Revision v1.05

Functional Blood Chemistry Analyzer

Maximizing Clinical Utility

Patient: /

16

Practitioner: Guillermo Martin

Report Date: 03/23/16

Users of the Functional Blo ® reporting syst understand that the reports generated are solely for educational purposes only, and are non-diagnostic. These statements have not been reviewed by the food and drug administration. The Functional Blood Chemistry Analyzer® reporting system does not diagnose, treat or cure any disease. The educational and opinion-oriented subject matter contained in this report should not replace the treatments, diagnoses, or therapies of your licensed physician, or licensed, primary healthcare provider.

Table of Contents

Section 1: Overview of Results

This section is an overview of all blood testing results that have been analyzed. These include:

1. All individual markers tested and analyzed as being a) within optimal functioning limits listed in **green** and b) individual markers outside of optimal functioning range listed in **red** as either high (H), or low (L).

2. A listing of ONLY the markers outside of optimal range.

3. A listing of the potential physiological imbalances identified. These are categorized as either *primary* or *secondary* .

Patient: María Asuncion Ceniz, female, age: 60, date of testing: 3/23/16 .

[Table of Contents]

Section 1.1: All Markers

Click here to make corrections.

Metabolic Panel

Marker	Optimal Range	Result
Glucose	80 - 90 mg/dl	(H) 118
Insulin	1 - 5 mg/dl	—
Hemoglobin A1C	4.8 - 5.8 %	—
Uric Acid	3.5 - 5 mg/dl	(L) 3.2
Blood Urea Nitrogen (BUN)	12 - 18 mg/dl	—
Creatinine	0.65 - 1.18 mg/dL	0.9
Glomerular Filtration Rate (GFR)	60 - 130 mL/min	60
Sodium	137 - 143 mmol/L	—
Potassium	4 - 4.5 mmol/L	—
Chloride	100 - 106 mmol/L	—
Carbon Dioxide	23 - 27 mmol/L	—
Calcium	9.1 - 9.8 mg/dl	—
Phosphorus	3 - 4 mg/dl	—
Total Bilirubin	0.2 - 1 mg/dl	—
Total Protein	6.7 - 7.4 g/dl	—
Albumin	4.1 - 4.8 g/dl	—
Globulin	2.3 - 2.8 g/dl	—
Alkaline Phosphatase (ALP)	60 - 100 IU/L	—
Alanine Aminotransferase (ALT)	15 - 35 IU/L	20
Aspartate Aminotransferase (AST)	15 - 35 IU/L	19
Gamma-Glutamyl Transferase	15 - 35 IU/L	15
LDH	140 - 200 IU/L	—
Iron, serum	60 - 110 ug/dl	—

Lipid Panel

Marker	Optimal Range	Result
Triglycerides	60 - 100 mg/dl	(H) 104
HDL Cholesterol	50 - 85 mg/dl	62
LDL Cholesterol	80 - 150 mg/dl	142
Total Cholesterol	170 - 240 mg/dl	225

Triglycerides to HDL ratio: 1.68

[Table of Contents]

CBC (complete blood count)

Marker	Optimal Range	Result
White Blood Cells	5 - 7.5 x10E3/uL	—
Red Blood Cells (RBC)	4 - 5 x10E6/uL	—
Hemoglobin	13.5 - 15 g/dl	15
Hematocrit	38 - 48 %	43
Mean Corpuscular Volume (MCV)	85 - 93 pg/cell	—
Mean Corpuscular Hemoglobin (MCH)	27 - 32 fL	—
Mean Corpuscular Hemoglobin Concentration (MCHC)	32 - 35 g/dL	—
Red Blood Cell Distribution Width (RDW)	0 - 15 %	—
Platelets	150 - 380 x10E3/uL	—
Neutrophils (percent of total)	40 - 60 %	(H) 65
Lymphocytes (percent of total)	30 - 45 %	(L) 22
Eosinophils (percent of total)	0 - 3 %	—
Monocytes (percent of total)	0 - 7 %	(H) 9.9
Basophils (percent of total)	0 - 2 %	—

Thyroid-Related Markers

Marker	Optimal Range	Result
TSH	1.8 - 3 uIU/mL	—
Total Triiodothyronine / T3	100 - 200 ng/dL	—
Total Thyroxine	6 - 12 ug/dL	—
Free Triidothyroinine / Free T3	3 - 4.5 pg/mL	—
Free Thyroxine	1 - 1.5 ng/dL	—
Resin T3 Uptake	28 - 38 %	—
Reverse T3	0 - 15 ng/dL	—
Thyroid Peroxidase Anti Body	0 - 10 IU/mL	—

[Table of Contents]

Additional Markers

Marker	Optimal Range	Result
Zinc, serum/plasma	90 - 135 ug/dl	(L) 70
Copper, serum	70 - 110 ug/dl	77
Ceruloplasmin	16 - 45 mg/dl	—
Homocysteine (SI)	6 - 8 umol/L	—
B-12 serum	500 - 1000 pg/ml	—
Folate, serum	6 - 16 ng/ml	—
Histamine, whole blood	40 - 70 ng/ml	(L) 1
Prostate-Specific Antigen (PSA)	0 - 4 ng/ml	—
C-Reactive Protein (hs-CRP)	0 - 2 mg/L	—
Vitamin D (25-hydroxyvitamin D)	30 - 80 ng/mL	35

[Table of Contents]

Section 1.2: Out of Range Markers

Click here to make corrections.

Metabolic Panel

Marker	Optimal Range	Result
Glucose	80 - 90 mg/dl	(H) 118
Uric Acid	3.5 - 5 mg/dl	(L) 3.2

Lipid Panel

Marker	Optimal Range	Result
Triglycerides	60 - 100 mg/dl	(H) 104

CBC (complete blood count)

Marker	Optimal Range	Result
Neutrophils (percent of total)	40 - 60 %	(H) 65
Lymphocytes (percent of total)	30 - 45 %	(L) 22
Monocytes (percent of total)	0 - 7 %	(H) 9.9

Additional Markers

Marker	Optimal Range	Result
Zinc, serum/plasma	90 - 135 ug/dl	(L) 70
Histamine, whole blood	40 - 70 ng/ml	(L) 1

[Table of Contents]

Section 1.3: Patterns Overview

This section provides an overview and description for potential physiological patterns that have been identified.

These potential physiological patterns are based upon the findings of individual blood chemistry markers. These patterns are determined by groups of individual markers that have triggered pre-determined indices.

There are potentially 68 physiological patterns, which can be triggered.

Patterns are classified as either:

- "Primary" (indicated with **this color**)
- "Secondary" (indicated with **this color**)

These analyses are non-diagnostic, but rather represent the potential that certain physiological imbalances are present. Further testing may be warranted to confirm or deny the existence of these potential physiological imbalances.

A "Primary" pattern suggests a stronger likelihood that such a physiological pattern exists. A "Secondary" pattern suggests a physiological pattern may exist, but is less certain than a "Primary pattern.

Lastly, the "Protocols & Recommended Additional Testing" section is based upon the physiological patterns identified, NOT the individual markers.

[Table of Contents]

Category	Pattern	Type	Information
Blood Sugar			
	Hyperglycemia	**Primary**	description/symptoms
Digestion			
	Bile Insufficiency	**Secondary**	description/symptoms
Inflammation			
	Non-Specific Inflammation	**Secondary**	description/symptoms
Immune Response			
	Acute Immune Response	**Secondary**	description/symptoms
Nutrients			
	Molybdenum Deficiency	**Secondary**	description/symptoms
	Zinc Deficiency	**Primary**	description/symptoms
Methylation			
	Over-Methylation	**Primary**	description/symptoms

Section 1.4: Clinical Objectives

Blood Sugar

Hyperglycemia
- Improve/restore insulin sensitivity & utilization
- Reduce inflammation
- Reduce stress response
- Reduce secondary complications if present

Digestion

Bile Insufficiency
- Support normal liver functions
- Thin bile flow, decongest liver
- Enhance digestion & fatty acid uptake

Inflammation

Non-Specific Inflammation
- Reduce inflammation
- Support immune defenses
- Investigate deeper

Immune Response

Acute Immune Response
- Reduce inflammation
- Support immune defenses

Nutrients

Molybdenum Deficiency
- Support molybdenum metabolism
- Investigate potential causes of molybdenum deficiency

Zinc Deficiency
- Increase sources of zinc
- Support digestion & assimilation

Methylation

Overmethylation

- Support normal methylation cycle function
- Provide nutrient support for over-methylation

Section 2: Markers Descriptions

The following section provides brief descriptions for each individual blood chemistry marker outside of optimal range.

Each blood chemistry marker description also includes a listing of interfering drugs, which are known to affect the status of each blood chemistry marker.

This section also contains other possible factors, which are known to affect blood chemistry.

Metabolic Panel

Glucose (Fasting) – High (Result: **118** ; Range: **80 - 90 mg/dl**)

Glucose is the sugar in the blood serving as a source of fuel to all cells of the body.

Drug interference: antidepressants, beta-adrenergic blocking agents, corticosteroids, dextrothyroxine, statins, diazoxide, diuretics, epinephrine, estrogens, glucagon, isoniazid, lithium, phenothiazines, phenytoin, salicylates, triamterene

Uric Acid – Low (Result: **3.2** ; Range: **3.5 - 5 mg/dl**)

Uric acid is the most abundant antioxidant in the blood. It is synthesized via the purine nuceloside adenosine and via the ADA and xanthine oxidase enzymes.

Drug interference: Allopurinol, NSAIDs, azathioprine, clofibrate, corticosteroids, estrogens, glucose, guaifenesin, mannitol, probenecid, warfarin

Lipid Panel

Triglycerides – Fasting, 12 hours – High (Result: **104** ; Range: **60 - 100 mg/dl**)

Triglycerides are fats in the blood, which serve as a source of fuel for all muscles of the body. Triglycerides contain a glycerol and 3 fatty acids.

Triglycerides can be derived from the diet directly, or synthesized endogenously by the liver. Diets high in carbohydrates and sugars can be a dietary cause of elevated blood triglycerides.

Drug interference: Alcohol, bile acid sequesterants, oral contraceptives, estrogens, beta blockers, steroids, diuretics

NOTE: Triglycerides may be elevated throughout pregnancy

CBC (complete blood count)

Lymphocytes – Low (Result: **22** ; Range: **30 - 45 %**)

Lymphocytes are immune cells that fight both bacterial and viral infections. There are 2 types of lymphocytes: T-cells and B-cells.

T-cells function in “cell-mediated immunity”, which involve cytokine signaling, as well as cytotoxic responses to various pathogens.

B-cells are involved in the production of antibodies.

Routine blood chemistry does not differentiate between lymphocytic B-cells and T- cells, but rather accounts for “total lymphocytes”.

Decreases in lymphocytes may indicate a longterm or chronic infection or inflammatory process.

Drug interference: chemotherapy, antibiotics, anticonvulsants, antihistamines, anti-thyroid drugs, barbiturates, diuretics, sulfonamides

Monocytes – High (Result: **9.9** ; Range: **0 - 7 %**)

Among the various immune cells, monocytes are the 2nd line of defense. They are capable of scavenging both bacteria and viruses. Monocytes produce the cytokine interferon, which possesses: anti-viral, anti-bacterial, anti-tumor and anti-parasitic activities.

When monocytes migrate to tissues they are called “macrophages”. Unlike neutrophils, monocytes can be produced more frequently and can remain in circulation longer.

An elevation in monocytes indicates some type of acute immune response.

Drug interference: adrenalin, steroids, heparin, NSAIDs, chloroform, quinine, triamterene

Additional Markers

Zinc, Serum or plasma – Low (Result: **70** ; Range: **90 - 135 ug/dl**)

Zinc is an essential trace element required to activate hundreds of chemical reactions in the body.

Drug interference: ACE inhibitors, chemotherapy drugs, penicillamine, thiazide diuretics, deferoxamine, acid-blocking drugs

Histamine, Whole Blood – Low (Result: **1** ; Range: **40 - 70 ng/ml**)

Histamine is a vaso-dilating, nitrogenous compound produced as part of the inflammatory immune response.

Additionally, histamine functions as a neurotransmitter in the gut where it plays an important role in gastric acid synthesis. Histamine is also concentrated in the central and peripheral nervous systems.

As part of the immune response, histamine is secreted by eosinophils and basophils.

Histamine is degraded by methyl groups, by the enzyme DAO (D-amino oxidase), making it a valid assessment tool for methylation capacity.

Decreases in histamine suggest an overall increased methylation capacity. Drug interference: Estrogen, antihistamines, epinephrine, acid-blocking drugs

Section 3: Pattern Descriptions & Symptoms

This section includes page descriptions for each of the physiological patterns that have been identified. These pages are intended as a reference section for clinicians, in order to better understand each pattern identified.

Additionally, each physiological pattern description includes a listing of related symptomatology, in order to obtain clinical correlations.

Blood Sugar: Hyperglycemia

A primary pattern for hyperglycemia suggests that elevated blood sugar is likely a factor.

There are essentially 3 tiers of elevated fasting glucose:

- Slightly elevated: 90-100; 4.99-5.55
- Moderately elevated: 100-110; 5.55-6.10

If blood sugar is consistently >110 or >6.10 consider that insulin resistance to some degree is possibly a factor.

In order to improve insulin and glucose utilization, its first important to understand the mechanisms influencing glucose metabolism. These include:

- Diet: Macro-nutrient ratios relative to the individual's metabolic needs
- Hormones that raise glucose: cortisol, thyroid hormone, ACTH, epinephrine, glucagon, growth hormone

Be sure to review the Recommendations & Protocols for Hyperglycemia.

Hyperglycemia Symptoms
• Increased thirst • Anxiety, agitated • Loss of appetite • Elevated blood pressure

Markers Considered: Glucose (**118.00** ; 80 - 90 mg/dl), Hemoglobin A1C (— ; 4.8 - 5.8 %)

Digestion: Bile Insufficiency

A Secondary pattern for bile insufficiency indicates the possibility for insufficient bile production, or inadequate bile utilization.

Bile is comprised mostly of water (>90%), and to a lesser degree bile salts, bilirubin and fats. Bile is produced in the liver and stored in the gall bladder.

Bile is an essential “degreaser” and “emulsifier” of dietary fats and fat-soluble vitamins (A, D, E, K). Inadequate bile may indicate a deficiency of fats and fat-soluble vitamins.

Bile also is a carrier of various “biotransformed” chemical and heavy metal toxins, which the liver has processed.

If bile deficiency is present, it is first essential to understand the mechanisms of why someone is deficient. These may include:

- Diet: Inadequate fat consumption, dehydration
- Liver dysfunction: faulty phase 2 mechanisms, especially glucuronidation
- Decreased cholesterol - cholesterol is required for bile synthesis
- Biliary stasis: obstruction in the biliary duct can cause inadequate bile flow

Be sure to review the Recommendations & Protocols for Bile Insufficiency

Bile Acid Insufficiency Symptoms
• GI symptoms worsen after consuming dietary fats • Bile acid reflux • Heartburn, indigestion • Constipation • Greasy, fatty stools • Diarrhea, or losse stools • Gall bladder removed

Markers Considered: Triglycerides (**104.00** ; 60 - 100 mg/dl), Total Bilirubin (— ; 0.2 - 1 mg/dl)

Inflammation: Non-Specific Inflammation

A secondary pattern for non-specific inflammation indicates some type of unspecified inflammation is possible.

This may include:

- Excess skeletal muscle degradation
- Tissue inflammation
- Auto-inflammatory processes

Be sure to review the Recommendations & Protocols for Non-Specific Inflammation.

Non-Specific Inflammation Symptoms
• None • Headaches • Pain, aches • Muscle soreness • Delayed recovery from exercise • GI symptoms • White coated tongue

Markers Considered: Uric Acid (**3.20** ; 3.5 - 5 mg/dl), Platelets (**—** ; 150 - 380 x10E3/uL), Triglycerides (**104.00** ; 60 - 100 mg/dl), Total Cholesterol (**225.00** ; 170 - 240 mg/dl), LDL Cholesterol (**142.00** ; 80 - 150 mg/dl), Albumin (**—** ; 4.1 - 4.8 g/dl)

Immune Response: Acute Immune Response

A secondary pattern for acute immune response suggests that some type of acute immune response is possibly in progress.

The activation and increased production of immune cells is a normal finding when acute antigenic invasion takes place.

An acute immune response will typically feature elevations in:

- Leukocyte count (WBC)
- Neutrophils - 1st line of defense
- Monocytes - 2nd line of defense
- Lymphocytes - inflammatory signaling & bacterial/viral scavenging

Uric acid may be elevated, above the individual's historic uric acid values.

Be sure to review the Recommendations & Protocols for Acute Immune Response.

Acute Immune Response Symptoms
• Fever • Body aches • Swollen lymph nodes • Soar throat • Cough • Sputum, especially yellow or green

Markers Considered: Lymphocytes (percent of total) (**22.00** ; 30 - 45 %), Monocytes (percent of total) (**9.90** ; 0 - 7 %), Uric Acid (**3.20** ; 3.5 - 5 mg/dl)

Nutrients: Molybdenum Deficiency

A secondary pattern for molybdenum deficiency suggests that molybdenum deficiency is possible.

The trace element molybdenum is a cofactor in 4 primary reactions:

- Detoxification: Conversion of sulfites into sulfates
- Uric acid synthesis via xanthine oxidase
- Aldehyde detoxification
- Mitochondrial amidoxime reductase

Be sure to review the Recommendations & Protocols for Molybdenum Deficiency.

Molybdenum Deficiency Symptoms
• Candidiasis • Increased toxic body burden • Skin flushing reaction from alcohol consumption • Elevated urine sulfates/sulfites

Markers Considered: Uric Acid (**3.20** ; 3.5 - 5 mg/dl),

Nutrients: Zinc Deficiency

A primary pattern for zinc deficiency suggests that zinc deficiency is possible.

Zinc is a cofactor in more than 100 enzymatic reactions in the body. Some of these include:

- ATP synthesis
- Cellulars antioxidants SOD & metallothionein
- Methylation reactions
- T4 to T3 conversion
- Vitamin A utilization
- Formation of calcitrol (hormonal D3)
- Growth development
- Synthesis of ALP enzyme
- Neurotransmission
- Digestive enzyme synthesis
- Reproductive health
- Immune functions: clotting, platelet formation

Zinc deficiency is among the most common nutrient deficiencies. The most common causes of zinc deficiency include:

- Diet: Inadequate consumption of zinc-containing foods
- Copper toxicity
- Cadmium toxicity
- Pyrrole disorder
- Low gastric acid: gastric acid is essential for zinc absorption
- Leaky gut: poor intestinal nutrient absorption

Be sure to review the Recommendations & Protocols for Zinc Deficiency.

Zinc Deficiency Symptoms
• White spots on finger nails • Decreased sense of smell • Decreased sense of taste • Prostatitis • Slow wound healing time • Growth development slow • PMS

Markers Considered: Zinc, serum/plasma (**70.00** ; 90 - 135 ug/dl), Alkaline Phosphatase (ALP) (— ; 60 - 100 IU/L)

Methylation: Over-Methylation

A primary pattern for Over-Methylation has been identified.

Over-methylation indicates an overload of methyl groups.

Status of functional methylation activity involves the activity of numerous methyltransferase enzymes, namely those which are involved in the metabolism and degradation of histamine (DAO and HNMT).

Decreases in whole blood histamine is a relative gauge for functionally excessive methylation capacity.

Methylation is a biochemical process that has numerous physiological influences:

- Brain & neurotransmitter function
- DNA & RNA synthesis
- Cardiovascular health
- Detoxification processes
- Inflammatory/Anti-inflammatory balance
- Immune cell synthesis

Be sure to review the Recommendations & Protocols for Over-Methylation.

Over-Methylation Symptoms
• Anxiety disorders, mania • Highly creative or artistic • Hyperactivity • Dry eyes and mouth • Paranoia • Estrogen intolerance • Adverse reaction to SAMe • Adverse reactions to SSRI anti-depressants • Anti-histamine intolerance

Markers Considered: Histamine, whole blood (**1.00** ; 40 - 70 ng/ml)

Section 4: Recommendations & Protocols

Section 4.1: Lifestyle

Lifestyle factors are among the most foundational components influencing your client's health.

Various lifestyle factors can complement your dietary and supplemental protocols. Some of these important lifestyle factors can include:

- Clean water & sufficient hydration
- Sleep, rest and relaxation
- Stress management: Regular exercise and/or physical activity
- Improved circulatory function: sauna therapy, sweating, exercise

In many instances, the implementation of lifestyle practices can greatly influence the effectiveness of your protocols. Always encourage your clients to regularly practice the foundations of health, regardless of their age or degree of illness.

Section 4.2: Diet

The following is a list of dietary recommendations based upon the Primary and Secondary physiological patterns identified.

This list serves as a catalyst for understanding how to use food under certain physiological circumstances. Not all recommendations listed may be required. Clinicians are encouraged to pick, choose and implement these recommendations based upon what is needed in each situation.

Blood Sugar

Hyperglycemia

Improve/Restore Insulin Response & Sensitivity: Maximize macro-nutrient ratios, restrict simple sugars, trans fats, PUFA's, alcohol & caffeine, Discover Metabolic Type® to individualize diet according to intracellular oxidative & nervous system tendencies. Dietary needs among diabetics may be vastly different.

If Complications Due to Poor Circulation: Garlic, Ginger, Turmeric, Cayenne, Cinnamon.

Reduce Inflammation Induced by Hyperglycemia: Restrict simple sugars, trans fats, PUFA's, alcohol & caffeine, discover Metabolic Type® to individualize diet according to intracellular oxidative & nervous system tendencies.

Digestion

Bile Insufficiency

Support Normal Function Of Liver: Dietary protein, beets & beet greens, artichoke (leaf, stem), bitter green vegetables such as dandelion greens, cruciferous vegetables: broccoli, cauliflower, kale, cabbage, brussel sprouts.

Thin Bile Flow, Decongest Liver: Beets & beet greens, artichoke (leaf, stem, root), burdock root, rhubarb root, bitter green vegetables such as dandelion greens, egg yolks, lecithin, olive oil.

Enhance Digestion & Fatty Acid Uptake: Bitter green vegetables such as dandelion greens.

Inflammation

Non-Specific Inflammation

Reduce Inflammation: Eliminate sugar, PUFA, trans fats; include foods rich in antioxidants: vegetables, animal protein (especially liver, heart, kidney); Foods high in omega 3 fatty acids: (raw) fish, flax seeds, turmeric, ginger, garlic.

Support Immune Defenses: Foods rich in Vitamin C (citrus fruit, berries, vegetables), Vitamin A (liver, butter, cream, egg yolks), Vitamin D (liver, egg yolks, whole fat dairy), foods rich in Vitamin E (flax, sunflower, annato, dark green vegetables).

Immune Response

Acute Immune Response

Reduce Inflammation: Eliminate sugar, PUFA, trans fats; include foods rich in antioxidants: vegetables, animal protein (especially liver, heart, kidney); Foods high in omega 3 fatty acids: (raw) fish, flax seeds, turmeric, ginger, garlic.

Support Immune Defenses: Foods rich in Vitamin C (citrus fruit, berries, vegetables), Vitamin A (liver, butter, cream, egg yolks), Vitamin D (liver, egg yolks, whole fat dairy), foods rich in Vitamin E (flax, sunflower, annato, dark green vegetables).

Nutrients

Molybdenum Deficiency

Support Molybdenum Deficiency: Richest sources: Legumes, peas, whole grains, nuts & seeds.

Zinc Deficiency

Increase Sources of Zinc: Red meat, liver, poultry, eggs, oysters, pumpkin seeds, hemp seeds.

Section 4.3: Supplements

Blood Sugar

Hyperglycemia

Improve/Restore Insulin Response & Sensitivity: Magnesium, chromium, GTF, vanadium, niacin, Vitamin D3, berberine herbs (Oregon grape, barberry, goldenseal, celendine), bitter melon, pancreatic glandular/protomorphogen, gymnema sylvestre, coleus, gynostemma, Korean ginseng, Giant Knotweed.

Reduce Inflammation Induced by Hyperglycemia: R-Lipoic acid, Vitamin D3, EPA/DHA/ALA, pancreatic enzymes, proteolytic enzymes (serrapeptase, bromealin, lumbrokinaise), liposomal glutathione, NAC, vitamins C, E, selenium, cat's claw, boswellia, turmeric, tienchi ginseng, Chinese saliva root.

If Complications Due to Poor Circulation: Cayenne, Garlic, Niacin, Ginkgo biloba, Gotu kola, Butcher's broom, Horsechestnut, Grapeseed extract, St. John's wort, Hawthorn, Sauna therapy (nitric oxide synthesis).

Reduce Chronic Stress Response: pancreatic enzymes, proteolytic enzymes (serrapeptase, bromealin, lumbrokinaise), ashwagandha, eleuthero, hawthorn, schizandra, coleus, adrenal adaptogenic support.

Digestion

Bile Insufficiency

Support Normal Function Of Liver: B-complex, B-12, glycine, cysteine, taurine, methionine, milk thistle, bitter berberrine-containing herbs (Oregon grape, barberry, goldenseal, celendine).

Thin Bile Flow, Decongest Liver: Choline, inositol, betaine HCL, lecithin, artichoke leaf extract, dandelion root, rhubarb root, berberrine-containing herbs (Oregon grape, barberry, goldenseal, celendine), cascara sagrada, digestive bitters, bayberry, phosphoric acid, yellow dock.

Enhance Digestion & Fatty Acid Uptake: Digestive enzymes, especially lipase, pancreatic enzymes, especially pancreatic lipase, bovine bile salts, ox bile, black radish.

Inflammation

Non-Specific Inflammation

Reduce Inflammation: Vitamins C, E, CoQ10,lipoic acid, molybdenum (if low uric acid), turmeric, ginger, boswellia, garlic, proteolytic enzymes (bromelain, serrapeptase,pancreatin).

Support Immune Defenses: Probiotics, Vitamins A, C, D, E, DHA/EPA/ALA, echinacea, goldenseal, cordyceps & medicinal mushrooms, garlic.

Immune Response

Acute Immune Response

Reduce Inflammation: Vitamins C, E, CoQ10, lipoic acid, turmeric, ginger, boswellia, garlic, proteolytic enzymes (bromelain, serrapeptase, pancreatin), thyme, cat's claw, nettles, licorice, panax ginseng, devil's claw.

Support Immune Defenses: Probiotics, zinc, Vitamins A, C, D, E, DHA/EPA/ALA, take together: echinacea (angustifolia & purpurea) & goldenseal, yarrow & elder flower (take together), cordyceps & medicinal mushrooms, garlic, colloidal silver, cat's claw, acacia, Oregon grape root, astragalus, adrenal & thymus glandular/protomorphogen; consider anti-virals: Chinese skullcap, ginger, licorice, elder, isatis, houttuynia, lomatium dissectum, olive leaf extract, pau d'arco, colloidal silver, St. John's wort, cat's claw, oregano oil, lemon balm, honeysuckle, sarsaparilla; herbal antibiotics: usnea, chaparral, isatis, honeysuckle; respiratory support: ther: echinacea (angustifolia & purpurea) & goldenseal, platycodon (expectorant), mullein, wild cherry bark, elecampagne (expectorant) .

Nutrients

Molybdenum Deficiency

Support Molybdenum Deficiency: Sodium molybdate, ammonium molybdate .

Zinc Deficiency

Increase Sources of Zinc: Zinc chelate, zinc picolinate, zinc sulfate, zinc chloride.

Support Digestion & Assimilation: HCL with pepsin, digestive enzymes, pancreatic enzymes.

Methylation

Overmethylation

- B-12 (hydroxycobalamin or cyanocobalamin) - 1000-2000 mcg
- Folinic acid (5-formyl tetrahydrofolate) or 5-MTHF (5-methyltetrahydrofolate) - 400-3000 mcg
- P5P (25-100 mg)
- Niacin or Niacinamide - 200-1600 mg (possibly if anxiety or mania related to dopamine overload)
- Choline, or Sunflower Lecithin - 1000-2000 mg
- Magnesium 200-500 mg
- L-Theanine 100-400 mg (possibly if anxiety-related to glutamate)
- GABA 200-1000 mg (possibly if anxiety-related to glutamate)

Notes:

- Protocol should be titrated slowly and carefully, beginning with P5P, then Choline/lecithin, then Magnesium, then B-12, then Folate, then possibly Niacin/Niacinamide, and L-theanine.
- Dosages must be titrated according to individual and circumstances. No “one-size fits all dosage” for over-methylators exists.
- If individual has MTHFR C677T or A1298C homozygous mutations, do not use Folinic acid or Folic acid. Use only 5-MTHF.
- If symptoms of anxiety or mania exist, be cautious with Folates, as they have the propensity to increase glutamate. In such cases, consider beginning titration with P5P, magnesium, then niacinamide/niacin.

Section 4.4: Related or Follow-Up Testing

Blood Sugar

Hyperglycemia
- Retest blood chemistry monthly
- Monitor insulin, Hgb A1C

Digestion

Generally:
- Comprehensive GI panel
- Re-test blood chemistry within 30-60 days

Inflammation

Generally:
- Comprehensive GI panel with stool IgA, bacteriology & parasitology
- Follow-up blood test every 4-8 weeks

Immune Response

Generally:
- Re-test blood chemistry in 4-6 weeks
- Comprehensive GI panel with bacteriology and parasitology

Nutrients

Generally:
- Re-test blood chemistry in 30 days
- Intracellular nutrient assessment

Methylation

Overmethylation

- Serum B-12, or urinary MMA
- Serum Folate
- MTHFR C677T and MTHFR A1298C genetics
- Urinary organic acids (OAT): FIGLU, UMMA, 5-HIAA, VMA, HVA, kynurenate, xanthurenate
- Biopterin/Neopterin
- Homocysteine
- Vitamin Diagnostics Methylation panel

Section 5: Introduction & Support

Section 5.1: Introduction

Blood Chemistry For the 21st Century Clinician

In today's clinical world, there is a seemingly endless bombardment of symptoms, diagnosed and non-diagnosed conditions, and degenerative processes. As research and understanding of these issues evolves, the functional medicine and alternative healthcare marketplace is saturated with biological testing involving: blood, urine, stool, genetics, saliva and hair.

The 21st century clinician has the challenge of keeping up with this sea of functional testing, its relevance, application and importance. Clinical discernment, which evolves from clinical experience is a continual learning process for discovering how and when to use a test, and when not to. Using certain functional lab tests may or may not be useful for the client or patient you are working with. Additionally, functional lab testing can become an expensive expedition, particularly if a clinician cannot properly identify which type of tests to use for each client or patient.

Enter functional blood chemistry analysis. Routine blood chemistry is an inexpensive, minimally invasive test, which when evaluated functionally rather than for pathological assessment, can yield a tremendous amount of physiological data.

In most instances, functional blood chemistry analysis serves as a foundational clinical test to:

- Understand where and what the physiological priorities are: Obtain an understanding of the individual's primary arenas of physiological and biochemical imbalance and dysfunction
- Identify the next level of clinical testing: Lead the clinician towards the best use of various functional tests
- Create an effective, individualized protocol, aimed at supporting and improving biological functions
- Track progress and effectiveness of protocols and health markers over time

Functional blood chemistry analysis can greatly assist the clinician in sorting out a patient or client's clinical presentation, and what to do about it.

Identifying & Working Around Limitations of Blood Chemistry

It is also important for the clinician to understand that, like all types of testing, there may be certain limitations to using blood chemistry solely as a functional test. Some of these limitations may include:

- Understanding that certain factors on a blood test can change frequently due to the body's homeostatic nature.
- Understanding that most blood chemistry factors are under the influence of multiple, physiological factors, making it difficult to discern "what is causing what".
- Understanding that because many blood chemistry factors may be changing more frequently, a single blood test may not effectively identify the physiological patterns over a longer period of time.

Fortunately, there are ways around some of these potential limitations. While we cannot stop the body from its homeostatic fluctuation, we can track a person's blood tests over weeks, months and years. This provides the clinician with a better understanding and appreciation for an individual's inherent tendencies over the long-term. In fact, tracking an individual's blood chemistry over a long-term may actually be more useful than single isolated tests, as it may elucidate the individual's organ, system and physiological patterns more clearly.

Physiological Patterns Indices

Because of the fact that multiple physiological activities may influence a single blood chemistry factor, it is essential to understand correlations and patterns among groups of blood chemistry factors. Viewing individual blood chemistry markers in concert with other markers enables a specific, systematic and more precise analysis of physiological patterns and tendencies. This type of analysis leads the clinician towards identifying more meaningful and effective nutritional therapies.

The analysis of blood chemistry using a physiological patterns assessment is the primary driving mechanism operative in this blood chemistry software system.

Laboratory Reference Ranges

Have you ever been to your doctor or healthcare provider and had them tell you that your blood test results are normal and there is nothing wrong with you? Clearly you don't feel well. You may even be gravely ill, in a state of intense chronic fatigue and have multiple symptoms. But why doesn't your blood or lab test reflect the way you feel? Surely your physician would be able to detect something, right? The problem lies in how the test is being interpreted.

The reality is that there are multiple ways of interpreting a blood test, and what many labs consider to be "normal" or "healthy" values is highly questionable.

The laboratory reference ranges that are the so-called "normal" or "healthy" places to be, are actually statistical averages. Different labs can and do have different reference ranges. It is common to have a test result come back "normal" from one lab and "out of range" from another lab. In truth, if your lab values are within the set reference range, you are within the "average", and not necessarily "normal" or ideal. Standard laboratory reference ranges will continue to get wider and wider as patients get sicker and sicker.

The ranges established in this blood chemistry software system represent the Optimum Functioning ranges for each blood chemistry marker. Blood chemistry markers outside of the Optimal Functioning ranges are not necessarily correlative with disease states. Rather these markers out of optimal range indicate that some physiological imbalance exists, which should be investigated.

”Functional” Approach Versus Pathological

Another important point to consider is that physicians are looking for definable diseases when looking at blood tests. Yet there is a huge percentage of people with no identifiable disease yet with multiple health issues.

Interpreting a blood test functionally rather than pathologically offers a greater scope for knowing where a person's malfunction may lie.

By interpreting a blood test functionally, rather than pathologically, and by assessing a person's biochemical Individuality through other methods of intake and inquiry, there becomes a greater precision for understanding where the problems may exist.

Furthermore, no laboratory data is enough by itself to create an entire nutritional program. Just as important, is the need to understand how a person’s symptoms correlates to their lab test results.

For this reason, recommended is the use of sophisticated questionnaires and intake data, as well as diet logs and food journals. When combined with functional blood chemistry analysis, specifically targeted and effective nutritional therapies can be initiated.

Section 5.2: Clinical and Technical Support

For support regarding access issues or other technical problems with the forms or the PDFs, use this email address: support@pathwaysfx.com