick blood samples. These samples can literally be done from home – saving the patient considerable stress and inconvenience. By combining organic acids, lipid peroxides, fatty acids, amino acids, IgG food antigens, Anti-Gliadin IgA and Secretory IgA tests into one advanced assessment profile, this profile helps you not only target each patient's needs – but using complex algorithms – will also help select specific supplements and the most appropriate dosages.

Organic Acids

The CMP+ starts with an Organic Acids profile. This is much like an emission test on your car. The exhaust is examined to see how efficiently the engine is burning fuel. Similarly, organic acids in urine reveal the efficiency of the body's cellular "engine".

Many organic acids result from the chemical reactions your body uses to transform food

into energy, growth, maintenance, and repair of body tissue. Like spark plugs that ignite fuel in a car engine, vitamins and other nutrients are essential for these chemical reactions that power the metabolic machinery. Tens of thousands of these reactions occur in the body every second and are the basis for your level of health and vitality.

The figure on page 38 illustrates a well-functioning metabolic pathway. Molecule A is converted to Molecule B by the enzyme AB. Molecule B is converted to Molecule C by the enzyme BC and so on all the way down the metabolic pathway. Most enzymes require specific vitamins or minerals in order to convert one molecule to another.

If specific nutrients are not available in adequate amounts, important reactions cannot occur as efficiently as they should. The illustration below shows what happens when the nutrient is not present in adequate amounts, causing enzyme AB to function inefficiently. Less of molecule A is converted to molecule B, while the remainder of molecule A builds up and spills into the urine. Notice that molecules B through D downstream are also affected.

This process is like a dam blocking a stream: very little water flowing downstream and an overflow occurring upstream. The organic acids profile measures specific organic acids in urine to determine what metabolic blockages may be occurring due to nutrient →



→ insufficiencies or other issues. High levels of certain organic acids indicate specific nutrient insufficiencies that may be affecting health; others show how the body is responding to toxins. When these are high on the organic acids profile, the patient may benefit from therapies that support detoxification processes. A few organic acids are significant at low levels. As a healthcare practitioner, you can use this profile to design an individual nutritional support program tailored to your patient's unique biochemical needs. There are five main categories covered in the organic acids profile:

B vitamin insufficiency

Insufficiency of B vitamins tends to be common since they are not stored as efficiently in the body as are other vitamins. B vitamins are involved in many critical processes, including energy production, digestion, and muscle and nerve function. For example, production of stomach acid requires large amounts of energy. Even modest B vitamin insufficiencies can compromise adequate energy production, leading to poor acid secretion and digestive disturbances commonly experienced as indigestion.

Cellular energy

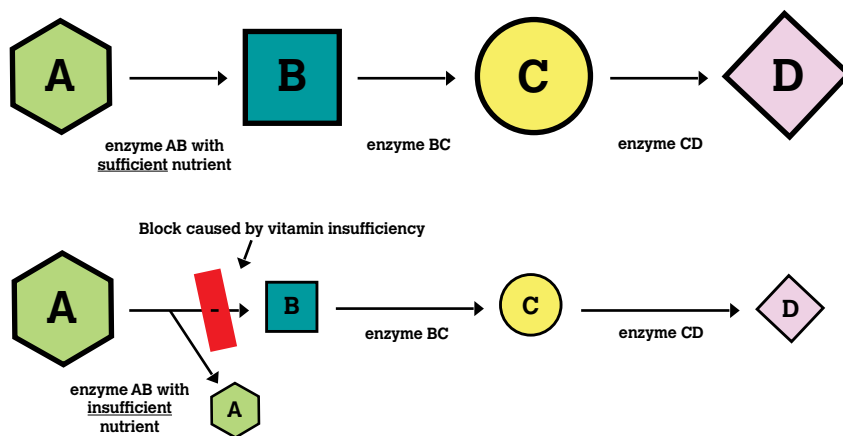
Although B vitamins also impact energy production, this category measures compounds that relate most directly to how efficiently mitochondria produce energy. All body processes depend on this key activity. Inadequate energy production at the cellular level can affect any aspect of body function and can have dramatic impact on a wide range of health conditions.

Neural function

This category relates to neurotransmitters, the chemicals the nervous system uses to function and communicate with the body. Abnormalities in this area can relate to symptoms of mental, emotional, and behavioral problems.

Detoxification

Not only does the body use essential nutrients to actively build and maintain itself, it also must eliminate environmental toxins and certain chemicals created by the body itself. This detoxification process is critical to health. Like a backed-up sewer, an impaired detoxification system can lead to many problems. Brain fog, headaches, insomnia, nausea, chemical sensitivities, and a variety of chronic health problems have been related to toxicity issues.



Intestinal microbial balance markers

The compounds in this category normally appear in urine only at low levels, since they're not normally produced in the cells of the body. However, unfriendly intestinal microorganisms can manufacture them in relatively high quantities. The compounds are then absorbed into the blood from the intestines and eventually appear in the urine. Microbial overgrowth can lead to a wide variety of symptoms due to reactions to the toxic products produced by bacteria, parasites, or fungi. Various patterns of the compounds listed below appear elevated in conditions of general intestinal microbial overgrowth.

Urine lipid peroxides

During the process to produce the chemical energy to power cells and fight infection, the body makes harmful chemicals called free radicals. Breakdown of the lipid components of cell membranes by free radicals leads to the formation of lipid peroxides. Antioxidant nutrients protect against this process. The lipid peroxide test tells you if you are getting enough of these nutrients. High levels of lipid peroxides are associated with cancer, heart disease, stroke and aging.

Bloodspot fatty acids

In addition to the metabolic information gained from the organic acids profile, the CMP+ adds critical information about essential fatty acids. This is where the multiple system function assessment becomes very powerful for predicting weaknesses that impact health.

Many profound clinical symptoms hinge on fatty acid status. While there is much discussion of the negative impact of fats on health, the positive benefits associated with essential fatty acids are often overlooked.

Achieving the optimum balance of essential fatty acids minimises inflammation, a major risk factor in heart disease and cancer. A balance of fatty acids is also necessary for proper brain development and function of the nervous system. The activity of every cell in the body is compromised when fatty acids are deficient. Cell membranes, made of fatty acids, serve as the door that regulates the flow of nutrients into the cell and removal of metabolic waste products out of the cell.

Blood-spot levels of fatty acids (from a finger-prick sample) reveal circulating levels in plasma as well as long-term balance in the tissue. By examining whole blood it is possible to gauge how well your body is utilizing the fatty acids you consume.

Bloodspot amino acids

Amino acids make up proteins found in every tissue of the body. They play a major role in nearly every chemical process that affects both physical and mental function. As a result, amino acids have more diverse functions than any other nutrient group, including cellular energy production, formation of ligaments, tendons, and bones, formation of antibodies, formation and regulation of enzymes and blood transport proteins.

After ruling out chronic dietary deficiency of high quality protein, if many amino acids are low, consider malabsorption or low hydrochloric acid in the stomach. When replenishing with amino acid supplements, use a balanced or individualized formulation with all the L-amino acids in order to avoid a relative deficiency of the missing groups.

Bloodspot IgG food antibodies

The next test is the extremely important question of food sensitivities. The barrier between the blood and the digested food and →



About the author

Laurent Bannock MSc CISSN is a clinical, sports and exercise nutritionist, and the clinical director of NutritionGeeks in the UK – the exclusive supplier of Metamatrix Laboratory services in the UK. Laurent also runs an international nutrition and wellness practice and is based both in the USA (Santa Fe) and the UK (London). He is an adjunct professor in the department of nutrition at Huntington College of Health Sciences (USA) and holds a masters degree in nutrition. He is currently completing a post-graduate degree in Exercise Science and Health Promotion at California University of Pennsylvania (USA). Laurent is also the nutrition and wellness expert and columnist for "Outside" magazine in the US.

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→ microbial mass in the gut must be strong to keep from overloading the immune system. If antigens from food have become a chronic challenge to immune function, then steps may be needed to heal the gut.

IgG antibodies are associated with non-atopic or "delayed" food reactions that can worsen or contribute to many different health problems. Food sensitivities can occur at any age, triggering many different symptoms and contribute to a variety of disorders.

From a simple finger-prick sample, the Bloodspot IgG Food Antibody Profile measures levels of IgG antibodies specific to 30 commonly offending foods. It clearly identifies those foods that may be causing health problems, helping to achieve positive outcomes sooner, even when combined with elimination / provocation testing.

Immunology

A particular useful section of the CMP+ profile is the assessment of Secretory IgA (sIgA) and Anti-Gliadin Antibody.


A depressed sIgA can be caused by a variety of issues such as chronic stress, a compromised immune system and dysbiosis. With this information, along with the other test findings, you will be able to prioritise treatment options such as whether to support the gut mucosa and/or support immune function. An

elevated sIgA can be caused by an immune response to eliminate pathogenic organisms in the GI tract and/or sensitivities to foods. This information can identify appropriate treatment options such as supporting the immune system, removal of pathogens (ie parasites, opportunistic bacteria, yeast etc), suggest food sensitivities and even an elimination diet.

Since gluten intolerance is so common, and since IgG food antigen testing may not identify wheat intolerance, testing for Anti-Gliadin antibody is an essential foundational test for every patient. This test will help determine gluten enteropathy or sensitivity in the colon. This information will help determine treatment options such as removal of gluten in the diet, consideration for testing for coeliac disease, and indication for support of mucosal healing.

Summary

Measuring markers of deficiency and food sensitivity is a quantum leap over guessing from signs and symptoms where support might be needed. The chosen markers cover most aspects of individual requirements for nutrients and dietary modification. The laboratory measurements must be translated into specific corrections that can lead to improved function. The Designs for Health Metabolic Profile Plus provides clear recommendations for products and dosages that meet the individual needs

indicated by the test results. While symptoms frequently improve in a matter of days to weeks, abnormal metabolic markers may take longer to fully normalize. They usually show changes toward normality in three months, so retesting may be done at that time. Abnormalities that persist may be due to toxins that have not been identified or to strong genetic influences. 

References:

Lord RS and Brally JA, Laboratory Evaluations for Integrative and Functional Medicine, Metamatrix Institute, 2nd Edition 2008