

**JANE DOE**

Report Date: January 20, 2015
Kit Received: October 22, 2010
DOB: 2010-01-01
Practitioner: Nutrichem

**PATIENT REPORT**

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This information is not intended to be used for diagnostic puposes but serves as an analytical and educational guide for interpretation of laboratory results by medical professionals, in association with other clinical tests and case histories.

Patient: JANE DOE	Practitioner: Nutrichem
Diagnosis:	Ref #: 7420101022103707
DOB: 2010-01-01	NutriChem Client #: 0000291528

January 20, 2015

## Antioxidants

Result	Range	Hi/Lo	0----- Percentile Graph -----100	% of range
<b>Gamma-Tocopherol</b> <span style="float:right">µmol/L</span>				
2	1 - 7	-		17%
<b>Alpha-Tocopherol</b> <span style="float:right">µmol/L</span>				
62	15 - 70	-		85%
<b>Coenzyme Q-10</b> <span style="float:right">µmol/L</span>				
1.8	0.5 - 5	-		29%
<b>Beta-Carotene</b> <span style="float:right">µmol/L</span>				
3.2	0.3 - 3.7	-		85%
<b>Lycopene</b> <span style="float:right">µmol/L</span>				
0.9	0.02 - 1	-		90%
<b>Retinol</b> <span style="float:right">µmol/L</span>				
2.4	1 - 4.1	-		45%
<b>Alpha-Carotene</b> <span style="float:right">µmol/L</span>				
0.5	0.1 - 0.95	-		47%

## Antioxidants

### ANTIOXIDANTS

ALPHA-TOCOPHEROL and GAMMA-TOCOPHEROL are both forms of Vitamin E. Alpha-tocopherol is the predominant form of vitamin E in food and human tissues, and is the most biologically active. Along with its antioxidant role, vitamin E is important for the formation of red blood cells and helps the body to use vitamin K.

COENZYME Q10 (CoQ10) is essential for energy production in the cell, enhances the immune system and acts as an antioxidant. Low levels of CoQ10 will dramatically affect the heart and the skeletal muscles, because these tissues have high energy requirements. CoQ10 levels decline with age, and are also lowered by cholesterol reducing drugs.

ALPHA- and BETA-CAROTENE are naturally occurring pigments, contributing orange and yellow hues to fruit and vegetables. Alpha and Beta-Carotene are converted to vitamin A in the liver, and zinc is needed for this process. With adequate zinc in your diet, and by eating carotene rich foods, you can increase the levels of vitamin A in your body.

LYCOPENE is a type of carotene but it cannot be converted to vitamin A. While lycopene is not an essential nutrient, lycopene is associated with a reduced risk of prostate and digestive tract cancers and myocardial infarction. The richest sources of lycopene are tomato-based products (sauce, juice and paste).

RETINOL is a form of Vitamin A. Vitamin A is essential for vision, bone growth, reproduction, wound healing and is critical for a healthy immune system. Low levels of retinol may result from malabsorption, protein-energy malnutrition, liver disease or zinc deficiency. Immune system abnormalities can arise from vitamin A deficiency.

### UNDERSTANDING YOUR RESULTS

The Focus for interpreting this panel is placed on the percentile graph and the positioning of the black arrow.

Ideally, the placement of the black arrow should fall within the white portion of the percentile graph for any of the antioxidants.

If the arrow is placed within the coloured region on the left side of the percentile range, then supplementation is recommended and will be provided in your custom vitamin formula.

If the arrow is placed within the coloured region on the right side of the percentile range, then this indicates that either you're supplementing with this antioxidant and your dosage will be reviewed or you're gaining large amounts of this antioxidant in your diet and your diet will be reviewed.

Zinc nutritional status is reflected in this panel. Zinc is needed to convert the carotenes into retinol. If both alpha and beta-carotene are higher than retinol, then you may be lacking adequate zinc in your diet and supplementation will be recommended.

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### Organic Acids: Energy Production

Result	Range	Hi/Lo	0----- Percentile Graph -----100	% of range
<b>Lactate</b> <span style="float: right;">µmol/g creatinine</span>				
22	10 - 100	-		13%
<b>Citrate</b> <span style="float: right;">µmol/g creatinine</span>				
1200	454 - 3940	-		21%
<b>cis-Aconitate</b> <span style="float: right;">µmol/g creatinine</span>				
212	85 - 400	-		40%
<b>Isocitrate</b> <span style="float: right;">µmol/g creatinine</span>				
175	110 - 500	-		17%
<b>2-Ketoglutarate</b> <span style="float: right;">µmol/g creatinine</span>				
42	0 - 344	-		12%
<b>Succinate</b> <span style="float: right;">µmol/g creatinine</span>				
160	0 - 163	-		98%
<b>Fumarate</b> <span style="float: right;">µmol/g creatinine</span>				
14	0 - 20	-		70%
<b>Malate</b> <span style="float: right;">µmol/g creatinine</span>				
21	0 - 23	-		91%

### Organic Acids: Energy Production

Our body gets macronutrients (such as protein, fat and carbohydrate) and micronutrients (vitamins and minerals) from the foods we eat, and from any supplements that we take. We use these nutrients to fuel and support all the metabolic processes in the body. During these processes, chemical by-products are produced and removed from the body in your urine. These chemical by-products are called Organic Acids.

When we are missing out on key nutrients, these metabolic processes do not work properly. Our body then starts to produce altered levels of organic acids, which can accumulate and spill into the urine.

The measurement of urinary organic acids gives an extensive overview of a person's metabolism. This information can then be used to develop an individual treatment protocol specific to the patient's needs. Nutrichem's Organic acid panel is divided into 4 sections to provide valuable information about energy production, neurotransmitter function, and gastrointestinal health as well as general metabolism.

#### ENERGY PRODUCTION

Fats, carbohydrates and protein are contained in the food we eat. In order to use the energy of these compounds, the body needs to break them down and convert them into a form of energy that can be used by our cells. This is called the Citric Acid Cycle. This section measures all the organic acids that are produced in the Citric Acid Cycle, which is illustrated in Figure #3.

The citric acid cycle is a circular chain reaction that requires different nutritional cofactors in order to work. Vitamin B complex, lipoic acid, CoQ10, iron, magnesium, manganese and copper are all essential cofactors for the Citric Acid Cycle. If one or more of the cofactors are deficient, then a block in the chain is produced and this leads to an elevation in the urinary organic acids.

#### UNDERSTANDING YOUR RESULTS

The Focus for interpreting this panel is placed on the percentile graph and the positioning of the black arrow.

Ideally, the placement of the black arrow should fall within the middle or white portion of the percentile graph.

If the arrow is placed within the coloured region on the left side of the percentile graph, then the levels of organic acids being produced are considered low. If the majority of your arrows are placed on the left side of the percentile graph it could indicate an underactive thyroid or a carnitine deficiency. Both of these can be confirmed with a simple blood test that measures TSH (Thyroid Stimulating Hormone) or with an amino acid evaluation. In order to improve this situation, the thyroid can be supported naturally through supplementation.

If the Arrow placement falls within the coloured region on the right side of the percentile graph, then the level of that urinary organic acid is considered high. This can indicate a blockage of the citric acid cycle. Energy production in the cell is not happening efficiently. This may translate to a person experiencing fatigue and weakness. The proper co-factors needed to remove this blockage will be added to your custom vitamin formula.

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### Organic Acids: Neurotransmitter Function

Result	Range	Hi/Lo	0----- Percentile Graph -----100	% of range
<b>HVA</b> <span style="float: right;">µmol/g creatinine</span>				
30	8 - 50	-		52%
<b>VMA</b> <span style="float: right;">µmol/g creatinine</span>				
28	0 < 33	-		85%
<b>5-Hydroxyindol-3-acetate</b> <span style="float: right;">µmol/g creatinine</span>				
26	0 < 64	-		41%

### Organic Acids: Neurotransmitter Function

Neurotransmitters are biochemical messengers that transmit signals into the muscles, the glands, the gastrointestinal tract and the central nervous system to elicit normal body functions. These neurotransmitters include dopamine, norepinephrine, epinephrine which are particularly important during times of physical and emotional stress; and serotonin which helps with regulating sleep, memory, appetite, and helps prevent depression.

HOMOVANILLATE (HVA) is the main urinary metabolite of dopamine.

VANILMANDELATE (VMA) is the main urinary metabolite of epinephrine and norepinephrine.

5-HYDROXYINDOLE-3-ACETATE is the main urinary metabolite of serotonin.

### UNDERSTANDING YOUR RESULTS

The focus for interpreting this panel is placed on the % of range. It is the value located to the far right.

When the values of VMA, HVA and 5-Hydroxyindole-3-acetate are below 20% of the range, the metabolism of these neurotransmitters is considered low. This may lead to symptoms that include depression, sleep disturbances, anxiety and fatigue.

Improving protein intake is equally as important and may be achieved by supplementing with protein powder.

If HVA is elevated and the other 2 neurotransmitters are low, this indicates a copper deficiency. Copper will be added to your custom formula if this pattern is displayed.

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**Organic Acids: Gastrointestinal Health**

Result	Range	Hi/Lo	0----- Percentile Graph -----100	% of range
<b>4-Hydroxybenzoate</b> <span style="float: right;">µmol/g creatinine</span>				
4	0 < 45	-	▼ 	9%
<b>4-Hydroxyphenylacetate</b> <span style="float: right;">µmol/g creatinine</span>				
68	0 < 268	-	▼ 	25%
<b>Tartarate</b> <span style="float: right;">µmol/g creatinine</span>				
23	0 < 300	-	▼ 	8%
<b>Citramalate</b> <span style="float: right;">µmol/g creatinine</span>				
3	0 < 50	-	▼ 	6%
<b>Tricarballylate</b> <span style="float: right;">µmol/g creatinine</span>				
2	0 < 8	-	▼ 	25%
<b>Para-Cresol</b> <span style="float: right;">µmol/g creatinine</span>				
213	0 < 430	-	▼ 	50%

**Organic Acids: Gastrointestinal Health**

Microorganisms such as bacteria, protozoa and fungi, have their own unique metabolism, and they produce specific organic acids, which are normally not found in a healthy human. The presence of the organic acids tested in this panel suggests the presence of unhealthy microorganisms or overgrowth in the human bowel.

4-HYDROXYBENZOATE is a marker for bacterial overgrowth. 4-HYDROXYPHENYLACETATE is a marker for protozoa overgrowth.

TARTARATE and CITRAMALATE may indicate the presence of yeast.

TRICARBALLYATE is a marker for bacteria that can affect the body's ability to use magnesium.

PARA-CRESOL is a marker for bacteria activity in the colon.

**UNDERSTANDING YOUR RESULTS**

The focus for interpreting this panel is placed on the % of range. It is the value located to the far right.

If any of these organic acid markers are at 35% or above, then there is an overgrowth of unhealthy microorganisms in your bowel, which may lead to discomfort and poor absorption. The use of a probiotic is recommended.

If any of these organic acid markers are 34% or below, then unhealthy bacteria are present but not at levels that would cause any discomfort to the bowel. Unhealthy bacteria are always present in the bowel. But it is important to regulate the amount of unhealthy bacteria through the use of a probiotic.

This panel is used as a general screen. When elevations are present, further testing may be suggested to find out exactly what type of growth is present.

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### Organic Acids: General Metabolism

Result	Range	Hi/Lo	0----- Percentile Graph -----100	% of range
<b>Methylmalonate</b> <span style="float:right">µmol/g creatinine</span>				
15	0 < 20	-		75%
<b>2-hydroxybutyrate</b> <span style="float:right">µmol/g creatinine</span>				
1.4	0 < 5	-		28%
<b>3-hydroxybutyrate</b> <span style="float:right">µmol/g creatinine</span>				
7	0 < 20	-		35%
<b>b-hydroxyisovalerate</b> <span style="float:right">µmol/g creatinine</span>				
21	0 < 57	-		37%
<b>Hippurate</b> <span style="float:right">µmol/g creatinine</span>				
300	0 < 3650	-		8%
<b>Orotate</b> <span style="float:right">µmol/g creatinine</span>				
2	0 < 20	-		10%
<b>Adipate</b> <span style="float:right">µmol/g creatinine</span>				
16	0 < 31	-		52%
<b>Suberate</b> <span style="float:right">µmol/g creatinine</span>				
10	0 < 26	-		38%
<b>3-hydroxy-3-methylglutarate</b> <span style="float:right">µmol/g creatinine</span>				
18	0 < 88	-		20%
<b>Benzoate</b> <span style="float:right">µmol/g creatinine</span>				
35	0 < 76	-		46%
<b>Pyroglutamate</b> <span style="float:right">µmol/g creatinine</span>				
115	25 - 550	-		17%

### Organic Acids: General Metabolism

#### GENERAL METABOLISM

In this panel, we measure a variety of urinary organic acids, to provide additional information and a comprehensive overview of the efficiency of metabolic processes in the body.

#### UNDERSTANDING YOUR RESULTS

The focus for interpreting this panel is placed on the % of range. It is the value located to the far right.

When the value for METHYLMALONATE is 50% or above, it indicates a Vitamin B12 deficiency. Supplementation of B12 will be provided in your custom formula.

2-HYDROXYBUTYRATE and 3-HYDROXYBUTYRATE are formed when glucose cannot be used for energy. When one, or both, of these values is 40% or above, it suggests a need for chromium supplementation. Chromium is important for efficient glucose metabolism. It will be provided in your custom formula.

When the value of BETA-HYDROXYISOVALERATE is above 40%, then biotin is deficient and should be supplemented. It will be provided in your custom vitamin formula.

OROTATE is a marker of the urea cycle (Figure #1). When this value is 50% or above, it is a strong indicator of a block in the urea cycle, which can lead to excess ammonia in the body. This can cause gastrointestinal discomfort. If your result indicates a blockage then your amino acid profile will be reviewed to determine how it is blocked and what supplementation is needed to ensure the blockage is removed.

ADIPATE and SUBERATE are markers of the body's ability to utilize fats for energy. If these values are 40% or above, your body may not be using fats efficiently, and supplementation with carnitine is recommended. Carnitine transports fats into the area of the cell where they can be metabolized for energy. It will be provided in your custom vitamin formula.

3-HYDROXY-3-METHYLGLUTARATE is a precursor to cholesterol and to CoQ10. If this value is 40% or above, then CoQ10 deficiency is possible. Your CoQ10 levels will be reviewed in your antioxidant panel.

BENZOATE and HIPPURATE can give us an indication of intestinal microbial action when compared with the gastrointestinal section of the organic acids. When the value is 50% or above, a closer look at your digestive health is indicated.

Glutathione is a powerful antioxidant. Glutathione can be recycled in the body, but when this recycling process is not working properly, PYROGLUTAMATE can be elevated in the urine. A value of pyroglutamate 40% or higher suggests depletion of glutathione.

