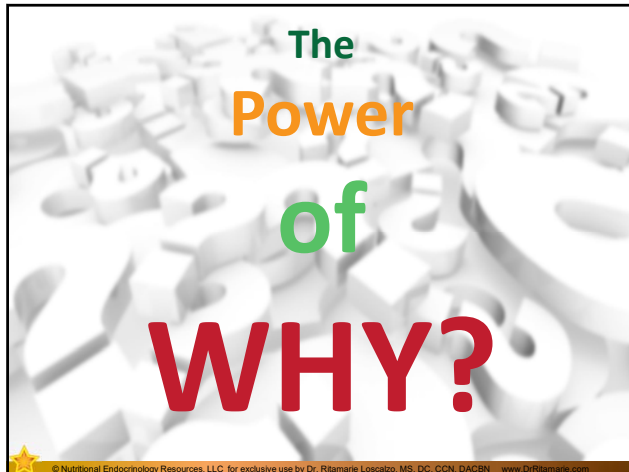
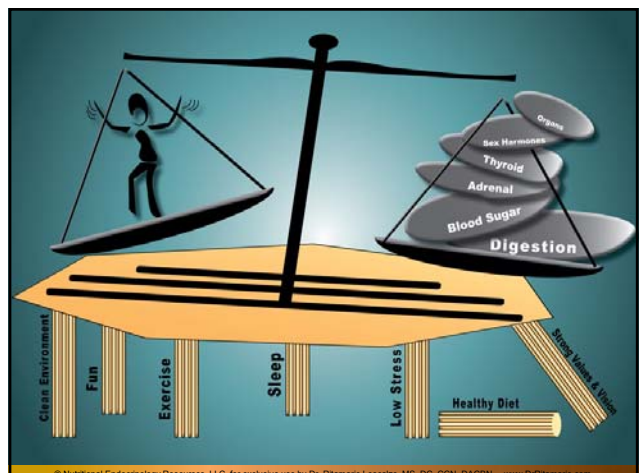
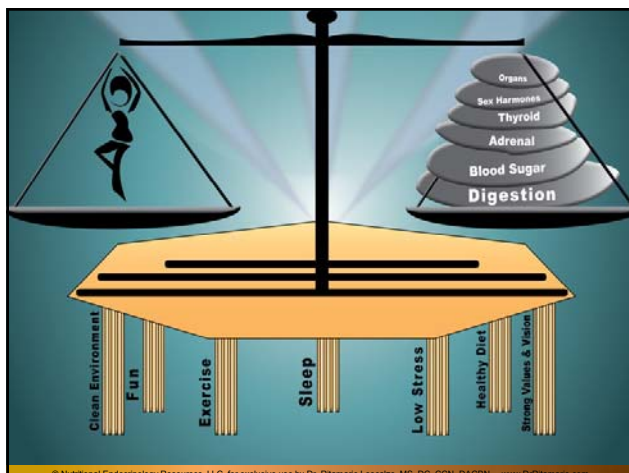


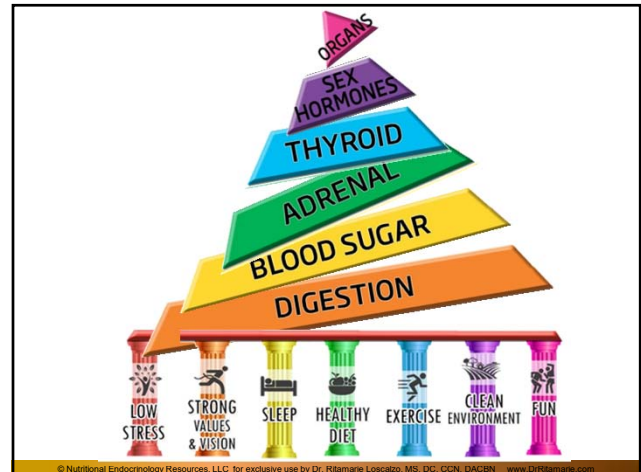
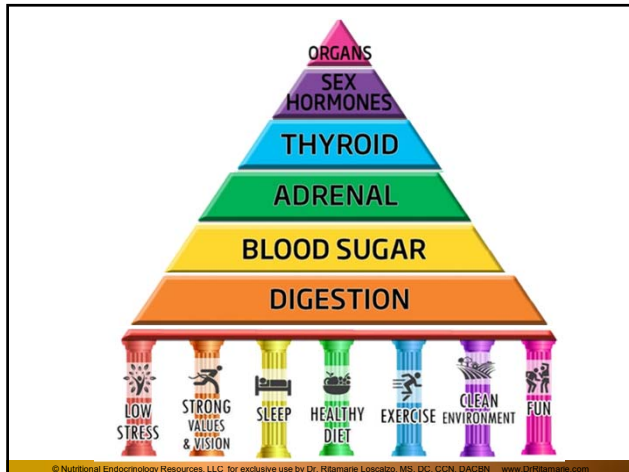




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Functional Lab Testing

- ✓ Salivary Cortisol Testing (Adrenals)
- ✓ Steroid Hormone Panels - DUTCH and 24-hour urine
- ✓ Comprehensive Digestive Analysis
- ✓ Immune System Evaluation
- ✓ Fatty Acids
- ✓ Amino Acids/Neuro
- ✓ Organic Acids
- ✓ Heavy Metals
- ✓ Methylation & Genetics



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Adrenal Assessment

- ✓ Symptoms (Surveys or Interview)
- ✓ Physical Signs (Exam)
- ✓ Routine Blood Testing (Indirect)
- ✓ Direct Blood Testing of Adrenal Hormones
- ✓ Saliva Testing
- ✓ Part of 24-Hour Urine Comprehensive Steroid Panel or DUTCH



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Routine Blood Screen: Adrenal Analysis

Low Adrenal

- ✓ Potassium +
- ✓ Sodium -
- ✓ Glucose -

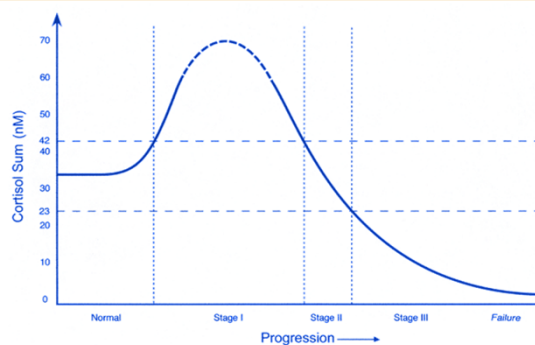


Hyperadrenal

- ✓ Potassium -
- ✓ Sodium +
- ✓ Glucose +
- ✓ Triglycerides +

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Progression of Stages in Adrenal Exhaustion – per BioHealth

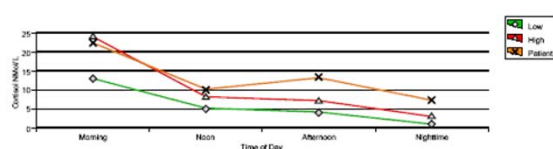


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BioHealth Example – Stage 1

Functional Adrenal Stress Profile - 201

Parameter	Result	Reference Range	Units
Cortisol - Morning (6 - 8 AM)	22.4	13.0 - 24.0	nM/L
Cortisol - Noon (12 - 1 PM)	10.0*	5.0 - 8.0	nM/L
Cortisol - Afternoon (4 - 5 PM)	13.4*	4.0 - 7.0	nM/L
Cortisol - Nighttime (10 PM - 12 AM)	7.3*	1.0 - 3.0	nM/L
Cortisol Sum	53.1*	23.0 - 42.0	nM/L
DHEA-S Average	2.00	2.00 - 10.00	ng/mL
Cortisol/DHEA-S Ratio	26.6*	5.0 - 6.0	Ratio

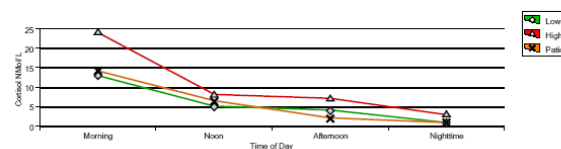


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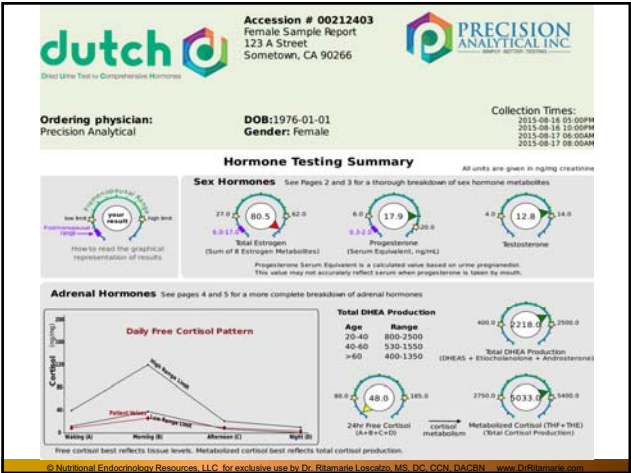
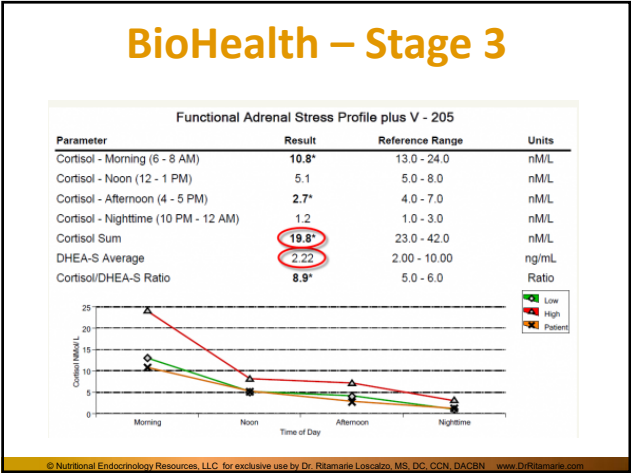
BioHealth – Stage 2

Functional Adrenal Stress Profile - 201

Parameter	Result	Reference Range	Units
Cortisol - Morning (6 - 8 AM)	14.2	13.0 - 24.0	nM/L
Cortisol - Noon (12 - 1 PM)	6.4	5.0 - 8.0	nM/L
Cortisol - Afternoon (4 - 5 PM)	2.0*	4.0 - 7.0	nM/L
Cortisol - Nighttime (10 PM - 12 AM)	1.0	1.0 - 3.0	nM/L
Cortisol Sum	23.6	23.0 - 42.0	nM/L
DHEA-S Average	2.60	2.00 - 10.00	ng/mL
Cortisol/DHEA-S Ratio	9.1*	5.0 - 6.0	Ratio



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		Amount Excreted in 24hrs		Adult Reference Range	
CREATININE		0.8 gm/24hr		0.5-2.0 gm/24hr	
TOTAL VOLUME		1800 mL			
STEROID	Amount Excreted in µg/24hr	Phase	Day	Female	µg/24hr
ESTRONE	22.4	Luteal	17-26	3.3 - 44.6 *	
		Follicular	27-11	2.0 - 39	
		Mid-Cycle	12-16	11.0 - 46	
ESTRADIOL	4.5	Post Menopausal		1.0 - 7.0	
		Luteal	17-26	1.4 - 12.2 *	
		Follicular	27-11	1.0 - 23	
ESTRIOL	7.4	Mid-Cycle	12-16	4.0 - 45	
		Post Menopausal		0 - 4	
		Luteal	17-26	6.1 - 32.4 *	
Total Estrogens	34.3	Follicular	27-11	3.0 - 48	
		Mid-Cycle	12-16	20 - 130	
		Post Menopausal		0 - 30	
Estrogen Quotient	0.3	Luteal	17-26	10.8 - 89.2 *	
		Follicular	27-11	7.0 - 110	
		Mid-Cycle	12-16	38 - 221	
		Post Menopausal		0 - 41	
		Estriol / (estrone + estradiol)		>1.0	
2-OH ESTRONE	< 0.25 LOW	Luteal	17-26	3.8 - 38.1 *	
		Post Menopausal		0.2 - 5.4 *	
16α-OH ESTRONE	Below Detection Limit	Luteal	17-26	2.1 - 7.9 *	
		Post Menopausal		0.15 - 3.5 *	
2 / 16α Ratio	Not Calculated	Luteal	17-26	1.8 - 5.5 *	
		Post Menopausal		0.8 - 5.0 *	
4-OH ESTRONE	< 0.25 LOW	Luteal	17-26	0.8 - 5.9	
		Post Menopausal		0.05 - 1.1	
2-METHOXYESTRONE	< 0.25 LOW	Luteal	17-26	2.2 - 14.4 *	
		Post Menopausal		0.3 - 4.1	
2-METHOXYESTRADIOL	< 0.1	Luteal	17-26	0.1 - 2.2 *	
		Post Menopausal		0.03 - 0.54	



Meridian Valley LAB

<http://www.drritamare.com/go/MVLC ComprehensiveULTIMATE>

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<http://www.drRitamarie.com/go/MVLComprehensiveULTIMATE>

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Comprehensive ULTIMATE Hormone Profile				
Patient Name: Jane Doe HCLD				
Accession #: 1000 Test ID: 419073 Test Code: 4100				
STERIOD	Amount Excreted in 24hrs		Adult Reference Range	
	CREATININE TOTAL VOLUME	0.8 gm/24hr 1800 mL	0.5-2.0 gm/24hr	Female µg/24hr
Amount Excreted in µg/24hr				
Phase Day				
PREGNANEDIOL (progesterone metabolite)	880	Luteal Follicular Post Menopausal	1450 - 8140 *	0 - 2500 200 - 1500
DHEA	185		100 - 2000	
TESTOSTERONE	7.4		5.0 - 35.0	
5α-ANDROSTANEDIOL	90.0 HIGH		3.0 - 35.0	
5β-ANDROSTANEDIOL	155.0		13.0 - 140.0	
ANDROSTERONE	1547		500 - 3200	
ETIOCHOLANOLONE	1491		500 - 8000	
PREGNANETRIOL	554		100 - 1500	
CORTISONE (E)	92		31-200	
CORTISOL (F)	50		30-170	
TETRAHYDROCORTISONE (THE)	1733		1700-4300	
ALLO-TETRAHYDROCORTISOL (α-THF)	515		400-2100	
TETRAHYDROCORTISOL (THF)	596 LOW		900-2800	
11β-HYDROXYANDROSTERONE	215 LOW		200-1471	
11β-HYDROXYETIOCHOLANOLONE	260		153-827	
ALDOSTERONE	15.0		Normal Diet: 6.0-25.0 Low Salt: 17.0-44.0 High Salt: 5.0-6.0	
ALLO-TETRAHYDROCORTICOSTERONE (5α-THB)	270		130-600	
TETRAHYDROCORTICOSTERONE (THB)	103		30-240	
11-DEHYDROTETRAHYDROCORTICOSTERONE (THA)	32 LOW		62-293	

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Urinary HGH		Amount Excreted in pg/24hr	Adult Reference Range
Human Growth Hormone		2652	1065 - 4722 pg/24hr
Urinary Oxytocin		Amount Excreted in pmol/24hr	Adult Reference Range
Oxytocin		215	250 - 700 pmol/24hr
Urinary Melatonin Analyses		Amount Excreted	Adult Reference Range
Melatonin		33.1	9.1 - 57.3 ng/24hr
6-Sulfatoxymelatonin		5.8	8.3 - 39.7 µg/24hr
Urinary Thyroid		Amount Excreted in ng/24hr	Adult Reference Range
Free T3		396	470 - 1750
Free T4		524	430 - 3200
Urinary Mineral		Amount Excreted in mmol/24hr	Adult Reference Range
Sodium		86	40 - 220
Potassium		41	25 - 150
Sodium/Potassium Ratio		2.1	1.3 - 4.8

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ENZYME ACTIVITY PHENOTYPE ASSESSMENT	
5-α-REDUCTASE	
Androstenedione/Etiocholanolone Ratio: 1.04	
Ratio: 0.4	0.7
Percentile: 10	50
Allo-tetrahydrocortisol/tetrahydrocortisol Ratio: 0.74	
Ratio: 0.4	0.6
Percentile: 10	50
Elevated 5-α-reductase activity is associated with polycystic ovary syndrome and hirsutism in women, benign prostatic hyperplasia and premature baldness in men, and obesity and insulin resistance in both genders. Low 5-α-reductase activity may result in reduced conversion of testosterone to DHT and undervirilization in males.	
11-β-hydroxysteroid dehydrogenase I & II	
Cortisol/Cortisone Ratio: 0.54	
Ratio: 0.5	0.7
Percentile: 10	50
Tetrahydrocortisol+allo-tetrahydrocortisol/Tetrahydrocortisone Ratio: 0.70	
Ratio: 0.7	0.9
Percentile: 10	50
Low ratios are associated with obesity and insulin resistance	
Elevated ratios are associated with low-renin hypertension, high dose licorice, and cortisol administration.	

<http://www.drRitamarie.com/go/MeridianValleyUrinaryHormoneGuide>

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Comprehensive Digestive Analysis



- ✓ Symptoms: digestive and outside
- ✓ Physical signs of nutrient deficiencies due to malabsorption
- ✓ Functional assessments
 - Transit time, HCl challenge
- ✓ Immune system responses
- ✓ Lab testing
 - Blood chemistry markers
 - Stool testing
 - Organic acid testing

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Immune System and Fatty Acids Testing



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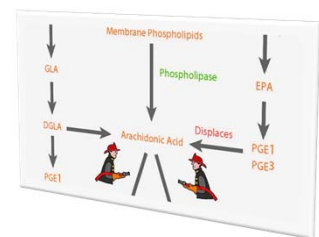
Inflammatory Cascade



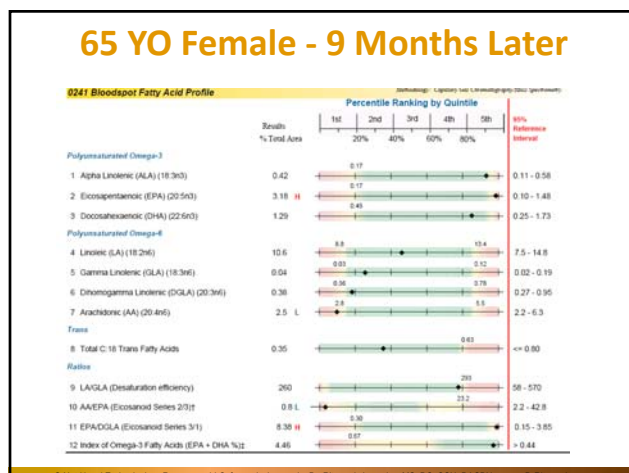
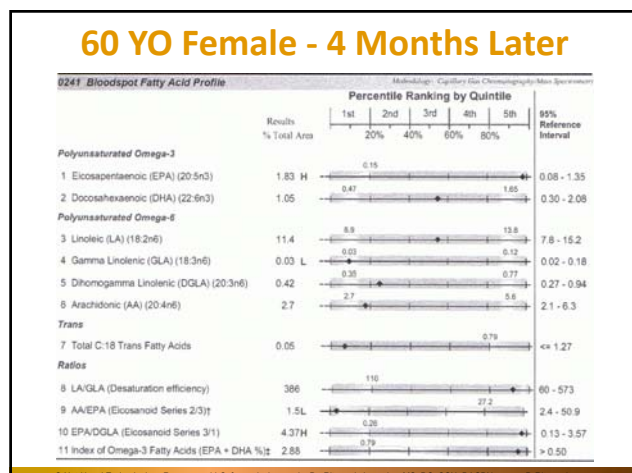
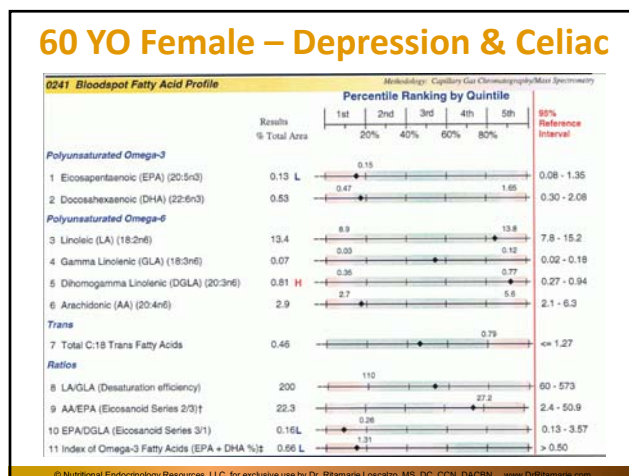
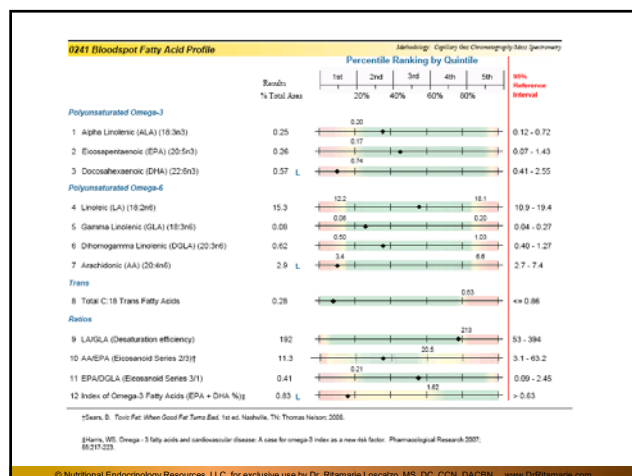
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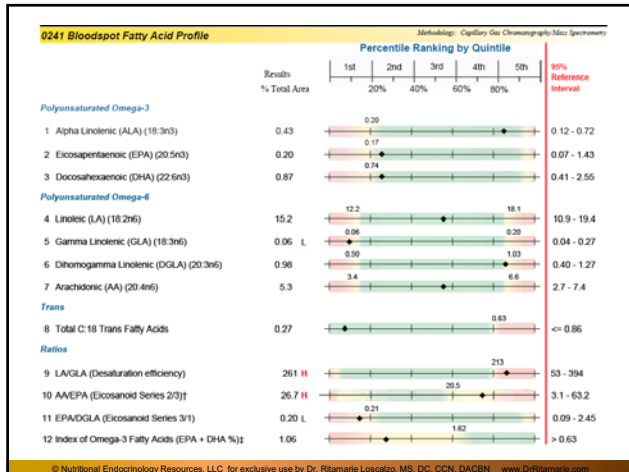
Inflammation Marker: AA/EPA Ratio

- ✓ Optimum ratio: 1.5 - 3.0
- ✓ Average American: 11
- ✓ "Unwell": >10
- ✓ High inflammation: >15
- ✓ Chronic illness and disease: >=15



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Omega-3 and Omega-6 Ratios

ALA: 2.2 grams per day

EPA/DHA: 0.65 grams per day

<http://www.drRitamarie.com/go/USDAsearch>

n-3 is Omega 3 Alpha Linolenic Acid ; n-6 is Linoleic Acid

Seeds		Total n-3 FA (g)	Total n-6 FA (g)	n-6/n-3 Ratio
Flax seeds	1 oz.	1.8	0.4	0.2
Hemp Seeds	1 oz.	2.8	8.4	3
Chia Seeds	1 oz.	5	1.6	0.32
Pumpkin seeds, shelled	1 oz.	0.1	5.4	107.8
Poppy seeds	1 oz.	0.1	8.6	96.0
Sesame seeds	1 oz.	0.1	6.7	67
Sunflower Seeds	1 oz.	0.1	8.5	85

Fish		Total n-3 FA (g)	Total n-6 FA (g)	n-6/n-3 Ratio
Salmon	3 oz.	0.27 251 EPA 948 DHA	0.14	.1

For people who don't eat fish, recommended intake of ALA is 10 grams per day. (1 ounce Chia, 2 ½ Tablespoons, is 5 grams)

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Why Measure Amino Acids?

- ✓ Assess protein intake and sufficiency
- ✓ Determine adequacy of stomach acid
- ✓ Assess pancreatic enzyme status
- ✓ Evaluate neurotransmitter imbalance
- ✓ Determine hormone adequacy
- ✓ Evaluate healing and immune issues
- ✓ Assess vitamin and mineral status

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Organic Acids Test: Great Plains

- ✓ Intestinal Microbial Overgrowth
- ✓ Oxalate Metabolites
- ✓ Glycolytic Metabolites
- ✓ Krebs Cycle Metabolites
- ✓ Neurotransmitter Metabolites
- ✓ Folate Metabolism
- ✓ Ketones and Fatty Acid Oxidation
- ✓ Nutritional Markers
- ✓ Detoxification Indicators
- ✓ Amino Acid Metabolites
- ✓ Bone Metabolites



72 MARKERS

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Organic Acids Test: Genova Diagnostics

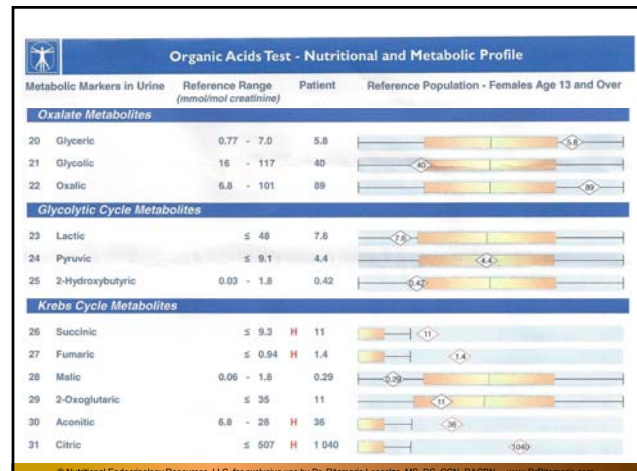
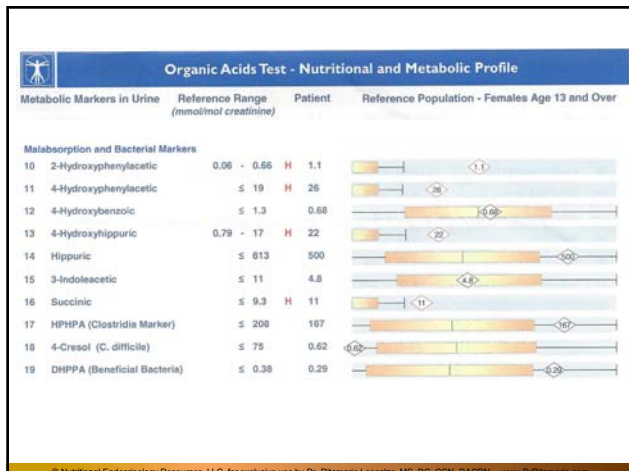
- ✓ Fatty Acids Oxidation
- ✓ Carbohydrate Metabolism
- ✓ Energy Production
- ✓ B Complex Vitamin Markers
- ✓ Neurotransmitter Metabolism
- ✓ Detoxification Indicators
- ✓ Dysbiosis Markers

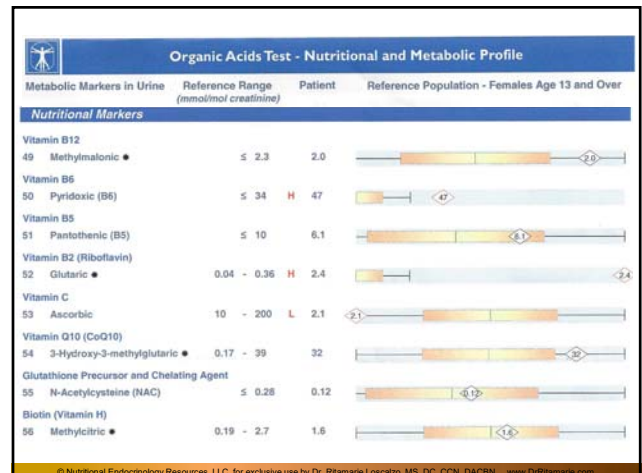
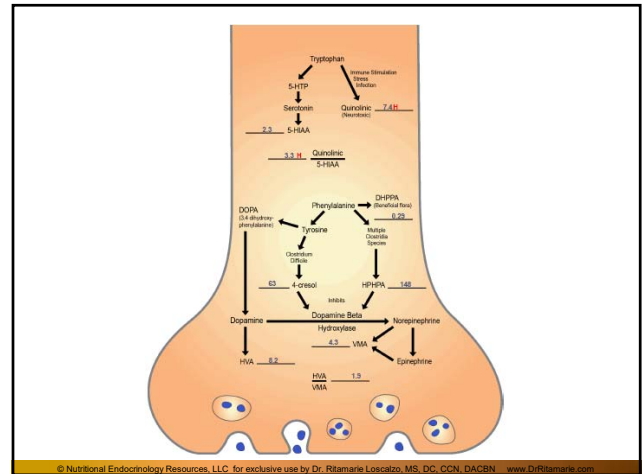


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46 MARKERS

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Metabolic Markers in Urine	Reference Range (mmol/mol creatinine)	Patient	Reference Population - Females Age 13 and Over
Amino Acid Metabolites			
60 2-Hydroxyisovaleric	≤ 0.42	0.08	0.08
61 2-Oxoisovaleric	≤ 2.1	0.59	0.29
62 3-Methyl-2-oxovaleric	≤ 0.87	0.41	0.41
63 2-Hydroxyisocaproic	≤ 0.48	0.04	0.04
64 2-Oxoisocaproic	≤ 0.37	0.16	0.16
65 2-Oxo-4-methylbutyric	≤ 0.16	0.13	0.13
66 Mandelic	≤ 0.21	0.34	0.34
67 Phenyllactic	≤ 0.20	0.31	0.31
68 Phenylpyruvic	0.20 - 1.9	0.66	0.66
69 Homogentisic	≤ 0.36	0.13	0.13
70 4-Hydroxyphenyllactic	≤ 0.80	1.1	1.1
71 N-Acetylaspartic	≤ 3.0	1.3	1.3
72 Malonic	≤ 9.7	1.8	1.8
73 3-Methylglutaric	≤ 0.76	0.79	0.79
74 3-Hydroxyglutaric	≤ 6.2	2.1	2.1
75 3-Methylglutaconic	≤ 4.5	2.4	2.4

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Labs for Organic Acids

Practitioner Only:

✓ Genova Diagnostics

<https://www.gdx.net>

Direct Access:

✓ Great Plains:

<http://www.greatplainslaboratory.com>

✓ Direct Labs:

<http://www.directlabs.com>

✓ Accesa Labs:

<http://www.accesalabs.com>



Toxic and Essential Minerals

Not all methods are created equal!

- ✓ **Blood Chemistry** and electrolyte indicators
- ✓ **Blood Levels** of minerals
- ✓ **Blood Cells:** Essential elements
- ✓ **Hair Testing:** Toxics
- ✓ **Taste Testing:** Not universally accepted, although good evidence for validity
- ✓ **Stool Testing:** Controversial
- ✓ **Urine Testing:**
 - Chelation challenge for toxics
 - Unchallenged
- ✓ **Loading:** Pre- and post-urine test based on a loading dose



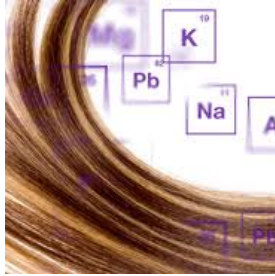
Routine Blood Test Indicators as an Indicator of Mineral Status

- ✓ **Calcium:** Not a good measure of overall status
- ✓ **Potassium:** Not a good indicator of tissue status
- ✓ **Sodium:** Reliable
- ✓ **Chloride:** Reliable
- ✓ **Phosphorus:** Reliable
- ✓ **Iron:** Reliable
- ✓ **Molybdenum:** Indirect – uric acid low suggests molybdenum low
- ✓ **Selenium:** Indirect per thyroid T4-to-T3 ratios
- ✓ **Zinc:** Indirect via alkaline phosphatase



Hair Testing for Toxic Elements

- ✓ U.S. EPA
- ✓ 300-page review
- ✓ 400 studies of hair in 1979
- ✓ "Hair is a meaningful and representative tissue for biological monitoring for most of the toxic metals."



"Toxic Trace Metals in Human and Mammalian Hair and Nails", EPA-600 4.79-049, August 1979, US Environmental Protection Agency, Research and Development.

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Fecal Metals Testing

- ✓ Used by **Dr. Amy Yasko** in combination with other tests
- ✓ Good for evaluating **ability to excrete**
- ✓ Good for monitoring **heavy metal detox**
- ✓ Performed by **Doctor's Data**



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Mineral Testing Resources

✓ Red Blood Cell, Urine, Hair:

- Great Plains
- Doctor's Data
- Genova Diagnostics
- Trace Elements



✓ Feces:

- Doctor's Data

✓ Taste Test Kits:

- <http://www.drRitamarie.com/go/MineralTests>



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