

## Interpreting Urine test results

### How to interpret urine organic acid and urine amino acid test results?

-- Ascorbic acid is low at 3.91 (ref 10-200)

2-oxo-glutaric acid is very low at 0.50 (ref 15-200) mmol/mcr.

This might mean that there is a glutathione deficiency.

Citrate is converted to 2-oxo-glutaric by an enzyme that is glutathione-dependent. So if glutathione is down, citrate will go up. And 2-oxo-glutaric will go down. That is in the citric acid cycle - an energy producing cycle.

On the other hand, that the citric acid levels are not elevated, but intracellular it may be elevated. If this is a problem, then the blood must be alkaline and the urine acid.

The interpretation report says that many amino acids might be elevated or low because of B6 deficiency.

Remember that B6 (pyridoxine) is a precursor to pyridoxalphosphate, which is the actual enzyme that does the job in the metabolism of proteins. Pyridoxalphosphate is up to 10 times as powerful as normal B6 (pyridoxine).

Three forms of B6: pyridoxine, pyridoxal, and pyridoxamine. All forms are functional as precursors of pyridoxine coenzyme, pyridoxalphosphate (PLP). PLP is a very potent coenzyme. PLP is necessary for many protein metabolism reactions such as transfer of amino groups, removal of amide groups, removal of a carbon dioxide molecule from carboxylic acid, homocysteine conversion, niacin and serotonin formation from tryptophan, nicotinic acid formation, hemoglobin synthesis, and amino acid

transport.

Deficiency signs and symptoms include eczema, seborrheic dermatitis of ears, nose, mouth, glossitis angular stomatitis, and chapped lips.

-- 2-oxo-glutaric is very low at 0.50 (ref 15-200) mmol/mcr

Meaning: Low conversion of citric acid to 2-oxo-glutaric acid in the Krebs's cycle

Needed for conversion: B3, magnesium, manganese, iron and glutathione

++ Indican ++ (elevated)

This is a by-product of bacterial metabolism of the amino acid tryptophan, and elevated levels may indicate overgrowth of the bowel.

Essential amino acids that are elevated

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++ valine is elevated at 78 (normal 10-55)

++ methionine is elevated at 71 (ref 10-60)

Essential amino acids that are low

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Tryptophan levels are too low (is essential amino); Must be caused by same bacteria as above (Indican test)

-- Tryptophan slightly low at 26 (ref 30-140)

MAGNESIUM-related

Probable disturbed functioning of magnesium-dependant enzymes.

Mg. The following amino acids are elevated:

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++ Fosfoserine high normal at 72 (20-90)

++ Methionine elevated at 71 (10-60)

++ Ethanolamine at 268 (80-350)

## VITAMIN B6-related

Probable disturbed functioning of B6-dependent enzymes.

B6. The following amino acids are elevated:

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++ alfa-amino-adipic acid elevated at 127, ref 10-50 umol/24h (B6 related)

++ beta-alanine is elevated at 70 (ref 0-50)

Interpretation of elevated beta-alanine:

\* Reduced need for B6

\* Decreased reabsorption of amino acids in the kidneys, predominantly taurine (probably low anyway)

\* Reduced breakdown of anserine and carnosine

\* Disturbed intestinal flora

B6. The following amino acids are low:

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-- alfa-amino-butyric acid slightly low at 22 (normal 25-85) (B6 related)

-- cystathion at 18 (15-75)

++ gamma-amino-butyric acid elevated at 41 (normal 0-20)

May be due to disturbed intestinal flora

++ hydroxylysine elevated at 23 (ref 0-15)

Catabolic process might have started

++ 1-methylhistidine very high at 906 (ref 130-390)

Probably due to defect in methylation process. Possibly because of B12/folic acid deficiency

++ 3-methylhistidine very high at 549 (ref 50-300).

Probably due to defect in methylation process. Possibly because of B12/folic acid deficiency

Might also be caused by high meat consumption.

++ anserine elevated at 115 (ref 0-55)

Fits elevated beta-alanine or incomplete protein breakdown (anserine is a di-peptide that consists of B-alanine and methylhistidine)

++ carnosine very high at 324 (ref 0-100)

Fits elevated b-alanine and histidine

-- glutamic acid lactam low at 10.5 (ref 20-115) mmol/mcr

Metabolite of glutathione. Glutathione is probably low.

-- Fumaric acid low at 0.19 (0-10)

Can be increased with b1, b2, b3, b5, lipoic acid, coQ10 and magnesium

## Neurotransmitters

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-- VMA vanilylmandelate low at 1.47 (0-18)

-- HVA homovanillate low at 0.92 (0-25)

These are metabolites of the catecholamines, epinephrine and norepinephrine, which are based on the essential amino acid phenylalanine and tyrosine. Possible symptoms are depression, insomnia, incapability to handle stress.

Three reasons to think that the intestinal flora is not alright:

++ indican test positive

++ beta alanine elevated

++ gamma amino butyric acid elevated

-- tryptophan low

## URINALYSIS

● **Urinalysis (UA) dipstick, with or without a microscopic examination of centrifuged urine sediment.**

- A urine test for screening and monitoring various urinary and metabolic conditions of the body.

The urinalysis consists of three components: the physical (color, appearance, pH, specific gravity); the chemical (leukocyte esterase-LE-, nitrite, pH (a physical component measured chemically), protein, glucose, ketones, urobilinogen, bilirubin, blood (intact Rbc), and hemoglobin (lysed Rbc).

Confirmatory tests are performed if protein, ketones, or bilirubin are abnormal on the dipstick. Any abnormal result on the dipstick (except pH) will be followed up with a microscopic analysis of urine sediment.

A fresh, first morning urine is preferred. For a midstream-catch specimen, the patient should urinate a small amount of urine into the toilet, and then collect urine into the container without stopping the urine stream.

Female patients:

If specimen may be contaminated with vaginal discharge or menstrual blood, the vaginal area should be thoroughly cleansed by wiping from front to back with moistened towelettes prior to collecting the urine specimen. Note on requisition if patient is currently menstruating. The recommended volume is 20 mL (protected from light), minimum volume required is 15 mL. DO NOT freeze. Refrigerate within 10 minutes of collection.

A properly performed urine dipstick analysis will allow screening for urinary tract infections (LE and nitrite), kidney conditions (protein, blood, specific gravity), diabetic problems (glucose and ketones), liver problems (bilirubin and urobilinogen), hemolytic problems (urobilinogen and blood), and acid/base problems (pH).

Depending on the test, the result may be reported as negative or positive, 1+ to 4+, mg/dL, EU/dL, trace to large, or in case of pH and specific gravity, a plain number.

A microscopic examination of the urine sediment will help confirm some of the dipstick findings and add additional information on the status and location of the Urinary Tract Infection (UTI) problem. Various casts and cells may indicate renal from non-renal conditions. Types of epithelial cells, RBCs and WBCs may also help indicate the state of an infection. In certain cases, yeast and *T. vaginalis* may be detected in fresh urine

#### • Urine vitamin C, Ascorbic acid

- A urine screening test for vitamin C, Ascorbic Acid.

This is a screening test for measuring the amount of vitamin C or ascorbic acid being excreted in the urine. The urine is collected fresh and transported (protected from light) as described for the urinalysis specimen.

The amount of vitamin C excreted in the urine varies with the intake and stress level of the patient. In a 24-hour period, a person on an adequate diet and tissue saturation levels will excrete 20-30 mg/day. People under severe physiological or psychological stress may show a negative, or ZERO urine vitamin C.

Since some of the tests on the urine dipstick are inhibited by high levels of vitamin C (glucose, bilirubin, blood), some laboratories use the vitamin C results as a technical help in interpreting these results. Depending on the manufacturer of the strip, the chemical reaction may differ. It is usually some form or modification of the Tillman's reagent. The presence of vitamin C (ascorbic acid) causes a

decolourization of the chemical in the test field from a gray-blue to orange. The sensitivity of most strips is 10 mg/dL.

### **Potassium/Sodium Ratio, (K/Na ratio)**

- A urine test for diagnosis and monitoring whole foods in your diet.

The amount of potassium and sodium is measured in a random urine specimen and is one of the indicators used to look at the amount of whole foods in your diet.

Thousands of years ago, our diet contained much more potassium ( $K^+$ ) than it did sodium ( $Na^+$ ). Today, our diet contains much more sodium than potassium. A ratio of one to one (1.0 on your laboratory results) suggests that you may be getting a reasonable amount of whole foods in your diet. A level of greater than 1.0 could indicate that you are eating a predominately whole food diet.

“Whole food” refers to the cellular completeness of a food. If a food retains the same cellular components that it grew with, then it is a whole food. White flour, for example, is only 50% whole because the bran and germ have been milled out. Sugar is less than one percent whole.

Provided that your intestinal digestion and absorption are normal, eating more whole foods is one of the best ways to improve your nutritional status and overall health. Whole foods mean eating fruits, vegetables, and whole grains in place of processed foods. Foods naturally higher in potassium than sodium may have a K/Na ratio of 4.0 or more. The ratio for an apple is 150/1.0; unsweetened applesauce is 39/1.0, while a piece of a store-bought apple pie is 0.27/1.0!

When food wholeness and omega-6/omega-3 fatty acid ratios are compared to various diet changes through history, we find the following:

Diet >	Ancestral	Agricultural	Industrial	Fast Food
Wholeness	100%	90%	60%	35%
Omega-6/3	1:1	5:1	10:1	20:1

The method for K/Na ratio is by ion selective electrode detection. There is no special patient preparation. A minimum of 1.0 mL of urine is required, collected in a clean plastic container. If not run immediately, place in a plastic transport tube, freeze and ship immediately.

### **Pyrroles, Pyrroluria (Kryptopyrrole, Mauve Factor)**

- A urine test for diagnosis and monitoring severe physiological or psychological stress.

Pyrroles appear in the urine of patients undergoing severe physiological or psychological stress. The presence of urinary pyrroles (mauve factor) was first reported in patients with LSD psychosis. Later, high levels of pyrroles were found in the urine of schizophrenic patients. The chemical structure is a 2,4 dimethyl-3-ethylpyrrole. It is also called *kryptopyrrole*. *Kryptos* comes from the Greek word “hidden.”

In normal urine, the amount of pyrroles excreted is small, less than 20 ug/dL. It has been reported that kryptopyrrole will form a base with the aldehyde form of vitamin B6 in the blood. This combination will then bind with zinc. As large amounts of kryptopyrroles are excreted in the urine, it depletes the blood of B6 and zinc.

Kryptopyrroles may be found in the urine of 11% of “normal”, 24% of “disturbed children”, 42% of psychiatric patients, and 52% of schizophrenic patients.

Urine specimen collection and transport is very important for proper test results. Kits for shipping can be obtained from the laboratory. A brown, plastic tube containing 500 mg of ascorbic acid (vitamin C) is



filled with urine, no less than 1/2 full and no more than 3/4 full. The urine is mixed and frozen. Ship frozen with a cold pack by overnight delivery.

Normal reference range is less than 20 ug/dL. A “borderline” value is between 10 to 20 ug/dL

## **Urine Strontium**

- A 20-mL random urine specimen is required for this test.

The action of strontium, a trace mineral, is closely related to that of calcium and the retention of strontium varies inversely with intake. It affects the osteoporetic process by inhibiting the activity of the 24, 25 hydroxyl forms of vitamin D3 in animals. It has been shown that treating postmenopausal women with strontium ranelate leads to early and sustained reductions in the risk of vertebral fractures. Low levels have been found in patients with dental caries, decreased growth in animals, bone pain and osteoporosis. Toxic levels may cause dental caries, rickets, abdominal pain and diarrhea.

No RDA has been established for strontium. An estimated mean daily intake of strontium worldwide from food and water is 1.0 mg to 5.0 mg per day. A therapeutic range is said to be from 10 mg to 2000 mg. Sources of strontium are most plant foods, dairy products, brazil nuts, and seawater.

The method is by ICP. Normal values established in our laboratory are 0.012 to 0.084 ug/mL.

## **Indican**

- Sample required: 1 test tube of urine
- This single test may be used for initial diagnosing and follow-up, as well as a primary test for monitoring therapeutic digestive protocols.

## Overview

The Indican test uses a urine sample to test for the presence of indole, a metabolic byproduct of the action of intestinal bacteria on the amino acid tryptophan. The level of indican is an index of the efficiency of protein digestion.

The indican scale measures the presence of indole, a metabolic byproduct of the action of intestinal bacteria on the amino acid tryptophan. Insufficient gastric hydrochloric acid, insufficient digestive enzymes, adverse food reactions, parasitic infection, fungal infection, overgrowth of bacteria that metabolize specific proteins, hypermotility of the small intestine, or other gastrointestinal dysfunction can compromise protein digestion.

Poor protein digestion also can result from the dietary intake of protein from a group of food proteins called lectins. A property common to lectins is that they agglutinate specific cell-surface antigens. Lectins have many beneficial effects, and some harmful ones. A beneficial example is the agglutination of cancer cells, which makes them easier for macrophages to phagocytize. Determining which lectins will cause agglutination, however, varies among individuals, possibly because of differing blood types. A commonly found lectin is gluten, which is present in various forms in several grains. In the intestines of some individuals, gluten can agglutinate with other food proteins, which makes complete digestion difficult or impossible. Ingestion of incompatible lectin-containing foodstuffs can lead to chronic subclinical agglutination, indigestion, and eventually, putrefaction.

Putrefaction is especially detrimental, because it can produce dozens of carcinogenic substances. These substances can enter the liver through the general circulation. Undigested protein also increases systemic toxicity, burdening the detoxification capacity of the liver. Poor protein digestion can lead to other problems, such as intestinal microbial overgrowth, which can lead to unfavorable pH changes and

impaired absorption. These factors can prevent the synthesis of essential proteins and other compounds.

Eventually, the inability to digest protein can prevent proper glycemic control, and can lead to serious hormone imbalances. With poor protein digestion, eventually all absorption is adversely affected, including the absorption of water. This can be a prelude to chronic degenerative disorder including gastrointestinal disease and cancer. Without proper digestion, it is impossible to have optimal health.

In normal urine, the amount of indican excreted is small. It is increased with high protein diets or inefficient protein digestion. If not digested properly, or if the wrong type of proteins is ingested, bowel putrefaction can occur. Problems with protein digestion can be caused by overgrowth of anaerobic bacteria, intestinal obstruction, stomach cancer, low stomach acid, parasitic infections, malabsorptive syndromes (sprue, etc.), fungal infections, lack of digestive enzymes, or liver problems. In the rare condition, Hartnup disease, amino acids are poorly absorbed from the intestine. This allows bacterial decomposition to take place. The inability to digest protein can have adverse affects on glycemic control, hormone balance and water balance.

## **Clinical Use**

This profile provides data relevant to a multitude of health disorders. Its findings are applicable in treating existing health concerns and in counseling for nutritionally based wellness and anti-aging programs. This lab test specifically assesses protein digestion.

## **Conditions Assessed**

Conditions assessed include a wide variety of GI symptoms and other vague, generalized symptoms.

## **Logical Sequence of Testing**

The logical sequence of using this test as an initial or follow-up test is determined by a variety of individual considerations, including the patient's chief complaint, the array of signs and symptoms, the chronicity of the condition, the tests previously taken, and the judgment of the practitioner.