



SACRAMENTO
NATUROPATHIC
MEDICAL CENTER • SINCE 2005

Functional Health Report

A comprehensive analysis of your patient's test results.

BLOOD CHEMISTRY ANALYSIS



Practitioner Report

Prepared for Jane Sample
51 year old female born Dec 24, 1972
Fasting

Requested by Dr. Dennis Godby
Sacramento Naturopathic Medical Center



Collected Date Jan 30, 2024

Lab Lab Corp

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An introduction to Functional Blood Chemistry Analysis and the Functional Health Report (FHR).

Introduction

- 1 What's Inside?
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Functional Blood Chemistry Analysis (FBCA)

Functional Blood Chemistry Analysis is the process by which blood biomarkers are organized, analyzed, and interpreted. FBCA provides a comprehensive assessment of the state of health in the main functional systems and the supporting accessory systems of the body. It also gives us a window into the nutrient status of the body and whether you are trending towards or away from optimal health.



Dr. Dennis Godby

Sacramento Naturopathic Medical Center

WHY BLOOD TESTING?

Blood has a lot to tell us about our state of health and the blood chemistry and CBC / hematology test is the most commonly ordered medical lab test worldwide. These blood tests are an integral part of Western clinical medicine and are used to aid in the diagnostic decision-making process.

Patients understand and are educated that blood testing is the norm for health assessment.

However, many people feel unwell long before a traditional blood test becomes diagnostic. More often than not, our patients are told by their physician that "everything on your blood test looks normal."

NORMAL IS NOT OPTIMAL

Most patients who feel "unwell" will come out "normal" on a blood test. Clinical experience suggests that these people are by no means "normal" and are a far cry from being functionally optimal. They may not yet have progressed to a known disease state but they are what we call dys-functional, i.e. their physiological systems are no longer functioning properly and they are starting to feel un-well.

The issue is not that the blood test is a poor diagnostic tool, far from it. The issue is that the reference ranges used on a traditional lab test are based on statistics, not on whether a certain value represents good health or optimal physiological function. The problem is that "normal" ranges represent "average" populations rather than the optimal level required to maintain good health. Most "normal" reference ranges are too broad to adequately detect health problems before they become pathology and are not useful for detecting the emergence of dysfunction.

THE FUNCTIONAL APPROACH

The functional approach to chem screen and CBC analysis is oriented around changes in physiology and not pathology. We use ranges based on optimal physiology, not the "normal" population. This results in a tighter "Functional Physiological Range," which allows us to evaluate the area within the "Normal" reference range to detect patients with changes in physiological "function." We can identify the factors that obstruct the patient from achieving optimal physiological, biochemical, and metabolic functioning in their body.

Another thing that separates the Functional Blood Chemistry Analysis from the Traditional approach is we are not simply looking at one individual biomarker at a time in a linear report of the data. Rather, we use trend analysis between the individual biomarkers to establish a client's otherwise hidden trend towards or away from a functional health optimal.

THE FUNCTIONAL HEALTH REPORT

The Functional Health Report is the result of a detailed algorithmic analysis of your blood test results. Our analytical and interpretive software analyzes the blood test data for its hidden meaning and reveals the subtle, web-like patterns hidden within the numbers that signal the first stages of functional change in the body.

SUMMARY

In closing, Blood testing is no longer simply a part of disease or injury management. It's a vital component of a comprehensive Functional Medicine work up and plays a vital role in uncovering hidden health trends, comprehensive health promotion and disease prevention.

Practitioner Report

Your Practitioner Report is the result of a detailed and proprietary algorithmic analysis of your patient's complex and comprehensive blood biomarkers.



Dr. Dennis Godby

Sacramento Naturopathic Medical Center

THE FUNCTIONAL HEALTH REPORT

The Functional Health Report uniquely organizes and creates an interpretation providing a comprehensive insight and assessment into the state of previously hidden health trends of the main body systems, its supporting body accessory systems, along with reporting on the status of key nutrients and trends to and from clinical dysfunction.

The analytical and interpretive software analyzes the blood test data for its hidden meaning and reveals the subtle, web-like patterns hidden within the numbers that signal the first stages of functional change in the body.

ASSESSMENT

The Assessment section is at the very heart of the Functional Health Report. It is here that the findings of the algorithmic trend analysis are presented. The Functional Body Systems and Accessory Reports show the level of dysfunction that exists in the various physiological systems in the body.

The Nutrient Systems report gives you an indication of your client's general nutritional status as well as the degree of deficiency for individual nutrients.

The Assessment section also includes the Practitioner Only "Clinical Dysfunctions Report", which lists the individual dysfunctions and conditions themselves that may be causing the changes seen in the Body and Accessory Systems reports.

ANALYSIS

The Analysis section shows you the actual results of the blood test itself.

The Blood Test Results Report lists the results of the patient's blood test results and shows you if an individual biomarker is optimal, outside of the optimal range or outside of the standard range.

The Blood Test Results Comparative Report compares results of the patient's latest and previous Chemistry Screen and Hematology test and gives you a sense of whether or not there has been an improvement on the individual biomarker level.

The Blood Test History report allows you to compare results over time and see where improvement has been made and allows you to track progress in the individual biomarkers.

A Blood Test Score report is made showing which markers exhibit the largest shifts away from an optimal norm either higher or lower.

HEALTH CONCERNS

All the information on the Assessment and Analysis sections of the report are summarized in the Health Concerns section, which focuses on the top areas of need as presented in this report.

Based on the results of the analysis of this blood test, there may be a "Recommended Further Testing" report, which indicates areas that may require further investigation.

APPENDIX

The appendix may contain the "What to Look For" report, which contains detailed descriptions and interpretation explanations of each biomarker that is out of optimal giving you even more information on dysfunctions associated with each biomarker.



A full breakdown of all the individual biomarker results, showing if a particular biomarker is outside the optimal range or the standard range, plus a comparative and historical view.

Analytics

- 6 Blood Test Results
- 14 Blood Test Comparative
- 18 Blood Test Score
- 21 Blood Test History
- 25 Out of Optimal Range

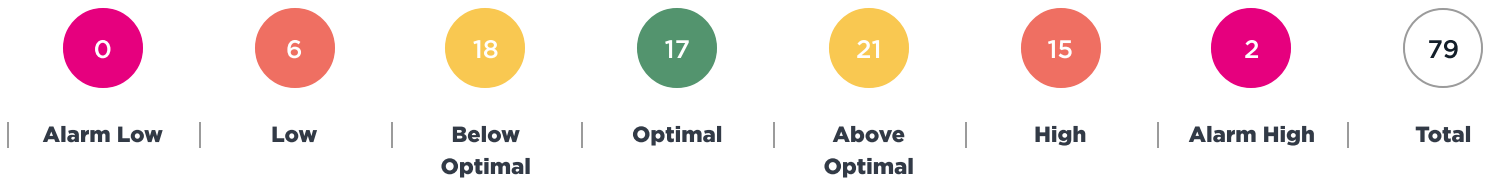
Blood Test Results

Blood Test Results	Blood Test Comparative	Blood Test Score	Blood Test History	Out of Optimal Range
Blood Glucose	Renal	Electrolytes	Metabolic	Proteins
Minerals	Liver and GB	Iron Markers	Lipids	Thyroid
Inflammation	Vitamins	CBC	WBCs	

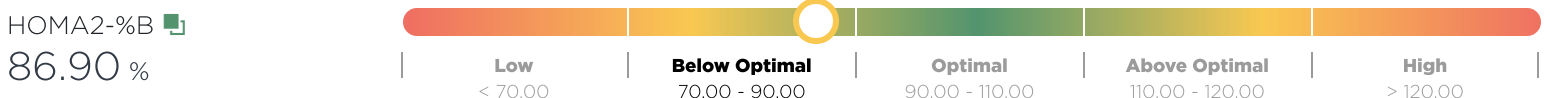
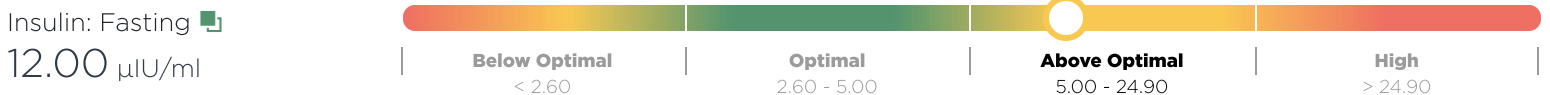
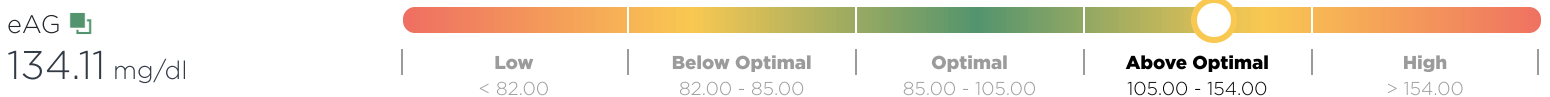
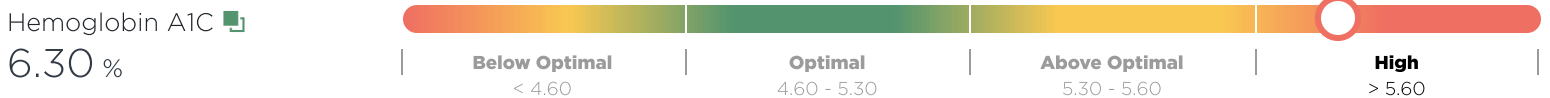
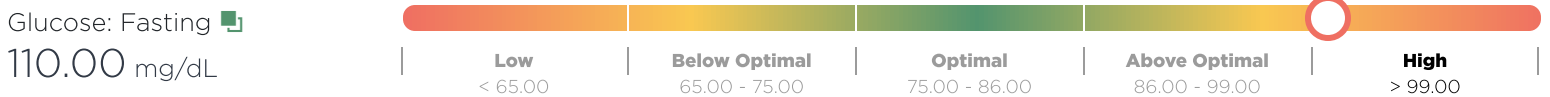
Blood Test Results

The Blood Test Results Report lists the results of your patient’s Chemistry Screen and CBC and shows you whether or not an individual biomarker is optimal, outside of the optimal range, or outside of the standard range. The biomarkers are grouped into their most common categories.

Some biomarkers in the Blood Test Results Report that are above or below the Optimal or marked Low or High may be hyperlinked into the "Out of Optimal Range Report", so you can read some background information on those biomarkers and why they may be high or low.

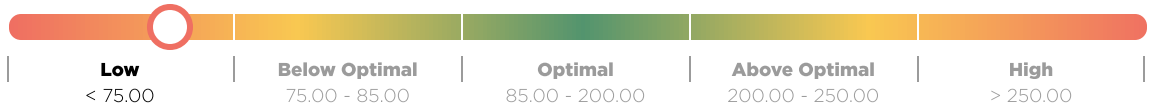


BLOOD GLUCOSE



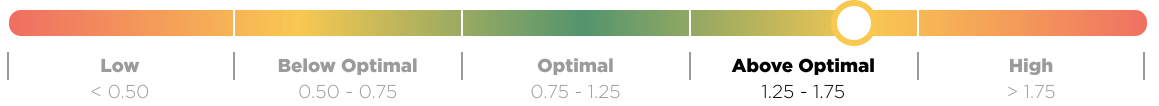
HOMA2-%S

61.60 %



HOMA2-IR

1.62 Index



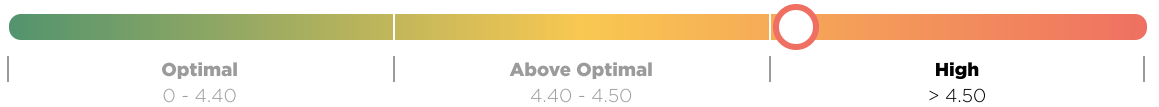
QUICKI

0.32 Index



Triglyceride-Glucose Index (TyG)

4.78 Index



RENAL

BUN

21.00 mg/dL



Creatinine

0.56 mg/dL



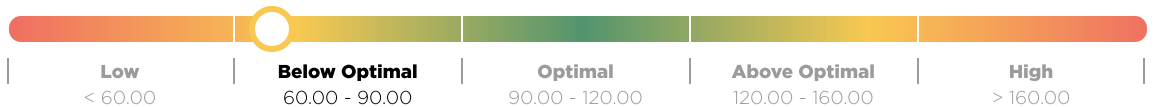
BUN : Creatinine

37.50 Ratio



eGFR

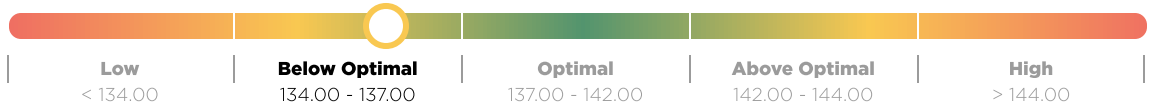
65.00 mL/min/1.73m2



ELECTROLYTES

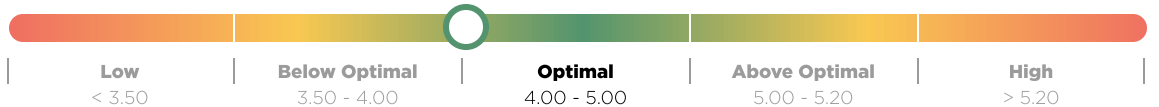
Sodium

136.00 mEq/L



Potassium

4.00 mEq/L



Chloride

106.00 mEq/L

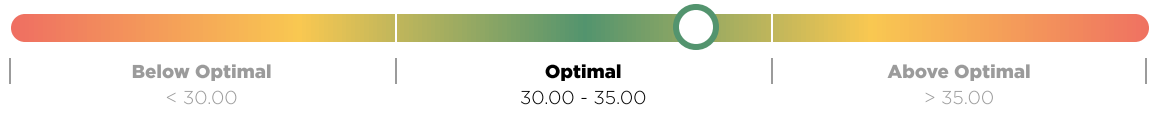


CO2

22.00 mEq/L



Sodium : Potassium
34.00 ratio



METABOLIC

Anion Gap
12.00 mEq/L



Uric Acid - Female
3.50 mg/dL



PROTEINS

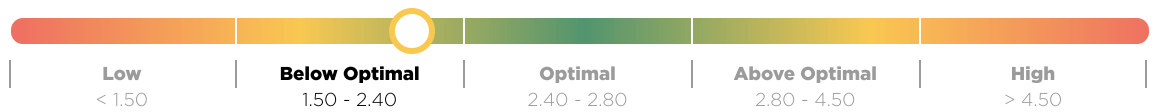
Protein - Total
7.80 g/dL



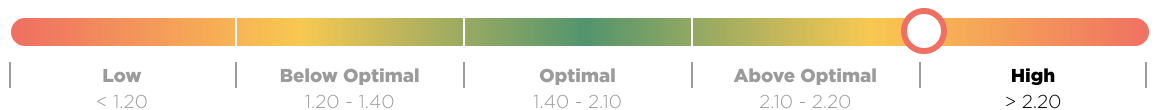
Albumin
5.00 g/dL



Globulin - Total ■
2.20 g/dL

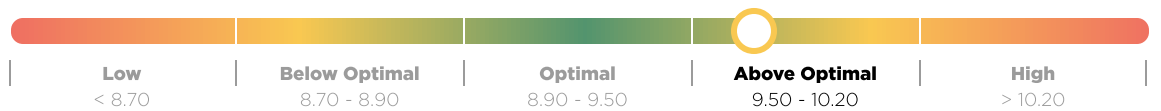


Albumin : Globulin ■
2.27 ratio



MINERALS

Calcium ■
9.70 mg/dL



Phosphorus
3.00 mg/dL



Magnesium - Serum ■
2.00 mg/dl



Magnesium - RBC ■
4.80 mg/dl

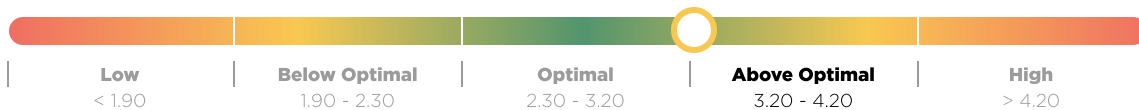


Calcium : Albumin
1.94 ratio



Calcium : Phosphorus 

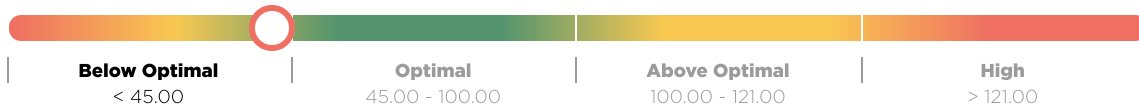
3.23 ratio



LIVER AND GB

Alk Phos 

44.00 IU/L



AST 

28.00 IU/L



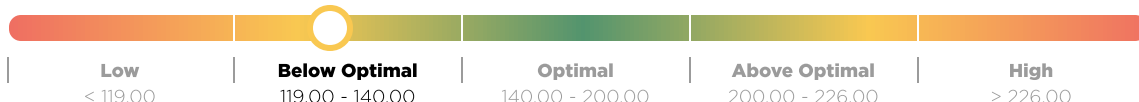
ALT 


45.00 IU/L



LDH 

128.00 IU/L



Bilirubin - Total 

1.05 mg/dL



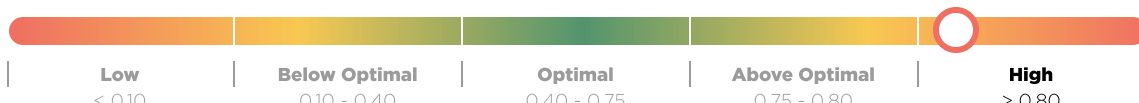
Bilirubin - Direct

0.10 mg/dL



Bilirubin - Indirect 

0.95 mg/dL



GGT 

31.00 IU/L



AST : ALT

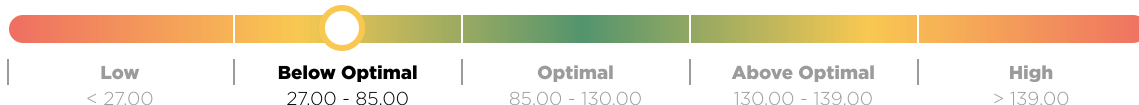
0.62 Ratio



IRON MARKERS

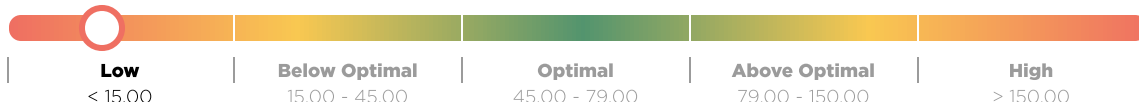
Iron - Serum 

55.00 µg/dL



Ferritin 

12.00 ng/mL




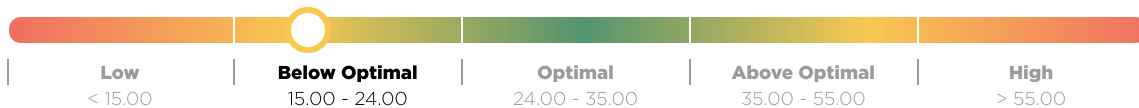
TIBC 
385.00 µg/dL




UIBC 
330.00 µg/dL




% Transferrin saturation 
18.00 %



LIPIDS

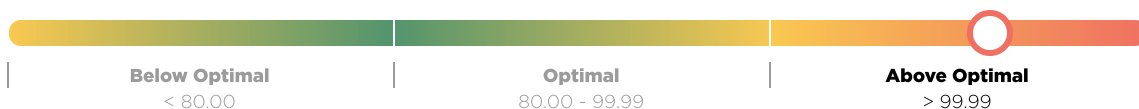
Cholesterol - Total 
208.00 mg/dL



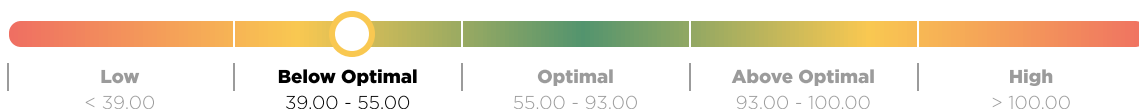
Triglycerides 
128.00 mg/dL




LDL Cholesterol 
133.00 mg/dL



HDL Cholesterol 
47.00 mg/dL



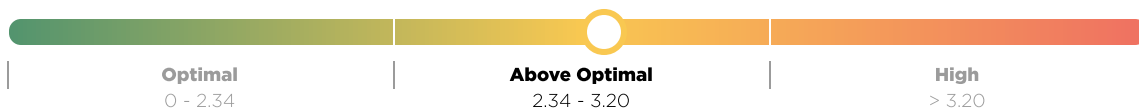
Non-HDL Cholesterol 
161.00 mg/dl




VLDL Cholesterol 
28.00 mg/dl




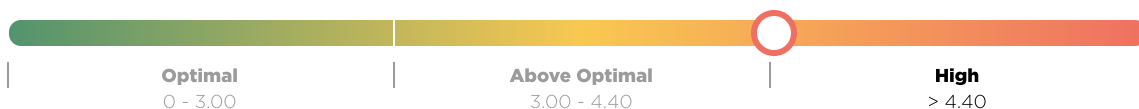
LDL : HDL - Female 
2.83 Ratio



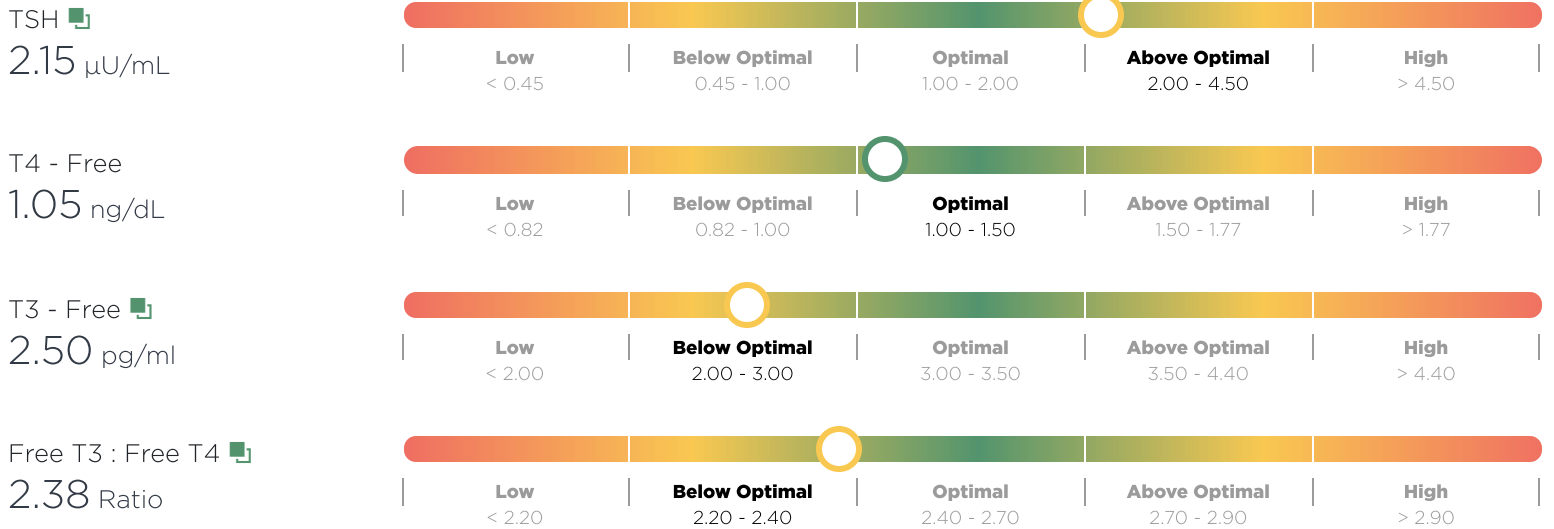
Triglyceride:HDL 
2.72 ratio



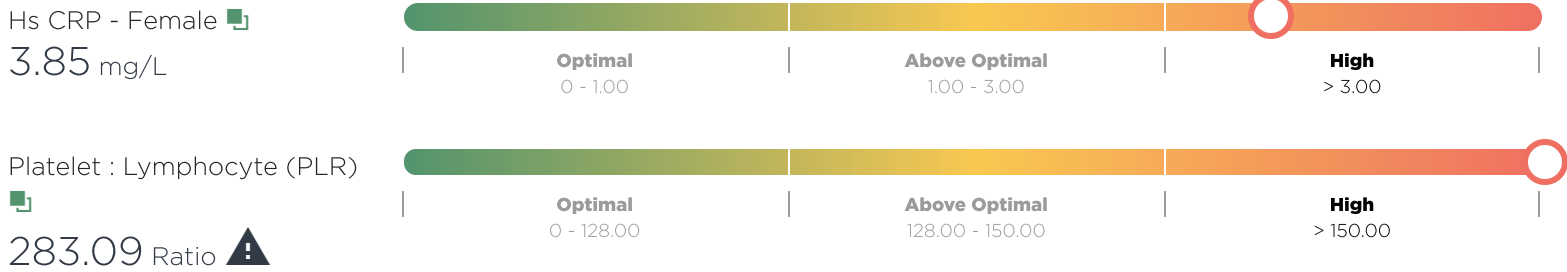
Cholesterol : HDL 
4.43 Ratio



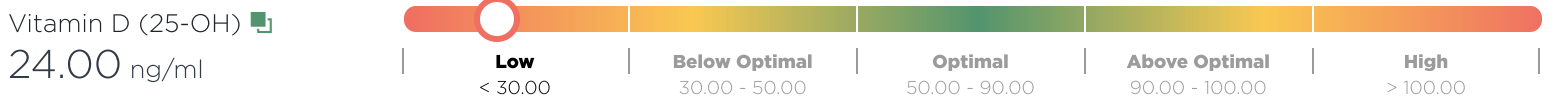
THYROID



INFLAMMATION



VITAMINS



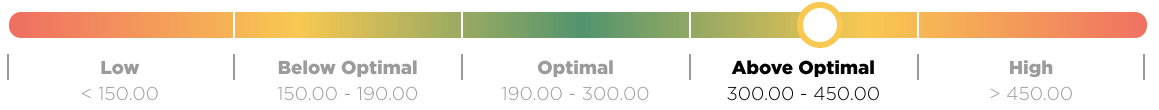
CBC



MCHC
35.00 g/dL



Platelets
385.00 10E3/ μ L

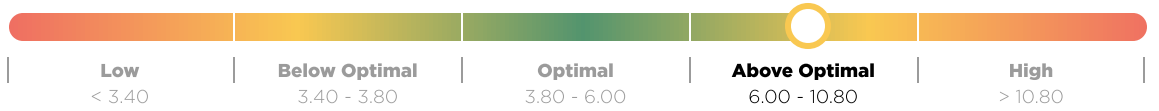


RDW
14.00 %

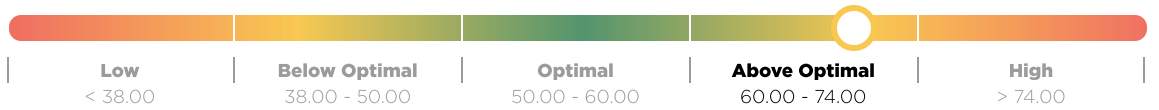


WBCS

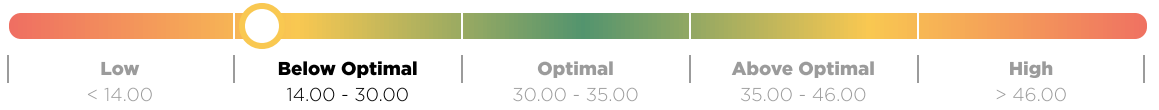
Total WBCs
8.50 k/cumm



Neutrophils - %
70.00 %



Lymphocytes - %
16.00 %



Monocytes - %
4.00 %



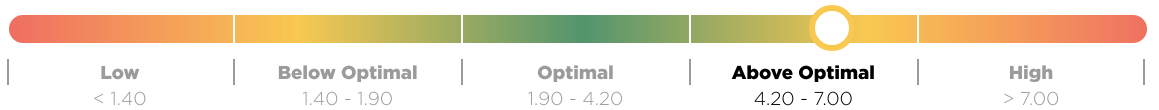
Eosinophils - %
8.00 %



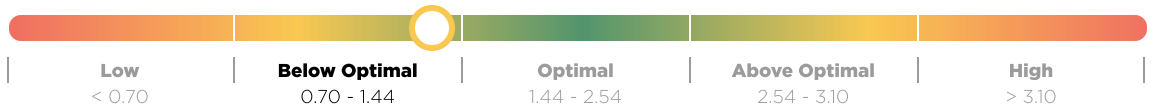
Basophils - %
0.00 %



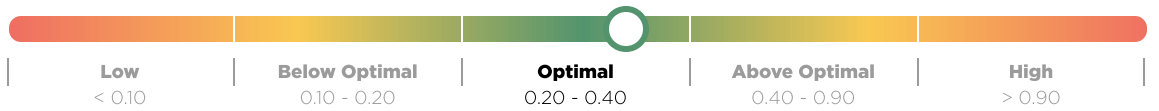
Neutrophils - Absolute
5.95 k/cumm



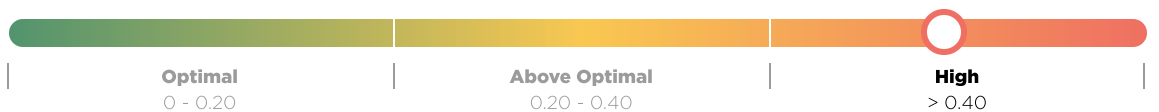
Lymphocytes - Absolute
1.36 k/cumm



Monocytes - Absolute
0.34 k/cumm

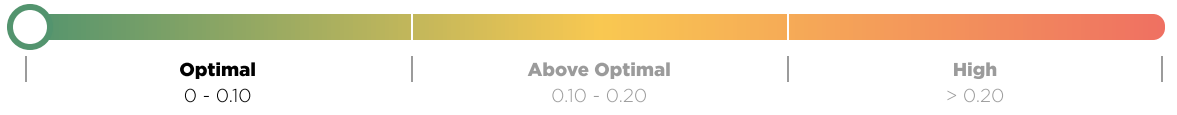


Eosinophils - Absolute
0.68 k/cumm



Basophils - Absolute

0.00 k/cumm



Neutrophil : Lymphocyte 

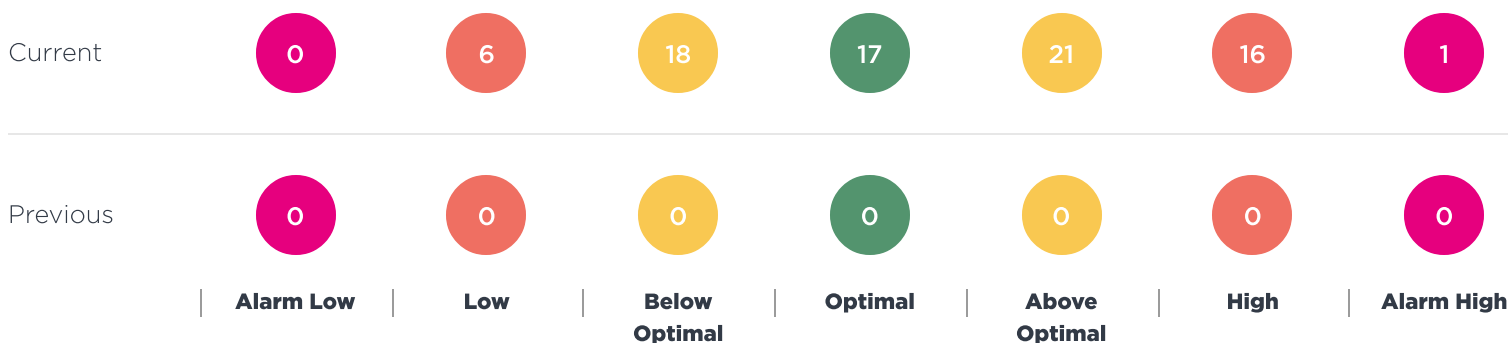
4.38 Ratio



Blood Test Results Comparative

The Blood Test Results Comparative Report lists the results of your patient's latest and previous Chemistry Screen and CBC and shows you whether or not an individual biomarker is optimal, outside of the optimal range, or outside of the standard range.

A comparison of the total number of biomarkers by optimal range



Biomarker	Lab Corp		Optimal range	Standard range	Units
	Current	Jan 30 2024			

BLOOD GLUCOSE

Glucose: Fasting	110.00	↑↑	75.00 - 86.00	65.00 - 99.00	mg/dL
Hemoglobin A1C	6.30	↑↑	4.60 - 5.30	4.80 - 5.60	%
eAG	134.11	↑	85.00 - 105.00	82.00 - 154.00	mg/dl
Insulin: Fasting	12.00	↑	2.60 - 5.00	2.60 - 24.90	μIU/ml
HOMA2-%B	86.90	↓	90.00 - 110.00	70.00 - 120.00	%
HOMA2-%S	61.60	↓↓	85.00 - 200.00	75.00 - 250.00	%
HOMA2-IR	1.62	↑	0.75 - 1.25	0.50 - 1.75	Index
QUICKI	0.32	↓↓	0.45 - 5.00	0.34 - 5.00	Index
Triglyceride-Glucose Index (TyG)	4.78	↑↑	0 - 4.40	0 - 4.50	Index

RENAL

BUN	21.00	↑	10.00 - 16.00	6.00 - 24.00	mg/dL
Creatinine	0.56	↓↓	0.80 - 1.10	0.57 - 1.00	mg/dL
BUN : Creatinine	37.50	▲	10.00 - 16.00	9.00 - 23.00	Ratio
eGFR	65.00	↓	90.00 - 120.00	60.00 - 160.00	mL/min/1.73m2

Biomarker	Lab Corp			
	Current Jan 30 2024	Optimal range	Standard range	Units
ELECTROLYTES				
Sodium	136.00 ↓	137.00 - 142.00	134.00 - 144.00	mEq/L
Potassium	4.00	4.00 - 5.00	3.50 - 5.20	mEq/L
Chloride	106.00	100.00 - 106.00	96.00 - 106.00	mEq/L
CO2	22.00 ↓	25.00 - 30.00	20.00 - 29.00	mEq/L
Sodium : Potassium	34.00	30.00 - 35.00		ratio
METABOLIC				
Anion Gap	12.00	7.00 - 12.00	6.00 - 16.00	mEq/L
Uric Acid - Female	3.50	3.00 - 4.70	3.00 - 7.20	mg/dL
PROTEINS				
Protein - Total	7.80	6.90 - 8.10	6.00 - 8.50	g/dL
Albumin	5.00	4.50 - 5.00	3.80 - 4.90	g/dL
Globulin - Total	2.20 ↓	2.40 - 2.80	1.50 - 4.50	g/dL
Albumin : Globulin	2.27 ↑↑	1.40 - 2.10	1.20 - 2.20	ratio
MINERALS				
Calcium	9.70 ↑	8.90 - 9.50	8.70 - 10.20	mg/dL
Phosphorus	3.00	2.60 - 3.50	2.80 - 4.10	mg/dL
Magnesium - Serum	2.00 ↓	2.20 - 2.50	1.60 - 2.30	mg/dl
Magnesium - RBC	4.80 ↓	6.00 - 6.80	4.20 - 6.80	mg/dl
Calcium : Albumin	1.94	0 - 2.18	0 - 2.60	ratio
Calcium : Phosphorus	3.23 ↑	2.30 - 3.20	1.90 - 4.20	ratio
LIVER AND GB				
Alk Phos	44.00 ↓↓	45.00 - 100.00	48.00 - 121.00	IU/L
AST	28.00 ↑	10.00 - 26.00	0.00 - 40.00	IU/L
ALT	45.00 ↑↑	10.00 - 26.00	0.00 - 32.00	IU/L
LDH	128.00 ↓	140.00 - 200.00	119.00 - 226.00	IU/L
Bilirubin - Total	1.05 ↑	0.50 - 0.90	0.00 - 1.20	mg/dL
Bilirubin - Direct	0.10	0.10 - 0.15	0 - 0.40	mg/dL
Bilirubin - Indirect	0.95 ↑↑	0.40 - 0.75	0.10 - 0.80	mg/dL
GGT	31.00 ↑	10.00 - 17.00	0.00 - 65.00	IU/L
AST : ALT	0.62	0 - 1.00		Ratio
IRON MARKERS				
Iron - Serum	55.00 ↓	85.00 - 130.00	27.00 - 139.00	µg/dL
Ferritin	12.00 ↓↓	45.00 - 79.00	15.00 - 150.00	ng/mL
TIBC	385.00 ↑	250.00 - 350.00	250.00 - 450.00	µg/dL
UIBC	330.00 ↑	130.00 - 300.00	131.00 - 425.00	µg/dL
% Transferrin saturation	18.00 ↓	24.00 - 35.00	15.00 - 55.00	%
LIPIDS				

Biomarker	Lab Corp			
	Current Jan 30 2024	Optimal range	Standard range	Units
Cholesterol - Total	208.00 ↑↑	160.00 - 199.00	100.00 - 199.00	mg/dL
Triglycerides	128.00 ↑	70.00 - 80.00	0 - 149.00	mg/dL
LDL Cholesterol	133.00 ↑↑	80.00 - 99.99	0 - 99.00	mg/dL
HDL Cholesterol	47.00 ↓	55.00 - 93.00	39.00 - 100.00	mg/dL
Non-HDL Cholesterol	161.00 ↑↑	70.00 - 99.00	0 - 129.99	mg/dl
VLDL Cholesterol	28.00 ↑	0 - 15.00	5.00 - 40.00	mg/dl
LDL : HDL - Female	2.83 ↑	0 - 2.34	0 - 3.20	Ratio
Triglyceride:HDL	2.72 ↑↑	0.50 - 1.90	0 - 2.00	ratio
Cholesterol : HDL	4.43 ↑↑	0 - 3.00	0 - 4.40	Ratio

THYROID

TSH	2.15 ↑	1.00 - 2.00	0.45 - 4.50	μU/mL
T4 - Free	1.05	1.00 - 1.50	0.82 - 1.77	ng/dL
T3 - Free	2.50 ↓	3.00 - 3.50	2.00 - 4.40	pg/ml
Free T3 : Free T4	2.38 ↓	2.40 - 2.70	2.20 - 2.90	Ratio

INFLAMMATION

Hs CRP - Female	3.85 ↑↑	0 - 1.00	0 - 3.00	mg/L
Platelet : Lymphocyte (PLR)	283.09 ↑↑	0 - 128.00	0 - 150.00	Ratio

VITAMINS


Vitamin D (25-OH)	24.00 ↓↓	50.00 - 90.00	30.00 - 100.00	ng/ml
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CBC

RBC - Female	3.95 ↓	4.30 - 4.80	3.80 - 5.10	m/cumm
Hemoglobin - Female	12.50 ↓	13.50 - 14.50	11.10 - 15.90	g/dl
Hematocrit - Female	34.50 ↓	37.00 - 44.00	34.00 - 46.60	%
MCV	97.00 ↑	82.00 - 89.90	79.00 - 97.00	fL
MCHC	35.00	34.00 - 36.00	31.50 - 35.70	g/dL
Platelets	385.00 ↑	190.00 - 300.00	150.00 - 450.00	10E3/μL
RDW	14.00 ↑	11.00 - 12.60	11.60 - 15.40	%

WBCS

Total WBCs	8.50 ↑	3.80 - 6.00	3.40 - 10.80	k/cumm
Neutrophils - %	70.00 ↑	50.00 - 60.00	38.00 - 74.00	%
Lymphocytes - %	16.00 ↓	30.00 - 35.00	14.00 - 46.00	%
Monocytes - %	4.00	4.00 - 7.00	4.00 - 13.00	%
Eosinophils - %	8.00 ↑↑	0 - 3.00		%
Basophils - %	0.00	0 - 1.00		%
Neutrophils - Absolute	5.95 ↑	1.90 - 4.20	1.40 - 7.00	k/cumm
Lymphocytes - Absolute	1.36 ↓	1.44 - 2.54	0.70 - 3.10	k/cumm
Monocytes - Absolute	0.34	0.20 - 0.40	0.10 - 0.90	k/cumm
Eosinophils - Absolute	0.68 ↑↑	0 - 0.20	0 - 0.40	k/cumm
Basophils - Absolute	0.00	0 - 0.10	0 - 0.20	k/cumm










































Biomarker	Lab Corp	Current Jan 30 2024	Optimal range	Standard range	Units
Neutrophil : Lymphocyte 	4.38 ↑↑	1.00 - 1.70	1.00 - 3.00	Ratio	







Blood Test Score Report

This report shows the biomarkers on the blood test that are farthest from the median expressed as a %.

The biomarkers that appear closest to the top and the bottom are those biomarkers that are farthest from the median and should be carefully reviewed.

Biomarker	Lab result	Optimal range		% deviation	Optimal range	
		Low	High		Low	High
Triglycerides	128.00	70.00	80.00	530		
Neutrophil : Lymphocyte	4.38	1.00	1.70	433		
BUN : Creatinine	37.50	10.00	16.00	408		
Insulin: Fasting	12.00	2.60	5.00	342		
Hs CRP - Female	3.85	0	1.00	335		
Eosinophils - Absolute	0.68	0	0.20	290		
Glucose: Fasting	110.00	75.00	86.00	268		
Non-HDL Cholesterol	161.00	70.00	99.00	264		
GGT	31.00	10.00	17.00	250		
Eosinophils - %	8.00	0	3.00	217		
LDL Cholesterol	133.00	80.00	99.99	215		
eAG	134.11	85.00	105.00	196		
Hemoglobin A1C	6.30	4.60	5.30	193		
Platelet : Lymphocyte (PLR)	283.09	0	128.00	171		
ALT	45.00	10.00	26.00	169		
Total WBCs	8.50	3.80	6.00	164		
Neutrophils - %	70.00	50.00	60.00	150		
MCV	97.00	82.00	89.90	140		
RDW	14.00	11.00	12.60	138		
VLDL Cholesterol	28.00	0	15.00	137		
BUN	21.00	10.00	16.00	133		
Platelets	385.00	190.00	300.00	127		
Neutrophils - Absolute	5.95	1.90	4.20	126		
HOMA2-IR	1.62	0.75	1.25	124		
Triglyceride:HDL	2.72	0.50	1.90	109		
Bilirubin - Indirect	0.95	0.40	0.75	107		
Cholesterol : HDL	4.43	0	3.00	98		
Bilirubin - Total	1.05	0.50	0.90	88		
TIBC	385.00	250.00	350.00	85		
Calcium	9.70	8.90	9.50	83		
Albumin : Globulin	2.27	1.40	2.10	74		
Cholesterol - Total	208.00	160.00	199.00	73		

Biomarker	Lab result	Optimal range		% deviation	Optimal range	
		Low	High		Low	High
LDL : HDL - Female	2.83	0	2.34	71		
UIBC	330.00	130.00	300.00	68		
TSH	2.15	1.00	2.00	65		
AST	28.00	10.00	26.00	62		
Triglyceride-Glucose Index (TyG)	4.78	0	4.40	59		
Calcium : Phosphorus	3.23	2.30	3.20	53		
Chloride	106.00	100.00	106.00	50		
Anion Gap	12.00	7.00	12.00	50		
Albumin	5.00	4.50	5.00	50		
Calcium : Albumin	1.94	0	2.18	39		
Sodium : Potassium	34.00	30.00	35.00	30		
Protein - Total	7.80	6.90	8.10	25		
Monocytes - Absolute	0.34	0.20	0.40	20		
AST : ALT	0.62	0	1.00	12		
MCHC	35.00	34.00	36.00	0		
Phosphorus	3.00	2.60	3.50	-6		
Uric Acid - Female	3.50	3.00	4.70	-21		
T4 - Free	1.05	1.00	1.50	-40		
Potassium	4.00	4.00	5.00	-50		
Bilirubin - Direct	0.10	0.10	0.15	-50		
Monocytes - %	4.00	4.00	7.00	-50		
Basophils - %	0.00	0	1.00	-50		
Basophils - Absolute	0.00	0	0.10	-50		
Alk Phos	44.00	45.00	100.00	-52		
QUICKI	0.32	0.45	5.00	-53		
Free T3 : Free T4	2.38	2.40	2.70	-57		
Lymphocytes - Absolute	1.36	1.44	2.54	-57		
HOMA2-%B	86.90	90.00	110.00	-66		
Sodium	136.00	137.00	142.00	-70		
LDH	128.00	140.00	200.00	-70		
HOMA2-%S	61.60	85.00	200.00	-70		
HDL Cholesterol	47.00	55.00	93.00	-71		
Hematocrit - Female	34.50	37.00	44.00	-86		
Globulin - Total	2.20	2.40	2.80	-100		
% Transferrin saturation	18.00	24.00	35.00	-105		
CO2	22.00	25.00	30.00	-110		
Vitamin D (25-OH)	24.00	50.00	90.00	-115		
Iron - Serum	55.00	85.00	130.00	-117		
Magnesium - Serum	2.00	2.20	2.50	-117		
RBC - Female	3.95	4.30	4.80	-120		
Creatinine	0.56	0.80	1.10	-130		

Biomarker	Lab result	Optimal range		% deviation	Optimal range		
		Low	High		Low		High
eGFR	65.00	90.00	120.00	-133			
Ferritin	12.00	45.00	79.00	-147			
T3 - Free	2.50	3.00	3.50	-150			
Hemoglobin - Female	12.50	13.50	14.50	-150			
Magnesium - RBC	4.80	6.00	6.80	-200			
Lymphocytes - %	16.00	30.00	35.00	-330			



Blood Test History

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 right-hand side. This report allows you to compare results over time and see where improvement has been made and allows you to track progress.

Key

- Optimal
- Above / Below Optimal
- Above / Below Standard
- Alarm High / Alarm Low

Biomarker	Latest Test Result
	Lab Corp
	Jan 30 2024

BLOOD GLUCOSE




Glucose: Fasting	110.00 ↑ ↑
Hemoglobin A1C	6.30 ↑ ↑
eAG	134.11 ↑
Insulin: Fasting	12.00 ↑
HOMA2-%B	86.90 ↓
HOMA2-%S	61.60 ↓ ↓
HOMA2-IR	1.62 ↑
QUICKI	0.32 ↓ ↓
Triglyceride-Glucose Index (TyG)	4.78 ↑ ↑

RENAL



BUN	21.00 ↑
Creatinine	0.56 ↓ ↓
BUN : Creatinine	37.50 ⚠
eGFR	65.00 ↓

ELECTROLYTES




Sodium	136.00 ↓
Potassium	4.00

Biomarker	Latest Test Result
	Lab Corp
	Jan 30 2024
Chloride 	106.00
CO2 	22.00 ↓
Sodium : Potassium 	34.00







METABOLIC

Anion Gap 	12.00
Uric Acid - Female 	3.50








PROTEINS

Protein - Total 	7.80
Albumin 	5.00
Globulin - Total 	2.20 ↓
Albumin : Globulin 	2.27 ↑ ↑

MINERALS

Calcium 	9.70 ↑
Phosphorus 	3.00
Magnesium - Serum 	2.00 ↓
Magnesium - RBC 	4.80 ↓
Calcium : Albumin 	1.94
Calcium : Phosphorus 	3.23 ↑

LIVER AND GB

Alk Phos 	44.00 ↓ ↓
AST 	28.00 ↑
ALT 	45.00 ↑ ↑
LDH 	128.00 ↓
Bilirubin - Total 	1.05 ↑
Bilirubin - Direct 	0.10
Bilirubin - Indirect 	0.95 ↑ ↑

Biomarker	Latest Test Result
	Lab Corp
	Jan 30 2024
GGT	31.00 ↑
AST : ALT	0.62

IRON MARKERS

Iron - Serum	55.00 ↓
Ferritin	12.00 ↓ ↓
TIBC	385.00 ↑
UIBC	330.00 ↑
% Transferrin saturation	18.00 ↓

LIPIDS

Cholesterol - Total	208.00 ↑ ↑
Triglycerides	128.00 ↑
LDL Cholesterol	133.00 ↑ ↑
HDL Cholesterol	47.00 ↓
Non-HDL Cholesterol	161.00 ↑ ↑
VLDL Cholesterol	28.00 ↑
LDL : HDL - Female	2.83 ↑
Triglyceride:HDL	2.72 ↑ ↑
Cholesterol : HDL	4.43 ↑ ↑

THYROID

TSH	2.15 ↑
T4 - Free	1.05
T3 - Free	2.50 ↓
Free T3 : Free T4	2.38 ↓

INFLAMMATION

Hs CRP - Female	3.85 ↑ ↑
Platelet : Lymphocyte (PLR)	283.09 ↑ ↑

VITAMINS

Vitamin D (25-OH)	24.00 ↓ ↓
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CBC

RBC - Female	3.95 ↓
Hemoglobin - Female	12.50 ↓
Hematocrit - Female	34.50 ↓
MCV	97.00 ↑
MCHC	35.00
Platelets	385.00 ↑
RDW	14.00 ↑

WBCS

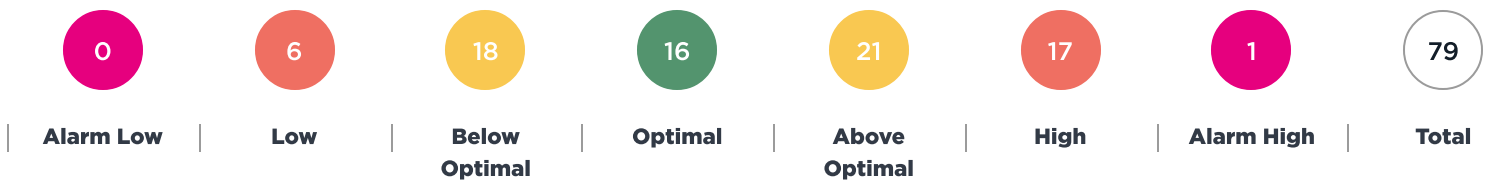
Total WBCs	8.50 ↑
Neutrophils - %	70.00 ↑
Lymphocytes - %	16.00 ↓
Monocytes - %	4.00
Eosinophils - %	8.00 ↑ ↑
Basophils - %	0.00
Neutrophils - Absolute	5.95 ↑
Lymphocytes - Absolute	1.36 ↓
Monocytes - Absolute	0.34
Eosinophils - Absolute	0.68 ↑ ↑
Basophils - Absolute	0.00
Neutrophil : Lymphocyte	4.38 ↑ ↑

Out of Optimal Range

The following report shows all of the biomarkers that are out of the optimal range and gives you some important information as to why each biomarker might be elevated or decreased.

Each biomarker in the Out of Optimal Range report hyperlinks back into the Blood Test Results report so you can see a more detailed view of the blood test result itself.

Total number of biomarkers by range



Above Optimal

Platelet : Lymphocyte (PLR)

283.09 Ratio

The Platelet-Lymphocyte Ratio, or PLR for short, is a way to look at your blood to get clues about inflammation and clotting in your body. If the PLR is higher than what's typical, it might mean there's more inflammation in your body. This can be linked to various health problems, including issues with the heart and circulation.

BUN : Creatinine

37.50 Ratio

The BUN/Creatinine is a ratio between the BUN and Creatinine levels. An increased level is associated with renal dysfunction.

Triglyceride-Glucose Index (TyG)

4.78 Index

The Triglyceride-Glucose (TyG) Index is a valuable prevention tool that can identify insulin resistance and its associated complications early on. It is based on fasting triglycerides and fasting glucose. An increased TyG Index reflects glucose dysregulation and metabolic dysfunction and is directly associated with an increased risk of cardiometabolic disorders, including diabetes, cardiovascular disease, and stroke.

Cholesterol - Total**208.00** mg/dL

Cholesterol is a steroid found in every cell of the body and in the plasma. It is an essential component in the structure of the cell membrane where it controls membrane fluidity. It provides the structural backbone for every steroid hormone in the body, which includes adrenal and sex hormones and vitamin D. The myelin sheaths of nerve fibers are derived from cholesterol and the bile salts that emulsify fats are composed of cholesterol. Cholesterol is made in the body by the liver and other organs and from dietary sources. The liver, the intestines, and the skin produce between 60-80% of the body's cholesterol. The remainder comes from the diet. Increased cholesterol is just one of many independent risk factors for cardiovascular disease. It is also associated with metabolic syndrome, hypothyroidism, biliary stasis, and fatty liver.

Bilirubin - Indirect**0.95** mg/dL

Bilirubin is formed from the breakdown of red blood cells. Indirect or unconjugated bilirubin is the protein (albumin) bound form of bilirubin that circulates in the blood on its way to the liver prior to being eliminated from the body in the bile. Elevated levels of indirect or unconjugated bilirubin are usually associated with increased red blood cell destruction.

Albumin : Globulin**2.27** ratio

The albumin/globulin ratio is the ratio between the albumin and total globulin levels. An increased Albumin/Globulin ratio is uncommon and is usually due to dehydration.

Triglyceride:HDL**2.72** ratio

The Triglyceride:HDL ratio is determined from serum triglyceride and HDL levels. Increased ratios are associated with increased cardiovascular risk and an increased risk of developing insulin resistance and Type II Diabetes.

Cholesterol : HDL**4.43** Ratio

The ratio of total cholesterol to HDL is a far better predictor of cardiovascular disease than cholesterol by itself. A lower ratio is ideal because you want to lower cholesterol (but not too low) and raise HDL. A level below 3.0 would be ideal. Every increase of 1.0, i.e. 3.0 to 4.0 increases the risk of heart attack by 60%.

ALT**45.00** IU/L

ALT is an enzyme present in high concentrations in the liver and to a lesser extent skeletal muscle, the heart, and kidney. ALT will be liberated into the bloodstream following cell damage or destruction. Any condition or situation that causes damage to the hepatocytes will cause leakage of ALT into the bloodstream. These include exposure to chemicals, viruses (viral hepatitis, mononucleosis, cytomegalovirus, Epstein Barr, etc.), alcoholic hepatitis. The most common non-infectious cause of an increased ALT is a condition called steatosis (fatty liver).

Hemoglobin A1C

6.30 %

The Hemoglobin A1C (HgbA1C) test measures the amount of glucose that combines with hemoglobin during the normal lifespan of a red blood cell, which is about 120 days. Elevated levels of HgbA1C are associated with elevated blood glucose in the past 120 days. Hemoglobin A1C is used primarily to monitor long-term blood glucose control and to help determine therapeutic options for treatment and management. Studies have shown that the closer to normal the hemoglobin A1C levels are kept, the less likely those patients are to develop the long-term complications of diabetes.

Non-HDL Cholesterol

161.00 mg/dl

Non-HDL cholesterol represents the circulating cholesterol not carried by HDL (the protective carrier that collects cholesterol from tissues and blood vessels and transports it back to the liver). Elevated Non-HDL Cholesterol is associated with an increased risk of cardiovascular disease and related events.

Hs CRP - Female

3.85 mg/L

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.

LDL Cholesterol

133.00 mg/dL

LDL functions to transport cholesterol and other fatty acids from the liver to the peripheral tissues for uptake and metabolism by the cells. It is known as “bad cholesterol” because it is thought that this process of bringing cholesterol from the liver to the peripheral tissue increases the risk for atherosclerosis. An increased LDL cholesterol is just one of many independent risk factors for cardiovascular disease. It is also associated with metabolic syndrome, oxidative stress, and fatty liver.

Glucose: Fasting

110.00 mg/dL

Blood glucose levels are regulated by several important hormones including insulin and glucagon. Glucose is also directly formed in the body from carbohydrate digestion and from the conversion in the liver of other sugars, such as fructose, and fat into glucose. Increased blood glucose is associated with type 1 & 2 diabetes, metabolic syndrome, and insulin resistance.

Neutrophil : Lymphocyte

4.38 Ratio

The neutrophil-lymphocyte ratio (NLR) reflects important components of the cell-mediated inflammatory response, i.e. neutrophils and lymphocytes. Elevated levels are seen in bacterial infections and are considered a marker of systemic inflammation and metabolic dysfunction such as metabolic syndrome and thyroid dysfunction.

Eosinophils - %

8.00 %

Eosinophils are a type of White Blood Cell, which are often increased in people that are suffering from intestinal parasites or food or environmental sensitivities/allergies.

Eosinophils - Absolute

0.68 k/cumm

Eosinophils are a type of White Blood Cell, which are often increased in patients that are suffering from intestinal parasites or food or environmental sensitivities/allergies.

Calcium : Phosphorus

3.23 ratio

The Calcium:Phosphorus ratio is determined from the serum calcium and serum phosphorus levels. This ratio is maintained by the parathyroid glands and is also affected by various foods. A high ratio is often caused by high serum calcium and low serum phosphorus, so investigating the reasons for this is important. A diet high in refined carbohydrates can decrease serum phosphorus thus increasing the Calcium:Phosphorus ratio.

AST**28.00** IU/L

AST is an enzyme present in highly metabolic tissues such as skeletal muscle, the liver, the heart, kidney, and lungs. This enzyme is at times released into the bloodstream following cell damage or destruction. AST levels will be increased when liver cells and/or heart muscle cells and/or skeletal muscle cells are damaged. The cause of the damage must be investigated.

LDL : HDL - Female**2.83** Ratio

The calculation of the LDL Cholesterol to HDL Cholesterol ratio provides a better assessment of cardiovascular risk than measuring either biomarker alone. Increased ratios are associated with increased cardiovascular risk.

Bilirubin - Total**1.05** mg/dL

The total bilirubin is composed of two forms of bilirubin: Indirect or unconjugated bilirubin, which circulates in the blood on its way to the liver and direct or conjugated bilirubin, which is the form of bilirubin made water-soluble before it is excreted in the bile. An increase in total bilirubin is associated with dysfunction or blockage in the liver, gallbladder, or biliary tree, or red blood cell hemolysis.

TSH**2.15** μ U/mL

TSH or thyroid-stimulating hormone is a hormone produced by the anterior pituitary to control the thyroid gland's production of the thyroid hormone thyroxine (T4). TSH levels can be confusing because TSH levels increase when there is too little thyroid hormone in circulation. An elevated TSH is a sign that the body needs more thyroid hormone. Elevated levels of TSH are associated with primary hypothyroidism.

Calcium**9.70** mg/dL

Serum calcium levels, which are tightly regulated within a narrow range, are principally regulated by parathyroid hormone (PTH) and vitamin D. Elevated calcium is associated with parathyroid hyperfunction. If significantly elevated (>10.6 mg/dl or 2.65 mmol/L) check serum PTH levels and refer to an endocrinologist.

HOMA2-IR**1.62** Index

The HOMA2 (Homeostasis Model Assessment) calculator is a tool used to express the degree of insulin sensitivity and insulin resistance. HOMA2-IR helps estimate the degree of cellular resistance to the hormone insulin. A HOMA2-IR score of 1 is considered optimal. Levels above 1 show an increasing trend towards metabolic syndrome, insulin resistance and type 2 diabetes.

UIBC**330.00** μ g/dL

UIBC measures the unsaturated binding capacity of transferrin, the protein that carries iron in the body i.e. UIBC measures levels of transferrin that have not bound to iron. Increased levels of UIBC are associated with a trend towards iron deficiency.

TIBC**385.00** μ g/dL

Total Iron Binding Capacity is an approximate estimation of the serum transferrin level. Transferrin is the protein that carries most of the iron in the blood. Elevated levels of TIBC are associated with iron deficiency anemia.

Neutrophils - Absolute**5.95** k/cumm

Neutrophils are the white blood cells used by the body to combat bacterial infections and are the most numerous and important white cell in the body's reaction to inflammation. *Neutrophils - Absolute* is an actual count of the number of neutrophils in a known volume of blood. Levels will be raised in bacterial infections.

Platelets**385.00** 10E3/ μ L

Platelets or thrombocytes are the smallest of the formed elements in the blood. Platelets are necessary for blood clotting, vascular integrity, and vasoconstriction. They form a platelet plug, which plugs up breaks in small vessels. Increased platelets may be seen with atherosclerosis.

RDW**14.00** %

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.

Total WBCs**8.50** k/cumm

The total White Blood Cell (WBC) count measures the sum of all the WBCs in the peripheral blood. Increased total White Blood Cell Levels are associated with acute bacterial or viral infections and may be seen in people who eat a diet of highly refined foods.

BUN**21.00** mg/dL

BUN or Blood Urea Nitrogen reflects the ratio between the production and clearance of urea in the body. Urea is formed almost entirely by the liver from both protein metabolism and protein digestion. The amount of urea excreted as BUN varies with the amount of dietary protein intake. Increased BUN may be due to increased production of urea by the liver or decreased excretion by the kidney. BUN is a test used predominantly to measure kidney function, where it will be increased. An increased BUN is also associated with dehydration and hypochlorhydria.

MCV**97.00** fL

The MCV is a measurement of the volume in cubic microns of an average single red blood cell. MCV indicates whether the red blood cell size appears normal (normocytic), small (microcytic), or large (macrocytic). An increase or decrease in MCV can help determine the type of anemia present. An increased MCV is associated with B12, folate, or vitamin C deficiency.

eAG**134.11** mg/dl

Estimated Average Glucose or eAG represents average daily glucose levels over a 2-3 month period. The eAG is calculated using the Hemoglobin A1C, a measurement of the amount of hemoglobin that is bound to glucose due to elevated blood sugar. Elevated levels of eAG are associated with a hemoglobin A1C above the ODX optimal of 5.5% and point to a trend towards pre-diabetes, metabolic syndrome, insulin resistance, and diabetes.

VLDL Cholesterol**28.00** mg/dl

VLDL is a lipoprotein formed in the liver to transport endogenous triglycerides, phospholipids, protein, and cholesterol. It serves, from a functional perspective, as an internal lipid transport molecule, moving triglyceride and other lipids from one area of the body to another.

Neutrophils - %**70.00** %

Neutrophils are the white blood cells used by the body to combat bacterial infections and are the most numerous and important white cell in the body's reaction to inflammation. Neutrophils - % tells us the % distribution of neutrophils in the total white blood cell count. Levels will be increased in bacterial infections.

GGT**31.00** IU/L

Gamma Glutamyl Transferase (GGT) is an enzyme that is present in highest amounts in the liver cells and to a lesser extent the kidney, prostate, and pancreas. It is also found in the epithelial cells of the biliary tract. GGT will be liberated into the bloodstream following cell damage or destruction and/or biliary obstruction. GGT is induced by alcohol and can be elevated following chronic alcohol consumption and in alcoholism.

Insulin: Fasting **12.00** $\mu\text{U/ml}$

Insulin is the hormone released by the pancreas in response to rising blood glucose levels and decreases blood glucose by transporting glucose into the cells. Often people lose their ability to utilize insulin to effectively drive blood glucose into energy-producing cells. This is commonly known as “insulin resistance” and is associated with increasing levels of insulin in the blood. Excess insulin is associated with greater risks of heart attack, stroke, metabolic syndrome, and diabetes.

Triglycerides **128.00** mg/dL

Serum triglycerides are composed of fatty acid molecules that enter the bloodstream either from the liver or from the diet. Levels will be elevated in metabolic syndrome, fatty liver, in people with an increased risk of cardiovascular disease, hypothyroidism, and adrenal dysfunction

Below Optimal

Alk Phos

44.00 IU/L

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.

Vitamin D (25-OH)

24.00 ng/ml

This vitamin D test measures for levels of 25-OH vitamin D and is a very good way to assess vitamin D status. Decreased vitamin D levels are a sign of Vitamin D deficiency.

Free T3 : Free T4

2.38 Ratio

The Free T3: Free T4 ratio is a measure that assesses the balance between two important thyroid hormones in your blood: Free T3 (triiodothyronine) and Free T4 (thyroxine). These hormones play vital roles in regulating energy, metabolism, and many other bodily functions. A normal ratio indicates a balanced conversion of T4 (a storage hormone) to T3 (the active hormone). If the ratio is low, it suggests that the body may not be converting T4 to T3 efficiently, which can lead to symptoms of low thyroid function, even if individual T4 levels are normal.

QUICKI

0.32 Index

QUICKI is a simple calculation that uses fasting glucose and fasting insulin to assess insulin sensitivity. Decreased QUICKI results are associated with a trend towards increasing insulin resistance, cardiovascular risk, metabolic syndrome, and fatty liver.

Creatinine

0.56 mg/dL

Creatinine is produced primarily from the contraction of muscle and is removed by the kidneys. Decreased levels are associated with muscle loss.

Lymphocytes - Absolute

1.36 k/cumm

Lymphocytes are a type of white blood cell. Decreased levels are often seen in a chronic viral infection when the body can use up a large number of lymphocytes and oxidative stress. A decreased *Lymphocytes - Absolute* count may also indicate the presence of a fatigued immune response, especially with a low Total WBC count.

HOMA2-%S

61.60 %

The HOMA2 (Homeostasis Model Assessment) calculator is a tool used to express the degree of insulin sensitivity and insulin resistance. HOMA2-%S helps estimate the degree of cellular sensitivity to the hormone insulin. A decreasing HOMA2-%S score is an indication of a decrease in insulin sensitivity at the cellular level. This is a sign of a trend towards insulin resistance, pre-diabetes, and eventually type 2 diabetes.

Ferritin

12.00 ng/mL

Ferritin is the main storage form of iron in the body. Decreased levels are strongly associated with iron deficiency where it is the most sensitive test to detect iron deficiency.

HOMA2-%B

86.90 %

The HOMA2 (Homeostasis Model Assessment) calculator is a tool used to express the degree of insulin sensitivity and insulin resistance. HOMA2-%B helps estimate the beta-cell function of the pancreas. Beta-cells produce insulin. Decreased HOMA2-%B levels indicate a decreased output of insulin from the pancreas. This, along with a number of other factors, points to an increasing trend towards the progression of Type 2 Diabetes.

LDH**128.00** IU/L

LDH represents a group of enzymes that are involved in carbohydrate metabolism. Decreased levels of LDH often correspond to hypoglycemia (especially reactive hypoglycemia), pancreatic function, and glucose metabolism.

Hematocrit - Female**34.50** %

The hematocrit (HCT) measures the percentage of the volume of red blood cells in a known volume of centrifuged blood. It is an integral part of the Complete Blood Count (CBC) or Hematology panel. Low levels of hematocrit are associated with anemia. The hematocrit should be evaluated with the other elements on a CBC/Hematology panel to determine the cause and type of anemia.

CO2**22.00** mEq/L

Carbon Dioxide is a measure of bicarbonate in the blood. CO₂, as bicarbonate, is available for acid-base balancing. Bicarbonate neutralizes metabolic acids in the body. Decreased levels are associated with metabolic acidosis.

Sodium**136.00** mEq/L

Sodium is an important blood electrolyte and functions to maintain osmotic pressure, acid-base balance, aids in nerve impulse transmission, as well as renal, cardiac, and adrenal functions. Decreased sodium levels are associated with adrenal insufficiency and edema.

Globulin - Total**2.20** g/dL

Globulins constitute the body's antibody system and Total globulin is a measurement of all the individual globulin fractions in the blood. Decreased levels are associated with inflammation in the digestive system and immune insufficiency.

Magnesium - Serum**2.00** mg/dl

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. A decreased magnesium is a common finding with muscle cramps.

HDL Cholesterol**47.00** mg/dL

HDL functions to transport cholesterol from the peripheral tissues and vessel walls to the liver for processing and metabolism into bile salts. It is known as "good cholesterol" because it is thought that this process of bringing cholesterol from the peripheral tissue to the liver is protective against atherosclerosis. Decreased HDL is considered atherogenic (tending towards the formation of fatty plaques in the artery).

% Transferrin saturation**18.00** %

The % transferrin saturation index is a calculated value that tells how much serum iron is bound to the iron-carrying protein transferrin. A % transferrin saturation value of 15% means that 15% of iron-binding sites of transferrin is being occupied by iron. It is a sensitive screening test for iron deficiency anemia if it is below the optimal range.

Iron - Serum**55.00** µg/dL

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. 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.

RBC - Female**3.95** m/cumm

The RBC Count determines the total number of red blood cells or erythrocytes found in a cubic millimeter of blood. The red blood cell functions to carry oxygen from the lungs to the body tissues and to transfer carbon dioxide from the tissues to the lungs where it is expelled. Decreased levels are primarily associated with anemia.

T3 - Free**2.50** pg/ml

T-3 is the most active thyroid hormone and is primarily produced from the conversion of thyroxine (T-4) in the peripheral tissue. Free T3 is the unbound form of T3 measured in the blood. Free T3 represents approximately 8 - 10% of circulating T3 in the blood. Free T-3 levels may be decreased with hypothyroidism and is associated with selenium deficiency.

eGFR**65.00** mL/min/1.73m²

The eGFR is a calculated estimate of the kidney's Glomerular Filtration Rate. It uses 4 variables: age, race, creatinine levels and gender to estimate kidney function. Levels below 90 are an indication of a mild loss of kidney function. Levels below 60 indicate a moderate loss of kidney function and may require a visit to a renal specialist for further evaluation.

Magnesium - RBC**4.80** mg/dl

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. A decreased RBC magnesium is a sign of magnesium deficiency and is a common finding with muscle cramps.

Hemoglobin - Female**12.50** g/dl

Hemoglobin is the oxygen-carrying molecule in red blood cells. Low levels of hemoglobin are associated with anemia. Measuring hemoglobin is useful to determine the cause and type of anemia and for evaluating the efficacy of anemia treatment.

Lymphocytes - %**16.00** %

Lymphocytes are a type of white blood cell. Decreased levels are often seen in a chronic viral infection when the body can use up a large number of lymphocytes and oxidative stress. A decreased *Lymphocytes - %* may also indicate the presence of a fatigued immune response, especially with a low Total WBC count.



An in-depth functional system and nutrient evaluation.

Assessment

- 35 Functional Body Systems
- 40 Accessory Systems
- 43 Nutrient Status
- 46 Nutrient Deficiencies
- 50 Clinical Dysfunctions

Functional Body Systems

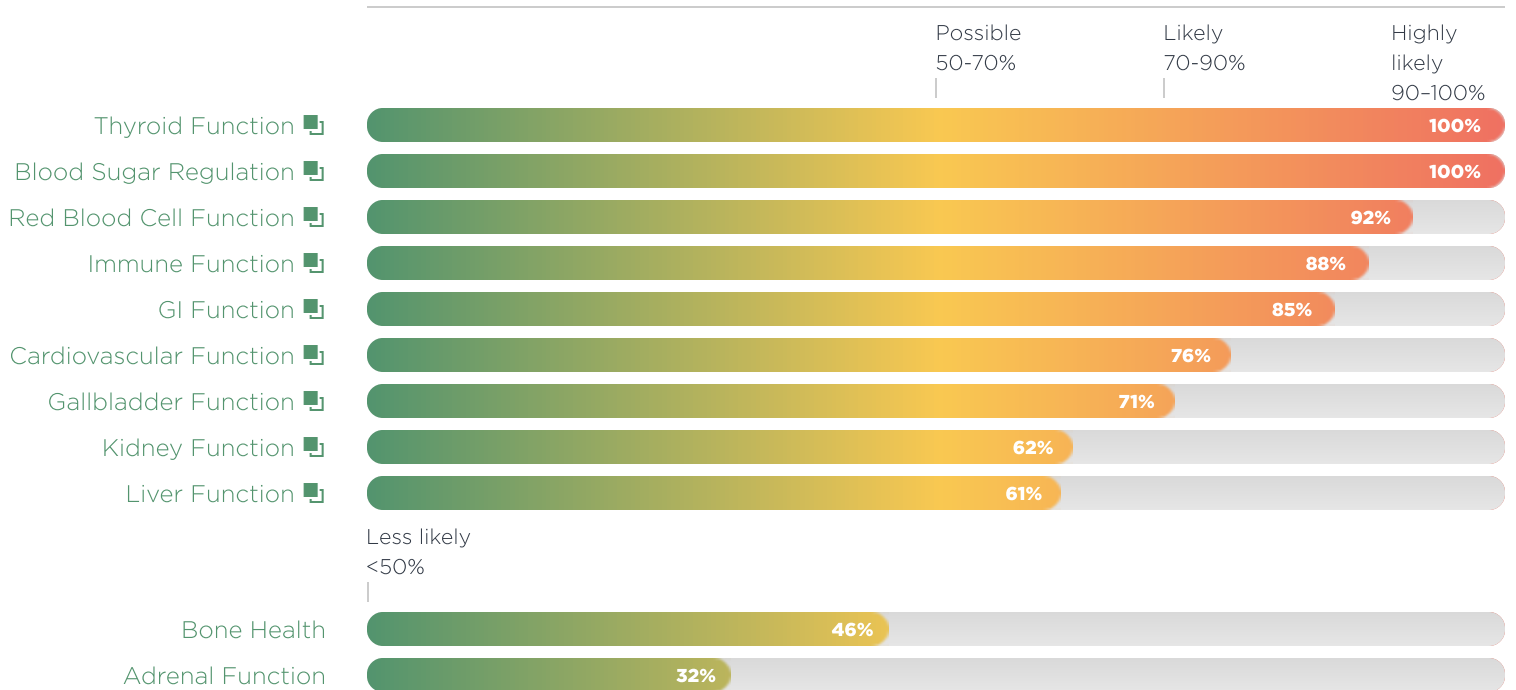
The Functional Body System results represent an algorithmic analysis of this blood test. These results have been converted into your client's individual Functional Body Systems Report based on our latest research.

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 Body Systems.

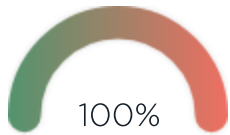
Each Body System that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.

PROBABILITY OF DYSFUNCTION



Functional Body Systems Details

This section contains detailed descriptions and explanations of the results presented in the Functional Body Systems Report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Highly Likely.
Much improvement
required.

THYROID FUNCTION

Your patient has a high Thyroid Function score, which indicates that there is likely a high risk of dysfunction in their thyroid. Further assessment is needed to pinpoint exactly what that dysfunction is. There is a strong likelihood that there's significant distress in the systems that help regulate the thyroid gland in the body. This may be caused by increased levels of stress, adrenal insufficiency, iodine and/or selenium deficiency, liver dysfunction, kidney insufficiency, a low-calorie diet, etc. Consider that the dysfunction might be a hyperactive thyroid (hyperthyroid) or a hypothyroid situation. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions": **Hyperactive Thyroid**, **Hypothyroidism - Primary** (a dysfunction in the thyroid itself), **Anterior Pituitary Dysfunction** (also known as Secondary Hypothyroidism), or **Thyroid Conversion Syndrome**, which could be causing the Thyroid Function score to be so high.

Rationale

TSH , T3 - Free 

Biomarkers considered

TSH, T4 - Free, T3 - Free

Biomarkers not available in this test - consider running in future tests:

T4 - Total, T3 - Total, Reverse T3, T3 Uptake, Free T3 : Reverse T3, Free Thyroxine Index (T7)












Dysfunction Highly Likely.
Much improvement
required.

BLOOD SUGAR REGULATION

Your patient has a high Blood Sugar Regulation score, which indicates that there is likely a high risk of dysfunction in their blood sugar regulation. Further assessment is required to find out what the dysfunction is. Blood sugar dysregulation is affected by genetics, diet, lifestyle, nutrition, and the environment. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions": **Hypoglycemia**, **Metabolic Syndrome**, and **Insulin Resistance**, which could be causing the Blood Sugar Regulation score to be so high. Long-standing Blood Sugar Dysregulation, if left unassessed or treated, may lead to hyperinsulinemia, and type 2 Diabetes.

Rationale

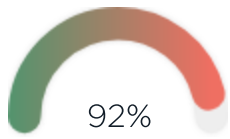
Glucose: Fasting , HOMA2-IR , LDH , Hemoglobin A1C , Insulin: Fasting , Cholesterol - Total , Triglycerides , LDL Cholesterol , HDL Cholesterol 

Biomarkers considered

Glucose: Fasting, HOMA2-IR, LDH, Hemoglobin A1C, Insulin: Fasting, Cholesterol - Total, Triglycerides, LDL Cholesterol, HDL Cholesterol

Biomarkers not available in this test - consider running in future tests:

DHEA-S - Female, Leptin - Female, C-Peptide, Fructosamine



92%

Dysfunction Highly Likely.
Much improvement
required.

RED BLOOD CELL FUNCTION

Your patient has a high RBC Function score, which indicates that there is likely a high risk of anemia. you'll need to examine the blood test further to identify the cause of the anemia. One of the main causes is nutrient deficiency. Please refer to the "Nutrient Deficiency" report to understand the probability of dysfunction in these nutrients: **Iron, B12/folate, Vitamin B6, Copper,** and **Vitamin C**, which could be causing the anemia and the RBC Function score to be so high. It would be best if you also ruled out other causes that are not nutritionally related.

Rationale

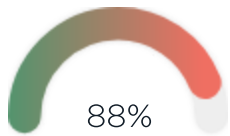
RBC - Female ↓, Hemoglobin - Female ↓, Hematocrit - Female ↓, MCV ↑, RDW ↑

Biomarkers considered

RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCV, MCHC, RDW

Biomarkers not available in this test - consider running in future tests:

MCH



88%

Dysfunction Likely
Improvement required.

IMMUNE FUNCTION

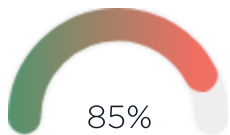
It is likely that your patient is trending towards dysfunction in their immune system. This could be emerging immune insufficiency, bacterial or viral Infections. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions".

Rationale

Total WBCs ↑, Globulin - Total ↓, Neutrophils - % ↑, Lymphocytes - % ↓, Lymphocytes - Absolute ↓, Neutrophils - Absolute ↑, Alk Phos ↓

Biomarkers considered

Total WBCs, Globulin - Total, Neutrophils - %, Lymphocytes - %, Monocytes - %, Monocytes - Absolute, Lymphocytes - Absolute, Neutrophils - Absolute, Albumin, Alk Phos, Ferritin



85%

Dysfunction Likely
Improvement required.

GI FUNCTION

It is likely that your patient is trending towards dysfunction in their GI system. This could be emerging hypochlorhydria, inflammation of the gastric mucosa, H. pylori, pancreatic insufficiency, dysbiosis, or intestinal hyperpermeability. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions".

Rationale

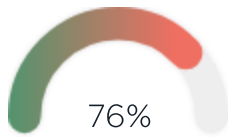
BUN ↑, Globulin - Total ↓, Alk Phos ↓, MCV ↑, Eosinophils - % ↑, Iron - Serum ↓, Creatinine ↓

Biomarkers considered

BUN, Protein - Total, Globulin - Total, Albumin, Phosphorus, Alk Phos, MCV, Eosinophils - %, Basophils - %, Iron - Serum, Creatinine, Chloride, Calcium, Total WBCs

Biomarkers not available in this test - consider running in future tests:

Gastrin












76%

Dysfunction Likely Improvement required.

CARDIOVASCULAR FUNCTION

It is likely that your patient is heading towards an increased risk of cardiovascular disease. This could be the emerging endothelial dysfunction, atherosclerosis, or inflammation. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions".

Rationale

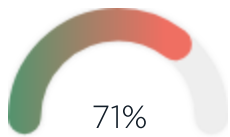
Triglyceride:HDL , Glucose: Fasting , Cholesterol - Total , Triglycerides , LDL Cholesterol , HDL Cholesterol , Hs CRP - Female , Hemoglobin A1C , Insulin: Fasting , Vitamin D (25-OH) 

Biomarkers considered

Triglyceride:HDL, Glucose: Fasting, LDH, Cholesterol - Total, Triglycerides, LDL Cholesterol, HDL Cholesterol, Ferritin, Hs CRP - Female, Hemoglobin A1C, Insulin: Fasting, Vitamin D (25-OH)

Biomarkers not available in this test - consider running in future tests:

Lipoprotein (a), Fibrinogen, Homocysteine, Testosterone Free - Female



71%

Dysfunction Likely Improvement required.

GALLBLADDER FUNCTION

It is likely that your patient is trending towards dysfunction in their hepato-biliary system. This could be emerging biliary insufficiency or biliary stasis. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions". Catching these conditions early can help prevent gallstones and biliary obstruction, which can cause cholestasis, a condition of impaired bile flow.

Rationale

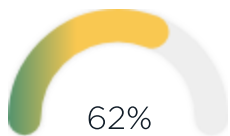
GGT , Cholesterol - Total , ALT , Bilirubin - Total 

Biomarkers considered

GGT, AST : ALT, Alk Phos, Cholesterol - Total, ALT, LDH, Bilirubin - Total, Bilirubin - Direct, Triglycerides

Biomarkers not available in this test - consider running in future tests:

Gastrin



62%

Dysfunction Possible There may be improvement needed in certain areas.

KIDNEY FUNCTION

It is possible that your patient is in the early stages of a decrease in kidney function, which is causing an increase in their Kidney Function score. While this may not require immediate attention, you may want to keep an eye on this on future blood tests.

Rationale

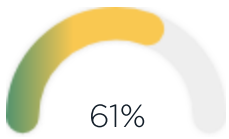
BUN , BUN : Creatinine , eGFR , AST 

Biomarkers considered

BUN, Creatinine, BUN : Creatinine, Phosphorus, eGFR, Uric Acid - Female, AST, LDH, Magnesium - Serum

Biomarkers not available in this test - consider running in future tests:

eGFR African American



61%

Dysfunction Possible
There may be
improvement needed in
certain areas.

LIVER FUNCTION

It is possible that your patient is in the early stages of liver dysfunction, which is causing an increase in their Liver Function score. While this may not require immediate attention, you may want to keep an eye on this on future blood tests.

Rationale

ALT ↑, AST ↑, Bilirubin - Total ↑, Cholesterol - Total ↑, GGT ↑

Biomarkers considered

ALT, BUN, Albumin, Globulin - Total, Albumin : Globulin, Alk Phos, AST, LDH, Bilirubin - Total, Cholesterol - Total, Iron - Serum, Ferritin, Bilirubin - Direct, GGT, Protein - Total, AST : ALT

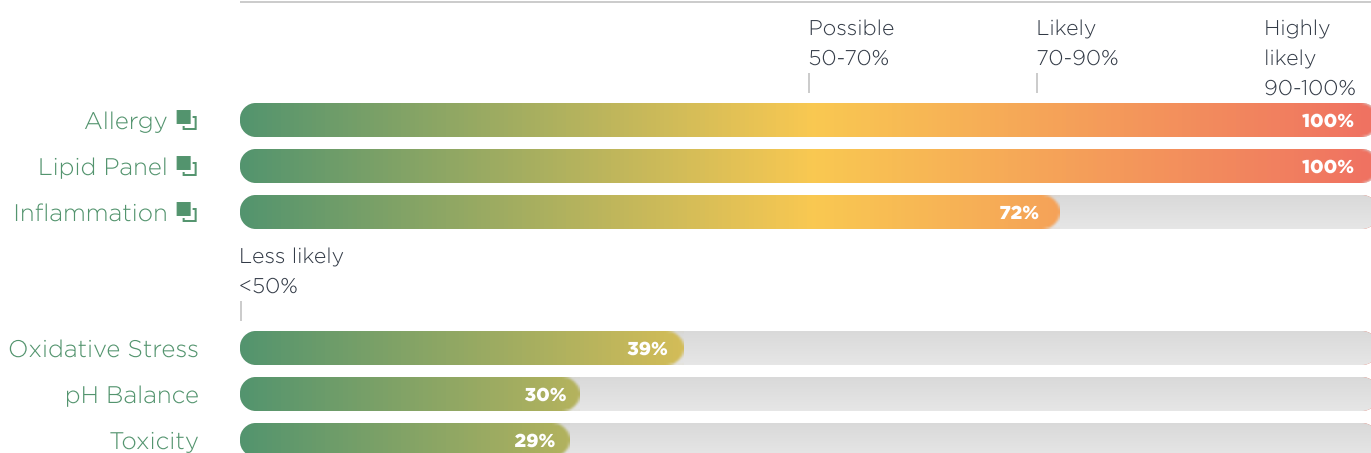
Accessory Systems

The Accessory Systems are additional physiological systems that are not related to individual organs or body systems.

The Accessory Systems Report represents an algorithmic analysis of this blood test. These results have been converted into an individualized risk evaluation based on the latest research.

Each Accessory System that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.

PROBABILITY OF DYSFUNCTION



Accessory Systems Details

This section contains detailed descriptions and explanations of the results presented in the Accessory Systems report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Highly Likely.
Much improvement
required.

ALLERGY

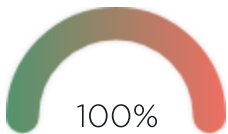
Your patient has a high Allergy score, which may indicate the need for further assessment or evaluation through allergy elimination/challenge, more sophisticated allergy testing, and/or GI function assessment. The Allergy score reflects the degree of food or environmental sensitivities/allergies your patient may be dealing with. Biomarkers such as eosinophils and basophils may increase in association with food allergies and/or sensitivities.

Rationale

Eosinophils - % , Eosinophils - Absolute 

Biomarkers considered

Eosinophils - %, Eosinophils - Absolute, Basophils - %, Basophils - Absolute









Dysfunction Highly Likely.
Much improvement
required.

LIPID PANEL

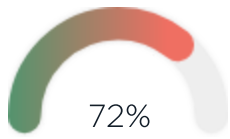
Your patient has a high Lipid Panel score. This indicates that there is likely a high risk of hyperlipidemia, which, along with other biomarkers, has been shown to indicate a potential risk of developing cardiovascular disease (CVD). Although hyperlipidemia is a cause, it's important to look at many other risks for CVD including smoking, blood sugar dysregulation, hypertension, elevated homocysteine, and other diet and lifestyle considerations, which could be causing the Lipid Panel score to be so high.

Rationale

Cholesterol - Total , Triglycerides , LDL Cholesterol , Cholesterol : HDL , Triglyceride:HDL , HDL Cholesterol 

Biomarkers considered

Cholesterol - Total, Triglycerides, LDL Cholesterol, Cholesterol : HDL, Triglyceride:HDL, HDL Cholesterol









72%

Dysfunction Likely.
Improvement required.

INFLAMMATION

Your patient has an increased Inflammation Score. They are likely trending towards an increase in inflammation in their body. The levels of various biomarkers in the blood shift in the presence of dysfunctions and diseases associated with inflammation. Reviewing the biomarkers in the Inflammation section of the "Blood Test Results" Report may give you an idea of what is causing the increased Inflammation Score.

Rationale

Hs CRP - Female , RDW ,
Neutrophil : Lymphocyte ,
ALT , Platelet : Lymphocyte
(PLR) , Vitamin D (25-OH)


Biomarkers considered

Hs CRP - Female, Uric Acid - Female, LDH, RDW, Neutrophil : Lymphocyte, Cholesterol - Total, Triglycerides, HDL Cholesterol, Iron - Serum, Ferritin, Lymphocytes - %, Basophils - %, Albumin, ALT, Platelet : Lymphocyte (PLR), Vitamin D (25-OH)

Biomarkers not available in this test - consider running in future tests:

Fibrinogen, Homocysteine, Myeloperoxidase (MPO), Omega 3 Index, ESR - Female, Creatine Kinase, C-Reactive Protein

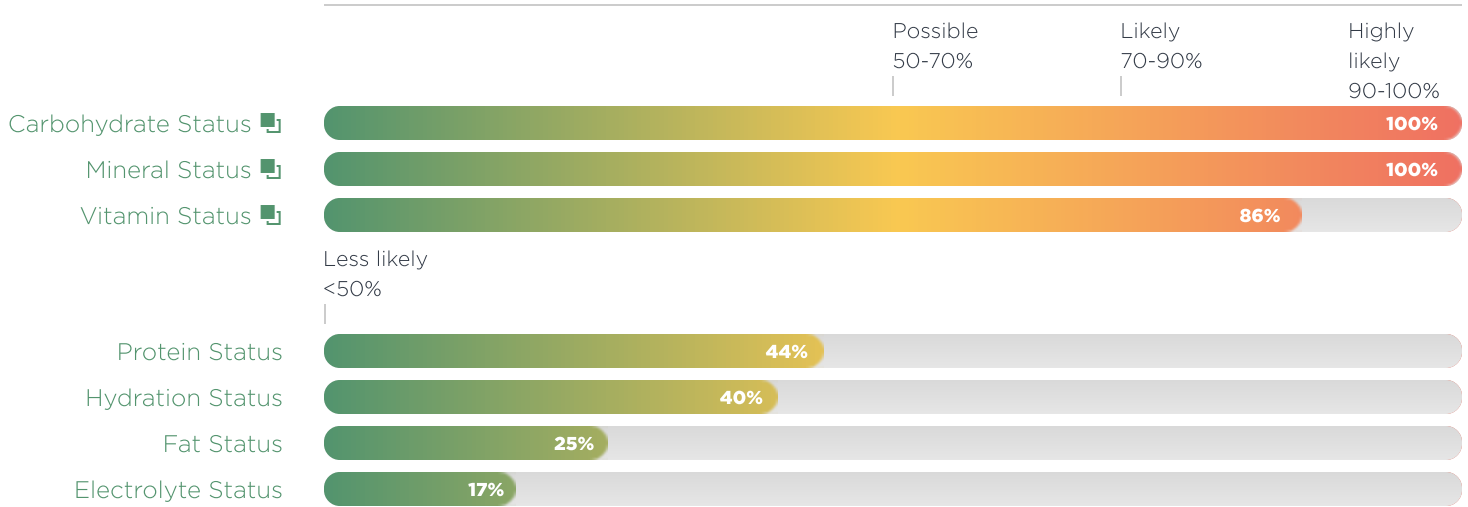
Nutrient Status

The Nutrient Status results represent an algorithmic analysis of this blood test. These results have been converted into your patient's individual Nutrient Status Report based on our latest research.

This report gives you an indication of your patient's general nutritional status. The Nutrient Status is influenced by actual dietary intake, digestion, absorption, assimilation, and cellular uptake of the nutrients themselves.

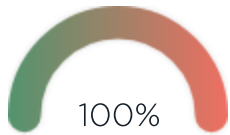
Each Nutrient category that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.

PROBABILITY OF DYSFUNCTION



Nutrient Status Details

This section contains detailed descriptions and explanations of the results presented in the Nutrient Status report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.





Dysfunction Highly Likely.
Much improvement
required.

CARBOHYDRATE STATUS

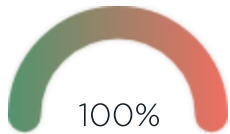
Your patient has a high Carbohydrate Status score, which may indicate that your patient is having a hard time handling their dietary intake of carbohydrates, especially refined carbohydrates, and sugars. A diet high in refined carbohydrates and sugars will deplete phosphorus stores and other important co-factors for carbohydrate metabolism. It may also increase serum glucose and serum triglyceride levels. Follow up a high Carbohydrate Status score with a thorough assessment of blood sugar regulation and investigate this patient's dietary consumption of sugars and refined carbohydrates.

Rationale

Glucose: Fasting , LDH ,
Cholesterol - Total ,
Triglycerides , LDL
Cholesterol , HDL Cholesterol


Biomarkers considered

Glucose: Fasting, Phosphorus,
LDH, Cholesterol - Total,
Triglycerides, LDL Cholesterol,
HDL Cholesterol, Total WBCs








Dysfunction Highly Likely.
Much improvement
required.

MINERAL STATUS

Your patient has a high Mineral Status score, which indicates that there is likely a high risk of deficiency or need in one or more of the minerals reflected in this score. This would include calcium, zinc, copper, potassium, molybdenum, selenium, magnesium, iodine, and iron. Please use the information in the Nutrient Deficiencies report to identify which mineral or minerals may be causing the Mineral Status score to be so high.

Rationale

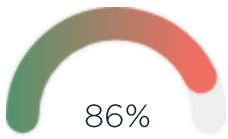
Magnesium - Serum ,
Magnesium - RBC , Alk Phos
, Iron - Serum , Ferritin 

Biomarkers considered

Magnesium - Serum, Magnesium
- RBC, Potassium, Uric Acid -
Female, Calcium, Phosphorus,
Alk Phos, Iron - Serum, Ferritin

Biomarkers not available in this test - consider running in future tests:

Copper - Serum, Zinc - Serum,
Selenium - Serum, Zinc - RBC,
Selenium - RBC, Chromium,
Copper - RBC



86%

Dysfunction Likely.
Improvement required.

VITAMIN STATUS

Your patient is likely trending towards a vitamin deficiency or need, causing an increase in their Vitamin Status score. This could be caused by emerging vitamin deficiencies or needs such as vitamin B12, vitamin B6, folate, thiamin, vitamin D, and vitamin C. Please refer to the "Nutrient Deficiency" report to get a sense of the probability of deficiency in these vitamins.

Rationale

Vitamin D (25-OH) ↓, MCV ↑

Biomarkers considered

Anion Gap, Albumin, AST, ALT, GGT, Vitamin D (25-OH), MCV

Biomarkers not available in this test - consider running in future tests:

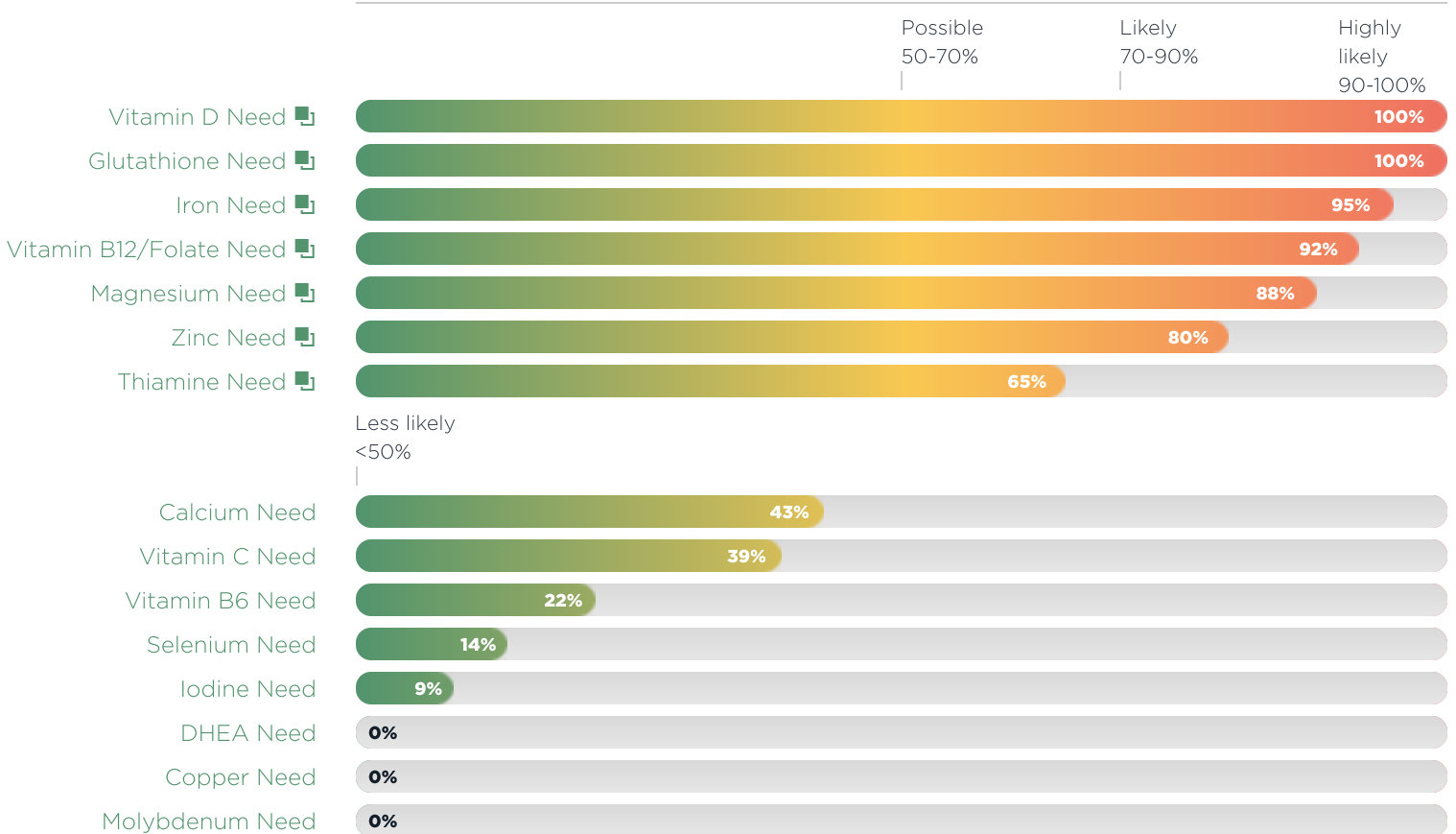
Homocysteine, Methylmalonic Acid, Folate - RBC, Folate - Serum, Vitamin B12

Individual Nutrient Deficiencies

The scores represent the degree of deficiency for individual nutrients based on your patient's blood results. The status of an individual nutrient is based on a number of factors such as actual dietary intake, digestion, absorption, assimilation and cellular uptake of the nutrients themselves. All of these factors must be taken into consideration before determining whether or not your patient actually needs an individual nutrient.

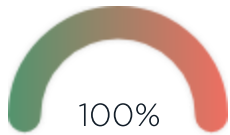
Each individual Nutrient Deficiency that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.

PROBABILITY OF DEFICIENCY



Individual Nutrient Deficiency Details

This section contains detailed descriptions and explanations of the results presented in the Nutrient Deficiencies report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



100%

Deficiency Highly Likely.
Much improvement
required.

VITAMIN D NEED

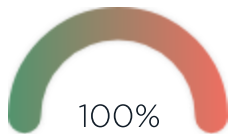
The results of this blood test indicate that this patient's Vitamin D levels might be lower than optimal.

Rationale

Vitamin D (25-OH) ↓

Biomarkers considered

Vitamin D (25-OH)



100%

Deficiency Highly Likely.
Much improvement
required.

GLUTATHIONE NEED

Suspect a glutathione need if the GGT is elevated. An elevated GGT is most commonly associated with alcohol consumption or gallbladder issues but suspect a glutathione need if GGT is elevated and there is no evidence of gallbladder dysfunction.

Rationale

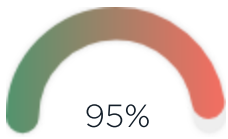
GGT ↑

Biomarkers considered

GGT

Biomarkers not available in this test - consider running in future tests:

Glutathione - Total



95%

Deficiency Highly Likely.
Much improvement
required.

IRON NEED

Consider an iron need if there is a decreased serum iron with a decreased MCH, MCV, and MCHC, ferritin, % transferrin saturation and/or HGB and/or HCT, and an increased RDW and an increased TIBC.

Rationale

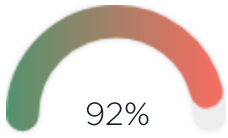
Iron - Serum ↓, Ferritin ↓, RBC - Female ↓, Hemoglobin - Female ↓, Hematocrit - Female ↓, % Transferrin saturation ↓, TIBC ↑, RDW ↑

Biomarkers considered

Iron - Serum, Ferritin, RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCV, MCHC, % Transferrin saturation, TIBC, RDW

Biomarkers not available in this test - consider running in future tests:

MCH



92%

Deficiency Highly Likely.
Much improvement
required.

VITAMIN B12/FOLATE NEED

Consider a Vitamin B12 and folate need if the MCV is increased along with an increased MCH and an increased Methylmalonic Acid (MMA). If there is also an increased RDW, MCHC, and LDH (especially the LDH-1 isoenzyme fraction), and a decreased Uric Acid the probability of vitamin B-12/folate deficiency anemia is very high. Serum Vitamin B12 and serum Folate may also be decreased.

Rationale

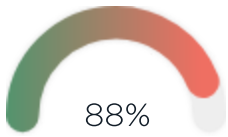
MCV ↑, RBC - Female ↓, Hemoglobin - Female ↓, Hematocrit - Female ↓, RDW ↑

Biomarkers considered

MCV, LDH, RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCHC, RDW, Neutrophils - %

Biomarkers not available in this test - consider running in future tests:

Vitamin B12, Methylmalonic Acid, Active B12, Homocysteine, MCH, Folate - Serum, Folate - RBC



88%

Deficiency Likely.
Improvement required.

MAGNESIUM NEED

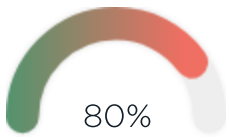
A magnesium need is associated with a decreased serum and/or RBC magnesium, and a decreased GGTP.

Rationale

Magnesium - Serum ↓, Magnesium - RBC ↓

Biomarkers considered

Magnesium - Serum, Magnesium - RBC, GGT



80%

Deficiency Likely.
Improvement required.

ZINC NEED

Consider a zinc need if the Serum Zinc levels are decreased along with a decreased Alk phos.

Rationale

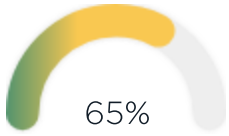
Alk Phos ↓

Biomarkers considered

Alk Phos

Biomarkers not available in this test - consider running in future tests:

Zinc - Serum, Zinc - RBC



65%

Deficiency Possible.
There may be improvement needed in certain areas.

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.

Rationale

CO₂ ↓, Glucose: Fasting ↑, LDH ↓, Hemoglobin - Female ↓, Hematocrit - Female ↓

Biomarkers considered

Anion Gap, CO₂, Glucose: Fasting, LDH, Hemoglobin - Female, Hematocrit - Female

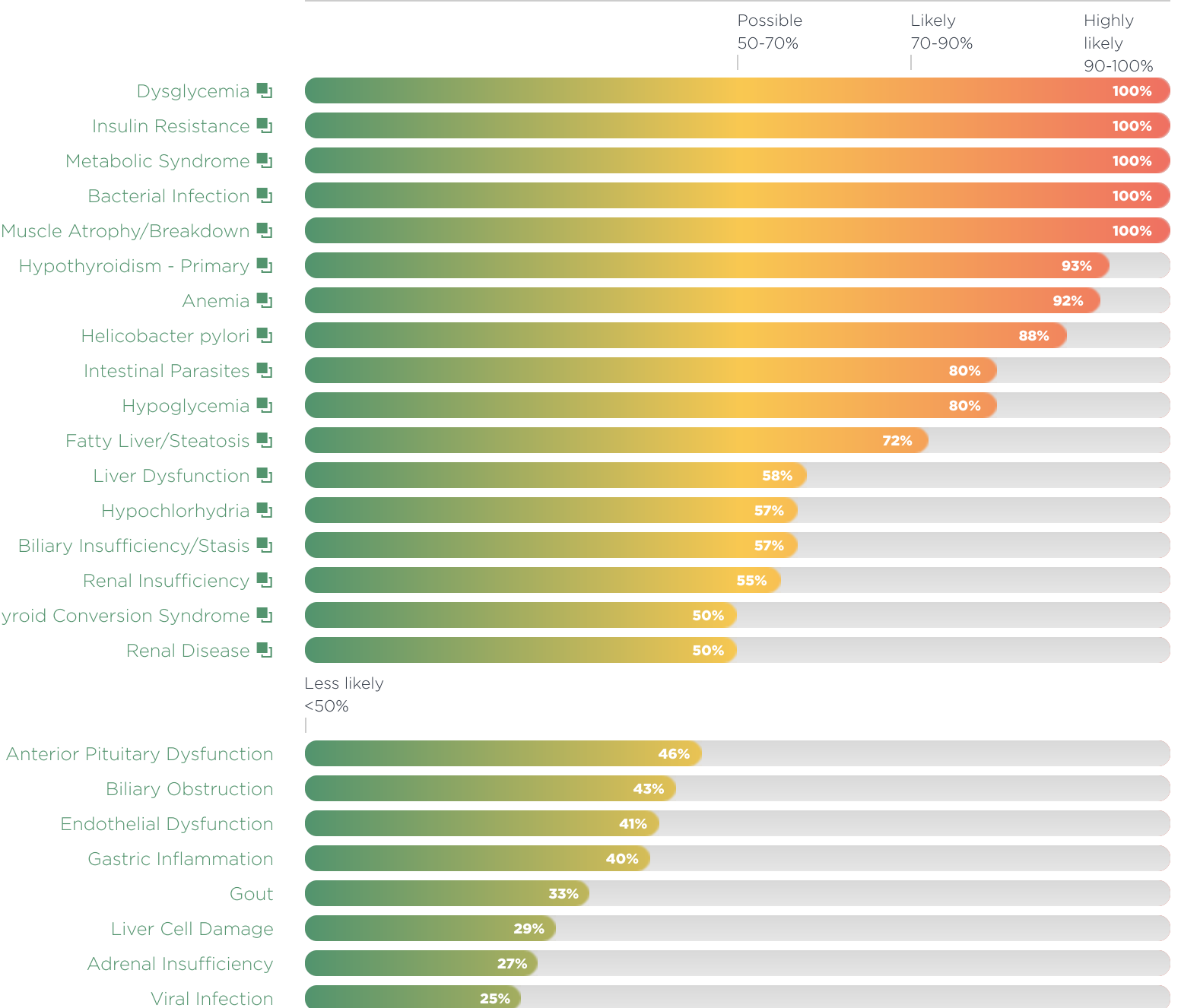
Clinical Dysfunctions

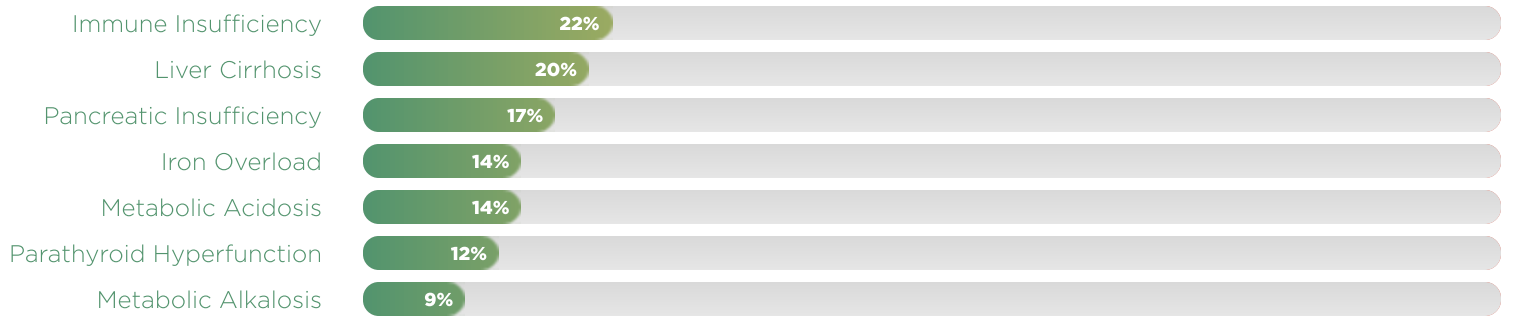
Advanced practitioner only report

The Clinical Dysfunctions Report shows a list of likely Health Concerns that your client may be suffering from based on an analysis of their Chemistry Screen and CBC results.

Each Clinical Dysfunction that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.

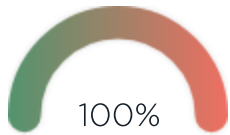
PROBABILITY OF DYSFUNCTION





Clinical Dysfunctions Details

This section contains detailed descriptions and explanations of the results presented in the Clinical Dysfunctions report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Highly Likely.
Much improvement
required.

DYSGLYCEMIA

Dysglycemia is an imbalance in the ability of the body to regulate blood glucose levels causing unhealthy blood glucose levels that can lead to Diabetes, Metabolic Syndrome, Obesity, Insulin Resistance and Hyperinsulinemia. Consider dysglycemia with an elevated blood glucose level and an elevated hemoglobin A1C level.

Rationale

Glucose: Fasting 
Hemoglobin A1C 

Biomarkers considered

Glucose: Fasting, Hemoglobin A1C

Biomarkers not available in this test - consider running in future tests:

Leptin - Female









Dysfunction Highly Likely.
Much improvement
required.

INSULIN RESISTANCE

Insulin resistance is the condition in which people lose sensitivity to the hormone insulin. As the cells become resistant to insulin, levels of insulin and blood glucose will rise. Consider insulin resistance with an increased fasting insulin and an increased fasting blood glucose, an increased Hemoglobin A1C, an increased triglyceride and an increased Triglyceride/HDL ratio. You may also see an increased total cholesterol, an increased C-Peptide, a decreased HDL and a decreased phosphorous.

Rationale

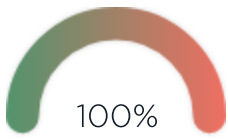
HOMA2-IR 
Triglycerides 
Triglyceride:HDL 
Hemoglobin A1C 
Glucose: Fasting 
Insulin: Fasting 
Cholesterol - Total 

Biomarkers considered

HOMA2-IR, Triglycerides, Triglyceride:HDL, Hemoglobin A1C, Glucose: Fasting, Insulin: Fasting, Cholesterol - Total

Biomarkers not available in this test - consider running in future tests:

C-Peptide, Leptin - Female



Dysfunction Highly Likely.
Much improvement
required.

METABOLIC SYNDROME

Consider metabolic syndrome with an increased triglyceride, an increased total cholesterol, an increased LDL cholesterol, a decreased HDL, an increased fasting blood glucose and an increased hemoglobin A1C. Additional elements that may be out of range with metabolic syndrome include an increased fasting insulin, an increased uric acid and decreased DHEA.

Rationale

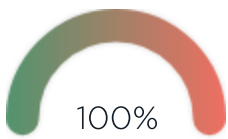
Glucose: Fasting ↑,
Triglycerides ↑, Hemoglobin
A1C ↑, Insulin: Fasting ↑,
Cholesterol - Total ↑, LDL
Cholesterol ↑, HDL Cholesterol
↓

Biomarkers considered

Glucose: Fasting, Triglycerides,
Hemoglobin A1C, Insulin:
Fasting, Uric Acid - Female,
Cholesterol - Total, LDL
Cholesterol, HDL Cholesterol

Biomarkers not available in this test - consider running in future tests:

DHEA-S - Female, Sex Hormone
Binding Globulin - Female,
Leptin - Female



Dysfunction Highly Likely.
Much improvement
required.

BACTERIAL INFECTION

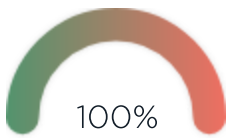
Consider a bacterial infection if there's an increased total WBC count along with an increased Neutrophil count, a normal or decreased Lymphocyte count. Increased Monocytes indicate the recovery period of the infection. Additional elements that may be out of range with a bacterial infection include an increased bands and an increased serum iron. Expect to see increased Band cells in the acute phase as the body is pumping out immature neutrophils to cope with the infection.

Rationale

Neutrophils - % ↑, Neutrophils
- Absolute ↑, Total WBCs ↑,
Lymphocytes - % ↓

Biomarkers considered

Neutrophils - %, Neutrophils -
Absolute, Total WBCs,
Monocytes - %, Iron - Serum,
Lymphocytes - %



Dysfunction Highly Likely.
Much improvement
required.

MUSCLE ATROPHY/BREAKDOWN

Consider muscle atrophy or muscle breakdown with a decreased serum creatinine along with an increased SGPT/ALT and SGOT/AST.

Rationale

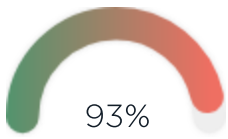
Creatinine ↓, AST ↑, ALT ↑

Biomarkers considered

Creatinine, AST, ALT

Biomarkers not available in this test - consider running in future tests:

Creatine Kinase



93%

Dysfunction Highly Likely.
Much improvement
required.

HYPOTHYROIDISM - PRIMARY

In primary hypothyroidism the problem is located in the thyroid gland itself, which fails to produce thyroid hormone. Consider primary hypothyroidism with an increased TSH, a decreased Total T4, a decreased Total T3, a decreased Free T4, a decreased Free T3 and a decreased T3-uptake. Additional elements that may be out of range with primary hypothyroidism include an increased total cholesterol and triglyceride level. Primary hypothyroidism is often preceded by autoimmune thyroid disease. If you have a patient with suspected thyroid disease you should screen for thyroid antibodies.

Rationale

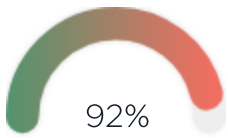
TSH ↑, Triglycerides ↑, T3 - Free ↓

Biomarkers considered

TSH, Cholesterol - Total, Triglycerides, T4 - Free, T3 - Free

Biomarkers not available in this test - consider running in future tests:

T4 - Total, T3 - Total, T3 Uptake, Free Thyroxine Index (T7)



92%

Dysfunction Highly Likely.
Much improvement
required.

ANEMIA

Anemia is a condition in which there is a decreased amount of hemoglobin, a decreased number of circulating RBCs, and a decrease in the hematocrit. Anemia is a symptom not a disease, and the cause of an anemia must be sought out. Some of the common causes of anemia include deficiencies of iron and certain vitamins (B12, folate, B6, copper), blood loss and increased destruction of red blood cells. If anemia shows high on this report, the underlying cause must be ruled out and treated.

Rationale

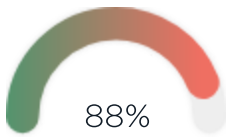
RBC - Female ↓, Hemoglobin - Female ↓, Hematocrit - Female ↓, MCV ↑, RDW ↑

Biomarkers considered

RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCV, MCHC, RDW

Biomarkers not available in this test - consider running in future tests:

MCH



88%

Dysfunction Likely.
Improvement required.

HELICOBACTER PYLORI

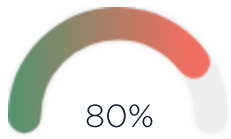
Helicobacter pylori infection is strongly associated with hypochlorhydria. Although there are no tests specifically for H. pylori on a blood chemistry screen you should suspect it if you see the the following pattern: an increased or decreased total globulin, an increased or decreased total protein, an increased or decreased BUN, a decreased serum phosphorous, an Increased WBC count, an increased neutrophil count, a decreased lymphocyte count, and a normal or increased monocyte count. If you see a high score for H. pylori consider doing further testing.

Rationale

BUN ↑, Globulin - Total ↓, Total WBCs ↑, Neutrophils - % ↑, Lymphocytes - % ↓

Biomarkers considered

BUN, Protein - Total, Globulin - Total, Phosphorus, Total WBCs, Neutrophils - %, Lymphocytes - %, Monocytes - %



80%

Dysfunction Likely.
Improvement required.

INTESTINAL PARASITES

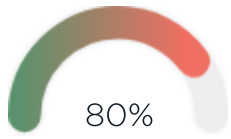
Consider intestinal parasites with increased eosinophils, increased basophils, and increased monocytes. Intestinal parasites are probable and should be ruled out. Additional biomarkers that may be out of range with intestinal parasites include a decreased hemoglobin, a decreased hematocrit and a decreased serum iron. It is important to do further studies if you suspect intestinal parasites, i.e. a stool analysis with ova and parasite, especially if the subjective indicators are present.

Rationale

Eosinophils - % \uparrow , Eosinophils - Absolute \uparrow , Hemoglobin - Female \downarrow , Hematocrit - Female \downarrow

Biomarkers considered

Eosinophils - %, Basophils - %, Basophils - Absolute, Eosinophils - Absolute, Monocytes - Absolute, Iron - Serum, Hemoglobin - Female, Hematocrit - Female, Monocytes - %



80%

Dysfunction Likely.
Improvement required.

HYPOGLYCEMIA

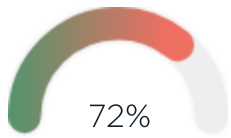
Consider hypoglycemia with a decreased fasting blood glucose along with a decreased LDH. Additional elements that may be out of range with hypoglycemia include a decreased Hemoglobin A1C and an increased SGPT/ALT level.

Rationale

LDH \downarrow

Biomarkers considered

Glucose: Fasting, LDH, Hemoglobin A1C



72%

Dysfunction Likely.
Improvement required.

FATTY LIVER/STEATOSIS

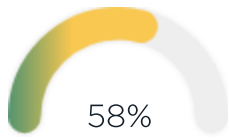
Steatosis or fatty liver is caused by the accumulation of fat in the functional units of the liver. Non Alcoholic Steatotic Hepatitis is one of the most common causes of elevated liver enzymes. Fatty liver will cause extensive liver cell damage, so early detection is essential. Consider steatosis/fatty liver if the SGPT/ALT is increased above the SGOT/AST and GGTP levels, which may be elevated. Advanced steatosis will cause the SGPT/ALT to be elevated as much as 4 times the upper limit of normal. Consider it more likely if the LDH and alkaline phosphatase levels are also increased.

Rationale

ALT \uparrow , GGT \uparrow , Glucose: Fasting \uparrow , Triglycerides \uparrow , AST \uparrow

Biomarkers considered

ALT, GGT, Glucose: Fasting, Triglycerides, AST, LDH, Ferritin



58%

Dysfunction Possible.
There may be improvement needed in certain areas.

LIVER DYSFUNCTION

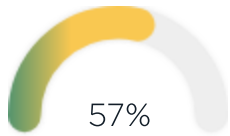
Suspect liver dysfunction if SGPT/ALT is increased along with an increased SGOT/AST and an increased GGTP. The likelihood of liver dysfunction increases with a decreased serum albumin, an increased serum alkaline phosphatase, an increased serum bilirubin, a decreased cholesterol, an increased globulin and an increased LDH. Additional biomarkers that may be out of range with liver dysfunction are an increased ferritin, an increased serum iron, a decreased total protein, an increased MCV and a decreased triglyceride.

Rationale

ALT ↑, AST ↑, GGT ↑, Bilirubin - Total ↑, Cholesterol - Total ↑

Biomarkers considered

ALT, Albumin, Ferritin, AST : ALT, Alk Phos, BUN, Bilirubin - Direct, Albumin : Globulin, Protein - Total, Iron - Serum, AST, GGT, Bilirubin - Total, Cholesterol - Total, LDH, Globulin - Total



57%

Dysfunction Possible.
There may be improvement needed in certain areas.

HYPOCHLORHYDRIA

Consider hypochlorhydria with an increased total globulin level and a normal or decreased total protein and/or albumin, an increased BUN, a decreased serum phosphorous. Other values that may be reflective of a developing or chronic hypochlorhydria include an increased MCV and MCH, a decreased calcium and iron, a decreased chloride, an increased anion gap and a decreased alkaline phosphatase.

Rationale

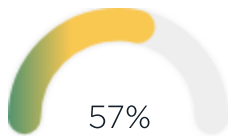
BUN ↑, Alk Phos ↓, MCV ↑, Iron - Serum ↓

Biomarkers considered

BUN, Protein - Total, Globulin - Total, Albumin, Phosphorus, Alk Phos, MCV, Iron - Serum, Calcium

Biomarkers not available in this test - consider running in future tests:

Gastrin



57%

Dysfunction Possible.
There may be improvement needed in certain areas.

BILIARY INSUFFICIENCY/STASIS

Biliary stasis or insufficiency can often be caused by a mild obstruction in the extra-hepatic biliary duct. GGTP levels will frequently be increased above optimal but not necessarily. Bilirubin levels (total and/or direct) will also be elevated along with alkaline phosphatase, LDH, triglycerides and total cholesterol. SGPT/ALT may be normal or increased. Many cases of biliary stasis will show normal lab values. In these situations suspect biliary stasis or insufficiency if there are strong subjective indicators. If the score for Biliary Insufficiency/Stasis is elevated consider further testing or treat accordingly.

Rationale

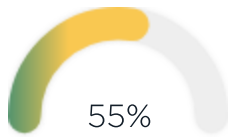
GGT ↑, Cholesterol - Total ↑, ALT ↑, Bilirubin - Total ↑

Biomarkers considered

AST : ALT, GGT, Cholesterol - Total, Alk Phos, ALT, LDH, Bilirubin - Total, Bilirubin - Direct, Triglycerides

Biomarkers not available in this test - consider running in future tests:

Gastrin



55%

Dysfunction Possible.
There may be improvement needed in certain areas.

RENAL INSUFFICIENCY

Suspect renal insufficiency if there is an increased BUN with a normal or increased serum Creatinine, a normal to increased Uric Acid, and an increased serum phosphorous. EGFR may be slightly elevated. LDH and SGOT/AST will usually be normal.

Rationale

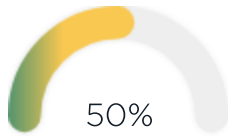
BUN ↑, eGFR ↓

Biomarkers considered

BUN, Creatinine, Phosphorus, eGFR, Uric Acid - Female

Biomarkers not available in this test - consider running in future tests:

eGFR African American



50%

Dysfunction Possible.
There may be improvement needed in certain areas.

THYROID CONVERSION SYNDROME

Thyroid Conversion Syndrome or low T3 syndrome is a form of hypothyroidism that clearly demonstrates the problem of using TSH alone as a marker for Hypothyroidism. Consider Thyroid Conversion Syndrome or low T3 syndrome when you have a normal TSH along with a decreased Total T3, a decreased Free T3, a normal Total T4, a normal Free T4 and an increased reverse T3. These patients will be suffering from all the classic signs and symptoms of low thyroid.

Rationale

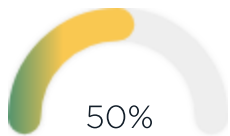
T3 - Free ↓

Biomarkers considered

T3 - Free

Biomarkers not available in this test - consider running in future tests:

Free T3 : Reverse T3, T3 - Total, Reverse T3



50%

Dysfunction Possible.
There may be improvement needed in certain areas.

RENAL DISEASE

Consider a potential renal disease with an increased **BUN**, increased **serum creatinine**, decreased **EGFR**, and an increased **BUN/Creatinine ratio** all above the "normal" reference range. However, a **BUN/Creatinine ratio** below 10 could be associated with renal failure. Additional biomarkers that may be out of range above the "normal" reference range include an increased **uric acid**, increased **serum phosphorous**, increased **LDH**, increased **AST**, increased serum **magnesium**, and increased **potassium**. Suspected renal disease should be referred to a qualified practitioner if present.

Rationale

BUN ↑, BUN : Creatinine ↑, AST ↑

Biomarkers considered

BUN, Creatinine, eGFR, BUN : Creatinine, Phosphorus, Potassium, Uric Acid - Female, AST, LDH, Magnesium - Serum

Biomarkers not available in this test - consider running in future tests:

eGFR African American



The Health Concerns report takes all the information on the Analytics and Assessment sections and focuses on the top areas of health concern that need the most support.

Health Concerns

59 Health Concerns

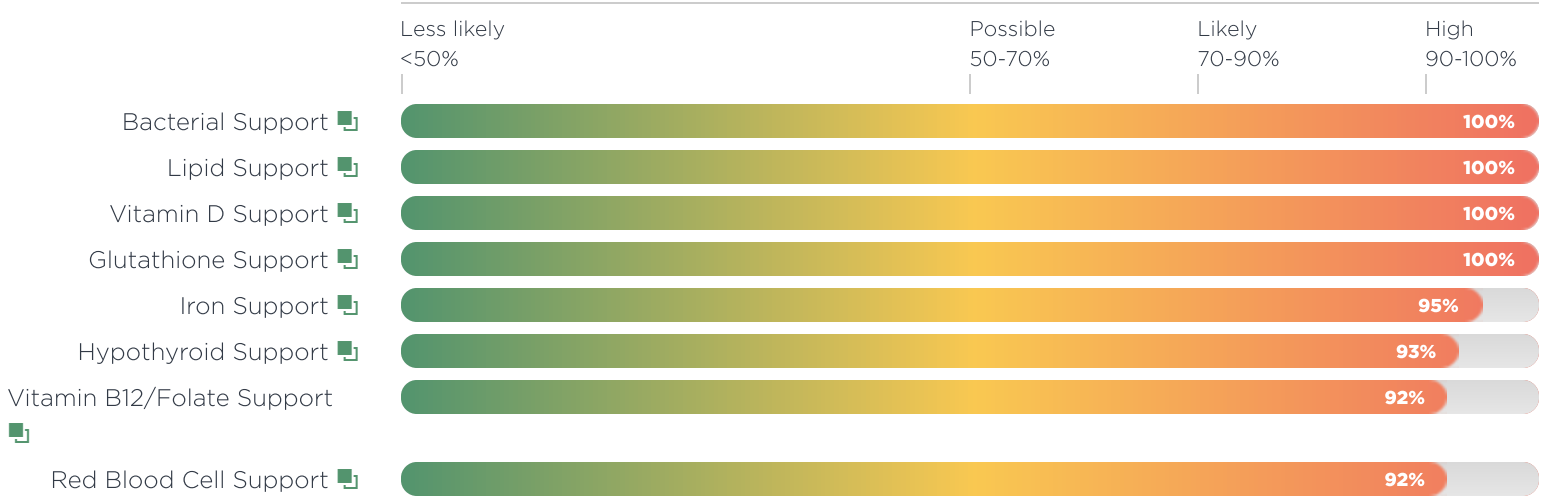
62 Recommended Further Testing

Health Concerns

The Health Concerns report takes all the information on the Functional Health Report and focuses on the health concerns that need the most support.

Each area of health concern that needs support is included in the section that follows so you can read an explanation of the results shown in this report.

NEED OF SUPPORT



Health Concerns Details

This section contains an explanation of the results presented in the Health Concerns report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.

BACTERIAL SUPPORT

The results of this blood test indicate a tendency towards a bacterial infection and a need for immune support.

Rationale

Neutrophils - % , Total WBCs , Neutrophils - Absolute , Lymphocytes - % 



LIPID SUPPORT

The results of this blood test indicate a tendency towards hyperlipidemia, which has been shown to increase the risk of developing atherosclerotic coronary artery disease. There is a need for cardiovascular support, especially support to help lower excessive blood fats.

Rationale

Cholesterol - Total , Triglycerides , LDL Cholesterol , Cholesterol : HDL , Triglyceride:HDL , HDL Cholesterol 



VITAMIN D SUPPORT

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

Rationale

Vitamin D (25-OH) 



GLUTATHIONE SUPPORT

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

Rationale

GGT 

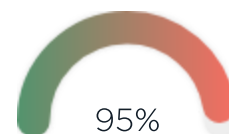


IRON SUPPORT

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

Rationale

Iron - Serum , Ferritin , RBC - Female , Hemoglobin - Female , Hematocrit - Female , % Transferrin saturation , TIBC , RDW 

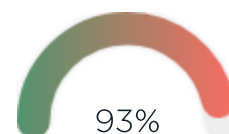


HYPOTHYROID SUPPORT

The results of this blood test indicate a tendency towards hypothyroidism and a need for thyroid gland support. If you haven't done so already, you may want to consider running a thyroid antibody panel to rule out autoimmune thyroiditis.

Rationale

TSH , Triglycerides , T3 - Free 



VITAMIN B12/FOLATE SUPPORT

The results of this blood test indicate that this patient's vitamin B12/folate levels might be lower than optimal and shows a need for vitamin B12/folate supplementation.

Rationale

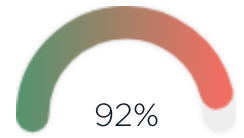
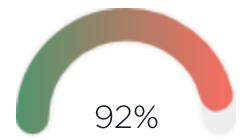
MCV , RBC - Female , Hemoglobin - Female , Hematocrit - Female , RDW 

RED BLOOD CELL SUPPORT

The results of this blood test indicate a tendency towards anemia and a need for red blood cell support.

Rationale

RBC - Female , Hemoglobin - Female , Hematocrit - Female , MCV , RDW 





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.

ALLERGIES

The results of this blood test indicate that this patient may be dealing with food or environmental sensitivities/allergies because a number of biomarkers in the "Rationale" section are out of the optimal range. We cannot tell what things your patient may be allergic to so you may want to do further testing or evaluation to rule this out. This may include doing an allergy elimination/challenge, more sophisticated immunological testing and/or gut function assessment because allergies may be a manifestation of a deeper gut issue such as intestinal hyperpermeability and/or malabsorption.

Rationale

Eosinophils - % ↑, Eosinophils - Absolute ↑

PRIMARY HYPOTHYROIDISM

The results of this blood test indicate that this patient might be at an increased risk of Primary Hypothyroidism, which may be causing the biomarkers listed under "rationale" to be outside the optimal range. If you haven't done so already, you may want to consider running additional thyroid tests such as a Thyroid Antibody Panel to rule out possible Hashimoto's Thyroiditis. The Thyroid Antibodies to consider running are: Thyroid Peroxidase Antibodies (TPO Ab) and Thyroglobulin Antibodies (TGH Ab).

Rationale

TSH ↑, Triglycerides ↑, T3 - Free ↓

INTESTINAL PARASITES

The results of this blood test indicate that this patient may be dealing with intestinal parasites because a number of biomarkers on the blood test associated with intestinal parasites, such as the ones listed in the "Rationale" section, may be out of optimal range. A blood test cannot tell what parasites your patient may be dealing with or even if your patient has an intestinal parasite so you may want to do further testing or evaluation to rule this out. This may include a thorough investigation of the subjective signs and symptoms associated with parasites and/or stool testing for ova and parasites.

Rationale

Eosinophils - % ↑, Eosinophils - Absolute ↑, Hemoglobin - Female ↓, Hematocrit - Female ↓

ADDITIONAL LIPID TESTING

The results of this blood test indicate that this patient may be dealing with hyperlipidemia, which may be causing the biomarkers in the "Rationale" section to be out of the optimal range. If you haven't done so already, you may want to consider running additional lipid tests such as an NMR Lipoprofile test to get more information on the nature of hyperlipidemia and its associated cardiovascular disease risk. The NMR Lipoprofile test is an expanded lipid panel that directly measures LDL, HDL, VLDL, Total cholesterol, and triglyceride levels. The test also measures the following: LDL Particle Number (LDL-P), Small LDL Particle Number (Small LDL-P), LDL Size, HDL Particle Number (HDL-P), HDL Size, Large HDL-P, VLDL Size, and Large VLDL-P. Finally, the test measures Lipoprotein (a) (Lp(a)), high levels of which are a very strong risk factor for heart attacks and strokes.

Rationale

Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑, Cholesterol : HDL ↑, Triglyceride:HDL ↑, HDL Cholesterol ↓

HELICOBACTER PYLORI

The results of this blood test indicate that this patient may be dealing with an Helicobacter pylori infection because a number of the biomarkers on this blood test, such as the ones listed in the "Rationale" section, may be out of optimal range. We cannot tell categorically that your patient has an H. pylori infection because there are no tests specifically for H. pylori on a common Chemistry Screen. The likelihood of H.pylori increases with symptoms of upper GI discomfort, burning, bloating, nausea etc. If you suspect H. pylori then you should follow up with more advanced testing to rule it out: H. pylori stool antigen test, which measures H. pylori antigens in the stool, or an H. pylori blood test, which measures the protein antibodies against the H. pylori. The presence of antibodies to H. pylori in the blood can mean one of 2 things: the H. pylori infection is currently present or that there was an infection in the past that has now resolved. You may want to consider a Digestive Stool Analysis, which will give you not only an H. pylori stool antigen but also a whole range of tests that will help you evaluate the terrain of the GI tract.

Rationale

BUN ↑, Globulin - Total ↓, Total WBCs ↑, Neutrophils - % ↑, Lymphocytes - % ↓

Future Test Recommendations

Biomarkers listed here would have contributed to the assessment outcomes of this report, but were unavailable. Consider running them in the future.

Biomarkers	Probability of Dysfunction	Assessment
A patient result was not available. Consider running in future tests.		
Active B12	Vitamin B12/Folate Need - 92%	Nutrient Deficiency
C-Peptide	Insulin Resistance - 100%	Dysfunction
	Blood Sugar Regulation - 100%	Functional Body System
C-Reactive Protein	Inflammation - 72%	Accessory System
Creatine Kinase	Muscle Atrophy/Breakdown - 100%	Dysfunction
	Inflammation - 72%	Accessory System
DHEA-S - Female	Metabolic Syndrome - 100%	Dysfunction
	Blood Sugar Regulation - 100%	Functional Body System
eGFR African American	Kidney Function - 62%	Functional Body System
	Renal Insufficiency - 55%	Dysfunction
	Renal Disease - 50%	Dysfunction
ESR - Female	Inflammation - 72%	Accessory System
Fibrinogen	Cardiovascular Function - 76%	Functional Body System
	Inflammation - 72%	Accessory System
Folate - RBC	Vitamin B12/Folate Need - 92%	Nutrient Deficiency

Biomarkers	Probability of Dysfunction	Assessment
A patient result was not available. Consider running in future tests.		
Folate - Serum	Vitamin B12/Folate Need - 92%	Nutrient Deficiency
Free T3 : Reverse T3	Thyroid Function - 100%	Functional Body System
	Thyroid Conversion Syndrome - 50%	Dysfunction
Free Thyroxine Index (T7)	Thyroid Function - 100%	Functional Body System
	Hypothyroidism - Primary - 93%	Dysfunction
Fructosamine	Blood Sugar Regulation - 100%	Functional Body System
Gastrin	GI Function - 85%	Functional Body System
	Gallbladder Function - 71%	Functional Body System
	Hypochlorhydria - 57%	Dysfunction
	Biliary Insufficiency/Stasis - 57%	Dysfunction
Glutathione - Total	Glutathione Need - 100%	Nutrient Deficiency
Homocysteine	Vitamin B12/Folate Need - 92%	Nutrient Deficiency
	Cardiovascular Function - 76%	Functional Body System
	Inflammation - 72%	Accessory System
Leptin - Female	Dysglycemia - 100%	Dysfunction
	Insulin Resistance - 100%	Dysfunction
	Metabolic Syndrome - 100%	Dysfunction
	Blood Sugar Regulation - 100%	Functional Body System
Lipoprotein (a)	Cardiovascular Function - 76%	Functional Body System
MCH	Iron Need - 95%	Nutrient Deficiency
	Anemia - 92%	Dysfunction
	Red Blood Cell Function - 92%	Functional Body System
	Vitamin B12/Folate Need - 92%	Nutrient Deficiency
Methylmalonic Acid	Vitamin B12/Folate Need - 92%	Nutrient Deficiency
Myeloperoxidase (MPO)	Inflammation - 72%	Accessory System
Omega 3 Index	Inflammation - 72%	Accessory System
Reverse T3	Thyroid Function - 100%	Functional Body System
	Thyroid Conversion Syndrome - 50%	Dysfunction
Sex Hormone Binding Globulin - Female	Metabolic Syndrome - 100%	Dysfunction
T3 - Total	Thyroid Function - 100%	Functional Body System
	Hypothyroidism - Primary - 93%	Dysfunction
	Thyroid Conversion Syndrome - 50%	Dysfunction
T3 Uptake	Thyroid Function - 100%	Functional Body System
	Hypothyroidism - Primary - 93%	Dysfunction
T4 - Total	Thyroid Function - 100%	Functional Body System
	Hypothyroidism - Primary - 93%	Dysfunction
Testosterone Free - Female	Cardiovascular Function - 76%	Functional Body System
Vitamin B12	Vitamin B12/Folate Need - 92%	Nutrient Deficiency
Zinc - RBC	Zinc Need - 80%	Nutrient Deficiency
Zinc - Serum	Zinc Need - 80%	Nutrient Deficiency

5

Highly detailed and interpretive descriptions of the results presented in each of the assessment and analysis section reports.

Appendix

66 What To Look For

99 Disclaimer

What to Look For When Values Are Out of Range

Advanced professional only report

This report shows what you need to look for when the blood test results are out of the optimal range. The report lists all the biomarkers that are above or below the optimal range and gives you possible associated health concerns with a short description.

% TRANSFERRIN SATURATION ↓

(18.00 %)

Anemia- iron deficiency

If the total iron binding capacity is increased along with a decreased total iron, MCV, MCH, Serum ferritin, % transferrin saturation and/or HGB and/or HCT, iron anemia is probable.

ALBUMIN : GLOBULIN ↑

(2.27 ratio)

An increased Albumin/Globulin ratio is fairly uncommon and is usually due to dehydration.

ALK PHOS ↓

(44.00 IU/L)

Zinc deficiency

Alkaline phosphatase is a zinc dependent enzyme. Decreased levels have been associated with zinc deficiency along with decreased WBC or RBC zinc levels and a low normal or decreased total WBC. Follow up a decreased alkaline phosphatase with a zinc taste test.

Magnesium deficiency

Decreased Alk phos levels have been associated with magnesium deficiency along with decreased serum and/or RBC magnesium levels.

ALT ↑

(45.00 IU/L)

Dysfunction located inside the liver

If the ALT is increased above the levels of the AST and GGT consider that the problem or area of involvement is possibly inside the liver.

Fatty liver (steatosis)

If the ALT is increased (>26) above the AST and GGT levels (>30), liver dysfunction due to fatty liver is probable. Consider it more likely if the LDH (>200) and ALP levels (>100) are also increased. In advanced steatosis, the ALT levels can be elevated 4 times the upper limit of normal (<140), accompanied by an elevation in AST. ALT is usually greater than the AST level.

Liver dysfunction

An increased ALT (>26) is associated with liver dysfunction. Dysfunction in the liver may cause an increase in ALT from hepatocytes.

Biliary tract obstruction

Suspect biliary tract obstruction when the ALT is elevated (>30) with increased GGT (>30), total bilirubin (>1.2 or >20.5 mmol/dL), alkaline phosphatase (>100) and/or LDH (>200)

Liver infection

When the ALT is elevated above the normal reference range (>40) or higher consider that there may be a liver infection. Hepatitis, CMV, EBV, Infectious mononucleosis, etc. should be ruled out when the ALT is greatly elevated.

Excessive muscle breakdown or turnover

ALT may be elevated when there is excessive muscle breakdown. Conditions such as weight-training and muscular injury can cause elevated levels of ALT to appear in the bloodstream.

Cirrhosis of the liver

An increase in ALT is associated with liver cirrhosis. Suspect liver cirrhosis if ALT (>45) is increased along with an increased AST (>40) and GGT (>70), with a decreased serum albumin (<4.0 or 40g/L), increased serum ALP (>200), increased serum bilirubin (>1.2 or >20.5 mmol/dL), decreased cholesterol (<160 or 4.14 mmol/L), increased globulin (>2.8 or 28 g/L), increased LDH (>200)

Liver cell damage

Liver damage due to active cellular destruction (i.e. chronic/acute hepatitis, active cirrhosis, infectious mononucleosis, hepatic necrosis, alcoholic hepatitis) will usually result in significantly elevated ALT values (30-50 times higher than normal).

AST ↑

(28.00 IU/L)

Dysfunction located outside the liver and biliary tree

If the AST is increased above the levels of the ALT and GGT consider that the problem or area of involvement is possible outside the liver and biliary tree (i.e. the heart, gall bladder, common bile duct, and pancreas)

A developing congestive heart problem

An increased AST level (>26) can be an important clue to a developing congestive heart problem. Congestive heart disease (CHF) is a very common cardiovascular disease so its helpful to use Functional Blood Chemistry Analysis to catch it before it fully develops. If the AST is increased higher than an accompanying ALT increase with a normal to increased GGT (>30), increased alkaline phosphatase (>100) and a decreased CO2 (<25) consider the possibility of a developing congestive heart problem. It is more likely if the patient also has an increased ESR, a normal to increased globulin and LDH, and an increased uric acid (>5.9 or 351 mmol/dL).

Cardiovascular insufficiency

Consider cardiovascular insufficiency if the AST is increased higher than an accompanying ALT increase with an increased CO2 and uric acid.

Liver dysfunction

An increased AST (>26) is associated with liver dysfunction. Dysfunction in the liver may cause an increase in AST from hepatocytes. You may also see a rise in ALT as well.

Acute Myocardial Infarct

With a suspected or an acute MI, the AST is increased 4-10 times above the reference range, peaking after 24 hours and normalizing after 3-4 days. Secondary rises in AST levels suggest a recurring MI or continued infarction.

Liver cell damage

Liver damage due to active cellular destruction (i.e. chronic/acute hepatitis, active cirrhosis, infectious mononucleosis, hepatic necrosis, alcoholic hepatitis) will usually result in AST values 10-100 times above reference range.

Excessive muscle breakdown or turnover

AST is present in high concentrations in tissues with high metabolic activity, such as skeletal muscle. Conditions or situations that cause cellular damage to skeletal muscle cells may cause an increased AST level (i.e. weight training injuries, trauma to skeletal muscle, polymyositis)

Infectious mononucleosis, Epstein Barr and Cytomegalovirus

AST levels are usually elevated way above the normal reference level about 5-14 days after the onset of illness. Alkaline phosphatase levels will also be elevated. LDH levels are usually elevated in about 95% of cases of. You may expect the following changes: decreased WBCs in the first week, increased WBCs by 2nd week of illness, increased GGT (about 7-21 days after onset of illness).

BILIRUBIN - INDIRECT ↑

(0.95 mg/dL)

RBC hemolysis

Increased hemolysis of red blood cells will lead to an increased formation of indirect or unconjugated bilirubin. The level of total bilirubin will rise when the level of indirect or unconjugated bilirubin exceeds the liver's ability to clear it from the blood. The direct or conjugated fraction remains normal or slightly elevated.

Gilbert's syndrome

Gilbert's syndrome is a genetic defect in the ability to clear unconjugated or indirect bilirubin due to a decreased function in one of the phase II liver detoxification pathway enzymes. Males are affected more than females. Clinically, the disorder has elevated total bilirubin levels with 90% or more of the total bilirubin coming from indirect/unconjugated bilirubin. GGT, AST, and ALT show no signs of abnormality. Diagnosis is difficult. Follow the patient for 12-18 months. Persistently elevated total and unconjugated bilirubin level in the absence of other abnormal liver function tests are diagnostic for Gilbert's syndrome.

BILIRUBIN - TOTAL ↑

(1.05 mg/dL)

Gallbladder Dysfunction: insufficiency or stasis

Consider gallbladder dysfunction due to either biliary stasis or biliary insufficiency when total bilirubin levels are elevated (>1.2 or >20.5 mmol/dL) along with increased alkaline phosphatase (>100). GGT, AST, and ALT may be normal or increased (>26). Cholesterol levels may be also increased (>180 or 4.65 mmol/L) but in many cases of gallbladder dysfunction the cholesterol is decreased (<160 or 4 mmol/L). Many cases of biliary stasis will show normal lab values. In these situations suspect biliary stasis or insufficiency if there are strong subjective indicators.

Thymus dysfunction

Consider an abnormality in the thymus with an elevated bilirubin (>1.2 or >20.5 mmol/dL) and an increased HGB (>14.5 or 145 g/L in women or 15 or 150 g/L in men), HCT (>44 or 0.44 in women and >48 or 0.48 in men), and RBCs (>4.5 in women and >4.9 in men).

Biliary tract obstruction/biliary calculi

Bile tract obstruction/biliary calculi should be ruled out when the total bilirubin is increased (>1.2 or 20.5 mmol/dL) along with an increase in both the direct (>0.2 or 3.4 mmol/dL) and indirect bilirubin (>1.0 or 17.1 mmol/dL). You will likely see an increased GGT (>30), a normal to increased ALT (>30), an elevated alkaline phosphatase (>100), and/or LDH (>200).

Liver dysfunction

An increased total bilirubin (>1.2 or 20.5 mmol/dL) is associated with liver dysfunction. Dysfunction in the liver may also cause an increase in albumin (>4.0 or 40g/L) and an increase of ALT (>26) from hepatocytes.

RBC hemolysis

Increased hemolysis of red blood cells will lead to an increased formation of indirect or unconjugated bilirubin (>1.0 or 17.1 mmol/dL). The level of total bilirubin will rise (>1.2 or 20.5 mmol/dL) when the level of indirect or unconjugated bilirubin exceeds the liver's ability to clear it from the blood. The direct or conjugated fraction remains normal or slightly elevated.

Gilbert's syndrome

Gilbert's syndrome is a genetic defect in the ability to clear unconjugated or indirect bilirubin due to a decreased function in one of the phase II liver detoxification pathway enzymes. Males are affected more than females. Clinically, the disorder has elevated total bilirubin levels with 90% or more of the total bilirubin coming from indirect/unconjugated bilirubin. GGT, AST, and ALT show no signs of abnormality. Diagnosis is difficult. Follow the patient for 12-18 months. Persistently elevated total and unconjugated bilirubin level in the absence of other abnormal liver function tests are diagnostic for Gilbert's syndrome.

BUN ↑

(21.00 mg/dL)

Renal disease

Consider impaired renal function due to a potential renal disease with an increased BUN and serum creatinine, a BUN/Creatinine ratio between 10-20, a urine specific gravity between 1.010 - 1.016. You may also see an increased uric acid, serum phosphorous, LDH, and AST. Suspected renal disease should be referred to a qualified practitioner if present. However, an elevated BUN found in isolation of the pattern below is more indicative of renal insufficiency or other causes.

Renal insufficiency

An increased BUN level can be a sign of renal insufficiency, an often over-looked condition. Suspect renal insufficiency if there is an increased BUN level with a normal or increased serum Creatinine, a normal to increased Uric Acid, and an increased serum phosphorous. LDH and AST will usually be normal.

Dehydration

If BUN is increased suspect dehydration. Suspect a short-term (acute) dehydration if there is an increased HGB and/or HCT along with an increased RBC count. A relative increase in Sodium and Potassium can be noted as well. Suspect a long-term (chronic) dehydration if any of the above findings are accompanied by an increased Albumin, increased BUN and/or serum Protein.

Hypochlorhydria

An increased BUN level is associated with hypochlorhydria, a decreased production of hydrochloric acid in the stomach. Hypochlorhydria is possible with an increased globulin level and a normal or decreased Total Protein/Albumin. Hypochlorhydria is probable if globulin levels are increased along with an increased BUN, a decreased or normal Total Protein/Albumin and/or decreased serum Phosphorous. Other values that may be reflective of a developing or chronic hypochlorhydria include increased or decreased gastrin, an increased MCV and MCH, a decreased (or normal) calcium, a decreased iron, a decreased chloride, and a decreased alkaline phosphatase.

Diet- excessive protein intake or catabolism

Since the BUN level is dependent on dietary protein, an increased dietary protein or an increased catabolism of protein will lead to an increased BUN level.

Adrenal stress

BUN levels will be increased in states of protein catabolism, which is increased in adrenal hyperfunction. Excess cortisol levels will cause mobilization and an increased level of amino acids in the blood and liver by promoting protein catabolism. This will increase the levels of BUN.

Dysbiosis

An increased BUN level in the absence of other causes may be due to dysbiosis.

Edema

An increased BUN is associated with edema. Edema is rarely primary and is most often secondary to other metabolic disturbances, e.g. renal dysfunction, food/environmental sensitivities, cardiac muscle stress, or endocrine dysfunction. Investigate with appropriate testing (i.e. cardiac, hormone, and allergy testing). Serum sodium levels may also be decreased.

Anterior pituitary dysfunction

An increased BUN should be viewed as a sign of renal dysfunction. In cases of renal dysfunction the serum creatinine will most likely be elevated. If the serum creatinine is not elevated and the BUN is above normal L consider that the problem may be due to an anterior pituitary dysfunction and not renal dysfunction.

BUN : CREATININE ↑

(37.50 Ratio)

Renal disease

Consider impaired renal function due to a potential renal disease with an increased BUN and an increased serum creatinine. The BUN/Creatinine ratio will likely be between 10-20 and the Urine specific gravity will be between 1.010 - 1.016. You may also see increased Uric acid, increased serum phosphorous, increased LDH, and an increased AST. Suspected renal disease should be referred to a qualified practitioner if present. However, an elevated BUN found in isolation of the pattern below is more indicative of renal insufficiency or other causes.

CALCIUM ↑

(9.70 mg/dL)

Parathyroid Hyperfunction

Parathyroid hyperfunction will cause an increase in PTH levels, which can lead to significantly increased serum calcium above the normal reference range. If the serum calcium is significantly increased above the *normal* reference range with a decreased phosphorous parathyroid hyperfunction is possible. Alkaline phosphatase levels may also be increased, along with a normal or decreased serum or RBC magnesium. Follow-up with a serum parathyroid hormone test. If parathyroid hormone levels are also increased, presume clinical hyperparathyroidism exists.

Thyroid dysfunction (primary or secondary)

Serum calcium may be increased in either primary thyroid hypofunction or secondary thyroid hypofunction due to anterior pituitary hypofunction. With primary hypothyroidism the calcium levels may be increased along with an increased TSH. With secondary thyroid hypofunction due to anterior pituitary hypofunction, the calcium levels may be increased along with a decreased TSH.

Tissue/Cell Damage

Increased serum levels of calcium is associated with tissue or cell damage due to a disruption in the cellular membrane. Calcium is a vital component of the interstitial matrix where it facilitates cell to cell adhesion and communication. Calcium will be released into the serum if this matrix is disrupted. Space-occupying lesions should be considered and ruled out with appropriate examination and testing.

CALCIUM : PHOSPHORUS ↑

(3.23 ratio)

A high calcium/phosphorus ratio favors deposition of calcium into the soft tissue. This deposition will decrease the availability of ionized calcium and reduce the serum calcium reading.

Indicative of Excess Calcium and Decreased Phosphorus

An increased Calcium:Phosphorus ratio above 3.2 indicates that there is either excess serum calcium or decreased serum phosphorus, or both. Therefore, we need to look at the clinical implications of elevated calcium and decreased phosphorus.

Parathyroid Hyperfunction

Parathyroid hyperfunction will cause an increase in PTH levels, which can lead to significantly increased serum calcium above the normal reference range. If the serum calcium is significantly increased above the standard reference range with a decreased phosphorus parathyroid hyperfunction is possible. Alkaline phosphatase levels may also be increased, along with a normal or decreased serum or RBC magnesium. Follow-up with a serum parathyroid hormone test. If parathyroid hormone levels are also increased, presume clinical hyperparathyroidism exists.

Thyroid dysfunction (primary or secondary)

Serum calcium may be increased in either primary thyroid hypofunction or secondary thyroid hypofunction due to anterior pituitary hypofunction. With primary hypothyroidism, the calcium levels may be increased along with an increased TSH. With secondary thyroid hypofunction due to anterior pituitary hypofunction, the calcium levels may be increased along with a decreased TSH.

Tissue/Cell Damage

Increased serum levels of calcium is associated with tissue or cell damage due to a disruption in the cellular membrane. Calcium is a vital component of the interstitial matrix where it facilitates cell to cell adhesion and communication. Calcium will be released into the serum if this matrix is disrupted. Space-occupying lesions should be considered and ruled out with appropriate examination and testing.

Hyperinsulinism

Phosphate crosses the cell membrane with glucose. Hyperinsulinism, therefore, will cause an increased uptake of glucose by the cells and will also increase phosphorus uptake, possibly contributing to a decreased serum phosphorus level.

Diet- high in refined carbohydrates

Phosphate crosses the cell membrane with glucose. Plasma levels may be decreased after a meal high in refined carbohydrates. A diet high in refined carbohydrates and sugars will deplete phosphorus stores and other important co-factors for carbohydrate metabolism.

CHOLESTEROL - TOTAL ↑

(208.00 mg/dL)

Increased cardiovascular disease risk

Increased cholesterol levels are associated with an increased risk of developing cardiovascular disease, atherosclerosis, coronary artery disease and stroke. Although this may be true, it is important to look at many of the other risks for this disease before jumping to conclusion that elevated cholesterol levels are the culprit. Other risks for atherosclerosis, cardiovascular disease and stroke include: smoking, elevated homocysteine levels, elevated fasting glucose, elevated fasting insulin, elevated Hs-CRP, elevated fibrinogen, B6, B12 and folate deficiency, ingestion of chlorine, blood sugar dysregulation, and hypertension. Consider an increased risk of cardiovascular disease with an increased triglyceride level in relation to an increased total cholesterol with an increased uric acid level, a decreased HDL and an increased LDL. Platelet levels may also be increased. Homocysteine, Hs-CRP, and Fibrinogen levels are frequently increased.

Primary hypothyroidism

Primary hypothyroidism is possible if the total cholesterol is increased (>180 or 4.66 mmol/L) along with an increased triglyceride and TSH.

Adrenal insufficiency

Consider adrenal insufficiency if the total cholesterol is elevated with an increased triglyceride level and a decreased serum potassium. Confirm with salivary adrenal studies or other functional adrenal tests.

Secondary Hypothyroidism (Anterior pituitary dysfunction)

Increased cholesterol levels are associated with thyroid hypofunction that is secondary to an anterior pituitary dysfunction. If cholesterol levels are increased with a decreased TSH and an elevated serum triglyceride, then consider that anterior pituitary hypofunction is probable.

Gallbladder dysfunction - Biliary stasis

Thickened bile is the hallmark of biliary stasis. It may occur if the total cholesterol is increased. GGTP levels will frequently be increased but not necessarily. Bilirubin levels may also be elevated. There may also be an increased alkaline phosphatase. The ALT and AST may be normal or increased. However, many cases of biliary stasis will show normal lab values.

Metabolic Syndrome

If triglycerides are increased above the total cholesterol level with increased LDL cholesterol, a decreased HDL, and an increased fasting blood glucose, and fasting insulin, then metabolic syndrome and hyperinsulinemia is probable.

Fatty liver (early development) and Liver congestion

If total cholesterol, LDL, and triglyceride levels are increased and HDL levels are decreased, then fatty liver is possible. Liver congestion, due to the early development of fatty liver, should be considered if total cholesterol and triglycerides are both increased, and the ALT is decreased.

Early stage of insulin resistance

Elevated cholesterol and other lipids often accompany the elevated glucose levels that are seen in insulin resistance.

Poor metabolism and utilization of fats

This is often the case in patients that are eating an optimal diet and have elevated cholesterol and triglyceride levels.

Early stage Diabetes

Elevated blood lipids are seen in patients with diabetes. The triglycerides are often higher than the total cholesterol level. Lipid metabolism problems are a hallmark of the early stages of diabetes.

CHOLESTEROL : HDL ↑

(4.43 Ratio)

A high cholesterol/HDL ratio is associated with an increased risk of cardiovascular disease.

CO2 ↓

(22.00 mEq/L)

Metabolic Acidosis

Serum CO₂, or bicarbonate will be decreased (<25), in metabolic acidosis. Consider metabolic acidosis if the CO₂ is decreased (<25), along with an increased chloride (>106) and/or an increased anion gap (>12).

Respiratory alkalosis

The CO₂ levels (<25) are often decreased in respiratory alkalosis, which is due to conditions that cause excess loss of CO₂ from the lungs. The classic presentation of this phenomenon is hyperventilation syndrome caused by hysteria, anxiety, stress, etc. Other causes include low blood pressure, shock, direct stimulation of the respiratory centers by drugs or trauma, and high altitude. Bicarbonate is lost due to the formation of CO₂ in the lungs.

CREATININE ↓

(0.56 mg/dL)

Muscle Atrophy/Nerve-Muscle Degeneration

Due to its connection to muscle metabolism serum creatinine will be decreased in cases of muscle atrophy or nerve-muscle degeneration.

EAG ↑

(134.11 mg/dl)

Diabetes

Estimated average glucose has a linear relationship with HbA1C as demonstrated in the A1C-Derived Average Glucose (ADAG) study. An eAG above 137 mg/dL (7.6 mmol/L) indicates diabetes. HbA1C and eAG had a stronger association with preprandial than postprandial blood glucose in both type 1 and type 2 diabetes.

Although eAG may be useful for long term glycemic management, it may not reflect extreme highs and lows over the 2-3 month period.

Insulin resistance

Insulin resistance with accompanying elevated blood glucose may present with elevated eAG levels over time.

Metabolic Syndrome

The clustering of risk factors associated with metabolic syndrome (insulin resistance, hypertension, dyslipidemia, and obesity) increase the risk of developing type 2 diabetes and cardiovascular disease. An increasing eAG suggests an increasing progression toward type 2 diabetes.

Pre-diabetes

An estimated glucose of 117-137 mg/dL (6.5-7.6 mmol/L) indicates impaired glucose tolerance and will likely progress to diabetes without nutrition and lifestyle intervention.

Cardiovascular risk

Hyperglycemia increases the risk of cardiovascular disease.

Estimated average glucose and HbA1C have a stronger association with CVD risk than fasting blood glucose, postprandial glucose, or glucose variability in diabetics.

Elevated HbA1C was associated with higher systolic blood pressure, total cholesterol, and hs-CRP, as well as lower HDL.

EGFR ↓

(65.00 mL/min/1.73m²)

Levels of eGFR below 60 are an indication of a loss of kidney function and may require a visit to a renal specialist for

further evaluation.

Levels below 15 indicate that a treatment for kidney failure, such as dialysis or transplant will be needed.

EOSINOPHILS - % ↑

(8.00 %)

Intestinal parasites

It is important to do further studies if the Eosinophils - Absolute count is increased and/or the Eosinophils - % is increased, i.e. a digestive stool analysis with ova and parasite, especially if the subjective indicators are present. In some cases the stool tests may be normal, especially with amoebic parasites or if the lab sample was not collected or analyzed appropriately by a qualified lab. Multiple and/or purged samples are sometimes necessary. Intestinal parasites are probable and should be ruled out if you see the following: An increased Eosinophils - %, an increased Eosinophils - Absolute count, an increased Basophils - %, an increased Basophils - Absolute count, an increased Monocytes - %, and an increased Monocytes - Absolute.

Food and Environmental allergy/sensitivity

An increased Eosinophils - Absolute count and/or an increased Eosinophils - % is associated with food allergies and/or sensitivities. There are a number of sophisticated and expensive tests for specific food allergies. These are often normal. In our experience, a weekly diet diary can be a very helpful tool to investigate possible food allergies and sensitivities. An elimination diet for 4 weeks and a subsequent challenge of suspect foods can help determine the most common foods that a patient is allergic or sensitive to. Foods that the patient may be sensitive to most often are: Dairy products, Gluten containing grains, Citrus, Shellfish, Foods containing additives and food dyes. Several methods of food sensitivity testing are available.

Asthma

An increased Eosinophils - Absolute count and/or an increased Eosinophils - % are often seen in asthma due to the connection between allergies and asthma. A digestive stool analysis will frequently indicate dysbiosis in an asthmatic, and a liver detoxification panel will often indicate liver dysfunction.

EOSINOPHILS - ABSOLUTE ↑

(0.68 k/cumm)

Intestinal parasites

It is important to do further studies if the Eosinophils - Absolute count is increased and/or the Eosinophils - % is increased, i.e. a digestive stool analysis with ova and parasite, especially if the subjective indicators are present. In some cases the stool tests may be normal, especially with amoebic parasites or if the lab sample was not collected or analyzed appropriately by a qualified lab. Multiple and/or purged samples are sometimes necessary. Intestinal parasites are probable and should be ruled out if you see the following: An increased Eosinophils - %, an increased Eosinophils - Absolute count, an increased Basophils - %, an increased Basophils - Absolute count, an increased Monocytes - %, and an increased Monocytes - Absolute.

Food and Environmental allergy/sensitivity

An increased Eosinophils - Absolute count and/or an increased Eosinophils - % is associated with food allergies and/or sensitivities. There are a number of sophisticated and expensive tests for specific food allergies. These are often normal. In our experience, a weekly diet diary can be a very helpful tool to investigate possible food allergies and sensitivities. An elimination diet for 4 weeks and a subsequent challenge of suspect foods can help determine the most common foods that a patient is allergic or sensitive to. Foods that the patient may be sensitive to most often are Dairy products, Gluten containing grains, Citrus, Shellfish, Foods containing additives and food dyes. Several methods of food sensitivity testing are available.

Asthma

An increased Eosinophils - Absolute count and/or an increased Eosinophils - % are often seen in asthma due to the connection between allergies and asthma. A digestive stool analysis will frequently indicate dysbiosis in an asthmatic, and a liver detoxification panel will often indicate liver dysfunction.

FERRITIN ↓

(12.00 ng/mL)

Anemia- iron deficiency

If ferritin and serum iron levels are decreased alongside a drop in % transferrin saturation, iron deficiency anemia is likely to be present. A Complete Blood Count (CBC) can confirm this, which may show reductions in Red Blood Cell (RBC) count, Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Hemoglobin (HGB), and Hematocrit (HCT), along with an increase in Red Cell Distribution Width (RDW). In cases where Total Iron Binding Capacity (TIBC) is increased, it's possible that microscopic bleeding is occurring, which should be investigated further with a reticulocyte count, urinalysis, or stool analysis. If serum phosphorous levels are decreased and serum globulin levels are fluctuating, either increased or decreased, it's possible that the iron deficiency anemia is secondary to hypochlorhydria.

FREE T3 : FREE T4 ↓

(2.38 Ratio)

Thyroid Conversion Syndrome or Low T3 Syndrome

A Free T3 : Free T4 ratio of less than 2 suggests the presence of thyroid conversion Syndrome or low T3 syndrome.

Selenium Deficiency

A deficiency in selenium can cause a disruption in the selenium-dependent 5'-deiodinase enzyme that converts T4 into T3. This can lower the level of Free T3 thus causing a decrease in the ratio.

Cardiovascular Risk

The FT3:FT4 ratio can be useful in assessment of cardiovascular risk as well. The heart and cardiovascular system are profoundly affected by thyroid hormones. Subclinical hypothyroidism is strongly correlated with atherosclerosis, atrial fibrillation, infarct size, and increased mortality in cardiac disease.

GGT ↑

(31.00 IU/L)

Dysfunction located outside the liver and inside the biliary tree

If the GGT is increased above the levels of the ALT and AST consider that the problem or area of involvement is possible outside the liver but inside the biliary tree (i.e. gall bladder, common bile duct, and pancreas)

Biliary obstruction

GGT levels rise when excretion is blocked by an obstruction somewhere in the biliary tree. Increased GGT along with an increased alkaline phosphatase is seen with biliary tree involvement. There will usually be significant increases in GGT (greater than 5 times higher than normal). If GGT (>30) and alkaline phosphatase (>100) are increased along with a normal or increased AST (>26) and ALT (>26), biliary obstruction with possible calculi is probable. Biliary obstruction with possible calculi becomes even more likely with an increased total bilirubin (>1.2 or 20.5 mmol/dL) and direct bilirubin (>0.2 or 3.4 mmol/dL).

Biliary stasis or insufficiency

Biliary stasis or insufficiency can often be caused by a mild obstruction in the extra-hepatic biliary duct. GGT levels will frequently be increased (>30) but not necessarily. Bilirubin levels will also be elevated (>1.2 or 20.5 mmol/dL) along with alkaline phosphatase (>100) and total cholesterol (>180 or 4.66 mmol/L). AST and ALT may be normal or increased (>26). Many cases of biliary stasis will show normal lab values. In these situations suspect biliary stasis or insufficiency if there are strong subjective indicators.

Liver cell damage

Another common cause of an increased GGT level is active or acute liver cell damage (i.e. chronic/acute hepatitis, active cirrhosis, infectious mononucleosis, hepatic necrosis, alcoholic hepatitis). There will usually be moderate increases in GGT 3-5 times higher than normal (200 - 300).

Excessive alcohol consumption, alcoholism

Increased GGT without an increase in the other liver enzymes suggests excessive alcohol consumption. If GGT is increased (>30) along with an increased serum triglyceride level (>80 or 0.90 mmol/L), excess alcohol use should be ruled out. Excessive alcohol use can seriously affect the liver function, therefore we may also see elevated AST (>26) and ALT levels (>26), but the GGT will usually be higher.

Acute or chronic pancreatitis

Suspect pancreatic pathology if the GGT is increased 5 times higher than the normal i.e. 320 U/L or higher.

Pancreatic insufficiency

Mild to moderate chronic pancreatitis can lead to a pancreatic insufficiency over time. In these cases GGT levels may be mild to moderately increased (>30). One of the most significant contributing factors to pancreatic insufficiency is an accompanying hypochlorhydria picture.

GLOBALIN - TOTAL ↓

(2.20 g/dL)

Digestive Inflammation/Gastritis

Suspect primary digestive inflammation or inflammation secondary to HCL insufficiency. The pattern will be similar to that of hypochlorhydria but the globulin may be decreased unless inflammation is severe. Many patients with the subjective and laboratory indications of HCL need experience an aggravation of their symptoms when taking HCL supplementation. Patients with this type of reaction probably have gastric inflammation due to a long-term HCL need. If inflammation is suspected or present, support the digestive terrain to heal the inflammation appropriately for 3 to 4 weeks prior to initiating HCL therapy. Acute digestive inflammation may lead to an increased globulin level due to the increased production of inflammatory immunoglobulins. Chronic digestive inflammation due to colitis, enteritis, Crohn's etc., will compromise protein breakdown and absorption, leading to a widespread protein deficiency in the body and a decreased level of the inflammatory immunoglobulins, hence the decreased total globulin level. Decreased total globulin, decreased serum phosphorous, increased BUN, increased basophils, an increased gastrin and an increased ESR.

Immune insufficiency

A decreased total globulin suggests immune insufficiency. Suspect an increased use of globulin by the liver, spleen, thymus, kidneys, or heart. Apart from known kidney or heart dysfunction, rule out a chronic immune disruptor (virus, xenobiotics, toxicity etc.) and consider a serum protein electrophoresis test (look for a decreased gamma fraction) in the investigation of immune insufficiency.

GLUCOSE: FASTING ↑

(110.00 mg/dL)

Insulin resistance (Early stage) and glucose intolerance

Research has shown that individuals progress through several stages of insulin resistance and glucose intolerance before becoming a classic type II diabetic. The stages include: Normal glucose tolerance hypoglycemia (often due to hyperinsulinemia) insulin insensitivity/resistance eventually overt type II diabetes. An increased fasting blood glucose level is a sign that this individual is possibly in an insulin resistant phase, also known as a pre-diabetic state.

Early stage of Hyperglycemia/Diabetes

If serum glucose and Hemoglobin A1C are both above optimal, diabetes is probable. Serum triglycerides are often higher than the total cholesterol in patients with diabetes. Urinary glucose may be increased, HDL levels decreased, and BUN and creatinine frequently increased with the renal damage associated with diabetes. Follow-up with appropriate testing to confirm the diagnosis, e.g. oral Glucose Insulin Tolerance Testing (GITT).

Metabolic Syndrome / insulin resistance

Metabolic Syndrome or hyperinsulinemia is a cluster of related symptoms: Increased triglycerides, increased total cholesterol, decreased HDL cholesterol, obesity, increased blood insulin levels, increased glucose and increased blood pressure. The hallmark of this syndrome is the insulin resistance that leads to high glucose levels and an imbalance in blood fats. The overall effect is an increased risk for cardiovascular disease and diabetes.

Thiamine (Vitamin B1) need

An increased glucose is associated with a thiamine need. Thiamine transports glucose across the blood brain barrier and is an essential component in the enzymatic conversion of pyruvate into acetyl CoA that allows pyruvate to enter the Krebs cycle. If glucose is increased and the hemoglobin A1C is normal, thiamine need is possible. If CO2 is decreased and the anion gap is increased along with moderately high serum glucose, thiamine need is probable. Due to thiamine's role in glycolysis, LDH levels may be decreased.

Anterior Pituitary resistance to cortisol

During the decompensated/maladapted phase of the chronic stress response, the hypothalamus and pituitary become less and less sensitive to cortisol, causing increased cortisol resistance. The net result is an increase in cortisol levels in the body because the negative feedback loop that shuts cortisol production down is not activated. Increased levels of circulating cortisol will cause increased blood glucose levels through increased gluconeogenesis. Excess cortisol will also reduce the utilization and uptake of glucose by the cell.

Acute stress

Increasing levels of stress cause the body to move into the chronic stress response. This is marked by an increased Cortisol to DHEA ratio, which causes an increase in gluconeogenic activity and a concomitant rise in blood glucose levels. Excess cortisol will also reduce the utilization and uptake of glucose by the cell.

Fatty liver (early development) and Liver congestion

High blood glucose levels have been associated with increased levels of blood fats, e.g. high total cholesterol, LDL and triglycerides, low HDL. In individuals with liver congestion, this may lead to the deposition of fat in the liver and the development of fatty liver.

HDL CHOLESTEROL ↓

(47.00 mg/dL)

Hyperlipidemia and atherosclerosis

If HDL is less than 25% of the total cholesterol, then there is a strong clinical indication that hyperlipidemia is present. If the serum triglycerides and LDL are also increased, hyperlipidemia is likely present and atherosclerosis should be ruled-out.

Diets high in refined carbohydrates

The Standard American Diet (SAD), which is very high in refined carbohydrates, can contribute to decreased HDL levels

Metabolic Syndrome /hyperinsulinemia

If HDL levels are decreased, triglycerides are increased above the total cholesterol level with increased LDL cholesterol and increased fasting blood glucose, then metabolic syndrome and hyperinsulinemia are probable. Metabolic Syndrome can lead to adrenal dysregulation, so adrenal hyperfunctioning should be ruled out.

Oxidative stress

Unoxidized cholesterol, including HDL cholesterol, acts as an antioxidant and a free radical scavenger in the body, so decreased levels put the body at risk for developing oxidative stress, especially lipid peroxidation, and increases the chance of free radical induced diseases.

Heavy metal/Chemical overload

patients with historically low HDL and total cholesterol levels may be more prone to heavy metal and chemical toxins due to poor cell membrane integrity. This is irrespective of level of exposure, but related more to susceptibility of the individual patient. This may also leave patients at an increased risk for developing neoplasm.

Fatty liver (early development) and Liver congestion

If HDL levels are decreased, and LDL, triglyceride and total cholesterol levels are increased, then the early development of fatty liver is possible. Liver congestion, due to the fatty liver, should be considered if total cholesterol is elevated, triglycerides are increased, and the ALT is decreased. Fatty liver is caused by obesity, excessive alcohol consumption, prescription drugs (e.g. steroids), iron overload, solvent exposure, and rapid weight loss. Fatty changes to the liver tissue can impair the liver's detoxification ability. The degree of fatty liver changes is directly related to the amount of obesity. Fatty liver and liver congestion increases the risk of insulin resistance, hypertension, Metabolic Syndrome, and type II diabetes mellitus.

Hyperthyroidism

The increased metabolic activity found in hyperthyroidism can lead to decreased HDL levels. The body preferentially uses fatty acids, which are transported via lipoproteins, for energy in this heightened metabolic state.

Lack of exercise/ sedentary lifestyle

A sedentary lifestyle has been shown to decrease HDL levels. Increasing cardiovascular and resistance exercise is a very good way to elevate HDL levels.

HEMATOCRIT - FEMALE ↓

(34.50 %)

Anemia

A condition in which there is a decreased amount of hemoglobin, a decreased number of circulating RBCs, and a decrease in the hematocrit. Anemia is a symptom not a disease, and the cause of an anemia must be sought out:

- Deficiencies of iron and certain vitamins (B12, folate, B6, copper)

- Blood loss

- Increased destruction

The following are some of the different nutritional types of anemia.

Anemia- Iron deficiency

This is the most prevalent anemia worldwide. The major causes are: Dietary inadequacies, Malabsorption, Increased iron loss, Increased iron requirements, e.g. pregnancy stool analysis. If there is a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men) and/or HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCV (<82) and MCHC (<32), and a decreased serum iron (< 85 or 15.22 mmol/dL), ferritin (<30), % transferrin saturation, and an increased RDW (>13), then iron anemia is **probable**. If TIBC is increased (>350 or 62.7 mmol/dL), internal/microscopic bleeding is **possible**, and should be ruled out with reticulocyte count (>1), urinalysis, and/or stool analysis. Iron deficiency anemia may be secondary to hypochlorhydria if serum phosphorous is decreased (<3.0) and serum globulin is increased (>2.8) or decreased (<2.4).

Anemia- B6 deficiency

B6 anemia is not very common but possible given the deficiencies of B6 and other B complex vitamins. If there is a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCV (<82), MCH (<28), MCHC (<32), and an increased to normal serum iron (>130 or 23.27 mmol/dL) and/or ferritin (>70), B6 anemia is **probable**. Look for a decreased SGOT/AST and/or SGPT/ALT and/or GGTP (<10).

B12/folic acid anemia

If there is a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men) with a decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men), RBC (<3.9 in women or 4.2 in men), and uric acid (<3.5 or 208 mmol/dL) and an increased MCH (>31.9), MCV (>90), RDW (>13), LDH (>200) (especially the LDH-1 isoenzyme fraction) and serum iron, then B12/folic acid anemia is **probable**. Often you will see decreased WBC (<5.0) and neutrophils (<40) and an increased LDH (>200) in megaloblastic anemia (i.e. anemia of large cells). Homocysteine often >7.2. Check with methylmalonic acid. The presence of hypersegmented neutrophils (5 or more lobes in more than 5% of all neutrophils) has been reported to be more sensitive and reliable than an elevated MCV in detecting megaloblastic anemia and is not affected by coexisting iron deficiency. If MCV is >97 oral supplementation may be ineffective. B12 injections may be needed.

Copper anemia

If there is decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men) with a decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and RBCs (<3.9 in women or 4.2 in men), and low high MCV (>89.9), an increased to normal MCH (>31.9), and an increased or decreased hair copper, then copper anemia is **possible**. Check serum or WBC copper.

Internal bleeding

An unrecognized internal bleed can cause a gradual decrease in hematocrit due to the loss of blood. Internal bleeding is a serious condition and should be referred to a specialist qualified to diagnose and treat this condition.

Digestive inflammation

A decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men) is by no means diagnostic for digestive inflammation (Crohn's disease, ileitis, colitis, gastritis, etc.) but one of a number of patterns seen with these disorders. Decreased total globulin (<2.4 or 24 g/L), decreased serum phosphorous (<3.0 or 0.97 mmol/L), increased BUN (>16 or 5.71 mmol/L), while serum gastrin generally will be increased, basophils and ESR increased.

Thymus hypofunction

A hematocrit below the optimum range (<37 or 0.37 in women and 40 or 0.4 in men) is associated with thymus dysfunction.

Vitamin C need

A decreased hematocrit level is associated with vitamin C need. Albumin will frequently be decreased (<4.0 or 40g/L) along a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCHC (<32), serum iron (< 85 or 15.22 mmol/dL). There will also be an increased MCV (>90), alkaline phosphatase (>100), fibrinogen >300, and RBCs (>4.5 in women and >4.9 in men).

HEMOGLOBIN - FEMALE ↓

(12.50 g/dl)

Anemia

Anemia is condition in which there is a decreased amount of hemoglobin, a decreased number of circulating RBCs, and a decrease in the hematocrit. Anemia is a symptom not a disease, and the cause of an anemia must be sought out: Deficiencies of iron and certain vitamins (B12, folate, B6), Blood loss, Increased destruction, decreased production or an anemia of chronic disease are all possible causes.

Anemia- Iron deficiency

This is the most prevalent anemia worldwide. The major causes are: Dietary inadequacies, Malabsorption, Increased iron loss and Increased iron requirements. If there is a decreased HGB and/or HCT, MCH, MCV, and MCHC, and a decreased serum iron, ferritin, % transferrin saturation, and an increased RDW, then iron anemia is probable. If TIBC is increased, microscopic bleeding is possible, and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. Iron deficiency anemia may be secondary to hypochlorhydria if serum phosphorous is decreased and serum globulin is increased.

Anemia- B6 deficiency

B6 anemia is not very common but possible given the deficiencies of B6 and other B complex vitamins. If there is a decreased HCT, HGB, MCV, MCH, MCHC, and an increased to normal serum iron and/or ferritin, B6 anemia is probable. Look for a decreased AST and/or ALT and/or GGTP.

Anemia- B12/folate deficiency

If there is a decreased HGB with a decreased HCT, RBC, and uric acid and an increased MCH, MCV, RDW, LDH (especially the LDH-1 isoenzyme fraction,) and serum iron, then B12/folate anemia is probable. Often you will see decreased WBC and neutrophils and an increased LDH in megaloblastic anemia (i.e. anemia of large cells). Homocysteine may be elevated. Check methylmalonic acid test. The presence of hypersegmented neutrophils (5 or more lobes in more than 5% of all neutrophils) has been reported to be more sensitive and reliable than an elevated MCV in detecting megaloblastic anemia and is not affected by coexisting iron deficiency. If MCV is above the reference range oral supplementation may be ineffective. B12 injections may be needed.

Copper deficiency anemia

If there is decreased HGB with a decreased HCT and RBCs, and low high MCV, an increased to normal MCH, and a decreased Serum Copper, along with a decreased RBC copper, then copper anemia is possible.

Vitamin C need

A decreased hemoglobin level is associated with vitamin C need. Albumin will frequently be decreased along a decreased HCT, HGB, MCH, MCHC, serum iron. There will also be an increased MCV, alkaline phosphatase, fibrinogen, and RBCs.

Digestive inflammation

A decreased HGB is by no means diagnostic for digestive inflammation (Crohn's disease, ileitis, colitis, gastritis, etc.) but one of a number of patterns seen with these disorders. Decreased total globulin, decreased serum phosphorous, increased BUN, while serum gastrin generally will be increased, along with increased basophils and ESR.

Internal bleeding

An unrecognized internal bleed can cause a gradual decrease in hemoglobin due to the loss of blood. Internal bleeding is a serious condition and should be referred to a specialist qualified to diagnose and treat this condition.

HEMOGLOBIN A1C ↑

(6.30 %)

Diabetes mellitus

This test is a measurement of long-term blood glucose control and management. Values will be increased in patients with poorly controlled diabetes. It is important to remember that a patient who has recently made the changes to control their short-term blood glucose levels may still show elevated levels of glycosylated hemoglobin.

Insulin resistance (early stage) and glucose intolerance

An increased hemoglobin A1C above the optimal range is a sign that this individual is not controlling their long-term glucose levels very well. They are possibly in the insulin-resistant phase, also known as a pre-diabetic state. Research has shown that individuals progress through several stages of insulin resistance and glucose intolerance before becoming a classic type II diabetic. The stages include: Normal glucose tolerance hypoglycemia (often due to hyperinsulinemia) insulin insensitivity/resistance eventually overt type II diabetes.

HOMA2-%B ↓

(86.90 %)

Progression towards Type 2 Diabetes

After prolonged, untreated insulin resistance and overactivity of beta cells, the beta cells will lose their capacity to maintain an increased activity level, beta-cell function and insulin production will decline, and this will be expressed by a DECREASE in the HOMA2-%B measurement.

A decreasing HOMA2-%B measurement (a decline of beta-cell function and insulin secretion), in addition to an elevated HOMA2-IR measurement (rising level of insulin resistance), is indicative of progression to Type 2 Diabetes Mellitus.

HOMA2-%S ↓

(61.60 %)

Increasing Levels of Insulin Resistance

Decreased HOMA2-%S is indicative of decreasing levels of insulin sensitivity by the peripheral tissue cells. This is commonly seen in pre-diabetes and type 2 diabetes. Loss of Insulin sensitivity and decreased HOMA2-%S measures are secondary to chronically elevated insulin levels, which is usually a result of elevated serum blood glucose levels. A decreased HOMA2-%S measure would be seen in conjunction with an elevated HOMA2-IR measure, and an elevated HOMA2-%B measurement in the pre-diabetes or perhaps early stages of T2DM.

Progressed Insulin resistance and Type 2 Diabetes

A decreasing HOMA2-%S in conjunction with a decreased HOMA2-%B measurement is a sign that the patient is progressing beyond pre-diabetes and early stage insulin resistance towards type 2 diabetes. The accompanying low HOMA2-%B is a sign that the disease has progressed to the point of beta-cell failure.

HOMA2-IR ↑

(1.62 Index)

Increasing Levels of Insulin Resistance

Elevated HOMA2-IR > 1.8 is of insulin resistance by the peripheral tissue cells. This is commonly seen in pre-diabetes and T2DM. Insulin resistance and elevated HOMA2-IR measures are secondary to elevated insulin levels, which is usually a result of elevated serum blood glucose levels. An elevated HOMA2-IR measure would be seen in conjunction with an elevated HOMA2-%B measurement in the pre-diabetes or perhaps early stages of T2DM, and would be seen in conjunction with a decreased HOMA2-%B measurement once the disease has progressed to the point of beta-cell failure.

Metabolic Syndrome

Elevated HOMA2-IR > 1.4 is a sign of metabolic syndrome.

Polycystic Ovarian Syndrome (PCOS)

Elevated HOMA2-IR is common in 60-75% of cases of PCOS.

HS CRP - FEMALE ↑

(3.85 mg/L)

Increased levels of CRP are associated with the following:

- Abdominal obesity,
- Periodontal disease,
- High blood pressure
- An increased risk of cardiovascular disease and stroke
- Diabetes
- Depression
- Alzheimer's disease

INSULIN: FASTING ↑

(12.00 µIU/ml)

Elevated fasting insulin levels are associated with greater risks of heart attack, stroke, metabolic syndrome,, and diabetes.

Insulin resistance (Early stage) and glucose intolerance

Research has shown that individuals progress through several stages of insulin resistance and glucose intolerance before becoming a classic type II diabetic. The stages include normal glucose tolerance, hypoglycemia (often due to hyperinsulinemia) insulin insensitivity/resistance eventually, overt type II diabetes. An increased fasting blood glucose level is a sign that this individual is possibly in an insulin-resistant phase, also known as a pre-diabetic state.

Early stage of Hyperglycemia/Diabetes

If fasting insulin is elevated along with elevated serum glucose and Hemoglobin A1C, diabetes is probable. Serum triglycerides are often higher than the total cholesterol level in patients with diabetes. Urinary glucose may be increased, HDL levels decreased, and BUN and creatinine are frequently increased with the renal damage associated with diabetes. Follow-up with appropriate testing to confirm the diagnosis, e.g. oral Glucose Insulin Tolerance Testing (GITT).

Metabolic Syndrome / insulin resistance

Metabolic Syndrome or hyperinsulinemia is a cluster of related symptoms: Increased triglycerides, increased total cholesterol, decreased HDL cholesterol, obesity, increased blood insulin levels, increased glucose, and increased blood pressure. Fasting insulin may also be elevated. The hallmark of this syndrome is insulin resistance, which leads to high glucose levels, high insulin levels, and an imbalance in blood fats. The overall effect is an increased risk for cardiovascular disease and diabetes.

Insulinoma (pancreatic islet tumor)

A pancreatic islet tumor can cause levels of insulin to rise high. If you see hyperinsulinemia with hypoglycemia then refer the patient to an endocrinologist for further investigation.

IRON - SERUM ↓

(55.00 µg/dL)

Anemia- iron deficiency

This is the most prevalent anemia worldwide. The major causes are dietary inadequacies, malabsorption, increased iron loss, and increased iron requirements e.g. pregnancy. If there is a decreased serum iron with a decreased MCH, MCV, and MCHC, ferritin, % transferrin saturation and/or HGB and/or HCT, and increased RDW, then iron deficiency anemia is probable. If TIBC is increased, internal/microscopic bleeding is possible and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. If serum phosphorous is decreased and serum globulin is increased, iron anemia may be secondary to hypochlorhydria.

Hypochlorhydria

A low serum iron level is often associated with hypochlorhydria. Adequate levels of stomach acid are necessary for iron absorption. Hypochlorhydria is possible with low serum iron and an increased total globulin. Hypochlorhydria is probable if the BUN is also increased and/or serum phosphorous is decreased.

Internal bleeding and internal microscopic bleeding

A decreased total serum iron may be due to internal bleeding. TIBC, transferrin, and reticulocyte count will be elevated. HGB and HCT may be decreased or normal depending on the severity of the bleeding. Internal microscopic bleeding may present with a decreased TIBC and an elevated reticulocyte count. If this pattern is present, internal bleeding must be ruled out with reticulocyte count, urinalysis, and/or stool analysis. Refer to a doctor qualified to diagnose and treat internal bleeding.

LDH ↓

(128.00 IU/L)

Reactive Hypoglycemia

A common finding in reactive hypoglycemia is a decreased fasting blood glucose along with a decreased LDH (<140). Hemoglobin A1C levels may also be reduced (<4.5% or 0.045). LDH is an important enzyme for pyruvate metabolism in glycolysis and is associated with pancreatic function and glucose metabolism.

LDL : HDL - FEMALE ↑

(2.83 Ratio)

Cardiovascular disease risk increase

An increased LDL/HDL ratio indicates a relative increase in LDL (that can cause atherosclerotic plaque and blood vessel damage when it becomes oxidized) and a relative decrease in HDL (that collects cholesterol and carries it away from tissues and blood vessels).

Familial hypercholesterolemia

A one-unit increase in LDL/HDL ratio increased risk of a coronary heart disease event by 17% in those with familial hypercholesterolemia. Also, an LDL level eight times greater than the HDL level predicted an adverse coronary heart disease event (i.e. LDL/HDL ratio of 8).

Sudden cardiac death

An increased LDL/HDL ratio was significantly associated with sudden cardiac death in those with coronary heart disease, those on lipid-lowering medications, and even in those without a history of coronary heart disease.

LDL CHOLESTEROL ↑

(133.00 mg/dL)

Metabolic Syndrome /hyperinsulinemia

If LDL levels are increased (>100 or 2.59 mmol/L), triglycerides are increased (> 80 or 0.90 mmol/L) with decreased HDL cholesterol (< 55 or < 1.42 mmol/L), and increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L), then metabolic syndrome and hyperinsulinemia is probable. Metabolic Syndrome can lead to adrenal dysregulation, so adrenal hyperfunctioning should be ruled out.

Increased risk of atherosclerosis, cardiovascular risk and stroke

An increased LDL level is associated with the development of atherosclerosis and an increased risk for cardiovascular disease and stroke. If there is an increased triglyceride level (>80 or 0.90 mmol/L) in relation to total cholesterol (>180 or 4.66 mmol/L) with an increased uric acid level (>5.9 or > 351 mmol/dL), a decreased HDL (< 45 or < 1.16 mmol/L) and an increased LDL (>100 or 2.59 mmol/L), atherosclerosis is probable. Platelet levels may also be increased (>385). Homocysteine levels are frequently increased > 7.2 with atherosclerosis. Hs-CRP are frequently >0.55 in men and >1.5 in women, and fibrinogen levels are frequently increased above 300. Diabetes and thyroid hypofunction should also be considered with this pattern.

Hyperlipidemia

Increased LDL cholesterol and total cholesterol levels are associated with hyperlipidemia, which has been shown to indicate a potential risk of developing atherosclerotic coronary artery disease. If LDL is increased (>100 or 2.59 mmol/L) with an increased total cholesterol (>180 or 4.66 mmol/L) and an increased LDL/HDL ratio and an increased level of triglycerides (>80 or >0.90 mmol/L) with HDL less than 25% of the total cholesterol, hyperlipidemia is probable.

Oxidative stress

Increased LDL levels are associated with increasing free radical activity and oxidative stress. The peroxidation of LDL may promote the accumulation of cholesterol in the macrophages and smooth muscle cells, which can lead to atherosclerotic plaque formation.

Fatty liver (early development) and Liver congestion

If LDL levels are increased, along with increased triglyceride and total cholesterol levels, and HDL levels are decreased, the early development of fatty liver is possible. Liver congestion, due to the fatty liver, should be considered if total cholesterol is above 180 or 4.99 mmol/L, triglycerides are increased (>80 or >0.90 mmol/L), and the SGPT/ALT is below 10.

Diet- high in refined carbohydrates

The Standard American Diet (SAD), which is very high in refined carbohydrates, can contribute to increased LDL.

LYMPHOCYTES - % ↓

(16.00 %)

Chronic viral or bacterial infection

Frequently a decreased lymphocyte count is seen with chronic infection, the classic case being the viral infection of AIDS.

Active infection

An active infection of unknown cause (i.e. not sure if it is bacterial or viral) can use up a large number of lymphocytes so expect to see a low Lymphocytes - Absolute (<0.95) and a decreased Lymphocytes - %. You may also see an increased total WBC count and increased Neutrophils - % and an increased Neutrophils - Absolute count Further testing should be considered (ESR, C reactive protein, etc.)

Oxidative Stress and Free Radical Activity

Suspect excess free radical activity and oxidative stress if the Lymphocyte - Absolute count is decreased with a decreased Lymphocytes - %. If a decreased Lymphocyte - Absolute count and/or a decreased Lymphocytes - % is seen with a total cholesterol level suddenly below its historical level, a decreased albumin and low platelet levels, an increased total globulin and uric acid level, free radical pathology, which increases the risk for developing a neoplasm, should be investigated. Oxidative stress can cause an increased destruction of red blood cells; in these situations, you will see an elevated bilirubin level.

Suppressed bone marrow production

Anything that affects the output of white blood cells from the bone marrow can cause a decreased Lymphocyte - Absolute count and a decreased Lymphocyte - % (aplastic anemia, chemotherapy, radiation, Hodgkin's disease)

LYMPHOCYTES - ABSOLUTE ↓

(1.36 k/cumm)

Chronic viral or bacterial infection

Frequently a decreased lymphocyte count is seen with chronic infection, the classic case being the viral infection of AIDS.

Active infection

An active infection of unknown cause (i.e. not sure if it is bacterial or viral) can use up a large number of lymphocytes so expect to see a low Lymphocytes - Absolute (<0.95) and a decreased Lymphocytes - %. You may also see an increased total WBC count and increased Neutrophils - % and an increased Neutrophils - Absolute count. Further testing should be considered (ESR, C reactive protein, etc.)

Oxidative Stress and Free Radical Activity

Suspect excess free radical activity and oxidative stress if the Lymphocyte - Absolute count is decreased (<0.95) with a decreased Lymphocytes - %. If a decreased Lymphocyte - Absolute count and/or a decreased Lymphocytes - % is seen with a total cholesterol level suddenly below its historical level, a decreased albumin and low platelet levels, an increased total globulin and uric acid level, free radical pathology, which increases the risk for developing a neoplasm, should be investigated. Oxidative stress can cause an increased destruction of red blood cells; in these situations, you will see an elevated bilirubin level.

Suppressed bone marrow production

Anything that affects the output of white blood cells from the bone marrow can cause a decreased Lymphocyte - Absolute count and a decreased Lymphocyte - % (aplastic anemia, chemotherapy, radiation, Hodgkin's disease)

MAGNESIUM - RBC ↓

(4.80 mg/dl)

Magnesium Deficiency

Consider that the patient has a need for magnesium if the RBC and Serum Magnesium level is decreased.

Muscle Spasm

The laboratory results with muscle spasm are variable; however, decreased serum or RBC magnesium is a common finding.

MAGNESIUM - SERUM ↓

(2.00 mg/dl)

Muscle Spasm

The laboratory results with muscle spasm are variable; however, decreased serum or RBC magnesium is a common finding.

MCV ↑

(97.00 fL)

Anemia- Vitamin B12 and/or Folate deficiency

B12 and folate are needed for proper nucleus development. In situations of deficiency the cytoplasm of the erythrocyte continues to expand until the nucleus has reached its proper size. This leads to large red blood cells. The probability of vitamin B-12 or folate deficiency anemia increases when the MCV is increased.. If there is also an increased MCH, RDW, MCHC, and LDH (especially the LDH-1 isoenzyme fraction), and a decreased uric acid level the probability of vitamin B-12 or folic acid anemia is very high. Serum or urinary methylmalonic acid is a good test for confirming vitamin B-12 deficiency. An elevated serum homocysteine can help confirm folic acid and vitamin B-6 deficiency. The presence of hypersegmented neutrophils (5 or more lobes in more than 5% of all neutrophils) has been reported to be more sensitive and reliable than an elevated MCV in detecting megaloblastic anemia and is not affected by coexisting iron deficiency.

Hypochlorhydria

Hypochlorhydria is possible with an increased MCV, MCHC and/or MCH, especially with a low serum iron and an increased total globulin. Hypochlorhydria is probable if BUN is increased and/or serum phosphorous is decreased.

Vitamin C need

Consider a vitamin C need if there's a decreased albumin along a decreased HCT, HGB, MCH, MCHC, serum iron. There also may be an increased MCV, alkaline phosphatase, fibrinogen and RBCs.

NEUTROPHIL : LYMPHOCYTE ↑

(4.38 Ratio)

Bacterial infection

An elevated NLR is associated with bacterial infection and can help differentiate between bacterial and viral infections which, in turn, can help determine whether antibiotics would be indicated in patients with fever. An elevated NLR in those with sepsis is associated with poorer outcomes.

Inflammation

NLR is considered a marker of systemic inflammation and is elevated in inflammatory disorders, vasculitis, cancer, and Alzheimer's disease.

Metabolic dysfunction

Elevated NLR is observed in metabolic syndrome, diabetes mellitus, renal or hepatic dysfunction, and thyroid dysfunction.

Arteriosclerosis, Atherosclerosis

Elevated NLR has been associated with increased pulse-wave velocity, an indicator for early atherosclerotic changes. It has also been associated with arteriosclerosis (stiffening or hardening of the artery wall).

Cardiovascular disease

Elevated NLR is associated with cardiovascular disease, congestive heart failure, cardiac arrhythmias, acute coronary syndrome, endothelial dysfunction, and atherosclerosis.

NEUTROPHILS - % ↑

(70.00 %)

Childhood diseases (Measles, Mumps, Chicken-pox, Rubella, etc.)

The pattern seen in the Neutrophil count is as follows: Early in the infection Neutrophils - % and Neutrophils - Absolute will be elevated. Both of these biomarkers will be decreased later in the infection.

Acute, localized, and general bacterial infections

The Neutrophil % result will be increased along with an increased Neutrophil absolute account. They are the primary cell type for fighting bacterial infections.

Acute viral infection

Neutrophils will tend to be normal

Chronic viral or bacterial infection

Frequently in a chronic infection, you'll see an increased Neutrophils - Absolute along with an increased Neutrophils % and a decreased total WBC count.

Inflammation

An increased Neutrophil - Absolute along with an increased Neutrophil - % will often be seen in acute and chronic inflammation (RA, SLE, Rheumatic fever and acute gout)

NEUTROPHILS - ABSOLUTE ↑

(5.95 k/cumm)

Childhood diseases (Measles, Mumps, Chicken-pox, Rubella, etc.)

The pattern seen in the Neutrophil count is as follows: Early in the infection Neutrophils - Absolute and the Neutrophils - % will be elevated. Levels of both biomarkers will be decreased later in the infection.

Acute, localized, and general bacterial infections

The Neutrophil absolute account will be increased and you'll see an increased Neutrophil - %. They are the primary cell type for fighting bacterial infections.

Acute viral infection

Neutrophils will tend to be normal

Chronic viral or bacterial infection

Frequently in a chronic infection, you'll see an increased Neutrophils - Absolute along with an increased Neutrophils and a decreased total WBC count.

Inflammation

An increased Neutrophil - Absolute along with an increased Neutrophil - % will often be seen in acute and chronic inflammation (RA, SLE, Rheumatic fever and acute gout)

NON-HDL CHOLESTEROL ↑

(161.00 mg/dl)

Increased risk of cardiovascular disease and related events

An elevated non-HDL cholesterol is indicative of a relative increase in atherogenic lipoproteins and increased risk of oxidative damage and atherosclerosis.

Non-HDL cholesterol was found to be the best of all cardiac measures for predicting risk of coronary artery disease events and stroke.

Increased small, dense LDL cholesterol

An increase in non-HDL cholesterol may reflect an increase in atherogenic small, dense LDL cholesterol (sdLDL-C). This is the type of cholesterol most likely to become oxidized, and to infiltrate and damage blood vessels.

Non-alcoholic fatty liver disease (NAFLD)

Elevated non-HDL-C is observed in non-alcoholic fatty liver disease. Further assessment of disease progression can be achieved by calculating non-HDL-C/HDL-C ratio, as well as assessing LDL cholesterol in those with normal triglyceride levels.

Metabolic imbalance

Elevated non-HDL cholesterol levels are associated with diabetes, metabolic syndrome, obesity, and hypothyroidism.

Smoking

Smokers are found to have lower HDL levels which then can cause a relative increase in non-HDL cholesterol levels.

Unhealthy lifestyle and diet

An elevated non-HDL cholesterol level may be related to lack of exercise/activity as well as an unhealthy diet high in total calories, trans fats, unhealthy saturated fats, and excess sugar and refined carbohydrates.

Vitamin D insufficiency or deficiency

Non-HDL cholesterol levels may be inversely related to vitamin D levels. Vitamin D is believed to be cardioprotective.

PLATELET : LYMPHOCYTE (PLR) ↑

(283.09 Ratio)

Atherosclerosis severity

An elevated PLR is associated with more severe, advanced atherosclerosis and a higher Gensini score, a score that reflects the extent and severity of atherosclerosis.

Bipolar disorder

A higher PLR, suggestive of inflammatory activation, is associated with bipolar disorder, especially during the manic phase.

Cancer prognosis

A higher PLR is associated with a poorer cancer prognosis, including in cases of breast, ovarian, cervical, and prostate cancers.

Cardiovascular disease and complications

Increased PLR is associated with cardiovascular disease, the degree of atherosclerosis, and the relative risk of major adverse cardiac events (MACE), associated mortality, and acute coronary syndrome.

Heart failure

Increased PLR is associated with worsening heart failure, especially in conjunction with other inflammatory indicators such as the neutrophil:lymphocyte count.

Inflammation and thrombosis

An elevated ratio of platelets to lymphocytes suggests a thrombotic, pro-inflammatory state characterized by an increase in platelets, especially activated platelets, and a decrease in lymphocytes, which are destroyed by inflammation. Elevated PLR is often associated with other inflammatory markers including NLR, CRP, and fibrinogen.

Rheumatoid arthritis

A significantly higher PLR has been associated with rheumatoid arthritis, an inherently inflammatory disorder.

Stroke

Elevated PLR is associated with acute ischemic stroke and increased risk of unfavorable outcomes.

PLATELETS ↑

(385.00 10E3/ μ L)

Atherosclerosis

Platelet count may be high due to the platelet involvement in the plaque formation. People with atherosclerosis and atherosclerosis are often told they have “thick” blood and are advised by their medical doctors to take a baby aspirin to “thin” the blood. Atherosclerosis is probable if the platelet is increased along with an increased uric acid level, an increased triglyceride in relation to total cholesterol, a decreased HDL, and an increased LDL. C-reactive protein may also be elevated along with elevated homocysteine and elevated fibrinogen.

QUICKI ↓

(0.32 Index)

Decreased Levels Associated with:

- Insulin resistance
- Metabolic syndrome
- Non Alcoholic Fatty Liver Disease (NAFLD)
- Diabetes
- Obesity

RBC - FEMALE ↓

(3.95 m/cumm)

Anemia

Anemia is a condition in which there is a decreased amount of hemoglobin, a decreased number of circulating RBCs, and a decrease in the hematocrit. Anemia is a symptom, not a disease, and the cause of the anemia must be sought out: Deficiencies of iron and certain vitamins (B12, folate, B6, C) and copper, Blood loss, Increased destruction, Decreased production or anemia of chronic disease are some of the causes.

Anemia- Iron deficiency

This is the most prevalent anemia worldwide. The major causes are Dietary inadequacies, Malabsorption, Increased iron loss, Increased iron requirements. If there is a decreased HCT and/or HGB, MCH, MCV, and MCHC, and a decreased serum iron, ferritin, % transferrin saturation, and an increased RDW, then iron anemia is probable. If TIBC is increased, internal/microscopic bleeding is possible and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. Iron deficiency anemia may be secondary to hypochlorhydria if serum phosphorous is decreased and serum globulin is increased or decreased.

Anemia- B12/folate

If there are decreased RBCs with a decreased HCT and/or HGB and uric acid and an increased MCH, MCV, RDW, LDH (especially the LDH-1 isoenzyme fraction), increase and serum iron, then B12/folic acid anemia is probable. Often you will see decreased WBC and neutrophils and an increased LDH in megaloblastic anemia (i.e. anemia of large cells). Check with methylmalonic acid and homocysteine. The presence of hypersegmented neutrophils (5 or more lobes in more than 5% of all neutrophils) has been reported to be more sensitive and reliable than an elevated MCV in detecting megaloblastic anemia and is not affected by coexisting iron deficiency. If MCV is greatly elevated oral supplementation may be ineffective. B12 injections may be needed.

Anemia- Copper

If there are decreased RBCs with a decreased HCT and/or HGB, low high MCV, an increased to normal MCH, and an increased or decreased hair copper, then copper anemia is possible. Check serum or WBC copper.

Internal bleeding

An unrecognized internal bleed can cause a gradual decrease in RBCs due to the loss of blood. Check reticulocyte count. Internal bleeding is a serious condition and should be referred to a specialist qualified to diagnose and treat this condition

RDW ↑

(14.00 %)

Conditions Associated with an Increased RDW:

- Iron Deficiency
- Vitamin B12/folate Deficiency
- Pernicious Anemia
- Thalassemia
- Inflamamation

SODIUM ↓

(136.00 mEq/L)

Adrenal Fatigue and Insufficiency

Adrenal fatigue and adrenal insufficiency cause a decrease in the secretions of both the glucocorticoid and mineralocorticoid hormones. A decrease in aldosterone, the major mineralocorticoid, from adrenal fatigue and adrenal insufficiency will impact sodium metabolism. Decreased aldosterone levels will cause an increase in the amount of renal sodium excretion, which will cause a decrease in serum sodium. If the sodium levels are decreased along with increased potassium, adrenal fatigue, and adrenal insufficiency are possible. The sodium: potassium ratio will also be decreased. Other values that may be out of balance include decreased chloride, aldosterone, and cortisol levels. Urinary chloride will be increased. Adrenal fatigue and adrenal insufficiency can be confirmed with salivary cortisol studies.

Addison's disease

In its pathological state, severe hypoadrenia from Addison's disease impairs sodium reabsorption and causes excess sodium excretion due to a lack of both glucocorticoids and mineralcorticoids, especially aldosterone.

Edema

Hyponatremia (a decreased sodium level) is often reflective of a relative excess of body water rather than a low total body sodium. The following are some of the conditions implicated by this pattern: Congestive heart failure, Hypothyroidism, Nephritis/ Kidney disease

Drug Diuretics

Drug diuretics can alter sodium as well as potassium levels in the body. Many of the diuretic drugs are potassium-sparing. Even so, serum potassium can be decreased with the use of these drugs. In these cases the BUN and creatinine will frequently be increased, indicating renal insufficiency, and sodium will be decreased. On the other hand, it is important to not presume that a patient needs potassium because they are on a drug diuretic. Prolonged diuretic use may also deplete Thiamine.

T3 - FREE ↓

(2.50 pg/ml)

Primary hypothyroidism

Primary hypothyroidism is often linked to lower levels of total T3 and/or free T3. Some studies indicate that while some individuals might have slightly low T4 levels, they still produce enough T3 from the thyroid to maintain normal thyroid function.

Thyroid Conversion Syndrome

Thyroid Conversion Syndrome is similar to a condition called Euthyroid sick syndrome, which is a condition of normal thyroid gland activity with a reduced peripheral 5'-deiodination conversion of T4 into T3 due to a liver or renal dysfunction or disease. However, Thyroid Conversion Syndrome is due to many of the conditions that affect the peripheral conversion of T4 into T3 with a rise in reverse T3 levels (stress, malnutrition, low-calorie diets, lack of exercise etc.). In both cases, there will be an increase in reverse T3. Consider this condition with normal TSH, low total T3, low free T3, normal total T4, normal free T4, and an increased reverse T3. With Thyroid Conversion Syndrome we might not see any liver or kidney dysfunction.

Secondary Hypothyroidism (Anterior Pituitary Hypofunction)

Thyroid hypofunction is often secondary to an anterior pituitary hypofunction (Secondary Hypothyroidism). Suspect anterior pituitary dysfunction if the subjective indications of thyroid hypofunction are present and the following pattern is seen: A decreased TSH, a normal T-3 uptake, a decreased or normal Total T4, a normal or decreased Free T4 and a normal or decreased Free T3. The likelihood increases if serum triglycerides are elevated and total cholesterol is increased. Additional elements that may be out of range with secondary hypothyroidism include an increased BUN above the "normal" range and an increased calcium. Anterior pituitary hypofunction is a common problem and one that is frequently mistaken for thyroid hypofunction (the subjective indications are usually identical and the patient's axillary temperature will frequently be below normal).

Euthyroid Sick Syndrome

For Euthyroid Sick Syndrome we see the same patterns as in Low T3 Syndrome plus other findings on blood chem screen with evidence of liver or renal dysfunction: decreased albumin, increased BUN, increased creatinine, decreased potassium, increased sodium, and/or Increased ALT.

Selenium deficiency

Consider Selenium deficiency if the total T3 is reduced, the free T3 is reduced along with a normal TSH and T-4 level. Inactive T4 is converted into T3, the active thyroid hormone, by cleaving an iodine molecule from its structure. Selenium plays an active role in this cleaving process.

TIBC ↑

(385.00 µg/dL)

Anemia- iron deficiency

If the total iron binding capacity is increased along with a decreased total iron, MCV, MCH, Serum ferritin, % transferrin saturation, and/or HGB and/or HCT , iron anemia is probable.

Internal bleeding

With a high TIBC there is always the possibility of microscopic bleeding, which should be ruled out with reticulocyte count, urinalysis, and/or stool analysis.

TOTAL WBCS ↑

(8.50 k/cumm)

Childhood diseases (Measles, Mumps, Chicken-pox, Rubella, etc.)

Total WBC is increased early in the disease process and will be decreased later. The increase in total WBC may be so great as to suggest leukemia. Such a leukocytosis of a temporary nature must be distinguished from leukemia. In general the following common patterns may be seen in childhood disease: Neutrophils: Increased early. Decreased later. Lymphocytes: Decreased early. Increased later. The findings relative to the WBC differential are variable due to the increases or decreases in the other WBC fractions (eosinophils, Monocytes, basophils)

Acute viral infection

This is a strong inflammatory process so expect to see an increased ESR. The total WBC will be elevated due to the increased levels of individual fractions. Increased Lymphocytes and normal Neutrophils = Acute viral picture. Increased Monocytes indicate the recovery period. Increased Bands- Expect to see increased Band cells in the acute phase as the body is pumping out immature neutrophils to cope with the infection. Bands can be used to help differentiate an active from a chronic infection. In the active phase of infection bands will tend to become increased and their levels tend to normalize during recovery or during the chronic phase. Checking viral titers may be helpful.

Acute bacterial infection

This is a strong inflammatory process so expect to see an increased ESR. The total WBC will be elevated due to the increased levels of individual fractions. Increased Neutrophils and normal Lymphocytes = Acute bacterial picture. Increased Monocytes indicate the recovery period. Increased Bands- Expect to see increased Band cells in the acute phase as the body is pumping out immature neutrophils to cope with the infection. Bands can be used to help differentiate an active from a chronic infection. In the active phase of infection bands will tend to become increased and their levels tend to normalize during recovery or during the chronic phase.

Stressful situations

Any stressful situation, which leads to an increase in epinephrine production, may cause an increase in the total WBC.

Highly refined diets

The total WBC may be slightly above the optimum level for people on a diet of highly refined foods as found in the Standard Western Diet.

TRIGLYCERIDE:HDL ↑

(2.72 ratio)

Increased Risk of Cardiovascular Disease

An increased Triglyceride:HDL ratio is significantly associated with an increased risk for developing cardiovascular disease and is perhaps one of the best predictors of cardiac risk.

Increased Risk of Insulin Resistance and Type II Diabetes

An increased Triglyceride:HDL ratio is significantly associated with an increased risk for developing insulin resistance and Type II Diabetes.

TRIGLYCERIDE-GLUCOSE INDEX (TYG) ↑

(4.78 Index)

An elevated TyG Index increases the risk of cardiovascular disease in initially healthy individuals and the risk of adverse cardiac events in those with suspected CVD and those with type 2 diabetes. A higher TyG Index is also associated with greater risk and severity of non-alcoholic metabolic fatty liver disease.

TRIGLYCERIDES ↑

(128.00 mg/dL)

Metabolic Syndrome /hyperinsulinemia/early stage diabetes

If triglycerides are increased above the total cholesterol level with increased LDL cholesterol (>100 or 2.59 mmol/L), a decreased HDL (< 55 or < 1.42 mmol/L), and increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L), then metabolic syndrome and hyperinsulinemia is probable. Metabolic Syndrome can lead to adrenal dysregulation, so adrenal hyperfunctioning should be ruled out. Elevated triglycerides are seen in patients with diabetes. The triglycerides are often higher than the total cholesterol level. Lipid metabolism problems are a hallmark of the early stages of diabetes.

Fatty liver and Liver congestion

Increased triglycerides are associated with liver congestion and the early development of fatty liver (steatosis). If total cholesterol (>180 or 4.66 mmol/L), LDL (>100 or 2.59 mmol/L) and triglyceride levels (>80 or >0.90 mmol/L) are increased, and HDL levels are decreased (< 55 or < 1.42 mmol/L), then the early development of fatty liver is possible. Liver congestion, due to the fatty liver, should be considered if total cholesterol is above 180, triglycerides are increased (>80 or >0.90 mmol/L), and the SGPT/ALT is below 10.

Early stage of insulin resistance

Elevated triglycerides often accompany the elevated glucose levels that are seen in hyperinsulinism and insulin resistance.

Increased risk of cardiovascular disease, stroke and atherosclerosis

An increased triglyceride level is associated with the development of atherosclerosis and an increase in cardiovascular risk and stroke. Atherosclerosis is probable with an increased triglyceride level (>80 or 0.90 mmol/L) in relation to total cholesterol (>180 or 4.66 mmol/L) with an increased uric acid level (>5.9 or > 351 mmol/dL), a decreased HDL (< 45 or < 1.16 mmol/L) and an increased LDL (>100 or 2.59 mmol/L). Platelet levels may also be increased (>385). Homocysteine levels are frequently increased > 7.2 with atherosclerosis. Hs-CRP are frequently >0.55 in men and >1.5 in women, and fibrinogen levels are frequently increased above 300. Diabetes and thyroid hypofunction should also be considered with this pattern.

Poor metabolism and utilization of fats

This is often the case in patients that are eating an optimal diet and have elevated triglyceride and cholesterol levels.

Hypothyroidism

Primary hypothyroidism is possible if the triglycerides and cholesterol levels are increased along with an increased TSH >2.0. Consider Secondary Hypothyroidism if the TSH is decreased (<1.3).

Hyperlipoproteinemia

Lipoprotein disorders usually present with elevated total cholesterol and triglyceride levels. There are 6 distinctive sub-types of these disorders, which are mostly genetic in nature. The lipid electrophoresis is one of the best methods for determining the various metabolic problems associated with hyperlipoproteinemia.

Alcoholism

Alcohol is extremely calorie dense. Regular alcohol consumption and alcoholism can lead to significantly elevated levels of triglycerides in the blood. This is often accompanied by a greatly increased GGTP.

TSH ↑

(2.15 μU/mL)

Primary hypothyroidism

In primary hypothyroidism the problem is located in the thyroid gland itself, which fails to produce thyroid hormone. Primary hypothyroidism is often preceded by autoimmune thyroid disease. If you have a patient with suspected thyroid disease you should screen for thyroid antibodies. Primary hypothyroidism will present with increased TSH levels and you may see a normal or decreased total T4 level and/or T-3, free T4, free T3, increased cholesterol and triglyceride levels.

UIBC ↑

(330.00 µg/dL)

Anemia- iron deficiency

If the UIBC is elevated and the total iron binding capacity is increased (>350 or 62.7 mmol/dL) along with a decreased total iron (< 85 or 15.22 mmol/dL), MCV (<82), MCH (<28), Serum ferritin (< 30), % transferrin saturation, and/or HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and/or HCT (<37 or 0.37 in women and 40 or 0.4 in men), iron anemia is probable.

Hypochlorhydria

An elevated UIBC may be seen in hypochlorhydria, a condition associated with low serum iron levels.

VITAMIN D (25-OH) ↓

(24.00 ng/ml)

Vitamin D deficiency

A decreased Vitamin D is suggestive of a deficiency in vitamin D. Treatment should be initiated to raise the levels into the optimal range.

Vitamin D deficiency is associated with a number of diseases and disorders not limited to:

- Diabetes Mellitus
- Cancer
- Hypertension
- Cardiovascular disease
- Autoimmune/inflammatory disorders

Vitamin D insufficiency is prevalent in patients with chronic musculoskeletal pain.

VLDL CHOLESTEROL ↑

(28.00 mg/dl)

Increased risk of heart disease and stroke

An increased VLDL level is associated with an increased risk of heart disease and stroke.

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