Functional Health Report

A comprehensive analysis of your patient's test results.

BLOOD CHEMISTRY ANALYSIS

Practitioner Report

Prepared for	Female Sample 57 year old female born Nov 01, 1966 56 years old at the time this lab test was taken Fasting
Requested by	Mr. Kendrick McCarty Inception Telehealth & Wellness
Collected Date	Jun 07, 2023
Lab	Quest
Powered by	OptimalDX

What's Inside?

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An introduction to Functional Blood Chemistry Analysis and this report.

SECTION 2: ANALYSIS

A full breakdown of all individual biomarker results.

SECTION 3: ASSESSMENT

An in-depth functional system and nutrient evaluation.

SECTION 4: HEALTH CONCERNS

The health concerns that need the most support.

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Additional information pertinent to this report.

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

Introduction

Mr. Kendrick McCarty's Notes Report

This report highlights the notes made about the results of this blood test.

REPORT NOTES

Health Goals:

1. Reduce sugar cravings
2. Improve digestion
3. Improve immune system and decrease number of coughs and colds
4. Improve sleep

Signs and Symptoms

The following signs and symptoms were reported:

1. Heartburn or acid reflux
2. Bloating one hour after meal
3. stomach pains or cramps
4. Catch colds at beginning of winter
5. Frequent colds or flu
6. Easily fatigued
7. Difficulty losing weight

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.

Mr. Kendrick McCarty
Inception Telehealth & Wellness

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.

Mr. Kendrick McCarty
Inception Telehealth & Wellness

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.

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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

Blood Test Results

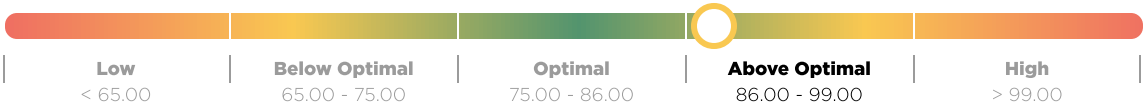
The Blood Test Results Report lists the results of your patient's Chemistry Screen and CBC and shows you whether or not an individual biomarker is optimal, outside of the optimal range, or outside of the standard range. The biomarkers are grouped into their most common categories.

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.

Alarm Low	Low	Below Optimal	Optimal	Above Optimal	High	Alarm High	Total
0	7	27	60	15	5	0	118

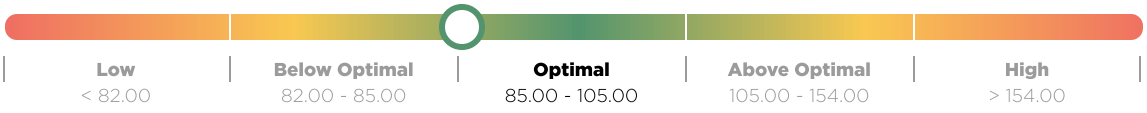
BLOOD GLUCOSE

Glucose Fasting
87.50 mg/dL



Hemoglobin A1C
4.60 %

eAG
85.00 mg/dL

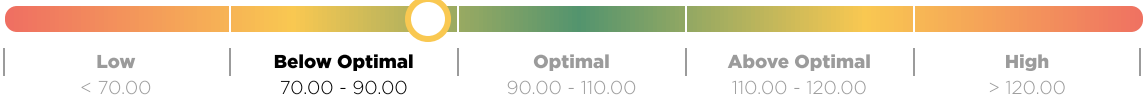


Insulin - Fasting
3.70 µIU/mL

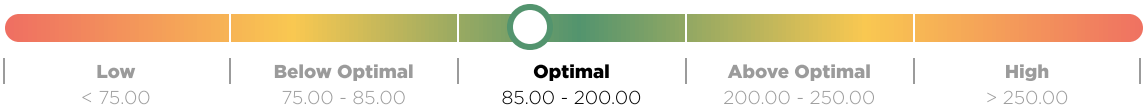
C-Peptide
1.11 ng/mL

Fructosamine
201.00 µmol/L

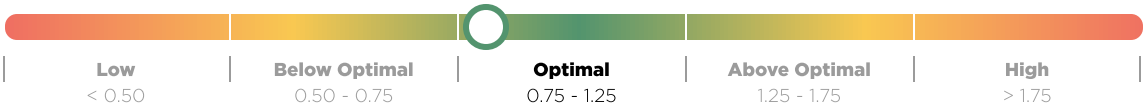
HOMA2-%B
87.50 %



HOMA2-%S
124.00 %



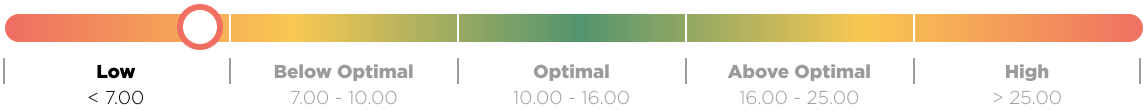
HOMA2-IR
0.80 Index



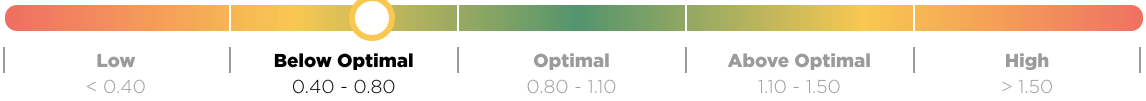
QUICKI
0.40 Index

RENAL

BUN
6.00 mg/dL

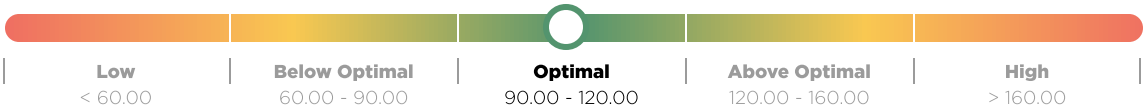


Creatinine
0.65 mg/dL



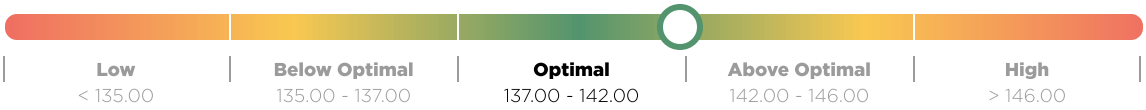
BUN : Creatinine
9.00 Ratio

eGFR
104.00 mL/min/1.73m2

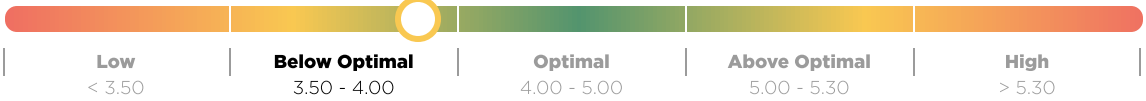


ELECTROLYTES

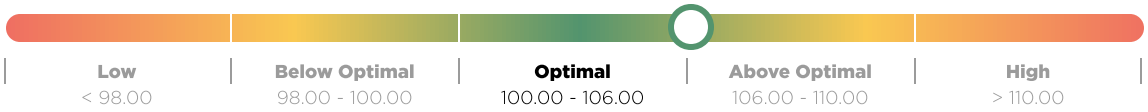
Sodium
141.90 mEq/L



Potassium
3.90 mEq/L

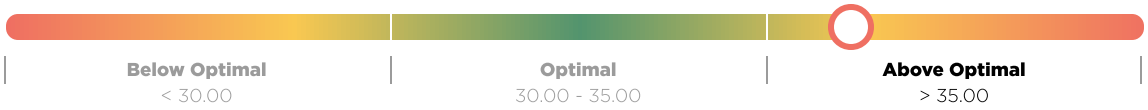


Chloride
106.00 mEq/L



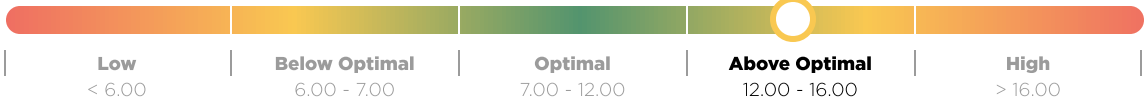
CO2
26.00 mEq/L

Sodium : Potassium
36.38 ratio

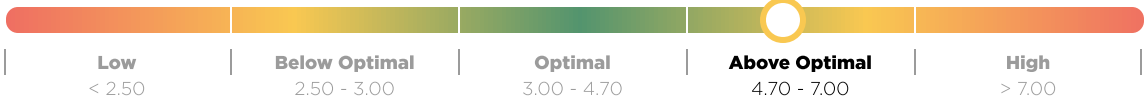


METABOLIC

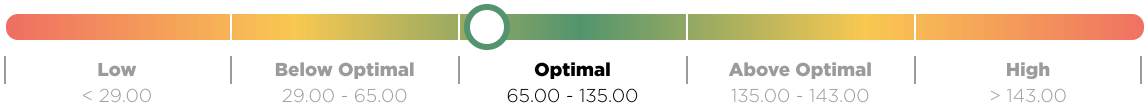
Anion Gap
13.80 mEq/L



Uric Acid - Female
5.65 mg/dL



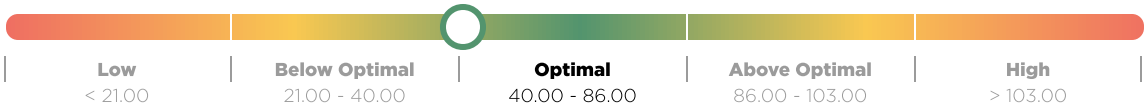
Creatine Kinase
72.00 U/L



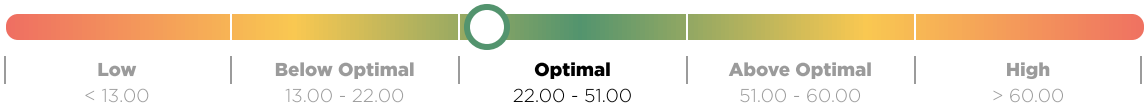
Leptin - Female
12.20 ng/mL

ENZYMES

Amylase
42.00 U/L



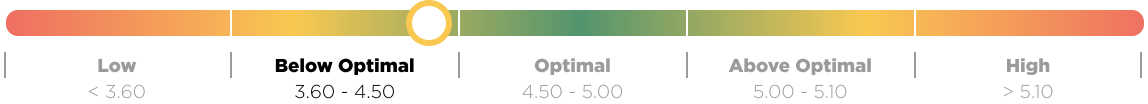
Lipase
25.00 U/L



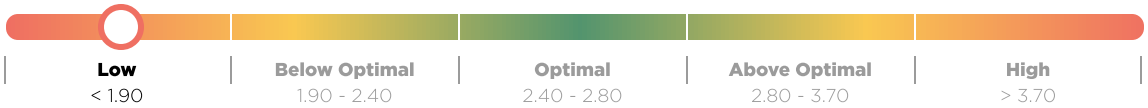
PROTEINS

Protein - Total
6.10 g/dL

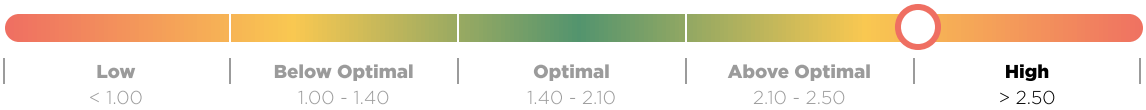
Albumin
4.40 g/dL



Globulin - Total
1.70 g/dL

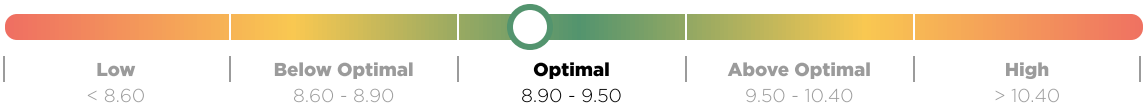


Albumin : Globulin
2.60 ratio

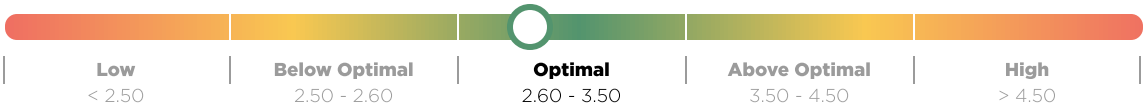


MINERALS

Calcium
9.10 mg/dL



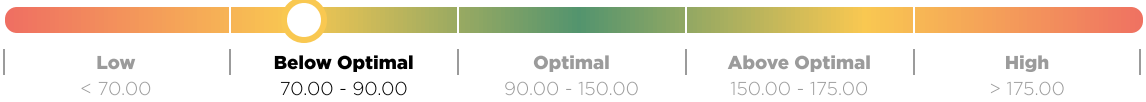
Phosphorus
2.90 mg/dL



Magnesium - Serum
2.30 mg/dL

Magnesium - RBC
6.20 mg/dL

Copper - Serum
76.00 µg/dL



Zinc - Serum
65.70 µg/dL

Zinc - RBC
9.20 mg/L

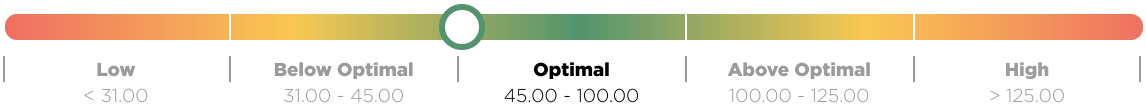
Copper : Zinc Ratio
1.16 Ratio

Calcium : Albumin
2.07 ratio

Calcium : Phosphorus
3.14 ratio

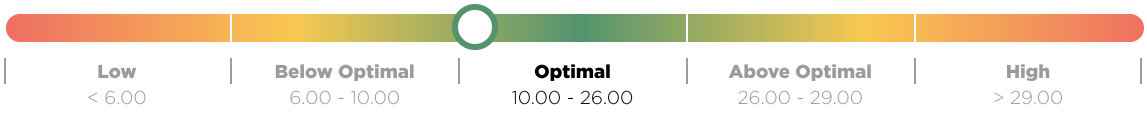
LIVER AND GB

Alk Phos
46.00 IU/L



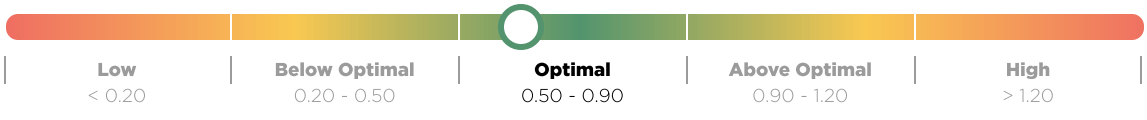
AST
14.00 IU/L

ALT
11.00 IU/L



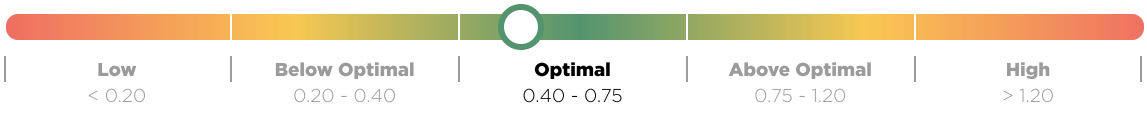
LDH
131.00 IU/L

Bilirubin - Total
0.60 mg/dL

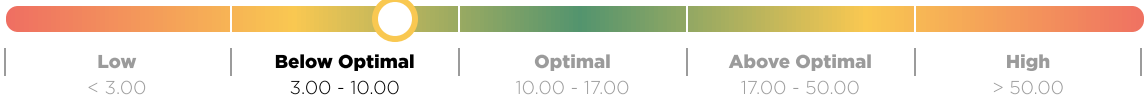


Bilirubin - Direct
0.10 mg/dL

Bilirubin - Indirect
0.50 mg/dL



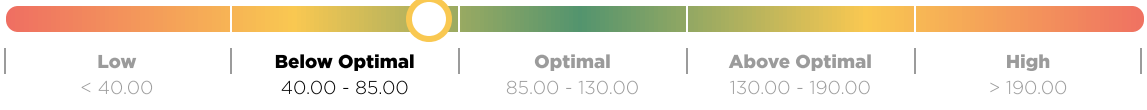
GGT
8.00 IU/L



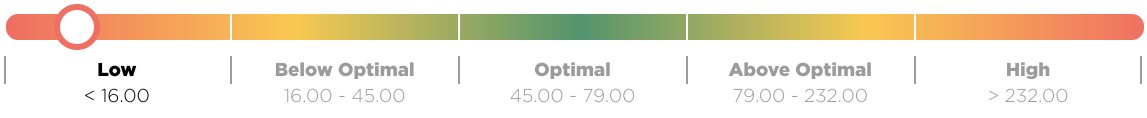
AST : ALT
1.27 Ratio

IRON MARKERS

Iron - Serum
79.00 µg/dL

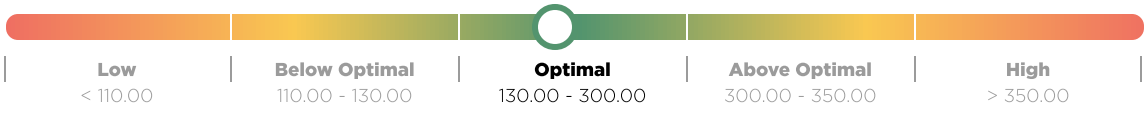


Ferritin
12.00 ng/mL

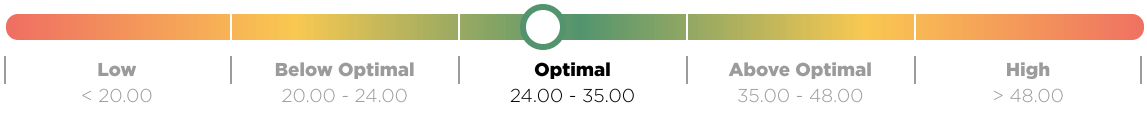


TIBC
284.00 µg/dL

UIBC
205.00 µg/dL



% Transferrin saturation
28.00 %



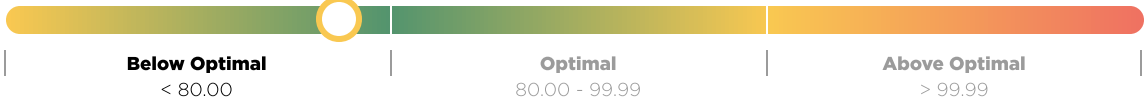
Transferrin
255.00 mg/dL

LIPIDS

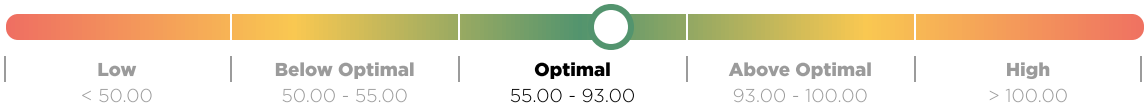
Cholesterol - Total
165.00 mg/dL

Triglycerides
65.00 mg/dL

LDL Cholesterol
70.00 mg/dL

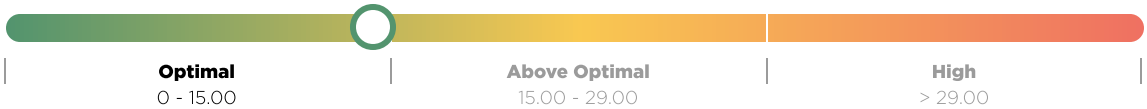


HDL Cholesterol
81.00 mg/dL

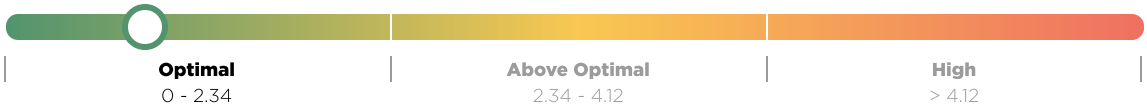


Non-HDL Cholesterol
84.00 mg/dL

VLDL Cholesterol
14.20 mg/dL



LDL : HDL - Female
0.86 Ratio



Triglyceride:HDL
0.80 ratio

Cholesterol : HDL
2.04 Ratio

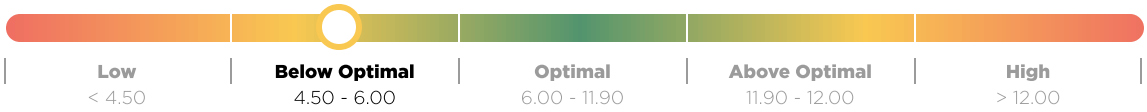
CARDIOMETABOLIC

Homocysteine
7.50 µmol/L

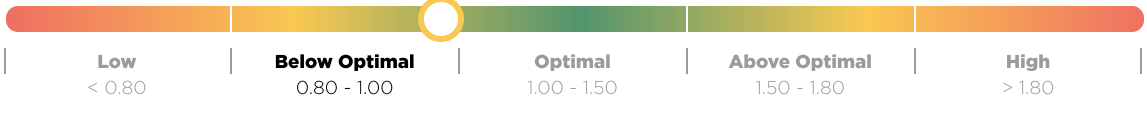
THYROID

TSH
2.95 mIU/L

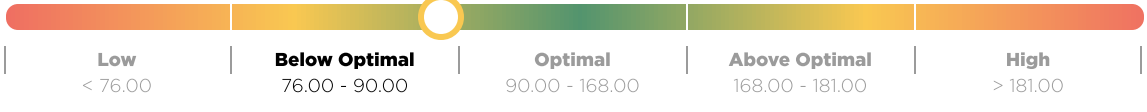
T4 - Total
5.20 µg/dL



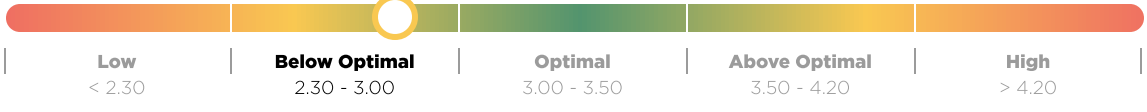
T4 - Free
0.98 ng/dL



T3 - Total
89.20 ng/dL



T3 - Free
2.80 pg/mL

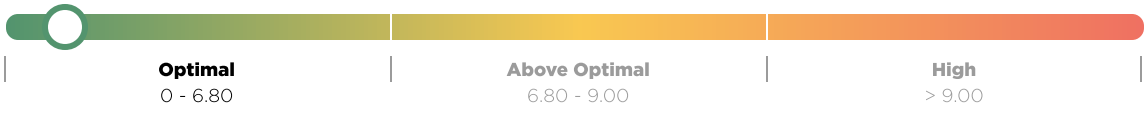


Reverse T3
28.00 ng/dL

T3 Uptake
26.20 %

Free Thyroxine Index (T7)
1.36 Index

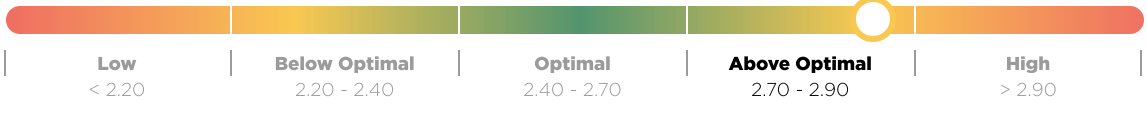
Thyroid Peroxidase (TPO) Abs
1.10 IU/mL



Thyroglobulin Abs
<1.00 IU/mL

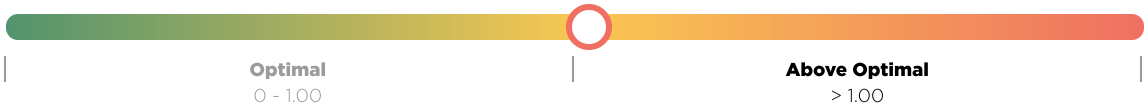
Free T3 : Reverse T3
10.00 Ratio

Free T3 : Free T4
2.86 Ratio



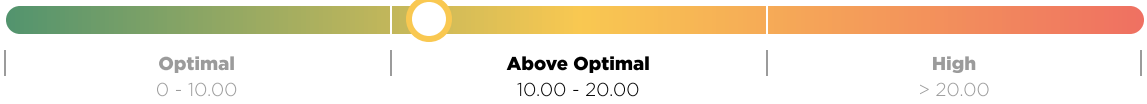
INFLAMMATION

Hs CRP - Female
1.15 mg/L



C-Reactive Protein
4.65 mg/L

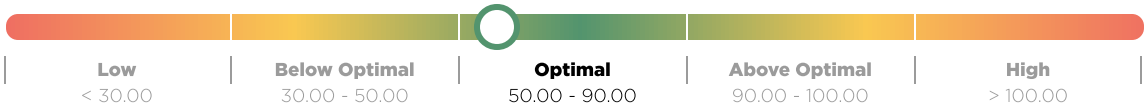
ESR - Female
11.20 mm/hr



Fibrinogen Activity
221.00 mg/dL

VITAMINS

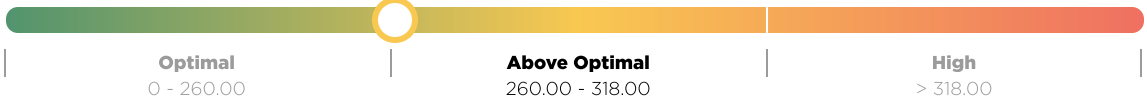
Vitamin D (25-OH)
56.20 ng/mL



Vitamin B12
462.00 pg/mL

Folate - Serum
15.20 ng/mL

Methylmalonic Acid
261.00 nmol/L



Folate - RBC
376.00 ng/mL

HORMONES

DHEA-S - Female
285.00 µg/dL

FSH - Female
Unknown
16.30 mIU/mL

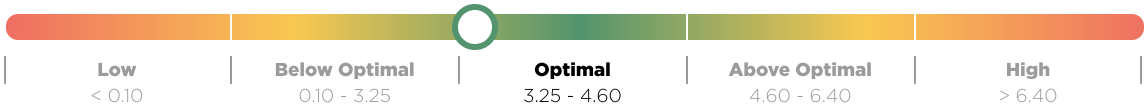
Follicular	2.50-10.20	Luteal	1.50-9.10
Ovulation	3.10-17.70	Post Menopausal	23.00-116.30

LH - Female
Unknown
9.80 mIU/mL

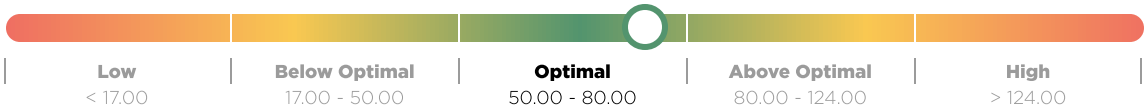
Follicular	1.90-12.50	Luteal	0.50-16.90
Ovulation	8.70-76.30	Post Menopausal	10.00-54.70

Testosterone Total - Female
33.20 ng/dL

Testosterone Free - Female
3.38 pg/mL



Sex Hormone Binding Globulin - Female
75.00 nmol/L



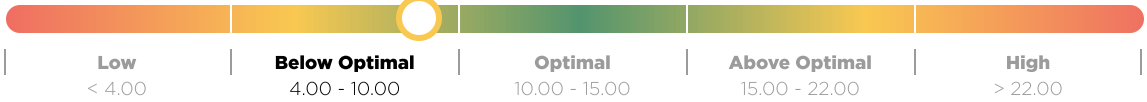
Estradiol - Female
Unknown
55.00 pg/mL

Follicular	19.00-144.00	Luteal	56.00-214.00
Ovulation	64.00-357.00	Post Menopausal	0.00-31.00

Progesterone - Female
Unknown
8.00 ng/mL

Follicular	0.00-1.00	Luteal	2.60-21.50
Ovulation	0.10-12.00	Post Menopausal	0.00-0.50

Cortisol - Total/AM
9.00 µg/dL



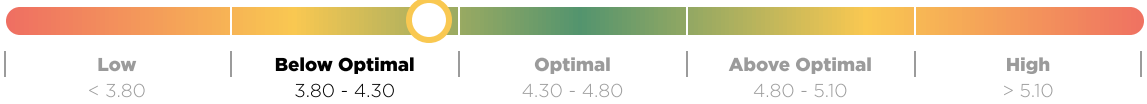
Cortisol : DHEA-S
0.03 ratio

Gastrin
46.00 pg/mL

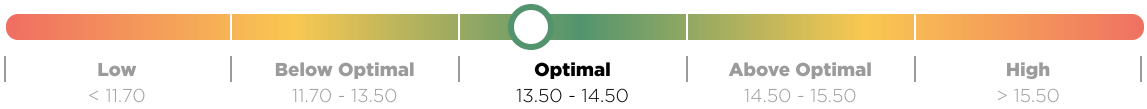
Testosterone Bioavailable - Female
8.10 ng/dL

CBC

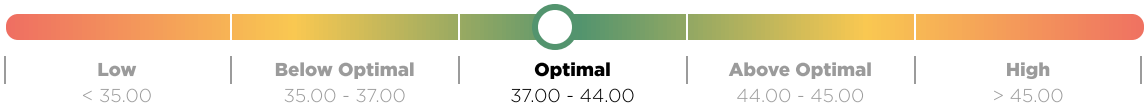
RBC - Female
4.23 m/cumm



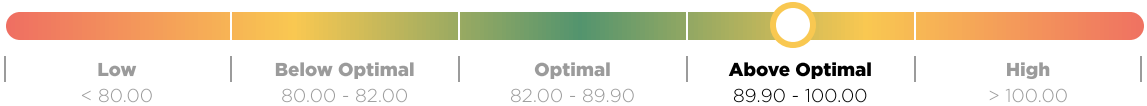
Hemoglobin - Female
13.80 g/dL



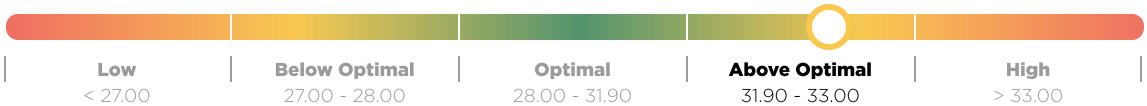
Hematocrit - Female
40.00 %



MCV
94.60 fL

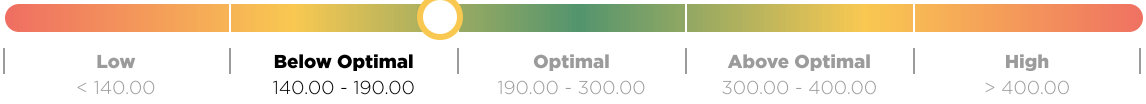


MCH
32.60 pg



MCHC
34.50 g/dL

Platelets
187.00 10E3/uL



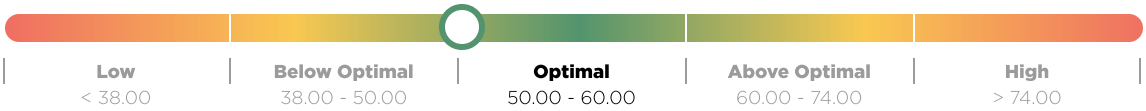
MPV
8.80 fL

RDW
12.40 %

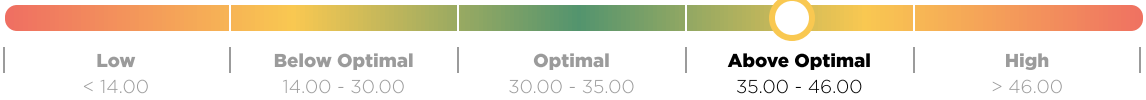
WBCS

Total WBCs
2.60 k/cumm

Neutrophils - %
50.40 %



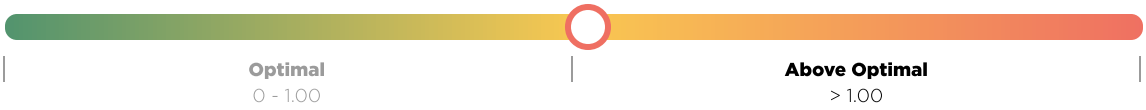
Lymphocytes - %
40.20 %



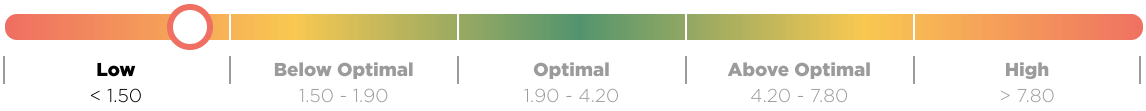
Monocytes - %
6.80 %

Eosinophils - %
1.50 %

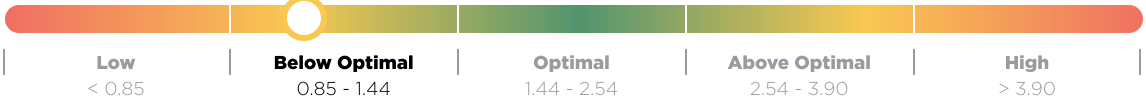
Basophils - %
1.10 %



Neutrophils - Absolute
1.31 k/cumm



Lymphocytes - Absolute
1.05 k/cumm



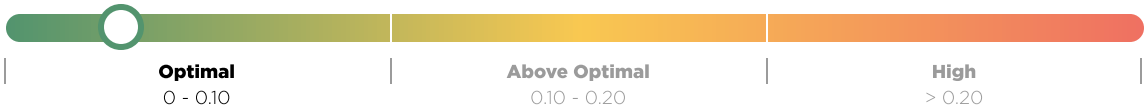
Monocytes - Absolute
0.18 k/cumm

Eosinophils - Absolute

0.04 k/cumm

Basophils - Absolute

0.03 k/cumm



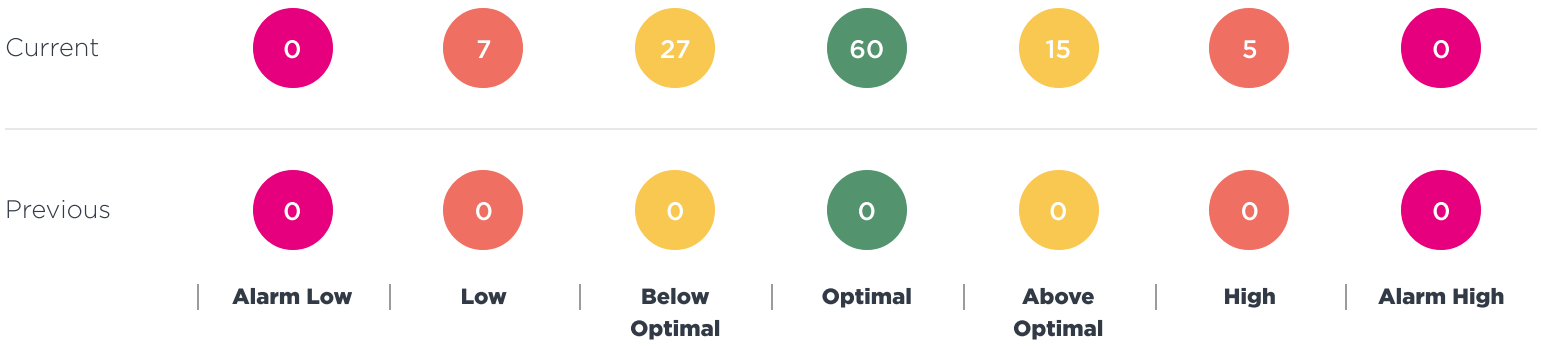
Neutrophil : Lymphocyte

1.25 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	Quest Current Jun 07 2023	Optimal Range	Standard Range	Units
BLOOD GLUCOSE				
Glucose Fasting	87.50 ↑	75.00 - 86.00	65.00 - 99.00	mg/dL
Hemoglobin A1C	4.60	4.60 - 5.30	0 - 5.70	%
eAG	85.00	85.00 - 105.00	82.00 - 154.00	mg/dL
Insulin - Fasting	3.70	2.00 - 5.00	0 - 18.40	µIU/mL
C-Peptide	1.11	1.10 - 2.10	0.80 - 3.85	ng/mL
Fructosamine	201.00	190.00 - 228.00	190.00 - 270.00	µmol/L
HOMA2-%B	87.50 ↓	90.00 - 110.00	70.00 - 120.00	%
HOMA2-%S	124.00	85.00 - 200.00	75.00 - 250.00	%
HOMA2-IR	0.80	0.75 - 1.25	0.50 - 1.75	Index
QUICKI	0.40 ↓	0.45 - 5.00	0.34 - 5.00	Index
RENAL				
BUN	6.00 ↓↓	10.00 - 16.00	7.00 - 25.00	mg/dL
Creatinine	0.65 ↓	0.80 - 1.10	0.40 - 1.50	mg/dL
BUN : Creatinine	9.00 ↓	10.00 - 16.00	6.00 - 22.00	Ratio
eGFR	104.00	90.00 - 120.00	60.00 - 160.00	mL/min/1.73m2

Biomarker	Quest Current Jun 07 2023	Optimal Range	Standard Range	Units
ELECTROLYTES				
Sodium	141.90	137.00 - 142.00	135.00 - 146.00	mEq/L
Potassium	3.90 ↓	4.00 - 5.00	3.50 - 5.30	mEq/L
Chloride	106.00	100.00 - 106.00	98.00 - 110.00	mEq/L
CO2	26.00	25.00 - 30.00	19.00 - 30.00	mEq/L
Sodium : Potassium	36.38 ↑ ↑	30.00 - 35.00		ratio
METABOLIC				
Anion Gap	13.80 ↑	7.00 - 12.00	6.00 - 16.00	mEq/L
Uric Acid - Female	5.65 ↑	3.00 - 4.70	2.50 - 7.00	mg/dL
Creatine Kinase	72.00	65.00 - 135.00	29.00 - 143.00	U/L
Leptin - Female	12.20 ↑	4.70 - 11.00	4.70 - 23.70	ng/mL
ENZYMES				
Amylase	42.00	40.00 - 86.00	21.00 - 103.00	U/L
Lipase	25.00	22.00 - 51.00	13.00 - 60.00	U/L
PROTEINS				
Protein - Total	6.10 ↓	6.90 - 8.10	6.10 - 8.10	g/dL
Albumin	4.40 ↓	4.50 - 5.00	3.60 - 5.10	g/dL
Globulin - Total	1.70 ↓ ↓	2.40 - 2.80	1.90 - 3.70	g/dL
Albumin : Globulin	2.60 ↑ ↑	1.40 - 2.10	1.00 - 2.50	ratio
MINERALS				
Calcium	9.10	8.90 - 9.50	8.60 - 10.40	mg/dL
Phosphorus	2.90	2.60 - 3.50	2.50 - 4.50	mg/dL
Magnesium - Serum	2.30	2.20 - 2.50	1.50 - 2.50	mg/dL
Magnesium - RBC	6.20	6.00 - 6.80	4.00 - 6.80	mg/dL
Copper - Serum	76.00 ↓	90.00 - 150.00	70.00 - 175.00	µg/dL
Zinc - Serum	65.70 ↓	99.00 - 130.00	50.00 - 130.00	µg/dL
Zinc - RBC	9.20 ↓	10.40 - 14.70	9.00 - 14.70	mg/L
Copper : Zinc Ratio	1.16	0.70 - 1.50	0.80 - 2.00	Ratio
Calcium : Albumin	2.07	0 - 2.18	0 - 2.60	ratio
Calcium : Phosphorus	3.14	2.30 - 3.20	1.90 - 4.20	ratio
LIVER AND GB				
Alk Phos	46.00	45.00 - 100.00	31.00 - 125.00	IU/L
AST	14.00	10.00 - 26.00	10.00 - 35.00	IU/L
ALT	11.00	10.00 - 26.00	6.00 - 29.00	IU/L
LDH	131.00 ↓	140.00 - 200.00	100.00 - 200.00	IU/L
Bilirubin - Total	0.60	0.50 - 0.90	0.20 - 1.20	mg/dL
Bilirubin - Direct	0.10	0.10 - 0.15	0 - 0.20	mg/dL
Bilirubin - Indirect	0.50	0.40 - 0.75	0.20 - 1.20	mg/dL
GGT	8.00 ↓	10.00 - 17.00	3.00 - 50.00	IU/L
AST : ALT	1.27 ↑	0 - 1.00	0 - 1.50	Ratio

Biomarker	Quest Current Jun 07 2023	Optimal Range	Standard Range	Units
IRON MARKERS				
Iron - Serum	79.00 ↓	85.00 - 130.00	40.00 - 190.00	µg/dL
Ferritin	12.00 ↓ ↓	45.00 - 79.00	16.00 - 232.00	ng/mL
TIBC	284.00	250.00 - 350.00	250.00 - 425.00	µg/dL
UIBC	205.00	130.00 - 300.00	110.00 - 350.00	µg/dL
% Transferrin saturation	28.00	24.00 - 35.00	20.00 - 48.00	%
Transferrin	255.00	200.00 - 360.00	200.00 - 390.00	mg/dL
LIPIDS				
Cholesterol - Total	165.00	160.00 - 199.00	125.00 - 199.00	mg/dL
Triglycerides	65.00 ↓	70.00 - 80.00	0 - 149.99	mg/dL
LDL Cholesterol	70.00 ↓	80.00 - 99.99	0 - 99.99	mg/dL
HDL Cholesterol	81.00	55.00 - 93.00	50.00 - 100.00	mg/dL
Non-HDL Cholesterol	84.00	70.00 - 99.00	0 - 129.99	mg/dL
VLDL Cholesterol	14.20	0 - 15.00	0 - 29.00	mg/dL
LDL : HDL - Female	0.86	0 - 2.34	0 - 4.12	Ratio
Triglyceride:HDL	0.80	0.50 - 1.90	0 - 2.00	ratio
Cholesterol : HDL	2.04	0 - 3.00	0 - 5.00	Ratio
CARDIOMETABOLIC				
Homocysteine	7.50 ↑	5.00 - 7.20	0 - 10.30	µmol/L
THYROID				
TSH	2.95 ↑	1.00 - 2.00	0.40 - 4.50	mIU/L
T4 - Total	5.20 ↓	6.00 - 11.90	4.50 - 12.00	µg/dL
T4 - Free	0.98 ↓	1.00 - 1.50	0.80 - 1.80	ng/dL
T3 - Total	89.20 ↓	90.00 - 168.00	76.00 - 181.00	ng/dL
T3 - Free	2.80 ↓	3.00 - 3.50	2.30 - 4.20	pg/mL
Reverse T3	28.00 ↑ ↑	10.00 - 25.00	8.00 - 25.00	ng/dL
T3 Uptake	26.20 ↓	27.00 - 35.00	22.00 - 35.00	%
Free Thyroxine Index (T7)	1.36 ↓ ↓	1.70 - 4.60	1.40 - 3.80	Index
Thyroid Peroxidase (TPO) Abs	1.10	0 - 6.80	0 - 9.00	IU/mL
Thyroglobulin Abs	<1.00	0 - 1.00		IU/mL
Free T3 : Reverse T3	10.00	10.00 - 28.00	2.00 - 28.00	Ratio
Free T3 : Free T4	2.86 ↑	2.40 - 2.70	2.20 - 2.90	Ratio
INFLAMMATION				
Hs CRP - Female	1.15 ↑ ↑	0 - 1.00		mg/L
C-Reactive Protein	4.65 ↑	0 - 3.00	0 - 7.90	mg/L
ESR - Female	11.20 ↑	0 - 10.00	0 - 20.00	mm/hr
Fibrinogen Activity	221.00	175.00 - 300.00	175.00 - 425.00	mg/dL
VITAMINS				
Vitamin D (25-OH)	56.20	50.00 - 90.00	30.00 - 100.00	ng/mL
Vitamin B12	462.00 ↓	545.00 - 1100.00	200.00 - 1100.00	pg/mL

Biomarker	Quest Current Jun 07 2023	Optimal Range	Standard Range	Units
Folate - Serum	15.20	15.00 - 27.00	5.50 - 27.00	ng/mL
Methylmalonic Acid	261.00 ↑	0 - 260.00	0 - 318.00	nmol/L
Folate - RBC	376.00 ↓	500.00 - 1504.00	280.00 - 1504.00	ng/mL
HORMONES				
DHEA-S - Female	285.00	275.00 - 391.00	18.00 - 391.00	µg/dL
FSH - Female	16.30 *UNKNOWN*	Follicular Luteal Ovulation Post Menopausal	2.50 - 10.20 1.50 - 9.10 3.10 - 17.70 23.00 - 116.30	mIU/mL
LH - Female	9.80 *UNKNOWN*	Follicular Luteal Ovulation Post Menopausal	1.90 - 12.50 0.50 - 16.90 8.70 - 76.30 10.00 - 54.70	mIU/mL
Testosterone Total - Female	33.20 ↓	35.00 - 45.00	2.00 - 45.00	ng/dL
Testosterone Free - Female	3.38	3.25 - 4.60	0.10 - 6.40	pg/mL
Sex Hormone Binding Globulin - Female	75.00	50.00 - 80.00	17.00 - 124.00	nmol/L
Estradiol - Female	55.00 *UNKNOWN*	Follicular Luteal Ovulation Post Menopausal	19.00 - 144.00 56.00 - 214.00 64.00 - 357.00 0.00 - 31.00	pg/mL
Progesterone - Female	8.00 *UNKNOWN*	Follicular Luteal Ovulation Post Menopausal	0.00 - 1.00 2.60 - 21.50 0.10 - 12.00 0.00 - 0.50	ng/mL
Cortisol - Total/AM	9.00 ↓	10.00 - 15.00	4.00 - 22.00	µg/dL
Cortisol : DHEA-S	0.03	0 - 0.09		ratio
Gastrin	46.00	45.00 - 90.00	0 - 100.00	pg/mL
Testosterone Bioavailable - Female	8.10	5.50 - 8.50	0.50 - 8.50	ng/dL
CBC				
RBC - Female	4.23 ↓	4.30 - 4.80	3.80 - 5.10	m/cumm
Hemoglobin - Female	13.80	13.50 - 14.50	11.70 - 15.50	g/dL
Hematocrit - Female	40.00	37.00 - 44.00	35.00 - 45.00	%
MCV	94.60 ↑	82.00 - 89.90	80.00 - 100.00	fL
MCH	32.60 ↑	28.00 - 31.90	27.00 - 33.00	pg
MCHC	34.50	34.00 - 36.00	32.00 - 36.00	g/dL
Platelets	187.00 ↓	190.00 - 300.00	140.00 - 400.00	10E3/uL
MPV	8.80 ↑	7.50 - 8.20	7.50 - 11.50	fL
RDW	12.40	11.00 - 12.60	11.00 - 15.00	%
WBCS				
Total WBCs	2.60 ↓ ↓	3.80 - 6.00	3.80 - 10.80	k/cumm
Neutrophils - %	50.40	50.00 - 60.00	38.00 - 74.00	%
Lymphocytes - %	40.20 ↑	30.00 - 35.00	14.00 - 46.00	%
Monocytes - %	6.80	4.00 - 7.00	4.00 - 13.00	%
Eosinophils - %	1.50	0 - 3.00		%
Basophils - %	1.10 ↑ ↑	0 - 1.00		%

Biomarker	Quest			
	Current Jun 07 2023	Optimal Range	Standard Range	Units
Neutrophils - Absolute	1.31 ↓ ↓	1.90 - 4.20	1.50 - 7.80	k/cumm
Lymphocytes - Absolute	1.05 ↓	1.44 - 2.54	0.85 - 3.90	k/cumm
Monocytes - Absolute	0.18 ↓ ↓	0.20 - 0.40	0.20 - 0.95	k/cumm
Eosinophils - Absolute	0.04	0.03 - 0.20	0 - 0.50	k/cumm
Basophils - Absolute	0.03	0 - 0.10	0 - 0.20	k/cumm
Neutrophil : Lymphocyte	1.25	1.00 - 1.70	1.00 - 3.00	Ratio

Blood Test Score Report

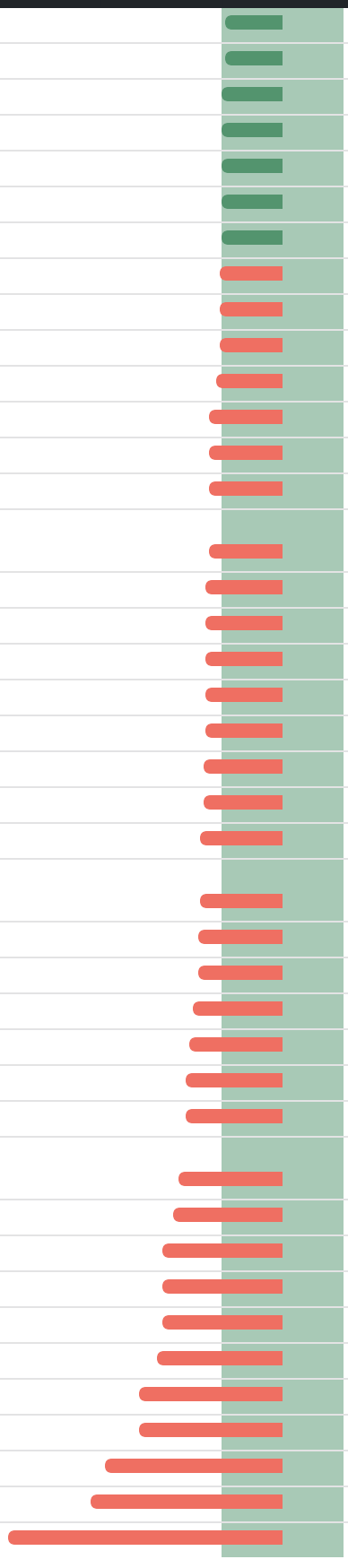
This report shows the biomarkers on the blood test that are farthest from the median expressed as a %.

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
Lymphocytes - %	40.20	30.00	35.00	154	
TSH	2.95	1.00	2.00	145	
MPV	8.80	7.50	8.20	136	
Albumin : Globulin	2.60	1.40	2.10	121	
MCV	94.60	82.00	89.90	109	
Uric Acid - Female	5.65	3.00	4.70	106	
C-Reactive Protein	4.65	0	3.00	105	
Free T3 : Free T4	2.86	2.40	2.70	103	
Anion Gap	13.80	7.00	12.00	86	
Sodium : Potassium	36.38	30.00	35.00	78	
AST : ALT	1.27	0	1.00	77	
Reverse T3	28.00	10.00	25.00	70	
Leptin - Female	12.20	4.70	11.00	69	
MCH	32.60	28.00	31.90	68	
Hs CRP - Female	1.15	0	1.00	65	
Glucose Fasting	87.50	75.00	86.00	64	
Homocysteine	7.50	5.00	7.20	64	
ESR - Female	11.20	0	10.00	62	
Basophils - %	1.10	0	1.00	60	
Methylmalonic Acid	261.00	0	260.00	50	
Chloride	106.00	100.00	106.00	50	
Thyroglobulin Abs	<1.00	0	1.00	50	
Sodium	141.90	137.00	142.00	48	
Calcium : Albumin	2.07	0	2.18	45	
VLDL Cholesterol	14.20	0	15.00	45	
Monocytes - %	6.80	4.00	7.00	43	
Calcium : Phosphorus	3.14	2.30	3.20	43	
RDW	12.40	11.00	12.60	38	
Testosterone Bioavailable - Female	8.10	5.50	8.50	37	
Sex Hormone Binding Globulin - Female	75.00	50.00	80.00	33	
HDL Cholesterol	81.00	55.00	93.00	18	
Cholesterol : HDL	2.04	0	3.00	18	

Biomarker	Lab Result	Optimal Range		% Deviation	Optimal Range
		Low	High		Low High
Copper : Zinc Ratio	1.16	0.70	1.50	8	
Insulin - Fasting	3.70	2.00	5.00	7	
Eosinophils - %	1.50	0	3.00	0	
Non-HDL Cholesterol	84.00	70.00	99.00	-2	
eGFR	104.00	90.00	120.00	-3	
UIBC	205.00	130.00	300.00	-6	
Hematocrit - Female	40.00	37.00	44.00	-7	
Fibrinogen Activity	221.00	175.00	300.00	-13	
LDL : HDL - Female	0.86	0	2.34	-13	
% Transferrin saturation	28.00	24.00	35.00	-14	
Neutrophil : Lymphocyte	1.25	1.00	1.70	-14	
Transferrin	255.00	200.00	360.00	-16	
TIBC	284.00	250.00	350.00	-16	
HOMA2-%S	124.00	85.00	200.00	-16	
Calcium	9.10	8.90	9.50	-17	
Phosphorus	2.90	2.60	3.50	-17	
Magnesium - Serum	2.30	2.20	2.50	-17	
Cortisol : DHEA-S	0.03	0	0.09	-17	
Hemoglobin - Female	13.80	13.50	14.50	-20	
Basophils - Absolute	0.03	0	0.10	-20	
Fructosamine	201.00	190.00	228.00	-21	
Bilirubin - Indirect	0.50	0.40	0.75	-21	
AST	14.00	10.00	26.00	-25	
Bilirubin - Total	0.60	0.50	0.90	-25	
MCHC	34.50	34.00	36.00	-25	
Magnesium - RBC	6.20	6.00	6.80	-25	
Triglyceride:HDL	0.80	0.50	1.90	-29	
CO2	26.00	25.00	30.00	-30	
Thyroid Peroxidase (TPO) Abs	1.10	0	6.80	-34	
Vitamin D (25-OH)	56.20	50.00	90.00	-34	
Cholesterol - Total	165.00	160.00	199.00	-37	
Lipase	25.00	22.00	51.00	-40	
Creatine Kinase	72.00	65.00	135.00	-40	
HOMA2-IR	0.80	0.75	1.25	-40	
Testosterone Free - Female	3.38	3.25	4.60	-40	
DHEA-S - Female	285.00	275.00	391.00	-41	
ALT	11.00	10.00	26.00	-44	
Eosinophils - Absolute	0.04	0.03	0.20	-44	
Amylase	42.00	40.00	86.00	-46	
Neutrophils - %	50.40	50.00	60.00	-46	
Gastrin	46.00	45.00	90.00	-48	

Biomarker	Lab Result	Optimal Range		% Deviation	Optimal Range
		Low	High		Low High
Alk Phos	46.00	45.00	100.00	-48	
Folate - Serum	15.20	15.00	27.00	-48	
C-Peptide	1.11	1.10	2.10	-49	
Bilirubin - Direct	0.10	0.10	0.15	-50	
Hemoglobin A1C	4.60	4.60	5.30	-50	
eAG	85.00	85.00	105.00	-50	
Free T3 : Reverse T3	10.00	10.00	28.00	-50	
T3 - Total	89.20	90.00	168.00	-51	
QUICKI	0.40	0.45	5.00	-51	
Platelets	187.00	190.00	300.00	-53	
T4 - Free	0.98	1.00	1.50	-54	
Potassium	3.90	4.00	5.00	-60	
T3 Uptake	26.20	27.00	35.00	-60	
Monocytes - Absolute	0.18	0.20	0.40	-60	
Free Thyroxine Index (T7)	1.36	1.70	4.60	-62	
Folate - RBC	376.00	500.00	1504.00	-62	
HOMA2-%B	87.50	90.00	110.00	-62	
Iron - Serum	79.00	85.00	130.00	-63	
T4 - Total	5.20	6.00	11.90	-64	
RBC - Female	4.23	4.30	4.80	-64	
Vitamin B12	462.00	545.00	1100.00	-65	
LDH	131.00	140.00	200.00	-65	
BUN : Creatinine	9.00	10.00	16.00	-67	
Testosterone Total - Female	33.20	35.00	45.00	-68	
Albumin	4.40	4.50	5.00	-70	
Cortisol - Total/AM	9.00	10.00	15.00	-70	
Copper - Serum	76.00	90.00	150.00	-73	
Neutrophils - Absolute	1.31	1.90	4.20	-76	
Zinc - RBC	9.20	10.40	14.70	-78	
GGT	8.00	10.00	17.00	-79	
Lymphocytes - Absolute	1.05	1.44	2.54	-85	
T3 - Free	2.80	3.00	3.50	-90	
Creatinine	0.65	0.80	1.10	-100	
Triglycerides	65.00	70.00	80.00	-100	
LDL Cholesterol	70.00	80.00	99.99	-100	
Total WBCs	2.60	3.80	6.00	-105	
BUN	6.00	10.00	16.00	-117	
Protein - Total	6.10	6.90	8.10	-117	
Ferritin	12.00	45.00	79.00	-147	
Zinc - Serum	65.70	99.00	130.00	-157	
Globulin - Total	1.70	2.40	2.80	-225	



Blood Test History

Key

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

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.

Biomarker	Latest Test Result Quest Jun 07 2023
BLOOD GLUCOSE	
Glucose Fasting	87.50 ↑
Hemoglobin A1C	4.60
eAG	85.00
Insulin - Fasting	3.70
C-Peptide	1.11
Fructosamine	201.00
HOMA2-%B	87.50 ↓
HOMA2-%S	124.00
HOMA2-IR	0.80
QUICKI	0.40 ↓
RENAL	
BUN	6.00 ↓ ↓
Creatinine	0.65 ↓
BUN : Creatinine	9.00 ↓
eGFR	104.00
ELECTROLYTES	
Sodium	141.90

Biomarker	Latest Test Result Quest Jun 07 2023
Potassium	3.90 ↓
Chloride	106.00
CO2	26.00
Sodium : Potassium	36.38 ↑ ↑
METABOLIC	
Anion Gap	13.80 ↑
Uric Acid - Female	5.65 ↑
Creatine Kinase	72.00
Leptin - Female	12.20 ↑
ENZYMES	
Amylase	42.00
Lipase	25.00
PROTEINS	
Protein - Total	6.10 ↓
Albumin	4.40 ↓
Globulin - Total	1.70 ↓ ↓
Albumin : Globulin	2.60 ↑ ↑
MINERALS	
Calcium	9.10
Phosphorus	2.90
Magnesium - Serum	2.30
Magnesium - RBC	6.20
Copper - Serum	76.00 ↓
Zinc - Serum	65.70 ↓
Zinc - RBC	9.20 ↓
Copper : Zinc Ratio	1.16

Biomarker	Latest Test Result Quest Jun 07 2023
Calcium : Albumin	2.07
Calcium : Phosphorus	3.14
LIVER AND GB	
Alk Phos	46.00
AST	14.00
ALT	11.00
LDH	131.00 ↓
Bilirubin - Total	0.60
Bilirubin - Direct	0.10
Bilirubin - Indirect	0.50
GGT	8.00 ↓
AST : ALT	1.27 ↑
IRON MARKERS	
Iron - Serum	79.00 ↓
Ferritin	12.00 ↓ ↓
TIBC	284.00
UIBC	205.00
% Transferrin saturation	28.00
Transferrin	255.00
LIPIDS	
Cholesterol - Total	165.00
Triglycerides	65.00 ↓
LDL Cholesterol	70.00 ↓
HDL Cholesterol	81.00
Non-HDL Cholesterol	84.00
VLDL Cholesterol	14.20

Biomarker	Latest Test Result Quest Jun 07 2023
LDL : HDL - Female	0.86
Triglyceride:HDL	0.80
Cholesterol : HDL	2.04
CARDIOMETABOLIC	
Homocysteine	7.50 ↑
THYROID	
TSH	2.95 ↑
T4 - Total	5.20 ↓
T4 - Free	0.98 ↓
T3 - Total	89.20 ↓
T3 - Free	2.80 ↓
Reverse T3	28.00 ↑ ↑
T3 Uptake	26.20 ↓
Free Thyroxine Index (T7)	1.36 ↓ ↓
Thyroid Peroxidase (TPO) Abs	1.10
Thyroglobulin Abs	<1.00
Free T3 : Reverse T3	10.00
Free T3 : Free T4	2.86 ↑
INFLAMMATION	
Hs CRP - Female	1.15 ↑ ↑
C-Reactive Protein	4.65 ↑
ESR - Female	11.20 ↑
Fibrinogen Activity	221.00
VITAMINS	
Vitamin D (25-OH)	56.20
Vitamin B12	462.00 ↓

Biomarker	Latest Test Result Quest Jun 07 2023
Folate - Serum	15.20
Methylmalonic Acid	261.00 ↑
Folate - RBC	376.00 ↓
HORMONES	
DHEA-S - Female	285.00
FSH - Female	16.30 *UNKNOWN*
LH - Female	9.80 *UNKNOWN*
Testosterone Total - Female	33.20 ↓
Testosterone Free - Female	3.38
Sex Hormone Binding Globulin - Female	75.00
Estradiol - Female	55.00 *UNKNOWN*
Progesterone - Female	8.00 *UNKNOWN*
Cortisol - Total/AM	9.00 ↓
Cortisol : DHEA-S	0.03
Gastrin	46.00
Testosterone Bioavailable - Female	8.10
CBC	
RBC - Female	4.23 ↓
Hemoglobin - Female	13.80
Hematocrit - Female	40.00
MCV	94.60 ↑
MCH	32.60 ↑
MCHC	34.50
Platelets	187.00 ↓
MPV	8.80 ↑
RDW	12.40

Biomarker	Latest Test Result Quest Jun 07 2023
WBCS	
Total WBCs	2.60 ↓ ↓
Neutrophils - %	50.40
Lymphocytes - %	40.20 ↑
Monocytes - %	6.80
Eosinophils - %	1.50
Basophils - %	1.10 ↑ ↑
Neutrophils - Absolute	1.31 ↓ ↓
Lymphocytes - Absolute	1.05 ↓
Monocytes - Absolute	0.18 ↓ ↓
Eosinophils - Absolute	0.04
Basophils - Absolute	0.03
Neutrophil : Lymphocyte	1.25

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 a see a more detailed view of the blood test result itself.

Total number of biomarkers by range

Alarm Low	Low	Below Optimal	Optimal	Above Optimal	High	Alarm High	Total
0	7	27	60	15	5	0	114

Above Optimal

Basophils - %

1.10 %

Basophils are one of the circulating white blood cells. They constitute a small percentage of the total white blood cell count. Basophils play an important role in the inflammatory process by releasing important substances, such as heparin, to prevent clotting in the inflamed tissue. Basophils will often be increased with tissue inflammation and are often seen with cases of intestinal parasites.

Hs CRP - Female

1.15 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.

Reverse T3

28.00 ng/dL

Reverse T-3 is formed from the thyroid hormone T-4 (thyroxine). It is thought to be an inactive form of thyroid hormone that acts as a sort of metabolic brake on the body. High stress and cortisol levels, chronic illness, inflammation, multiple vitamin deficiencies, fasting, yo-yo dieting, poor nutrition, calorie restriction, lack of exercise, and increased alcohol intake can all raise reverse T-3 levels.

Sodium : Potassium

36.38 ratio

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

Albumin : Globulin

2.60 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.

Methylmalonic Acid

261.00 nmol/L

Methylmalonic acid (MMA) is a byproduct of the metabolism of certain fatty acids and amino acids, a process that requires vitamin B12. Testing for MMA can help detect an early B12 deficiency and help differentiate between folate and B12 deficiency. Elevated levels reflect a B12 deficiency.

ESR - Female

11.20 mm/hr

The ESR test is based on the fact that certain blood proteins will become altered in inflammatory conditions, causing aggregation of the red blood cells. Elevated levels of ESR are associated with inflammation.

Homocysteine

7.50 µmol/L

Homocysteine is a molecule formed from the incomplete metabolism of the amino acid methionine. Increased levels of homocysteine are associated with an increased risk of cardiovascular disease and stroke.

Glucose Fasting

87.50 mg/dL

Fasting blood glucose (FBG) is a critical indicator of metabolic status and reflects the intricate balance of glucose homeostasis, primarily mediated by the hormones insulin and glucagon. Insulin facilitates cellular glucose uptake and inhibits hepatic glucose production, while glucagon promotes glycogenolysis and gluconeogenesis in the liver. Elevated FBG levels are typically indicative of disrupted insulin activity or insufficient insulin secretion, commonly seen in conditions such as type 1 diabetes mellitus, where pancreatic beta-cell destruction leads to severe insulin deficiency, and type 2 diabetes mellitus, characterized by insulin resistance and eventual pancreatic beta-cell exhaustion. Additionally, increased FBG can signal underlying metabolic syndrome or prediabetic states, suggesting a broader spectrum of insulin resistance encompassing impaired glucose tolerance and altered lipid metabolism.

MCH

32.60 pg

The Mean Corpuscular Hemoglobin (MCH) is a calculated value and is an expression of the average weight of hemoglobin per red blood cell. MCH, along with MCV can be helpful in determining the type of anemia present. It is elevated with B12/folate deficiency and hypochlorhydria.

Leptin - Female

12.20 ng/mL

Leptin is a hormone produced by adipose (fat) tissue. Ongoing research indicates that leptin plays a role in many physiological processes in the body including immunity, bone formation, blood cell formation, and blood sugar regulation. Increasing leptin levels are associated with increased body fat levels.

AST : ALT

1.27 Ratio

The AST:ALT ratio, also known as the De Ritis ratio, provides a tool for assessing and monitoring liver function and the progression and the severity of liver disease. An increasing AST:ALT ratio above 1 is associated with a trend towards progressive impairment of liver function

Anion Gap

13.80 mEq/L

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

Free T3 : Free T4

2.86 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). A high ratio, on the other hand, indicates that there might be an excessive conversion of T4 to T3, which can be seen in situations of hyperactive thyroid function where there's excessive T3 production. In certain situations, an elevated ratio may also be associated with an emerging hypothyroidism.

C-Reactive Protein

4.65 mg/L

C-Reactive Protein is a blood marker that can help indicate the level of inflammation in the body.

Uric Acid - Female

5.65 mg/dL

Uric acid is produced as an end-product of purine, nucleic acid, and nucleoprotein metabolism. Levels can increase due to over-production by the body or decreased excretion by the kidneys. Increased uric acid levels are associated with gout, atherosclerosis, oxidative stress, arthritis, kidney dysfunction, circulatory disorders and intestinal permeability.

MCV

94.60 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.

MPV

8.80 fL

MPV or Mean Platelet Volume is a calculated measurement of the relative size of platelets in the blood. Elevated levels of MPV are seen with platelet destruction.

TSH

2.95 mIU/L

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.

Lymphocytes - %

40.20 %

Lymphocytes are a type of white blood cell. An increase in *Lymphocytes - %* is usually a sign of a viral infection but can also be a sign of increased toxicity in the body or inflammation.

Below Optimal

Monocytes - Absolute

0.18 k/cumm

Monocytes are white blood cells that are the body's second line of defense against infection. They are phagocytic cells that are capable of movement and remove dead cells, microorganisms, and particulate matter from circulating blood. Levels tend to rise at the recovery phase of an infection or with chronic infection.

Free Thyroxine Index (T7)

1.36 Index

The Free Thyroxine Index is a calculated measurement used to determine how much active thyroid hormone (thyroxine/Free T4) is available. Decreased levels are associated with hypothyroidism.

Neutrophils - Absolute

1.31 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. Decreased levels are often seen in chronic viral infections.

Total WBCs

2.60 k/cumm

The total White Blood Cell (WBC) count measures the sum of all the WBCs in the peripheral blood. Decreased total White Blood Cell Levels are associated with chronic bacterial or viral infections, immune insufficiency, and may be seen in people eating a raw food diet.

BUN

6.00 mg/dL

Blood Urea Nitrogen (BUN) is a key biochemical marker reflecting protein metabolism and renal function. Urea, the primary component measured by BUN tests, is formed in the liver as an end product of protein degradation and is subsequently excreted by the kidneys. Decreased BUN levels may be less clinically significant but can occur in scenarios such as severe hepatic damage where urea production is compromised, malnutrition or overhydration, which dilutes the concentration of urea in the blood.

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.

Globulin - Total

1.70 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.

T3 - Total

89.20 ng/dL

T-3 is the most active thyroid hormone and is primarily produced from the conversion of thyroxine (T-4) in the peripheral tissue. T-3 is 4 -5 times more metabolically active than T-4. Total T3 reflects the total amount of T3 present in the blood i.e. amount bound to protein and free levels. Decreased total T-3 are associated with Hypothyroidism and/or a selenium deficiency.

QUICKI

0.40 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.

Platelets

187.00 10E3/uL

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. Decreased levels are associated with oxidative stress, heavy metal body burden and infections.

T4 - Free

0.98 ng/dL

T-4 is the major hormone secreted by the thyroid gland. T-4 production and secretion from the thyroid gland are stimulated by the pituitary hormone TSH. Deficiencies of zinc, copper, and vitamins A, B2, B3, B6, and C will cause a decrease in the production of T4 by the follicles of the thyroid gland. Free T-4 is the unbound form of T4 in the body. Only about 0.03 – 0.05% of circulating T4 is in the free form. Free T-4 will be decreased in hypothyroidism and is associated with iodine deficiency.

T3 Uptake

26.20 %

The T-3 uptake test has nothing to do with actual T-3 levels, as the name might suggest. Decreased levels are associated with hypothyroidism and deficiencies of iodine and selenium.

Potassium

3.90 mEq/L

Potassium is one of the main electrolytes in the body. Due to the critical functions of potassium for human metabolism and physiology, it is essential for the body to maintain optimal serum levels even though a small concentration is found outside of the cell. Potassium levels should always be viewed in relation to the other electrolytes. Potassium concentration is greatly influenced by adrenal hormones. Decreased levels are associated with adrenal stress and may also be decreased with high blood pressure.

Folate - RBC

376.00 ng/mL

Folate functions as a coenzyme in the process of methylation. Along with vitamin B12, folate is essential for DNA synthesis. Low folate intake can result in folate deficiency, which can impair methylation, DNA synthesis, and red blood cell production.

HOMA2-%B

87.50 %

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.

Iron - Serum

79.00 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.

T4 - Total

5.20 µg/dL

T-4 is the major hormone secreted by the thyroid gland. T-4 production and secretion from the thyroid gland is stimulated by the pituitary hormone TSH. Total T4 reflects the total amount of T4 present in the blood i.e. amount bound to thyroxine-binding globulin and free levels. Decreased total T-4 levels are associated with Hypothyroidism and/or a selenium deficiency.

RBC - Female

4.23 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.

Vitamin B12

462.00 pg/mL

Vitamin B12 is an essential nutrient for DNA synthesis and red blood cell maturation and is also necessary for myelin sheath formation and the maintenance of nerves in the body. Decreased serum B12 levels are associated with a deficiency of B12, insufficient B12 intake in the diet, or malabsorption.

LDH

131.00 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.

BUN : Creatinine

9.00 Ratio

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

Testosterone Total - Female

33.20 ng/dL

The total testosterone test measures both the testosterone that is bound to serum proteins and the unbound form (free testosterone). In women, low total testosterone levels have been linked to an increased risk for the following: osteoporosis, decreased lean body mass and decreased libido.

Cortisol - Total/AM

9.00 µg/dL

The serum cortisol test is used to identify dysfunction in the adrenal gland. Decreased levels are associated with adrenal hypofunction, a dysfunction where the adrenal glands do not produce enough cortisol.

Albumin

4.40 g/dL

Albumin is one of the major blood proteins. Produced primarily in the liver, Albumin plays a major role in water distribution and serves as a transport protein for hormones and various drugs. Albumin levels are affected by digestive dysfunction and a decreased albumin can be an indication of malnutrition, digestive dysfunction due to HCl need (hypochlorhydria), or liver dysfunction. Malnutrition leads to a decreased albumin level in the serum primarily from lack of available essential amino acids. Decreased albumin can also be a strong indicator of oxidative stress and excess free radical activity.

Copper - Serum

76.00 µg/dL

Copper is an essential trace mineral involved in multiple functions in the body including energy production, iron transport, neurotransmitter synthesis, antioxidant activity, regulation of gene expression, red and white blood cell maturation, bone strength, brain development, and the metabolism of glucose and cholesterol. Low levels of copper are associated with anemia due to its role in red blood cell maturation in the bone marrow.

Zinc - RBC

9.20 mg/L

Zinc is a trace mineral that participates in a significant number of metabolic functions and is found throughout the body's tissues and fluids. Low levels of serum zinc are associated with zinc deficiency. Measuring RBC zinc provides a better assessment of intracellular and long-term zinc status than serum zinc alone.

GGT

8.00 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. Decreased levels are associated with vitamin B6 and magnesium deficiency.

Lymphocytes - Absolute

1.05 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.

T3 - Free

2.80 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.

Triglycerides

65.00 mg/dL

Serum triglycerides are composed of fatty acid molecules that enter the bloodstream either from the liver or from the diet. Serum Triglyceride levels may be decreased in liver dysfunction, a diet deficient in fat, and inflammatory processes.

Creatinine

0.65 mg/dL

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

LDL Cholesterol

70.00 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. There is no clinical significance for a decreased LDL level.

Protein - Total

6.10 g/dL

Total serum protein is composed of albumin and total globulin. Conditions that affect albumin and total globulin readings will impact the total protein value. A decreased total protein can be an indication of malnutrition, digestive dysfunction due to HCl need, or liver dysfunction. Malnutrition leads to a decreased total protein level in the serum primarily from lack of available essential amino acids.

Zinc - Serum

65.70 µg/dL

Zinc is a trace mineral that participates in a significant number of metabolic functions and is found throughout the body's tissues and fluids. Low levels of serum zinc are associated with zinc deficiency.

3

An in-depth functional system and nutrient evaluation.

Assessment

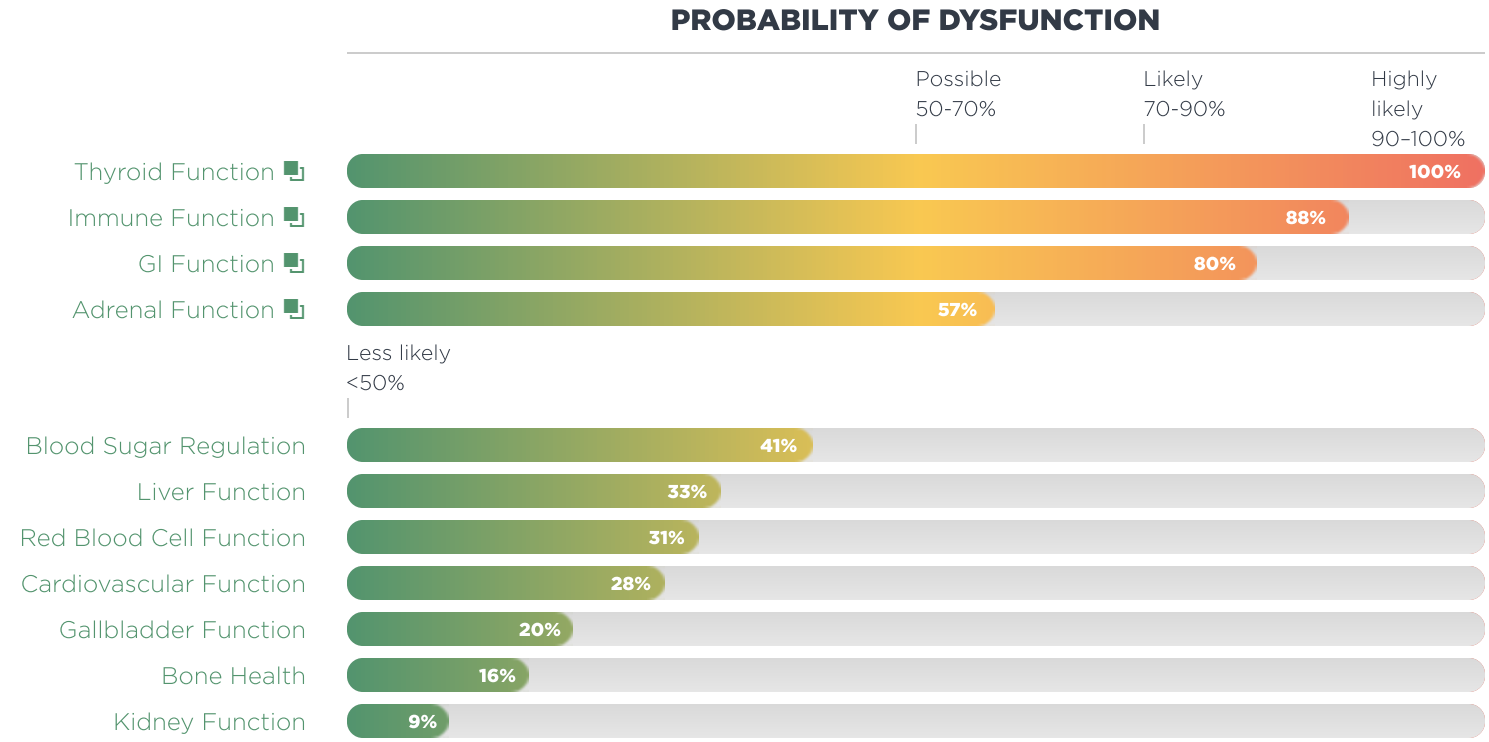
Functional Body Systems

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.

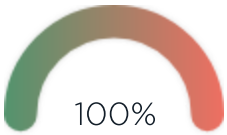
Please use this report in conjunction with the "Practitioner's Only Clinical Dysfunctions Report" to identify which dysfunctions and conditions are causing changes in the Functional Body Systems.

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.



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

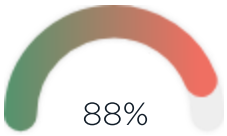
Your patient has a high Thyroid Function score, which indicates that there is likely a high risk of dysfunction in their thyroid. Further assessment is needed to pinpoint exactly what that dysfunction is. There is a strong likelihood of significant distress in the systems that help regulate the thyroid gland in the body. This may be caused by increased stress levels, 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 ↑, T4 - Total ↓, T4 - Free ↓, T3 - Total ↓, T3 - Free ↓, Reverse T3 ↑, T3 Uptake ↓, Free Thyroxine Index (T7) ↓

Biomarkers considered

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



Dysfunction Likely Improvement required.

IMMUNE FUNCTION

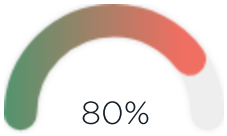
It is likely that your patient is trending towards dysfunction in their immune system. This could be emerging immune insufficiency, bacterial or viral Infections. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions".

Rationale

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

Biomarkers considered

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



Dysfunction Likely Improvement required.

GI FUNCTION

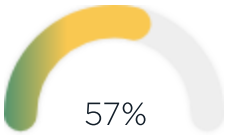
It is likely that your patient is trending towards dysfunction in their GI system. This could be emerging hypochlorhydria, inflammation of the gastric mucosa, H. pylori, pancreatic insufficiency, dysbiosis, or intestinal hyperpermeability. Please refer to the "Clinical Dysfunctions" report to get a sense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

Rationale

BUN ↓, Protein - Total ↓, Globulin - Total ↓, Albumin ↓, MCV ↑, Basophils - % ↑, Iron - Serum ↓, Creatinine ↓, Total WBCs ↓

Biomarkers considered

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



Dysfunction Possible There may be improvement needed in certain areas.

ADRENAL FUNCTION

Your patient has a moderately elevated Adrenal Function score, suggesting the potential for early-stage adrenal dysfunction. This may reflect initial imbalances in adrenal function, potentially indicating early Adrenal Stress or Adrenal Insufficiency. While immediate intervention may not be necessary, it is prudent to monitor this trend in future evaluations. Ongoing monitoring through periodic blood tests is recommended to detect any progression towards more significant dysfunction and to implement timely preventative measures.

Rationale

Sodium : Potassium ↑, Potassium ↓, Cortisol - Total/AM ↓

Biomarkers considered

Sodium : Potassium, Sodium, Potassium, Cortisol - Total/AM, DHEA-S - Female, Chloride

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

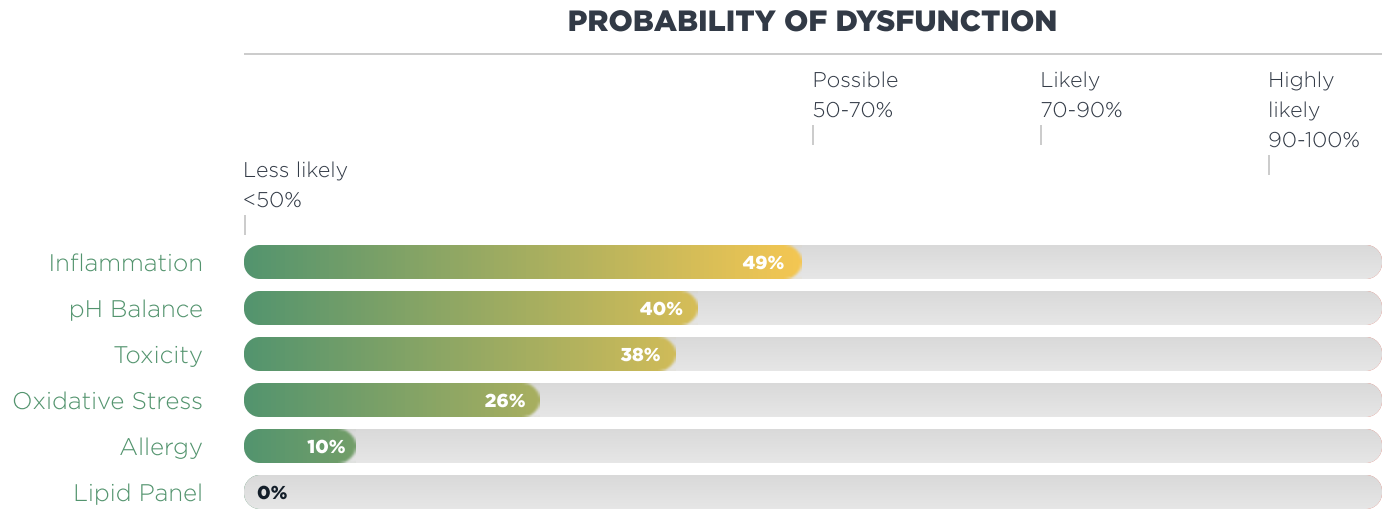
Aldosterone, Cortisol - PM

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.

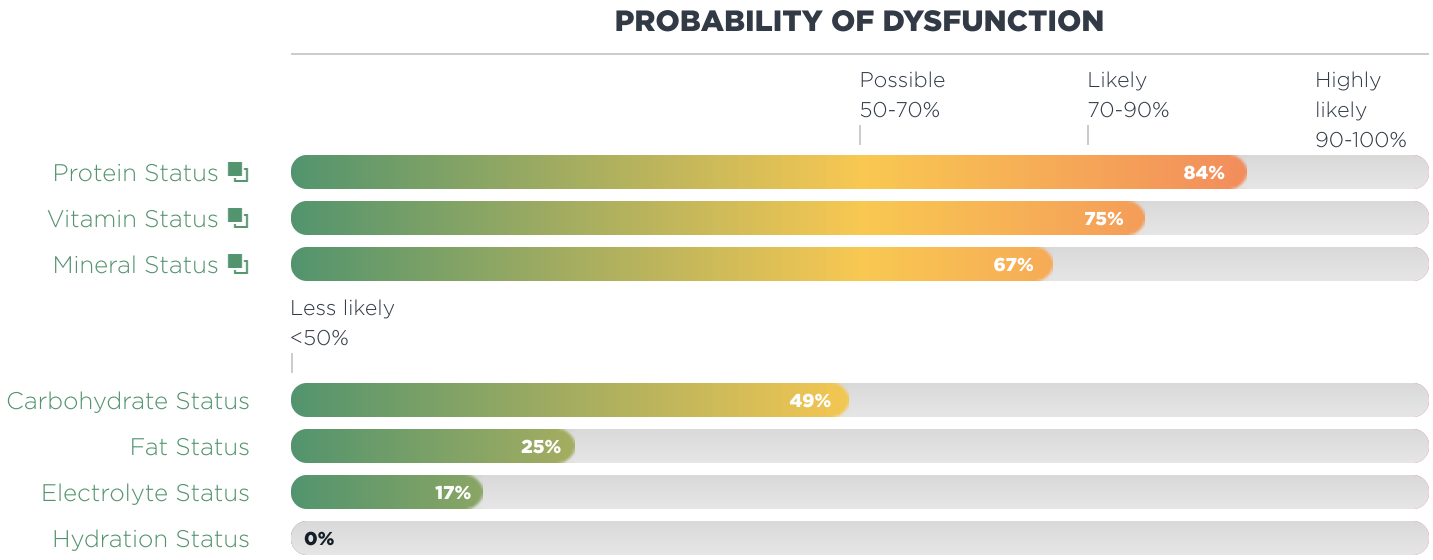


Nutrient Status

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.

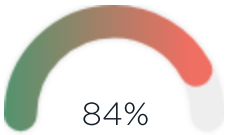
This report gives you an indication of your patient's general nutritional status. The Nutrient Status is influenced by actual dietary intake, digestion, absorption, assimilation, and cellular uptake of the nutrients themselves.

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.



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 Likely.
Improvement required.

PROTEIN STATUS

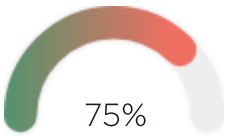
Your patient is likely having a hard time with protein. This may be due to a diet that is low in protein and available amino acids or possibly digetive dysfunction, which will greatly compromise protein digestion and absorption. With a rising Protein Status score, you may want to evaluate your patient's digestive function with respect to hypochlorhydria and also check their diet to make sure that they are consuming enough protein.

Rationale

Protein - Total ↓, BUN ↓, Albumin ↓, Creatinine ↓, BUN : Creatinine ↓, C-Reactive Protein ↑

Biomarkers considered

Protein - Total, BUN, Albumin, Calcium : Albumin, Creatinine, BUN : Creatinine, C-Reactive Protein, Hs CRP - Female, ALT, AST, CO2, GGT, Total WBCs, TIBC



Dysfunction Likely.
Improvement required.

VITAMIN STATUS

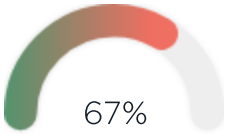
Your patient is likely trending towards a vitamin deficiency or need, causing an increase in their Vitamin Status score. This could be caused by emerging vitamin deficiencies or needs such as vitamin B12, vitamin B6, folate, thiamin, vitamin D, and vitamin C. Please refer to the "Nutrient Deficiency"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

Rationale

Anion Gap ↑, GGT ↓, Homocysteine ↑, MCV ↑, Methylmalonic Acid ↑, Folate - RBC ↓, Vitamin B12 ↓

Biomarkers considered

Anion Gap, Albumin, AST, ALT, GGT, Homocysteine, Vitamin D (25-OH), MCV, Methylmalonic Acid, Folate - RBC, Folate - Serum, Vitamin B12



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

MINERAL STATUS

Your patient may be in the early stages of mineral deficiency or need, causing an increase in their Mineral Status score. While this may not require immediate attention, you may want to keep an eye on their mineral levels and keep monitoring this on future blood tests.

Rationale

Zinc - RBC ↓, Copper - Serum ↓, Zinc - Serum ↓, Potassium ↓, Iron - Serum ↓, Ferritin ↓

Biomarkers considered

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

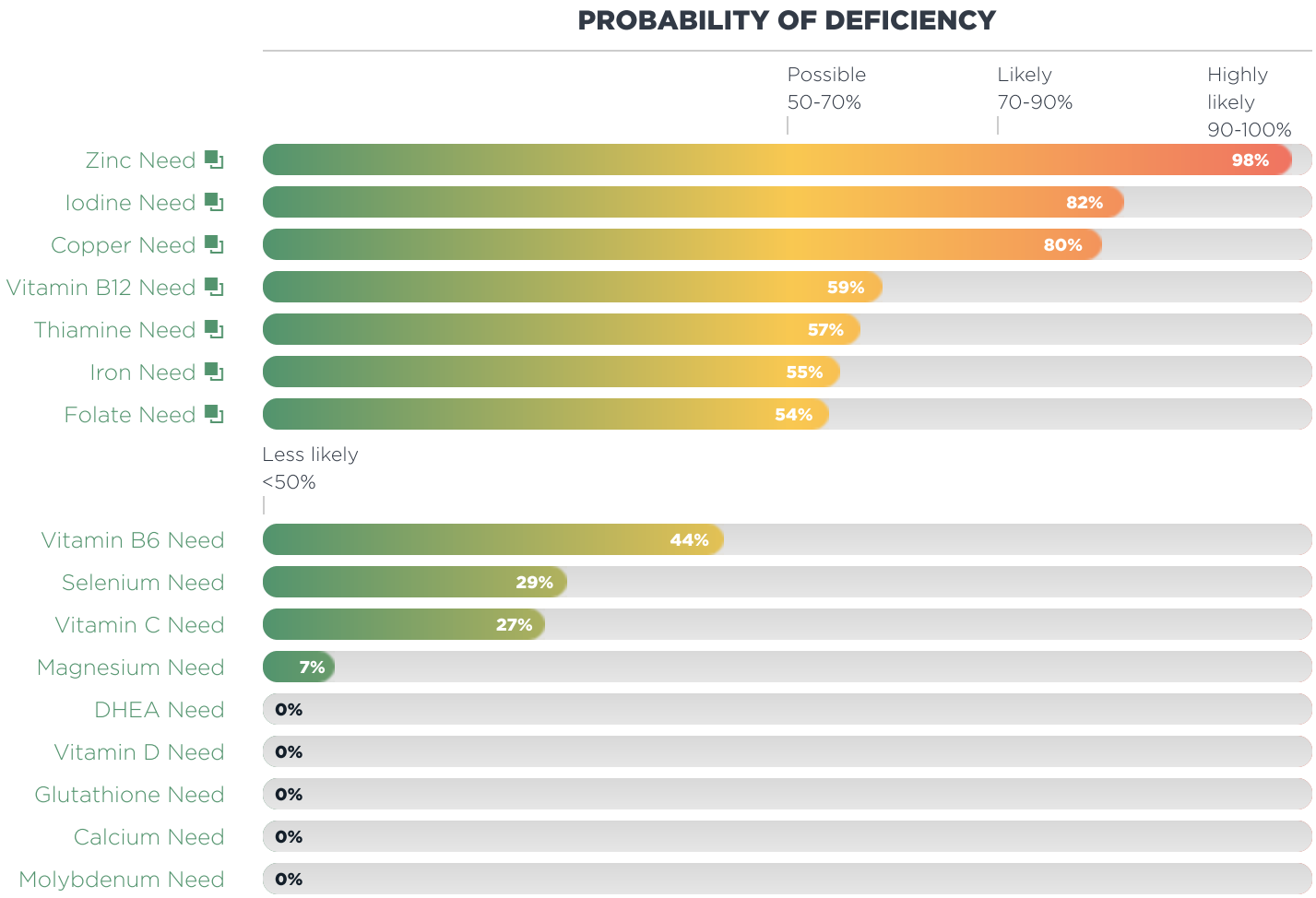
Biomarkers not available in this test - consider running in future tests:

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

Individual Nutrient Deficiencies

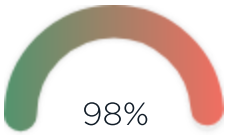
The scores represent the degree of deficiency for individual nutrients based on your patient's blood results. The status of an individual nutrient is based on a number of factors such as actual dietary intake, digestion, absorption, assimilation and cellular uptake of the nutrients themselves. All of 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.



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.



Deficiency Highly Likely. Much improvement required.

ZINC NEED

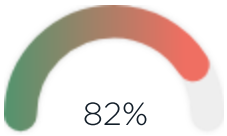
Your patient has a high Zinc Need score, indicating a significant likelihood of zinc deficiency. Indicators of zinc deficiency include low serum zinc levels, low RBC zinc levels, elevated alkaline phosphatase levels, and symptoms such as impaired immune function, hair loss, dermatitis, delayed wound healing, and taste disturbances. It is essential to evaluate your patient's dietary intake and absorption of zinc. Factors such as poor dietary intake, gastrointestinal disorders (e.g., Crohn's disease, celiac disease), chronic liver or kidney disease, and high phytate intake (which impairs zinc absorption) can contribute to reduced zinc levels. Before considering zinc supplementation, review your patient's diet for zinc-rich foods (e.g., meat, shellfish, legumes, seeds, nuts) and evaluate potential factors that may impair absorption or increase its utilization.

Rationale

Zinc - Serum ↓, Zinc - RBC ↓

Biomarkers considered

Zinc - Serum, Zinc - RBC



Deficiency Likely. Improvement required.

IODINE NEED

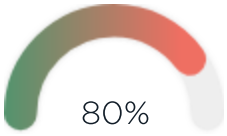
Your patient is likely trending towards an iodine deficiency, as evidenced by their increasing iodine need score. While there is a rising risk of deficiency, it is important to monitor their thyroid function and overall iodine status. Factors such as low dietary iodine intake, exposure to goitrogenic substances, and suboptimal thyroid function can contribute to declining iodine levels. Evaluating these aspects and implementing dietary modifications to increase iodine intake, such as incorporating more iodine-rich foods like seaweed, dairy, and iodized salt, may help improve iodine levels before considering supplementation.

Rationale

T4 - Total ↓, T4 - Free ↓, T3 Uptake ↓, TSH ↑

Biomarkers considered

T4 - Total, T4 - Free, T3 - Total, T3 - Free, T3 Uptake, TSH



Deficiency Likely. Improvement required.

COPPER NEED

Your patient is likely trending towards a copper deficiency, as indicated by their elevated copper need score. While the risk of copper deficiency is increasing, assessing their dietary intake and absorption efficiency is vital. Factors such as excessive zinc intake, gastrointestinal issues, or inadequate nutritional copper could contribute to this trend. Evaluating and addressing these potential causes, including the need for vitamin C and B vitamins, is recommended before initiating copper supplementation.

Rationale

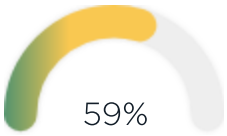
Copper - Serum ↓

Biomarkers considered

Copper - Serum

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

Copper - RBC



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

VITAMIN B12 NEED

Your patient may be in the early stages of vitamin B12 deficiency, as indicated by their elevated vitamin B12 need score. Although immediate intervention may not be necessary, it is advisable to monitor their vitamin B12 levels in future assessments. Keeping an eye on lifestyle factors that influence vitamin B12 status, such as diet, overall health, and exposure to factors that impair absorption or increase requirements, can help manage and potentially prevent further decline in vitamin B12 levels. Regular monitoring and dietary adjustments to ensure adequate vitamin B12 intake, along with strategies to enhance absorption, may be sufficient at this stage to address potential deficiencies.

Rationale

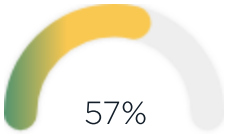
Vitamin B12 ↓, Methylmalonic Acid ↑, Homocysteine ↑, MCV ↑

Biomarkers considered

Vitamin B12, Methylmalonic Acid, Homocysteine, LDH, MCV, RDW

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

Active B12



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

THIAMINE NEED

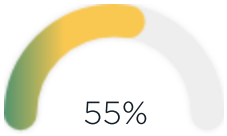
Your patient may be in the early stages of thiamine deficiency, as indicated by their elevated thiamine need score. Although immediate intervention may not be necessary, it is advisable to monitor their thiamine levels in future assessments. Keeping an eye on lifestyle factors that influence thiamine status, such as diet, overall health, and exposure to factors that increase thiamine requirements, can help manage and potentially prevent further decline in thiamine levels. Regular monitoring and dietary adjustments to ensure adequate thiamine intake, along with strategies to enhance absorption and reduce factors that increase thiamine requirements, may be sufficient at this stage to address potential deficiencies.

Rationale

Anion Gap ↑, Glucose Fasting ↑, LDH ↓

Biomarkers considered

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



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

IRON NEED

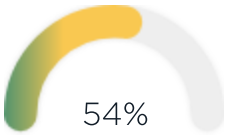
Your patient may be in the early stages of iron deficiency, as indicated by their elevated iron need score. Although immediate intervention may not be necessary, it is advisable to monitor their iron levels in future assessments. Keeping an eye on lifestyle factors that influence iron status, such as diet, the presence of minor sources of blood loss (e.g., heavy menstruation), and overall health, can help manage and potentially prevent further decline in iron levels. Regular monitoring and dietary adjustments to ensure adequate iron intake, along with strategies to enhance iron absorption, may be sufficient at this stage to address potential deficiencies.

Rationale

Iron - Serum ↓, Ferritin ↓, RBC - Female ↓

Biomarkers considered

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



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

FOLATE NEED

Your patient may be in the early stages of folate deficiency, as indicated by their elevated Folate Need score. Although immediate intervention may not be necessary, it is advisable to monitor their folate levels in future assessments. RBC folate levels may be within the lower normal range but below optimal, suggesting potential early depletion, while serum folate levels may be slightly below optimal. Elevated homocysteine levels, if present, suggest a need for closer observation. At this stage, symptoms may be minimal or absent, but it is important to keep an eye on lifestyle factors that influence folate status, such as diet, overall health, and exposure to factors that impair absorption or increase requirements. Regular monitoring and dietary adjustments, including increasing intake of folate-rich foods, may be sufficient at this stage to manage and potentially prevent further decline in folate levels.

Rationale

Folate - RBC ↓, Homocysteine ↑, MCV ↑

Biomarkers considered

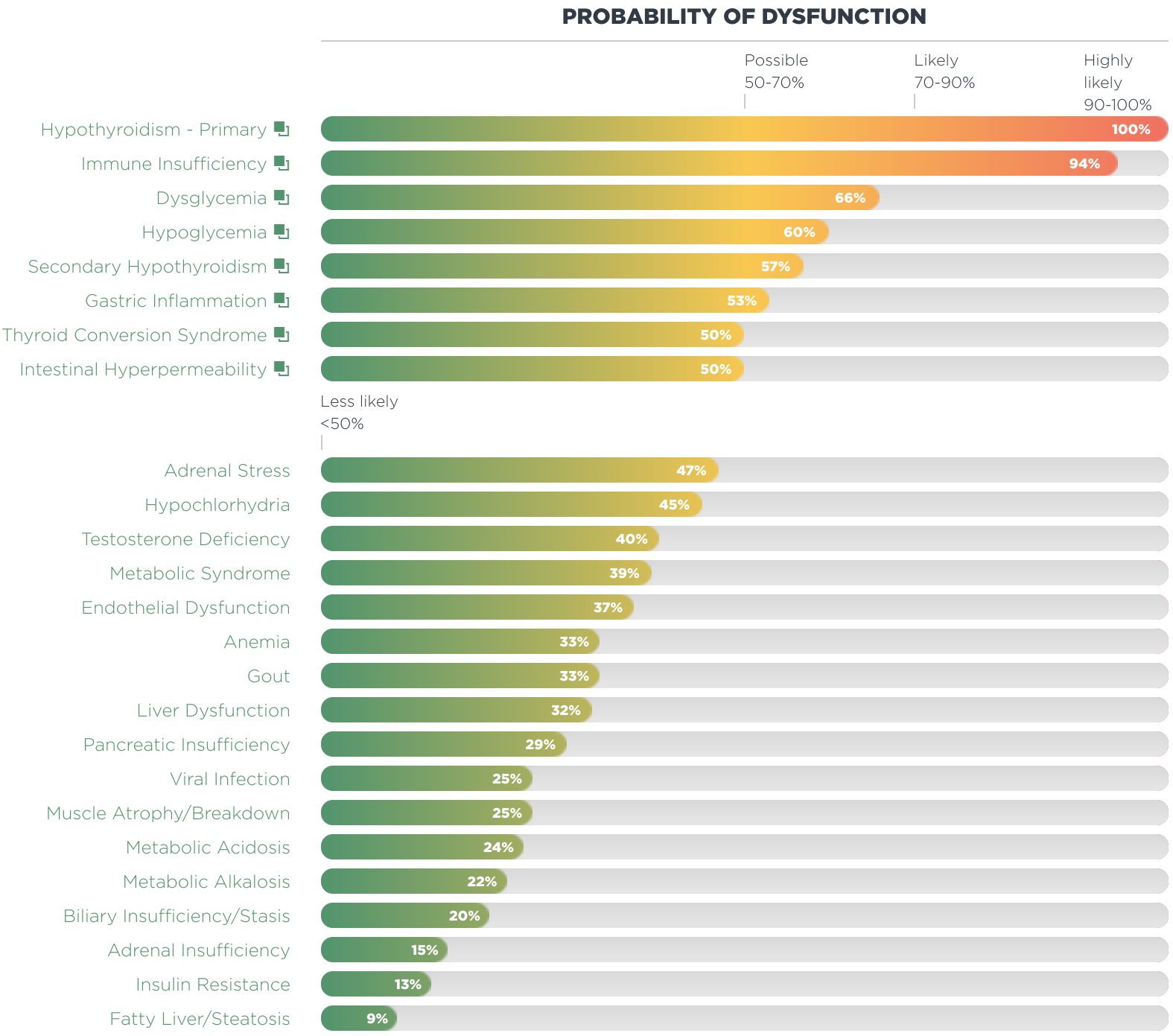
Folate - RBC, Folate - Serum, Homocysteine, MCV, RDW

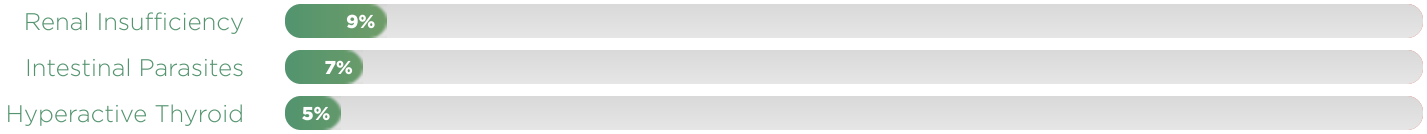
Clinical Dysfunctions

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.

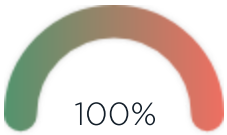
Each Clinical Dysfunction that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.




Renal Insufficiency
9%
Intestinal Parasites
7%
Hyperactive Thyroid
5%

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.

HYPOTHYROIDISM - PRIMARY

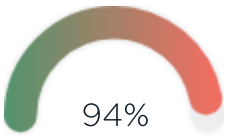
In primary hypothyroidism the problem is located in the thyroid gland itself, which fails to produce thyroid hormone. Consider primary hypothyroidism with an increased TSH, a decreased Total T4, a decreased Total T3, a decreased Free T4, a decreased Free T3 and a decreased T3-uptake. Additional elements 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 ↑, T4 - Total ↓, T3 - Total ↓, T3 Uptake ↓, T4 - Free ↓, T3 - Free ↓, Free Thyroxine Index (T7) ↓

Biomarkers considered

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



Dysfunction Highly Likely. Much improvement required.

IMMUNE INSUFFICIENCY

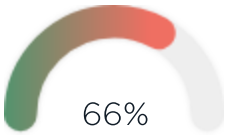
Consider an immune insufficiency with a decreased total WBC count along with a decreased albumin, a decreased total globulin, and a decreased alkaline phosphatase level.

Rationale

Total WBCs ↓, Albumin ↓, Globulin - Total ↓

Biomarkers considered

Total WBCs, Albumin, Globulin - Total, Alk Phos



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

DYSGLYCEMIA

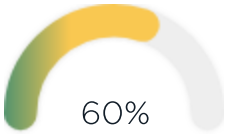
Dysglycemia is an imbalance in the ability of the body to regulate blood glucose levels causing unhealthy blood glucose levels that can lead to Diabetes, Metabolic Syndrome, Obesity, Insulin Resistance and Hyperinsulinemia. Consider dysglycemia with an elevated blood glucose level and an elevated hemoglobin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

Rationale

Glucose Fasting ↑, Leptin - Female ↑

Biomarkers considered

Glucose Fasting, Hemoglobin A1C, Leptin - Female



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

HYPOGLYCEMIA

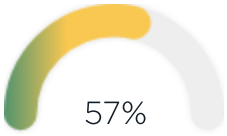
Consider hypoglycemia with a decreased fasting blood glucose along with a decreased LDH. Additional elements that may be out of range with hypoglycemia include a decreased Hemoglobin A1C and an increased SGPT/ALT level.

Rationale

LDH ↓

Biomarkers considered

Glucose Fasting, LDH, Hemoglobin A1C



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

SECONDARY HYPOTHYROIDISM

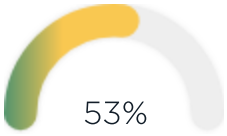
Secondary hypothyroidism is highly likely when there is significant anterior pituitary dysfunction affecting the production of thyroid-stimulating hormone (TSH). This results in inadequate stimulation of the thyroid gland, leading to low thyroid hormone levels despite a normally functioning thyroid. Suspect secondary hypothyroidism due to anterior pituitary dysfunction if the subjective indications of thyroid hypofunction are present and the following pattern is seen in the thyroid biomarkers: A decreased TSH, a decreased or normal Total T4, a decreased or normal Free T4 and a decreased or normal Free T3. The likelihood increases if serum triglycerides are elevated and total cholesterol is increased. Additional biomarkers that may be out of range with anterior pituitary dysfunction (secondary hypothyroidism) include an increased BUN above the "normal" range and an increased calcium. Anterior pituitary dysfunction 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).

Rationale

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

Biomarkers considered

TSH, Free Thyroxine Index (T7), T3 - Total, BUN, Calcium, Cholesterol - Total, Triglycerides, T4 - Total, T4 - Free, T3 - Free



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

GASTRIC INFLAMMATION

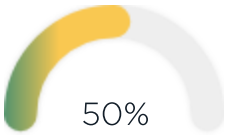
Gastric inflammation or gastritis is often secondary to hypochlorhydria where the pattern is similar but the total globulin level may be decreased unless inflammation is severe, which may lead to an increased globulin level due to the increased production of inflammatory immunoglobulins. Consider gastric inflammation or gastritis with a decreased total globulin, a decreased serum protein, a decreased phosphorous, a decreased hemoglobin and an increased BUN. Additional elements that may be out of range with gastric inflammation include an increased basophil count, an increased ESR, a decreased albumin and a decreased creatinine.

Rationale

Protein - Total ↓, Creatinine ↓, Albumin ↓, ESR - Female ↑, Basophils - % ↑

Biomarkers considered

Globulin - Total, Protein - Total, Hemoglobin - Female, Gastrin, BUN, Creatinine, Albumin, Phosphorus, ESR - Female, Basophils - %



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

THYROID CONVERSION SYNDROME

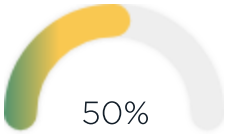
Thyroid Conversion Syndrome or low T3 syndrome is a form of hypothyroidism that clearly demonstrates the problem of using TSH alone as a marker for Hypothyroidism. Consider Thyroid Conversion Syndrome or low T3 syndrome when you have a normal TSH along with a decreased Total T3, a decreased Free T3, 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 - Total ↓, T3 - Free ↓, Reverse T3 ↑

Biomarkers considered

Free T3 : Reverse T3, T3 - Total, T3 - Free, Free T3 : Free T4, Reverse T3



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

INTESTINAL HYPERPERMEABILITY

Although there are no tests specifically for intestinal hyperpermeability on a blood chemistry screen, it is associated with an increased uric acid and an increased alkaline phosphatase.

Rationale

Uric Acid - Female ↑

Biomarkers considered

Uric Acid - Female, Alk Phos

4

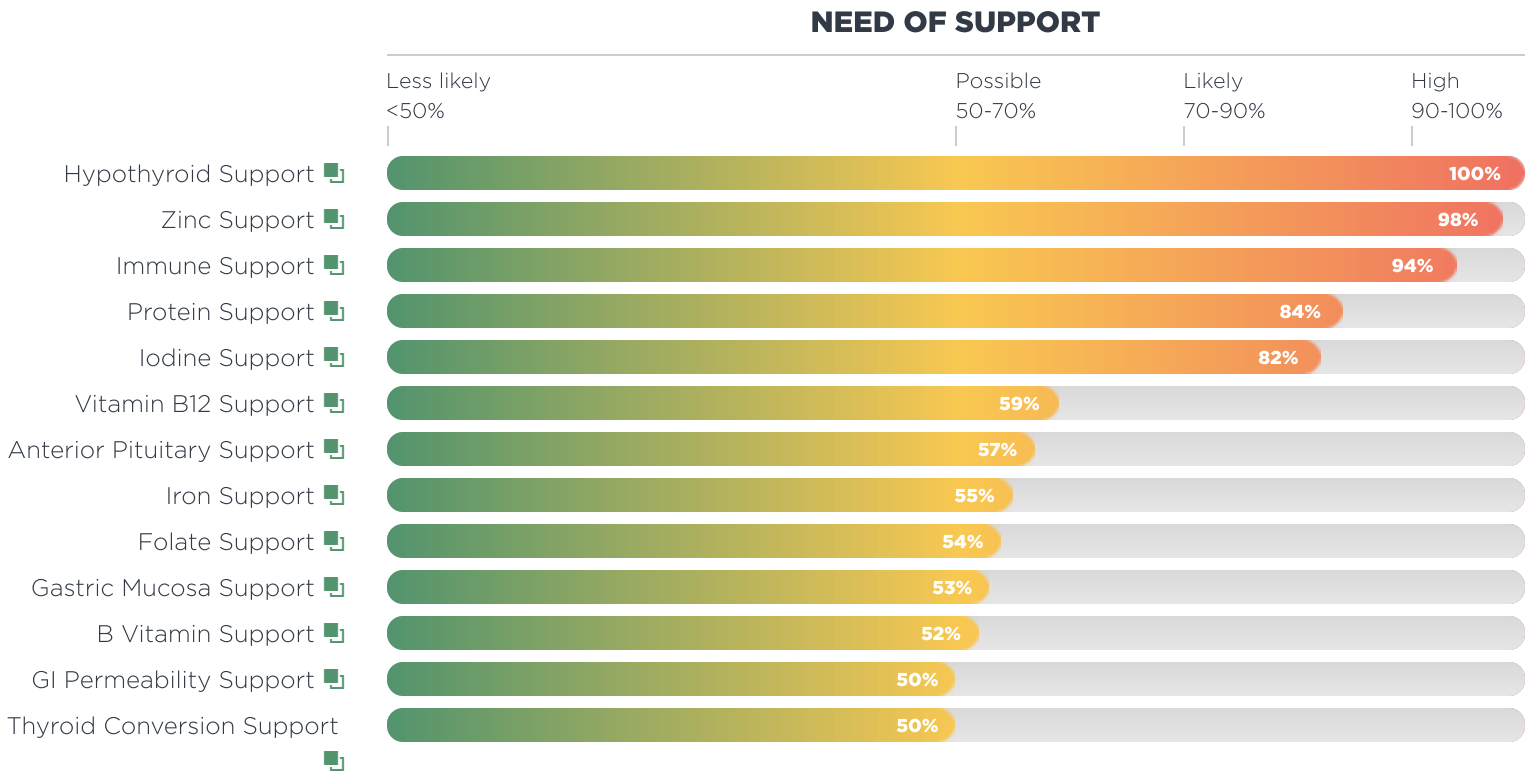
The Health Concerns report takes all the information on the Analytics and Assessment sections and focuses on the top areas of health concern that need the most support.

Health Concerns

Health Concerns Report

The Health Concerns Report takes all the information in this report and focuses on the top areas that need the most support.

Each health concern is included in the following section so you can read an explanation of the results shown in this report.



Health Concerns Details

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

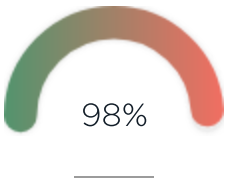
HYPOTHYROID SUPPORT

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

ZINC SUPPORT

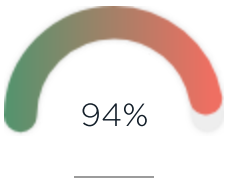


The results of this blood test indicate that this patient's zinc levels might be lower than optimal and shows a need for zinc supplementation.

Rationale

Zinc - Serum ↓, Zinc - RBC ↓

IMMUNE SUPPORT

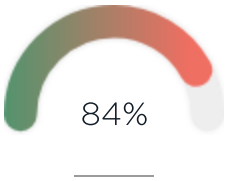


The results of this blood test indicate a tendency towards immune insufficiency and a need for immune support.

Rationale

Total WBCs ↓, Albumin ↓, Globulin - Total ↓

PROTEIN SUPPORT

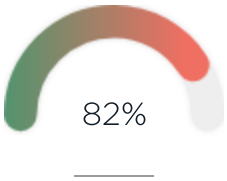


The results of this blood test indicate that this patient's protein levels might be lower than optimal and shows a need for protein supplementation.

Rationale

Protein - Total ↓, BUN ↓, Albumin ↓, Creatinine ↓, BUN : Creatinine ↓, C-Reactive Protein ↑

IODINE SUPPORT

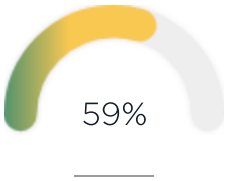


The results of this blood test indicate that this patient's iodine levels might be lower than optimal and shows a need for iodine supplementation.

Rationale

T4 - Total ↓, T4 - Free ↓, T3 Uptake ↓, TSH ↑

VITAMIN B12 SUPPORT

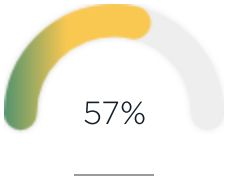


The blood test results indicate that this patient's vitamin B12 level might be lower than optimal and that vitamin B12 supplementation may be needed.

Rationale

Vitamin B12 ↓, Methylmalonic Acid ↑, Homocysteine ↑, MCV ↑

ANTERIOR PITUITARY SUPPORT

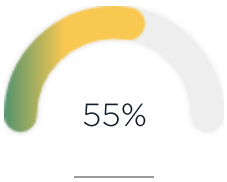


The results of this blood test indicate a need for anterior pituitary support.

Rationale

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

IRON SUPPORT

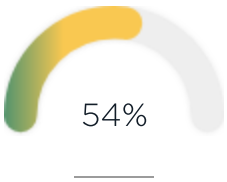


The results of this blood test indicate that this patient's iron levels might be lower than optimal and shows a need for iron supplementation.

Rationale

Iron - Serum ↓, Ferritin ↓, RBC - Female ↓

FOLATE SUPPORT

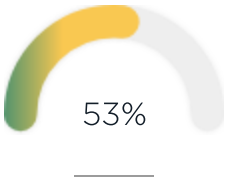


The blood test results indicate that this patient's folate level might be lower than optimal and that folate supplementation may be needed.

Rationale

Folate - RBC ↓, Homocysteine ↑, MCV ↑

GASTRIC MUCOSA SUPPORT

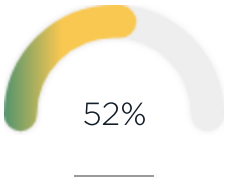


The results of this blood test indicate a tendency towards gastric inflammation and a need for support for the gastric mucosa.

Rationale

Protein - Total ↓, Creatinine ↓, Albumin ↓, ESR - Female ↑, Basophils - % ↑

B VITAMIN SUPPORT

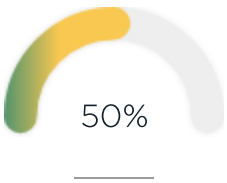


The results of this blood test indicate that this patient's B vitamin levels might be lower than optimal and shows a need for B complex supplementation.

Rationale

Anion Gap ↑, Glucose Fasting ↑, LDH ↓

GI PERMEABILITY SUPPORT



The results of this blood test indicate a tendency towards intestinal hyperpermeability and a need for support for the GI mucosa.

Rationale

Uric Acid - Female ↑

THYROID CONVERSION SUPPORT

The results of this blood test indicate a tendency towards Thyroid COnversion Syndrome, a type of hypothyroidism connected to a difficulty converting thyroxine (T4) into triiodothyronine (T3). With this condition, there is a need for thyroid gland support.

Rationale

T3 - Total ↓, T3 - Free ↓, Reverse T3 ↑

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.

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

IODINE DEFICIENCY

The results of this blood test indicate that this patient may be dealing with an iodine deficiency because a number of the biomarkers in the "Rationale" section are out of the optimal range. We cannot tell categorically that your patient has an iodine deficiency because there are no tests specifically testing for iodine levels on a common Chemistry Screen. If you suspect iodine deficiency, you may want to check iodine levels in the urine using either a spot check or a 24-hour test, which is the preferred test for reliability and accuracy.

Rationale

T4 - Total ↓,T4 - Free ↓,T3 Uptake ↓,TSH ↑

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 A patient result was not available. Consider running in future tests.	Probability of Dysfunction	Assessment
Active B12	Vitamin B12 Need - 59%	Nutrient Deficiency
Aldosterone	Adrenal Function - 57%	Functional Body System
Copper - RBC	Copper Need - 80%	Nutrient Deficiency
Cortisol - PM	Adrenal Function - 57%	Functional Body System

5

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

Appendix

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.

ALBUMIN ↓

(4.40 g/dL)

Hypochlorhydria

A decreased albumin level is often associated with a decreased production of hydrochloric acid in the stomach (hypochlorhydria). Hypochlorhydria is associated with an increased globulin level and a normal or decreased total protein and/or albumin, an increased BUN, a decreased or normal total protein and/or 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 and iron, a decreased chloride, and a decreased alkaline phosphatase.

Liver dysfunction

Albumin is produced almost entirely by the liver and dysfunction in the liver will have a great impact on albumin production and serum albumin levels. Therefore, a decreased albumin level may be indicative of a liver dysfunction that prevents the synthesis and formation of protein. A decreased albumin may be observed before any changes in liver enzymes are noted. Functionally oriented liver problems, such as detoxification issues, liver congestion, and conjugation problems are extremely common and should be evaluated based upon early prognostic indicators. The liver should always be viewed in the context of the hepato-biliary tree. Some of the key clinical indicators include:

1. Pain between shoulder blades
2. Stomach upset by greasy foods
3. If drinking alcohol, easily intoxicated
4. Headache over the eye
5. Sensitive to chemicals (perfume, cleaning solvents, insecticides, exhaust, etc.)
6. Hemorrhoids or varicose veins

Oxidative Stress

Oxidative stress should be investigated if albumin levels are decreased along with a decreased lymphocyte count, a total cholesterol that is suddenly below its historical level, an increased total globulin an increased uric acid and low platelet levels (<150). Oxidative stress can cause an increased destruction of red blood cells; in these situations you may see an elevated bilirubin level.

Inflammation

Albumin decreases with inflammation, especially systemic inflammation due to decreased synthesis and increased degradation.

Vitamin C need

Albumin will frequently be decreased along a decreased HCT, HGB, MCH, MCHC, and serum iron. There will also be an increased MCV, alkaline phosphatase, and fibrinogen.

Pregnancy

A decreased albumin reading is considered normal in pregnancy.

Kidney Disease

Albumin can be lost in the urine with kidney disease, and can also appear further decreased with fluid overload.

ALBUMIN : GLOBULIN ↑

(2.60 ratio)

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

ANION GAP ↑

(13.80 mEq/L)

Thiamine (vitamin B1) need

An increased anion gap is associated with thiamine deficiency. If the anion gap is increased along with a decreased CO2, thiamine deficiency is possible. 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.

Metabolic Acidosis

Consider metabolic acidosis if the anion gap is increased along with a decreased CO2 and an increased chloride.

AST : ALT ↑

(1.27 Ratio)

Liver dysfunction

An AST/ALT ratio of 1 or more is significantly correlated with a reduction in hepatic detoxification and excretion capacity as measured by the monoethylglycinexylidide (MEGX) test. The greater the AST/ALT ratio, the poorer the liver function.

Muscle damage

An elevated AST/ALT ratio above 1.67 is seen in the event of muscle damage as AST is found in significantly higher levels in muscle than ALT is. Associated elevation in AST/ALT from muscle damage may be observed in critical limb ischemia (CLI) from peripheral arterial occlusive disease (PAOD), myocardial infarction, rhabdomyolysis, and even strenuous exercise.

Biliary obstruction

In biliary obstruction, an AST/ALT ratio of greater than 1.5 suggests that intrahepatic cholestasis is likely while an AST/ALT ratio of <1.5 suggests extrahepatic obstruction.

Cirrhosis

A ratio greater than 1 indicates cirrhosis has begun to develop; a ratio greater than 2 suggests the presence of alcoholic liver disease, and a ratio of greater than 3 strongly suggests active alcoholic liver disease. The ratio may increase due to liver fibrosis or reduced clearance of AST by specialized liver cells called sinusoidal cells.

Alcoholic liver disease

AST/ALT ratio is >1 in 92% of patients with alcoholic liver disease, and >2 in 70%. A ratio of greater than 3 is strongly suggestive of advanced alcoholic liver disease.

Wilson's disease

An elevated AST/ALT ratio is observed in Wilson's disease, a genetic liver disease associated with a build-up of copper in the liver.

BASOPHILS - % ↑

(1.10 %)

Inflammation: non-specific

You may see an increased Basophils - Absolute count and/or an increased Basophils - % with any non-specific type of histamine, heparin, or serotonin-mediated inflammation or tissue destruction (bursitis, tendinitis, fibromyalgia, phlebitis, etc.) With severe inflammation and subsequent tissue damage expect to see an increase in Alpha 1 globulin. If the inflammation is located in the digestive tract, bone or liver expect to see increased Alkaline phosphatase levels.

Intestinal parasites

Consider intestinal parasites if there are an increased Basophils - Absolute count and/or an increased Basophils - %, an increased Eosinophils - %, an increased Eosinophils - Absolute count, an increased Monocytes - %, and an increased Monocytes - Absolute. Although not as indicative as an increased Eosinophils - Absolute count or an increased Eosinophils - %, an increased Basophils - Absolute count and/or an increased Basophils - % is often seen with intestinal parasites, especially if inflammation is ruled-out as a cause of a basophil increase. If you suspect intestinal parasites you may want to rule it out with stool analysis. Eosinophils may be normal with an intestinal amoebic problem; however, the basophil count may be increased.

BUN ↓

(6.00 mg/dL)

Diet- low protein

A decreased BUN level is associated with a diet that is low in protein. Low protein diets may show up with a decreased BUN level and a decreased BUN/Creatinine ratio.

Malabsorption

A decreased BUN is associated with a chronic intestinal malabsorption, which is an inability of nutrients to be absorbed through the intestinal wall. Malabsorption can lead to a functional protein deficit, which in turn will lead to lower levels of protein catabolism and low BUN levels.

Pancreatic insufficiency

A decreased BUN is associated with a pancreatic insufficiency. A decreased level of digestive enzymes secreted from the pancreas, especially protease, can lead to a functional protein deficit. This in turn will lead to lower levels of protein catabolism and low BUN levels. Total WBC count may be decreased.

Liver dysfunction

A decreased BUN is associated with liver dysfunction. Dysfunction in the liver will have a great impact on protein production and synthesis, which will affect the availability of protein for catabolism, resulting in low BUN levels.

Posterior pituitary dysfunction

A decreased BUN along with a decreased urinary specific gravity and a decreased BUN/Creatinine ratio that is below 10 can be an indication of dysfunction in the posterior pituitary, which is responsible for the production of Anti Diuretic Hormone (ADH).

BUN : CREATININE ↓

(9.00 Ratio)

Diet- Low protein

A decreased BUN/Creatinine ratio is associated with a diet that is low in protein. BUN levels may be also be decreased.

Posterior pituitary dysfunction

A decreased BUN/Creatinine ratio may be an indication of inappropriate secretion of anti-diuretic hormone (ADH - Vasopressin) due to posterior pituitary dysfunction. You may also see a decreased BUN along with a decreased urinary specific gravity.

COPPER - SERUM ↓

(76.00 µg/dL)

Copper deficiency

A low serum copper may indicate copper insufficiency or deficiency leading to disruption of copper-dependent metabolic processes, cardiovascular complications, neurological disorders, and abnormalities in red and white blood cells. Severe copper deficiency may mimic myelodysplastic syndrome.

Anemia

The copper-containing protein ceruloplasmin is required for iron transport from the liver to the bone marrow. Copper is also important to the utilization of iron by red blood cells. A deficiency of copper can contribute to anemia as well as to hepatic iron overload.

Bone abnormalities

Copper deficiency contributes to bone abnormalities, especially in infants and young children. Deficiency may manifest as osteoporosis, bone fractures, and epiphyseal separations. The copper-dependent enzyme lysyl oxidase is required for the maturation of collagen in bone and may be the link between copper deficiency and bone health.

Low serum proteins

Nephrosis, malabsorption, and malnutrition may cause a low serum copper level even if liver stores are adequate.

Malabsorption

Malabsorption of copper at the gastrointestinal level will contribute to decreased copper status.

Neutropenia

Abnormally low levels of neutrophils have been associated with copper deficiency.

CORTISOL - TOTAL/AM ↓

(9.00 µg/dL)

Adrenal Fatigue and Adrenal Insufficiency

Adrenal fatigue and adrenal insufficiency cause a decrease in the glucocorticoid hormone cortisol. Additional findings include an increase in serum potassium along with a normal or decreased sodium and/or chloride. The sodium:potassium ratio will also be decreased. Other values that may be out of balance include decreased aldosterone level. Urinary chloride will be increased. Adrenal fatigue and adrenal insufficiency can be confirmed with salivary cortisol studies.

C-REACTIVE PROTEIN ↑

(4.65 mg/L)

Increased levels of CRP are associated with the following:

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

CREATININE ↓

(0.65 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.

ESR - FEMALE ↑

(11.20 mm/hr)

Tissue inflammation

Any type of inflammation in the body will cause an increased ESR. As a generalized indicator of inflammation, an ESR will be increased in most cases of tissue inflammation (SLE, RA, gout, arthritis, nephritis, nephrosis, endocarditis).

Tissue destruction

An increased ESR is seen in carcinoma, lymphoma, and neoplasms as well as any process that involves cell or tissue destruction e.g. auto-immune processes.

Musculoskeletal conditions

In rheumatic and acute gouty arthritis the rate is greatly increased.
In osteoarthritis the rate is slightly increased.

Cardiovascular conditions

In myocardial infarction, the rate is increased
In angina pectoris the rate is not increased

Malignant diseases

In multiple myeloma, lymphoma, and metastatic cancer, the rate is very high. The degree of elevation does not correspond with prognosis.

ESTRADIOL - FEMALE ↓

(55.00 pg/mL)

Menopause

Low levels of estradiol are a finding in post-menopausal women. Declining levels may signal the onset of menopause in your peri-menopausal patients.

Osteoporosis and Bone Fractures

Low levels of estradiol can be a risk factor for osteoporosis and bone fracture. Researchers at the Creighton University School of Medicine in Omaha, NE, observed that in women aged 65-75, low levels of serum total and bio-available estradiol correlated with low levels of bone mineral density in the femur, spine, and total body.

Migraine Headaches

Hormone imbalance may be a cause of migraine headaches in women. Declining estrogen levels during menstruation and menopause may trigger migraine headaches. By contrast, sustained high levels of estrogen, as occur during pregnancy, frequently provide relief from headaches. Estrogen produces changes in body levels of prostaglandins and opioids, which may account for its effects in relieving headaches.

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.

Hypoferritinemia Without Anemia

Hypoferritinemia can also be seen without anemia (HWA), in which RBCs, hemoglobin, and CBC in general are within range. This condition may present with classic symptoms of fatigue, general weakness, hair loss, and depression despite a normal CBC (Al-Jafar 2017).

Vitamin C/Ascorbate Insufficiency

Low serum ferritin may also be associated with vitamin C/ascorbate insufficiency and hypothyroidism (Knovich 2009). Ascorbate increases iron absorption by making it soluble at a variety of gastrointestinal pH levels and its insufficiency can jeopardize iron absorption (Skolmowska 2022).

Hypothyroidism

In hypothyroidism, iron absorption may be impaired by increased production of hepcidin, a peptide hormone that blocks iron absorption (Garofalo 2023).

FOLATE - RBC ↓

(376.00 ng/mL)

Folate Deficiency

Folate deficiency is common in pregnant women, alcoholics, in patients whose diets do not include raw fruits and vegetables, and in people with structural damage to the small intestine. Low folate levels, however, can also be the result of a primary vitamin B12 deficiency that decreases the ability of cells to take up folate.

Increased Need

All pregnant women need increased amounts of folate for proper fetal development. People with cancer that has metastasized or with chronic hemolytic anemia have an increased need for folate.

Neural Tube Defect

Low folate levels during pregnancy have been associated with neural tube defects in the fetus.

Increased Utilization

Conditions such as liver disease, cancer, and hemolytic disorders may deplete folate in the body through increased utilization and thus cause a decreased folate level

FREE T3 : FREE T4 ↑

(2.86 Ratio)

Hyperactive Thyroid

An elevated FT3:FT4 ratio, reflecting increased Free T3 and/or decreased Free T4, can be associated with a hyperactive thyroid and in extreme cases Graves' disease.

Thyrotoxicosis- Graves' disease

Calculating the ratio of free T3 to free T4 can help differentiate Graves' disease from subacute thyroiditis. A ratio of free T3/free T4 greater than 4.4 suggests Graves' disease whereas a ratio of 2.73 is suggestive of subacute thyroiditis in those with thyroid dysfunction.

Metabolic Syndrome

Research suggests that an elevated FT3:FT4 ratio may be predictive of metabolic syndrome. Results from the Dutch population-based LifeLines Cohort study of 26,719 men and women revealed that increases in the FT3:FT4 ratio were associated with four of five defining components of metabolic syndrome (i.e. blood pressure, HDL-cholesterol, triglycerides, and waist circumference but not fasting blood glucose). Subjects in the highest quartiles of FT3:FT4 ratio had a 50-80% increased risk of metabolic syndrome than those in the lowest quartile [14]. Mean baseline FT3:FT4 ratio was 2.88 for men and 2.75 for women (FT3 in pg/mL and FT4 in ng/dL).

Non-alcoholic fatty liver disease (NAFLD)

An increased FT3/FT4 ratio is considered an independent risk factor for NAFLD. Insulin resistance, enlarged waist circumference, elevated body mass index, and hypertriglyceridemia are also considered independent risk factors for NAFLD.

FREE THYROXINE INDEX (T7) ↓

(1.36 Index)

Hypothyrodisim

Decreased levels of FTI or T7 are suggestive of hypothyrodism

FSH - FEMALE ↑

(16.30 mIU/mL)

Menopause

Elevated FSH levels will be seen during and after menopause. Increasing levels may signal the onset of menopause in your peri-menopausal patients. Levels of about 30 - 40 mIU/ml usually signify menopause.

Mid-Cycle FSH Surge

Levels of FSH will spike mid-cycle and levels may be as high as 18 mIU/ml are normal if the blood sample is taken mid-cycle.

Ovarian hypofunction or failure

Elevated FSH levels may be a sign of ovarian hypofunction or ovarian failure, a situation where the body is not producing enough estrogen to maintain optimal ovarian function.

Polycystic Ovary Syndrome (PCOS)

Increased levels of FSH are associated with Polycystic Ovary Syndrome (PCOS), a dysfunction with the ovaries. Typically the LH level is higher than the FSH level and the LH:FSH ratio is >2 and you may also see a corresponding increase in both Total and Free testosterone

GGT ↓

(8.00 IU/L)

B6 Deficiency

Vitamin B6, in its active form of pyridoxyl-5-phosphate (P-5-P), is essential for the effective operation of the transferase enzymes. A deficiency in P-5-P from alcoholism, malnutrition, poor assimilation, deficiencies in the diet, etc. will cause decreased levels of aminotransferase enzymes, such as AST in general circulation. B6 deficiency is likely if there is a decreased AST and a concomitant deficiency in GGT and/or ALT, enzymes that also need B6 for optimum activity. B6 deficiency can also impact red blood cell activity leading to a decreased MCV and/or MCH and a normal serum iron and ferritin level. This situation leads to B6 deficiency anemia.

Magnesium need

A low GGT is associated with a need for magnesium. Magnesium levels can be assessed using RBC or serum magnesium levels. Some of the clinical signs of a potential magnesium deficiency are: Muscle cramps, Chocolate craving, Chronic constipation, Dysrhythmia

GLOBULIN - TOTAL ↓

(1.70 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 ↑

(87.50 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 Kreb's 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.

HOMA2-%B ↓

(87.50 %)

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.

HOMOCYSTEINE ↑

(7.50 µmol/L)

Increased Risk for Cardiovascular Disease

Hyperhomocysteinemia, a condition of increased homocysteine levels, is a risk factor for developing cardiovascular disease, arterial disease, stroke, and venous thrombosis. Homocysteine levels are affected by nutritional and genetic factors. Consider genetic testing for MTHFR gene mutations with elevated levels of homocysteine.

Additional diseases and pathological processes associated with an increased homocysteine

Colon cancer
Cervical cancer
Depression
Alzheimer's disease
Inflammatory bowel disease

HS CRP - FEMALE ↑

(1.15 mg/L)

Increased levels of CRP are associated with the following:

Abdominal obesity,
Peridontal disease,

High blood pressure
An increased risk of cardiovascular disease and stroke
Diabetes
Depression
Alzheimer's disease

IRON - SERUM ↓

(79.00 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 ↓

(131.00 IU/L)

Reactive Hypoglycemia

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

LDL CHOLESTEROL ↓

(70.00 mg/dL)

LEPTIN - FEMALE ↑

(12.20 ng/mL)

Leptin Resistance

An increased leptin level is an indication that the body and cells may have become resistant to the actions of leptin. This is similar to the development of insulin resistance. The net effect of leptin resistance is a reduction in the feeling of satiation after meals, similar to the effect caused by low leptin levels. Therefore, these individuals feel like they are hungry all the time so they eat more and gain more body fat perpetuating this cycle.

Increased Risk of Developing Metabolic Syndrome, Insulin Resistance, CVD and Type II Diabetes

Leptin is pivotal in preventing ectopic lipid accumulation, which is the accumulation of fat outside the usual fat stores i.e. in places other than adipose tissue. An increased leptin level can lead to ectopic lipid accumulation in organs and tissues, especially the abdomen. When this occurs in the muscle, it leads to insulin insensitivity. Insulin insensitivity is the first step towards the development of both type 2 diabetes and heart disease. Lipid accumulation in pancreatic beta cells, the site of insulin production, contributes to the development of type 2 diabetes, and in cardiomyocytes, contributes to cardiovascular disease. In addition, in obesity the release of growth hormone declines, exacerbating the decline normally seen with aging, and perpetuating obesity through the loss of the hormone's muscle building and fat burning effects. Therefore an increased leptin level is significantly associated with an increased risk for developing metabolic syndrome, insulin resistance. cardiovascular disease and Type II Diabetes.

LYMPHOCYTES - % ↑

(40.20 %)

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

In childhood disease Lymphocytes - Absolute will be decreased in the early phase and increased in the later phase, and Lymphocytes - % will be decreased in the early phase and increased in the later phase.

Acute viral infection

In viral diseases such as upper respiratory infections, cytomegalovirus, infectious hepatitis, and toxoplasmosis, Lymphocytes - % will be increased, Lymphocytes - Absolute will be increased along with an increased total WBC count.

Chronic viral infection

In chronic viral infections, you may still see increased lymphocytes - % and an increased Lymphocytes - Absolute, with a *decreased* total WBC count.

Infectious mononucleosis

A disease caused by the Epstein-Barr virus. It is most common in adolescents and young adults. It is characterized by an increased Lymphocyte - Absolute count and the presence of atypical lymphocytes or Downey cells. LDH levels are usually elevated in about 95% of cases of infectious mononucleosis and Epstein Barr infection (EBV). You may expect the following changes: decreased WBCs in the first week, increased WBCs by 2nd week of illness, increased Alk Phos and AST (about 5-14 days after onset of illness), increased GGT (about 7-21 days after onset of illness)

Relative Lymphocytosis

Lymphocytosis = a Lymphocytes - Absolute count above the standard reference range
This finding, along with a greatly elevated Total WBC count and very low neutrophils, may suggest a need for further investigation into acute and chronic lymphatic leukemia lymphoma.

Acute bacterial infections

Lymphocytes will tend to be normal.

Inflammation

An increased Lymphocyte - Absolute count and an increased Lymphocytes - % will often be seen in acute and chronic inflammation, especially Crohn’s disease and ulcerative colitis.

Systemic toxicity or Poor Detoxification

Increased Lymphocytes - % and an increased Lymphocytes - Absolute count are associated with an increased level of toxicity in the body. If lymphocytes are increased, consider that either the body is dealing with excessive systemic toxins or the body cannot handle the current toxicity load and may not be detoxifying efficiently. Rule out heavy metals, xenobiotics, parasites, etc.

LYMPHOCYTES - ABSOLUTE ↓

(1.05 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)

MCH ↑

(32.60 pg)

Anemia- Vitamin B12 and/or folic acid deficiency

The probability of vitamin B-12 or folate deficiency anemia increases when the MCH is increased and there is an increased MCV. If there is also an increased 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. Serum homocysteine will be elevated and can help confirm folic acid and vitamin B-6 deficiency.

Hypochlorhydria

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

MCV ↑

(94.60 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.

METHYLMALONIC ACID ↑

(261.00 nmol/L)

B12 deficiency

An elevated MMA level above 260 nmol/L is considered an indicator for vitamin B12 deficiency. An elevated MMA along with an elevated homocysteine is a strong indication that B12 deficiency is present. If both MMA and homocysteine are normal then a B12 deficiency is unlikely.

Risk factors for vitamin B12 deficiency include advanced age, hypochlorhydria, gastrointestinal surgery (gastric or ileal), malabsorption, and long-term adherence to a vegan or vegetarian diet.

The early detection and resolution of B12 deficiency can help prevent its associated advanced central nervous system impairment.

Renal insufficiency

An impaired renal function may lead to a build-up of MMA due to decreased excretion.

Small intestine bacterial overgrowth (SIBO)

Bacterial overgrowth in the small intestine may contribute to elevated methylmalonic acid.

MONOCYTES - ABSOLUTE ↓

(0.18 k/cumm)

Low monocytes are not usually associated with any specific disease or disorder

MPV ↑

(8.80 fL)

An elevated MPV is seen in:

Conditions that cause the destruction of platelets: Inflammatory Bowel Disease, Idiopathic thrombocytopenic purpura (autoimmune) and myeloproliferative disorders
Immune thrombocytopenia
Acute and Chronic Myeloid Leukemia
Megaloblastic anemia
Other anemias: hemolytic, pernicious
MPV has been shown to increase prior to an acute Myocardial infarction.

NEUTROPHILS - ABSOLUTE ↓

(1.31 k/cumm)

Blood diseases

Anything that affects the output of white blood cells from the bone marrow can cause a decreased Neutrophil - Absolute and Neutrophils - % (aplastic anemia, pernicious anemia, acute lymphoblastic leukemia)

Chronic viral infection

A chronic viral infection is possible with a decreased Neutrophils - %, a decreased Neutrophils - Absolute, an increased Lymphocytes - %, an increased Lymphocytes - Absolute, and/or a decreased total WBC count.

PLATELETS ↓

(187.00 10E3/uL)

Infections

Some viral, rickettsial, and bacterial infections can cause a decreased platelet count.

Idiopathic Thrombocytopenia

A hemorrhagic disease that is often triggered by a viral disease in children and has symptoms of purpura, increased platelet destruction, petechiae, mucosal bleeding, and thrombocytopenia. This is not something that you are likely to see in general practice.

Heavy metals

Blood platelets may be low when the body is dealing with an increased heavy metal load. Check for decreased MCH, MCHC, and LDH Isoenzyme #5. If either is decreased, along with a decreased platelet count, suspect a heavy metal body burden and consider hair analysis or toxic element testing via blood or urine.

Oxidative Stress and Free Radical Activity

Suspect excess free radical activity and oxidative stress if the platelet level is decreased. If the platelet level is decreased along with a total cholesterol level that is suddenly below its historical and a decreased lymphocyte count, a decreased albumin, and an increased total globulin and uric acid level, free radical pathology, increases the risk of developing a neoplasm, should be investigated.

Purpura and petechiae

The platelet count may be low in these conditions. People who bruise easily often have low vascular and capillary integrity. A low platelet count can exacerbate such a condition.

POTASSIUM ↓

(3.90 mEq/L)

Adrenal Stress

Adrenal stress causes an increase in the secretions of both the glucocorticoid and mineralcorticoid hormones. An increase in aldosterone, the major mineralcorticoid, from adrenal hyperfunction has an impact on potassium metabolism. Increased aldosterone levels will cause an increase in the amount of renal potassium excretion, which will cause a decrease in serum potassium. If the potassium levels are decreased along with a normal or increased sodium, and/or chloride, adrenal stress is possible. The sodium:potassium ratio will also be increased. Other values that may be out of balance include increased aldosterone and cortisol levels. If the cortisol level is significantly elevated, rule out adrenal adenoma. Urinary chloride will be decreased. Adrenal stress can be confirmed with salivary cortisol studies.

Drug Diuretics

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.

Benign Essential Hypertension

Benign Essential Hypertension is common with decreased potassium, even when cortisol, renin and other indicators may be normal. Generally, increased potassium suggests a congestive heart problem, and decreased potassium suggests a fatigued heart muscle. HTN has many potential causes and should be investigated with other methodologies beyond blood chemistries.

PROTEIN - TOTAL ↓

(6.10 g/dL)

Hypochlorhydria

A decreased or normal total protein level is often associated with a decreased production of hydrochloric acid in the stomach (Hypochlorhydria). Hypochlorhydria is possible with an increased globulin level and a normal or decreased total protein and/or albumin. Hypochlorhydria is probable if globulin levels are increased along with an increased BUN, a decreased or normal total protein and/or 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 and a decreased iron, a decreased CO2, and a decreased alkaline phosphatase.

Digestive dysfunction/ inflammation

Suspect primary digestive inflammation or inflammation secondary to HCL insufficiency with a low total protein. This pattern will be similar to that of Hypochlorhydria but the globulin may be decreased unless inflammation is severe. Decreased total globulin, decreased serum phosphorous, increased BUN, increased basophils, and increased ESR.

Liver dysfunction

Dysfunction in the liver will have a great impact on protein production and synthesis, which will affect total serum protein levels. Therefore, a decreased total serum protein level may be indicative of liver dysfunction. Functionally-oriented liver problems, such as detoxification issues, liver congestion, and conjugation problems are extremely common and should be evaluated based on early prognostic indicators. The liver should always be viewed in the context of the hepato-biliary tree. Some of the key clinical indicators include:

1. Pain between shoulder blades
2. Stomach upset by greasy foods
3. If drinking alcohol, easily intoxicated
4. Headache over the eye
5. Sensitive to chemicals (perfume, cleaning solvents, insecticides, exhaust, etc.)
6. Hemorrhoids or varicose veins

Diet- Low Protein/ Protein Deficiency/ Malnutrition/ Amino Acid Need

Protein digestion is dependent on an optimal pH in the stomach. A decreased total protein can be an indicator of digestive dysfunction, which will greatly compromise protein digestion and absorption. Protein malnutrition is due primarily to the lack of available essential amino acids in the diet.

QUICKI ↓

(0.40 Index)

Decreased Levels Associated with:

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

RBC - FEMALE ↓

(4.23 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

REVERSE T3 ↑

(28.00 ng/dL)

Factors Associated with an Increased Reverse T3 Level

- Diabetes
- Elevated cytokine levels: IL6, TNF-alpha, IFN-2
- Fasting
- Free radicals
- Heavy metals: Cadmium, Mercury, or Lead
- Increased epinephrine or norepinephrine
- Prolonged illness
- Stress

SODIUM : POTASSIUM ↑

(36.38 ratio)

Acute Stress

An elevated sodium:potassium ratio is an indication of acute stress. Acute stress causes an increase in adrenal activity and an increase in aldosterone output. Aldosterone causes sodium to be retained in the body and an increase in serum sodium. This also causes the potassium to be excreted thus lowering the serum potassium levels. The net effect is an increased sodium:potassium ratio.

An inflammation indicator

An elevated sodium:potassium ratio is an indication of a higher aldosterone output. Aldosterone is often considered a pro-inflammatory hormone and cortisol is an anti-inflammatory hormone so an increase in aldosterone, as seen in a high sodium:potassium ratio is seen as an inflammatory indicator associated with inflammation and pain.

T3 - FREE ↓

(2.80 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 hypothyrodism 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.

T3 - TOTAL ↓

(89.20 ng/dL)

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 T-4 levels, they still produce enough T-3 from the thyroid to maintain normal thyroid function.

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T3 UPTAKE ↓

(26.20 %)

Primary hypothyroidism

If T-3 uptake is decreased with an increased TSH, a normal or decreased total T-4 and/or total T-3 level , and an increased cholesterol and triglyceride level, primary hypothyroidism is probable.

Selenium deficiency

Consider Selenium deficiency if the total T-3 is reduced, the free T-3 is reduced or T-3 uptake is reduced along with a normal TSH and T-4 level. Inactive T-4 is converted into T-3, the active thyroid hormone, by cleaving an iodine molecule from its structure. Selenium plays an active role in this cleaving process.

Iodine deficiency

If T-3 uptake is decreased along with a decreased total T-4 and an increased total T-3 and a usually normal or mildly elevated TSH, then suspect an iodine deficiency.

T4 - FREE ↓

(0.98 ng/dL)

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 an increased TSH and you may see a normal or decreased total T4 level along woith a possible decrease in total T3, free T4, and/or free T3. You may see a possible increase in cholesterol and/or triglyceride levels. Note: Hypothyroidism can exist with an increased TSH and a normal Free T-4.

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Iodine deficiency

In an iodine deficieincy the total T4 will often be decreased along with a decreased free T4. The total T3 is often increased and the TSH may be normal or mildly elevated TSH.

T4 - TOTAL ↓

(5.20 µg/dL)

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, total T3, free T4, and free T3 along with a possible increase in cholesterol and/or triglyceride level.

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 hypothyrodism 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).

Iodine deficiency

In an iodine deficiency the total T4 will often be decreased along with a decreased free T4. The total T3 is often increased and the TSH is either normal or mildly elevated. Serum iodine levels will also be decreased.

TESTOSTERONE TOTAL - FEMALE ↓

(33.20 ng/dL)

Low total testosterone levels have been linked to an increased risk for the following:

- Osteoporosis
- Decreased lean body mass
- Decreased libido
- It may also suggest ovarian insufficiency and/or adrenal insufficiency.

Testosterone levels decrease following menopause, and restoring testosterone levels may help improve well-being and libido.

TOTAL WBCS ↓

(2.60 k/cumm)

Chronic viral infection

In a chronic viral infection the total WBC count will be decreased, as the body is using up its WBCs. Decreased total WBC, increased lymphocyte count, decreased neutrophils, decreased LDH isoenzymes due to a decrease in the total WBC and an increased monocytes during the recovery phase.

Chronic bacterial infection

The total WBC count in a chronic bacterial infection will often be opposite of that seen with active infection: Decreased total WBC, increased neutrophils, decreased lymphocyte count, and decreased LDH isoenzymes due to a decrease in the total WBC. Expect to see an increased monocyte count during the recovery phase.

Pancreatic insufficiency

The body responds to pancreatic insufficiency by using phagocytic white cells to do the job of breaking down food and clearing food residue from the system. This is known as leukocytic auto digestion and can cause a decreased white count.

Systemic Lupus Erythematosis (SLE)

SLE is a disease characterized by inflammation in several organ systems and the production of auto-antibodies that cause cellular injury. It is a disease of extreme variability in clinical and laboratory presentation. Nearly half of all people suffering from SLE have leukopenia, and anemia is usually present in the active disease. SLE is possible with decreased WBC count and C-complement, and an increased ANA, Alpha 1 globulin, C reactive protein, and gamma globulin.

Decreased production

If the following chemistries are out of range we can suspect a functional decreased production from the bone marrow: Decreased total WBC, RBCs, cholesterol, magnesium, and BUN with an increased MCV. Certain drugs, chemotherapeutic agents, radiation, and heavy metals can cause bone marrow depression.

Raw food diet

The total WBC will frequently be slightly below the optimum range for patients on a diet high in raw foods.

TRIGLYCERIDES ↓

(65.00 mg/dL)

Liver/biliary dysfunction

Biliary congestion/stasis can impact on the emulsification and digestion of fats, which may lead to a decreased level of triglycerides <70 or <0.79 mmol/l. Liver dysfunction, such as fatty liver, can also prevent the synthesis of endogenous triglycerides and other lipids and lipoproteins. Biliary congestion/stasis can often be caused by a mild obstruction in the extra-hepatic biliary duct. Here are the findings on a blood test for biliary congestion/stasis: GGTP levels will frequently be increased but not necessarily, Bilirubin levels will also be elevated, Increased alkaline phosphatase, Increased total cholesterol, AST and ALT may be normal or increased. Also, many cases of biliary congestion/stasis will show normal lab values.

Diet- Nutrient deficient, insufficient fat intake, vegetarian diet

Dietary intake of healthy fats maybe low, a pattern that is commonly seen in vegetarians.

Thyroid hyperfunction

Hyperthyroidism is probable if there are low triglycerides with a low TSH and a high total T-3, elevated free T3 and an elevated total T4. The low triglyceride levels are probably due to the excessive utilization of fatty acids by a metabolism that is excessively fast.

Autoimmune processes

If triglycerides are decreased with low or normal cholesterol and an increased HDL, then some kind of autoimmune process in the body is possible. The problem may be inflammatory or destructive in nature. Consider further testing to rule-out tissue inflammation or destruction (C-reactive protein, ANA, rheumatoid factor etc.). If tissue destruction is present, LDH, Alpha 1 or Alpha 2 globulin (seen with serum protein electrophoresis) will frequently be increased. This may also be a sign of endocrine dysfunction due to endocrine hypo or hyper function. Consider further endocrine testing to locate cause of the disturbance.

TSH ↑

(2.95 mIU/L)

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.

URIC ACID - FEMALE ↑

(5.65 mg/dL)

Gout

Increased uric acid levels are associated with Gout, which is a condition in which uric acid crystals precipitate in the tissue, especially the big toe (tophi). If there is an increased uric acid, Gout is possible. The likelihood increases if there is also a decreased phosphorous, an increased cholesterol, an increased BUN and a normal or increased creatinine.

Increased risk of atherosclerosis, cardiovascular disease and stroke

An increased uric acid level is associated with chronic inflammatory states including those in the vascular system. This is one of the precipitating factors in the development of atherosclerosis. If there is an increased uric acid level with an increased triglyceride level in relation to total cholesterol with a decreased HDL and an increased LDL, atherosclerosis is probable. Platelet levels may also be increased. Homocysteine levels are frequently increased with atherosclerosis. Hs-CRP are frequently increased, and fibrinogen levels are frequently increased. If the above pattern is not present and the uric acid level is elevated still consider running a serum homocysteine, as a homocysteinuria may be the locus of a developing problem.

Oxidative Stress and Free Radical Activity

If the uric acid level is high, it could point to an overabundance of free radical activity and oxidative stress. This condition should be explored further if the total cholesterol level suddenly drops from its usual range. Other potential signs include a decrease in lymphocyte count, albumin, and platelet levels. An increase in total globulin also indicates a free radical pathology, heightening the risk for neoplasm development. Oxidative stress can lead to a higher red blood cell destruction rate, often marked by an elevated bilirubin level.

Rheumatoid Arthritis

Elevated uric acid levels often correspond with chronic inflammation and are a common characteristic of conditions like Rheumatoid Arthritis. The development of rheumatoid arthritis may be indicated by an increase in uric acid level, an elevated ESR, and a decrease or normal level of albumin and alkaline phosphatase. The serum calcium level might be increased or remain normal. To better understand the nature of the joint pain, consider further investigation with appropriate diagnostic tests or a Rheumatoid panel.

Renal insufficiency

Elevated uric acid levels can be indicative of renal insufficiency. This condition is often overlooked. Renal insufficiency should be suspected if there is an increase in BUN level, even with normal or elevated serum creatinine. Concurrently, uric acid levels might be normal or increased, as can serum phosphorous. Both LDH and AST are usually within the normal range.

Renal disease

Higher uric acid levels are often associated with decreased renal function. The presence of increased BUN, serum creatinine, BUN/creatinine ratio, urine specific gravity, uric acid, serum phosphorous, LDH, and AST may indicate impaired renal function. If such a pattern is observed, the condition should either be ruled out or referred to a qualified practitioner.

Circulatory disorders

patients who exhibit increased uric acid levels should be evaluated for potential circulatory disorders. Poor circulation activates the enzyme Xanthine oxidase, crucial for uric acid formation, resulting in elevated uric acid levels and a superoxide radical. Conditions like Hypertension, Raynaud's, Atherosclerosis, and Polycythemia should be considered and treated accordingly.

Intestinal Hyperpermeability

Consider an altered intestinal permeability when uric acid levels are elevated, and an underlying inflammatory issue exists. Various organisms such as bacteria, yeast, and amoebas and their toxins can be readily absorbed in a compromised digestive barrier, often leading to an auto-immune response. Treatment should focus on restoring gut integrity and correcting the dysbiotic terrain. Note that a common initial reaction, known as the Herxheimer reaction, might occur due to an increased release of endotoxins during early treatment.

VITAMIN B12 ↓

(462.00 pg/mL)

Insufficient B12 Intake

Dietary deficiency of folate or B12 is uncommon in the U.S. It sometimes may be seen with general malnutrition and in vegans who do not consume any animal products, including milk and eggs.

Malabsorption

You may see B12 deficiency with conditions that interfere with the normal absorption of B12 in the GI. These include: Celiac disease, SIBO (Small Intesting Bacterial Overgrowth), parasites, hypochlorhydria, acid blocking medication, gastric bypass surgery, pacreatic insufficiency.

ZINC - RBC ↓

(9.20 mg/L)

Inadequate zinc intake/absorption/deficiency

Decreased intake and absorption will lead to zinc depletion and reduced RBC zinc. Levels decline more gradually with marginal insufficiency. Zinc absorption may be decreased when consumed with iron, magnesium, calcium, phytates, oxalates. Excess copper levels will reduce zinc absorption and retention. The heavy metal cadmium can also inhibit zinc absorption. When zinc intake and total body content decreases, the plasma, bone, liver, and testes will lose proportionately more zinc than other tissues such as the heart, skin, and skeletal muscle.

Hypochlorhydria

Zinc is part of the carbonic anhydrase enzyme which facilitates production of hydrochloric acid in the stomach. Low zinc levels and zinc deficiency are associated with decreased activity of the carbonic anhydrase enzyme, resulting in alterations in oxygen and carbon dioxide metabolism and hydrochloric acid production.

Immune Compromise

Zinc deficiency will negatively affect immunity and increase susceptibility to pathogenic infection.

Maldigestion and malabsorption

Zinc deficiency can contribute to impaired protein digestion and contribute to gastrointestinal symptoms such as diarrhea. Zinc absorption can be reduced when bound to phytates in whole grains.

Hyperlipidemia

Low RBC zinc is associated with increased blood levels of cholesterol and triglycerides.

Inflammatory process

The body will decrease serum zinc and increase serum copper during inflammation or an acute phase of disease. Zinc helps control oxidative stress, regulates inflammatory cytokines, and targets pro-inflammatory NF-kappaB. A deficiency of zinc contributes to increased inflammation and tissue damage.

Metabolic syndrome

Zinc has a pivotal role in insulin metabolism and its association with metabolic syndrome is being researched. Current results suggest that low serum zinc is associated with increased fasting insulin and the association becomes stronger as the number of metabolic syndrome risk factors increases.

Thyroid Disease

RBC zinc may be decreased in hyperthyroidism (i.e. Graves' disease) even if serum levels are within normal limits. Levels may be reduced in hypothyroidism but not to the same degree as in hyperthyroidism.

Antioxidant insufficiency

Low RBC zinc associated with reduced levels of RBC copper-zinc superoxide dismutase which in turn can reduce antioxidant activity within the cell.

ZINC - SERUM ↓

(65.70 µg/dL)

Inadequate zinc intake/absorption/deficiency

Serum zinc levels decrease quickly with severe zinc deficiency due to inadequate intake. Levels decline more gradually with marginal insufficiency. Zinc absorption may be decreased when consumed with iron, magnesium, calcium, phytates, oxalates. The heavy metal cadmium can also inhibit zinc absorption. When zinc intake and total body content decreases, the plasma, bone, liver, and testes will lose proportionately more zinc than other tissues such as the heart, skin, and skeletal muscle.

Hypochlorhydria

Zinc is part of the carbonic anhydrase enzyme which facilitates production of hydrochloric acid in the stomach. Low serum zinc and zinc deficiency are associated with decreased activity of the carbonic anhydrase enzyme, resulting in alterations in oxygen and carbon dioxide metabolism and hydrochloric acid production.

Increased Copper to zinc ratio

As zinc decreases in the serum, the copper to zinc ratio is altered. An elevation in copper to zinc ratio, especially above 2, is associated with inflammation, advanced disease or debilitation, increased CVD risk, malignancy, and a decreased ability to recover or regain homeostasis after a destabilizing event.

Hypogeusia

A noticeable sign of zinc deficiency is a decreased sense of taste and smell

Inflammatory process

The body will decrease serum zinc and increase serum copper during inflammation or an acute phase of disease. This, in turn, alters the copper to zinc ratio (CZr). A copper to zinc ratio above 2 may reflect an inflammatory process, especially if zinc intake and absorption are normal.

Metabolic syndrome

Zinc has a pivotal role in insulin metabolism and its association with metabolic syndrome is being researched. Current results suggest that low serum zinc is associated with increased fasting insulin and the association becomes stronger as the number of metabolic syndrome risk factors increases.

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