FUNCTIONAL BLOOD CHEMISTRY **ANALYZER**

CLIENT ID: 10438
TEST DATE: 08-28-2017
PRACTITIONER: Jennifer
REPORT DATE: 09-29-2017

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1.0: Overview of Results

This section presents a comprehensive overview of all blood testing results that have been submitted and analyzed.

Patient: 10438, male, age: 63, date of testing: 2017-08-28.

Markers with a red up-facing arrow are flagged as *higher* than optimal range.

Markers with a blue down-facing arrow are flagged as *lower* than optimal range.

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1.1: Individual Markers

Click here to make corrections.

Metabolic Panel

Marker	⚠	Result	Optimal Range	Unit
Glucose	↑	97	80 - 90	mg/dl
Insulin	↑	9.1	1 - 5	mg/dl
Hemoglobin A1C	↓	4.6	4.8 - 5.8	%
Uric Acid	↑	7.7	3.5 - 5	mg/dl
Blood Urea Nitrogen (BUN)	↑	19	12 - 18	mg/dl
Creatinine		1.04	0.65 - 1.18	mg/dL
Glomerular Filtration Rate (GFR)		76	60 - 130	mL/min
Sodium	↑	144	137 - 143	mmol/L
Potassium		4.3	4 - 4.5	mmol/L
Chloride		105	100 - 106	mmol/L
Carbon Dioxide		23	23 - 27	mmol/L
Calcium	↓	8.9	9.1 - 9.8	mg/dl
Phosphorus	↓	2.9	3 - 4	mg/dl
Total Bilirubin		0.8	0.2 - 1	mg/dl
Total Protein	↓	6.1	6.7 - 7.4	g/dl
Albumin		4.3	4.1 - 4.8	g/dl
Globulin	↓	1.8	2.3 - 2.7	g/dl
Alkaline Phosphatase (ALP)	↑	108	60 - 100	IU/L
Alanine Aminotransferase (ALT)		24	15 - 35	IU/L
Aspartate Aminotransferase (AST)		15	15 - 35	IU/L
Gamma-Glutamyl Transferase	↓	14	15 - 35	IU/L
LDH	↓	124	140 - 200	IU/L
Iron, serum	↑	126	60 - 110	ug/dl
Ferritin			15 - 200	ng/ml

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Lipid Panel

Marker	⚠	Result	Optimal Range	Unit
Triglycerides		88	60 - 100	mg/dl
HDL Cholesterol	↓	49	50 - 85	mg/dl
LDL Cholesterol	↓	47	80 - 150	mg/dl
Total Cholesterol	↓	114	170 - 240	mg/dl

*Triglycerides to HDL ratio: 1.46

CBC (complete blood count)

Marker	⚠	Result	Optimal Range	Unit
White Blood Cells		6.2	5 - 7.5	x10E3/uL
Red Blood Cells (RBC)	↑	5.04	4 - 5	x10E6/uL
Hemoglobin		14.7	13.5 - 15	g/dl
Hematocrit		46.2	38 - 48	%
Mean Corpuscular Volume (MCV)		92	85 - 93	fL
Mean Corpuscular Hemoglobin (MCH)		29.2	27 - 32	pg/cell
Mean Corpuscular Hemoglobin Concentration (MCHC)	↓	31.8	32 - 35	g/dL
Red Blood Cell Distribution Width (RDW)		12.5	0 - 15	%
Platelets		190	150 - 380	x10E3/uL
Neutrophils (percent of total)		57	40 - 60	%
Lymphocytes (percent of total)	↓	27	30 - 45	%
Eosinophils (percent of total)	↑	4	0 - 3	%
Monocytes (percent of total)	↑	10	0 - 7	%
Basophils (percent of total)		1	0 - 2	%

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Thyroid-Related Markers

Marker	⚠	Result	Optimal Range	Unit
TSH		2.67	1.8 - 3	uIU/mL
Total Triiodothyronine / T3	↓	98	100 - 200	ng/dL
Total Thyroxine		6.1	6 - 12	ug/dL
Free Triidothyroinine / Free T3		3.1	3 - 4.5	pg/mL
Free Thyroxine		1.19	1 - 1.5	ng/dL
Resin T3 Uptake	↓	25	28 - 38	%
Reverse T3	↑	17.2	0 - 15	ng/dL
Thyroid Peroxidase Anti Body		8	0 - 10	IU/mL

Additional Markers

Marker	⚠	Result	Optimal Range	Unit
Zinc, serum/plasma			90 - 135	ug/dl
Copper, serum			70 - 110	ug/dl
Ceruloplasmin			16 - 45	mg/dl
Homocysteine			6 - 8	umol/L
B-12 serum		721	500 - 1000	pg/ml
Folate, serum			6 - 16	ng/ml
Histamine, whole blood			40 - 70	ng/ml
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

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1.2: Out of Range

Metabolic Panel

Marker	⚠	Result	Optimal Range	Unit
Glucose	↑	97	80 - 90	mg/dl
Insulin	↑	9.1	1 - 5	mg/dl
Hemoglobin A1C	↓	4.6	4.8 - 5.8	%
Uric Acid	↑	7.7	3.5 - 5	mg/dl
Blood Urea Nitrogen (BUN)	↑	19	12 - 18	mg/dl
Sodium	↑	144	137 - 143	mmol/L
Calcium	↓	8.9	9.1 - 9.8	mg/dl
Phosphorus	↓	2.9	3 - 4	mg/dl
Total Protein	↓	6.1	6.7 - 7.4	g/dl
Globulin	↓	1.8	2.3 - 2.7	g/dl
Alkaline Phosphatase (ALP)	↑	108	60 - 100	IU/L
Gamma-Glutamyl Transferase	↓	14	15 - 35	IU/L
LDH	↓	124	140 - 200	IU/L
Iron, serum	↑	126	60 - 110	ug/dl

Lipid Panel

Marker	⚠	Result	Optimal Range	Unit
HDL Cholesterol	↓	49	50 - 85	mg/dl
LDL Cholesterol	↓	47	80 - 150	mg/dl
Total Cholesterol	↓	114	170 - 240	mg/dl

CBC (complete blood count)

Marker	⚠	Result	Optimal Range	Unit
Red Blood Cells (RBC)	↑	5.04	4 - 5	x10E6/uL
Mean Corpuscular Hemoglobin Concentration (MCHC)	↓	31.8	32 - 35	g/dL
Lymphocytes (percent of total)	↓	27	30 - 45	%
Eosinophils (percent of total)	↑	4	0 - 3	%
Monocytes (percent of total)	↑	10	0 - 7	%

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Thyroid-Related Markers

Marker	⚠	Result	Optimal Range	Unit
Total Triiodothyronine / T3	↓	98	100 - 200	ng/dL
Resin T3 Uptake	↓	25	28 - 38	%
Reverse T3	↑	17.2	0 - 15	ng/dL

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2.0: 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.

Patterns are classified as either:

- "High Risk" is indicated with this Icon:
- "Moderate Risk" is indicated with this icon:

A "**High Risk**" pattern suggests a stronger likelihood that such a physiological pattern exists.
A "**Moderate Risk**" pattern suggests a physiological pattern may exist, but is less certain than a "High Risk pattern".

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.

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2.1: Flagged Patterns

BLOOD SUGAR

Pattern	Risk	Links
Hypoglycemia	⚠	Protocols | Pattern Reference

CELL HYDRATION

Pattern	Risk	Links
Dehydration	⚠	Protocols | Pattern Reference
Electrolyte Imbalance	⚠	Protocols | Pattern Reference

LIVER

Pattern	Risk	Links
Diminished Liver Function	⚠	Protocols | Pattern Reference

Adrenal Related Markers

Pattern	Risk	Links
Increased Adrenal Output	⚠	Protocols | Pattern Reference

Inflammatory Activity

Pattern	Risk	Links
GI Inflammation Possible	⚠	Protocols | Pattern Reference
Possible Intestinal Parasites	⚠	Protocols | Pattern Reference

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Nutrient Markers

Pattern	Risk	Links
Iron Deficiency	⚠	Protocols | Pattern Reference
Excess Serum Iron	⚠	Protocols | Pattern Reference

Immune Response

Pattern	Risk	Links
Acute Immune Response	⚠	Protocols | Pattern Reference

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2.2: Patterns Recommendations & protocols

The following “protocols & Recommended Additional Testing” section is based upon the physiological patterns identified, NOT the individual markers

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ACUTE IMMUNE RESPONSE

Click here to jump to the reference section for this pattern

Symptoms

- Fever
- Body aches
- Swollen lymph nodes
- Soar throat
- Cough
- Contraceptives
- Sputum, especially yellow or green

Clinical Objectives

- Reduce inflammation
- Support immune defenses

Lifestyle Factors

- Rest
- Hydration
- Sauna therapy & heating the body may increase immune defenses
- Lymphatic stimulation: skin brushing, yoga, massage, lymph drainage, sauna therapy, sweating
- Coffee enemas

Dietary Considerations

- **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)

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Supplementation

- **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:** NAC, take together: echinacea (angustifolia & purpurea) & goldenseal, platycodon (expectorant), mullein, wild cherry bark, elecampagne (expectorant)

Related or Follow-up Testing

- Retest blood chemistry
- Immunological assay - varying types

Notes

- Improve: circulation, hydration, digestion, elimination & detoxification
- Implementation of herbs should be done cautiously if using pharmaceuticals concomitantly
- Taking herbal formula every 2-4 hours may be needed.
- Tinctured herbs may be several times stronger than dry herbs or teas

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DEHYDRATION

Click here to jump to the reference section for this pattern

Symptoms

- Dry mouth
- Unquenchable thirst
- Lack of saliva
- Flaking and/or dry skin
- Excess consumption of caffeine, alcohol or diuretics
- Muscle soreness, trigger points or tightness

Clinical Objectives

- Maximize hydration

Lifestyle Factors

- Excess sweating can cause dehydration
- Consumption of diuretics can dehydrate: coffee, tea, alcohol, caffeine, diuretic drugs

Dietary Considerations

- **Restore Hydration:** Consume potassium-rich & water soluble vegetables, cucumber,cucumber juice, watermelon

Supplementation

- **Restore Hydration:** water with pH >7.0 and 250 ppm, water & mineral salt,magnesium

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Related or Follow-up Testing

- None
- RBC elements
- RBC magnesium
- Hair tissue mineral analysis (HTMA)

Notes

- Aluminum, chlorine, fluoride can induce blood sludge
- Monitor renal functions
- Monitor pH tendencies
- Monitor serum electrolytes

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DIMINISHED LIVER FUNCTION

Click here to jump to the reference section for this pattern

Symptoms

- Chemical sensitivity
- Edema
- Caffeine or alcohol sensitivity
- Headaches: front lobe
- Headaches: base of skull
- Pain between shoulder blades
- Burning or itching anus

Clinical Objectives

- Improve/restore functionality of liver
- Support/normalize detoxification phases
- Protect liver cells from damage

Lifestyle Factors

- **Improve/Restore Functionality of Liver:** Hydration, restrict alcohol, caffeine
- **Support/Normalize Detoxification Phases:** Hydration, Restrict alcohol, caffeine
- **Protect Liver Cells From Damage:** Restrict alcohol, caffeine

Dietary Considerations

- **Improve/Restore Functionality of Liver:** Increase dietary protein, especially if albumin is decreased, increase intake of beets, beet greens, artichoke (leaf, stem & heart)
- **Support/Normalize Detoxification Phases:** Increase dietary protein, Cruciferous vegetables: broccoli, cauliflower, kale, brussel sprouts, cabbage, Increase intake of beets, beet greens, artichoke (leaf, stem & heart), garlic, radish
- **Protect Liver Cells From Damage:** Increase dietary protein, Cruciferous vegetables: broccoli, cauliflower, kale, brussel sprouts, cabbage, citrus fruit

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Supplementation

- **Improve/Restore Functionality of Liver:** If albumin is low then low-molecular weight antioxidants (vitamin C, E, lipoid acid), B-complex, B-12, glycine, cysteine, taurine, arginine, glutamine, methionine, glutathione, NAC, turmeric, milk thistle, berberrinecontaining herbs (Oregon grape, barberry, phellodendron, coptis, goldenseal, celendine), bovine liver glandular/protomorphogen
- **Support/Normalize Detoxification Phases:** B-complex, B-12, P5P, Betaine HCL, vitamins C, E, choline, inositol, magnesium, molybdenum, sulfur, zinc, dandelion root, berberrine-containing herbs (Oregon grape, barberry, phellodendron, coptis, goldenseal, celendine)
- **Protect Liver Cells From Damage If Liver Enzymes are Elevated:** Vitamins C, E, bioflavanoids, glutathione, lipoic acid, NAC, milk thistle, bupleurum, dandelion, ban zhi lian, cornsilk, licorice, selenium, CoQ10, SOD

Related or Follow-up Testing

- Urinary hepatic detoxification profile
- Urinary bile acid sulfates (UBAS)
- Organic acids test (OAT)
- Toxic metal screen: HTMA, urine, fecal

Notes

- Pharmaceuticals are hepato-toxic
- Pay attention to heavy metal & chemical toxicity
- Monitor endocrine functions

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ELECTROLYTE IMBALANCE

Click here to jump to the reference section for this pattern

Symptoms

- Dry mouth
- High or low blood pressure
- Orthostatic blood pressure failure
- Unquenchable thirst
- Lack of saliva
- Flaking and/or dry skin
- Excess consumption of caffeine, alcohol or diuretics
- ncreased or decreased urination
- Muscle soreness, trigger points or tightness

Clinical Objectives

- Maximize hydration
- Maximize fluid/electrolyte balance

Lifestyle Factors

- Excess sweating can cause loss of electrolytes
- Consumption of diuretics can dehydrate and deplete/derange electrolytes: coffee, tea, alcohol, caffeine, diuretic drugs

Dietary Considerations

- **Restore Fluid/Electrolyte Balance:** Consume potassium and magnesium-rich & water-soluble vegetables, cucumber, cucumber juice, greens, watermelon

Supplementation

- **Restore Hydration:** water with pH >7.0 and 250 ppm, water, mineral salt, magnesium
- **Individual Considerations:** If sodium <137 consider increasing salt intake; if sodium>143 consider restricting salt intake and increase magnesium. Dilution of

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minerals salts in water may increase effectiveness of mineral transport.

Related or Follow-up Testing

- Blood pressure
- Orthostatic blood pressure
- RBC elements: intracellular elements can vary from serum
- Adrenal hormone profile: cortisol, aldosterone
- Hair tissue mineral analysis (HTMA)

Notes

- Aluminum, chlorine, fluoride can induce blood sludge and induce changes to electrolytes
- Monitor renal function markers
- Monitor pH tendencies
- Monitor serum electrolytes

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EXCESS SERUM IRON

Click here to jump to the reference section for this pattern

Symptoms

- Joint pain
- Cardiac arrhythmia
- Gray or bronzing skin color
- Amenorrhea
- Testicular dysfunction or impotence

Clinical Objectives

- Investigate cause of elevated serum Iron

Lifestyle Factors

- **NA**

Dietary Considerations

- Dietary sources of iron are not frequently a contributing factor to elevated serum iron.
- Restriction of dietary iron does not typically result in reduction of serum iron

Supplementation

- **N/A**

Related or Follow-up Testing

- Transferrin
- TIBC
- % Transferrin saturation

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- Ferritin

Notes

- Investigate possible acute inflammation
- Consider anaerobic gram negative anaerobic bacteria altering iron proteins

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GI INFLAMMATION POSSIBLE

Click here to jump to the reference section for this pattern

Symptoms

- Lower or upper GI symptoms: bloating,reflux, gas
- Intestinal/lower bowel cramping
- External fungal infection
- Skin outbreaks
- Cystic acne
- Diarrhea, loose stools
- Blood in stools
- Mucus in stools
- White coating on tongue

Clinical Objectives

- Support digestion & assimilation
- Support/restore GI mucosal barrier
- Consider anti-microbials/antifungals

Lifestyle Factors

- Increase hydration: consider use of mineral salt & water (provides Na, Cl & trace minerals)
- Rest, exercise, improve circulation, stress reduction

Dietary Considerations

- **Support Digestion & Assimilation:** Consider raw versus cooked foods, consume sufficient dietary protein, remove all antigenic foods (consider: gluten, sugar, dairy, eggs, corn, soy, grains, legumes, FODMAPS, nightshades, high histamine foods, oxalates, salicylates, sulfates), discover Metabolic Type®
- **Support/Restore GI Mucosal Barrier:** Protein, fermented foods (not with fungal issues or SIBO), cabbage, cooked papaya, colostrum, butter, ghee, cream, okra, acorn, gelatin, bone broth, remove antigenic foods, remove fructose & sugars

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Supplementation

- **Support Digestion & Assimilation:** Betaine HCL with pepsin, malic acid, digestive enzymes, pancreatic enzymes, digestive bitters, ginger, peppermint
- **Support/Restore GI Mucosal Barrier:** Probiotics, vitamin E, S. boulardi (if yeast overgrowth) L-glutamine, zinc L-carnosine, slippery elm, comfrey leaf, phosphatidylcholine, glucosamine, licorice, marshmallow root, aloe vera, triphala. If intestinal hemorrhaging: triphala (extremely high dose), bayberry, shepherd's purse, white oak bark, yellow dock, calendula, uva ursi
- **Consider Anti-microbials/Anti-fungals:** Berberrine-containing hebs (goldenseal, Oregon grape root, celendine, barberry, coptis) echinacea, clove, pau d'arco, oregano oil, olive leaf, ginger, cat's claw, wormwood, colloidal silver, S. boulardi, candex. Proteolytic enzymes to reduce inflammation & dissolve pathogenic biofilm: serrapeptase, bromelain, lumbrokinaise

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Related or Follow-up Testing

- GI pathogen screen or comprehensive stool analysis
- Organic acids test (OAT)
- Urinary indican
- Fecal IgA

Notes

- Identify source of GI inflammation

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HYPOGLYCEMIA

Click here to jump to the reference section for this pattern

Symptoms

- Hungry all of the time
- Need to snack between meals
- Energy crash from high carbohydrate meal
- High carbohydrate meal produces hunger within 60-90 minutes or less
- Loss of cognitive function if meals skipped or delayed

Clinical Objectives

- Normalize inefficient glucose utilization
- Investigate endocrine disturbance if present

Lifestyle Factors

- **Normalize Inefficient Glucose Utilization:** Establish routine of correct dietary habits
- **Support Endocrine Disturbance (if present):** Stress reduction

Dietary Considerations

- **Normalize Inefficient Glucose Utilization:** Increase dietary protein & fat, restrict sugar & carbohydrates, Maximize macronutrient ratios, discover Metabolic Type®

Supplementation

- **Normalize Inefficient Glucose Utilization:** zinc, calcium, vitamin B-5, pancreatic glandular, astragalus
- **Support Endocrine Disturbance (if present):** Adrenal glandular, licorice, eleuthero, siberian or Korean ginseng

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Related or Follow-up Testing

- Glucose tolerance test
- LDH electrophoresis (if LDH is <140)
- Thyroid screen
- Saliva-cortisol hormone test
- Metabolic Type assessment

Notes

- In severe cases of hypoglycemia support HPA axis & investigate thyroid & adrenal status.
- Consider investigating liver function

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INCREASED ADRENAL OUTPUT

Click here to jump to the reference section for this pattern

Symptoms

- Keyed up
- Insomnia
- Physically wired but mentally tired
- Elevated BP
- Increased urination
- Fatigue
- Glucose in urine

Clinical Objectives

- Support increased adrenal output & HPA axis
- Support secondary symptoms of increased adrenal output: GI, digestion

Lifestyle Factors

- **Support Hyperadrenal Function:** Moderate exercise, rest, stress reduction, hydration, eliminate: caffeine, alcohol, diuretics

Dietary Considerations

- **Support Hyperadrenal Function:** Maximize macro-nutrient ratios relative to Metabolic Type®, Vitamin C-rich foods: citrus, vegetables

Supplementation

- **Support Hyperadrenal Function:** Adrenal glandular /protomorphogen, magnesium and calcium (give together), P5P, Vitamins C with bioflavanoids, Vitamin E, inositol (if insomnia or anxiety), holy basil, hawthorn (especially if BP is elevated), phosphatidylserine, rhemmania, ashwagandha, if keyed up then consider antispasmodics:kava kava, skullcap, lobelia, goth kola, American ginseng, valerian
- **Support Digestion & Assimilation:** Eliminate antigenic foods, Digestive enzymes,HCL, bovine bile salts

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Related or Follow-up Testing

- Cortisol testing (urine, saliva)
- Orthostatic blood pressure
- Orthostatic pulse
- Na/K ratio: Hair tissue mineral analysis (HTMA)
- Organic acids test (OAT)

Notes

- Monitor GI inflammation & infections
- Monitor glucose & blood pressure
- Monitor thyroid function
- Corticosteroids suppress immune function & induce bone loss longterm
- With prolonged elevated cortisol, monitor bone health & Ca/P ratio

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IRON DEFICIENCY

Click here to jump to the reference section for this pattern

Symptoms

- Anemia
- Fatigue
- Headaches
- Pale complexion
- Weakness upon exertion
- Uterine fibroids
- Acid-blocking drugs
- Regular NSAID use

Clinical Objectives

- Increase dietary sources of iron
- Support digestion & assimilation
- Support anemia-related symptoms

Lifestyle Factors

- Improve hydration to improve digestion
- **Support Anemia-Related Symptoms:** Thermogenic, heat-building exercises,cardiovascular exercise

Dietary Considerations

- **Increase Sources of Iron**: Richest heme sources: Liver, red meat; Richest nonheme sources: Parsley, spinach, swiss chard, legumes
- **Support Anemia-Related Symptoms:** blackberry, raspberry, mulberry, lycium berry, bilberry

Supplementation

- **Increase Sources of Iron:** Supplemental iron is not recommended. However, consider the use of Vitamin C to aid in iron assimilation
- **Support Anemia-Related Symptoms:** Astragalus & dong quai (Angelicasinensis), chyavanprash, ligusticum, codonopsis, blackstrap molasses & yellow dock,

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rehmannia, mulberry, lycium berry, blackberry, raspberry, bilberry
- **Support Digestion & Assimilation:** HCL with pepsin, digestive enzymes,pancreatic enzymes

Related or Follow-up Testing

- Serum ferritin
- Renal function (If persistent anemia)
- Urine lipid peroxides
- Thyroid panel

Notes

- Heme iron sources are much preferred
- Vitamin C is an iron synergist
- Caffeine may inhibit iron uptake
- Acid-blocking medications induce iron deficiency
- Iron deficiency patterns that do not correct with dietary intervention, may require further analysis. In females, consider that uterine fibroids can highjack iron metabolic pathways. Genetic configurations may also

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POSSIBLE INTESTINAL PARASITES

Click here to jump to the reference section for this pattern

Symptoms

- Constipation
- Flatulence - foul odor
- Abdominal bloating/distention
- Persistent diarrhea
- Unformed stools

Clinical Objectives

- Support GI mucosal barrier
- Consider possible anti-parasitics

Lifestyle Factors

- Increase hydration: consider use of mineral salt & water (provides Na, Cl & trace minerals)
- Remove source of toxicity

Dietary Considerations

- **Support GI Mucosal Barrier:** Protein, cabbage, fermented foods (not with fungal issues), cooked papaya, colostrum, butter, cream, okra, acorn, gelatin, bone broth, remove antigenic foods, remove fructose & sugars

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Supplementation

- **Support/Restore GI Mucosal Barrier:** Probiotics, vitamin E, S. boulardi (if yeast overgrowth) L-glutamine, zinc L-carnosine, slippery elm, comfrey leaf, phosphatidylcholine, glucosamine, licorice, marshmallow root, aloe vera, triphala
- **Consider Anti-parasitics:** Wormwood, black walnut, clove, goldenseal, Oregon grape root, garlic, andrographis, black radish, pumpkin seed, wild carrot

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Related or Follow-up Testing

- GI pathogen screen or comprehensive stool analysis
- Urinary organic acids test (OAT)
- Urinary indican
- Stool IgA

Notes

- Make GI terrain inhospitable to parasites
- Do food sensitivity test
- Do GI pathogen screen & comprehensive stool analysis

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3.0: Appendix

The following sections provide additional information to help you gather a deeper understanding of the report results.

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3.1: Individual Marker Appendix

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

Alkaline Phosphatase – High (Result: 108 ; Range: 60 - 100 IU/L)

Alkaline phosphatase (ALP) is a metabolic enzyme derived from bone. It is found in many tissue types. Its highest concentrations throughout the body include: bone, liver, biliary tract epithelium, intestinal mucosa and placenta. ALP on routine blood chemistry reflects the “total” ALP. In actuality, there are 6 isoenzymes of ALP, the values of which may be determined through electrophoresis.

Drug interference: allopurinol, antibiotics, fluoride, methotrexate, tetracyclines, verapamil

Blood Urea Nitrogen (BUN) – High (Result: 19 ; Range: 12 - 18 mg/dl)

Bun is blood, urea, nitrogen. BUN is a major indicator of dietary protein metabolism. BUN reflects the amount of urea and nitrogenic waste remaining from dietary protein metabolism. Urea is formed in the liver and excreted via the kidneys, making it a valid marker of renal dysfunction.

Drug interference: Acid-blockers such as H2 blockers and PPI’s, diuretics, steroids

Calcium – Low (Result: 8.9 ; Range: 9.1 - 9.8 mg/dl)

Calcium is the most abundant mineral of the body. It is essential for: nerve conduction, skeletal health, cell membrane permeability, muscle contraction, blood clotting, cell membrane voltage, hormone regulation. The calcium in the blood is directly influenced by parathyroid hormone, as well as the availability of Vitamin D. Calcium values on a blood test are typically not related to actual dietary calcium intake, in many cases. Rather, calcium values are reflective of the large number of direct and indirect factors influencing calcium metabolism.

Drug interference: Acid-blocking drugs, estrogens, blood thinning drugs, steroids, NSAIDs,

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contaceptives, albuterol

Eosinophils – High (Result: 4 ; Range: 0 - 3 %)

Eosinophils are among the fewest type of immune cells produced. Unlike neutrophils, monocytes and lymphocytes, eosinophils do not scavenge bacteria or viruses. Instead, eosinophils are produced as part of the allergic response, as well as in the presence of parasitic infections. Eosinophils produce leukotrienes, a type of conjugated fatty acid that is among the most inflammatory immune compounds. Elevations in eosinophils are seen among those with: parasitic infections, environmental allergies, food allergies and intolerances, and asthma.

Drug interference: None known

Gamma-Glutamyl Transferase – Low (Result: 14 ; Range: 15 - 35 IU/L)

GGTP is a metabolic enzyme concentrated in numerous tissues. Its greatest concentrations are found in the liver, biliary tract and kidneys, and to a lesser extent in the prostate. GGTP is the primary enzyme that activates the gamma glutamyl cycle, a pathway that involves the transfer of amino acids and peptides across cell membranes. In these regards, the gamma glutamyl cycle is critical for the transport and utilization of the cellular antioxidant glutathione.

Drug interference: Clofibrate, oral contraceptives, drugs that deplete Vitamin B-6: theophylline, loop diuretics, steroids, vasodilators

Glucose – High (Result: 97 ; 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

Hemoglobin A1C – Low (Result: 4.6 ; Range: 4.8 - 5.8 %)

HbA1C is a long-term indicator for the amount of glucose in the blood. HbA1C values reflect how much glucose that red blood cells have been exposed to over their 120-day life span. HbA1C values reflect approximately 100-120 days of glucose values. The test is useful at differentiating how long glucose levels have been abnormal.

Drug interference: acetaminophen, alcohol, steroids, clofibrate, disopyramide, gemfibrozil, insulin, MAO-A inhibitors, pentamidine, propranolol, tolazamide, tolbutamide

HDL Cholesterol – Low (Result: 49 ; Range: 50 - 85 mg/dl)

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HDL is high density lipo-protein. It is the primary lipo-protein that transports cholesterol and other nutrients from the peripheral tissues back to the liver. HDL possesses unique antioxidant activities, which are capable of preventing the oxidation of LDL, as well as removing oxidized LDL particles.

Drug interference: alcohol, smoking, high dose Vitamin C

Insulin – High (Result: 9.1 ; Range: 1 - 5 mg/dl)

Insulin is the primary hormone that facilitates the uptake of glucose by cells. Insulin is produced by the beta islet cells of the pancreas. An elevation of insulin indicates varying degrees of glucose dysregulation and insulin resistance.

Drug interference: Insulin, oral contraceptives, corticosteroids, levodopa

LDH – Low (Result: 124 ; Range: 140 - 200 IU/L)

LDH is a metabolic enzyme concentrated in numerous tissues. Its highest concentrations are found in: heart, liver, lungs, brain, kidney, placenta, pancreas, and skeletal muscle. LDH converts the reversible reactions of pyruvate to lactate, as well as NADH to NAD. The conversion of pyruvate (from glycolysis) into lactate occurs when oxygen availability is reduced (anaerobic conditions). LDH on routine blood chemistry represents the “total LDH”. In actuality, there exist 5 LDH isoenzymes. Each isoenzyme originates from a specific tissue. Differentiation of LDH can be determined through electrophoresis.

Drug interference: High doses of Vitamin C

LDL Cholesterol – Low (Result: 47 ; Range: 80 - 150 mg/dl)

LDL is low density lipo-protein. It is the primary lipo-protein that transports cholesterol, essential fatty acids, and other nutrients from the liver to the peripheral tissues. Numerous factors can influence LDL values, including: inflammatory processes, infection, chronic disease, thyroid function, fluctuation of endocrine activity, environmental toxins, dietary factors and genetics.

Drug interference: allopurinol, androgenic hormones, bile acid sequestrants, statins, Cytomel, MAO-A inhibitors, Niacin, neomycin, nitrates, clofibrate, isoniazid, catopril

Lymphocytes – Low (Result: 27 ; 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

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indicate a longterm or chronic infection or inflammatory process.

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

Mean Corpuscular Hemoglobin Concentration – Low (Result: 31.8 ; Range: 32 - 35 g/dL)

MCHC is a calculation for the average amount of hemoglobin found in red blood cells. MCHC is usually decreased when certain types of anemia are present, primary “microcytosis”.

Drug interference: Drugs that decrease iron: Acid-blocking drugs, ACTH, bile acid sequesterants, chloramphenicol, colchicine, methicilin, testosterone. Drugs that decrease B-6: oral contraceptives, alcohol, aspirin and salicylates

Monocytes – High (Result: 10 ; 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

Phosphorus – Low (Result: 2.9 ; Range: 3 - 4 mg/dl)

Phosphorous in its biological form is bound to oxygen, and is called phosphate. Phosphate is found primarily in bone (85%). The remaining 15% of phosphate is either intracellular or in the blood. Phosphate is a major component of ATP (adenosine triphosphate), is the basis of phospholipids, and thus cell membrane function and permeability. Phosphate is also a building block of DNA. In blood chemistry, phosphorous is under the influence of parathyroid hormone (PTH). Phosphorous and calcium are ideally viewed together due to their intrinsic relationship. Phosphorous is excreted via urine and feces.

Drug interference: Antacids, acid blockers, mannitol

Red Blood Cells – High (Result: 5.04 ; Range: 4 - 5 x10E6/uL)

RBC measures the red blood cells found in a cubic millimeter of blood. Red blood cells (erythrocytes) transport oxygen from the lungs to the tissues and remove carbon dioxide from tissues, bringing Co2 back to the lungs. The RBC is very sensitive to the status of: Iron, hemoglobin, B-12, folate, B-6, the hormone EPO and hydration status.

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Drug interference: Gentamicin, methyldopa, caffeine

Reverse T3 – High (Result: 17.2 ; Range: 0 - 15 ng/dL)

Reverse T3 is a metabolically inactive form of T3. Elevations in RT3 are believed to result due to inadequate conversion of T4 into T3, and possibly decreased hepatic clearance of RT3. Elevations in RT3 are possibly indicative of: metabolic distress, chronic illness and/or adrenal distress.

Drug interference: propylthiouracil, ipodate, propranolol, amiodarone, Dexamethasone, Halothane

Iron, serum – High (Result: 126 ; Range: 60 - 110 ug/dl)

Iron is an essential element needed for oxygen transport, blood cell formation and function, and numerous enzymatic processes. 70% of the iron in the body is intracellular in the form of hemoglobin. The remaining 30% of iron is stored in tissues in the form of ferritin and hemosiderin. On a blood test, the iron measured is determined by the amount of transferrin bound to iron. In elevated quantities, iron is potentially toxic.

Drug interference – Dextran, chloramphenicol, estrogen, oral contraceptives, methyldopa, ethanol, alcohol

Sodium – High (Result: 144 ; Range: 137 - 143 mmol/L)

Sodium is the primary base of the blood, functioning as a pH buffer. Sodium is also essential as an electrolyte, working with other electrolytes to produce the proper electrical charge of cells. Sodium is predominantly found in the extracellular fluids. Sodium is essential for numerous physiological processes, including: nerve impulse and blood pressure, hormone synthesis, adrenal function, renal function, vascular integrity, and various cardiac functions. Increases in sodium should be viewed in concert with other electrolytes, especially potassium and chloride.

Drug interference: Steroids, NSAID’s, anti-hypertensives

Resin T3 Uptake – Low (Result: 25 ; Range: 28 - 38 %)

Resin T3 uptake measures the amount of available binding sites for metabolically active T3 to bind with proteins. Decreased T3 uptake is one indicator for decreased thyroid activity. However, a full thyroid panel is recommended in order to understand the nature of imbalance.

Drug interference: Contraceptives, clofibrate, antithyroid drugs, estrogens, thiazdide diuretics

Total Cholesterol – Low (Result: 114 ; Range: 170 - 240 mg/dl)

The cholesterol on a blood test is actually a sum of 3 lipo-proteins: LDL, HDL and VLDL. Lipo-

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proteins function as transport mechanisms for cholesterol, as well as for other essential nutrients such as Vitamins A, D, E, K, phospholipids and antioxidants. Cholesterol is essential for life processes. The primary functions of cholesterol include: primary constituent of all cellular membranes where it controls membrane fluidity, precursor of all steroidal hormones, precursor of bile acids, primary component of myelin and as anti-inflammatory. Dietary sources of cholesterol have little if any influence on serum cholesterol measurements.

Drug interference: allopurinol, androgenic hormones, bile acid sequestrants, statins, Cytomel, MAO-A inhibitors, Niacin, neomycin, nitrates, clofibrate, isoniazid, catopril

Globulin – Low (Result: 1.8 ; Range: 2.3 - 2.7 g/dl)

Drug interference: Hepatotoxic drugs, immune suppressants, ammonium ions, estrogens, oral contraceptives

Total Protein – Low (Result: 6.1 ; Range: 6.7 - 7.4 g/dl)

The total protein is a sum of albumin and globulin. To understand why total protein is decreased, investigate the individual albumin and globulin markers.

Total Triiodothyronine – Low (Result: 98 ; Range: 100 - 200 ng/dL)

T3 is also known as triiodothyronine. It is the most active form of thyroid hormone. The Total T3 represents both bound and unbound forms of the hormone, and is therefore not as good of an indicator as Free T3 measures. Decreased TT3 is seen among those with decreased thyroid activity, and possibly decreased anterior pituitary function. A full thyroid panel is recommended in order to understand the nature of imbalance.

Drug interference: Steroids, androgenic hormones, phenytoin, propranolol, resperine, salicylates

Uric Acid – High (Result: 7.7 ; 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: Vitamin C, alcohol, NSAIDs, caffeine, cisplatin, diazoxide, diuretics, epinephrine, ethambutol, levodopa, methyldopa, vitamin B3, phenothiazines, theophylline

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3.2: Patterns Appendix

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.

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ACUTE IMMUNE RESPONSE

Recommendations & Protocols

This report has identified a pattern for Acute Immune Response.
A pattern for acute immune response suggests that some type of acute immune response is likely 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

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DEHYDRATION

Recommendations & Protocols

This report has identified a pattern for dehydration. All cell and tissue types require sufficient fluid and electrolyte medium for proper physiological functions. Dehydration is a common finding. Individuals who are dehydrated tend to exhibit various changes in blood volume. "High Risk" Dehydration patterns typically cause an elevation in blood volume (hypervolemia). This can result in red blood cell agglutination (clumping or “blood sludge”), which can decrease oxygen transport, alter fluid and nutrient transport, as well as effect osmotic pressure. "High Risk" Dehydration is most often caused by inadequate water consumption, but may also involve:

- Inadequate electrolytes
- Excess diuretic consumption: caffeine, alcohol
- Drugs which increase fluid loss such as diuretics

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DIMINISHED LIVER FUNCTION

Recommendations & Protocols

This report has identified a pattern for Diminished Liver Function. The liver is a massive organ with countless, essential functions. These include:

- Metabolism of nutrients (amino acids, B-vitamins, minerals, lipids) & drugs
- Biotransformation of substances, especially xenobiotics, chemicals and toxic metals
- Bile synthesis
- Hormone synthesis & degradation
- Blood sugar regulation: stores and releases glycogen & regulates gluconeogenesis
- Synthesis of cholesterol
- Nutrient storage
- Synthesis of blood clotting factors
- Blood pressure regulation: angiotensinogen
- Albumin synthesis, which influences osmotic pressure and nutrient transport

It is important to understand that inadequate liver function has numerous implications related to the overall health of the individual.

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ELECTROLYTE IMBALANCE

Recommendations & Protocols

This report has identified a pattern for Electrolyte Imbalance. The electrolytes in the blood serve as the raw materials for the “cell battery”. All cells and tissues require sufficient electrolyte and fluid balance in order to perform fundamental physiological functions. Among the numerous functions of electrolytes in cell physiology, the following functions are greatly influenced by the balance of electrolytes:

- Cell membrane voltage & action potential
- Cell membrane permeability
- Signal transduction
- ATP synthesis & utilization
- Hormonal messaging & utilization

The status of serum electrolytes are influenced by:

- Dietary intake of electrolytes
- Hydration & fluid balance
- Intra and extracellular fluid volume
- Blood pressure-regulating mechanisms: water/salt balance, renin, ACE, renal & liver sufficiency
- ADH (anti-diuretic hormone)
- Adrenal hormones: aldosterone & cortisol

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EXCESS SERUM IRON

Recommendations & Protocols

A pattern for Excess serum iron suggests that elevated serum iron is probable. Iron is an essential trace element, needed for numerous biological functions. Some of these include:

- Red blood cell formation
- Mitochondrial ATP synthesis

Excess serum iron may be caused by numerous mechanisms. Some of these include:

- Genetic susceptibility for hemochromatosis
- Liver dysfunction
- Acute inflammation causing a reduction in Transferrin, the primary iron-binding protein
- Low blood proteins: hypoproteinemia
- Excess iron intake

Excess Serum Iron High serum iron may not produce symptoms. The possible symptoms of hemochromatosis may include:

- Joint pain
- Cardiac arrhythmia
- Gray or bronzing skin color
- Amenorrhea
- Testicular dysfunction or impotence

Attention! This report has identified a pattern for both Iron Deficiency and Iron Excess. This is not accidental. Physiologically Iron Excess represents an increased accumulation of Iron in the extracellular serum, whereas the triggers for Iron Deficiency are due to a loss of functional iron intracellularly. Thus, the problem is due to a transport or utilization issue. Anecdotal experience has shown that accompanying this dual pattern often includes a low Transferrin, the most abundant Iron-binding protein. The TIBC (total iron binding capacity) may also be reduced, or on the lower end of the range. The dual patterns for both Iron Deficiency and Iron Excess can be caused by acute inflammation and/or the presence of infections such as microbial or viral. When these two patterns appear together, you should consider investigating the source of inflammation and possible infection.

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GI INFLAMMATION POSSIBLE

Recommendations & Protocols

This report has identified a pattern for Possible GI Inflammation. The gastrointestinal tract is host to trillions of micro-organisms, most of which comprise the body's immune defenses. Immunoglobulins such as IgA line the intestinal tract, as do numerous types of white blood cells. GI inflammation is a very common finding, and may feature various symptoms and causal factors. These may include:

- Food intolerances & or food allergies: multiple foods (gluten, dairy, soy, corn, etc) and food groups (FODMAPS, nightshades, high oxalates, high sulfur, high salicylates, etc) may trigger antigenic immune responses in certain individuals
- Yeast/fungal imbalances such as candidiasis
- High chemical & heavy metal toxicity
- SIBO & other bacterial imbalance issues
- Possible genetic predispositions: FUT2, ATG16L1, IRF5

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HYPOGLYCEMIA

Recommendations & Protocols

This report has identified a pattern for Hypoglycemia. A pattern for hypoglycemia suggests that low blood sugar episodes is a likely occurrence. Hypoglycemia does not necessarily mean “low blood sugar”, as much as “inefficient glucose utilization”. An individual with hypoglycemic tendencies may exhibit normal and even optimal fasting glucose levels. In hypoglycemia, cells tend to metabolize glucose very rapidly and inefficiently. In order to improve glucose homeostasis, it is essential to first understand the primary mechanisms influencing blood sugar utilization. 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
- Hormones that lower glucose: insulin, somatostatin

Attention: This report has identified a pattern for both Hyperglycemia and Hypoglycemia. This is not accidental. Physiologically “hyperglycemia“ represents an increase in extracellular glucose accumulation, whereas “hypoglycemia“ is defined as “inefficient glucose utilization”. So while the extracellular compartment has high glucose (in hyperglycemia), the intracellular compartment may be deficient in glucose due to loss of proper insulin utilization and glucose uptake by cells. When these two patterns appear simultaneously, you should consider it very possible that some degree of insulin resistance is occurring.

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INCREASED ADRENAL OUTPUT

Recommendations & Protocols

This report has identified a pattern for Possible Increased Adrenal Output. Increased adrenal response may directly involve either or both of the 2 primary adrenal steroid hormones:

- Cortisol
- Aldosterone

Cortisol is produced as a “buffer” to stress, and also has a relationship with other physiological processes, such as: anti-inflammatory immune responses, digestion, blood sugar maintenance and HPT axis influences. Chronically elevated cortisol may negatively impact the immune system in general, as well as decrease skeletal integrity. Elevations in cortisol, like aldosterone can cause significant changes in serum electrolytes, sodium and potassium. Elevations in aldosterone can cause precipitous changes in serum electrolytes, sodium and potassium, particularly causing a decrease in potassium.

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IRON DEFICIENCY

Recommendations & Protocols

This report has identified a pattern for Iron Deficiency. In Primary Iron Deficiency, both iron and hemoglobin values are diminished. Iron is an essential trace element, needed for numerous biological functions. Some of these include:

- Red blood cell formation
- Mitochondrial ATP synthesis
- Antioxidant activity: forms catalase

Decreased iron status can negatively impact oxygen transport to the tissues. Inadequate oxygen transport will result in metabolic inefficiency, and lead to symptoms of iron-deficient anemia. Iron deficiency is often due to:

- Diet: Inadequate iron-containing foods
- Low gastric acid
- Drugs that deplete iron
- Uterine fibroids
- Genetic predispositions

Attention! This report has identified a pattern for both Iron Deficiency and Iron Excess. This is not accidental. Physiologically Iron Excess represents an increased accumulation of Iron in the extracellular serum, whereas the triggers for Iron Deficiency are due to a loss of functional iron intracellularly. Thus, the problem is due to a transport or utilization issue. Anecdotal experience has shown that accompanying this dual pattern often includes a low Transferrin, the most abundant Iron-binding protein. The TIBC (total iron binding capacity) may also be reduced, or on the lower end of the range. The dual patterns for both Iron Deficiency and Iron Excess can be caused by acute inflammation and/or the presence of infections such as microbial or viral. When these two patterns appear together, you should consider investigating the source of inflammation and possible infection.

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POSSIBLE INTESTINAL PARASITES

Recommendations & Protocols

This report has identified a pattern for Possible Intestinal Parasites. Intestinal parasites are a common clinical presentation. In many instances, parasitic infestation comes with no symptomatology. In other instances, parasite infestation may present with numerous types of symptoms. From a clinical perspective it is important to understand that evaluating the gut terrain is equally or more important than the presence of any unwanted GI pathogens. In these regards, a healthy gut terrain makes it difficult for pathogenic infestation to arise.

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