The Functional Lens Report

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An introduction to functional blood chemistry anaysis and your report.

Introduction

Functional Blood Chemistry Analysis

Functional Blood Chemistry Analysis can be defined as the process by which complex and comprehensive blood biomarkers are organized, analyzed and interpreted to provide a comprehensive assessment of the state and trends of the main body systems, the supporting body accessory systems, along with the status of nutrients and trends towards and away from clinical dysfunction.

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, many people start to feel unwell long before a traditional blood test becomes diagnostic and 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 ranges used on a traditional lab test are based on statistics and not on whether a certain value represents good health or optimal physiological function. The problem is that "normal" reference ranges usually represent "average" populations rather that the optimal level required to maintain good health. Most "normal" 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 that are based on optimal physiology and not the "normal" population. This results in a tighter "Functional Physiological Range", which allows us to evaluate the area within the "Normal" range that indicates that something is not quite right in the physiological systems associated with this biomarker. This gives us the ability 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.

The Functional Lens Report

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An in-depth functional system and nutrient evaluation.

Assessment

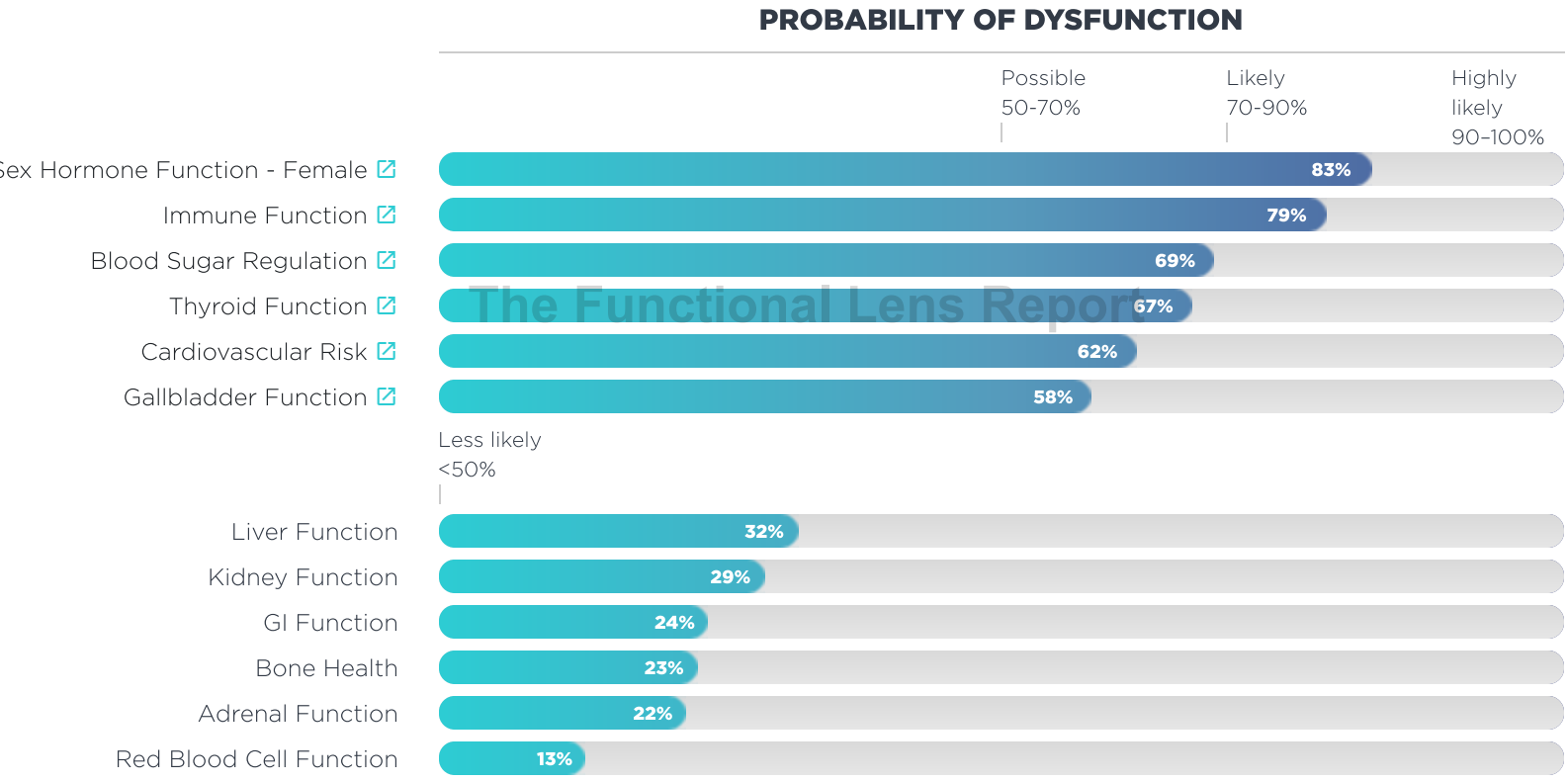
Functional Body Systems

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 highly 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 Likely.
Improvement required

SEX HORMONE FUNCTION - FEMALE

The Female Sex Hormone Function score helps us assess for sex hormone regulation in your patient. A high Female Sex Hormone Function score indicates an increasing level of sex hormone deficiencies in your patient. Review the individual levels of hormones to identify which hormones are causing the high Sex Hormone Function score: Testosterone Total, Testosterone Free, DHEA-S, Progesterone, Sex Hormone Binding Globulin (SHBG), and Estradiol.

Rationale

Estradiol - Female ↓, Testosterone Total - Female ↓, Testosterone Free - Female ↓, Progesterone - Female ↓, Sex Hormone Binding Globulin - Female ↑

Biomarkers considered

Estradiol - Female, Testosterone Total - Female, Testosterone Free - Female, Progesterone - Female, Sex Hormone Binding Globulin - Female

Patient result not available - consider running in future tests:

DHEA-S - Female

Dysfunction Likely.
Improvement required

IMMUNE FUNCTION

The Immune Function score allows us to assess the functional health of your patient's immune system. A high Immune Function score indicates that there is dysfunction within your patient's immune system and further assessment is needed to pinpoint exactly what that dysfunction is. Some of the factors to consider include Immune Insufficiency, Bacterial or Viral Infections, or GI dysfunction associated with immune function: abnormal mucosal barrier function, secretory IgA dysfunction or dysbiosis.

Rationale

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

Biomarkers considered

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

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

BLOOD SUGAR REGULATION

The Blood Sugar Regulation score allows us to assess the functional health of your patient's blood sugar regulation. A high Blood Sugar Regulation score indicates that there is dysfunction in this patient's blood sugar regulation. Blood sugar dysregulation is affected by genetics, diet, lifestyle, nutrition, and environment. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions": Hypoglycemia, Metabolic Syndrome and Insulin Resistance. Long-standing Blood Sugar Dysregulation, if left unassessed or treated, may lead to hyperinsulinemia, and type 2 Diabetes.

Rationale

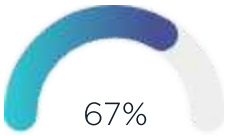
Glucose - Fasting ↑, Cholesterol - Total ↑, LDL Cholesterol ↑

Biomarkers considered

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

Patient result not available - consider running in future tests:

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



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

THYROID FUNCTION

The Thyroid Function score allows us to assess the functional health of your patient's thyroid. A high Thyroid score indicates that there is dysfunction in your patient's thyroid and there is a need for further assessment and treatment. There is a strong likelihood that there's significant distress in the systems that help regulate the thyroid gland in the body. This may be caused by increased levels of stress, adrenal insufficiency, iodine and/or selenium deficiency, liver dysfunction, kidney insufficiency, a low-calorie diet etc. Consider that the dysfunction might be a hyperactive thyroid (hyperthyroid) or a hypothyroid situation. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions": Hyperactive Thyroid, Hypothyroidism - Primary (a dysfunction in the thyroid itself), Hypothyroidism - Secondary (dysfunction in the anterior pituitary), or Thyroid Conversion Syndrome. You may also want to check the scores for Selenium Need and Iodine Need.

Rationale

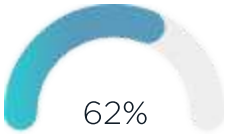
TSH ↑

Biomarkers considered

TSH, T4 - Free, T3 - Free, Reverse T3, Thyroglobulin Abs, Thyroid Peroxidase (TPO) Abs

Patient result not available - consider running in future tests:

T4 - Total, T3 - Total, T3 Uptake, Free Thyroxine Index (T7), Thyroglobulin Abs LABCORP, Thyroid Peroxidase (TPO) Abs LABCORP, Free T3 : Reverse T3



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

CARDIOVASCULAR RISK

The Cardiovascular Risk score is based on the measurement of 15 biomarkers in a blood test that indicates an increased risk of this patient developing cardiovascular disease (heart attack, coronary artery disease, and stroke). A high Cardiovascular Risk score indicates that your patient may have an increased risk of cardiovascular disease, Atherosclerosis, Endothelial Dysfunction, and Inflammation.

Rationale

Glucose - Fasting ↑, Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑, Homocysteine ↑, Testosterone Free - Female ↓, Vitamin D (25-OH) ↓

Biomarkers considered

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

Patient result not available - consider running in future tests:

LDH, Fibrinogen

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

GALLBLADDER FUNCTION

The Gallbladder Function score allows us to assess the functional health of your patient's biliary system. A high Gallbladder Function score indicates that there is dysfunction within your patient's hepato-biliary system and further assessment is needed to find out what the dysfunction is. Some factors to consider include problems in the liver itself that compromises the production of bile (Biliary Insufficiency), the progressive thickening of the bile within the gallbladder (Biliary Stasis) or Biliary Obstruction that causes cholestasis, a condition of impaired bile flow. Biliary obstruction can occur in the liver but more often occurs outside the liver where it is most often due to a common calculus and usually occurs on a spectrum of mild to severe. Biliary obstruction usually has a genesis in biliary stasis.

Rationale

Cholesterol - Total ↑, Bilirubin - Total ↑

Biomarkers considered

Alk Phos, Cholesterol - Total, ALT, Bilirubin - Total, Triglycerides

Patient result not available - consider running in future tests:

GGT, LDH, Bilirubin - Direct, Gastrin

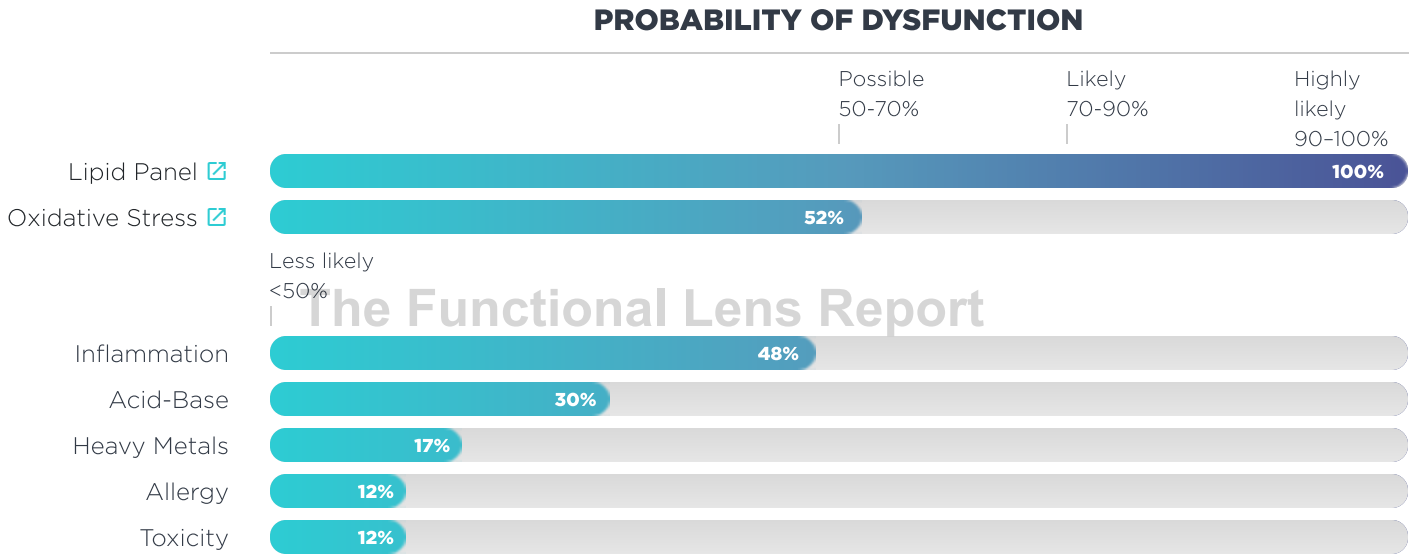
Accessory Systems

The Accessory System results represent an algorithmic analysis of this blood test. These results have been converted into your client's individual Accessory 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.

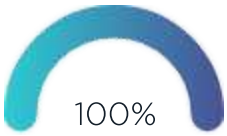
Please use this report in conjunction with the "Practitioner's Only Clinical Dysfunctions Report" to identify which dysfunctions and conditions are causing changes in the Accessory Systems.

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



Accessory Systems Details

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



Dysfunction Highly Likely. Much improvement required.

LIPID PANEL

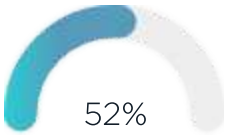
A high Lipid Panel score indicates that there is a strong clinical indication of hyperlipidemia, which has been shown to indicate a potential risk of developing atherosclerotic coronary artery disease. Although hyperlipidemia is a cause, it's important to look at many other risks for this disease including smoking, blood sugar dysregulation, hypertension, elevated homocysteine and other diet and lifestyle considerations.

Rationale

Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑

Biomarkers considered

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



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

OXIDATIVE STRESS

A high Oxidative Stress score indicates that your patient may be dealing with a high oxidative stress burden. A blood test does not directly measure oxidative stress but rather biomarkers in the blood that are affected by the presence of oxidative stress, e.g. a sudden decrease in total cholesterol from a historically normal level is a strong indicator of increased oxidative stress. Factors to consider are an exposure to environmental toxins, inflammatory processes and low antioxidant levels in the body.

Rationale

Bilirubin - Total ↑, HDL Cholesterol ↑, LDL Cholesterol ↑

Biomarkers considered

Albumin, Globulin - Total, Cholesterol - Total, Platelets, Lymphocytes - %, Bilirubin - Total, HDL Cholesterol, Lymphocytes - Absolute, LDL Cholesterol, Ferritin, Neutrophils - %, Homocysteine

Patient result not available - consider running in future tests:

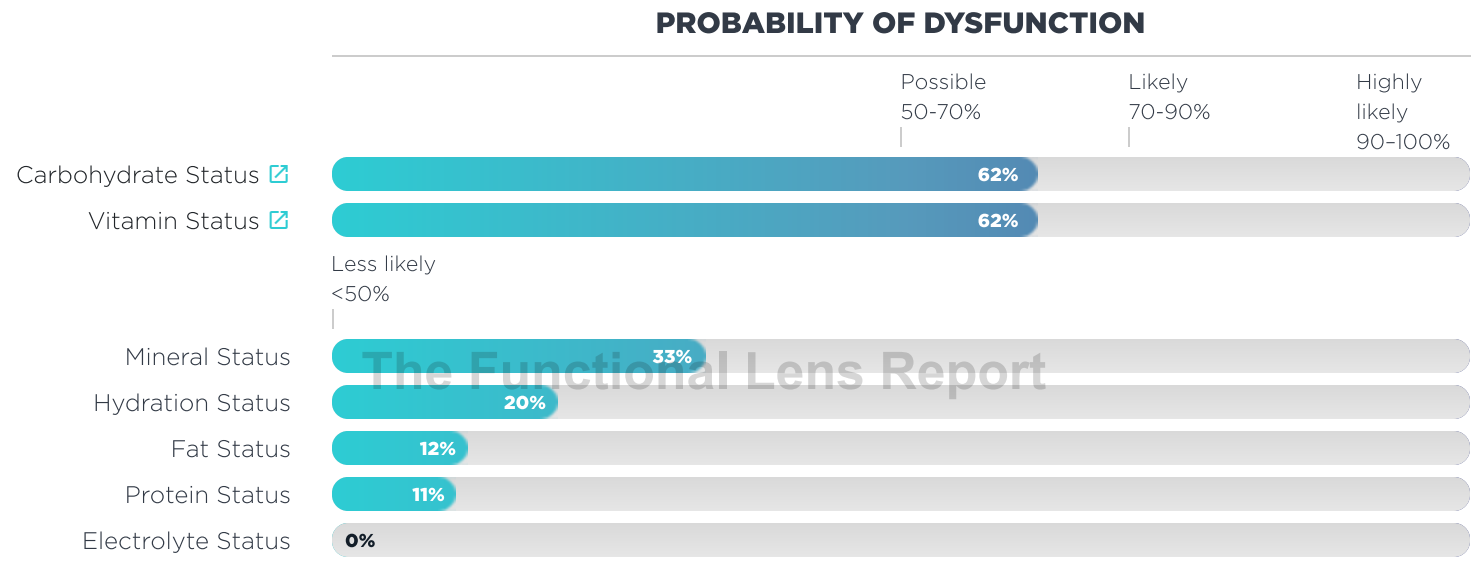
Uric Acid - Female

Macronutrient Status

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

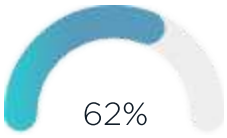
This report gives you an indication of your client's general nutritional dysfuction. The Macronutrient Status is influenced by actual dietary intake, digestion, absorption, assimilation and cellular uptake of the nutrients themselves.

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



Macronutrient Status Details

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



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

CARBOHYDRATE STATUS

The Carbohydrate Status score gives us an assessment of how your patient's body handles their dietary intake of carbohydrates, especially refined carbohydrates, and sugars. A diet high in refined carbohydrates and sugars will deplete phosphorus stores and other important co-factors for carbohydrate metabolism. It may also increase serum glucose and serum triglyceride levels. Follow up a high Carbohydrate Status score with a thorough assessment of blood sugar regulation and also an investigation into this patient's dietary consumption of sugars and refined carbohydrates.

Rationale

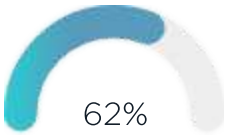
Glucose - Fasting ↑, Cholesterol - Total ↑, LDL Cholesterol ↑, Total WBCs ↓

Biomarkers considered

Glucose - Fasting, Cholesterol - Total, Triglycerides, LDL Cholesterol, HDL Cholesterol, Total WBCs

Patient result not available - consider running in future tests:

Phosphorus, LDH



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

VITAMIN STATUS

The Vitamin Status score gives us a general indication of the balance of certain vitamins in the body based on the results of this blood test. A high Vitamin Status score indicates a level of deficiency or need in one or more of the vitamins reflected in this score, which includes vitamin B12, vitamin B6, folate, thiamin, vitamin D and vitamin C. Please use the information in the Nutrient Deficiencies report to identify which vitamin or vitamins may be in need.

Rationale

Homocysteine ↑, Vitamin D (25-OH) ↓, MCV ↑

Biomarkers considered

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

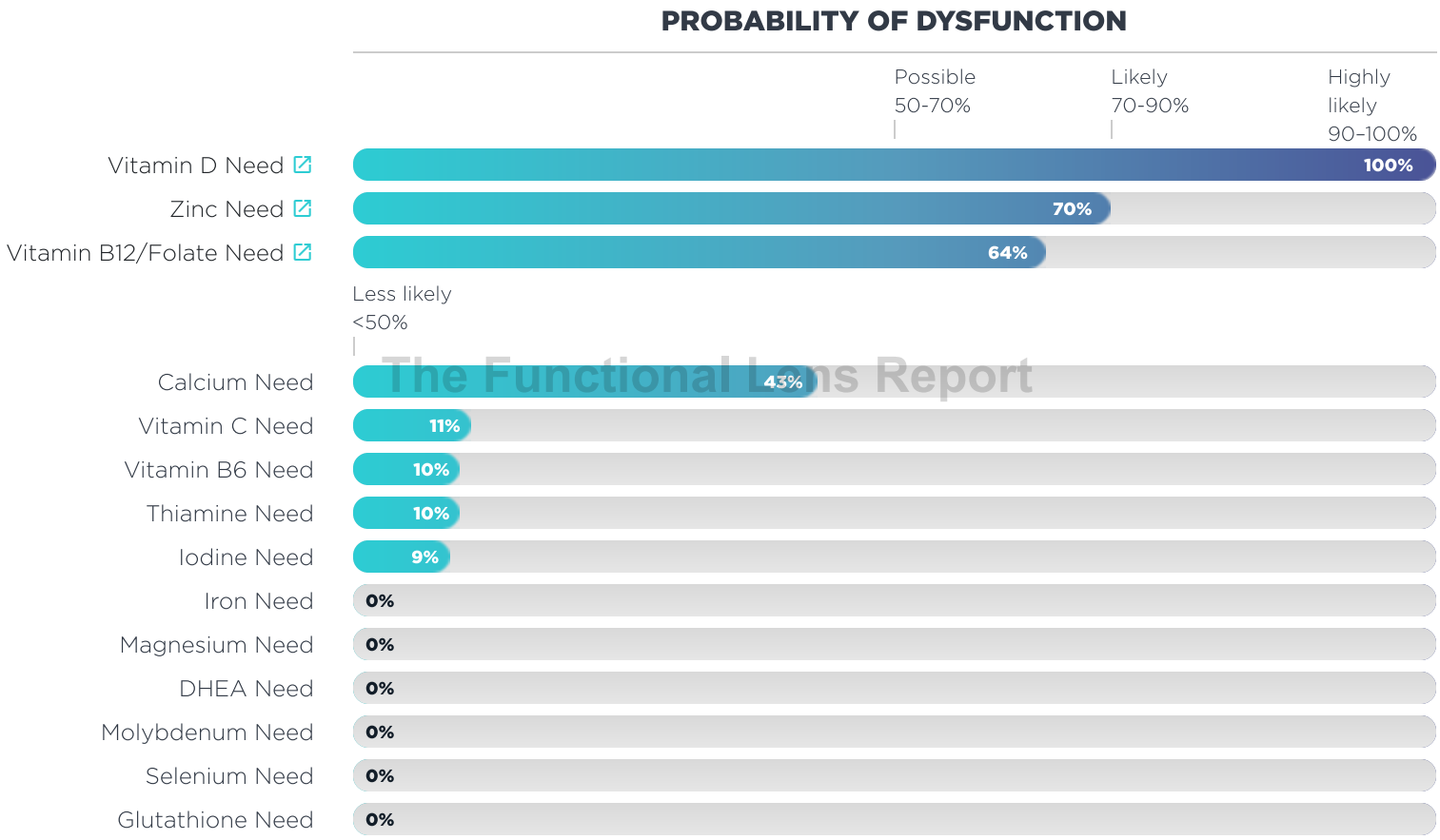
Patient result not available - consider running in future tests:

GGT, Folate - Serum, Vitamin B12, Methylmalonic Acid

Individual Nutrient Deficiencies

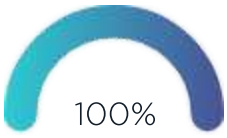
The values represent the degree of deficiency for individual nutrients based on your client's blood results. The status of an individual nutrient is based on a number of factors such as actual dietary intake, digestion, absorption, assimilation and cellular uptake of the nutrients themselves. All of these factors must be taken into consideration before determining whether or not your client 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 highly detailed description and individual explanation of the results shown in this report.



Individual Nutrient Deficiencies 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.



Dysfunction Highly Likely. Much improvement required.

VITAMIN D NEED

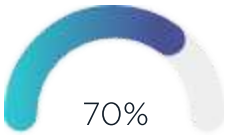
The results of this blood test indicate that this patient's Vitamin D levels might be lower than optimal.

Rationale

Vitamin D (25-OH) ↓

Biomarkers considered

Vitamin D (25-OH)



Dysfunction Likely. Improvement required

ZINC NEED

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

Rationale

Alk Phos ↓

Biomarkers considered

Alk Phos

Patient result not available - consider running in future tests:

Zinc - Serum

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

VITAMIN B12/FOLATE NEED

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

Rationale

MCV ↑, Homocysteine ↑, Total WBCs ↓

Biomarkers considered

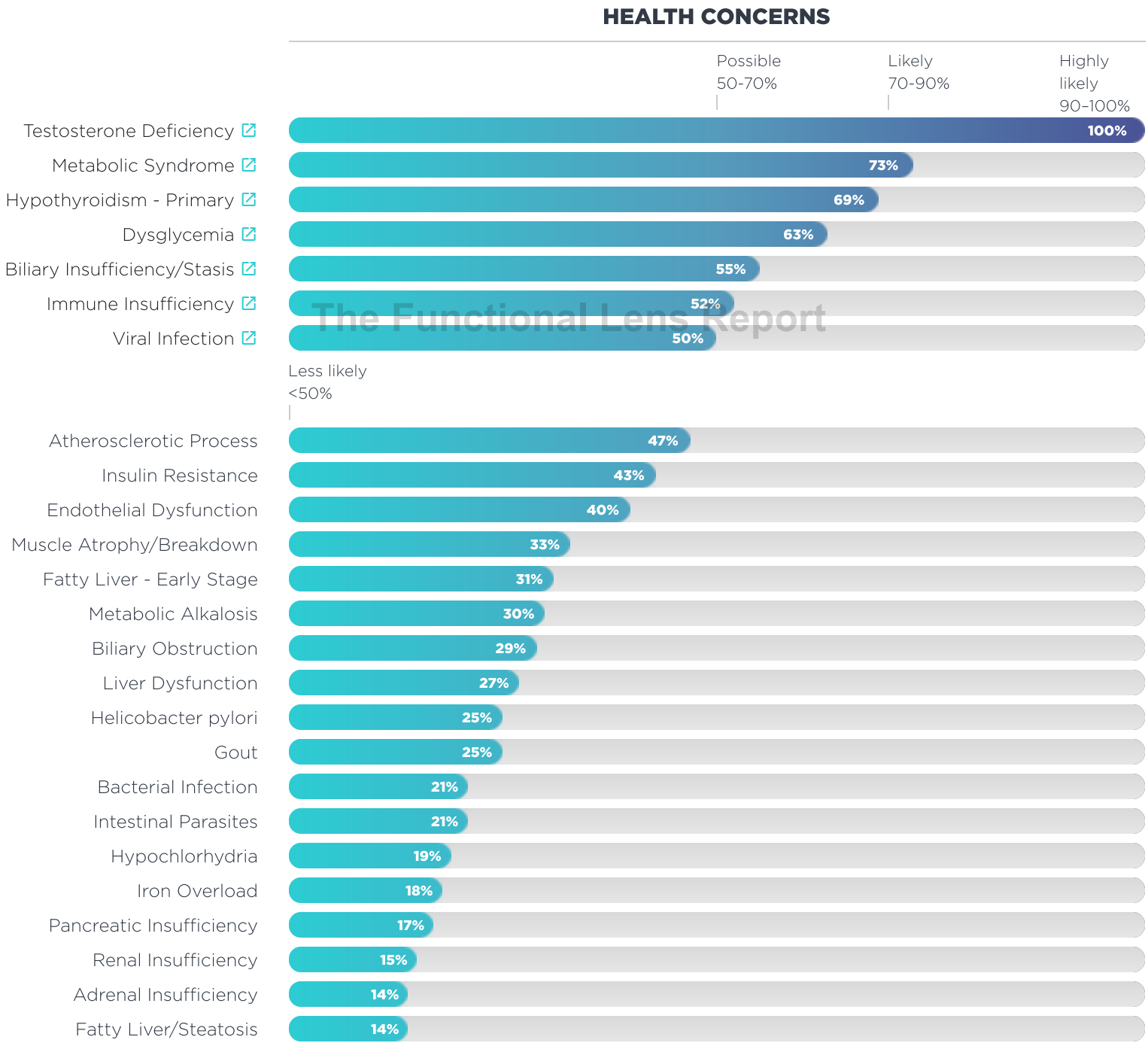
MCV, Homocysteine, Albumin, Total WBCs, RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCH, MCHC, RDW, Neutrophils - %

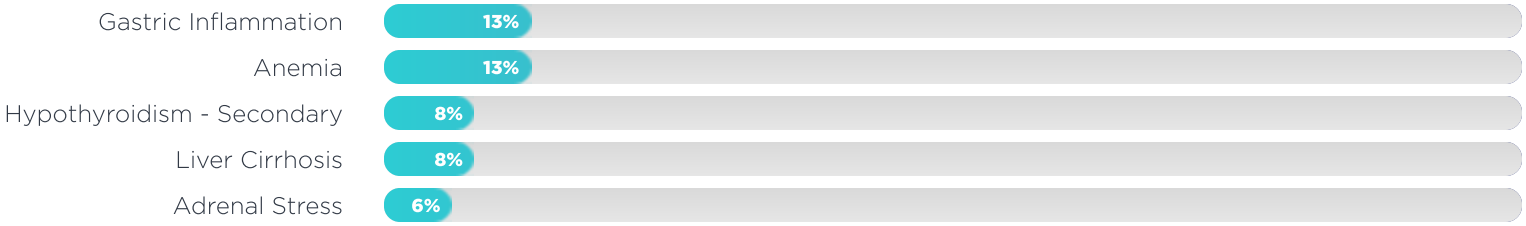
Patient result not available - consider running in future tests:

LDH, Methylmalonic Acid, Uric Acid - Female, Folate - Serum, Vitamin B12

Clinical Dysfunctions

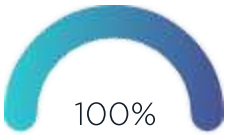
Each Clinical Dysfunction that has a probability of dysfunction above 50% is included in the section that follows so you can read a highly detailed description and individual explanation of the results shown in this report.





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.

TESTOSTERONE DEFICIENCY

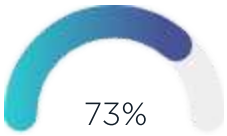
Consider a functional testosterone deficiency with a decreased total testosterone and a decreased free testosterone.

Rationale

Testosterone Free - Female ↓, Testosterone Total - Female ↓

Biomarkers considered

Testosterone Free - Female, Testosterone Total - Female



Dysfunction Likely. Improvement required

METABOLIC SYNDROME

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

Rationale

Glucose - Fasting ↑, Triglycerides ↑, Cholesterol - Total ↑, LDL Cholesterol ↑

Biomarkers considered

Glucose - Fasting, Triglycerides, Hemoglobin A1C, Insulin - Fasting, Cholesterol - Total, LDL Cholesterol, HDL Cholesterol, Sex Hormone Binding Globulin - Female

Patient result not available - consider running in future tests:

Uric Acid - Female, DHEA-S - Female, Leptin - Female

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

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 ↑, Cholesterol - Total ↑

Biomarkers considered

TSH, Cholesterol - Total, Triglycerides, T4 - Free, T3 - Free, Thyroid Peroxidase (TPO) Abs, Thyroglobulin Abs

Patient result not available - consider running in future tests:

T4 - Total, T3 - Total, T3 Uptake, Free Thyroxine Index (T7), Thyroid Peroxidase (TPO) Abs LABCORP, Thyroglobulin Abs LABCORP

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

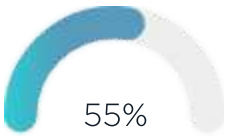
Glucose - Fasting ↑

Biomarkers considered

Glucose - Fasting, Hemoglobin A1C

Patient result not available - consider running in future tests:

Leptin - Female



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

BILIARY INSUFFICIENCY/STASIS

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

Rationale

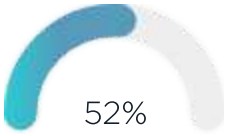
Cholesterol - Total ↑, Bilirubin - Total ↑

Biomarkers considered

Cholesterol - Total, Alk Phos, ALT, Bilirubin - Total, Triglycerides

Patient result not available - consider running in future tests:

GGT, LDH, Bilirubin - Direct, Gastrin



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

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 ↓, Alk Phos ↓

Biomarkers considered

Total WBCs, Albumin, Globulin - Total, Alk Phos

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

VIRAL INFECTION

Consider a viral infection with increased lymphocytes and an elevated total WBC count. Neutrophils may be normal or decreased. Increased monocytes indicate the recovery period. Expect to see increased band cells in the acute phase. Additional elements that may be out of range with a viral infection include an increased serum iron and an increased LDH.

Rationale

Lymphocytes - % ↑, Monocytes - % ↑

Biomarkers considered

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

Patient result not available - consider running in future tests:

LDH, Iron - Serum

The Functional Lens Report

3

A full breakdown of all individual biomarker results, showing distance from optimal, comparative and historical views.

Analytics

Blood Test Results

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

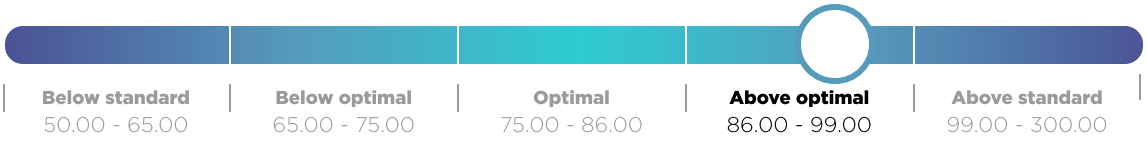
Each biomarker in the Blood Test results report that is above or below the Optimal or Standard Range hyperlinks into our Out of Optimal Range report so you can read a description of the biomarker and some of the reasons why it may be high or low.

Total number of biomarkers by optimal range

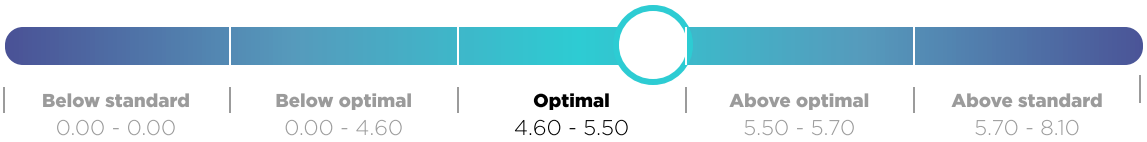
Alarm low	Below standard	Below optimal	Optimal	Above optimal	Above standard	Alarm high	Total
0	4	6	35	15	7	1	68

BLOOD GLUCOSE

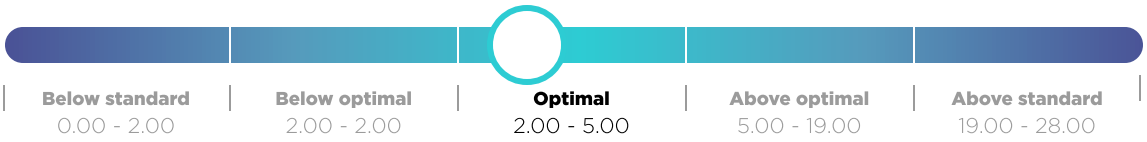
Glucose - Fasting
95.00 mg/dL



Hemoglobin A1C
5.40 %

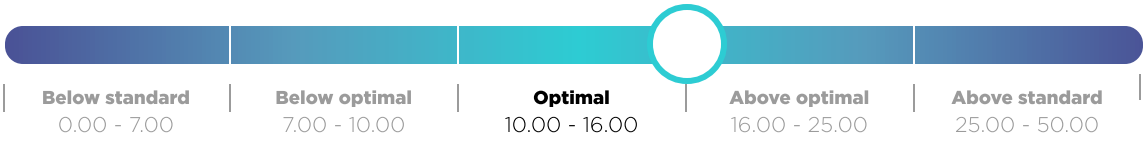


Insulin - Fasting
3.00 µIU/ml

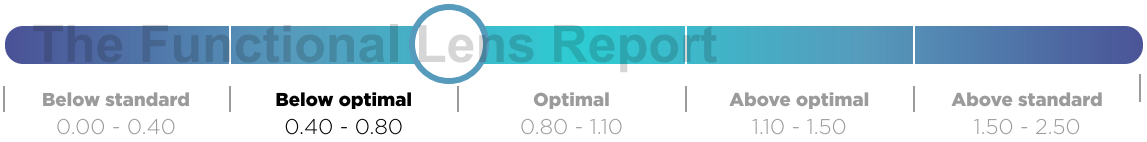


RENAL

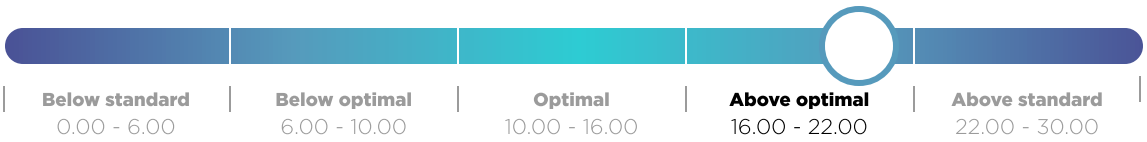
BUN
16.00 mg/dL



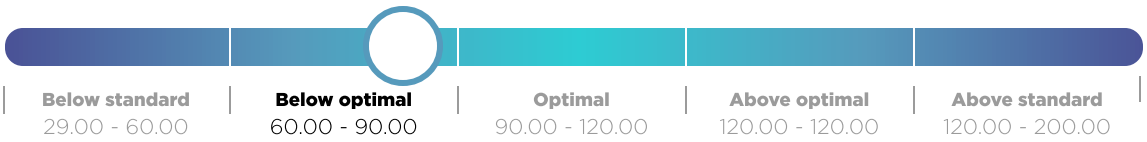
Creatinine
0.78 mg/dL



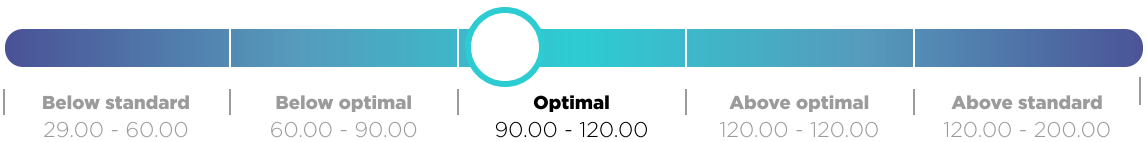
BUN : Creatinine
20.51 Ratio



eGFR Non-Afr. American
83.00 mL/min/1.73m2

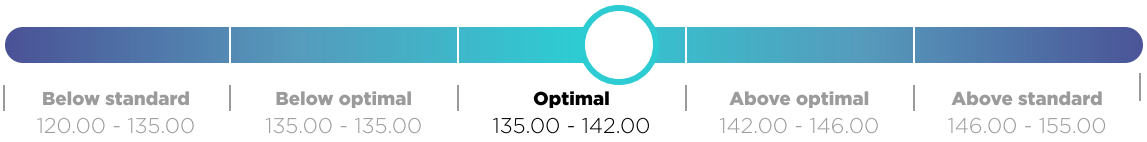


eGFR African American
96.00 mL/min/1.73m2

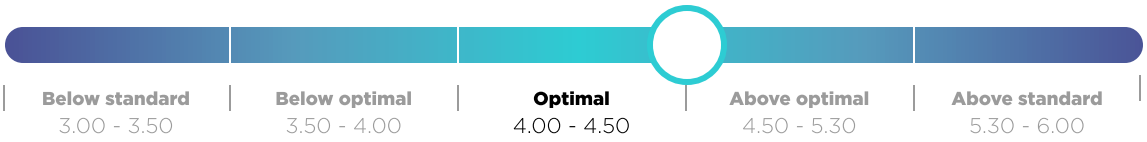


ELECTROLYTES

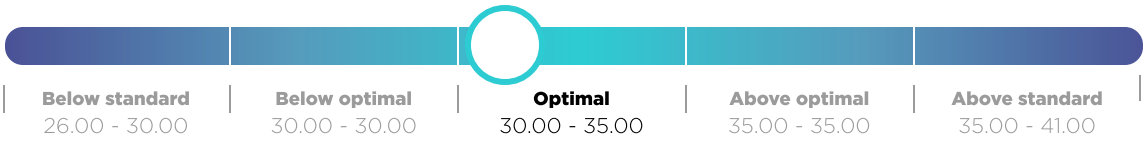
Sodium
140.00 mEq/L



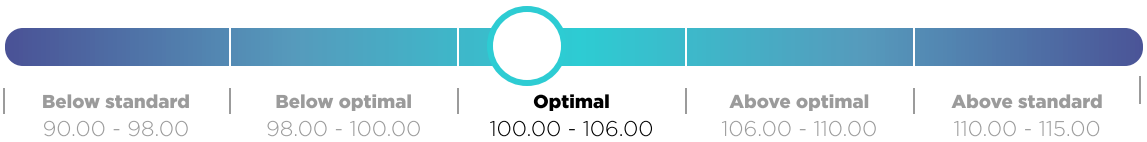
Potassium
4.50 mEq/L



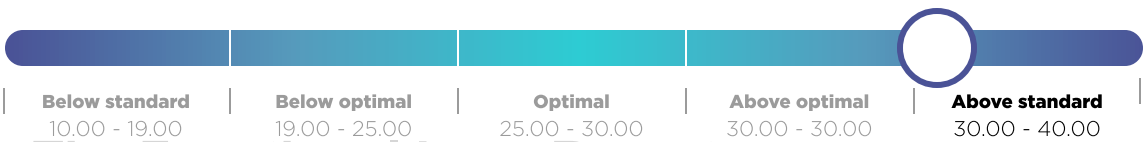
Sodium : Potassium
31.11 ratio



Chloride
102.00 mEq/L

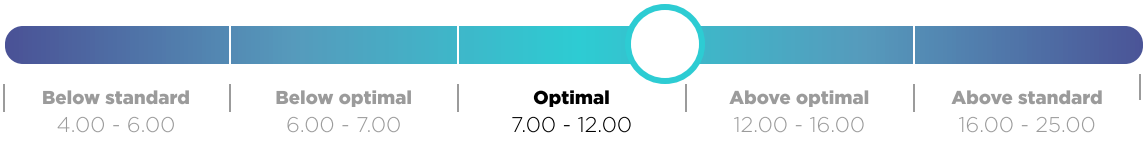


CO2
31.00 mEq/L



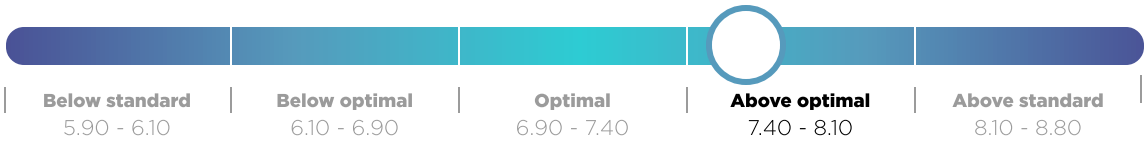
METABOLIC

Anion Gap
11.50 mEq/L



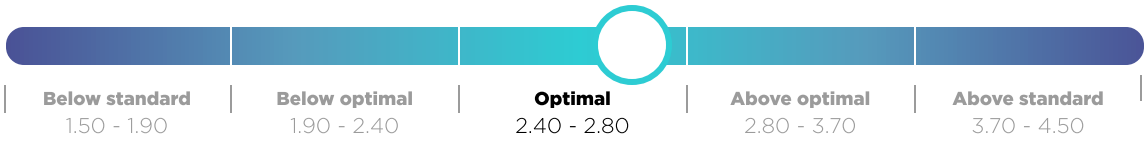
PROTEINS

Protein - Total
7.60 g/dL



Albumin
4.90 g/dL

Globulin - Total
2.70 g/dL

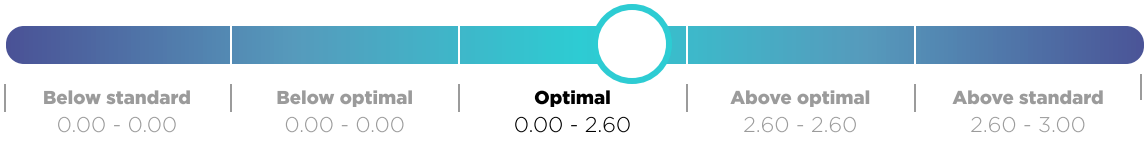


Albumin : Globulin
1.80 ratio

MINERALS

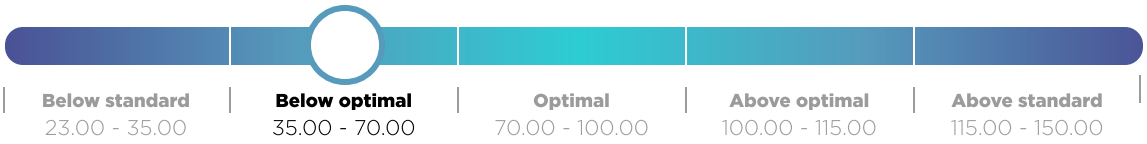
Calcium
9.80 mg/dL

Calcium : Albumin
2.00 ratio



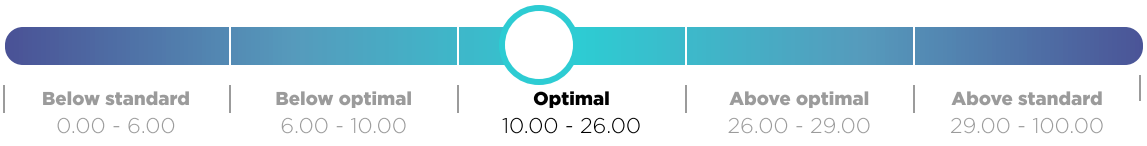
LIVER AND GB

Alk Phos
53.00 IU/L

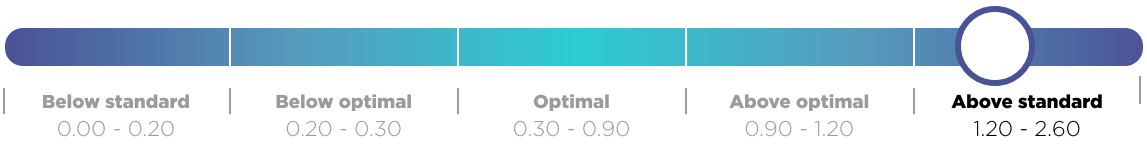


AST
19.00 IU/L

ALT
16.00 IU/L

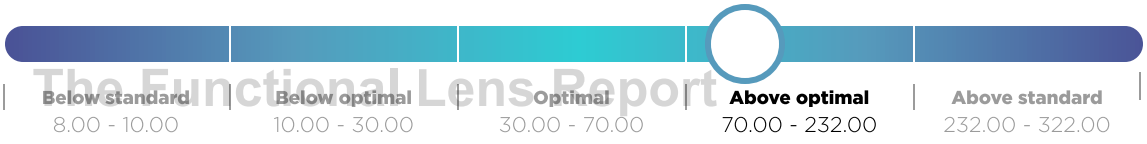


Bilirubin - Total
1.70 mg/dL



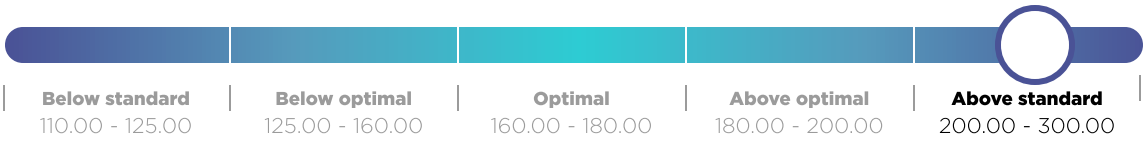
IRON MARKERS

Ferritin
118.00 ng/mL

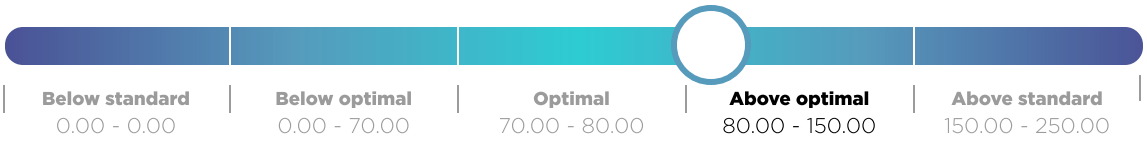


LIPIDS

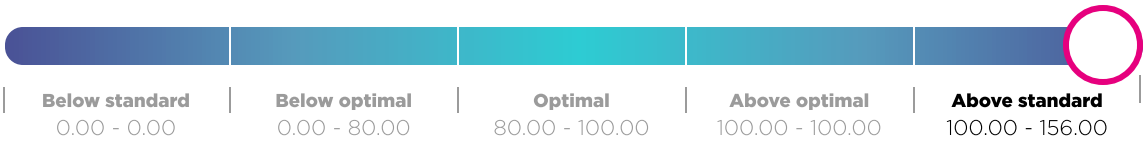
Cholesterol - Total
271.00 mg/dL



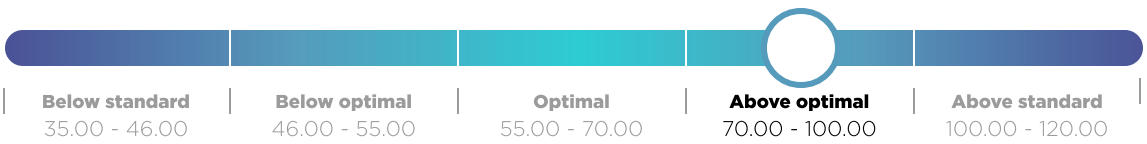
Triglycerides
89.00 mg/dL



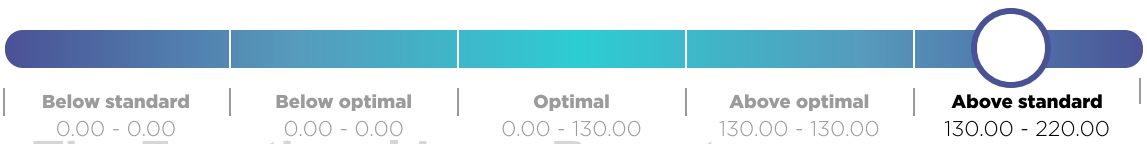
LDL Cholesterol
167.00 mg/dL ⚠



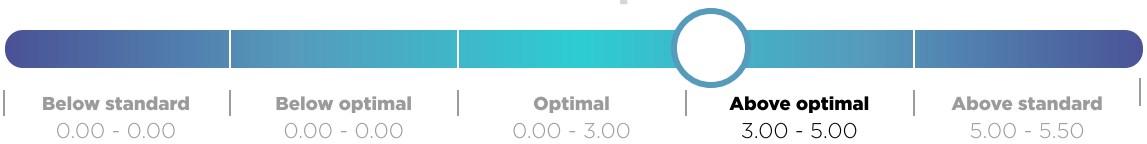
HDL Cholesterol
85.00 mg/dL



Non-HDL Cholesterol
186.00 mg/dl



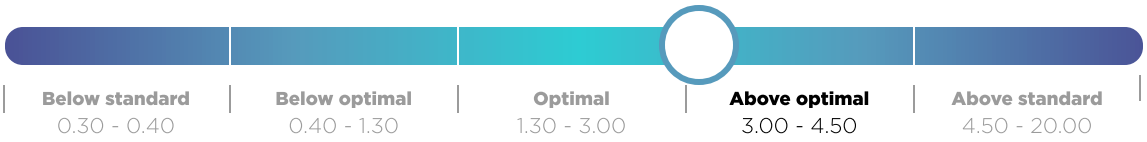
Cholesterol : HDL
3.20 Ratio



Triglyceride:HDL
1.04 ratio

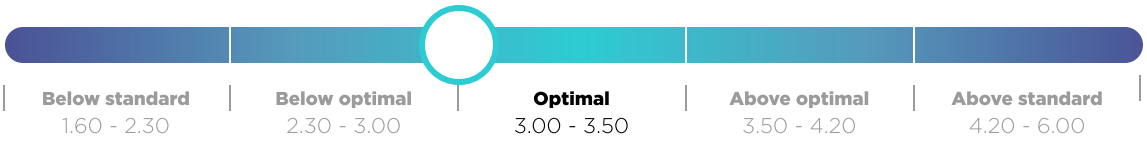
THYROID

TSH
3.08 µU/mL



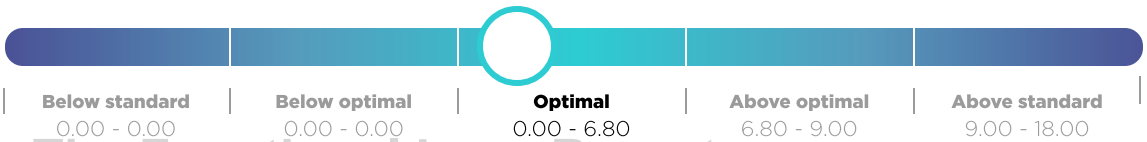
T4 - Free
1.20 ng/dL

T3 - Free
3.00 pg/ml

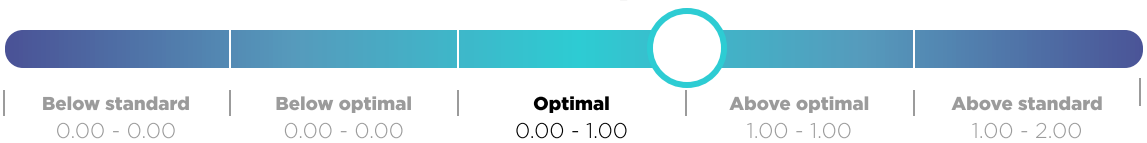


Reverse T3
18.00 ng/dl

Thyroid Peroxidase (TPO) Abs
2.00 IU/ml



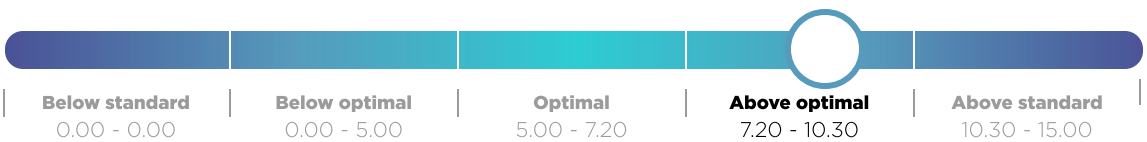
Thyroglobulin Abs
<1.00 IU/ml



INFLAMMATION

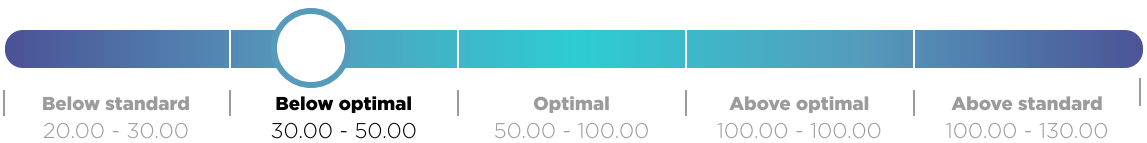
Hs CRP - Female
0.80 mg/L

Homocysteine
9.10 µmol/L



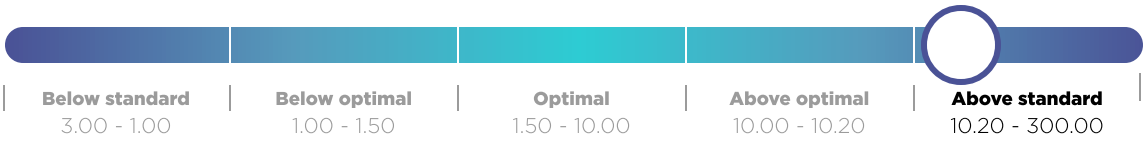
VITAMINS

Vitamin D (25-OH)
37.00 ng/ml

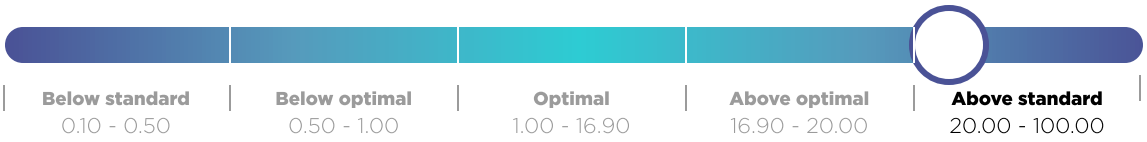


HORMONES

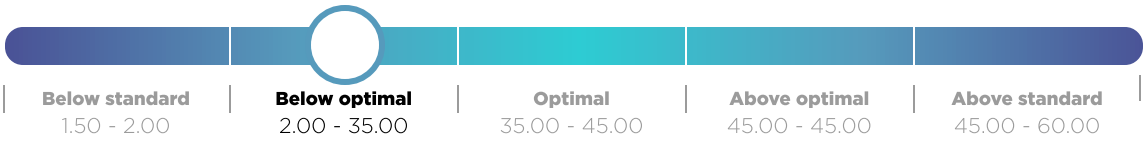
FSH - Female
74.20 mIU/ml



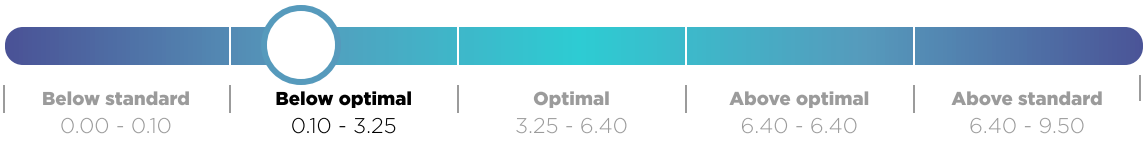
LH - Female
33.10 mIU/ml



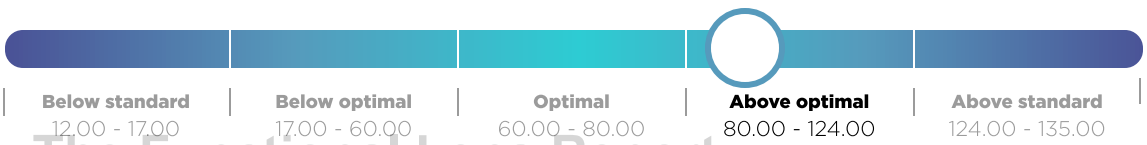
Testosterone Total - Female
20.00 ng/dl



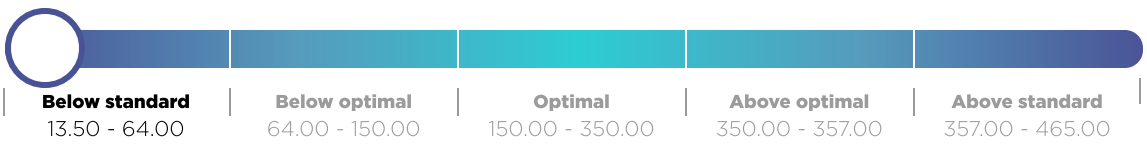
Testosterone Free - Female
1.10 pg/ml



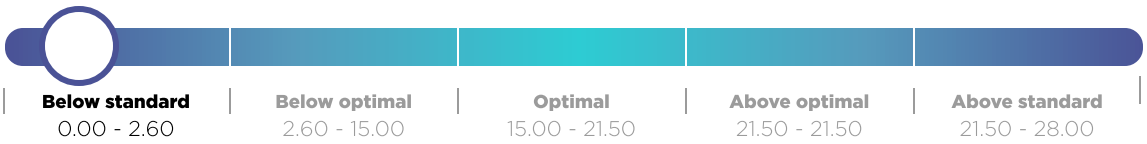
Sex Hormone Binding Globulin - Female
92.00 nmol/L



Estradiol - Female
<15.00 pg/ml

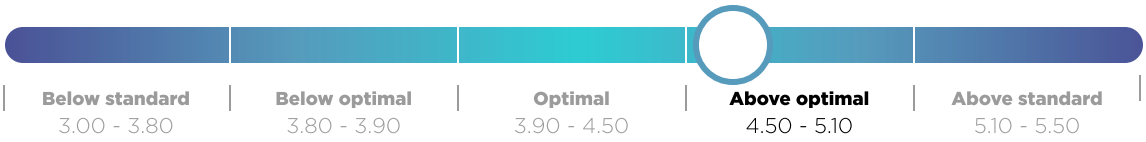


Progesterone - Female
<0.50 ng/ml



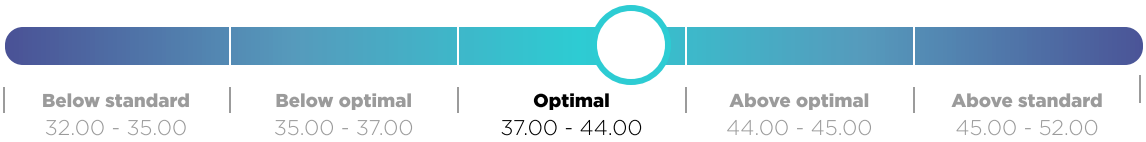
CBC/HEMATOLOGY

RBC - Female
4.63 m/cumm

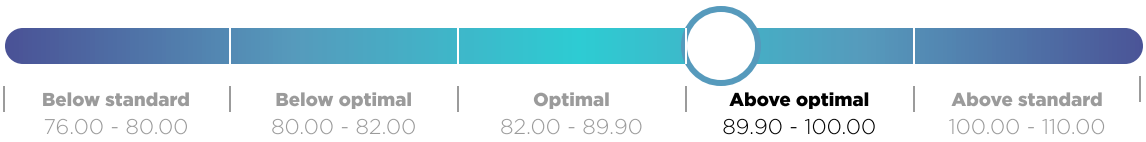


Hemoglobin - Female
14.00 g/dl

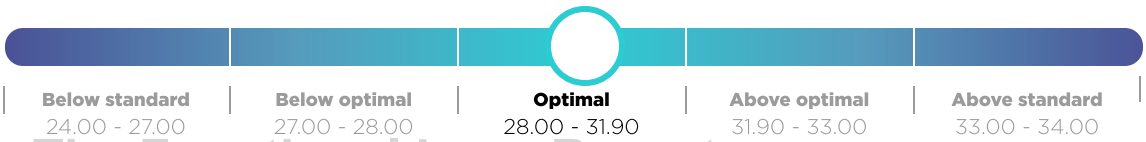
Hematocrit - Female
42.40 %



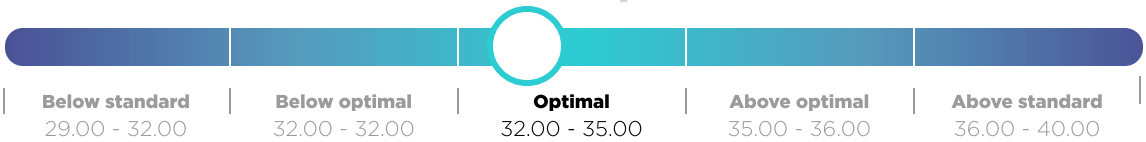
MCV
91.60 fL



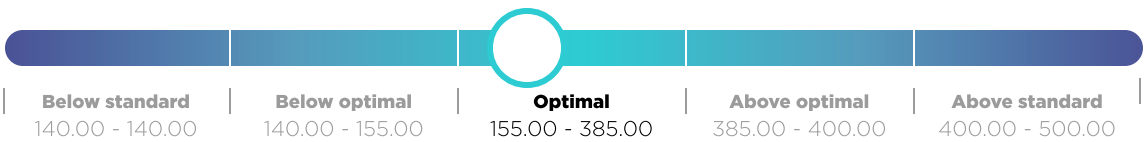
MCH
30.20 pg



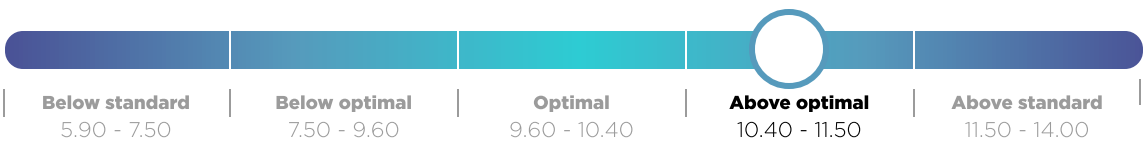
MCHC
33.00 g/dL



Platelets
229.00 k/cumm

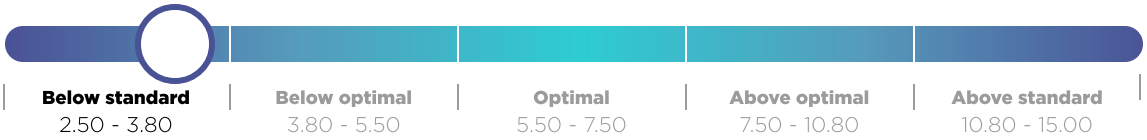


MPV
10.90 fL

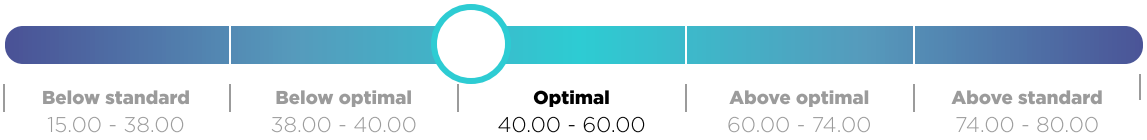


RDW
12.40 %

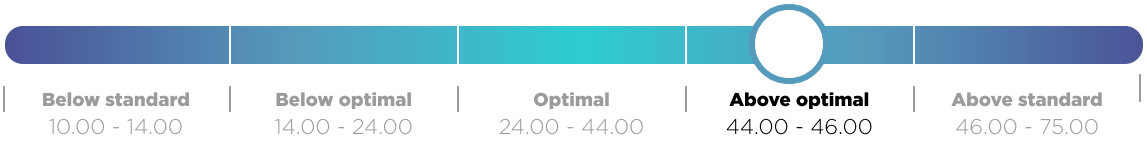
Total WBCs
3.50 k/cumm



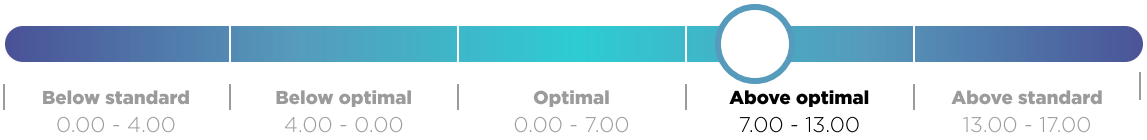
Neutrophils - %
41.90 %



Lymphocytes - %
44.90 %

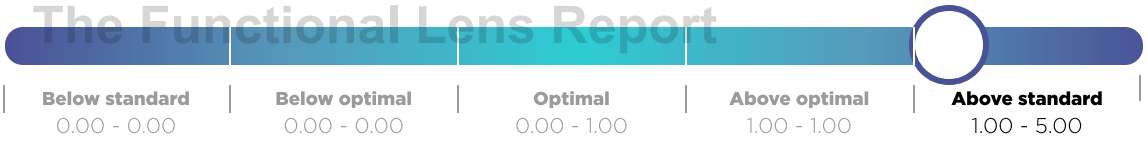


Monocytes - %
9.00 %

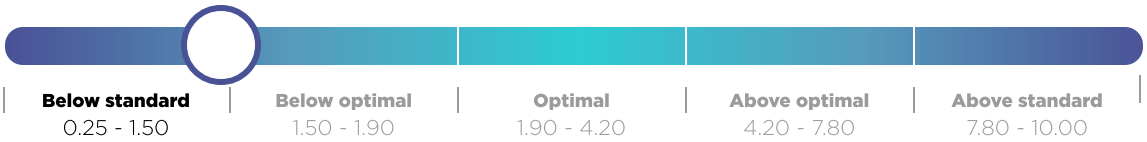


Eosinophils - %
2.50 %

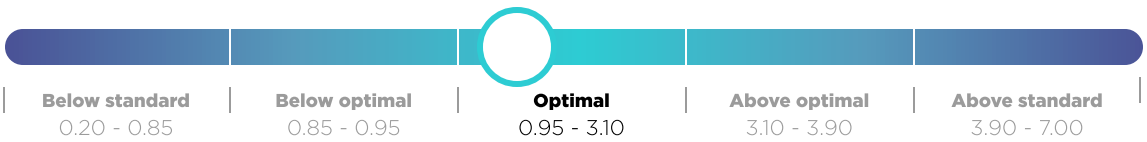
Basophils - %
1.70 %



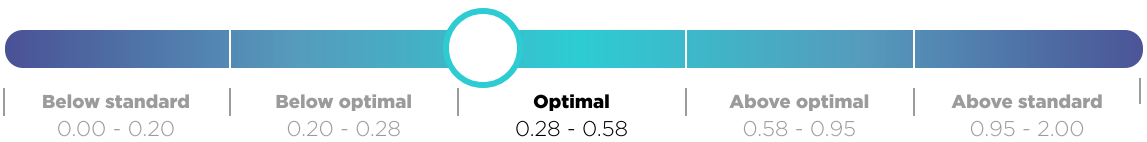
Neutrophils - Absolute
1.46 k/cumm



Lymphocytes - Absolute
1.57 k/cumm



Monocytes - Absolute
0.31 k/cumm



Eosinophils - Absolute
0.08 k/cumm

Basophils - Absolute

Blood Test Results Comparative

The Blood Test Results Comparative Report lists the results of the client's latest and previous Chemistry Screen and CBC and shows you whether or not an individual biomarker is outside of the optimal range and/or outside of the clinical lab range.

Comparative total number of biomarkers by optimal range

	Alarm low	Below standard	Below optimal	Optimal	Above optimal	Above standard	Alarm high
Current	0	4	6	35	15	7	1
Previous	0	0	0	0	0	0	0

Comparative Report

continued

Biomarker	Current Jul 11 2019	Optimal range	Standard range	Units
Glucose - Fasting	95.00	75.00 - 86.00	65.00 - 99.00	mg/dL
Hemoglobin A1C	5.40	4.60 - 5.50	0.00 - 5.70	%
Insulin - Fasting	3.00	2.00 - 5.00	2.00 - 19.00	µIU/ml
BUN	16.00	10.00 - 16.00	7.00 - 25.00	mg/dL
Creatinine	0.78	0.80 - 1.10	0.40 - 1.50	mg/dL
BUN : Creatinine	20.51	10.00 - 16.00	6.00 - 22.00	Ratio
eGFR Non-Afr. American	83.00	90.00 - 120.00	60.00 - 120.00	mL/min/1.73m2
eGFR African American	96.00	90.00 - 120.00	60.00 - 120.00	mL/min/1.73m2
Sodium	140.00	135.00 - 142.00	135.00 - 146.00	mEq/L
Potassium	4.50	4.00 - 4.50	3.50 - 5.30	mEq/L
Sodium : Potassium	31.11	30.00 - 35.00	30.00 - 35.00	ratio
Chloride	102.00	100.00 - 106.00	98.00 - 110.00	mEq/L
CO2	31.00	25.00 - 30.00	19.00 - 30.00	mEq/L
Anion Gap	11.50	7.00 - 12.00	6.00 - 16.00	mEq/L
Protein - Total	7.60	6.90 - 7.40	6.10 - 8.10	g/dL
Albumin	4.90	4.00 - 5.00	3.60 - 5.10	g/dL
Globulin - Total	2.70	2.40 - 2.80	1.90 - 3.70	g/dL
Albumin : Globulin	1.80	1.40 - 2.10	1.00 - 2.50	ratio
Calcium	9.80	9.20 - 10.00	8.60 - 10.40	mg/dL
Calcium : Albumin	2.00	0.00 - 2.60	0.00 - 2.60	ratio
Alk Phos	53.00	70.00 - 100.00	35.00 - 115.00	IU/L
AST	19.00	10.00 - 26.00	10.00 - 35.00	IU/L
ALT	16.00	10.00 - 26.00	6.00 - 29.00	IU/L
Bilirubin - Total	1.70	0.30 - 0.90	0.20 - 1.20	mg/dL
Ferritin	118.00	30.00 - 70.00	10.00 - 232.00	ng/mL
Cholesterol - Total	271.00	160.00 - 180.00	125.00 - 200.00	mg/dL
Triglycerides	89.00	70.00 - 80.00	0.00 - 150.00	mg/dL
LDL Cholesterol	167.00 ⚠	80.00 - 100.00	0.00 - 100.00	mg/dL
HDL Cholesterol	85.00	55.00 - 70.00	46.00 - 100.00	mg/dL
Non-HDL Cholesterol	186.00	0.00 - 130.00	0.00 - 130.00	mg/dl
Cholesterol : HDL	3.20	0.00 - 3.00	0.00 - 5.00	Ratio
Triglyceride:HDL	1.04	0.00 - 2.00	0.00 - 2.00	ratio
TSH	3.08	1.30 - 3.00	0.40 - 4.50	µU/mL
T4 - Free	1.20	1.00 - 1.50	0.80 - 1.80	ng/dL
T3 - Free	3.00	3.00 - 3.50	2.30 - 4.20	pg/ml
Reverse T3	18.00	10.00 - 25.00	8.00 - 25.00	ng/dl
Thyroid Peroxidase (TPO) Abs	2.00	0.00 - 6.80	0.00 - 9.00	IU/ml
Thyroglobulin Abs	<1.00	0.00 - 1.00	0.00 - 1.00	IU/ml
Hs CRP - Female	0.80	0.00 - 1.00	0.00 - 2.90	mg/L

Biomarker	Current Jul 11 2019	Optimal range	Standard range	Units
Homocysteine	9.10	5.00 - 7.20	0.00 - 10.30	µmol/L
Vitamin D (25-OH)	37.00	50.00 - 100.00	30.00 - 100.00	ng/ml
FSH - Female	74.20	1.50 - 10.00	1.00 - 10.20	mIU/ml
LH - Female	33.10	1.00 - 16.90	0.50 - 20.00	mIU/ml
Testosterone Total - Female	20.00	35.00 - 45.00	2.00 - 45.00	ng/dl
Testosterone Free - Female	1.10	3.25 - 6.40	0.10 - 6.40	pg/ml
Sex Hormone Binding Globulin - Female	92.00	60.00 - 80.00	17.00 - 124.00	nmol/L
Estradiol - Female	<15.00	150.00 - 350.00	64.00 - 357.00	pg/ml
Progesterone - Female	<0.50	15.00 - 21.50	2.60 - 21.50	ng/ml
Total WBCs	3.50	5.50 - 7.50	3.80 - 10.80	k/cumm
RBC - Female	4.63	3.90 - 4.50	3.80 - 5.10	m/cumm
Hemoglobin - Female	14.00	13.50 - 14.50	11.70 - 15.50	g/dl
Hematocrit - Female	42.40	37.00 - 44.00	35.00 - 45.00	%
MCV	91.60	82.00 - 89.90	80.00 - 100.00	fL
MCH	30.20	28.00 - 31.90	27.00 - 33.00	pg
MCHC	33.00	32.00 - 35.00	32.00 - 36.00	g/dL
Platelets	229.00	155.00 - 385.00	140.00 - 400.00	k/cumm
MPV	10.90	9.60 - 10.40	7.50 - 11.50	fL
RDW	12.40	11.70 - 13.00	11.00 - 15.00	%
Neutrophils - %	41.90	40.00 - 60.00	38.00 - 74.00	%
Lymphocytes - %	44.90	24.00 - 44.00	14.00 - 46.00	%
Monocytes - %	9.00	0.00 - 7.00	4.00 - 13.00	%
Eosinophils - %	2.50	0.00 - 3.00	0.00 - 3.00	%
Basophils - %	1.70	0.00 - 1.00	0.00 - 1.00	%
Neutrophils - Absolute	1.46	1.90 - 4.20	1.50 - 7.80	k/cumm
Lymphocytes - Absolute	1.57	0.95 - 3.10	0.85 - 3.90	k/cumm
Monocytes - Absolute	0.31	0.28 - 0.58	0.20 - 0.95	k/cumm
Eosinophils - Absolute	0.08	0.00 - 0.30	0.00 - 0.50	k/cumm
Basophils - Absolute	0.06	0.00 - 0.10	0.00 - 0.20	k/cumm

Blood Test Score Report

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

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

Biomarker	Lab result	Optimal range		% deviation	Optimal range
		Low	High		Low High
FSH - Female	74.20	1.50	10.00	805	
Cholesterol - Total	271.00	160.00	180.00	505	
LDL Cholesterol	167.00	80.00	100.00	385	
Bilirubin - Total	1.70	0.30	0.90	183	
Ferritin	118.00	30.00	70.00	170	
LH - Female	33.10	1.00	16.90	152	
HDL Cholesterol	85.00	55.00	70.00	150	
Triglycerides	89.00	70.00	80.00	140	
Homocysteine	9.10	5.00	7.20	136	
Glucose - Fasting	95.00	75.00	86.00	132	
BUN : Creatinine	20.51	10.00	16.00	125	
Basophils - %	1.70	0.00	1.00	120	
MPV	10.90	9.60	10.40	112	
Sex Hormone Binding Globulin - Female	92.00	60.00	80.00	110	
Non-HDL Cholesterol	186.00	0.00	130.00	93	
Protein - Total	7.60	6.90	7.40	90	
Monocytes - %	9.00	0.00	7.00	79	
RBC - Female	4.63	3.90	4.50	72	
MCV	91.60	82.00	89.90	72	
CO2	31.00	25.00	30.00	70	
Cholesterol : HDL	3.20	0.00	3.00	57	
TSH	3.08	1.30	3.00	55	
Lymphocytes - %	44.90	24.00	44.00	54	
Thyroglobulin Abs	<1.00	0.00	1.00	50	
Potassium	4.50	4.00	4.50	50	
BUN	16.00	10.00	16.00	50	
Anion Gap	11.50	7.00	12.00	40	
Albumin	4.90	4.00	5.00	40	
Hemoglobin A1C	5.40	4.60	5.50	39	
Eosinophils - %	2.50	0.00	3.00	33	
Hs CRP - Female	0.80	0.00	1.00	30	
Hematocrit - Female	42.40	37.00	44.00	27	
Calcium : Albumin	2.00	0.00	2.60	27	
Globulin - Total	2.70	2.40	2.80	25	

Biomarker	Lab result	Optimal range		% deviation	Optimal range	
		Low	High		Low	High
Calcium	9.80	9.20	10.00	25		
Sodium	140.00	135.00	142.00	21		
Basophils - Absolute	0.06	0.00	0.10	10		
Albumin : Globulin	1.80	1.40	2.10	7		
MCH	30.20	28.00	31.90	6		
AST	19.00	10.00	26.00	6		
RDW	12.40	11.70	13.00	4		
Reverse T3	18.00	10.00	25.00	3		
Triglyceride:HDL	1.04	0.00	2.00	2		
Hemoglobin - Female	14.00	13.50	14.50	0		
T4 - Free	1.20	1.00	1.50	-10		
ALT	16.00	10.00	26.00	-12		
Chloride	102.00	100.00	106.00	-17		
Insulin - Fasting	3.00	2.00	5.00	-17		
MCHC	33.00	32.00	35.00	-17		
Platelets	229.00	155.00	385.00	-18		
Thyroid Peroxidase (TPO) Abs	2.00	0.00	6.80	-21		
Lymphocytes - Absolute	1.57	0.95	3.10	-21		
Eosinophils - Absolute	0.08	0.00	0.30	-23		
Sodium : Potassium	31.11	30.00	35.00	-28		
eGFR African American	96.00	90.00	120.00	-30		
Monocytes - Absolute	0.31	0.28	0.58	-40		
Neutrophils - %	41.90	40.00	60.00	-40		
T3 - Free	3.00	3.00	3.50	-50		
Creatinine	0.78	0.80	1.10	-57		
Neutrophils - Absolute	1.46	1.90	4.20	-69		
eGFR Non-Afr. American	83.00	90.00	120.00	-73		
Vitamin D (25-OH)	37.00	50.00	100.00	-76		
Alk Phos	53.00	70.00	100.00	-107		
Estradiol - Female	<15.00	150.00	350.00	-118		
Testosterone Free - Female	1.10	3.25	6.40	-118		
Total WBCs	3.50	5.50	7.50	-150		
Testosterone Total - Female	20.00	35.00	45.00	-200		
Progesterone - Female	<0.50	15.00	21.50	-273		

Blood Test History

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

Key

- Optimal
- Above / Below optimal
- Above / Below standard
- Alarm high / Alarm low

Biomarker	Latest 1 Test Result Jul 11 2019
Glucose - Fasting	95.00
Hemoglobin A1C	5.40
Insulin - Fasting	3.00
BUN	16.00
Creatinine	0.78
BUN : Creatinine	20.51
eGFR Non-Afr. American	83.00
eGFR African American	96.00
Sodium	140.00
Potassium	4.50
Chloride	102.00
CO2	31.00
Sodium : Potassium	31.11
Anion Gap	11.50
Protein - Total	7.60
Albumin	4.90
Globulin - Total	2.70
Albumin : Globulin	1.80
Calcium	9.80

Biomarker	Latest 1 Test Result Jul 11 2019
Calcium : Albumin	2.00
Alk Phos	53.00
AST	19.00
ALT	16.00
Bilirubin - Total	1.70
Ferritin	118.00
Cholesterol - Total	271.00
Triglycerides	89.00
LDL Cholesterol	167.00 ⚠
HDL Cholesterol	85.00
Non-HDL Cholesterol	186.00
Cholesterol : HDL	3.20
Triglyceride:HDL	1.04
TSH	3.08
T4 - Free	1.20
T3 - Free	3.00
Reverse T3	18.00
Thyroid Peroxidase (TPO) Abs	2.00
Thyroglobulin Abs	<1.00
Hs CRP - Female	0.80
Homocysteine	9.10
Vitamin D (25-OH)	37.00
FSH - Female	74.20
LH - Female	33.10
Testosterone Total - Female	20.00
Testosterone Free - Female	1.10
Sex Hormone Binding Globulin - Female	92.00

Biomarker	Latest 1 Test Result Jul 11 2019
Estradiol - Female	<15.00
Progesterone - Female	<0.50
RBC - Female	4.63
Hemoglobin - Female	14.00
Hematocrit - Female	42.40
MCV	91.60
MCH	30.20
MCHC	33.00
RDW	12.40
Platelets	229.00
MPV	10.90
Total WBCs	3.50
Neutrophils - %	41.90
Lymphocytes - %	44.90
Monocytes - %	9.00
Eosinophils - %	2.50
Basophils - %	1.70
Neutrophils - Absolute	1.46
Lymphocytes - Absolute	1.57
Monocytes - Absolute	0.31
Eosinophils - Absolute	0.08
Basophils - Absolute	0.06

Out of Optimal Range

The following report shows all of the biomarkers that are out of the optimal reference 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 optimal range

Alarm low	Below standard	Below optimal	Optimal	Above optimal	Above standard	Alarm high	Total
0	4	6	35	15	7	1	68

Above Optimal

74.20
mIU/ml

FSH - FEMALE

FSH or Follicle-Stimulating Hormone is a hormone produced in and secreted by the anterior pituitary. FSH plays an important role in puberty, the menstrual cycle, and fertility. Elevated levels will be seen in menopause, ovarian dysfunction, and Polycystic Ovary Syndrome.

271.00
mg/dL

CHOLESTEROL - TOTAL

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

167.00
mg/dL

LDL CHOLESTEROL ⚠

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

1.70
mg/dL

BILIRUBIN - TOTAL

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

118.00
ng/mL

FERRITIN

Ferritin is the main storage form of iron in the body. Increased levels are associated with iron overload, an increasing risk of cardiovascular disease, inflammation and oxidative stress.

33.10
mIU/ml

LH - FEMALE

LH or Luteinizing Hormone is a hormone produced in and secreted by the anterior pituitary. LH plays an important role in puberty, the menstrual cycle, and fertility. LH levels are used in fertility diagnosis for the detection of ovulation and assessment of the onset of menopause. Elevated levels will be seen in menopause, ovarian dysfunction, and Polycystic Ovary Syndrome.

85.00
mg/dL

HDL CHOLESTEROL

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

89.00
mg/dL

TRIGLYCERIDES

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

9.10
µmol/L

HOMOCYSTEINE

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.

95.00
mg/dL

GLUCOSE - FASTING

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

20.51
Ratio

BUN : CREATININE

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

1.70
%

BASOPHILS - %

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 is often seen with cases of intestinal parasites.

10.90
fL

MPV

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.

92.00
nmol/L

SEX HORMONE BINDING GLOBULIN - FEMALE

Sex Hormone Binding Globulin (SHBG) is a protein produced primarily in the liver and to some extent the testes, uterus, brain, and placenta. SHBG acts as a transport molecule for carrying estrogen and testosterone around the body and delivering them to receptors on the cells. Increased SHBG levels are associated with a decreased availability of testosterone in women. SHBG levels may also be increased with hormone replacement therapy and undernourishment.

186.00
mg/dl

NON-HDL CHOLESTEROL

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

7.60
g/dL

PROTEIN - TOTAL

Total serum protein is composed of albumin and total globulin. Conditions that affect albumin and total globulin readings will impact the total protein value. An increased total protein is most often due to dehydration.

9.00
%

MONOCYTES - %

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.

4.63
m/cumm

RBC - FEMALE

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. Increased levels are associated with dehydration, stress, a need for vitamin C and respiratory distress such as asthma.

91.60
fL

MCV

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.

31.00
mEq/L

CO2

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

3.20
Ratio

CHOLESTEROL : HDL

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

3.08
µU/mL

TSH

TSH or thyroid stimulating hormone is a hormone produced by the anterior pituitary to control the thyroid gland's production of T4, to store T4 and to release it into the bloodstream. TSH synthesis and secretion is regulated by the release of TRH (Thyroid Releasing Hormone) from the hypothalamus. TSH levels describe the body's desire for more thyroid hormone (T4 or T3), which is done in relation to the body's need for energy. A high TSH is the body's way of saying "we need more thyroid hormone". Optimal TSH levels, in a normally functioning pituitary, can tell us that the amount of T4 in the blood match the body's current need and/or ability to utilize the energy necessary for optimal cell function. When the pituitary is not functioning in an optimal manner, the TSH test can be quite misleading.

44.90
%

LYMPHOCYTES - %

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

PROGESTERONE - FEMALE

Progesterone is a steroid hormone mainly formed in the cells of the corpus luteum and during pregnancy in the placenta. The ODX range for progesterone is set for the Luteal Phase of the menstrual cycle. Low serum progesterone may be due to a natural low point in progesterone output based on the day of your cycle that the blood test was run or conditions such as Short Luteal Phase Syndrome.

TOTAL WBCS

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, an immune insufficiency and may be seen in people eating a raw food diet.

ESTRADIOL - FEMALE

Estradiol (E2) is the most commonly measured estrogens, the others being estrone (E1) and estriol (E3). The serum estradiol level is not specific to any phase of the menstrual cycle. It is a general assessment of estradiol. Low levels of estradiol can be a risk factor for osteoporosis and bone fracture. Estradiol may improve the quality of life in menopausal women.

TESTOSTERONE TOTAL - FEMALE

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.

TESTOSTERONE FREE - FEMALE

The free testosterone test measures the testosterone that is unbound to serum proteins such as Sex Hormone Binding Globulin. In women, low free testosterone levels have been linked to an increased risk for the following: osteoporosis, decreased lean body mass and decreased libido.

ALK PHOS

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

37.00
ng/ml

VITAMIN D (25-OH)

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

83.00
mL/min/1.73m2

EGFR NON-AFR. AMERICAN

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

1.46
k/cumm

NEUTROPHILS - ABSOLUTE

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.

0.78
mg/dL

CREATININE

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

The Functional Lens Report

4

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

Health Improvement Plan

Further Testing

ADDITIONAL LIPID TESTING

The results of this blood test indicate that this patient may be dealing with hyperlipidemia, which may be causing the biomarkers in the "Rationale" section are out of the optimal range. If you haven't done so already, you may want to consider running additional lipid tests such as a VAP test to get more information on the nature of the hyperlipidemia and it's associated cardiovascular disease risk. The VAP Test is an expanded lipid panel that directly measures LDL, HDL, VLDL, Total cholesterol and triglyceride levels.The test also measures the following: The LDL particle density (clusters of small, dense LDL greatly increase the risk of cardiovascular disease). It also measures all the important lipoprotein subclasses: HDL2 (the most protective form of HDL), HDL3 (not as protective as HDL2), Intermediate Density Lipoproteins IDLs (these are often elevated in people with a family history of diabetes) and Very Low Density Lipoproteins (VLDL1, VLDL2, VLDL3). Knowing the different fractions of VLDL is important because high levels of VLDL3 put your patients at a greater risk of cardiovascular disease. Finally, the test measures Lipoprotein (a) (Lp(a)), high levels of which are a very strong risk factor for heart attacks and strokes.

Rationale

Cholesterol - Total ↑ ,Triglycerides ↑ ,LDL Cholesterol ↑

ZINC DEFICIENCY

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

Rationale

Alk Phos ↓

FEMALE HORMONE DYSFUNCTION

The results of this blood test indicate that this patient may be dealing with an imbalance in female hormone regulation because a number of the biomarkers in the "Rationale" section are out of the optimal range. We cannot tell from a blood test what kind of condition this patient is dealing with because the tests are not specific for a particular time in the menstrual cycle and we have no way of determining whether or not this patient is pre-menopausal, peri-menopausal or menopausal. A blood test can tell us about trends towards female hormone dysfunction but you may want to consider doing one of the Female Hormone Salivary panels to get more information on the type and severity of the issue.

Rationale

Estradiol - Female ↓,Testosterone Total - Female ↓,Testosterone Free - Female ↓,Progesterone - Female ↓,Sex Hormone Binding Globulin - Female ↑

The Functional Lens Report

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

GLUCOSE - FASTING ↑

(95.00 mg/dL)

Insulin resistance (Early stage) and glucose intolerance

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

Early stage of Hyperglycemia/Diabetes

If serum glucose (> 86 mg/dL or 4.77 mmol/L) and Hemoglobin A1C (> 5.5% or 0.055) are both elevated, diabetes is probable. Serum triglycerides are often higher than the total cholesterol level in patients with diabetes. Urinary glucose may be increased, HDL levels decreased (< 55 or < 1.42 mmol/L), BUN (> 16 or 5.71 mmol/L) and creatinine (>1.1 or >97.2 mmol/dL) 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 (>80 or >0.90 mmol/L), increased total cholesterol (>180 or 4.66 mmol/L), decreased HDL cholesterol (< 55 or < 1.42 mmol/L), obesity, increased blood insulin levels (>5 or 35.88), increased glucose (> 86 mg/dL or 4.77 mmol/L) 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 (> 86 mg/dL or 4.77 mmol/L) 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 (> 86 mg/dL or 4.77 mmol/L) and the hemoglobin A1C is normal, thiamine need is possible. If CO2 is decreased (<25) and the anion gap is increased (>12) along with moderately high serum glucose (>86 or 4.77 mmol/L), thiamine need is probable. Due to thiamine's role in glycolysis, LDH levels may be decreased (<140).

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 (>86 or 4.77 mmol/L) levels have been associated with increased levels of blood fats, e.g. high total cholesterol (>180 or 4.66 mmol/L), LDL (>100 or 2.59 mmol/L) and triglycerides (>80 or >0.90 mmol/L), low HDL (< 55 or < 1.42 mmol/L). In individuals with liver congestion, this may lead to the deposition of fat in the liver and the development of fatty liver.

CREATININE ↓

(0.78 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.

BUN : CREATININE ↑

(20.51 Ratio)

Renal disease

Consider impaired renal function due to a potential renal disease with an increased BUN (>25 or 8.93 mmol/L), serum creatinine (>1.4 or >123.8 mmol/dL), BUN/Creatinine ratio (between 10-20), Urine specific gravity (1.010 - 1.016), Uric acid (>5.9 or > 351 mmol/dL), serum phosphorous (>4.0 or 1.29 mmol/L) LDH (>200), and SGOT/AST (>30). Suspected renal disease should be referred to a qualified practitioner if present. However, an elevated BUN found in isolation of the pattern below is more indicative of renal insufficiency or other causes.

EGFR NON-AFR. AMERICAN ↓

(83.00 mL/min/1.73m2)

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

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

CO2 ↑

(31.00 mEq/L)

Metabolic Alkalosis

CO2, or bicarbonate, will be increased in metabolic alkalosis. Consider metabolic alkalosis if the CO2 is increased (>30), along with a decreased chloride (<100), a decreased calcium (<9.2 or 2.30 mmol/L), and a decreased serum potassium (<4.0).

Hypochlorhydria

With hypochlorhydria (low levels of stomach acid) the body will attempt to increase acidity by increasing the production of the H+ ion, which leads to a rise in CO2 levels (bicarbonate) in the serum.

Respiratory acidosis

Serum CO2 levels are often increased in respiratory acidosis (>30), which is due to conditions that cause pulmonary retention of CO2. Some of the conditions include asthma, high blood pressure, damage to the respiratory centers, chest trauma, chronic respiratory diseases (emphysema and pneumonia) and obstruction of the respiratory passage.

PROTEIN - TOTAL ↑

(7.60 g/dL)

Dehydration

If total protein is increased (>7.4 or 74 g/L) suspect dehydration. Dehydration is a very common problem and should be factored into your blood chemistry and CBC analysis. Suspect a short-term (acute) dehydration if there is an increased HGB (>14.5 or 145 in women or 15 or 150 in men) and/or HCT (>44 or 0.44 in women and >48 or 0.48 in men) along with an increased RBC count (>4.5 in women and >4.9 in men). A relative increase in sodium (>142) and potassium (>4.5) can be noted as well. Suspect a long-term (chronic) dehydration if any of the above findings are accompanied by an increased albumin (>5.0 or 50 g/L), increased BUN (>16 or 5.71 mmol/L), and/or serum protein (>7.4 or 74 g/L).

ALK PHOS ↓

(53.00 IU/L)

Zinc deficiency

Alkaline phosphatase is a zinc dependent enzyme. Decreased levels (<70) have been associated with zinc deficiency along with decreased WBC or RBC zinc levels and a low normal or decreased total WBC. Follow up a decreased alkaline phosphatase with a zinc taste test.

BILIRUBIN - TOTAL ↑

(1.70 mg/dL)

Gallbladder Dysfunction: insufficiency or stasis

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

Thymus dysfunction

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

Biliary tract obstruction/biliary calculi

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

Liver dysfunction

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

RBC hemolysis

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

Gilbert's syndrome

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

FERRITIN ↑

(118.00 ng/mL)

Hemochromatosis/ hemosiderosis/iron overload

Hemochromatosis is a disease produced by an excess absorption of iron, which leads to deposition of excess iron in the tissues, especially the liver. Laboratory changes include an increased serum iron (>130 or 23.27 mmol/dL), a decreased TIBC (<250 or 44.8 mmol/dL), an increased % transferrin saturation (usually > 60%), and an increased ferritin level (>200 ng/ml and often >1000). SGOT/AST may be elevated (>40).

Excess consumption of iron

Excess consumption of iron can come from a number of different sources: Elevated levels of iron in the drinking water, Iron cookware, especially when used to cook acidic foods e.g. tomatoes, Consumption of iron containing supplements. All of the above are often the reason for an increased serum iron (>130 or 23.27 mmol/dL) and an increased ferritin (> 200 ng/ml)

Cardiovascular Risk

Low ferritin is the best measure of iron deficiency but most people do not know that elevated ferritin is an important maker of cardiovascular health. High levels are found in inflammation, ischemic heart disease, iron overload (hemosiderosis), and hemochromatosis, the genetic disease that causes iron to be deposited into the tissue. When the transferrin saturation rate, transferrin iron binding capacity, and serum iron are all normal, then a high serum ferritin indicates inflammation, not hemochromatosis.

Inflammation/ liver dysfunction/ oxidative stress

Serum ferritin is one of a group of proteins that can become increased in response to inflammation, infection, or trauma. Elevations can last for weeks. An elevated ferritin (>200) along with normal serum iron is suggestive of inflammation, liver dysfunction, or oxidative stress.

CHOLESTEROL - TOTAL ↑

(271.00 mg/dL)

Increased cardiovascular disease risk

Increased cholesterol levels are associated with an increased risk of developing cardiovascular disease, atherosclerosis, coronary artery disease and stroke. Although this may be true, it is important to look at many of the other risks for this disease before jumping to conclusion that elevated cholesterol levels are the culprit. Other risks for atherosclerosis, cardiovascular disease and stroke include: smoking, elevated homocysteine levels, elevated fasting glucose, elevated fasting insulin, elevated Hs-CRP, elevated fibrinogen, B6, B12 and folate deficiency, ingestion of chlorine, blood sugar dysregulation, and hypertension. Consider an increased risk of cardiovascular disease with an increased triglyceride level (>80 or 0.90 mmol/L) in relation to an increased total cholesterol (>180 or 4.66 mmol/L) with an increased uric acid level (>5.9 or > 351 mmol/dL), a decreased HDL (< 45 or < 1.16 mmol/L) and an increased LDL (>100 or 2.59 mmol/L). Platelet levels may also be increased (>385). Homocysteine levels are frequently increased > 7.2, Hs-CRP are frequently >0.55 in men and >1.5 in women, and fibrinogen levels are frequently increased above 300.

Primary hypothyroidism

Primary hypothyroidism is possible if the total cholesterol is increased (>180 or 4.66 mmol/L) along with an increased triglyceride (>80 or >0.90 mmol/L) and TSH (>2.0).

Adrenal insufficiency

Consider adrenal insufficiency if the total cholesterol is elevated (>180 or 4.66 mmol/L) with an increased triglyceride level (>80 or >0.90 mmol/L) and a decreased serum potassium (<4.0). Confirm with salivary adrenal studies or other functional adrenal tests.

Secondary Hypothyroidism (Anterior pituitary dysfunction)

Increased cholesterol levels are associated with thyroid hypofunction that is secondary to an anterior pituitary dysfunction. If cholesterol levels are increased (>180 or 4.66 mmol/L) with a decreased TSH (<1.3), and an elevated serum triglyceride (>80 or >0.90 mmol/L), then consider that anterior pituitary hypofunction is probable.

Gallbladder dysfunction - Biliary stasis

Thickened bile is the hallmark of biliary stasis. It may occur if the total cholesterol is increased (>180 or 4.66 mmol/L). GGTP levels will frequently be increased (>30) but not necessarily. Bilirubin levels may also be elevated (>1.2 or 20.5 mmol/dL). There may also be an increased alkaline phosphatase (>100) and SGOT/AST and SGPT/ALT may be normal or increased (>30). However, many cases of biliary stasis will show normal lab values.

Metabolic Syndrome

If triglycerides are increased above the total cholesterol level with increased LDL cholesterol (>100 or 2.59 mmol/L), a decreased HDL (< 55 or < 1.42 mmol/L), an increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L) and an increased fasting insulin (>5), then metabolic syndrome and hyperinsulinemia is probable.

Fatty liver (early development) and Liver congestion

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

Early stage of insulin resistance

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

Poor metabolism and utilization of fats

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

Early stage Diabetes

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

TRIGLYCERIDES ↑

(89.00 mg/dL)

Metabolic Syndrome /hyperinsulinemia/early stage diabetes

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

Fatty liver and Liver congestion

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

Early stage of insulin resistance

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

Increased risk of cardiovascular disease, stroke and atherosclerosis

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

Poor metabolism and utilization of fats

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

Hypothyroidism

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

Hyperlipoproteinemia

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

Alcoholism

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

LDL CHOLESTEROL ↑

(167.00 mg/dL)

Metabolic Syndrome /hyperinsulinemia

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

Increased risk of atherosclerosis, cardiovascular risk and stroke

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

Hyperlipidemia

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

Oxidative stress

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

Fatty liver (early development) and Liver congestion

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

Diet- high in refined carbohydrates

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

HDL CHOLESTEROL ↑

(85.00 mg/dL)

Autoimmune processes

If HDL cholesterol is increased (>70 or 1.81 mmol/L), and triglycerides are decreased (<40 or 0.45 mmol/L) with low or normal cholesterol (160 - 180 or 4.13 - 4.99 mmol/L), 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 the cause of the disturbance. Before running these tests ask the patient about historical HDL levels, whether they have a genetic predisposition i.e. family history, or whether they are exercising heavily. These factors may contribute to significantly increased HDL levels in a healthy patient.

NON-HDL CHOLESTEROL ↑

(186.00 mg/dl)

Increased risk of cardiovascular disease and related events

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

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

Increased small, dense LDL cholesterol

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

Non-alcoholic fatty liver disease (NAFLD)

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

Metabolic imbalance

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

Smoking

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

Unhealthy lifestyle and diet

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

Vitamin D insufficiency or deficiency

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

CHOLESTEROL : HDL ↑

(3.20 Ratio)

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

TSH ↑

(3.08 µU/mL)

Primary hypothyroidism

In primary hypothyroidism the problem is located in the thyroid gland itself, which fails to produce thyroid hormone. Primary hypothyroidism is often preceded by autoimmune thyroid disease. If you have a patient with suspected thyroid disease you should screen for thyroid antibodies. Primary hypothyroidism will present with TSH levels increased above 2.0 and you may see a normal or decreased total T4 level (<6.0 mcg/dL or 77 nmol/L) and/or T-3 (<90 ng/dl or 1.4nmol/L), free T4 (<1.0 ng/dl or 12.9 pmol/L), free T3 <3.0 ng/dl or 300 pg/dl), increased cholesterol (>180 or 4.66 mmol/L) and triglyceride level (>80 or 0.9 mmol/L)

HOMOCYSTEINE ↑

(9.10 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

VITAMIN D (25-OH) ↓

(37.00 ng/ml)

Vitamin D deficiency

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

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

Diabetes Mellitus
Cancer
Hypertension
Cardiovascular disease
Autoimmune/inflammatory disorders
Vitamin D insufficiency is prevalent in patients with chronic musculoskeletal pain.

FSH - FEMALE ↑

(74.20 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

LH - FEMALE ↑

(33.10 mIU/ml)

Mid-Cycle LH Surge

Levels of LH will surge mid-cycle and levels as high as 76.3 mIU/ml are normal if the blood sample is taken mid-cycle.

Ovarian hypofunction

Elevated LH levels may be a sign of ovarian hypofunction, which is when the ovaries produce little to no hormones.

Polycystic Ovary Syndrome (PCOS)

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

Menopause

Elevated LH levels will be seen during and after menopause. increasing levels may signal the onset of menopause in your peri-menopausal patients.

TESTOSTERONE TOTAL - FEMALE ↓

(20.00 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.

TESTOSTERONE FREE - FEMALE ↓

(1.10 pg/ml)

Low free 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.

SEX HORMONE BINDING GLOBULIN - FEMALE ↑

(92.00 nmol/L)

Less Available Testosterone

Women with higher SHBG levels tend to have lower testosterone levels, which can lead to low energy levels, muscle loss, bone loss and low libido.

Hormone Treatment

Thyroid replacement therapy or exogenous estrogen replacement therapy can cause higher than optimal levels of SHBG, which can in turn decrease testosterone levels.

Undernourishment

Anorexia can cause higher than optimal levels of SHBG, which can in turn decrease testosterone levels.

ESTRADIOL - FEMALE ↓

(<15.00 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.

PROGESTERONE - FEMALE ↓

(<0.50 ng/ml)

Short Luteal Phase Syndrome

Low serum progesterone may be an indication of Short Luteal Phase Syndrome, which may indicate a disruption in a woman's menstrual cycle. Short Luteal Phase Syndrome can be associated with hyperestrogenism and estrogen dominance. It's important to remember that serum progesterone testing is a spot test, i.e. you do not know what day of the cycle you're doing the test on. As such a low progesterone test may be due to a natural low point in progesterone output or conditions such as Short Luteal Phase Syndrome. Suspicion of Short Luteal Phase Syndrome goes up with low serum progesterone below 0.2 ng/ml or 0.64 nmol/L and elevated serum estradiol above 352 pg/ml or 1292.2 pmol/L. Our recommendation, if you see low serum progesterone and suspect Short Luteal Phase Syndrome, is to order a full 30-day salivary hormone check for estrogens and progesterone.

TOTAL WBCS ↓

(3.50 k/cumm)

Chronic viral infection

In a chronic viral infection the total WBC count will be decreased (<5.5), as the body is using up its WBCs. Decreased total WBC (<5.5), increased lymphocyte count (>44), decreased neutrophils (<40), decreased LDH isoenzymes due to a decrease in the total WBC and an increased monocytes (>7) 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 (<5.5), increased neutrophils (>60), decreased lymphocyte count (<24), and decreased LDH isoenzymes due to a decrease in the total WBC. Expect to see an increased monocyte count (>7) 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 (<5.5).

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 (<5.5) 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 (<5.5), RBCs (<3.9 in women or 4.2 in men), cholesterol (<150 or 3.9 mmol/L), magnesium, and BUN (<10 or 3.57 mmol/L) with an increased MCV (>89.9). Certain drugs, chemotherapeutic agents, radiation, and heavy metals can cause bone marrow depression.

Raw food diet

The total WBC (<5.5) will frequently be slightly below the optimum range for patients on a diet high in raw foods.

RBC - FEMALE ↑

(4.63 m/cumm)

Relative increases in RBC count

Whenever there is a decrease in blood volume, you will see a relative increase in the RBC count (>4.5 in women and >4.9 in men) usually with an increased HCT (>44 or 0.44 in women and >48 or 0.48 in men), and HGB (>14.5 or 145 in women or 15 or 150 in men). Common causes of a relative increase in RBC count include: Dehydration (decreased fluid intake, vomiting, diarrhea), Stress, Tobacco use, Overuse of diuretics

Dehydration

If the RBC count is increased suspect dehydration. Suspect a short-term (acute) dehydration if there is an increased HGB (>14.5 or 145 in women or 15 or 150 in men) and/or HCT (>44 or 0.44 in women and >48 or 0.48 in men) along with an increased RBC count (>4.5 in women and >4.9 in men). A relative increase in Sodium (>142) and Potassium (>4.5) can be noted as well. Suspect a long-term (chronic) dehydration if any of the above findings are accompanied by an increased Albumin (>5.0 or 50 g/L), increased BUN (>16 or 5.71 mmol/L), and/or serum Protein (>7.4 or 74 g/L).

Respiratory distress

In severe cases of asthma and emphysema you can expect an increased red cell count with decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and HCT (<37 or 0.37 in women and 40 or 0.4 in men) . The body responds to an inability to fully oxygenate the blood with an increase in red blood cells.

Vitamin C need

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

Polycythemia vera

A myeloproliferative disease that causes an increase in all blood cell lines. This disease will cause an increased HCT (>44 or 0.44 in women and >48 or 0.48 in men), and HGB (>14.5 or 145 in women or 15 or 150 in men), total bilirubin (>1.2 or 20.5 mmol/dL), uric acid (>5.9 or > 351 mmol/dL), basophils (>1), and ALP (>100). Further testing with blood coagulation studies is needed.

MCV ↑

(91.60 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 (>90) and the MCH is above 31.9. If there is also an increased RDW (>13), MCHC (>35), and LDH (>200) (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 (>7.2) 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 (>2.8 or 28 g/L) or decreased (<2.4 or 24 g/L) total globulin. Hypochlorhydria is probable if BUN is increased (>16 or 5.71 mmol/L) and/or serum phosphorous is decreased (<3.0 or 0.97 mmol/L).

Vitamin C need

Consider a vitamin C need if there's a decreased albumin (<4.0 or 40g/L) along a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCHC (<32), serum iron (< 85 or 15.22 mmol/dL). There also may be an increased MCV (>89.9), alkaline phosphatase (>100), fibrinogen (>300) and RBCs (>4.5 in women and >4.9 in men).

MPV ↑

(10.90 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.

LYMPHOCYTES - % ↑

(44.90 %)

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

In childhood disease Lymphocytes - Absolute will be decreased (<0.95) in the early phase and increased in the later phase (>3.1), and Lymphocytes - % will be decreased (<24%) in the early phase and increased in the later phase (>44%).

Acute viral infection

In viral diseases such as upper respiratory infections, cytomegalovirus, infectious hepatitis, and toxoplasmosis, Lymphocytes - % will be increased (>44%), Lymphocytes - Absolute will be increased (>3.1) along with an increased total WBC count (>7.5)

Chronic viral infection

In chronic viral infections, you may still see increased lymphocytes - % (>44%) and an increased Lymphocytes - Absolute (>3.) with a *decreased* total WBC count (<5.0).

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 (>10.5) 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/SGOT (about 5-14 days after onset of illness), increased GGTP (about 7-21 days after onset of illness)

Relative Lymphocytosis

Lymphocytosis = a Lymphocytes - Absolute count > 4.0 K/cumm in adults.
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 (3.1) and an increased Lymphocytes - % (>44%) will often be seen in acute and chronic inflammation, especially Crohn's disease and ulcerative colitis.

Systemic toxicity or Poor Detoxification

Increased Lymphocytes - % (>44%) and an increased Lymphocytes - Absolute count (>3.1) 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.

MONOCYTES - % ↑

(9.00 %)

Recovery phase of acute infection

Due to their phagocytic function monocytes are often the white blood cell that removes the bacterial, viral, and cellular residue of infection. It is a positive sign to see an increase in Monocytes - % as high as 7% and an increased Monocytes - Absolute count as high as 0.58 towards the end of an infection.

Liver dysfunction

Not a primary marker but if an increased Monocyte - Absolute count (>0.58) and/or an increased Monocyte - % (>7%) is seen it is a good idea to rule out 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.

Intestinal parasites

If the Monocyte - Absolute count is elevated (>0.58) and/or the Monocyte - % is elevated (>7%) with increased Eosinophils - % (>3%), increased Eosinophils - Absolute count (>0.4), increased Basophils - % (>1%) and increased Basophils - Absolute count (>0.1), then intestinal parasites are possible. Further investigation is warranted, i.e. a digestive stool analysis with ova and parasite, especially if the subjective indicators are present. In some cases the stool tests may be normal especially with amoebic parasites or if the lab sample was not collected or analyzed appropriately by a qualified lab. Multiple and/or purged samples are sometimes necessary.

Males

Urinary Tract Congestion: Benign Prostatic Hypertrophy (BPH)

An increased Monocytes- Absolute count (>0.58) and/or an increased Monocytes- % (>7%) may be associated with prostatic hypertrophy, especially If the serum creatinine is elevated (>1.1 or 97.2 mmol/dL) in a male over 40 years old. Often the creatinine will increase long before the PSA increases. Suspect BPH if there is an increased creatinine level (>1.1 or 97.2 mmol/dL, along with a normal BUN and electrolytes. The likelihood of BPH increases when there is an increased creatinine level (>1.1 or 97.2 mmol/dL, along with a normal BUN and electrolytes, and an increased Monocytes- Absolute count (>0.58) and an increased Monocytes- % (>7%) and LDH isoenzyme #4, which has a prostatic origin. If BPH is suspected the following may be indicated: a microscopic examination of the urine for prostate cells, a urinalysis indicating infection, and a manual examination of the prostate.

BASOPHILS - % ↑

(1.70 %)

Inflammation: non-specific

You may see an increased Basophils - Absolute count (>0.1) and/or an increased Basophils - % (>1.0%) 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 (>100).

Intestinal parasites

Consider intestinal parasites if there are an increased Basophils - Absolute count (>0.1) and/or an increased Basophils - % (>1%), an increased Eosinophils - % (>3%), an increased Eosinophils - Absolute count (>0.3), an increased Monocytes - % (>7%), and an increased Monocytes - Absolute (>0.58). Although not as indicative as an increased Eosinophils - Absolute count (>0.3) or an increased Eosinophils - % (>3%), an increased Basophils - Absolute count (>0.1) and/or an increased Basophils - % (>1%) 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.

NEUTROPHILS - ABSOLUTE ↓

(1.46 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 - % (<40%), a decreased Neutrophils - Absolute (<1.9), an increased Lymphocytes - % (>44%), an increased Lymphocytes - Absolute (>3.1) and/or a decreased total WBC count (<5.0).

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