



CLINICAL LABORATORY TESTING:

BLOOD CHEMISTRY

& CBC ANALYSIS

FROM A FUNCTIONAL MEDICINE PERSPECTIVE

Part 6 of 8

**Integrative and Functional Medicine Perspective on
Laboratory Interpretation – Patterns of Dysfunction**

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Integrative and Functional Medicine Perspective on Laboratory Interpretation – Patterns of Dysfunction

In the 1980s Dr. Harry Eidenier and colleagues began their odyssey looking for particular patterns in blood chemistry tests that would **enhance the clinician's laboratory interpretation skills.**

Patterns of the observed changes in blood analytes, as it related to a particular conditions, were extracted from the review of over 10,000 case studies.



The parameters analyzed by the original researchers:

- Electrophoresis
- Atomic absorption spectroscopy
- Hormonal studies
- Standard hematological studies
- Review of the patient history
- Physical examination
- Urinalysis
- Stool analysis
- Hair analysis



The researchers stated that the patterns **should not be considered absolute and are often empirical.**



“No diagnostic procedure is absolute, and no lab test should be used as the sole means of making a diagnosis.”

Lab Test Results and Patterns of Dysfunction

CONDITIONS	SUBSTANCES INCREASED	SUBSTANCES DECREASED
Acidosis – metabolic	Chloride, potassium, anion gap	CO ₂ , Calcium
Adrenal Hyperfunction	Sodium, chloride, aldosterone, plasma and salivary cortisol, DHEA	Potassium
Adrenal Hypofunction	Potassium	Sodium, chloride, aldosterone, plasma and salivary cortisol, DHEA
Alkalosis - metabolic	CO ₂ , BUN	Chloride, calcium, potassium
Allergy (Food and Environmental)	Eosinophils, IgE (normal to increased), basophils (normal to increased), <i>total</i> serum globulins, phosphorous, BUN	Total serum globulins

Conditions	Substances Increased	Substances Decreased
Anemia – Iron Deficiency (Possible need for HCl)	TIBC	Iron, ferritin, MCV, MCH, MCHC RBC (normal/decreased) Neutrophils
Anemia B₆ deficiency	Serum iron (normal or increased)	GGT, ALT, AST, RBC, Hct, MCV, MCH, Reticulocytes (normal/decreased)
Anemia B₁₂/folate	MCV, urinary and serum methylmalonic acid Homocysteine, MCH Serum iron: (normal/increased) LDH isoenzyme #1	Hgb (normal/decreased) Hct (normal/decreased)

Condition	Substances Increased	Substances Decreased
Arthritis - RA	Uric acid, liver enzymes, ANA, serum calcium, CRP, ESR, immunoglobulins, BUN	Albumin, complement, HDL
Asthma	Eosinophils, alpha 2 globulin, Hct, Hgb, neutrophils, IgE, LDH (1,2,3, and 5)	Lymphocytes
Biliary Insufficiency/Stasis Cholecystitis /Cholangitis	GGT, ALP, AST/ALT (normal or increased) Serum protein (normal or increased) ESR, neutrophils, basophils, total cholesterol, LDH	Albumin

Condition	Substances Increased	Substances Decreased
Biliary Obstruction – Gall Stones	GGT, ALP, total serum bilirubin, ALT, AST, LDH Alpha-2 globulin	
Cancer (potential for neoplasm)	Changes seen in SPE: Increased alpha-1 glycoprotein Increased alpha-1 globulin Increased alpha-2 globulin	Albumin < 4.0 with lymphocyte % < 20 Cholesterol
Carpal Tunnel syndrome		Magnesium, zinc, B ₆
COPD	Potassium, WBC count, neutrophils RBC count, eosinophils	Hct, Hgb, CO ₂ , lymphocytes, alpha-1 antitrypsin

Condition	Substances Increased	Substances Decreased
Cramps/Muscle Spasms		Magnesium
Dehydration	Total protein, chloride, Hgb, Hct, BUN, creatinine	
Depression/Emotional Stress	Cortisol	
Diabetes	Glucose, triglycerides (usually above cholesterol), HbA1c,	HDL, CO ₂
Digestive Inflammation (Leaky gut, colitis, IBS, IBD)	MCV (normal to increased) MCH (normal to increased)	Total protein, albumin, phosphorous, Hct, Hgb

Conditions	Substances Increased	Substances Decreased
Digestive Inflammation (Gastritis)	Serum/urinary methylmalonic acid Homocysteine Gamma globulin Basophils ALP MCV (normal to increased) MCH (normal to increased)	Total protein, albumin, phosphorous, Hct, Hgb, potassium
Emphysema	Hct, Hgb, RBC, potassium	CO ₂ , alpha-1 globulin, alpha-1 antitrypsin
Gout	Serum uric acid, Liver enzymes in acute phase, serum creatinine WBC count, serum triglycerides, BUN	Phosphorous
Hypertension - essential	ALP, plasma aldosterone, total cholesterol, serum creatinine, potassium, glucose, atrial natriuretic peptide hormone	Serum albumin, magnesium, ionized calcium, ADH

Condition	Substances Increased	Substances Decreased
Hypochlorhydria	MCV > 90, MCH >31.9, BUN	Phosphorous, Total protein, serum calcium and iron (normal to decreased) CO ₂ , ALP
Kidney Dysfunction – chronic renal dysfunction	Albumin, ALP serum amylase, serum calcium, serum creatinine, CRP, urinary micro-albumin, HDL- C, homocysteine, phosphorous, osteoclastin, alpha-1 glycoprotein	WBC count
Kidney Stones	BUN, serum creatinine	
Molybdenum deficiency		Uric acid
Osteoporosis/Osteomalacia	ALP, acid phosphatase, urinary hydroxyproline, CRP	Vitamin K

Condition	Substances Increased	Substances Decreased
Pancreatitis	Serum lipase, serum amylase, ALP, ALT, AST, bilirubin, triglycerides, MCV	Calcium
Parasites - intestinal	Eosinophils, IgE, Basophils (normal to increased) Monocytes (normal to increased)	Serum iron, Hgb, and Hct (normal to decreased)
Polycystic Ovarian Syndrome	Free testosterone, androstenedione, DHEA, cortisol, insulin	Estradiol

Condition	Substances Increased	Substances Decreased
Prostate Hypertrophy - Benign	Serum creatinine, PSA (PSA is expressed on both normal and neoplastic prostate tissue)	
Thiamine Deficiency	Anion Gap Glucose (normal to increased)	Hct and Hgb (normal to decreased)
Zinc Deficiency		ALP

FUNCTIONAL HEALTH REPORT™

JANE DOE
46 year old Female - Born Dec 08, 1972

Lab Test on Mar 11, 2019

Blood Test Results Report

The Blood Test Results Report lists the results of the patient's Chemistry Screen and CBC and shows you whether or not an individual element is outside of the optimal range and/or outside of the clinical lab range. The elements appear in the order in which they appear on the lab test form.

Above Optimal Range 7 Current 4 Previous	Above Standard Range 4 Current 5 Previous	Alarm High 0 Current 1 Previous
Below Optimal Range 9 Current 14 Previous	Below Standard Range 1 Current 2 Previous	Alarm Low 0 Current 0 Previous

Element	Current		Previous		Impr	Optimal Range	Standard Range	Units
	Mar 11 2019	Nov 21 2018	Nov 21 2018	Nov 21 2018				
Glucose	89.00	89.00				72.00 - 90.00	65.00 - 99.00	mg/dL
Hemoglobin A1C	5.50	5.40				5.00 - 5.50	0.00 - 5.60	%
Insulin - Fasting	2.90	2.00				2.00 - 5.00	2.00 - 19.00	µU/ml
BUN	19.00	18.00	↑	↑	🚫	10.00 - 16.00	7.00 - 25.00	mg/dL
Creatinine	0.70	0.59	↓	↓	👍	0.80 - 1.10	0.40 - 1.35	mg/dL
BUN/Creatinine Ratio	27.14	30.50	↓	↓	🚫	10.00 - 16.00	6.00 - 22.00	Ratio
eGFR Non-Afr. American	104.00	111.00	↓	↓	👍	90.00 - 120.00	60.00 - 90.00	mL/min/1.73m2
eGFR African American	120.00	128.00	↓	↓	👍	90.00 - 120.00	60.00 - 90.00	mL/min/1.73m2
Sodium	140.00	136.00				135.00 - 142.00	135.00 - 146.00	mEq/L
Potassium	3.90	3.60	↓	↓	👍	4.00 - 4.50	3.50 - 5.30	mEq/L
Sodium/Potassium Ratio	35.89	37.77	↓	↓	👍	30.00 - 35.00	30.00 - 35.00	ratio
Chloride	104.00	102.00				100.00 - 106.00	98.00 - 110.00	mEq/L
CO2	26.00	27.00				25.00 - 30.00	19.00 - 30.00	mEq/L
Anion gap	13.90	10.60	↑	↑	🚫	7.00 - 12.00	6.00 - 16.00	mEq/L
Uric Acid, female	5.30	4.40				3.00 - 5.50	2.50 - 7.00	mg/dL
Protein, total	6.80	6.30	↓	↓	👍	6.90 - 7.40	6.10 - 8.10	g/dL
Albumin	4.40	3.90	↓	↓	👍	4.00 - 5.00	3.60 - 5.10	g/dL
Globulin, total	2.40	2.40				2.40 - 2.80	2.00 - 3.50	g/dL
Albumin/Globulin Ratio	1.80	1.60				1.40 - 2.10	1.00 - 2.50	ratio
Calcium	9.40	8.50	↓	↓	👍	9.40 - 10.10	8.60 - 10.40	mg/dL
Calcium/Albumin Ratio	2.13	2.17				0.00 - 2.60	0.00 - 2.70	ratio
Phosphorus	3.50	3.00	↓	↓	👍	3.50 - 4.00	2.50 - 4.50	mg/dL
Calcium/Phosphorus Ratio	2.68	2.83	↓	↓	👍	2.30 - 2.70	2.30 - 2.70	ratio
Magnesium	2.10	1.80	↓	↓	👍	2.20 - 2.50	1.50 - 2.50	mg/dL
Alk Phos	58.00	65.00	↓	↓	🚫	70.00 - 100.00	35.00 - 115.00	IU/L
AST (SGOT)	11.00	11.00				10.00 - 26.00	10.00 - 35.00	IU/L

Practitioner Only Report | Page 7

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Element	Current	Previous	Impr	Optimal Range	Standard Range	Units
	Mar 11 2019	Nov 21 2018				
Glucose	89.00	89.00		72.00 - 90.00	65.00 - 99.00	mg/dL
Hemoglobin A1C	5.50	5.40		5.00 - 5.50	0.00 - 5.60	%
Insulin - Fasting	2.90	2.00		2.00 - 5.00	2.00 - 19.00	µIU/ml
BUN	19.00	↑ 18.00	↑	10.00 - 16.00	7.00 - 25.00	mg/dL
Creatinine	0.70	↓ 0.59	↓	0.80 - 1.10	0.40 - 1.35	mg/dL
BUN/Creatinine Ratio	27.14	↑ 30.50	↑	10.00 - 16.00	6.00 - 22.00	Ratio

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Creatinine	0.70	↓ 0.59	↓	👍	0.80 - 1.10	0.40 - 1.35	mg/dL
BUN/Creatinine Ratio	27.14	↑ 30.50	⚠️	👍	10.00 - 16.00	6.00 - 22.00	Ratio
eGFR Non-Afr. American	104.00	111.00	↑	👍	90.00 - 120.00	60.00 - 90.00	mL/min/1.73m2
eGFR African American	120.00	128.00	↑	👍	90.00 - 120.00	60.00 - 90.00	mL/min/1.73m2
Sodium	140.00	136.00			135.00 - 142.00	135.00 - 146.00	mEq/L
Potassium	3.90	↓ 3.60	↓	👍	4.00 - 4.50	3.50 - 5.30	mEq/L
Sodium/Potassium Ratio	35.89	↑ 37.77	↑	👍	30.00 - 35.00	30.00 - 35.00	ratio
Chloride	104.00	102.00			100.00 - 106.00	98.00 - 110.00	mEq/L
CO2	26.00	27.00			25.00 - 30.00	19.00 - 30.00	mEq/L
Anion gap	13.90	↑ 10.60		👎	7.00 - 12.00	6.00 - 16.00	mEq/L
Uric Acid, female	5.30	4.40			3.00 - 5.50	2.50 - 7.00	mg/dL
Protein, total	6.80	↓ 6.30	↓	👍	6.90 - 7.40	6.10 - 8.10	g/dL
Albumin	4.40	3.90	↓	👍	4.00 - 5.00	3.60 - 5.10	g/dL
Globulin, total	2.40	2.40			2.40 - 2.80	2.00 - 3.50	g/dL
Albumin/Globulin Ratio	1.80	1.60			1.40 - 2.10	1.00 - 2.50	ratio
Calcium	9.40	8.50	↓	👍	9.40 - 10.10	8.60 - 10.40	mg/dL
Calcium/Albumin Ratio	2.13	2.17			0.00 - 2.60	0.00 - 2.70	ratio
Phosphorus	3.50	3.00	↓	👍	3.50 - 4.00	2.50 - 4.50	mg/dL
Calcium/Phosphorous Ratio	2.68	2.83	↑	👍	2.30 - 2.70	2.30 - 2.70	ratio
Magnesium	2.10	↓ 1.80	↓	👍	2.20 - 2.50	1.50 - 2.50	mg/dl
Alk Phos	58.00	↓ 65.00	↓	👎	70.00 - 100.00	35.00 - 115.00	IU/L
AST (SGOT)	11.00	11.00			10.00 - 26.00	10.00 - 35.00	IU/L



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ALT (SGPT)	9.00	↓ 9.00	↓	👎	10.00 - 26.00	6.00 - 29.00	IU/L
LDH	109.00	↓ 88.00	↓	👍	140.00 - 200.00	120.00 - 250.00	IU/L
Bilirubin - Total	0.60	0.60			0.10 - 0.90	0.20 - 1.20	mg/dL
Bilirubin - Direct	0.10	0.10			0.00 - 0.20	0.00 - 0.19	mg/dL
Bilirubin - Indirect	0.50	0.50			0.10 - 0.70	0.20 - 1.20	mg/dL
GGT	8.00	↓ 5.00	↓	👍	10.00 - 30.00	3.00 - 70.00	IU/L
Iron - Serum	69.00	↓ 89.00		👎	85.00 - 130.00	40.00 - 160.00	µg/dL
Ferritin	148.00	133.00			40.00 - 150.00	10.00 - 232.00	ng/mL
TIBC	312.00	288.00			250.00 - 350.00	250.00 - 425.00	µg/dL
% Transferrin saturation	22.00	↓ 31.00		👎	24.00 - 50.00	15.00 - 50.00	%
Cholesterol - Total	187.00	168.00			155.00 - 190.00	125.00 - 200.00	mg/dL
Triglycerides	113.00	↑ 112.00	↑	👎	50.00 - 100.00	0.00 - 150.00	mg/dL
LDL Cholesterol	108.00	98.00			0.00 - 120.00	0.00 - 130.00	mg/dL
HDL Cholesterol	57.00	49.00	↓	👍	55.00 - 70.00	46.00 - 100.00	mg/dL
Cholesterol/HDL Ratio	3.30	↑ 3.40	↑	👍	0.00 - 3.00	0.00 - 5.00	Ratio
Triglyceride/HDL Ratio	1.98	2.28	↑	👍	0.00 - 2.00	0.00 - 3.30	ratio
TSH	1.95	1.14			1.00 - 3.00	0.40 - 4.50	µU/mL
Free T3	2.90	2.80			2.80 - 3.50	2.30 - 4.20	pg/ml
Total T3	98.00	111.00			90.00 - 168.00	76.00 - 181.00	ng/dL

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Total T3	98.00	111.00			90.00 - 168.00	76.00 - 181.00	ng/dL
Free T4	1.00	1.10			1.00 - 1.50	0.80 - 1.80	ng/dL
Total T4	7.50	7.70			6.00 - 11.90	4.50 - 12.00	µg/dL
T3 Uptake	31.00	27.00			27.00 - 35.00	22.00 - 35.00	%
Free Thyroxine Index (T7)	2.32	2.07			1.70 - 4.60	1.40 - 3.80	Index
Hs CRP, Female	3.90	↑ 3.80	↑	👎	0.00 - 0.99	0.00 - 2.90	mg/L
Homocysteine	8.70	↑ 5.60	↑	👎	0.00 - 6.00	0.00 - 10.30	µmol/L
Vitamin D (25-OH)	66.00	69.00			50.00 - 90.00	30.00 - 100.00	ng/ml
Total WBCs	6.30	4.90	↓	👍	5.30 - 7.50	3.80 - 10.80	k/cumm
RBC, Female	4.88	↑ 4.28	↑	👎	3.90 - 4.50	3.80 - 5.10	m/cumm
Hemoglobin, Female	14.00	12.40	↓	👍	13.50 - 14.50	11.70 - 15.50	g/dl
Hematocrit, Female	42.00	36.30	↓	👍	37.00 - 44.00	35.00 - 45.00	%
MCV	86.10	84.80	↓	👍	85.00 - 92.00	80.00 - 100.00	fL
MCH	28.70	29.00			27.00 - 31.90	27.00 - 33.00	pg
MCHC	33.30	34.20			32.00 - 35.00	32.00 - 36.00	g/dL
Platelets	275.00	289.00			150.00 - 400.00	140.00 - 415.00	k/cumm
RDW	13.40	↑ 12.80	↑	👎	11.70 - 13.00	11.00 - 15.00	%
Neutrophils	57.20	60.00			40.00 - 60.00	40.00 - 60.00	%
Lymphocytes	33.70	30.00			25.00 - 40.00	25.00 - 40.00	%
Monocytes	7.10	↑ 7.00	↑	👎	0.00 - 7.00	0.00 - 7.00	%
Eosinophils	2.00	3.00			0.00 - 3.00	0.00 - 3.00	%
Basophils	0.00	0.00			0.00 - 1.00	0.00 - 1.00	%



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Health Improvement Plan



The Health Improvement Plan takes all the information on this report and focuses on the top areas that need the most attention.

Hypoglycemia

The results of this blood test indicate a tendency towards hypoglycemia or low blood sugar and a need for blood sugar support.

Rationale:

LDH↓

Endothelial Dysfunction

The results of this blood test indicate a higher than optimal risk of this patient developing cardiovascular disease and shows a need for cardiovascular support, especially support for the endothelium.

Rationale:

Hs CRP, Female ↑, Homocysteine ↑

Rationale:

Hs CRP, Female ↑, Homocysteine ↑

Inflammation

The results of this blood test indicate a tendency towards inflammation and shows a need for anti-inflammatory support.

Rationale:

Hs CRP, Female ↑, Homocysteine ↑, Sodium/Potassium Ratio ↑, RDW ↑

Fatty Liver - Early Stage

The results of this blood test indicate a tendency towards the early development of fatty liver and shows a need for liver support.

Rationale:

ALT (SGPT) ↓, Triglycerides ↑

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Adrenal Stress

The results of this blood test indicate a tendency towards adrenal stress and adrenal hyperfunction and a need for adrenal gland support.

Rationale:

Potassium ↓, Sodium/Potassium Ratio ↑, BUN ↑

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This Health Improvement Plan has been prepared for your patient based upon current algorithms. Additional personalized recommendations for nutritional support may be applicable based on this laboratory evaluation, your patient's history and your clinical practice experience.

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Lab Test on Mar 11, 2019

Suggested Individual Nutrient Recommendations

The Health Improvement Plan takes all the information on this report and focuses on the top areas that need the most attention.

Magnesium Need

The results of this blood test indicate that this patient's magnesium levels might be lower than optimal and shows a need for magnesium supplementation.

Rationale:

Magnesium ↓, GGT ↓, Potassium ↓

Zinc Need

The results of this blood test indicate that this patient's zinc levels might be lower than optimal and shows a need for zinc supplementation.*

Rationale:

Alk Phos ↓



B Vitamin Need

The results of this blood test indicate that this patient's B vitamin levels might be lower than optimal and shows a need for B complex supplementation.

Rationale:

Anion gap ↑, LDH ↓

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% Deviation from Optimal Report



This report shows the elements on the blood test that are farthest from optimal expressed as a %. The elements that appear closest to the top and the bottom are those elements that are farthest from optimal and should be carefully reviewed.

Element	% from Median	Lab Result	Low	High	Optimal Reference Ranges	
					Low	High
Hs CRP, Female	344	3.90	0.00	0.99		
BUN/Creatinine Ratio	236	27.14	10.00	16.00		
RBC, Female	113	4.88	3.90	4.50		
BUN	100	19.00	10.00	16.00		
Homocysteine	95	8.70	0.00	6.00		
Anion gap	88	13.90	7.00	12.00		
RDW	81	13.40	11.70	13.00		
Triglycerides	76	113.00	50.00	100.00		
Sodium/Potassium Ratio	68	35.89	30.00	35.00		
Cholesterol/HDL Ratio	60	3.30	0.00	3.00		
Monocytes	51	7.10	0.00	7.00		
eGFR African American	50	120.00	90.00	120.00		

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Monocytes	51	7.10	0.00	7.00		
eGFR African American	50	120.00	90.00	120.00		
Hemoglobin A1C	50	5.50	5.00	5.50		
Triglyceride/HDL Ratio	49	1.98	0.00	2.00		
Ferritin	48	148.00	40.00	150.00		
Calcium/Phosphorous Ratio	45	2.68	2.30	2.70		
Glucose	44	89.00	72.00	90.00		
Uric Acid, female	42	5.30	3.00	5.50		
Cholesterol - Total	41	187.00	155.00	190.00		
LDL Cholesterol	40	108.00	0.00	120.00		
Neutrophils	36	57.20	40.00	60.00		
Calcium/Albumin Ratio	32	2.13	0.00	2.60		
Hematocrit, Female	21	42.00	37.00	44.00		
Sodium	21	140.00	135.00	142.00		
Chloride	17	104.00	100.00	106.00		
Bilirubin - Indirect	17	0.50	0.10	0.70		
Eosinophils	17	2.00	0.00	3.00		
Bilirubin - Total	12	0.60	0.10	0.90		
TIBC	12	312.00	250.00	350.00		
Lymphocytes	8	33.70	25.00	40.00		
Albumin/Globulin Ratio	7	1.80	1.40	2.10		
Bilirubin - Direct	0	0.10	0.00	0.20		
Platelets	0	275.00	150.00	400.00		
Hemoglobin, Female	0	14.00	13.50	14.50		
T3 Uptake	0	31.00	27.00	35.00		



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TSH	-2	1.95	1.00	3.00	
eGFR Non-Afr. American	-3	104.00	90.00	120.00	
Total WBCs	-5	6.30	5.30	7.50	
MCHC	-7	33.30	32.00	35.00	
Vitamin D (25-OH)	-10	66.00	50.00	90.00	
Albumin	-10	4.40	4.00	5.00	
MCH	-15	28.70	27.00	31.90	
Insulin - Fasting	-20	2.90	2.00	5.00	
Total T4	-25	7.50	6.00	11.90	
Free Thyroxine Index (T7)	-29	2.32	1.70	4.60	
CO2	-30	26.00	25.00	30.00	
MCV	-34	86.10	85.00	92.00	
Free T3	-36	2.90	2.80	3.50	
HDL Cholesterol	-37	57.00	55.00	70.00	
Total T3	-40	98.00	90.00	168.00	
AST (SGOT)	-44	11.00	10.00	26.00	
Calcium	-50	9.40	9.40	10.10	
Phosphorus	-50	3.50	3.50	4.00	
Free T4	-50	1.00	1.00	1.50	
Globulin, total	-50	2.40	2.40	2.80	
Basophils	-50	0.00	0.00	1.00	



CLINICAL LABORATORY TESTING
BLOOD CHEMISTRY
& CBC ANALYSIS
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 **EVEXIA**
DIAGNOSTICS™

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Free T4	-50	1.00	1.00	1.50	
Globulin, total	-50	2.40	2.40	2.80	
Basophils	-50	0.00	0.00	1.00	
ALT (SGPT)	-56	9.00	10.00	26.00	
% Transferrin saturation	-58	22.00	24.00	50.00	
GGT	-60	8.00	10.00	30.00	
Protein, total	-70	6.80	6.90	7.40	
Potassium	-70	3.90	4.00	4.50	
Creatinine	-83	0.70	0.80	1.10	
Magnesium	-83	2.10	2.20	2.50	
Iron - Serum	-86	69.00	85.00	130.00	
Alk Phos	-90	58.00	70.00	100.00	
LDH	-102	109.00	140.00	200.00	



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Out of Optimal Range Report



The following results show all of the elements that are out of the optimal reference range. The elements that appear closest to the top of each section are those elements that are farthest from optimal and should be carefully reviewed.

Above Optimal Range

11 Total



Below Optimal Range

10 Total



Above Optimal

Hs CRP, Female ↑ 3.90 mg/L (+ 344 %)

High Sensitivity C-Reactive Protein (Hs-CRP) is a blood marker that can help indicate the level of chronic inflammation in the body. Increased levels are associated with an increased risk of inflammation, cardiovascular disease, stroke, and diabetes.

BUN/Creatinine Ratio ↑ 27.14 Ratio (+ 236 %)

The BUN/Creatinine is a ratio between the BUN and Creatinine levels. An increased level is associated with renal dysfunction. A decreased level is associated with a diet low in protein.

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Anion gap ↑ 13.90 mEq/L (+ 88 %)

The anion gap is the measurement of the difference between the sum of the sodium and potassium levels and the sum of the serum CO₂/bicarbonate and chloride levels. Increased levels are associated with thiamine deficiency and metabolic acidosis.

RDW ↑ 13.40 % (+ 81 %)

The Red Cell Distribution Width (RDW) is essentially an indication of the degree of abnormal variation in the size of red blood cells (called anisocytosis). Although the RDW will increase with vitamin B12 deficiency, folic acid, and iron anemia, it is increased most frequently with vitamin B12 deficiency anemia.

Triglycerides ↑ 113.00 mg/dL (+ 76 %)

Serum triglycerides are composed of fatty acid molecules that enter the blood stream either from the liver or from the diet. Patients that are optimally metabolizing their fats and carbohydrates tend to have a triglyceride level about one-half of the total cholesterol level. Levels will be elevated in metabolic syndrome, fatty liver, in patients with an increased risk of cardiovascular disease, hypothyroidism and adrenal dysfunction. Levels will be decreased in liver dysfunction, a diet deficient in fat, and inflammatory processes.

Sodium/Potassium Ratio ↑ 35.89 ratio (+ 68 %)

The Sodium:Potassium ratio is determined from the serum sodium and serum potassium levels. Both elements are under the influence of the adrenal glands. An increased Sodium:Potassium ratio is associated with acute stress and a decreased Sodium:Potassium ratio is associated with chronic stress and adrenal insufficiency.

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Alk Phos ↓ 58.00 IU/L (- 90 %)

Alkaline phosphatase (ALP) is a group of isoenzymes that originate in the bone, liver, intestines, skin, and placenta. It has a maximal activity at a pH of 9.0-10.0, hence the term alkaline phosphatase. Decreased levels of ALP have been associated with zinc deficiency.

Iron - Serum ↓ 69.00 µg/dL (- 86 %)

Serum iron reflects iron that is bound to serum proteins such as transferrin. Serum iron levels will begin to fall somewhere between the depletion of the iron stores and the development of anemia. Increased iron levels are associated with liver dysfunction, conditions of iron overload (hemochromatosis and hemosiderosis) and infections. Decreased iron levels are associated with iron deficiency anemia, hypochlorhydria and internal bleeding. The degree of iron deficiency is best appreciated with ferritin, TIBC and % transferrin saturation levels.

Creatinine ↓ 0.70 mg/dL (- 83 %)

Creatinine is produced primarily from the contraction of muscle and is removed by the kidneys. A disorder of the kidney and/or urinary tract will reduce the excretion of creatinine and thus raise blood serum levels. Creatinine is traditionally used with BUN to assess for impaired kidney function. Elevated levels can also indicate dysfunction in the prostate.

Magnesium ↓ 2.10 mg/dl (- 83 %)

Magnesium is important for many different enzymatic reactions, including carbohydrate metabolism, protein synthesis, nucleic acid synthesis, and muscular contraction. Magnesium is also needed for energy production and is used by the body in the blood clotting mechanism. An increased serum magnesium is associated with kidney dysfunction and thyroid hypofunction. A decreased magnesium is a common finding with muscle cramps.

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ALT (SGPT) ↓ 9.00 IU/L (- 56 %)

SGPT/ALT is an enzyme present in high concentrations in the liver and to lesser extent skeletal muscle, the heart, and kidney. ALT levels may be decreased in vitamin B6 deficiency and early stages of fatty liver.



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Functional Index Report

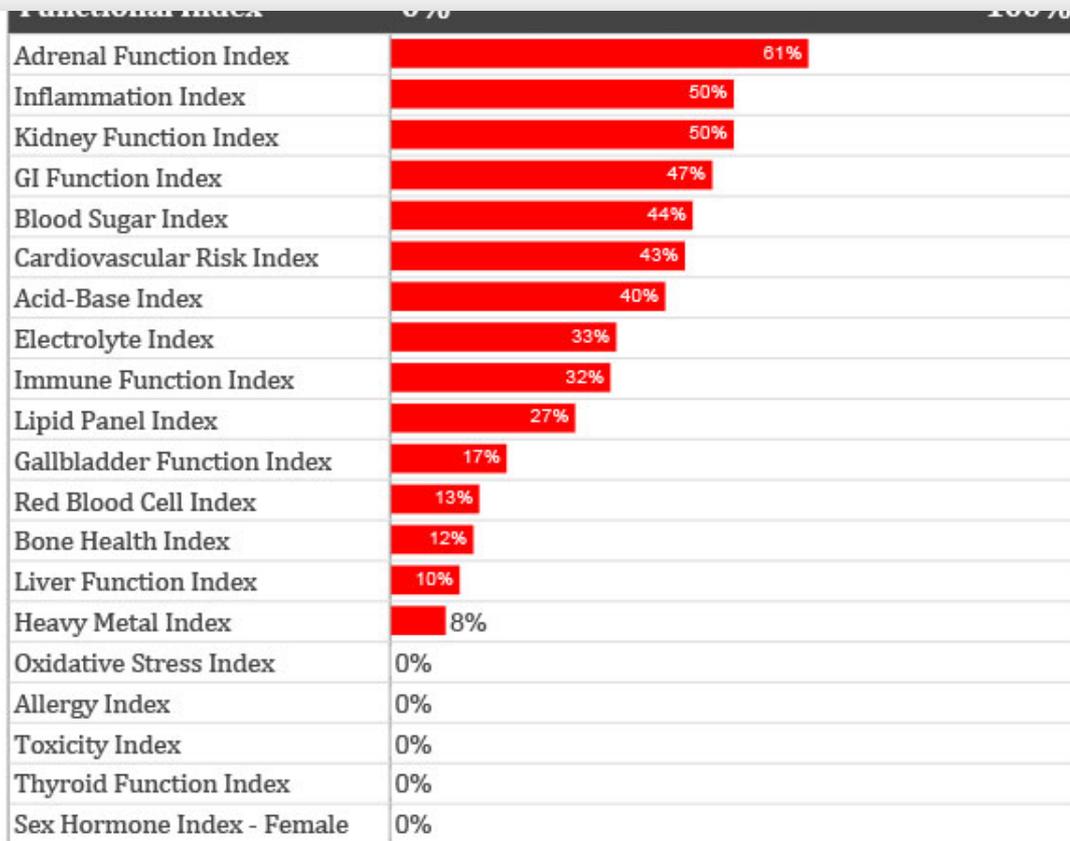


The indices shown below represent an analysis of this blood test. These results have been converted into your patient's individual Functional Index Report based on our latest research. This report gives you an indication of the level of dysfunction that exists in the various physiological systems in the body. Please use this report in conjunction with the "Practitioner's Only Clinical Dysfunctions Report" to identify which dysfunctions and conditions are causing changes in the Functional Index and to put together a unique treatment plan designed to bring their body back into a state of functional health, wellness and energy.

Score Guide: 90% - 100% - Dysfunction Highly Likely, 70% - 90% - Dysfunction Likely, 50% - 70% - Dysfunction Possible, < 50% - Dysfunction Less Likely.

Functional Index	0%	100%
Adrenal Function Index		81%
Inflammation Index		50%
Kidney Function Index		50%
GI Function Index		47%
Blood Sugar Index		44%
Cardiovascular Risk Index		43%
Acid-Base Index		40%
Electrolyte Index		33%
Immune Function Index		32%
Lipid Panel Index		27%

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Adrenal Function Index

A high Adrenal Function Index indicates that there is dysfunction within your patient's adrenal system and further assessment is needed to find out what the dysfunction is. Consider factors that contribute to adrenal hyperactivity, stress, or adrenal insufficiency. Based on this blood test, your patient's Adrenal Function Index is:

[61%] - Dysfunction Possible. There may be improvement needed in certain areas.

Rationale:

Potassium ↓, Sodium/Potassium Ratio ↑, BUN ↑, Triglycerides ↑

Elements Considered:

Sodium, Potassium, Sodium/Potassium Ratio, Glucose, BUN, Chloride, CO2, Cholesterol - Total, Triglycerides

Patient Result Not Available - Consider Running In Future Tests:

DHEA-S, Female, Cortisol - AM, Cortisol - PM

Inflammation Index

A high Inflammation Index reflects the degree of inflammation that your patient may be dealing with. A number of elements in the blood increase in the presence of dysfunctions and diseases associated with inflammation: cardiovascular disease, diabetes, hypertension, autoimmune diseases, and fibromyalgia to name a few. Based on this blood test, your patient's Inflammation Index is:

[50%] - Dysfunction Possible. There may be improvement needed in certain areas.



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Nutrient Index Report



The indices shown below represent an analysis of your patient's blood test results. These results have been converted into their individual Nutrient Assessment Report based on our latest research. This report gives you an indication of their general nutritional status. Nutritional status is influenced by actual dietary intake, digestion, absorption, assimilation and cellular uptake of the nutrients themselves. You can use this information, along with information about individual nutrient deficiencies, to put together a unique treatment plan designed to bring their body back into a state of functional health, wellness and energy.

Score Guide: 90% - 100% - Nutrient Status is Poor, 75% - 90% - Nutrient Status is Low, 50% - 75% - Moderate Nutrient Status, < 50% - Optimum Nutrient Status

Nutrient Index	0%	100%
Vitamin Index		88%
Mineral Index		64%
Hydration Index		50%
Carbohydrate Index		50%
Protein Index		35%
Fat Index	0%	

Vitamin Index

The Vitamin Index gives us a general indication of the balance of certain vitamins in the body based on the results of this blood test. A high Vitamin Index indicates a level of deficiency or need in one or more of the vitamins reflected in this index, which includes vitamin B12, vitamin B6, folate, thiamin, vitamin D and vitamin C. Factors to consider are the amount in the diet, the ability to digest and breakdown individual vitamins from the food or supplements consumed, and the ability of those vitamins to be absorbed, transported and ultimately taken up into the cells themselves. Please use the information at the bottom of this report to identify which vitamin or vitamins may be in need. Based on this blood test, your patient's Vitamin Index is:

[88%] - Nutrient Status is Low. Improvement required.

Rationale:

Anion gap ↑, ALT (SGPT) ↓, GGT ↓, Homocysteine ↑

Elements Considered:

Anion gap, Albumin, AST (SGOT), ALT (SGPT), GGT, Homocysteine, Vitamin D (25-OH), MCV

Mineral Index

The Mineral Index gives us a general indication of the balance of certain minerals in the body based on the results of this blood test. A high Mineral Index indicates a level of deficiency or need in one or more of the minerals reflected in this index, which includes calcium, zinc, copper, potassium, molybdenum, selenium, magnesium, iodine and iron. Factors to consider include the amount in the diet, the ability to digest and breakdown individual minerals from food or supplements consumed, the ability of those minerals to be absorbed, transported and ultimately taken up by the cells themselves. In the case of certain minerals, such as iron and potassium, you must also consider the possibility of a mineral deficiency due to increased excretion or loss, such as increased bleeding causing an iron deficiency. Please use the information at the bottom of this report to identify which mineral or minerals may be deficient. Based on this blood test, your patient's Mineral Index is:

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Score Guide: 90% - 100% - Deficiency Highly Likely, 70% - 90% - Deficiency Likely, 50% - 70% - Deficiency Possible, < 50% - Deficiency Less Likely.

Nutrient Deficiencies	0%	100%
Magnesium Need		100%
Zinc Need		90%
Vitamin B6 Need		80%
Thiamine Need		50%
Vitamin B12/Folate Need		41%
Iron Deficiency		26%
Iodine Need	0%	
Calcium Need	0%	
DHEA Need	0%	
Vitamin C Need	0%	
Molybdenum Need	0%	
Selenium Need	0%	
Glutathione Need	0%	



Magnesium Need

A magnesium need is associated with a **decreased serum magnesium**, a **decreased GGTP** and a **decreased serum potassium**.

[100%] - Dysfunction Highly Likely. Much improvement required.

Rationale:

Magnesium ↓, GGT ↓, Potassium ↓

Elements Considered:

Magnesium, GGT, Potassium

Zinc Need

Consider a zinc need if the **Alk phos** levels are decreased.

[90%] - Dysfunction Highly Likely. Much improvement required.

Rationale:

Alk Phos ↓

Elements Considered:

Alk Phos

Vitamin B6 Need

Consider a B6 need if there is a decreased **MCV**, **MCH**, **MCHC**, **HGB** and/or **HCT** and an increased or normal **serum iron** and/or **ferritin**. You may also see a decreased **SGOT/AST**, **SGPT/ALT** or **GGTP**.



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[80%] - Dysfunction Likely. Improvement required.

Rationale:

ALT (SGPT) ↓, GGT ↓

Elements Considered:

AST (SGOT), ALT (SGPT), GGT, Hemoglobin, Female, Hematocrit, Female, MCV, MCH, MCHC, Ferritin, Iron - Serum

Thiamine Need

Consider Thiamine deficiency with an **increased anion gap** along with a **decreased CO₂. Hemoglobin and hematocrit** levels may be normal or decreased. Due to thiamine's role in glycolysis, **LDH** levels may be decreased and **glucose** levels may be normal to increased.

[50%] - Dysfunction Possible. There may be improvement needed in certain areas.

Rationale:

Anion gap ↑, LDH ↓

Elements Considered:

Anion gap, CO₂, Glucose, LDH, Hemoglobin, Female, Hematocrit, Female



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Recommended Further Testing



Advanced Practitioner Only Report

Based on the results of the analysis of this blood test, the following areas may require further investigation. The suggestions for further testing are merely examples and do not attempt to provide you with an exhaustive list of further evaluation methods.

Zinc Deficiency

The results of this blood test indicate that this patient may be dealing with a zinc deficiency because the alk phos level is decreased. We cannot tell categorically that your patient has a zinc deficiency because there are no tests specifically testing for zinc levels on a common Chemistry Screen. The likelihood of zinc deficiency increases with the presence of clinical signs of zinc deficiency: white spots on nails, reduced sense of smell or taste, cuts that are slow to heal, acne, increased susceptibility to colds, infections, and flu, and for our male patients prostatic hypertrophy. If you suspect zinc deficiency, you may want to follow up with an in-office Zinc Taste Test or check White Blood cell or Red Blood cell zinc levels, which may be decreased.

Rationale:

Alk Phos ↓

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Blood Test History Report



The Blood Test History Report lists the results of your patient's Chemistry Screen and CBC tests side by side with the latest test listed on the left hand side. This report allows you to compare results over time and see where improvement has been made and allows you to track progress.

Element	Latest 3 Test Results		
	Jul 05 2018	Nov 21 2018	Mar 11 2019
Glucose	86.00	89.00	89.00
Hemoglobin A1C	5.30	5.40	5.50
Insulin - Fasting	3.80	2.00	2.90
Fructosamine			
C-Peptide			
BUN	12.00	18.00 ↑	19.00 ↑
Creatinine	0.68 ↓	0.59 ↓	0.70 ↓
Creatinine, 24-hour urine			
Creatinine Clearance			

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Creatinine Clearance			
eGFR Non-Afr. American	106.00	111.00	104.00
eGFR African American	122.00 ↑	128.00 ↑	120.00
BUN/Creatinine Ratio	17.64 ↑	30.50 ⚠	27.14 ↑
Sodium	137.00	136.00	140.00
Potassium	4.30	3.60 ↓	3.90 ↓
Sodium/Potassium Ratio	31.86	37.77 ↑	35.89 ↑
Chloride	103.00	102.00	104.00
CO2	23.00 ↓	27.00	26.00
Anion gap	15.30 ↑	10.60	13.90 ↑
Uric Acid, female	4.60	4.40	5.30
Protein, total	6.50 ↓	6.30 ↓	6.80 ↓
Albumin	4.00	3.90 ↓	4.40
Globulin, total	2.50	2.40	2.40
Albumin/Globulin Ratio	1.60	1.60	1.80
Calcium	8.70 ↓	8.50 ↓	9.40
Calcium/Albumin Ratio	2.17	2.17	2.13
Phosphorus	2.80 ↓	3.00 ↓	3.50
Calcium/Phosphorous Ratio	3.10 ↑	2.83 ↑	2.68
Collagen Cross-Linked NTx			
Magnesium	2.20	1.80 ↓	2.10 ↓

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Element	Latest 3 Test Results		
	Jul 05 2018	Nov 21 2018	Mar 11 2019
Alk Phos	72.00	65.00 ↓	58.00 ↓
LDH	94.00 ↓	88.00 ↓	109.00 ↓
AST (SGOT)	13.00	11.00	11.00
ALT (SGPT)	10.00	9.00 ↓	9.00 ↓
GGT	7.00 ↓	5.00 ↓	8.00 ↓
Bilirubin - Total	0.50	0.60	0.60
Bilirubin - Direct	0.10	0.10	0.10
Bilirubin - Indirect	0.40	0.50	0.50
Iron - Serum	106.00	89.00	69.00 ↓
Ferritin	119.00	133.00	148.00
TIBC	294.00	288.00	312.00
% Transferrin saturation	36.00	31.00	22.00 ↓
Cholesterol - Total	181.00	168.00	187.00
Triglycerides	126.00 ↑	112.00 ↑	113.00 ↑
LDL Cholesterol	103.00	98.00	108.00
HDL Cholesterol	55.00	49.00 ↓	57.00

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LDL Cholesterol	103.00	98.00	108.00
HDL Cholesterol	55.00	49.00 ↓	57.00
VLDL Cholesterol			
Cholesterol/HDL Ratio	3.30 ↑	3.40 ↑	3.30 ↑
Triglyceride/HDL Ratio	2.29 ↑	2.28 ↑	1.98
Leptin, Female			
TSH	1.55	1.14	1.95
Total T4	7.40	7.70	7.50
Total T3	103.00	111.00	98.00
Free T4	1.00	1.10	1.00
Free T3	2.90	2.80	2.90
T3 Uptake	30.00	27.00	31.00
Free Thyroxine Index (T7)	2.22	2.07	2.32
Thyroid Peroxidase (TPO) Abs			
Thyroglobulin Abs			
Reverse T3			
C-Reactive Protein			
Hs CRP, Female	5.00 ↑	3.80 ↑	3.90 ↑
ESR, Female			
Homocysteine	8.10 ↑	5.60	8.70 ↑

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Element	Latest 3 Test Results		
	Jul 05 2018	Nov 21 2018	Mar 11 2019
Fibrinogen			
Creatine Kinase			
Vitamin D (25-OH)	32.00 ↓	69.00	66.00
Vitamin B12			
Folate			
DHEA-S, Female			
Cortisol - AM			
Cortisol - PM			
Testosterone, Free Female			
Testosterone, Total Female			
Sex Hormone Binding Globulin, female			
Estradiol, Female			
Progesterone, Female			
Total WBCs	6.10	4.90 ↓	6.30
RBC, Female	4.70 ↑	4.28	4.88 ↑



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RBC, Female	4.70 ↑	4.28	4.88 ↑
Reticulocyte count			
Hemoglobin, Female	13.30 ↓	12.40 ↓	14.00
Hematocrit, Female	41.70	36.30 ↓	42.00
MCV	88.70	84.80 ↓	86.10
MCH	28.30	29.00	28.70
MCHC	31.90 ↓	34.20	33.30
Platelets	301.00	289.00	275.00
RDW	14.10 ↑	12.80	13.40 ↑
Neutrophils	52.50	60.00	57.20
Bands			
Lymphocytes	39.40	30.00	33.70
Monocytes	6.10	7.00	7.10 ↑
Eosinophils	2.00	3.00	2.00
Basophils	0.00	0.00	0.00



Ask the Doctor



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Next lesson: Part 7 of 8
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