

Metametrix

3425 Corporate Way  
Duluth, GA 30096

## 4146 Women's Health Profile

The method used for this assay has been changed from immunoassay to liquid chromatography with tandem mass spectrographic detection (LC-MS/MS). These changes lead to the following alterations in analytes and interpretations:

### Regarding the 2/16 ratio

- 2-Hydroxyestrone (2-OHE1) and 2-hydroxyestradiol (2-OHE2) are now independently determined.
- Relative contributions of each of these 2-hydroxylated estrogens may now be evaluated.
- The sum of 2-OHE1 & 2-OHE2 is calculated from the two independent measurements.
  - o This sum is equivalent to the 2/16 ratio numerator generated by the previous immunoassay method.
- Accurate readings can be now made at very low and very high concentrations that were previously truncated by the immunoassay method.
- These methodological changes result in the new reference ranges shown.

### Regarding other metabolites

- Other metabolites with potential relevance to cancer risk are added to the profile.
  - o Elevated 4-hydroxyestrone (4-OHE1) may be associated with increased risk, especially when hydroxyestrogen methylation is poor.
  - o Hydroxyestrogen methylation is evaluated by the ratio of 2-OHE1 to 2-methoxyestrone (2-OHE1 / 2-OMeE1).
    - Poor ability to methylate (and detoxify) 4-OHE1 is indicated when this ratio is high.
    - The methylated form of 4-OHE1 (4-OMeE1) is also assayed, but frequently the values are below the limit of detection, so the ratio cannot be calculated.



Accession Number: **A1001130353**  
 Reference Number:  
 Patient: Sample Report  
 Age: 47 Sex: Female  
 Date of Birth: 02/05/1962  
 Date Collected: 1/12/10  
 Date Received: 1/13/10  
 Report Date: 1/27/10  
 Telephone: (770) 446-4583  
 Fax: (770) 441-2237  
 Reprinted: 1/29/10  
 Comment:

Ordering Physician:

Metametrix

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### Summary of abnormal results:

	<u>Findings</u>	<u>Intervention Options</u>	<u>Metabolic Association</u>
<b>Endocrine</b>			
<b>Insulin Sensitivity</b>			
Triglycerides	High	Cr, V, Lipoate, n-3 FA balance	Insulin-stimulated lipogenesis
<b>Cell Regulation</b>			
<b>Eicosanoid Balance</b>			
Docosahexaenoic acid (22:6n3)	Low	Add fish oil	n-3 Fatty acid insufficiency
Arachidonic acid (20:4n6)	High	Reduce red meats	Pro-inflammatory responses
Index of Omega-3 Fatty Acids	Low	Fish oils or extracts	Omega-3 insufficiency
<b>Cell Protection</b>			
No Abnormality Found			
<b>Metabolic Markers (Organic Acids)</b>			
<b>Cellular Energy</b>			
Succinate	High	CoQ10	ATP production
Malate	High	CoQ10	ATP production
<b>Neural Function</b>			
Homovanillate	Very Low	Tyrosine	Dopamine turnover inhibition
5-Hydroxyindoleacetate	Very Low	5-HTP	Serotonin turnover inhibition
<b>Detoxification</b>			
Citrate	High	Arginine, Lipoic Acid	Renal ammonia loading
Cis-Aconitate	Very High	Arginine, Lipoic Acid	Renal ammonia loading
Isocitrate	Very High	Arginine, Lipoic Acid	Renal ammonia loading
Orotate	High	Arginine, Magnesium	Urea cycle overload (ammonia toxicity)
a-Hydroxybutyrate	High	N-acetylcysteine, Glutathione, other sulfur containing a. a.	Glutathione demand
Pyroglutamate	High	N-acetylcysteine, Glutathione, other sulfur containing a. a.	Glutathione wasting

**4146 Women's Health Profile**

Methodology: Immunometric Assay, Enzymatic Assay, GC/MS, LC/Tandem Mass Spectrometry, ICPMS, HPLC-TBARS, Colorimetric

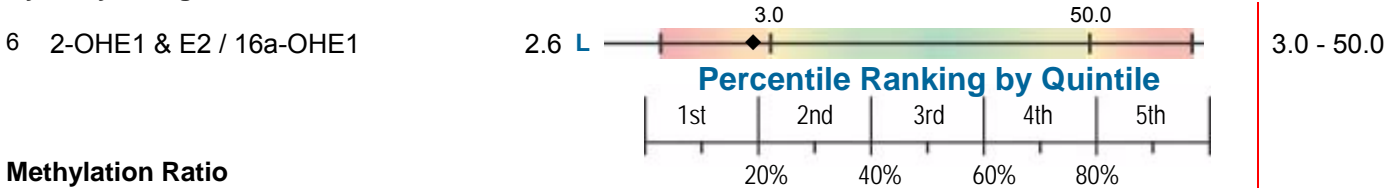
**Endocrine**

**Insulin Sensitivity**

	Results	Low Limit	High Limit	Reference Limits
1 Insulin	8.5			2.0 - 12.0 uIU/mL
2 Glucose	80			70 - 105 mg/dL
3 HDL Cholesterol	41			30 - 85 mg/dL
4 LDL Cholesterol (Direct)	129			<= 130 mg/dL
5 Triglycerides	165 <b>H</b>			35 - 160 mg/dL

**Estrogen Metabolism**

**Hydroxyestrogen Ratio**



**Methylation Ratio**



\*UC = Unable to calculate

**2/16 Ratio factors**

	Results	95% Reference Limits		
		Pre-Menopausal Females	Post-Menopausal Females (no hormone therapy)	Post-Menopausal Females (on hormone therapy)
8 2-Hydroxyestrone (2-OHE1)	1.0	0.6 - 44.2	0.6 - 18.7	0.6 - 121.4
9 2-Hydroxyestradiol (2-OHE2)	1.3	0.3 - 71.6	0.3 - 87.4	0.3 - 73.9
10 2-OHE1 + 2-OHE2	2.3	0.6 - 89.9	0.6 - 89.1	0.6 - 194.7
11 16a-Hydroxyestrone (16a-OHE1)	0.9	0.2 - 20.4	0.2 - 6.2	0.2 - 73.9

**4-Hydroxyestrone and estrogen methylation factors**

12 4-Hydroxyestrone (4-OHE1)	<0.6	<= 5.7	<= 2.0	<= 10.4
13 4-Methoxyestrone (4-OMeE1)	<0.66	>= 0.66	>= 0.66	>= 0.66
14 2-Methoxyestrone (2-OMeE1)	0.88	>= 0.41	>= 0.41	>= 0.41

Creatinine = 100 mg/dL

- Low 2/16 ratios may be raised by adding brassica vegetables or supplementing with I3C or DIM. Soy isoflavones, omega-3 fatty acids or flax seed (not oil) may also have favorable effects. However, soy isoflavones are considered mildly estrogenic and may not be suited for patients with hormone sensitive cancers.

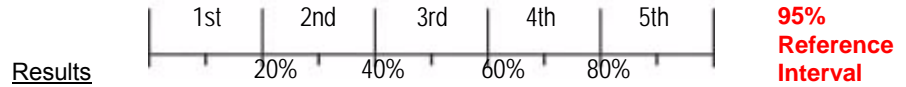
- High 2/16 ratios caused by very low 16a-OHE1 may contribute to bone loss due to poor osteoblastic activity. This situation usually occurs when total estrogen is low.

- Methylation ratios may be improved by adding cofactors (vit. B12 or folate) or methyl donors (betaine or DMG).

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**Percentile Ranking by Quintile**



**Cell Regulation**

**Nitric Oxide Regulation**

Test Name	Result	Percentile	Reference Interval	Units
15 Asymmetric Dimethylarginine (ADMA)	0.35	54	0.26 - 0.67	umol/L
16 Arginine	64	115	37 - 101	umol/L
17 Arginine/ADMA	183	0.54	80 - 248	

**Eicosanoid Balance**

Ranges are for ages 13 and over

Test Name	Result	Percentile	Reference Interval	Units
18 Eicosapentaenoic (20:5n3)	18	17	5 - 210	uM
19 Docosahexaenoic (22:6n3)	19 L	59	31 - 213	uM
20 Arachidonic (20:4n6)	510 H	201	158 - 521	uM
21 AA/EPA†	8	20	1 - 57	
Index of Omega-3 Fatty Acids (EPA + DHA %)<‡	37 L	129	>80.00	uM

†Sears, B. *Toxic Fat: When Good Fat Turns Bad*. 1st ed. Nashville, TN: Thomas Nelson; 2008.

‡Harris, WS. Omega - 3 fatty acids and cardiovascular disease: A case for omega-3 index as a new risk factor. *Pharmacological Research* 2007; 55:217-223.

**Cell Protection**

**Cell Membrane Oxidation**

Test Name	Result	Percentile	Reference Interval	Units
22 Lipid Peroxides	0.95	1.72	<= 2.60	nmol/mL

**Elemental Cofactor Status**

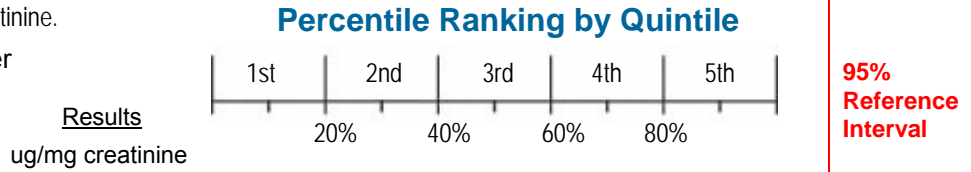
Results are expressed as ppm packed cells.

Test Name	Result	Percentile	Reference Interval
23 Magnesium	49	49	36 - 70
24 Zinc	11.5	10.4	7.5 - 16.3

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Results are expressed as mcg/mg creatinine.  
 Ranges are for ages 13 and over



**Metabolic Markers**

**B-Vitamin Insufficiency**

Item	Result	Percentile	Reference Interval
25 Pyruvate	1.5	3.9	<= 6.4
26 a-Ketoglutarate	1.9	19.0	<= 35.0
27 a-Ketoisovalerate	0.13	0.25	<= 0.49
28 a-Ketoisocaproate	0.22	0.34	<= 0.52
29 a-Keto-β-Methylvalerate	0.27	0.38	<= 1.10
30 Xanthurenate	0.15	0.47	<= 0.74
31 β-Hydroxyisovalerate	5.1	7.6	<= 11.5
32 Methylmalonate	1.2	1.7	<= 2.3
33 Formiminoglutamate	0.1	1.2	<= 2.2

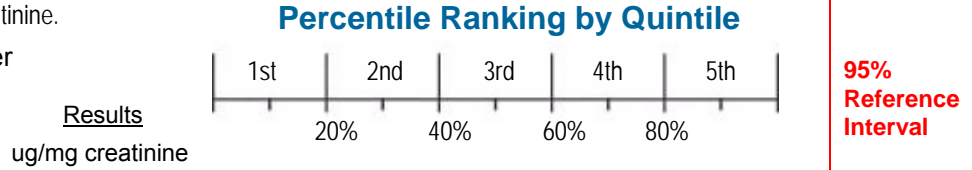
**Cellular Energy**

Item	Result	Percentile	Reference Interval
34 Adipate	2.7	5.2	<= 8.3
35 Suberate	1.1	1.7	<= 3.2
36 Ethylmalonate	2.3	3.6	<= 6.3
37 β-Hydroxybutyrate	<DL*	2.1	<= 9.9
38 Succinate	16.2 <b>H</b>	11.6	<= 20.9
39 Fumarate	0.15	0.59	<= 1.35
40 Malate	2.5 <b>H</b>	1.4	<= 3.1
41 Hydroxymethylglutarate	3.0	3.6	<= 5.1

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 Ranges are for ages 13 and over



Neural Function

Item	Result	Percentile Range	Reference Interval
42 Vanilmandelate	2.0	1.8 - 3.9	1.3 - 4.9
43 Homovanillate	1.5 L	2.1 - 6.3	1.6 - 10.9
44 5-Hydroxyindoleacetate	0.5 L	2.1 - 5.6	1.6 - 9.8
45 Kynurenate	0.5	1.9	<= 2.7
46 Quinolinate	3.0	4.0	<= 5.8
47 Picolinate	5.6	8.0	2.8 - 13.5

Detoxification

Item	Result	Percentile Range	Reference Interval
48 Citrate	740 H	601	56 - 987
49 Cis-Aconitate	81 H	51	18 - 78
50 Isocitrate	147 H	98	39 - 143
51 2-Methylhippurate	0.019	0.084	<= 0.192
52 Orotate	0.96 H	0.69	<= 1.01
53 Glucarate	3.2	6.3	<= 10.7
55 Pyroglutamate	83 H	59	28 - 88

Creatinine = 100 mg/dL

\* <DL = less than detection limit

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**Supplement Recommendation Summary**

With knowledge of a patient's full medical history and concerns, the Organix Basic Profile laboratory results may be used to help healthcare professionals create an individually optimized nutritional support program. Based strictly on the results from this test, the summary table below shows estimates of nutrient doses that may help to normalize nutrient-dependent metabolic functions. All amounts are adult doses that should be adjusted for children according to body weight and indication of need.

**Customized Vitamin and Mineral Formulation**

Nutrients listed in this section are normally contained in a multi-vitamin preparation. "Base" amounts may be used for insurance of health even when no abnormalities are found.

Customized preparations of the multi-vitamin/mineral formula shown below may be produced by compounding pharmacies. If such a product is made according to these specifications each dose should be thoroughly stirred into a few ounces of water or diluted fruit juice to allow bubbles to form and avoid stomach bloating effects.

**Daily Amounts**

Nutrient	Base	Units Added
Vitamin A	2500 IU	
β-Carotene	5500 IU	
Vitamin C	250 mg	1000 mg
Vitamin D	400 IU	
Vitamin E	100 IU	300 IU
Vitamin K*	100 mcg	
Thiamin (B1)	5 mg	
Riboflavin (B2)	5 mg	10 mg
Niacin (B3)	25 mg	10 mg
Pyridoxine (B6)	15 mg	
Folic Acid	400 mcg	
Vitamin B12	50 mcg	
Biotin	100 mcg	
Pantothenic Acid (B5)	25 mg	
Calcium	500 mg	400 mg
Iodine*	75 mcg	
Magnesium	250 mg	200 mg
Zinc	15 mg	
Selenium	100 mcg	100 mcg
Copper	1 mg	
Manganese	5 mg	
Chromium	200 mcg	
Molybdenum*	25 mcg	
Boron*	1 mg	
Citric Acid*	200 mg	
Malic Acid*	200 mg	

\* Nutrients with an asterisk are not modified based on the Organix Basic test results.

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**Other Items Indicated for Individual Supplementation**

Various conditionally essential nutrients and other potentially beneficial interventions appear in this section only if relevant abnormalities are present. These ingredients are not included in the customized vitamin formula on the previous page.

<b>Nutrient</b>	<b>Amount</b>
5-Hydroxytryptophan	200 mg
Arginine	2000 mg
Coenzyme Q10	60 mg
Fish Oil	2 gm
Glycine	4000 mg
N-Acetylcysteine	400 mg

· If orotate is elevated, amino acid supplementation may be contraindicated, except for arginine.  
· These guidelines are intended as a starting point for the clinician who requested the test and are based only on the laboratory results included in this report. Final recommendations should be implemented by the clinician with consideration of medical history and current clinical observations.  
· These tests are not intended for the diagnosis of specific disorders.