



**TEST PATIENT**

GUa d'Y'HYgh'BUa Y  
 Sex : :  
 DUHY Collected : 00-00-0000  
 111 H9GH'ROAD TEST SUBURB  
**@AB =8: 00000000** UR#:0000000

**TEST PHYSICIAN**

DR JOHN DOE  
 111 CLINIC STF 99H  
 7@B=7'GI 6I F 6'J =7'' \$\$\$

P: 1300 688 522  
 E: info@nutripath.com.au  
 A: PO Box 442 Ashburton VIC 3142

**INTEGRATIVE MEDICINE**

URINE, SPOT Result Range Units

**CITRIC ACID CYCLE Metabolites.**

**Citric Acid Cycle Metabolism**

Citric Acid Cycle Metabolites serve both anabolic and catabolic functions. They are the final common pathway of energy release from catabolism of fats, proteins, and carbohydrates.

They are the source of basic structural molecules that are drawn away from the cycle to support organ maintenance and neurological function-anabolic processes

Crossroads of food conversion and utilization.

Spillage of Citric Acid Cycle intermediates into the urine may indicate mitochondrial inefficiencies in energy production. A block in any step may cause a build up of compounds that precede this step.

Amino acids supply carbon skeletons for maintaining mitochondrial concentrations.

Citrate, cis-Aconitate and Isocitrate are the key organic acids in this biochemical pathway and are responsible for aerobic energy production

Metabolite	Result	Range	Units	Visual
Pyruvic Acid.	5.78	0.60 - 6.61	ug/mgCR	
Lactic Acid.	2.70 *H	0.00 - 1.58	ug/mgCR	
Citric Acid.	234.40	37.50 - 417.80	ug/mgCR	
cis-Aconitic Acid.	60.80 *H	12.00 - 42.90	ug/mgCR	
Isocitric Acid.	34.30	7.80 - 45.90	ug/mgCR	
a-Ketoglutaric Acid.	36.02	10.40 - 168.30	ug/mgCR	
Succinic Acid	2.33	1.80 - 13.30	ug/gCR	
Fumaric Acid.	0.94	0.18 - 1.20	ug/mgCR	
Malic Acid.	1.07	0.30 - 1.45	ug/mgCR	

(\*) Result outside normal reference range

(H) Result is above upper limit of reference rang



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**Citric Acid Cycle Metabolites Comment**

Pyruvate is the anaerobic breakdown product of glucose. Its further conversion to acetyl-CoA requires the pyruvate dehydrogenase enzyme complex. Pyruvate dehydrogenase requires cofactors derived from thiamin, riboflavin, niacin, lipoic acid, and pantothenic acid for optimal function. Levels of pyruvate in the tissues are further controlled by the biotin-containing protein, pyruvate carboxylase, which controls the first step in the reformation of glucose from pyruvate. Multiple forms of pyruvate carboxylase deficiency, some of which are biotin responsive, have been reported.

**Lactate Elevated:**

This metabolic precursor to the Citric Acid Cycle, may indicate a block in the production of energy. Can also be indicative of an on-going infectious state, use of some recreational and/or pharmaceutical drugs, alcohol over consumption, poor blood sugar control (especially with diabetics), and a number of inborn errors of metabolism.

**SUPPLEMENTATION RECOMMENDATIONS:**

CoQ10, thiamin (Vit B1), riboflavin, niacin, lipoic acid, and pantothenic acid.  
cis-Aconitate Elevated:

An intermediate of the citric acid cycle, an elevated level of this organic acid may be an indication of poor supplies or metabolism of amino acids. A clinical sign is fatigue. If elevated with orotate, isocitrate and citrate, suspect hyperammonia.

**SUPPLEMENTATION RECOMMENDATIONS:**

alpha Lipoic Acid, Vitamin B Complex, Cysteine, Iron, Magnesium, Manganese.

**Malate Comment:**

A high level of this organic acid may be indicative of a need for certain nutrients such as niacin (B3) and Coenzyme Q10. A low level of this organic acid may be indicative of the need for aspartic acid.

**Creatinine, Urine Spot.**

**10.2**    5.0 - 13.0    mmol/L



Tests ordered: CACM,KFAM,CACMF,KFAMF

(\*) Result outside normal reference range

(H) Result is above upper limit of reference rang