Perspective

Why run a Perspective profile on your patients?

The **Perspective** profile utilizes blood and saliva samples to evaluate several key areas known to significantly impact health:

- Oxidative Stress and Inflammation
- Adrenal Stress
- Metabolic Syndrome Risk
- IgG Food Antibodies
- Vitamin D Status (optional)

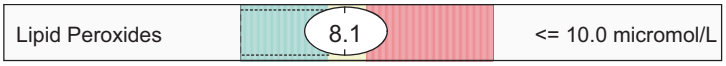
Perspective offers an array of tests, designed to help practitioners identify key areas of imbalance to determine treatment and/or help focus further evaluation.

Laboratory Interpretation—

Oxidative Stress and Inflammation

Oxidative stress has been implicated in aging and many chronic illnesses, including atherosclerosis, cancer, rheumatoid arthritis, asthma, macular degeneration, diabetes mellitus, chronic fatigue syndrome, and neurodegenerative diseases such as Parkinson's and Alzheimer's. Oxidative stress is caused by free radicals, which are unstable molecules that oxidize sugars, fats, proteins, and DNA, leading to cellular damage.

Serum lipid peroxides reflect oxidative damage to lipids in the body, such as in cell membranes and lipoproteins. A high level suggests a reduction/oxidation (redox) imbalance in favor of oxidative damage, an indication that free radical activity has surpassed the availability of antioxidant protection.



TREATMENT OPTIONS to reduce Serum Lipid Peroxides:

- Identify and reduce possible causes of oxidative stress, e.g., inflammation, infection, excessive exposure to xenobiotics or gut-derived toxins, upregulated Phase 1 detox (P450) activity, radiation, ischemia, strenuous exercise
- Increase intake of fresh fruits and vegetables; consider supplementation with antioxidants: tocopherols, ascorbic acid, carotenoids, coenzyme Q10, lipoic acid, selenium
- Consider herbal antioxidants, e.g., milk thistle, catechin, ginkgo biloba, hawthorne, reishi, anthocyanidins, curcumin
- Consider nutritional cell membrane support, e.g., phosphatidylcholine, taurine, essential fatty acids (esp. omega-3); eliminate trans fats from diet

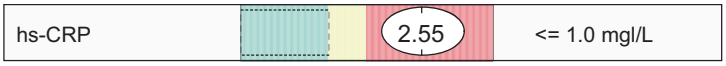
INTERPRETIVE GUIDELINES

Genova Diagnostics®
Innovative Testing for Optimal Health

FURTHER EVALUATION:

- Rule out detoxification imbalances as source of oxidative stress, with the **Comprehensive Detoxification Profile** or **Standard Detoxification Profile**
- Rule out fatty acid imbalances as source of oxidative stress, with the **Essential & Metabolic Essential Fatty Acids Profile**
- Rule out gut dysbiosis and leaky gut as source of systemic inflammation, with the **CDSA 2.0, CDSA/P, Microbiology**, or **Comprehensive Parasitology**; also **Intestinal Permeability Assessment**
- Consider more thorough evaluation of oxidative stress with the **Oxidative Stress Analysis** or the **Comprehensive Detoxification Profile**
- Rule out nutritional imbalances with the **NutrEval** or **ONE** (Optimal Nutrition Evaluation); Antioxidants with **CoQ10**

High-sensitivity C-Reactive Protein (hs-CRP) is an acute-phase reactant for systemic inflammation, cell injury, and immune activation. CRP activates complement, which can injure the inner layer of blood vessels. Elevated hs-CRP is a strong independent risk marker for cardiovascular disease, and is a powerful predictor of future myocardial infarction or peripheral arterial disease. Risk is compounded when serum fibrinogen is also elevated.



Possible contributors to elevated hs-CRP:

- Inflammatory processes
- Acute-phase processes (e.g., post-surgery, infection, neoplasm)
- Sublinical infection with *Chlamydia pneumonia*, *Helicobacter pylori*, CMV, or EBV
- Diabetes
- Smoking
- Sleep deprivation
- Carotenoid deficiency

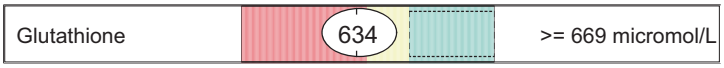
TREATMENT OPTIONS TO reduce hs-CRP:

- Address causes of acute-phase response
- Consider anti-inflammatory agents, such as omega-3 fats (EPA/DHA), pycnogenols, carotenoids, tocopherols, garlic, ginkgo biloba, turmeric, bromelain, baby aspirin
- Improve glycemic regulation and blood pressure control
- Smoking cessation
- Exercise, weight loss

FURTHER EVALUATION:

- Further evaluate cardiovascular risk with the **Comprehensive Cardiovascular Assessment** or **Comprehensive Cardiovascular Profile 2.0**
- Rule out nutritional imbalances with the **NutrEval** or **Optimal Nutrition Evaluation**; **Antioxidants with CoQ10**

Glutathione and other antioxidants provide critical protection against oxidative stress. Low levels of whole blood glutathione may result from nutrient insufficiencies and/or oxidative stress, the latter of which draws on glutathione reserves, contributing to their depletion.



TREATMENT OPTIONS to increase Glutathione:

- Consider supplementation with glutathione building blocks and nutrient cofactors: N-acetylcysteine (NAC), L-methionine, glycine, L-glutamine, magnesium, B6, B12, folic acid
- Consider agents that protect against glutathione depletion: vitamin C, alpha lipoic acid, milk thistle, taurine, ginkgo biloba

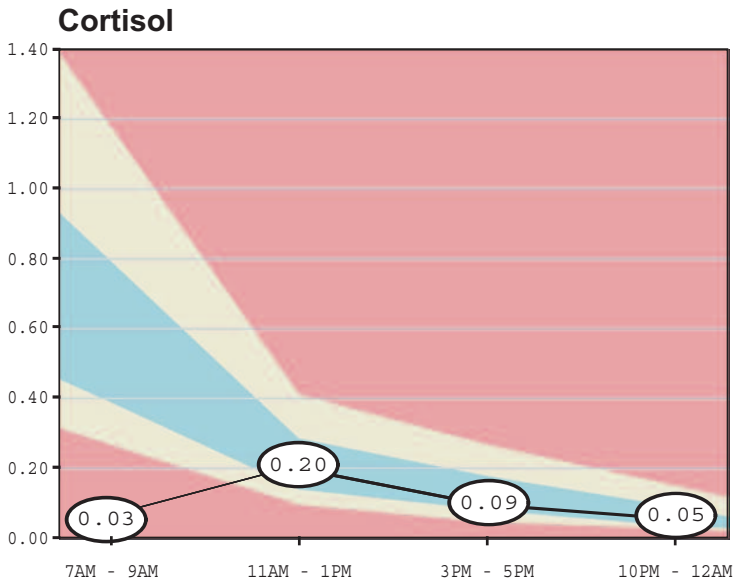
FURTHER EVALUATION:

- Rule out nutrient insufficiencies and methionine metabolism defects with the **Amino Acid Analysis**, the **Optimal Nutrition Evaluation**, or **NutrEval**
- Rule out heavy metal toxicity with the **Comprehensive Urine Element Profile**, **Toxic Element Clearance Profile**, **Elemental Analysis Packed Erythrocyte**, or **Hair Analysis**
- Rule out digestion/absorption issues with **CDSA/P** or **CDSA 2.0**; **Celiac Profile**

Laboratory Interpretation—

Adrenal Stress

Cortisol is a catabolic adrenal hormone, playing an important role in mobilizing energy reserves during stress. The rhythm of cortisol is regulated by the sleep-wake cycle and is characterized by a steep increase in the morning, followed by a gradual tapering off until about midnight. When stressors persist, the secretion of glucocorticoids is prolonged, leading to maladaptation of the adrenal cortex, adrenal hyperplasia, disrupted diurnal variation of cortisol (e.g., flat-line cortisol curve), and secondary hormonal imbalances.



Low salivary cortisol suggests:

- Chronic adrenal stress / low cortisol production
- Increased risk of fatigue, hypotension, hypoglycemia, and heightened inflammatory and allergic responses
- Possible increased metabolism and/or hyper-excretion of cortisol

TREATMENT OPTIONS for low cortisol:

- Stress management
- Address sources of chronic physiologic stress (e.g., infection, inflammatory conditions, dysbiosis/leaky gut, allergies, trauma)
- Minimize intake of sweets and refined carbohydrates
- Ensure adequate intake of nutrients used by adrenals: vitamin C, magnesium, zinc, B vitamins; consider extra vitamin B6 (100 mg 1-2 X day) and pantothenic acid (500 mg 2-3 X day)
- Consider "adaptogenic" herbs such as eleutherococcus (Siberian ginseng), Panax ginseng, ashwaganda, astragalus, schizandra, rhodiola, licorice
- Consider bovine glandular supplements (adrenal, hypothalamus, and/or pituitary), adrenal cortical extract, or low-dose hydrocortisone (rule out hyper-excretion; see below)

High salivary cortisol suggests:

- Acute adrenal stress / high cortisol production
- Possible strenuous exercise, or supplementation with adrenal glandular, hydrocortisone, licorice, or adrenal herbal stimulants
- Increased risk of hypothyroidism (impaired conversion of T4 to T3), osteoporosis, visceral obesity, hyperglycemia or reactive hypoglycemia, hypertension, suppressed immunity, depression, and memory loss

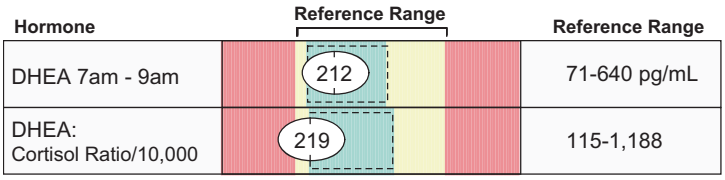
TREATMENT OPTIONS for high cortisol:

- Stress management
- Minimize stimulants such as caffeine, chocolate, ephedra, yerba mate
- Address sources of physiologic stress, e.g., infection, inflammatory conditions, dysbiosis/leaky gut, allergies, hypoglycemia, trauma
- Reduce visceral fat, which produces cortisol
- Ensure adequate intake of nutrients used by adrenals: vitamin C, magnesium, zinc, B vitamins; consider extra vitamin B6 (100 mg 1-2 X day) and pantothenic acid (500 mg 2-3 X day)
- Consider phosphatidylserine to calm HPA axis activation and prevent neuronal cortisol toxicity (300-800 mg/day)
- Consider calmative herbs such as passion flower, valerian, hypericum, skullcap, hops, magnolia bark, lemon balm
- Consider calmative nutritional agents such as GABA (250 mg 1-3 X day) or L-theanine (100 mg 3-4 X day)

FURTHER EVALUATION for imbalanced cortisol:

- In case of low or low-normal cortisol measurements, esp. if curve is flat-line, rule out hyper-excretion of cortisol with urinary **Steroid Balance** profile; hyper-excretors of cortisol may not tolerate adrenal glandular or low-dose hydrocortisone
- Rule out secondary thyroid imbalances with the **Comprehensive Thyroid Assessment**, esp. if high cortisol
- In case of high or low cortisol (esp. if also low DHEA), rule out downstream deficiencies of testosterone, estradiol, or estrone in serum (**Hormone Health, Male Hormone Health**), urine (**Complete Hormones** or **Essential Estrogens**), or saliva (**Rhythm, Menopause, Male Hormones**)

DHEA is an anabolic hormone that plays an important role in many functions in the body, including that of balancing catabolic cortisol. With chronic stress, DHEA production is compromised, resulting in excessive 'wear and tear' in the body and deficient production of downstream androgens and estrogens. The DHEA:Cortisol Ratio reflects this anabolic/catabolic balance in the body.



Low DHEA suggests:

- Chronic stress pattern, with precursor hormones preferentially being used for cortisol production
- Adrenal insufficiency (esp. if also low cortisol)

TREATMENT OPTIONS for low DHEA:

- Stress management (adequate sleep, meditation, yoga, counseling, or other stress-reducing measures)
- (See recommendations for high cortisol)
- Consider DHEA supplementation (10-50 mg)

High DHEA suggests:

- Acute stress; may be associated with panic attacks
- Possible polycystic ovarian syndrome (PCOS) in women
- Possible supplementation with DHEA or adrenal stimulants
- Possible bleeding from gums (false positive)

TREATMENT OPTIONS for high DHEA:

- Stress management

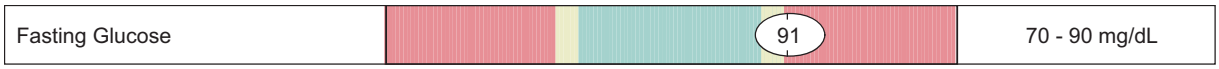
FURTHER EVALUATION for imbalanced DHEA:

- In case of high or low cortisol and/or low DHEA, rule out downstream deficiencies of testosterone, estradiol, or estrone in serum (**Hormone Health, Male Hormone Health**), urine (**Complete Hormones** or **Essential Estrogens**), or saliva (**Rhythm, Menopause, Male Hormones**)
- In case of high DHEA, rule out PCOS with **Hormone Health** (serum), **Complete Hormones** (urine), or saliva (**Rhythm** or **Menopause**)

Laboratory Interpretation—

Metabolic Syndrome Risk

Small to moderate elevations in **fasting glucose** (<126 mg/dL) signal impaired glucose tolerance and suggests increased risk of Metabolic Syndrome, (aka Insulin Resistance). Metabolic Syndrome features insulin resistance, obesity, hypertension, and dyslipidemia, and is a strong determinant of cardiovascular disease and type 2 diabetes. Chronic insulin resistance leads to hyperglycemia.



TREATMENT OPTIONS for hyperglycemia:

- Balance blood sugar by reducing sweets, refined carbohydrates, saturated fat, caffeine, and fruit juice; emphasize low-glycemic load foods, protein, whole grains, beans & legumes, essential fatty acids (esp. omega-3) and fresh vegetables
- Improve insulin sensitivity with weight loss (esp. abdominal), exercise, fish oils, alpha lipoic acid, chromium picolinate, vanadium, zinc, B complex, and DHEA (if indicated)
- Consider herbal agents to reduce hyperglycemia, e.g., *Gymnema sylvestre*, cinnamon bark extract, cloves

FURTHER EVALUATION for high glucose:

- Evaluate overall cardiovascular risk with the **Comprehensive Cardiovascular Profile 2.0** or **Comprehensive Cardiovascular Assessment**
- Rule out hyperglycemia-induced damage with **Oxidative Stress Analysis**

TREATMENT OPTIONS for hypoglycemia:

- Balance blood sugar by eating frequent small meals; reduce sweets, refined carbohydrates, caffeine, alcohol, and fruit juice; emphasize low-glycemic load foods, protein, complex carbohydrates, essential fatty acids (esp. omega-3) and fresh vegetables
- Ensure adequate intake of B vitamins, chromium, magnesium
- See section for low cortisol; adrenal insufficiency results in hypoglycemia

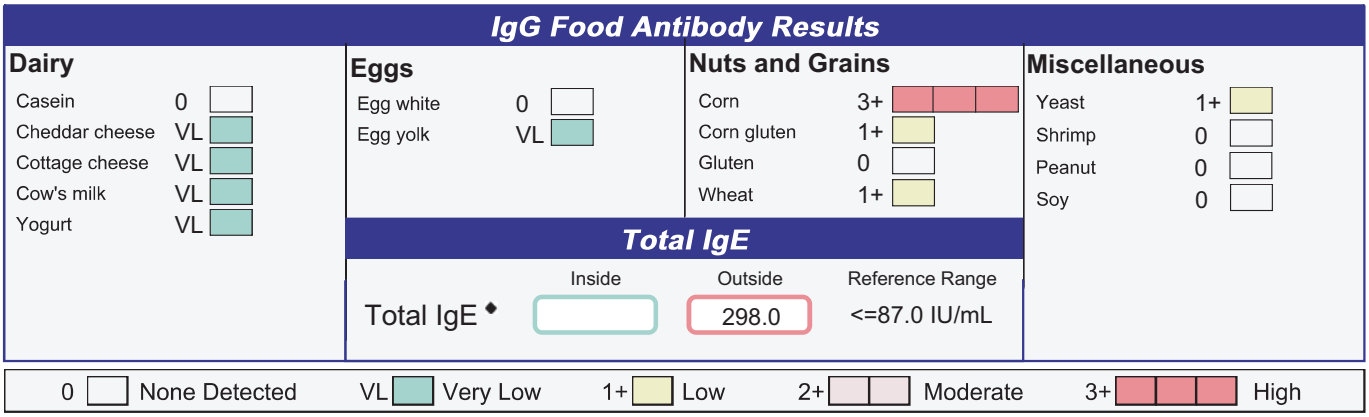
FURTHER EVALUATION for low glucose:

- Consider **Amino Acid Analysis**, **Optimal Nutrition Evaluation**, or **NutrEval** to rule out nutritional insufficiencies contributing to hypoglycemia

Laboratory Interpretation—

IgG Food Antibodies

Chronic leaky gut results in increased antigenic load on the body, which, in turn, triggers inflammation in the body. Depending on the particular site of antigen/antibody complex deposition, this inflammatory response can produce a wide variety of symptoms and conditions. Commonly ingested foods such as dairy, wheat, eggs, corn, and nuts are responsible for the majority of both IgG- and IgE-mediated food reactions.



IgG Antibodies

Elevated IgG antibodies suggest:

- Chronically increased intestinal permeability, leading to translocation of dietary antigens, sensitization of the immune system, and inflammation; causes of leaky gut include NSAIDs and other meds, alcohol, intestinal dysbiosis or infection, inflammatory bowel disease, celiac disease, impaired immunity, stress, radiation, and food allergy

TREATMENT OPTIONS for elevated IgG antibodies:

- Identify and address root causes of leaky gut
- Consider gut healing agents, e.g., L-glutamine, N-acetylcysteine (NAC), N-acetylglucosamine (NAG), soluble fiber, larch arabinogalactans, gamma oryzanol, ginkgo biloba, probiotics and fructooligosaccharides (FOS), zinc, folic acid, vitamin A, B vitamins, phosphatidylcholine

FURTHER EVALUATION for IgG:

- Rule out additional IgG-specific food reactions (esp. if several foods are positive) with **IgG Food Antibodies** (88 foods), **IgG Spice Profile**
- Evaluate intestinal causes of leaky gut with the **CDSA 2.0, CDSA/P, Celiac Profile**
- Rule out heavy metal toxicity as source of leaky gut with the **Toxic Element Clearance Profile, Comprehensive Urine Element Profile, Element Analysis Packed Erythrocytes,** or **Hair Analysis**

Total IgE

Elevated Total IgE suggests:

- A predominance of IgE reactivity, from dietary and/or inhalant sources

TREATMENT OPTIONS for elevated Total IgE:

- Identify and avoid exposure to allergenic substances
- Consider mast cell stabilizing agents to reduce histamine release, e.g., quercetin and other bioflavonoids, vitamin C, sodium cromoglycate or ketotifen fumarate
- Consider agents that help shift Th2 to Th1 immunity, such as glutathione, N-acetylcysteine, L-methionine, L-arginine, zinc, selenium, and B vitamins

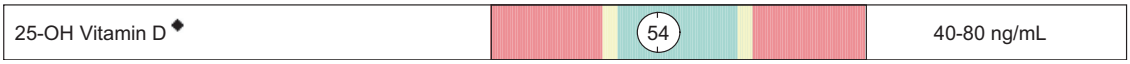
FURTHER EVALUATION for IgE:

- Identify IgE-specific allergens with **IgE Inhalants, IgE Molds,** and/or **IgG Food Antibodies with IgE Food**
- Rule out allergy-induced leaky gut with **Intestinal Permeability Assessment**
- Rule out intestinal immune reactions with **Eosinophil-Protein-X** (stand-alone test or part of **CDSA 2.0**)

Laboratory Interpretation—

Vitamin D

Vitamin D is a steroid hormone produced in the skin during sun exposure, and/or consumed in the diet. As a hormone, vitamin D impacts bone and mineral homeostasis, but also a wide variety of other tissues and functions in the body. Research suggests that vitamin D deficiency is much more common than previously thought, being associated with disorders such as osteoporosis, depression, autoimmune disease, cardiovascular disease, cancer, diabetes, and multiple sclerosis.



Deficiency = <20 ng/mL (<50nmol/L)
Insufficiency = 20-49 ng/mL (50-124 nmol/L
Optimal = 50-100 ng/mL (100-250 nmol/L)
Excessive = > 100 ng/mll (>250 nmol/L)

Low Vitamin D (<50 ng/mL) suggests:

- Increased risk of disorders such as osteoporosis, depression, autoimmune disease, osteoarthritis, cardiovascular disease, hypertension, cancer, diabetes, fibromyalgia, PCOS, migraine, epilepsy, and multiple sclerosis

TREATMENT OPTIONS for low Vitamin D:

- Increase sun exposure (without sunscreen, which blocks 99% of the UVB rays) and/or increase intake of vitamin D3; without exposure to sunlight, a minimum of 1000 iu/day is required
- Current research suggests general requirements as follows:
  - Infants: 1000-2000 iu/day
  - Children: 2000 iu/day
  - Adults: 4000 iu/day
- A dose of ~1700 iu/day typically increases levels of 25-OH-vitamin D from 20 to ~30 ng/mL

FURTHER EVALUATION:

- When dosing higher than 1000 iu/day, regular monitoring of 25-OH-vitamin D, along with serum calcium, is recommended until optimal levels are achieved; wait 3 months after adjusting dosage of vitamin D before re-testing

Please see the following pages for a Summary of Guidelines for Treatment Options & Further Testing

Perspective

Oxidative Stress and Inflammation:

If Serum Lipid Peroxides are > 7.0 umol/g

Treatment Options

Nutritional antioxidant support	Herbal antioxidant support	Cell membrane support
- Fresh fruits & vegetables - Tocopherols, ascorbic acid, carotenoids, CoQ10, lipolic acid, selenium	- Milk thistle, catechin, ginko biloba, hawthorne, reishi, anthocyanidins, curcumin	- Phosphatidylcholine, taurine, EFAs (esp. n3) - Eliminate trans fats from diet

Further Testing

Identify causes of oxidative stress	Further evaluate oxidative stress	Rule out nutritional imbalances
- Comprehensive Detoxification Profile, - CDSA 2.0, CDSA/P, Microbiology, or Comprehensive Parasitology - Intestinal Permeability Assessment - Essential and Metabolic Fatty Acids Analysis	- Oxidative Stress Analysis or Comprehensive Detoxification Profile	- NutrEval or ONE -Antioxidants with CoQ10

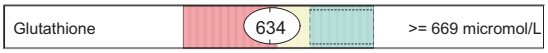
If hs-CRP is > 1.00 mg/L

Treatment Options

Consider anti-inflammatory agents	Improve glycemic regulation & blood pressure control
- Omega-3 fats (EPA/DHA), pycnogenols, carotenoids, tocopherols, garlic, ginkgo biloba, turmeric, bromelain, baby aspirin	- Smoking cessation - Exercise, weight loss

Further Testing

Further evaluate cardiovascular risk	Rule out nutritional imbalances
- Comprehensive Cardiovascular Profile 2.0 or Comprehensive Cardiovascular Assessment	- NutrEval or ONE - Antioxidants with CoQ10



If Glutathione is < 669 micromol/L

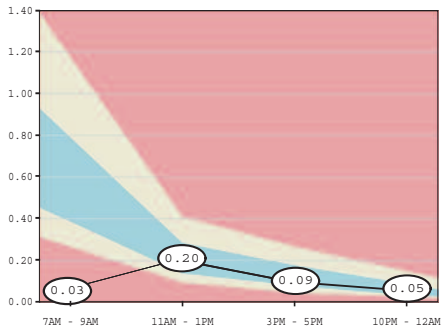
Treatment Options

Nutritional support	Glutathione depletion protective agents
- Glutathione building blocks and nutrient cofactors, N-acetylcysteine (NAC), L-methionine, glycine, L-glutamine, magnesium, B6, B12, folic acid	- Vitamin C, alpha lipoic acid, milk thistle, taurine, ginkgo biloba

Further Testing

Rule out methionine metabolism defects and nutrient insufficiencies	Rule out heavy metal toxicity	Rule out maldigestion/malabsorption
- Amino Acid Analysis - NutrEval - ONE	- Comprehensive Urine Element Profile, Toxic Element Profile, Elemental Analysis: Packed Erythrocytes, or Hair Analysis	- CDSA/P or CDSA 2.0 - Celiac Profile

Adrenal Stress:



If any cortisol is high or low

Treatment Options for Low Cortisol

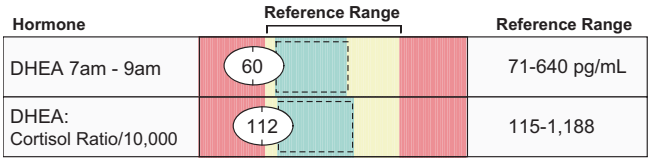
Address sources of chronic physiologic or psychologic stress	Ensure adequate intake of adrenal nutrients	Consider "adaptogenic" herbs
- Infection, inflammatory conditions, dysbiosis/leaky gut, allergies, trauma	- Vitamin C, magnesium, zinc, B vitamins, extra vitamin B6, pantothenic acid	- Eleutherococcus, Panax ginseng, ashwaganda, astragalus, schizandra, rhodiola, licorice

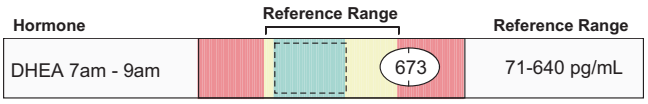
Treatment Options for High Cortisol

Minimize stimulants	Ensure adequate intake of adrenal nutrients	Consider calmative herbs
- Decrease caffeine, chocolate, ephedra, yerba mate	- Vitamin C, magnesium, zinc, B vitamins, extra vitamin B6, pantothenic acid	- Passion flower, valerian, hypericum, skullcap, hops, magnolia bark, lemon balm

Further Testing

Rule out thyroid imbalances (esp. if high cortisol)	Rule out deficiencies of downstream sex hormones	Rule out hyper-excretion of cortisol (if cortisol is low, esp. if flat-line cortisol)
- Comprehensive Thyroid Assessment	- Hormone Health or Male Hormone Health (serum) - Complete Hormones or Essential Estrogens (urine) - Rhythm, Menopause, or Male Hormones (saliva)	- Steroid Balance (urine)





If DHEA is < 71 pg/mL or DHEA:Cortisol Ratio is < 115

Treatment Options for Low DHEA

Stress management	DHEA supplementation
- Adequate sleep, meditation, yoga, counseling, or other stress-reducing measures	- 10-50 mg DHEA

Further Testing

Rule out deficiencies of downstream sex hormones

- Hormone Health or Male Hormone Health (serum)
- Complete Hormones or Essential Estrogens (urine)
- Rhythm, Menopause, or Male Hormones (saliva)

If DHEA is > 640 pg/mL

Treatment Options for High DHEA

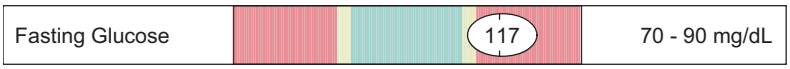
Stress management

Further Testing

Rule out PCOS in women, if suspect

- Hormone Health (serum)
- Complete Hormones (urine)
- Rhythm or Menopause (saliva)

Metabolic Syndrome Risk:



If Fasting Glucose is > 90 mg/dL

Treatment Options

Balance blood sugar	Improve insulin sensitivity	Consider hyperglycemia-reducing herbal agents
- Reduce sweets, refined carbohydrates, saturated fat, caffeine, and fruit juice - Emphasize low-glycemic load foods, protein, whole grains, beans & legumes, essential fatty acids (esp. omega-3) and fresh vegetables	- Weight loss, exercise, fish oils, alpha lipoic acid, chromium picolinate, vanadium, zinc, B complex, and DHEA (if indicated)	- *Gymnema sylvestre*, cinnamon bark extract, cloves

Further Testing

Evaluate cardiovascular risk	Rule out oxidative stress
- Comprehensive Cardiovascular Profile 2.0 or Comprehensive Cardiovascular Assessment	- Oxidative Stress Analysis

If Fasting Glucose is < 70 mg/dL

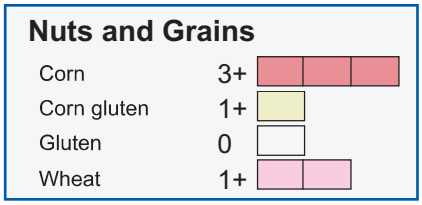
Treatment Options

Balance blood sugar	Nutritional support	See Low Cortisol section (Adrenal Stress)
- Eat frequent small meals; reduce sweets, refined carbohydrates, caffeine, alcohol, and fruit juice - Emphasize low-glycemic load foods, protein, complex carbohydrates, essential fatty acids (esp. omega-3) and fresh vegetables	- B vitamins, chromium, magnesium	- Adrenal insufficiency predisposes to hypoglycemia

Further Testing

Rule out nutritional insufficiencies
- Amino Acid Analysis, NutrEval, or ONE

IgG Food Antibodies & Total IgE:



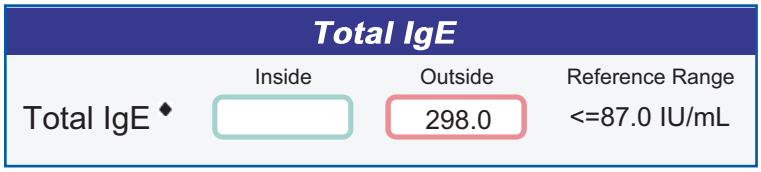
If positive IgG antibodies

Treatment Options

- Identify and address root causes of leaky gut
- Consider gut healing agents
  - L-glutamine, N-acetylcysteine (NAC), N-acetylglucosamine (NAG), soluble fiber, larch arabinogalactans, gamma oryzanol, ginkgo biloba, probiotics and fructooligosaccharides (FOS), zinc, folic acid, vitamin A, B vitamins, phosphatidylcholine

Further Testing

- Rule out additional IgG-specific food reactions
  - IgG Food Antibodies (88 foods), IgG Spice Profile
- Evaluate intestinal causes of leaky gut
  - CDSA 2.0 or CDSA/P
  - Celiac Profile
- Evaluate toxic metal cause of leaky gut
  - Toxic Element Clearance Profile, Comprehensive Urine Element Profile, Element Analysis: Packed Erythrocytes, or Hair Analysis



If high Total IgE

Treatment Options

- Identify and avoid exposure to allergenic substances
- Consider mast cell stabilizing agents to reduce histamine release
  - Quercetin and other bioflavonoids, vitamin C, sodium cromoglycate or ketotifen fumarate
- Consider agents that help shift Th2 to Th1 immunity
  - Glutathione, N-acetylcysteine, L-methionine, L-arginine, zinc, selenium, and B vitamins

Further Testing

- Identify IgE-specific allergens
  - IgE Inhalants, IgE Molds, and/or IgG Food Antibodies with IgE Foods
- Rule out intestinal immune reactions
  - Eosinophil-Protein-X (stand-alone test or part of CDSA 2.0)
- Rule out allergy-induced leaky gut
  - Intestinal Permeability Assessment

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