

**Finding the Cause of Disease  
with Specialty  
Alternative Medical Lab Tests**

by Ronald Steriti, ND, PhD

**About this book**

*Finding the Cause of Disease with Specialty Lab Tests* was written to help educate people about the cutting-edge advancements made in alternative medicine. This book exemplifies a fundamental principle of naturopathic medicine: Identify and treat the cause.

The first section of this book briefly describes what specialty lab tests are, and why they are important. The second section contains information on over 100 diseases. Each disease is briefly described, followed by a comprehensive list of causes. This is followed by the conventional lab tests, then by a list of specialty lab tests that can be used to identify the specific cause.

**Acknowledgements**

I would like to acknowledge the fine instruction I have received at Southwest College of Naturopathic Medicine. This review guide is based, in part, on the knowledge handed down from teacher to student in the time honored manner of true education.

**Disclaimer**

The information contained in this notebook has not been evaluated by the FDA. These products are not intended to diagnose, treat, cure or prevent any disease.

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## **Computer Software by Dr. Steriti**

### **Drug-Vitamin-Herb Interaction Analysis**

Many people are concerned about the interactions between prescription drugs and nutritional supplements. This computer program generates a list of the interactions between the prescription drugs entered and nutritional supplements.

### **Differential Diagnosis of Conventional Lab Test Results**

Interpreting standard lab tests is not easy, particularly when there are several out of range test results (which often happens with multiple medications). This computer program prints out the differential diagnosis for each lab test. You select whether it is high or low, giving you the ability to use tighter criteria.

### **The Bach Flower Emotional Wellness Quiz**

The Bach Flower Emotional Self-Help Quiz has four quizzes that help you choose Bach Flowers Remedies to balance your emotions.

Mac and PC demos of the software are available for download on [www.naturdoctor.com](http://www.naturdoctor.com)

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# Introduction



## **What Are Specialty Lab Tests?**

Specialty lab tests are diagnostic tools used primarily by holistic medical doctors and naturopathic physicians to assess the functional status of the body. Functional testing assesses the dynamic inter-relationship of physiological systems, thereby creating a more complete picture of one's health.

### **Why can't my medical doctor order these tests?**

Conventional medicine uses lab tests specifically to diagnose the disease. According to this method, once the disease has been identified, the treatment (drugs or surgery) is clear. Medical doctors are taught to use standard lab tests solely for the purpose of diagnosing diseases, and insurance companies will only pay for lab tests used for that purpose.

Specialty lab tests were designed to determine the underlying cause of disease, which is often due to nutritional deficiency or environmental toxicity. Identifying and treating the underlying cause of disease is a fundamental principle of naturopathic medicine.

### **Why do I need these specialty lab tests?**

Specialty lab tests are available to help identify the underlying cause of disease so that a specific nutritional protocol can be developed to address that cause. Many people are dissatisfied with the drug and surgical treatments used by conventional medicine. They are concerned about the side effects of their medications and are looking for alternatives. Specialty lab tests and functional assessments are primarily used by natural health practitioners that offer alternatives to conventional medical treatments.

### **Are these tests covered by my insurance?**

Unfortunately insurance companies are set up specifically to reduce the cost of medicine. One of the major ways that this is accomplished is by not paying for what they consider to be unnecessary lab testing. Since specialty lab tests are not accepted by conventional medicine, most insurance companies will not pay for them.

### **Which specialty lab tests do I need?**

The selection of which lab tests are appropriate for specific person is the focus of this book. There are informative handouts for over 100 diseases that briefly describe the disease and the conventional lab tests that are used to diagnose that disease. The handout also contains a comprehensive list of the causes of that disease, followed a list of the specialty lab tests which can be used to identify the specific cause underlying the disease.

### **Where can I order these specialty lab tests?**

These specialty lab tests are available only to naturopathic physicians and holistic medical doctors. The American Association of Naturopathic Physicians has a database on their web site ([www.naturopathic.org](http://www.naturopathic.org)).

# What is Naturopathic Medicine?

Naturopathic medicine is a distinct system of primary health care - an art, science, philosophy and practice of diagnosis, treatment and prevention of illness. Naturopathic medicine is distinguished by the principles which underlie and determine its practice. These principles are based upon the objective observation of the nature of health and disease, and are continually reexamined in the light of scientific advances. Methods used are consistent with these principles and are chosen upon the basis of patient individuality. Naturopathic physicians are primary health care practitioners, whose diverse techniques include modern and traditional, scientific and empirical methods.

## **The Healing Power of Nature (Vis Medicatrix Naturae)**

The healing power of nature is the inherent self-organizing and healing process of living systems which establishes, maintains and restores health. Naturopathic medicine recognizes this healing process to be ordered and intelligent. It is the naturopathic physician's role to support, facilitate and augment this process by identifying and removing obstacles to health and recovery, and by supporting the creation of a healthy internal and external environment.

## **Identify and Treat the Causes (Tolle Causam)**

Illness does not occur without cause. Causes may originate in many areas. Underlying causes of illness and disease must be identified and removed before complete recovery can occur. Symptoms can be expressions of the body's attempt to defend itself, to adapt and recover, to heal itself, or may be results of the causes of disease. The naturopathic physician seeks to treat the causes of disease, rather than to merely eliminate or suppress symptoms.

## **First Do No Harm (Primum Non Nocere)**

Naturopathic physicians follow three precepts to avoid harming the patient. Naturopathic physicians utilize methods and medicinal substances which minimize the risk of harmful effects, and apply the least possible force or intervention necessary to diagnose illness and restore health. Whenever possible the suppression of symptoms is avoided as suppression generally interferes with the healing process. Naturopathic physicians respect and work with the vis medicatrix naturae in diagnosis, treatment and counseling, for if this self-healing process is not respected the patient may be harmed.

## **Doctor As Teacher (Docere)**

The original meaning of the word "doctor" is teacher. A principal objective of naturopathic medicine is to educate the patient and emphasize self-responsibility for health. Naturopathic physicians also recognize and employ the therapeutic potential of the doctor-patient relationship.

## **Treat the Whole Person**

Health and disease result from a complex of physical, mental, emotional, genetic, environmental, social and other factors. Since total health also includes spiritual health, naturopathic physicians encourage individuals to pursue their personal spiritual development. Naturopathic medicine recognizes the harmonious functioning of all aspects of the individual as being essential to health. The multifactorial nature of health and disease requires a personalized and comprehensive approach to diagnosis and treatment. Naturopathic physicians treat the whole person taking all of these factors into account.

## **Prevention**

Naturopathic medical colleges emphasize the study of health as well as disease. The prevention of

## **What is Naturopathic Medicine?**

disease and the attainment of optimal health in patients are primary objectives of naturopathic medicine. In practice, these objectives are accomplished through education and the promotion of healthy ways of living. Naturopathic physicians assess risk factors, heredity and susceptibility to disease, and make appropriate interventions in partnership with their patients to prevent illness. Naturopathic medicine asserts that one cannot be healthy in an unhealthy environment and is committed to the creation of a world in which humanity may thrive.

### **Naturopathic Treatment**

Unlike drugs, naturopathic agents are not directed against the disease. Instead they support the bodies ability to mount a defense against the disease. As such, naturopathic treatment strengthen the bodies own abilites to regain and maintain health. Naturopathic medicine treats the person, not the disease. Yet it is the removal of the disease that is the main goal of naturopathic treatment.

### **Licensed Naturopathic Physicians**

A LICENSED naturopathic physician (N.D.) attends a four-year graduate level naturopathic medical school and is educated in all of the same basic sciences as an M.D. but also studies holistic and non-toxic approaches to therapy with a strong emphasis on disease prevention and optimizing wellness. In addition to a standard medical curriculum, the naturopathic physician is required to complete four years of training in clinical nutrition, acupuncture, homeopathic medicine, botanical medicine, psychology, and counseling (to encourage people to make lifestyle changes in support of their personal health). A naturopathic physician takes rigorous professional board exams so that he or she may be licensed by a state or jurisdiction as a primary care general practice physician.

### **All ND's are not the same**

There are currently only a few of accredited naturopathic medical schools in the United States and Canada. These include Southwest College of Naturopathic Medicine in Arizona, Bastyr College in Oregon, and National College of Naturopathic Medicine in Washington. In states without a law defining naturopathic licensing requirements, many people have naturopathic degrees obtained through mail order schools.

## **Specialty Lab Tests**

## **Digestive Function Tests**

### **Comprehensive Digestive Stool Analysis (CDSA)**

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA is used in the evaluation of various gastrointestinal symptoms or systemic illnesses that may have started in the intestine. It is recommended for patients with irritable bowel syndrome, indigestion, malabsorption, and other GI-related problems. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

### **Digestive Function Analysis**

The Digestive Function Analysis analyzes stool for digestive ability, absorption pH, and bacterial metabolism, as reflected by short chain fatty acids.

### **Comprehensive Parasitology Profile**

The Comprehensive Parasitology Profile evaluates stool for presence of parasites and levels of beneficial flora, and imbalances in flora, pathogenic bacteria, and yeast. It is recommended for patients with abdominal pain, chronic diarrhea, and other GI-related symptoms.

### **Bacterial Overgrowth of the Small Intestine Breath Test**

The Bacterial Overgrowth of the Small Intestine Breath Test is a simple, non-invasive test detects bacterial overgrowth in the small intestine, a common condition that often underlies chronic symptoms of maldigestion and malabsorption, including bloating, gas, diarrhea, irregularity, and abdominal pain.

### **Bacteriology Culture & Sensitivities**

Bacteriology Culture & Sensitivities evaluates and quantitates bacteria in fecal specimen.

### **Anti-Gliadin Antibody Assay**

Anti-Gliadin Antibody Assay assays a single saliva specimen for immune reaction to gluten.

### **E. coli Serotyping & Campylobacter Culture**

E. coli Serotyping & Campylobacter Culture evaluates stool for the presence of Campylobacter and enterohemorrhagic E. coli as an adjunct to CDSA, Parasitology, and other gastrointestinal assessments. Enterohemorrhagic E. coli culture is indicated for patients with acute diarrhea.

### **Gut Mucosal Assessment**

Gut Mucosal Assessment assays IgG and IgM antibodies to five normal gut flora as an indirect measurement of intestinal permeability.

### **Helicobacter pylori Antibody Assay**

The Helicobacter pylori Antibody Assay identifies H. pylori IgG antibodies in serum sample. H. pylori is the leading cause of peptic ulcers, chronic gastritis, and increased risk of gastric cancer.

### **Intestinal Permeability Assessment**

The Intestinal Permeability Assessment analyzes urinary clearance of two non-metabolized sugars. It is used to identify “leaky gut syndrome” and malabsorption.

## **Digestive Function Tests**

### **Lactose Intolerance Breath Test**

The Lactose Intolerance Breath Test is a simple, non-invasive test that detects lactose intolerance, a condition affecting more than 50 million Americans. Proper detection enables effective treatment of lactose maldigestion and malabsorption, to help alleviate chronic symptoms of bloating, gas, diarrhea, and abdominal pain.

### **Macroscopic Exam for Worms**

Macroscopic Exam for Worms examines stool specimen for adult cestodes, nematodes, and trematodes or pieces of worms that may be shed in stool.

### **MIC Sensitivities, Yeast or Bacteria**

MIC Sensitivities, Yeast or Bacteria identifies yeast and bacterial sensitivities to antimicrobial agents, and can help physicians select the most effective probiotics and antimicrobials for the specific pathogen(s) identified in the individual patient. For yeast, the MICs specify effective antifungals and botanicals.

### **Microbiology Analysis**

Microbiology Analysis evaluates stool for levels of beneficial flora, and imbalances in flora, pathogenic bacteria, and yeast.

### **Parasitology**

The Parasitology evaluates stool for presence of parasites using microscopic examination. It is indicated for patients with sudden changes in bowel pattern, especially those who have been abroad or camping.

### **Yeast Culture & Sensitivity**

Yeast Culture & Sensitivity evaluates and quantitates presence of yeast and may include a sensitivity panel of drugs and botanicals on all pathogens.

### **Candida Antibody**

Candida Antibody assays blood for IgG levels to *Candida albicans*.

### **Anti-Candida Antibody**

Anti-Candida Antibody assays blood sample for IgG, IgM & IgA antibodies against *Candida albicans*.

### **Candida Intensive Culture**

Candida Intensive Culture assays blood and stool for immune reactivity to *Candida albicans* infection using the Yeast Culture & Sensitivity and Candida Antibody to create a comprehensive profile. Useful for a wide array of symptoms, including irritable bowel syndrome, low energy, mood swings and “foggy brain.”

## **Food Allergy (Antibody) Tests**

### **Comprehensive Allergy (Antibody) Profile**

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

### **Food Allergy (Antibody) Profile**

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods.

### **24 Spice Profile**

The 24 Spice Profile evaluates IgE and IgG antibodies for 24 frequently used culinary herbs and spices.

### **Food Antibody, Vegetarian Add-On**

Vegetarian food categories include dairy, eggs, fruits, nuts and grains, and vegetables.

### **Inhalants Profile**

The Inhalants Profile is an ELISA test of IgE antibodies to 36 region-specific pollens and environmental inhalants.

## **Hormone Assessments**

### **Female Hormone Profile**

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

### **Comprehensive Female Hormone Profile**

In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

### **Menopause Profile**

The Menopause Profile examines four salivary samples over a 2-week period to determine levels of  $\beta$ -estradiol, progesterone, and testosterone for women who are peri- or post-menopausal.

### **Comprehensive Menopause Profile**

In addition to the analysis of hormones included in the Menopause Profile, the Comprehensive Menopause Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are affected by the influences of cortisol, DHEA, and melatonin.

### **Women's Hormonal Health Assessment**

The Women's Hormonal Health Assessment provides an in-depth understanding of sex steroid metabolism. Measurements are made of progesterone, sex-hormone-binding globulin (SHBG), DHEA-S, testosterone, estrone (E1), estradiol (E2), estriol (E3), 2-hydroxyestrone, and 16-alpha-hydroxyestrone.

### **Estrogen Metabolism Assessment**

The Estrogen Metabolism Assessment reveals important clinical information about estrogen metabolism in premenopausal and postmenopausal women, focusing on the critical balance between the body's two primary hydroxyestrogens (active and inactive). Hormonal imbalances that may affect the risk and prognosis of estrogen-dependent health conditions, such as breast cancer, lupus, osteoporosis, and heart disease. Analytes: 2-OHE1, 16a-OHE1, 2-OHE1/16a-OHE1 ratio, Estrogen Metabolism Index, creatinine (urine). Specimen Requirements: Serum-6ml serum in SST Urine-10ml first morning urine sample

### **Male Hormone Profile**

The Male Hormone Profile analyzes 4 saliva samples over a 24-hour period for levels of testosterone. Elevated levels suggest androgen resistance, while decreased levels can result from such causes as hypogonadism, hepatic cirrhosis, lipid abnormalities and aging.

### **Comprehensive Male Hormone Profile**

In addition to analysis of testosterone (in the Male Hormone Profile) the Comprehensive Male Hormone Profile profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how testosterone is influenced by cortisol, DHEA, and melatonin.



## **Endocrine Assessments**

### **Adrenocortex Stress Profile**

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period. It's also a crucial tool for monitoring DHEA and/or cortisone therapy.

### **Comprehensive Thyroid Assessment**

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

### **Glucose/Insulin Tolerance Test**

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

### **Metabolic Dysglycemia Profile**

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

### **Comprehensive Melatonin Profile**

The Comprehensive Melatonin Profile analyzes 3 saliva samples for the secretion pattern of melatonin. Melatonin imbalance has been associated with Seasonal Affective Disorder, infertility, sleep disorders, and compromised immune function.

### **DHEA**

DHEA (Salivary or Serum) measures levels of DHEA. Low levels of DHEA are associated with various degenerative conditions.

### **DHEA-S**

DHEA-S (Salivary or Serum) measures levels of DHEA Sulfate. Low levels of DHEA are associated with various degenerative conditions.

## **Nutritional Assessments**

### **Vitamin Profile**

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.

### **Essential and Metabolic Fatty Acids Analysis**

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

### **Amino Acids Analysis**

The Amino Acids Analysis examines fasting blood or 24-hour urine samples for 40+ amino acids and provides information on a wide spectrum of metabolic and nutritional disorders, including: protein inadequacy, gastrointestinal insufficiencies, inflammatory responses, vitamin and mineral dysfunctions, detoxification impairments, cardiovascular disease, ammonia toxicity, food and chemical sensitivities, depression, neurological dysfunction, and inborn errors of metabolism. Results can provide valuable biochemical information about many disorders, including chronic fatigue, learning disabilities, depression and immune problems.

## **Detoxification Function Tests**

### **Detoxification Profile**

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

### **Comprehensive Detoxification Profile**

In the Comprehensive Detoxification Profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

### **Anti-Chemical Antibodies Profile**

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

### **Oxidative Stress Analysis**

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. This test is offered by itself or included in the Comprehensive Detoxification Profile. It is especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

## **Toxic Element Lab Tests**

### **Toxic Element Exposure Profile**

The Toxic Element Exposure Profile assesses levels of 20 potentially damaging elements using a hair sample.

Although everyone is potentially exposed to toxic elements, this comprehensive profile is particularly relevant for individuals employed in high risk occupations, including welding, metal working, mining, battery production, aerospace work, optical fiber and lighting manufacturing, and various other high technology and metal manufacturing industries. Because of their unique physiologies, children and other adults (especially post-menopausal women) are also much more vulnerable to the negative health effects of toxic element exposure.

Elements assessed include: Aluminum, Antimony, Arsenic, Barium, Bismuth, Cadmium, Copper, Gallium, Germanium, Lead, Mercury, Nickel, Palladium, Platinum, Tellurium, Thallium, Thorium, Tin, Tungsten, and Uranium.

### **Toxic Element Clearance Profile**

The Toxic Element Clearance Profile (24 hr and Random/Timed) measures urinary excretion of 20 toxic metals. This test should be implemented when only a focused evaluation of exposure to toxic metals is desired.

In addition to measuring classic elemental toxics, both profiles assess elements used in the medical, aerospace, nuclear, and high-tech electronic industries. Use of these potential toxins is increasing because of their growing commercial, industrial, and medical applications.

Toxic elements assessed include: Aluminum, Antimony, Arsenic, Barium, Bismuth, Cadmium, Cesium, Gadolinium, Gallium, Lead, Mercury, Nickel, Niobium, Platinum, Rubidium, Thallium, Thorium, Tin, Tungsten, and Uranium.

### **Total Elemental Clearance Profile**

The Total Element Clearance Profile (24 hr and Random/Timed) measures urinary excretion of 9 nutrient elements and 20 toxic metals, including "classic" toxics such as lead, mercury, and arsenic, as well as newer technology toxics such as niobium and gadolinium. This is an ideal test for patients suspected of toxic metal exposure as well as potential nutrient mineral wasting.

### **Hair Elemental Analysis**

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

### **Elemental Analysis of Packed Erythrocytes**

The Elemental Analysis of Packed Erythrocytes measures red blood cell intracellular concentrations of 7 toxic and 8 nutrient elements.

### **Elemental Analysis, Provocative Challenge**

The Elemental Analysis, Provocative Challenge evaluates urine before and after administration of chelating agents. It measures levels of 10 toxic and 8 nutrient minerals. This test is used to evaluate mineral levels and to monitor the effectiveness of chelation therapy.

## **Toxic Element Lab Tests**

### **Elemental Analysis of Toxic Elements, Urine**

The Elemental Analysis of Toxic Elements, Urine evaluates (random or 24-hour) for levels of 10 toxic elements - Aluminum, Cadmium, Heavy Metals (Antimony, Arsenic, Mercury), Lead, Nickel, Tin and Uranium.

### **Urine Elemental Analysis**

The Urine Elemental Analysis evaluates urine for 10 toxic and 8 nutrient elements excreted. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

### **Creatinine Clearance Profile**

The Creatinine Clearance Profile allows health care providers to assess their patient's kidney function before they attempt to remove toxins via urine. The Creatinine Clearance Profile reports a urine and serum creatinine value, as well as a creatinine clearance value, using a timed urine (2-24 hour collection) and a non-fasting serum collection. Patient height and weight are also required to perform this test.

## Miscellaneous Assessments

### **Bone Resorption Assessment**

The Bone Resorption Assessment is a simple, direct urinary assay of pyridinium and deoxypyridinium crosslinks, useful in identifying current bone loss, lytic bone disease, and efficacy of bone support therapies.

### **IGF-1**

IGF-1 (Insulin-like Growth Factor-1 or Somatomedin C) (serum) mediates many of the in vivo cell division and metabolic effects of growth hormone. IGF-1 is a valuable diagnostic tool for the evaluation of suspected growth hormone disorders.

### **Cellular Energy Profile**

The Cellular Energy Profile evaluates organic acids that play a pivotal role in the generation of cell energy. The test can reveal metabolic distress associated generalized pain and fatigue, which may arise in response to toxic exposure, nutrient imbalances, digestive dysfunction and other causes. Plants synthesize and store energy from sunlight and nutrients. How efficiently the human body recovers this energy from plants or animals that eat plants can have a profound effect on physiological function.

### **Metabolic Analysis Profile**

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes include: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites.

### **Comprehensive Cardiovascular Assessment**

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

### **Metabolic Lipid Profile**

The Metabolic Lipid Profile evaluates blood for levels of triglycerides, total cholesterol, LDL, HDL and uric acid.

### **Cotinine Assay**

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

## **Eyes**

Cataracts  
Glaucoma  
Macular Degeneration

# Cataracts

## Description

A cataract is any opacity of the lens, either localized or generalized. Cataracts are the single largest cause of blindness in the world, blinding an estimated 17 million people. Treatment of cataracts is usually by surgical removal.

Types include: Age-related or "senile" cataracts (over 90%); Congenital (1 in 250 newborns, 10-38% of childhood blindness); Toxic or nutritional; Systemic disease associated (myotonic dystrophy, atopic dermatitis); Metabolic: diabetes (accelerated sorbitol pathway), hypocalcemia, Wilson's disease; "Complicated" - secondary to associated eye disease, such as uveitis (juvenile rheumatoid arthritis, sarcoid, etc.). Also secondary to occult tumor (melanoma, retinoblastoma); Trauma from heat (infrared), electrical shock, radiation, concussion, perforating eye injuries, or intraocular foreign body.

Age-related cataracts are caused by the continual addition of layers of lens fibers throughout life which creates a hard, dehydrated lens nucleus which impairs vision (nuclear cataract). Aging alters biochemical and osmotic balance required for lens clarity, and the outer lens layers hydrate and become opaque, affecting vision.

## Causes

The cause of congenital cataracts is usually obscure and includes: Drugs (corticosteroids in first trimester, sulfonamides, etc.); Metabolic - diabetes in mother, galactosemia in fetus; Intrauterine infections during the first trimester of pregnancy (rubella, herpes, mumps); and Maternal malnutrition. Other cataract types have in common that a biochemical/osmotic imbalance disrupts lens clarity. Local changes in lens protein distribution lead to light scattering manifest as lens opacity.

## Conventional Lab Tests

No lab tests are necessary for diagnosis.

## Specialty Lab Tests

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Oxidative Stress Analysis (Blood & Urine) identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. Offered by itself or included in the Comprehensive Detoxification Profile. Especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.



# **Glaucoma**

## **Definition**

Glaucoma is characterized by increased intraocular pressure that may cause impaired vision, ranging from slight loss to absolute blindness. Adequate lowering of intraocular pressure almost always stops optic nerve damage.

In chronic open-angle glaucoma, aqueous secretion by the ciliary body is normal, and its flow between the lens and the iris through the pupil into the anterior chamber is normal; however, the trabecular meshwork does not permit adequately rapid egress of aqueous with a resultant pressure elevation.

## **Causes**

The most common cause of glaucoma is impaired outflow through the trabecular meshwork. It can also be caused by obstruction to the outflow from Schlemm's canal and the aqueous veins created by elevated orbital venous pressure (as in AV malformations, orbital congestion due to thyroid disease, etc.). Excessive aqueous secretion is an extremely rare cause.

Secondary glaucoma is caused by any interference with the flow of aqueous humor from the posterior chamber through the pupil into the anterior chamber to the canal of Schlemm. Inflammatory disease of the anterior segment (uveitis) may prevent aqueous escape by causing complete posterior synechia and iris bombé and may plug the drainage channel with exudates. Other common causes are intraocular tumors, enlarged intumescent cataracts, central retinal vein occlusion, trauma to the eye, operative procedures, and intraocular hemorrhage.

Prolonged corticosteroid therapy, especially with topical ophthalmic preparations, can produce an increased pressure, particularly in patients with a predisposition, so-called steroid responders.

Risk factors for glaucoma include: Positive family history, Diabetes mellitus, and African-American ancestry.

## **Conventional Lab Tests**

Glaucoma is diagnosed with an ophthalmoscopic, which shows optic nerve head damage.

## **Specialty Lab Tests**

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period.

# Macular Degeneration

## Description

One definition of Age-Related Macular Degeneration (ARMD) is pigmentary changes in the macula or typical drusen (small bright structures seen in the retina and in the optic disc) associated with visual loss to the 20/30 level or worse, not caused by cataract or other eye disease in individuals over 50 years of age. Other definitions do not include age or visual acuity criteria. ARMD is the leading cause of irreversible severe visual loss in persons over 65 years of age.

There are two stages of macular degeneration. Atrophic/nonexudative has drusen and/or pigmentary changes in the macula. Neovascular/exudative has growth of blood vessels underneath the retina.

Prevalence increases with age. Over 75 years; one quarter of men and one third of women will have evidence of ARMD. The prevalence of severe visual loss from ARMD increases with age. 2.2% of patients over 65 years of age are blind in one or both eyes from ARMD. The atrophic/nonexudative stage accounts for 20% of cases of severe visual loss. The neovascular/exudative stage accounts for 80% of cases of severe visual loss.

## Causes

The cause of macular degeneration is considered to be visible light which can result in the formation and accumulation of metabolic byproducts in the RPE which normally helps remove metabolic byproducts from the retina. The excess accumulation of these metabolic byproducts interferes with the normal metabolic activity of the RPE and can lead to the formation of drusen.

Risk factors include: excess sunlight exposure; blue or light iris color; hyperopia; history of cardiovascular disease (hypertension, circulatory problems); short height; history of lung infection; and cigarette smoking.

## Conventional Lab Tests

No lab tests are necessary.

## Specialty Lab Tests

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

## **Ears**

Otitis Media  
Tinnitus

# Otitis Media

## Description

Otitis media is defined as inflammation of the middle ear. Acute otitis media is usually a bacterial infection accompanied by viral upper respiratory infection. Recurrent acute otitis media is diagnosed when there are 3 or more acute episodes in 6 months, or 4 or more in 1 year. Otitis media with effusion occurs when persistent inflammation manifests as asymptomatic middle ear fluid that follows acute otitis media or arises without prior otitis media.

By age 7 years, 93% of children have 1 or more episodes of acute otitis media; 39% have 6 or more episodes. Otitis media most commonly occurs between the ages of 6-12 months; and declines after age 7 years. It is rare in adults.

## Causes

Acute otitis media is considered to be caused by infection. A preceding viral upper respiratory infection produces eustachian tube dysfunction that is thought to promote bacterial infection via eustachian tube. Infectious agents include *Haemophilus influenzae* (20-25%); *Moraxella* (*Branhamella*) *catarrhalis* (10-15%); Group A streptococci (1-2%); *Staphylococcus aureus* (1-2%); and Sterile/non-pathogens (25-30%). Of particular interest is that acute otitis media is the last entry: the most common cause is not an infection!

Otitis media with effusion is considered to be caused by a silent bacterial infection in 20-40% of cases. Eustachian tube dysfunction thought important. Allergic causes rarely substantiated.

Risk factors include: day care; formula feeding; smoking in household; male gender; and a family history of middle ear disease. Acute otitis media in the first year of life is a risk factor for recurrent episodes.

## Conventional Lab Tests

No lab tests are necessary.

## Specialty Lab Tests

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

# Tinnitus

## Description

Tinnitus is defined as the perception of sound in the absence of an acoustic stimulus. Tinnitus, a subjective experience of the patient, is distinguished from bruit, noise that may be heard by the examiner and often by the patient as well.

Tinnitus may be of a buzzing, ringing, roaring, whistling, or hissing quality or may involve more complex sounds that vary over time. It may be intermittent, continuous, or pulsatile (synchronous with the heartbeat). An associated hearing loss is usually present.

## Causes

The mechanism involved in tinnitus remains obscure. Tinnitus may occur as a symptom of nearly all ear disorders, including obstruction of the external auditory canal as a result of cerumen or foreign bodies, infectious processes (external otitis, myringitis, otitis media, labyrinthitis, petrositis, syphilis, meningitis), eustachian tube obstruction, otosclerosis, middle ear neoplasms such as the glomus tympanicum and glomus jugulare tumors, Meniere's disease, arachnoiditis, cerebellopontine angle tumors, ototoxicity (due to salicylates, quinine and its synthetic analogs, aminoglycoside antibiotics, certain diuretics, carbon monoxide, heavy metals, alcohol, etc.), cardiovascular diseases (hypertension, arteriosclerosis, aneurysms, etc.), anemia, hypothyroidism, hereditary sensorineural or noise-induced hearing loss, acoustic trauma (blast injury), and head trauma.

## Conventional Lab Tests

Evaluation of the patient with tinnitus begins with a comprehensive audiologic assessment as well as CT of the temporal bone and MRI of the head. Pulsatile tinnitus requires investigation of the vascular system with carotid and vertebral arteriograms to exclude arterial obstruction, aneurysms, and vascular neoplasms.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

## **Throat**

Bruxism

# Bruxism

## Definition

Bruxism is the grinding and clenching of teeth usually during sleep. It is common in persons of all ages and affects about 15% of children and as many as 96% of adults. Clinically, bruxism commonly accompanies the stress of marital strife, school examinations or work difficulties. It may resolve when these stresses lessen.

## Causes

The specific cause of bruxism is unknown. Bruxism has been associated with stress, occlusal disorders, allergies and sleep position. Alcohol often aggravates bruxism. Some studies indicate that bruxism may be associated with magnesium deficiency.

Acrodynia (pain in peripheral or acral parts of the body) is a syndrome caused almost exclusively by mercury poisoning. In children it is characterized by erythema of the extremities, chest, and nose, polyneuritis, and gastrointestinal symptoms. In adults it is characterized by anorexia, photophobia, sweating, and tachycardia.

Recent research has indicated an association between neurotransmitters and bruxism, particularly epinephrine and dopamine. The use of serotonin re-uptake inhibitors (SSRI's, antidepressants) and ecstasy are associated with bruxism.

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites. Specimen Requirements: First morning urine collection; 2 tubes (samples frozen).

# Respiratory



# Asthma

## Description

Asthma is a disorder of the tracheobronchial tree characterized by mild to severe obstruction to airflow. Symptoms vary from coughing to dyspnea, and are generally episodic or paroxysmal, but may be persistent. The clinical hallmark is wheezing, but cough may be the predominant symptom. Commonly misdiagnosed as "recurrent pneumonia" or "chronic bronchitis." Acute symptoms are characterized by narrowing of large and small airways due to spasm of bronchial smooth muscle, edema and inflammation of the bronchial mucosa, and production of mucus

## Causes

Asthma can be caused by: allergic factors (airborne pollens, molds, house dust - mites, animal dander, or feather pillows), Smoke and other pollutants, Infections (especially viral), Aspirin, tartrates, Exercise, Sinusitis, Gastroesophageal reflux, or Sleep (peak expiratory flow rate is lowest at 4 am). Current research focuses on the inflammatory response (including abnormal release of chemical mediators, eosinophil chemotactic factor, neutrophil chemotactic factor, and others).

Risk factors for asthma include: a positive family history, and viral lower respiratory infection during infancy.

## Conventional Lab Tests

Standard labs include CBC (which is usually normal), Nasal eosinophils, Immunoglobulins, and a screen for immunodeficiency. IgE is elevated in allergic bronchopulmonary aspergillosis (ABPA). A sweat test may be ordered in chronic childhood asthmatics. Arterial blood gases are ordered in status asthmaticus. Additional tests include: Pulmonary function tests, Allergy testing, PPD yearly, and Exercise tolerance testing. A Chest x-ray is usually ordered once.

## Specialty Lab Tests

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Inhalants Profile is an ELISA test of IgE antibodies to 36 region-specific pollens and environmental inhalants.

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

# Bronchitis

## Description

Bronchitis is an inflammation of the trachea, bronchi and bronchioles resulting from a respiratory tract infection. It is generally self-limited with complete healing and full return of function.

## Causes

Risk factors include: Chronic bronchopulmonary diseases; Chronic sinusitis; Bronchopulmonary allergy; Hypertrophied tonsils and adenoids in children; Immunosuppression; Air pollutants; Elderly; Infants; Smoking; Second-hand smoke; Alcoholism; Reflux esophagitis; Tracheostomy; IgA deficiency; and Environmental changes.

## Conventional Lab Tests

Lab tests include a sputum culture an gram stain, viral and mycoplasm titers, and a CBC (for leukocytosis). Pulmonary function tests are recommended for chronic cases. A chest Xray can help rule out other diseases.

## Specialty Lab Tests

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Inhalants Profile is an ELISA test of IgE antibodies to 36 region-specific pollens and environmental inhalants.

The Cotinine Assay examines urine to determine the presence of this nicotine metabolite, an indicator of exposure to second-hand smoke. Useful in cases of recurrent infections or allergy in children of smokers.

## **Cardiology**

# Angina

## Definition

Angina is a symptom complex resulting from mismatch of myocardial oxygen demand and supply. Classic angina is a sense of pressure or heaviness deep to the precordium, usually brought on by exertion or anxiety and relieved by rest. Anginal equivalent is characterized by exertional dyspnea or exertional fatigue which results from myocardial ischemia and is relieved by rest or nitroglycerin. Variant angina, also referred to as Prinzmetal's angina, describes angina occurring at rest of in typical patterns such as after exercise or nocturnally. Prinzmetal's angina is caused by coronary artery spasm and is associated with ECG changes (usually ST elevation) during symptoms. Unstable angina is characterized by pain which is new or which is changed in character to become more frequent, more severe or both. Unstable angina portends myocardial infarction in a certain percentage of patients.

## Causes

Causes of angina include: atherosclerosis of the coronary arteries; Coronary artery spasm; Thrombosis; Aortic stenosis; Hypertrophic cardiomyopathy; Primary pulmonary hypertension; Severe hypertension; and Aortic insufficiency

Risk factors include: Family history of premature coronary artery disease (CAD); Hypercholesterolemia; Hypertension; Tobacco abuse; Diabetes mellitus; Male gender; and Advanced age.

## Conventional Lab Tests

Standard cardiovascular lab tests include Total cholesterol, and HDL and LDL cholesterol. An ECG may show evidence of prior myocardial infarction. Additional tests include Exercise stress testing; Radionuclide scintigraphy; Stress echocardiography; and Coronary angiography.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Atherosclerosis

## Description

Atherosclerosis is the common form of arteriosclerosis in which deposits of yellowish plaques (atheromas) containing cholesterol, lipid material, and lipophages are formed within the intima and inner media of large and medium sized arteries. Complications of atherosclerosis account for 1/2 of all deaths, and 1/3 of deaths in persons between ages 35-65.

## Causes

The cause of atherosclerosis is biochemical, physiologic, and environmental factors that lead to thickening and occlusion of the lumen of arteries. Atherosclerosis is considered to be a disease of aging since some degree of atherosclerosis is universal.

Risk factors include: Hypertension; Tobacco smoking; Diabetes mellitus; Obesity; Male gender; Physical inactivity; Increasing age; Family history of premature atherosclerosis; Decreased high-density lipoprotein (HDL) cholesterol; and Increased low-density lipoprotein (LDL) cholesterol.

Three mechanisms have been identified as the most probable causative factors in the development of atherosclerosis: Oxidation of LDL cholesterol; Homocysteine overload; and Abnormal platelet aggregation (clotting inside an artery).

Linus Pauling proposed that atherosclerosis was due to sub-clinical scurvy (vitamin C deficiency). Vitamin C is needed to make collagen that forms (and repairs) blood vessels. Pauling also proposed that a deficiency of lysine allowed lipoprotein (A) to attach to the blood vessel walls and form plaques.

## Conventional Lab Tests

Atherosclerosis is associated with elevated serum cholesterol, high HDL, and low LDL.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

# Atrial Fibrillation

## Description

Atrial fibrillation (AF) is a chronic or paroxysmal arrhythmia characterized by chaotic electrical activity. The electrophysiologic mechanism is most likely multiple reentrant wavelets within the atria. Because the AV node is bombarded with nearly continuous atrial electrical impulses, the ventricular response is irregular and usually rapid (up to or exceeding 180 beats per minute). Symptoms vary from none to mild (palpitations, lightheadedness, fatigue, poor exercise capacity) to severe (angina, dyspnea, syncope), and are frequently more serious in patients with significant structural heart disease. In some patients with Wolff- Parkinson-White syndrome, AF may be extremely rapid and degenerate into ventricular fibrillation.

## Causes

Causes of AF include: Hypertensive heart disease; Valvular or rheumatic heart disease; Coronary artery disease; Acute myocardial infarction; Pulmonary embolus; Cardiomyopathy; Congestive heart failure; Infiltrative heart disease; Pericarditis; Intoxication/ingestion (e.g., ethanol in "Holiday Heart"); Hyperthyroidism; Postoperative state (especially cardiothoracic surgery); Sick sinus syndrome (tachycardia-bradycardia syndrome); and Idiopathic (including "lone" atrial fibrillation).

Risk factors include: Hypertension; Diabetes mellitus; Left ventricular hypertrophy; Coronary artery disease; Congestive heart failure; and Rheumatic heart disease.

## Conventional Lab Tests

An ECG is diagnostic. A Holter monitor and event monitor may be helpful in diagnosing paroxysmal atrial fibrillation (PAF). An echocardiogram is used to assess for structural heart disease. Thyroid function tests are usually ordered.

## Specialty Lab Tests

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

# Cholesterol

## Description

Hypercholesterolemia is serum cholesterol > 200 mg/dL, with high risk at 240 mg/dL or more. The high density lipoprotein fraction of cholesterol (HDL) is protective, whereas the low density lipoprotein (LDL) is atherogenic.

## Causes

The primary causes of high cholesterol are: Diet; Heredity; Obesity; Sedentary life-style; and Stress. Secondary causes include: Hypothyroidism; Diabetes mellitus; Nephrotic syndrome; Obstructive liver disease; Progestins; Anabolic steroids; Diuretics except indapamide (Lozol); Beta blockers except those with intrinsic sympathomimetic activity (ISA); and Some immunosuppressant drugs.

## Naturopathic Approach

The naturopathic approach to hypercholesterolemia focuses on supplements that have been shown to lower cholesterol in scientific studies, including Red yeast rice, Policosanol, vitamin B3, and Guggul. In addition, the detoxification system should be assessed as the P450 enzyme system clears both cholesterol and toxins.

## Conventional Lab Tests

Standard lipid panels include serum cholesterol, and lipoproteins HDL, LDL, and VLDL.

## Specialty Labs

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage.

# Congestive Heart Failure

## Description

Congestive heart failure (CHF) is the principal complication of heart disease. It is a pathophysiologic state produced by an abnormality in cardiac pump function (either transient or prolonged). The heart is unable to transport blood in a sufficient flow to meet the metabolic needs of the peripheral tissues. This produces a wide variety of clinical circumstances ranging from acute left ventricular dysfunction (due to tachyarrhythmia, bradyarrhythmia, and acute myocardial infarction) to chronic left ventricular dysfunction (due to chronic volume/pressure overload as seen in valvular heart disease)

Two physiologic components explain most of the clinical findings of CHF: an inotropic abnormality which results in diminished systolic emptying (systolic failure); a compliance abnormality in which the ability of the ventricles to accept blood is impaired (diastolic failure). Most cases of heart failure have findings consistent with both mechanisms.

## Causes

Causes of congestive heart failure include: Myocardial infarction; High output states; Rheumatic heart disease (mitral and aortic valvular disease); Cardiomyopathy - alcohol and non-alcohol related; Hypertensive heart disease; Aortic stenosis or regurgitation; Volume overload; Beta-blockers or other cardiac depressants

Risk factors for congestive heart failure include: Iatrogenic inappropriate reduction of intensity of therapy; Patient non-compliance; Intercurrent arrhythmia; Pulmonary embolism; Administration of cardiac agent with negative inotropic effect; Inappropriate physical, emotional, or environmental stress; Thyrotoxicosis, pregnancy, or any condition associated with increased peripheral metabolic demand.

## Conventional Lab Tests

Conventional lab tests include arterial blood gases (for respiratory alkalosis), BUN (for azotemia), erythrocyte sedimentation rate (ESR), Urinalysis protein (for proteinuria), creatinine, bilirubin, and urine sodium (for dilutional hyponatremia)

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.



# Hypertension - High Blood Pressure

## Description

Hypertension is defined as a sustained elevated blood pressure (systolic blood pressure of 140 mm Hg or greater and/or diastolic blood pressure of 90 mm Hg or greater). Hypertension is a strong risk factor for cardiovascular disease. Men tend to run higher pressures than females but more importantly have a significantly higher risk of cardiovascular disease at any given blood pressure.

## Causes

Over 90% of hypertension has no identified cause. These can be labeled essential or primary hypertension.; Secondary causes of hypertension include four areas: Renal parenchymal (Glomerulonephritis; Pyelonephritis; Polycystic kidneys); Endocrine (Primary hyperaldosteronism; Pheochromocytoma; Hyperthyroidism; Cushing's syndrome); Vascular (Coarctation; Renal artery stenosis); and Chemical (Oral contraceptives; NSAID's; Decongestants; Antidepressants; Sympathomimetics; Many industrial chemicals; Corticosteroids; Ergotamine alkaloids; Lithium; Cyclosporine).

Risk factors include: Family history; Obesity; Alcohol; Excess dietary sodium; Stress; and Physical inactivity.

## Conventional Lab Tests

Standard lab tests include hemoglobin and hematocrit or CBC, Complete urinalysis (sometimes reveals proteinuria), Potassium, calcium and creatinine, Cholesterol and lipoproteins (HDL, LDL, VLDL), Fasting blood glucose, and Uric acid.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. It's also a crucial tool for monitoring DHEA and/or cortisone therapy.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

# Hypertriglyceridemia

## Description

The hypertriglyceridemias are a heterogeneous family of disorders due to disturbances in synthesis and/or degradation of triglycerides rich plasma lipoprotein. Triglycerides (TG) are fatty molecules of long-chain fatty acids and glycerol. Normal triglycerides is less than 100 mg/dL (1.13 mmol/L) in children and less than 150 mg/dL (1.70 mmol/L) in adults.

## Causes

Primary hypertriglyceridemia can be sporadic or genetic. Secondary hypertriglyceridemia is associated with several other diseases: obesity, diabetes mellitus, pregnancy, uremia/dialysis, hypothyroidism, nephrotic syndrome, acromegaly, Cushing's syndrome, systemic lupus erythematosus, dysgammaglobulinemias, glycogen storage Type I, and lipodystrophy. Drugs associated with hypertriglyceridemia include: alcohol, estrogen, birth control pill, beta blockers, diuretics, glucocorticoid, and isotretinoin/retinoid. Bile acid binding resins cause a modest (<10%) elevation in some patients with Type II hyperlipidemia.

Risk factors for hypertriglyceridemia include: genetic susceptibility, obesity, diabetes, and alcoholism. Hypertriglyceridemia can be exacerbated by medical illness and/or drugs (see secondary causes).

## Conventional Lab Tests

Hypertriglyceridemia usually found on cardiovascular lab tests, and is considered a secondary disease. Lab tests would be ordered to find the primary disease, and would include: CBC, chemistry, fasting glucose, and thyroid function tests.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyronine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

# Syncope

## Definition

Syncope is a loss of consciousness and postural tone caused by diminished cerebral blood flow. By age 75 approximately 5-20% of adults will have one or more episodes of syncope. It accounts for about 1% of hospital admissions and about 3% of emergency room visits. Its annual incidence in the institutionalized elderly is about 6%.

## Causes

Syncope can be caused by an obstruction to cardiac outflow: Aortic stenosis, Hypertrophic cardiomyopathy, and Pulmonary embolus. Syncope can be associated with cardiac arrhythmias: Ventricular tachycardia, Sick sinus syndrome, 2nd and 3rd degree AV block.

Non-cardiac causes of syncope include: Vasovagal, situational (micturition, defecation, cough); Orthostatic hypotension; Drug induced (see below); Seizures; Transient ischemic attack; Carotid sinus; and Psychogenic.

Patients with heart disease are at higher risk for syncope. Patients taking following drugs: Antihypertensives, Vasodilators (including calcium channel blockers, ACE inhibitors, and nitrates), Phenothiazines, Antidepressants, Antiarrhythmics, and Diuretics.

## Conventional Lab Tests

Lab tests are rarely helpful. Less than 2% have hyponatremia, hypocalcemia, hypoglycemia or renal failure causing seizures.

An echocardiogram and cardiac catheterization may be ordered if the history and physical is suggestive of ischemic, valvular or congenital heart disease. If CNS disease suspected, an EEG, head CT, head MRI may be ordered.

## Specialty Lab Tests

The Comprehensive Cardiovascular Profile 2.0 incorporates the latest breakthroughs in cardiovascular disease research to provide advanced, early warning of CVD risk. This thorough evaluation features an advanced lipid profile with fractionation, independent risk markers (including homocysteine and hs-C-reactive protein), relative risk indices, and Metabolic Syndrome alerts. All of these advanced markers play a critical role in the biochemical environment underlying cardiovascular health. The insight they provide allows the clinician to accurately address abnormalities relating to heart and vascular diseases.

## **Vascular Diseases**

# Deep Vein Thrombosis, DVT

## Description

Deep vein thrombosis is the development of single or multiple blood clots within the deep veins of the extremities or pelvis, usually accompanied by inflammation of the vessel wall. The major clinical consequence is embolization, usually to the lung, that is frequently life-threatening.

## Causes

Causes of DVT include: venous stasis, injury to vessel wall, and abnormalities of coagulation.

Clinical risk factors include: Trauma, especially long bone fractures or crush injuries; Surgery, particularly hip surgery; Prolonged immobility (e.g. bed rest); Pregnancy, especially the puerperium; Indwelling central venous catheters; Oral contraceptive use (risk is confined to current usage and is proportional to estrogen content); and Extreme high altitude (> 14,000 feet)

Pathological risk factors include: Carcinoma; Deficiencies of endogenous anticoagulants (protein C, protein S, antithrombin III); Presence of anti-phospholipid antibodies (also known as lupus anticoagulant or anti-cardiolipin antibodies); Nephrotic syndrome; Polycythemia vera; Homocystinuria (rare); *Campylobacter jejuni* bacteremia (very rare); and Mutation on Factor V conferring resistance to activated protein C (most common risk factor for idiopathic DVT).

## Conventional Lab Tests

No specific laboratory test is available for DVT. Protein C, protein S, antithrombin III and anti-phospholipid antibodies can be measured in some laboratories. But as these are rare causes of DVT.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The Women's Hormonal Health Assessment provides an in-depth understanding of sex steroid metabolism. Measurements are made of progesterone, sex-hormone-binding globulin (SHBG), DHEA-S, testosterone, estrone (E1), estradiol (E2), estriol (E3), 2-hydroxyestrone, and 16-alpha-hydroxyestrone.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Hemorrhoids

## Description

Hemorrhoids are varicosities of the hemorrhoidal venous plexus caused by dilation of the veins. External hemorrhoids are located below the dentate line and are covered by squamous epithelium. Internal hemorrhoids are located above the dentate line and are not visible.

## Causes

Risk factors for hemorrhoids include: Pregnancy; Colon malignancy; Liver disease; Portal hypertension; Constipation; Occupations that require prolonged sitting; Loss of muscle tone in old age; Rectal surgery; Episiotomy; Anal intercourse; and Obesity.

## The Naturopathic Approach

A comprehensive approach to treating hemorrhoids would include both strengthening and repairing the veins, and clearing the liver of toxins (the hemorrhoidal venous plexus flows through the portal system into the liver).

## Conventional Lab Tests

No lab is specific.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA is used in the evaluation of various gastrointestinal symptoms or systemic illnesses that may have started in the intestine. It is recommended for patients with irritable bowel syndrome, indigestion, malabsorption, and other GI-related problems. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage. This test measures the clearance of challenge substances in two salivary specimens; the products of detoxifying reactions are also assessed in an overnight urine specimen. In the Comprehensive version of this profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

# Intermittent Claudication

## Description

The term claudication is derived from the Latin word claudicare, to limp. Claudication is the feeling of muscle fatigue after a period of minimal exercise of an extremity. The feeling may progress to a cramp-like pain, usually in the calf muscles. It is always relieved by resting the extremity. It can be reproduced by undergoing a similar exercise pattern. It may occur in the arms, but is more common in the legs, calf > thigh.

## Causes

Causes of claudication include: Lower extremity claudication - blockage of superficial femoral artery, secondary to arteriosclerosis in 95% of cases; Other causes of arterial blocks - embolus, popliteal entrapment, adventitious cystic disease of popliteal artery, thromboangiitis obliterans; Thigh and hip claudication - blockage of aortic and iliac vessels; Upper extremity claudication - similar blocks of subclavian, axillary, and brachial artery. Patients with lumbar canal stenosis often present with similar complaints. This is referred to as pseudoclaudication.

Risk factors for claudication include: Smoking; Diabetes; Hypertension; Hyperlipidemia; Obesity; and Preexisting heart disease.

## Conventional Lab Tests

Conventional lab tests would include those for Diabetes (fasting glucose); Hypertension and Hyperlipidemia (cholesterol and lipoproteins).

## Specialty Lab Tests

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Raynaud's Disease

## Description

Raynaud's disease is a bilateral vasospastic disorder manifested by intermittent attacks of extreme pallor, then cyanosis of the fingers (rarely, of the toes) brought on by cold exposure. It may accompany emotional upset. With warming, vasodilatation and intense redness develops, followed by swelling, throbbing, paresthesias. Raynaud's disease resolves with warming.

## Causes

Raynaud's phenomenon may be idiopathic (Raynaud's disease) or secondary to other conditions, including: connective tissue disorders (e.g., scleroderma, RA, SLE), obstructive arterial diseases (arteriosclerosis obliterans, thromboangiitis obliterans, thoracic outlet syndrome), neurogenic lesions, drug intoxications (ergot and methysergide), dysproteinemias, myxedema, primary pulmonary hypertension, and trauma. Idiopathic Raynaud's disease is most common in young women (60 to 90% of reported cases).

Raynaud's syndrome may involve increased sensitivity of alpha-2-adrenergic receptors in digital vessels in the primary type. Serotonin receptors (5-HT<sub>2</sub> type) may be involved in secondary Raynaud's. Platelet and blood viscosity abnormalities are also implicated.

Current research focuses on prostaglandin metabolism, microcirculation, and the role of the endothelial cells. The clinical association between Raynaud's phenomenon and migraine headaches, variant angina, and pulmonary hypertension suggests that there is a common mechanism for vasospasm. The threshold for the vasospastic response in Raynaud's disease is lowered by anything that activates sympathetic outflow or releases catecholamines (e.g., emotion) in addition to local cold.

Risk factors include smoking and an existing autoimmune or connective tissue disorder.

## Conventional Lab Tests

Lab tests are used to screen for underlying secondary causes (CBC, ESR, RA, ANA, immunoelectrophoresis, esophageal motility studies). A cold challenge test will elicit characteristic color changes in hands. Nailfold capillaroscopy is used to detect enlarged, irregular capillary loops of other connective tissue diseases (primary Raynaud's should show normal vasculature).

## Specialty Lab Tests

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites. Specimen Requirements: First morning urine collection; 2 tubes (samples frozen).

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.



# Varicose Veins

## Description

Varicose veins are elongated, dilated, tortuous superficial veins with congenitally absent valves, or valves that have become incompetent. Varicose veins affects legs where the blood flows upwards back into the heart. About 20% of adults have varicose veins. Women are predominantly affected.

## Causes

Varicose veins can be caused by faulty valves in one or more perforator veins in the lower leg causing secondary incompetence at the saphenofemoral junction. Increased venous pressure from any cause can cause varicosities. Deep thrombophlebitis (inflammation of the veins with thrombus formation) can cause varicose veins. In many individuals, no cause or precipitating factor found.

Risk factors include: pregnancy; and occupations requiring prolonged standing, restrictive clothing (e.g., very tight girdles).

## Conventional Lab Tests

None are considered helpful.

## Specialty Lab Tests

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

## **Gastrology**

# Candida

## Description

*Candida albicans* and related species is a fungus that causes a variety of infections. Mucous membrane infections include oral candidiasis (thrush), esophagitis, and vaginitis. Candidal paronychia begins around the nail as a painful red swelling that later develops pus. Subungual infections are characterized by distal separation of one or several fingernails (onycholysis) with white or yellow discoloration of the subungual area. *Candida* is a cause of gastritis and stomatitis, infectious arthritis, fungal pneumonia, endocarditis, pyelonephritis, and urethritis. *Candida* is a common cause of diaper rash.

## Causes

*Candida* is associated with broad-spectrum antibiotics (notably tetracycline), high salivary concentrations of glucose (as in diabetes mellitus), immunosuppression, neutropenia (low white blood cell count), AIDS and HIV, and Cushing's syndrome (excess cortisol). Genital candidiasis is associated with oral contraceptive use.

A cellular immunodeficiency characterized by persistent *Candida* infection of the mucous membranes, scalp, skin, and nails, is often associated with an endocrinopathy, particularly hypothyroidism. Associated findings in some cases include bronchiectasis, hepatitis, and biotin deficiency with carboxylase enzyme deficiency.

The most common signs of vitamin B2 deficiency are pallor and maceration of the mucosa in the angles of the mouth (angular stomatitis) and vermilion surfaces of the lips (cheilosis), followed by superficial linear fissures that may leave scars on healing. When these lesions are infected by *Candida albicans*, grayish white exuberant lesions, termed perlèche, result.

## Conventional Lab Tests

Diagnosis is based on blood cultures.

## Specialty Labs

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Anti-*Candida* Antibody assays blood sample for IgG, IgM & IgA antibodies against *Candida albicans*. The *Candida* Antibody assays blood for IgG levels to *Candida albicans*. The *Candida* Intensive Culture assays blood and stool for immune reactivity to *Candida albicans* infection using the Yeast Culture & Sensitivity and *Candida* Antibody to create a comprehensive profile.

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

# Constipation

## Description

Constipation is defined as a combination of changes in the frequency, size, consistency, and ease of stool passage, which leads to an overall decrease in volume of bowel movements.

## Causes

Constipation can be caused by: electrolyte imbalances (hypercalcemia, hypokalemia); hormonal abnormalities (Hypothyroidism, Diabetes); Congenital impediments (aganglionic megacolon - Hirschsprung's disease; or excessively elongate, edundant, capacious bowel - dolichocolon); Congenital or acquired neuromuscular bowel impairment ("pseudo-obstruction"); Concomitant illness, injury, or debility; Mechanical bowel impediment (obstruction or ileus, due to any cause); Inadequate fluid intake; Side-effect of drugs (e.g., anticholinergic agents, opiates); Chronic abuse of laxatives or cathartics; Psychiatric, cultural, emotional, environmental factors; and Painful fecal evacuation from anal disease (e.g., fissures).

Risk factors include: extremes of life (very young and very old); neurosis; polypharmacy; and aedentary life style or condition.

## Conventional Lab Tests

Conventional labs are only necessary when other disorders are being considered, and include a CBC (to detect anemia which may indicate colorectal neoplasm); Thyroid function studies; Electrolytes, glucose, and calcium.

A digital rectal exam can rule out a rectal mass, check for blood in the stool, and define stool consistency.

Imaging studies include a plain (KUB) film of the abdomen and a barium enema or barium swallow with small bowel follow through looking for anatomical defects (mass lesions, ileus). Cineradiography of passage of barium, instilled in, then expelled from the rectosigmoid segment ("defecography"), may help define evacuation disorders in selected cases. Sigmoidoscopy or colonoscopy is seldom required, unless needed to define an abnormality discovered by barium enema or when there is evidence of iron deficiency anemia or blood in the stool.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA is used in the evaluation of various gastrointestinal symptoms or systemic illnesses that may have started in the intestine. It is recommended for patients with irritable bowel syndrome, indigestion, malabsorption, and other GI-related problems.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

# Crohn's Disease

## Description

Crohn's disease is an idiopathic inflammatory disease of the small intestine and colon involving all layers of the bowel. It is a slowly progressive and recurrent disease with a tendency to obstruct the bowel, fistulize, and involve adjacent structures in the inflammation. Crohn's disease occasionally occurs at all other sites in the GI tract.

## Causes

Crohn's disease is often idiopathic (of unknown cause). It is aggravated by bacterial infection; the inflammatory cascade, and by smoking cessation. Risk factors for Crohn's disease include cigarette smoking. Specific nutrient deficiencies are also common: B12, fat soluble vitamins, and folate.

## Conventional Lab Tests

Standard lab tests include erythrocyte sedimentation rate (ESR), CBC (anemia is common), Albumin (decreased in severe cases), Serum electrolytes, B12 and folate levels.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA is used in the evaluation of various gastrointestinal symptoms or systemic illnesses that may have started in the intestine. It is recommended for patients with irritable bowel syndrome, indigestion, malabsorption, and other GI-related problems. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Parasitology evaluates stool for presence of parasites using microscopic examination. It is indicated for patients with sudden changes in bowel pattern, especially those who have been abroad or camping.

The Anti-Gliadin Antibody Assay assays a single saliva specimen for immune reaction to gluten.

The Cotinine Assay examines urine to determine the presence of this nicotine metabolite, an indicator of exposure to second-hand smoke. Useful in cases of recurrent infections or allergy in children of smokers.

The Essential and Metabolic Fatty Acid Analysis measures a total of 24 fatty acids and 17 fatty acid ratios. Inflammatory disorders, a direct result of clinical imbalances in fatty acid metabolism, are one of the most common diagnoses observed by clinicians.

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.

# Chronic Diarrhea

## Description

Chronic diarrhea is defined as the frequent passage of loose stools greater than 200 grams per day for more than 3 weeks.

## Causes

Inflammatory diarrhea can be caused by: inflammatory bowel disease (ulcerative colitis and Crohn's disease); radiation enterocolitis; eosinophilic gastroenteritis; and AIDS. Risk factors include: infections, and radiation.

Osmotic diarrhea can be caused by: pancreatic insufficiency; bacterial overgrowth; Celiac disease; Lactase deficiency; Whipple's disease; abetalipoproteinemia; short bowel syndrome; drugs (colchicine, neomycin, and para-aminosalicylic acid - nondigestible intraluminal solute that exerts an osmotic force increasing the intraluminal fluid overwhelming the colonic mucosal absorptive capacities). Risk factors include: bacterial infections, abdominal surgery (cholecystectomy, gastric and small bowel resection), vagotomy, chronic alcohol abuse, Sorbitol, fructose, and gluten.

Secretory diarrhea can be caused by: carcinoid syndrome; Zollinger-Ellison syndrome; vasoactive intestinal peptide-secreting pancreatic adenomas; medullary carcinoma of thyroid; villous adenoma of rectum; microscopic colitis; choleraic diarrhea (excessive secretion of electrolytes). Risk factors include distal ileal surgery.

Altered intestinal motility can be caused by: irritable bowel syndrome; fecal impaction; neurologic diseases; diabetes (increased transit and possible bacterial overgrowth)

Factitious diarrhea can be caused by: laxative abuse; or self induced (patient may add water or urine to stool).

## Conventional Lab Tests

Standard lab tests include: Stool ova and parasites; Stool leukocytes; Stool fat and osmolality, and occult blood; Serum electrolytes and blood count; serum Iron studies, vitamin B12, folate, vitamin D, PT, blood chemistry for albumin and cholesterol, serum carotene; D-xylose absorption test

A barium enema and KUB are usually ordered. A colonoscopy and esophagogastroduodenoscopy (EGD) may be ordered, usually with biopsy.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The Comprehensive Parasitology Profile evaluates stool for presence of parasites and levels of beneficial flora, and imbalances in flora, pathogenic bacteria, and yeast.

The Lactose Intolerance Breath Test is a simple, non-invasive test detects lactose intolerance, a condition affecting more than 50 million Americans.

The Bacterial Overgrowth of the Small Intestine Breath Test is a simple, non-invasive test detects bacterial overgrowth in the small intestine, a common condition that often underlies chronic symptoms of maldigestion and malabsorption, including bloating, gas, diarrhea, irregularity, and abdominal pain.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

# Food Allergy

## Description

Food allergy is a hypersensitivity reaction which is caused by certain foods. Adverse reactions after food ingestion may be caused by immunologic mechanisms, such as the classic IgE allergic response, or by non-immunologic mediated mechanisms.

## Causes

Any food or ingested substance can cause an allergic reaction. The most commonly implicated foods include cow's milk, egg whites, wheat, soy, peanut, fish, tree nuts (walnut and pecan), shellfish, melons, sesame seeds, sunflower seeds, and chocolate. Several food dyes and additives can elicit allergic-like reactions

Persons with allergic or atopic predisposition are at increased risk of hypersensitivity reaction to foods. Increased risk is also associated when other family members have a history of food hypersensitivity.

## Conventional Lab Tests

Eosinophilia in either blood or tissue suggests atopy.

Epicutaneous (prick or puncture) allergy skin tests are useful in documenting IgE mediated immunologic hypersensitivity. In most clinical situations, the allergy skin tests are good for screening. An oral challenge should be completed to accurately determine the clinical hypersensitivity. The overall agreement between allergy skin testing and oral food challenge is approximately 60% (i.e., a positive skin test showing a positive challenge reaction to a particular food).

Radioallergosorbent (RAST) test can also detect specific IgE antibodies to offending foods. In certain laboratories, the RAST test was almost as accurate as a skin test in predicting positive oral challenges.

Leukocyte histamine release and assays for circulating immune complexes are predominantly research procedures and are of limited use in clinical practices. Assays for IgG and IgG 4 subclass antibodies are commercially available. There are no convincing data that these tests are reliable for the diagnosis of food allergy.

The elimination and challenge test is the best procedure for confirming food allergy. First, the suspected food is eliminated from the diet for 1-2 weeks. The patient's symptoms are monitored. If the patient's symptoms disappear or substantially improve, an oral challenge with the suspected food should be performed under medical supervision. Most allergic reactions will occur within 30 minutes to 2 hours after the challenge, although late reactions have also been described, which may occur from 12-24 hours

## Specialty Lab Tests

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods.

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA.

# Irritable Bowel Syndrome

## Description

Irritable Bowel Syndrome (IBS) is altered bowel habits, abdominal pain, and gaseousness, in the absence of organic pathology. It can be divided into four types: Alternating diarrhea with constipation; Diarrhea predominant; Constipation predominant; and Upper abdominal bloating and discomfort.

Risk factors include: Other members of the family with the same or similar gastrointestinal disorder; History of childhood sexual abuse; and Sexual or domestic abuse in women.

## Causes

The cause of IBS is unknown, although patients show some gut motility abnormalities with increased response to stress and stimulants, and an increase in the 3 cycles/minute smooth muscle contractions of the abdomen which accompany normal digestion.

## Conventional Lab Tests

Standard lab tests include CBC, ESR, and a stool culture for ova and parasites.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA is used in the evaluation of various gastrointestinal symptoms or systemic illnesses that may have started in the intestine. It is recommended for patients with irritable bowel syndrome, indigestion, malabsorption, and other GI-related problems. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Comprehensive Parasitology Profile evaluates stool for presence of parasites and levels of beneficial flora, and imbalances in flora, pathogenic bacteria, and yeast. It is recommended for patients with abdominal pain, chronic diarrhea, and other GI-related symptoms.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel. The 24 Spice Profile evaluates IgE and IgG antibodies for 24 frequently used culinary herbs and spices.



# Intestinal Parasites

## Description

There are two classes of infectious agents called parasites. Protozoa are single cell animals which characteristically divide and multiply within the host, are usually direct fecal-oral in transmission, and do not cause an eosinophilia. Helminths (worms) are multi-cellular animals and with rare exceptions do not multiply within the host and are often associated with some degree of eosinophilia that correlates with the degree of mucosal invasiveness. Worms have a limited life span within the host and without reinfection eventually die on their own.

Most worms require either a prolonged incubation period outside the host before being infectious or need a specific vector for transmission. A notable exception to this rule is *Enterobius vermicularis* (pinworm), the eggs of which are infectious shortly after being passed, so auto-infection occurs readily. Direct person-to-person transmission is uncommon.

## Causes

The likelihood of acquiring an intestinal parasite depends on several factors - the presence of the specific infectious agent, an appropriate "vector" or mode of transmission, and a host who is susceptible to the infectious agent. The world-wide distribution of parasites is determined by geographic factors, socio-economics, age, and crowding with poor food preparation and a break in the standard of water and personal sanitation being the major factors.

Risk factors include: Age (children), Low socioeconomic status, Poor sanitation (personal, food, water), International travel, Crowding (day care centers, mental institutions), Intercurrent medical conditions, pregnancy, gastric hypoacidity, and immunosuppression (AIDS).

## Conventional Lab Tests

A single stool specimen provides an accurate diagnosis in 90% of patients. Additional specimens will need to be examined for greater diagnostic accuracy. Special techniques for the detection of *Cryptosporidium*, *Isospora belli*, *Cyclospora*, and microsporidia often require that the laboratory be informed of the "risk" profile of the patient before these tests will be done. Pinworm paddles provide a greater diagnostic yield when *Enterobius vermicularis* is being considered. Multiple tests (5) may be needed to exclude the diagnosis of pinworms. A parasite culture is possible for a few organisms - *Giardia lamblia*, *Entamoeba histolytica*, *Strongyloides stercoralis*, but are rarely indicated and are usually available only in referral laboratories.

String tests and upper bowel intubations are rarely needed to diagnose the upper intestinal parasites. Rarely, a biopsy will demonstrate the presence of an invasive helminth on tissue section. Worms can be extremely difficult to diagnose in this manner, usually needing the expertise of a tissue parasite pathologist. The other parasites may be visualized on the mucosa or in the mucous layer.

## Specialty Lab Tests

The Comprehensive Parasitology Profile evaluates stool for presence of parasites and levels of beneficial flora, and imbalances in flora, pathogenic bacteria, and yeast. It is recommended for patients with abdominal pain, chronic diarrhea, and other GI-related symptoms.

Macroscopic Exam for Worms examines stool specimen for adult cestodes, nematodes, and trematodes or pieces of worms that may be shed in stool.

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

# Peptic Ulcer Disease

## Description

Peptic ulcer disease is a chronic ulcer in the lining of the gastrointestinal tract. There are several locations: duodenal, gastric, esophageal, and ectopic.

Duodenal ulcers are located in the duodenal bulb. Multiple ulcers, and if distal to the bulb raise the possibility of Zollinger-Ellison syndrome. Duodenal ulcers are 4 times more common than gastric ulcers. Gastric ulcers are most commonly located along the lesser curvature of the antrum near the incisura and in the pre-pyloric area. Gastric ulcers are 3-4 times as common as duodenal ulcers among NSAID users.

A peptic ulcer in the distal esophagus may be part of Barrett's epithelial change due to chronic reflux of gastroduodenal contents. Ectopic gastric mucosal ulceration may develop in patients with Meckel's diverticula or other sites of ectopic gastric mucosa.

## Causes

The cause of of duodenal and gastric ulcers is multifactorial. *H. pylori* gastritis is present in >90% of duodenal and >75% of gastric ulcers (*H. pylori* appears to be a requisite factor). An imbalance between aggressive factors (e.g., gastric acid, pepsin, bile salts, pancreatic enzymes) and defensive factors maintaining mucosal integrity (e.g., mucus, bicarbonate, blood flow, prostaglandins, growth factors, cell turnover) may allow *H. pylori* to grow. Ulcerogenic drugs (e.g., NSAID's) harm the gastric mucosa. Zollinger-Ellison syndrome causes excessive gastric acid secretion which damages gastric mucosa.

Peptic ulcers are strongly associated with cigarette smoking (more than 1/2 pack/day). Other risk factors include: drugs (e.g., NSAID use), family history of ulcer, and Zollinger-Ellison syndrome (gastrinoma). It is possibly associated with: Corticosteroids (high dose and/or prolonged therapy); blood group O; HLA-B12, B5, Bw35 phenotypes; stress; lower socioeconomic status; and manual labor. It is poorly or not associated with dietary spices, alcohol, caffeine, and acetaminophen.

## Conventional Lab Tests

Standard lab tests include a CBC (Anemia is uncommon in absence of hemorrhage), Fecal occult blood, serum gastrin (to rule out Zollinger-Ellison syndrome), Gastric analysis (to rule out achlorhydria, acid hypersecretion), Secretin stimulation test (paradoxical rise seen in Zollinger-Ellison syndrome), and Serum pepsinogen.

## Specialty Lab Tests

The *Helicobacter pylori* Antibody Assay identifies *H. pylori* IgG antibodies in serum sample. *H. pylori* is the leading cause of peptic ulcers, chronic gastritis, and increased risk of gastric cancer.

The Bacterial Overgrowth of the Small Intestine Breath Test is a simple, non-invasive test detects bacterial overgrowth in the small intestine, a common condition that often underlies chronic symptoms of maldigestion and malabsorption, including bloating, gas, diarrhea, irregularity, and abdominal pain. Bacterial overgrowth of the small intestine is a serious digestive disorder that can inhibit nutrient absorption and lead to many health problems. Although widespread, it is frequently unsuspected in cases of chronic bowel problems and carbohydrate intolerance because its symptoms often mimic other disorders. Often this condition is associated with reduced intestinal motility-a slower transit of foodstuffs through the bowels caused by fiber inadequacy or digestive imbalances.

# Ulcerative Colitis

## Description

Ulcerative colitis is one of a group of inflammatory bowel diseases of unknown etiology characterized by intermittent bouts of inflammation of all or portions of the colon. Ulcerative colitis presents with recurrences of rectal bleeding and various constitutional symptoms (such as arthritis and inflammation of the eyes). The predominant age for ulcerative colitis is between the ages of 15 and 35 years. There is a positive family history in 8-11%. Ulcerative colitis is more common in Jews.

## Causes

The cause is unknown, although genetic, infectious, immunologic, and psychological factors have all been suggested.

## Conventional Lab Tests

Conventional lab tests are non-specific. CBC with Differential (anemia may reflect chronic disease as well as iron deficiency from blood loss, leukocytosis occurs during exacerbations), ESR, Electrolytes (hypokalemia is common), Liver tests (AST, ALT, GGT), Albumin, and D-Xylose. Diagnostic tests include Sigmoidoscopy and Colonoscopy.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA is used in the evaluation of various gastrointestinal symptoms or systemic illnesses that may have started in the intestine. It is recommended for patients with irritable bowel syndrome, indigestion, malabsorption, and other GI-related problems. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Comprehensive Parasitology Profile evaluates stool for presence of parasites and levels of beneficial flora, and imbalances in flora, pathogenic bacteria, and yeast. It is recommended for patients with abdominal pain, chronic diarrhea, and other GI-related symptoms.

Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods.

The Anti-Gliadin Antibody Assay assays a single saliva specimen for immune reaction to gluten.

## **Liver and Gallbladder**

# Comprehensive Detoxification Program

## Description

We are exposed to many toxic substances in our daily life, including chemical food additives, food colorings, preservatives, alcohol, drugs, pesticides, paints, etc. The liver, gastrointestinal tract (through stool) and skin (through sweat) are the main organs of detoxification. Several chronic diseases can occur if you are over-burdened by toxins.

## Conventional Lab Tests

Detoxification is not recognized by conventional medicine.

## Specialty Lab Tests

The Standard Detoxification Profile analyzes saliva and urine after challenge doses of caffeine, aspirin, and acetaminophen, in order to assess the Phase I and Phase II functional capacity of the liver to convert and clear toxic substances from the body. The Comprehensive Detoxification Profile includes the Standard Detoxification Profile and markers for oxidative stress and important antioxidants.

The Elemental Analysis examines hair, blood and urine samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. This test is offered by itself or included in the Comprehensive Detoxification Profile. It is especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

The Amino Acids Analysis examines fasting blood or 24-hour urine samples for 40+ amino acids and provides information on a wide spectrum of metabolic and nutritional disorders, including: protein inadequacy, gastrointestinal insufficiencies, inflammatory responses, vitamin and mineral dysfunctions, detoxification impairments, cardiovascular disease, ammonia toxicity, food and chemical sensitivities, depression, neurological dysfunction, and inborn errors of metabolism. Results can provide valuable biochemical information about many disorders, including chronic fatigue, learning disabilities, depression and immune problems.

## Cleansing Diet

Eat only the following foods during your cleanse. Cleanses can be done for a short time, to several weeks. All foods must be organically grown. Have a simple breakfast of fruit or vegetable broth. Steam the vegetables you're going to have for lunch. Save the broth. Drink the broth from the vegetable steamer at 11:00 AM with a little sea salt. Eat the steamed vegetables and some kind of grain for lunch. Have steamed vegetables, grain, and chicken or fish for dinner.

### Steamed vegetables

The primary reason for using steamed vegetables is that steaming improves the utilization or the availability of the food substances and it reduces the irritating residue in the gut, allowing it to restore itself. Eat a variety of any and all vegetables that you tolerate. Do not use aluminum cookware or a microwave.

### Grains

Eat 1-2 cups of cooked grains per day of those you tolerate. Allowed grains are: millet, basmati or brown rice, quinoa, and amaranth. Other allowed grains are rice crisps and wasa crackers.

### Fish and Chicken

Deep sea fish is preferred - no shellfish. The fish should be poached, baked, steamed, or broiled. Eat only white meat and do not eat the skin. The chicken may be baked, broiled, or steamed.

### Fruit

Eat 1 or 2 pieces of any fruit except citrus.

### Sweeteners

Very small amounts of maple syrup and honey may be used. Absolutely no sugar, Nutrasweet, or any other sweetener is allowed. Stevia tincture may be used.

### Butter and Oils

For butter, mix 1 pound of butter and 1 cup of extra virgin olive oil (from a new dark jar). Whip at room temperature and store in the refrigerator. This provides the benefits and taste of butter and essential fatty acids. Use extra virgin olive oil for all other situations requiring oil.

### Herbal teas and good water to drink

Drink 8 to 10 glasses of reverse-osmosis filtered water every day. Drink 2 to 4 cups of herbal tea. Herbal teas are best taken in the evening, sipped slowly. Daily Detox Tea is recommended.

### For the time-being, avoid the following foods

Milk, Cheese, and Eggs; Breads and White flour; Fried food of any kind; Tea, Coffee, and Alcohol; Peanuts and peanut butter; Citrus except for lemon; Meat - red meat and especially pork and pork products; Sugar, Nutrasweet, and all sweeteners (except maple syrup and honey)

## **Endocrine**

# Diabetes

## Description

People with diabetes have difficulty processing glucose, a sugar the body uses for energy. This results in rising blood levels of glucose, and eventual spilling into the urine. At the same time, however, the cells of the body are starved for glucose.

## Causes

Secondary diabetes can be caused by Pancreatic disease (pancreatitis, cystic fibrosis); Hormonal disorders (pheochromocytoma, multiple endocrine adenomatosis); Inborn errors of metabolism (glycogen storage disease, Type I); Genetic disorders with insulin resistance (acanthosis nigricans); Hereditary neuromuscular disease; Progeroid syndromes; Obesity (Prader-Willi syndrome); Cytogenetic syndromes (trisomy 21, Klinefelter's and Turner's syndromes); and Acute poisonings (salicylate poisoning can cause hyperglycemia and glycosuria, and may mimic diabetic ketoacidosis).

Diabetes is associated with other endocrine diseases, including Cushing's syndrome, acromegaly, pheochromocytoma, glucagonoma, primary aldosteronism, or somatostatinoma, resulting from the influence of the primary endocrine abnormality on insulin effectiveness and secretion.

Substances that cause glucose intolerance may cause hyperglycemia (particularly in patients prone to diabetes). Hormones: glucagon, glucocorticoids, growth hormone, epinephrine, estrogen and progesterone (oral contraceptives), and thyroid preparations. Drugs: thiazide diuretics, furosemide, acetazolamide, diazoxide, beta-blockers, alpha-agonists, calcium channel blockers, phenytoin, phenobarbital sodium, nicotinic acid, cyclophosphamide, l-asparaginase, epinephrine-like drugs (decongestants and diet pills), nonsteroidal anti-inflammatory agents, nicotine, Foods: caffeine, sugar-containing syrups, and fish oils.

## Conventional Lab Tests

Standard labs include blood glucose, electrolytes, venous pH, Urinalysis for glucose and ketones, CBC (WBC may be elevated), Hemoglobin A1c level, C-peptide insulin level, Islet-cell antibodies, T4 and thyroid antibodies. Additional tests include an oral glucose tolerance test (possibly with insulin levels, if diagnosis is questionable), intravenous glucose test (for possible early detection of subclinical diabetes). HLA-typing may also be considered.

## Specialty Lab Tests

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.



# Diabetes, Type I or IDDM

## Description

People with diabetes have difficulty processing glucose, a sugar the body uses for energy. This results in rising blood levels of glucose, and eventual spilling into the urine. At the same time, however, the cells of the body are starved for glucose. In type I diabetes (childhood-onset, or insulin-dependant diabetes mellitus - IDDM) the pancreas is unable to make insulin, which moves glucose into cells.

## Causes

Autoimmunity is a primary cause of Type I diabetes. Antibodies to pancreatic islet cells are present in 75% of diabetics, which results in the destruction of insulin-secreting beta cells. Viral infections (mumps, Coxsackie, CMV, and hepatitis viruses) appear to incite the development of autoimmune beta-cell destruction. Patients with certain autoimmune endocrine diseases (Graves' disease, Hashimoto's thyroiditis, and idiopathic Addison's disease) have an increased prevalence of IDDM.

Genetics plays an important role in Type I diabetes, although the mode of genetic expression is not clear. Associated genes are located on major histocompatibility complex on chromosome 6. HLA DR3 and DR4 are individually associated with increased risk factor of 4. If both susceptibility genes are present, the relative risk factor increases to 12. HLA B8 and B15 also associated with increased risk. The inherited defect causes an alteration in immunologic integrity, placing the beta cell at special risk for inflammatory damage. The mechanism of damage is autoimmune. The presence of a specific 64K protein which may be responsible for antibody formation.

Diet may play a role in Type I diabetes. Dietary nitrites cause beta cell damage, resulting in Type I diabetes. Breast feeding may provide a degree of protection against the disease while diets high in dairy products are associated with increased risk. Type I diabetes is also associated with childhood exposure to cow's milk.

## Conventional Lab Tests

Standard labs include blood glucose, electrolytes, venous pH, Urinalysis for glucose and ketones, CBC (WBC may be elevated), Hemoglobin A1c level, C-peptide insulin level, Islet-cell antibodies, T4 and thyroid antibodies. Additional tests include an oral glucose tolerance test (possibly with insulin levels, if diagnosis is questionable), intravenous glucose test (for possible early detection of subclinical diabetes). HLA-typing may also be considered.

## Specialty Lab Tests

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

# Diabetes, Type II or NIDDM

## Description

People with diabetes have difficulty processing glucose, a sugar the body uses for energy. This results in rising blood levels of glucose, and eventual spilling into the urine. At the same time, however, the cells of the body are starved for glucose. The characteristic symptoms of diabetes are polydipsia, polyphagia and polyuria - excessive thirst, excessive eating, and excessive urination.

Type 2 diabetes mellitus is called adult-onset or non-insulin-dependant diabetes mellitus (NIDDM). In this form the body doesn't respond properly to insulin. Hyperglycemia results from both an impaired insulin secretory response to glucose and decreased insulin effectiveness (insulin resistance). There is a delayed and decreased rise in plasma insulin following glucose ingestion despite their higher plasma glucose levels. Type II (NIDDM) accounts for 80% of diabetic cases.

## Causes

The cause of Type II diabetes is often unknown (idiopathic). Other causes include: pancreatic destruction from surgery, hemachromatosis, or cancer; Hypophosphatemia (low phosphate); Glycogen synthetase deficiency; and Glucokinase deficiency associated with a genetic defect on chromosome 20. Genetic factors and obesity are important risk factors for type II diabetes.

## Convnetional Lab Tests

Sandard labs include fasting blood sugar, blood glucose, electrolytes, venous pH, Urinalysis for glucose and ketones, CBC (WBC may be elevated), Hemoglobin A1c level, C-peptide insulin level, Islet-cell antibodies, T4 and thyroid antibodies. Additional tests include an oral glucose tolerance test (possibly with insulin levels, if diagnosis is questionable), intravenous glucose test (for possible early detection of subclinical diabetes). HLA-typing may also be considered.

## Specialty Lab Tests

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

# Hyperthyroidism

## Description

Hyperthyroidism is the reaction to excess production of thyroid hormone.

## Causes

Graves' disease is the most common form. It is an autoimmune disease caused by thyroid stimulating immunoglobulins (TSI's) of the IgG class which bind to thyrotropin (TSH) receptors on the thyroid gland. The TSI's mimic the action of TSH and cause excess secretion of T4 and T3.

Large doses of iodine can result in hyperthyroidism. Toxic multinodular goiter is caused by iodine deprivation followed by iodine repletion. The jodbasedow phenomenon refers to thyrotoxicosis in a previously euthyroid patient as a result of exposure to iodine. It typically occurs in areas of endemic iodine deficiency when measures to increase iodine intake are implemented.

Lithium has several effects on intra-thyroidal iodine metabolism, one of which is to inhibit hormone release.

Glucocorticoids causes a decrease in serum thyroid hormone levels due to inhibition of TSH secretion and decreased binding of T4 to TBG. Serum T3 is also decreased, in part because of inhibition of the conversion of T4 to T3. A direct inhibitory action of glucocorticoids on the thyroid may occur in Graves' disease, possibly by inhibition of thyroid-stimulating immunoglobulins. Dexamethasone, in conjunction with iodide, can effect a rapid reduction in the degree of thyrotoxicosis.

Other causes are rare and include TSH-secreting, pituitary tumors, surreptitious ingestion of T4 or T3, and functioning trophoblastic tumors.

Risk factors for hyperthyroidism include: Positive family history; Female sex; and Other autoimmune disorders.

## Conventional Lab Tests

Standard lab tests include measurements of T3, T4, Free thyroxine index (FTI) and TSH. Many drugs can alter lab results, including: Anabolic steroids, Androgens, Estrogens, Heparin, Iodine containing compounds, Phenytoin, Rifampin, Salicylates, and Thyroxine.

High titers of antithyroid peroxidase (anti-TPO or antimicrosomal) antibodies or antithyroglobulin antibodies are found in the serum of most patients with Hashimoto's disease and in many with primary thyroprivic hypothyroidism or Graves' disease.

Diagnostic imaging using radioiodine (radioactive iodine uptake or RAIU) can differentiate between Grave's disease and toxic multinodular goiter.

## Specialty Lab Tests

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period.

# Hypothyroidism

## Description

Hypothyroidism is a clinical state resulting from decreased circulating levels of free thyroid hormone or from resistance to hormone action. Myxedema connotes severe hypothyroidism. Hypothyroidism is more common in women, and it predominantly affects people over the age of 65.

Signs include: Dry, coarse skin; Dull facial expression; Coarsening or huskiness of voice; Periorbital puffiness; Swelling of hands and feet; Bradycardia; Hypothermia; Reduced systolic blood pressure; Increased diastolic blood pressure; Reduced body and scalp hair; Delayed relaxation of deep tendon reflexes; Macroglossia; Dilutional hyponatremia; Anemia (usually normochromic, normocytic); Enlarged heart on chest x-ray (often due to pericardial effusion)

Symptoms include: Onset may be insidious, subtle; Weakness, fatigue, lethargy; Cold intolerance; Decreased memory; Hearing impairment; Constipation; Muscle cramps; Arthralgias; Paresthesias; Modest weight gain (10 pounds [4.5 kg]); Decreased sweating; Menorrhagia; Depression; Hoarseness; and Carpal tunnel syndrome.

## Causes

Hypothyroidism may be associated with Type II autoimmune polyglandular syndrome, which is associated with HLA-DR3, DR4. Secondary hypothyroidism frequently results from treatment for Graves disease, which may be familial.

Causes include: Post-ablative (most common) follows radioactive iodine therapy or thyroid surgery. Delayed hypothyroidism may develop in patients treated with thioamide drugs (propylthiouracil, methimazole) 4 to 25 years later. Primary hypothyroidism may develop as a result of autoimmune thyroiditis, or be idiopathic. With goiter, hypothyroidism is most commonly due to autoimmune disease, such as Hashimoto's thyroiditis; or heritable biosynthetic defects, iodine deficiency (rare in the US), or drug induced (iodides, lithium, phenylbutazone, aminosalicic acid). Suprathyroid hypothyroidism, may be due to deficiency of thyrotropin-releasing hormone (TRH) from the hypothalamus or thyroid-stimulating hormone (TSH) from the pituitary. Transient hypothyroidism may result from silent thyroiditis (most common in post partum period) and subacute granulomatous thyroiditis

Risk factors include: increasing age; and Autoimmune diseases

## Conventional Lab Tests

Standard labs include: total serum thyroxine (T4) - decreased, T3 resin uptake - increased, TSH - elevated, Free T4 index (= T3 resin uptake x total serum T4) - low. Severe hypothyroidism can cause anemia, elevated cholesterol, CPK, LDH, AST, and hyponatremia.

## Specialty Lab Tests

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyronine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

# Hypoglycemia

## Description

Hypoglycemia is an abnormally low blood glucose level. Reactive hypoglycemia occurs in response to a meal, specific nutrients, or drugs. It may occur within 2-3 hours after a meal, or later. It may also be seen after gastrointestinal surgery (in association with dumping syndrome in some patients).

Spontaneous (fasting) hypoglycemia may be associated with a primary condition, e.g., hypopituitarism, Addison's disease, myxedema, or in disorders related to liver malfunction, and renal failure. If hypoglycemia presents as a primary manifestation, other disorders to consider include hyperinsulinism and extrapancreatic tumors.

## Causes

Causes of reactive hypoglycemia include: meals high in refined carbohydrates and certain nutrients, (e.g., fructose, galactose, leucine). Drugs (e.g., sulfonyleureas, salicylates) or alcohol can cause excess glucose utilization or deficient glucose production. Hypoglycemia can also be caused by surreptitious drug use - injection of insulin or taking oral hypoglycemics. Hypoglycemia may be caused by gastrointestinal surgery.

Causes of spontaneous hypoglycemia include: hepatic disease; pancreatic islet cell tumor or extrapancreatic tumor; exercise; fever; pregnancy; renal glycosuria; ketotic hypoglycemia of childhood; adrenal insufficiency; hypopituitarism; or enzyme deficiency.

The development of hypoglycemia is a characteristic finding related to growth hormone deficiency.

## Conventional Lab Tests

Lab tests are best ordered while symptomatic, and include measurement of blood and plasma glucose; C-peptide; liver studies; serum insulin; and cortisol. An abdominal CT or ultrasound may be ordered to rule out an abdominal tumor.

## Specialty Lab Tests

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

IGF-1 (Insulin-like Growth Factor-1 or Somatomedin C) (serum) mediates many of the in vivo cell division and metabolic effects of growth hormone. IGF-1 is a valuable diagnostic tool for the evaluation of suspected growth hormone disorders.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period.

The Women's Hormonal Health Assessment provides an in-depth understanding of sex steroid metabolism. Measurements are made of progesterone, sex-hormone-binding globulin (SHBG), DHEA-S, testosterone, estrone (E1), estradiol (E2), estriol (E3), 2-hydroxyestrone, and 16-alpha-hydroxyestrone.

## Urology

# Chronic Renal Failure

## Description

Chronic renal failure is the result of any renal injury that decreases renal excretory and regulatory function chronically. Characteristic findings include nitrogen retention, acidosis, and anemia.

## Causes

Glomerular renal parenchymal damage can be caused by: membranous nephropathy, membranoproliferative glomerulonephritis, systemic lupus erythematosus, focal glomerulosclerosis, diabetes mellitus, proliferative glomerulonephritis, amyloidosis, Alport's syndrome, connective tissue disease.

Interstitial-tubular renal parenchymal damage can be caused by: heavy metals, drugs, nephrotoxins, multiple myeloma, hypertension, gout, thrombotic microangiopathies, oxalate deposition, infection, renal artery stenosis, connective tissue disease, autosomal dominant polycystic kidney disease, congenital.

Pre-renal damage can be caused by: cirrhosis, cardiac, volume, nephrotic, or drugs (e.g., NSAID's)

Risk factors include: Contrast (diabetes, myeloma), Circulatory failure, Urinary tract obstruction, Analgesic abuse, Untreated hypertension, and Diabetes mellitus.

## Conventional Lab Tests

Blood tests will reveal normochromic, normocytic anemia; decreased immune responsiveness; thrombocytopenia; decreased hematocrit; increased capillary fragility; and increased bleeding time.

Blood chemistry will reveal: azotemia; elevated ammonia; Type IV hyperlipidemia; decreased active Vitamin D; Increased parathyroid hormone; elevated glucose, insulin resistance; elevated phosphate; elevated potassium; elevated sulfate; elevated uric acid; and reduced calcium

Urinalysis will show proteinuria and casts.

## Specialty Lab Tests

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Elemental Analysis, Toxic Elements, Urine evaluates (random or 24-hour) for levels of 10 toxic elements - Aluminum, Cadmium, Heavy Metals (Antimony, Arsenic, Mercury), Lead, Nickel, Tin and Uranium.

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

In the Comprehensive Detoxification Profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

# Urinary Stones

## Description

Urinary calculia (stones) can be formed from several materials, including calcium (the most common form), uric acid, magnesium ammonium phosphate (struvite), and cystine stones.

Calcium stones can be caused by several mechanisms, including primary parathyroidism, sarcoidosis, vitamin D intoxication, hyperthyroidism, renal tubular acidosis, multiple myeloma, metastatic cancer, and primary hyperoxaluria. Idiopathic hypercalciuria is a hereditary condition, is present in 50% of men and 75% of women who form calcium stones. Several conditions predispose to forming calcium stones.

Decreased urinary citrate (hypocitricuria) promotes calcium stones because citrate normally binds 50% of urinary calcium as a soluble calcium citrate salt.

Excessive urinary oxalate (hyperoxaluria) is caused by excess ingestion of oxalate-containing foods (e.g., rhubarb, spinach, cocoa, nuts, pepper, and tea) or excess oxalate absorption due to a variety of enteric diseases (e.g., bacterial overgrowth syndromes, chronic pancreatic or biliary disease, or ileojejunocolic surgery).

Excess urinary uric acid (hyperuricosuria) promotes urinary stone formation because uric acid crystals provide a nidus on which calcium oxalate crystals can orient themselves and grow. These patients can form what appear to be pure calcium stones or mixed calcium and uric acid stones, because the uric acid nidus is not measurable by commercial laboratories. The cause of hyperuricosuria is usually excess consumption of purine, in the form of meat, fish, and poultry. Uric acid stones occur because of increased urine acidity in which undissociated uric acid crystallizes. Increasing the urine pH to between 6 and 6.5 with oral alkalinizing agents (such as sodium bicarbonate, or sodium or potassium citrate) or reducing purine intake and increasing water intake, are usually effective.

Magnesium ammonium phosphate stones (struvite) indicates the presence of urinary tract infection, with urea-splitting bacteria, usually of the *Proteus* species. The stones are loci of infection and must be treated as infected foreign bodies. In contrast to the other types of stones, infection stones occur mostly in women. Fastidious attention to even small numbers of urea-splitting bacteria as well as treatment of any metabolic causes of stone may delay the need for surgery.

Cystine stones are associated with defects in the transport of the amino acids cystine, lysine, arginine, and ornithine. Clinical disease is due solely to the insolubility of cystine, which forms stones. Three types of inheritance have been described. Conventional medical consists of a high fluid intake, even at night. Daily urine volume should exceed 3 Liters. Raising urine pH with alkali is helpful, provided the urine pH exceeds 7.5. A low-salt diet can reduce cystine excretion up to 40 percent. Captopril, which has a free sulfhydryl group to bind cysteine, has been used in a limited number of patients with some success. Low-methionine diets have not proved to be practical for clinical use, but patients should avoid protein gluttony.

## Conventional Lab Tests

Urinalysis (hematuria nearly 100%; if pH < 5.5 means uric acid, if pH > 7.5 means struvite); Chemistries (Calcium, phosphorus, electrolytes, uric acid, creatinine); Parathyroid hormone if serum calcium is high; Urine cystine if stone is not visible on plain x-ray; Urine culture if pyuria or fever is present.



# Gynecology

# Amenorrhea

## Description

Amenorrhea is defined as the absence of menses. Primary amenorrhea occurs when menarche has not occurred by age seventeen. Secondary amenorrhea is the cessation of menses for three cycles in a non-pregnant woman.

## Causes

Causes of primary amenorrhea include: Imperforate hymen; Agenesis of the uterus and upper 2/3 of the vagina; Turner's syndrome; Constitutional delay; Secondary amenorrhea; Physiological - pregnancy, corpus luteal cyst, breast-feeding, menopause; Suppression of the hypothalamic-pituitary axis - post pill amenorrhea, stress, intercurrent illness, weight loss, low body mass index; Pituitary disease - ablation of the pituitary gland, Sheehan's syndrome, prolactinoma; Uncontrolled endocrinopathies - diabetes, hypo- or hyperthyroidism; Polycystic ovarian disease (POD), (Stein-Leventhal syndrome); Chemotherapy; Pelvic irradiation; Endometrial ablation (Asherman's syndrome); Drug therapy - systemic steroids, danazol, GRH-RH analogs; and Premature ovarian failure.

Risk factors for amenorrhea include: Over-training (e.g., long-distance runner, ballet dancer); Eating disorders; and Psycho-social crisis.

## Conventional Lab Tests

Lab tests include: Estradiol, FSH, LH, Prolactin, Pregnancy test, T4, TSH, and Glucose. Diagnostic procedures include Laparoscopy, Ultrasound, and Radiologic evaluation of the sella turcica.

## Specialty Lab Tests

Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions.

The Comprehensive Melatonin Profile analyzes 3 saliva samples for the secretion pattern of melatonin. Melatonin imbalance has been associated with Seasonal Affective Disorder, infertility, sleep disorders, and compromised immune function.

IGF-1 (Insulin-like Growth Factor-1 or Somatomedin C) mediates many of the in vivo cell division and metabolic effects of growth hormone. IGF-1 is a valuable diagnostic tool for the evaluation of suspected growth hormone disorders.

# Dysmenorrhea (Menstrual Cramping)

## Description

Dysmenorrhea is defined as pelvic pain occurring at or around the time of menses. It is a leading cause of absenteeism for women under age 30. Primary dysmenorrhea is without pathological physical findings. Secondary dysmenorrhea has pain occurring prior to or during menses, often more severe than primary, having a secondary pathologic (structural) cause. 40% of adult females have menstrual pain, and 10% are incapacitated for 1-3 days each month. Primary dysmenorrhea usually affects teens to early 20's. Secondary dysmenorrhea affects women in their 20's to 30's.

## Causes

The cause of primary dysmenorrhea is considered to be elevated production (2-7 times normal) of prostaglandins and other mediators in the uterus which produce uterine ischemia through platelet aggregation, vasoconstriction and dysrhythmic contractions with pressures higher than the systemic blood pressure.

The causes of secondary dysmenorrhea include: Congenital abnormalities of uterine or vaginal anatomy; Cervical stenosis; Pelvic infection; Adenomyosis; Endometriosis; and Pelvic tumors - especially leiomyomata (uterine fibroids).

Risk factors for primary dysmenorrhea include: Nulliparity; Positive family history. Risk factors for secondary dysmenorrhea include: Pelvic infection; Sexually transmitted diseases; and Endometriosis.

## Conventional Lab Tests

Standard lab tests are non-contributory, except with acute infections where the white blood cell count is elevated and blood cultures are positive. Diagnostic procedures include an ultrasound (to rule out secondary abnormalities) and laparoscopy (to define anatomy).

## Specialty Lab Tests

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

The Women's Hormonal Health Assessment provides an in-depth understanding of sex steroid metabolism. Measurements are made of progesterone, sex-hormone-binding globulin (SHBG), DHEA-S, testosterone, estrone (E1), estradiol (E2), estriol (E3), 2-hydroxyestrone, and 16-alpha-hydroxyestrone.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Endometriosis

## Description

Endometriosis is heterotopic islands of uterine mucosa (endometrium) found in many locations.; Pelvic sites - peritoneal surfaces (bladder, cul-de-sac, pelvic side walls, broad ligaments, uterosacral ligaments, fallopian tubes, and uterus), lymph nodes, ovaries, bowel; Distant sites - vagina, cervix, abdominal wall, arm, leg, pleura, lung, diaphragm, kidneys, spleen, gallbladder, nasal mucous membranes, spinal canal, stomach, breast

## Causes

Causes of endometriosis include: Retrograde menstruation (Sampson's theory); Lymphatic/vascular metastases (Halban's theory); Direct implantation; Coelomic metaplasia (coelomic epithelium undergoes metaplasia forming functioning endometrium)

Risk factors for endometriosis include: Hereditary or genetic predisposition; Personality traits (achieving, egocentric, over-anxious, perfectionist, intelligent, underweight - but validity of these observations lacking); Delayed childbearing; Luteinized unruptured follicle syndrome (granulosa/theca cells undergo luteinization but actual follicular rupture fails to occur, thereby predisposing to limited progesterone secretion into peritoneal cavity thus allowing refluxed endometrial cells to implant and proliferate).

## Conventional Lab Tests

Standard lab tests are of no special value, although CA-125 levels may be elevated. Laparoscopy is recommended. Biopsy of endometriotic lesions usually demonstrate both endometrial glands and stroma. Vaginal and abdominal ultrasound can identify only endometriomas of ovaries. MRI can identify pelvic masses (endometriomas). Hysterosalpingography is useful for tubal occlusion proximally or distally and periadnexal adhesions.

## Specialty Lab Tests

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In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

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# Fibrocystic Breast Disease

## Description

Fibrocystic breast disease is a generalized term for benign breast disorders such as lumps and pain. It is, however, a misnomer since it has neither a well-defined set of symptoms, nor a clear etiology. The term benign breast disease is preferred. Benign lumps are usually smooth, regular, and mobile. It is estimated that at least 50% of women have benign breast symptoms during their lifetime. Symptoms tend to occur in menstruating women.

## Causes

The etiology of benign breast disease is unknown. Possible causes include: Luteal phase defect in progesterone; Increased estrogen (17 beta estradiol); Hyperprolactinemia; End organ hypersensitivity to estrogen; Sensitivity to methylxanthines; and Dietary fat intake. The effect of consumption of methylxanthine-containing substances (coffee, tea, cola, and chocolate) is controversial.

## Conventional Lab Tests

Standard lab test begin with cytology of the nipple discharge. Diagnostic imaging includes mammography and ultrasound (which can differentiate cystic from solid lesions). Fine needle aspiration and biopsy differentiates cystic from solid lesions. Excisional biopsy is indicated for solid lumps that are not clearly benign.

## Specialty Lab Tests

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Menopause

## Description

Menopause is defined as the cessation of spontaneous menstrual cycles. There are two stages of menopause: climacteric and postmenopause. During the climacteric period there is a decline in ovarian function. Although a woman may continue to have periodic uterine bleeding, such cycles may be anovulatory (without ovulation). During this time estrogen production diminishes and a woman may experience early signs of estrogen deficiency, such as vasomotor symptoms, even though she still has periodic bleeding. The average age of menopause is 51. It is unrelated to the age of the menarche (first menses). Virtually all women will be postmenopausal by age 58. The postmenopause period occurs after menopause and usually accounts for more than a third of a woman's total life.

Symptoms of menopause include a cessation of menses - either abruptly or preceded by a period of irregular cycles and/or diminished bleeding. Vasomotor symptoms (hot flashes, sweating) are common, as are psychologic symptoms - depression, nervousness, insomnia. Atrophy of epidermal tissue can affect several areas. Vaginal atrophy causes dyspareunia (painful menses). Urinary tract atrophy causes stress or urge urinary incontinence. Skin atrophy causes wrinkles.

Menopause is also associated with osteoporosis (which can cause fractures), and arteriosclerosis - coronary artery disease.

## Causes

There are three main causes of menopause: Physiologic - when due to depletion of oocytes; Surgical - when due to removal of functioning ovaries because of disease or incidental to hysterectomy; and Medical - as a result of treatment of endometriosis (danazol [Danocrine] or GnRH analogues) or of breast cancer (antiestrogens). Menopause may also occur after cancer chemotherapy and be permanent or reversible.

## Conventional Lab Tests

Lab tests are usually not required because the patient's age and symptoms can readily establish the diagnosis.

## Specialty Lab Tests

Menopause Profile examines four salivary samples over a 2-week period to determine levels of  $\beta$ -estradiol, progesterone, and testosterone for women who are peri- or post-menopausal. In addition to the analysis of hormones included in the Menopause Profile, the Comprehensive Menopause Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are affected by the influences of cortisol, DHEA, and melatonin.

The Bone Resorption Assessment is a simple, direct urinary assay of pyridinium and deoxypyridinium crosslinks, useful in identifying current bone loss, lytic bone disease, and efficacy of bone support therapies.

The revolutionary Cardiovascular Assessment is on the cutting edge of molecular medicine and is based on the latest advancements in cardiovascular disease (CVD) research. The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status. Using this state-of-the-art assessment, you can now better identify individuals who don't show abnormalities in traditional markers of CVD—those who comprise almost 50% of all heart attack victims.

# Menorrhagia

## Description

Menorrhagia is defined as excessive amount or duration of menstrual flow, at more or less regular intervals. The average normal menstrual flow is about 30 mL per cycle. Abnormal bleeding is common, about 50% of cases occur after 40 years of age. Dysfunctional bleeding is fairly common in adolescence and near menopause.

Menorrhagia is distinguished from, but may overlap with, Metrorrhagia (irregular or frequent flow, noncyclic), Menometrorrhagia (frequent, excessive, irregular flow; menorrhagia plus metrorrhagia), Polymenorrhea (frequent flow, cycles of 21 days or less), Intermenstrual bleeding (bleeding between regular menses), and Dysfunctional uterine bleeding - DUB (abnormal endometrial bleeding of hormonal cause and related to anovulation).

## Causes

Causes of menorrhagia include: Hypothyroidism; Endometrial proliferation/excess/hyperplasia: Anovulation, oligo-ovulation, Polycystic ovarian disease (PCOD), Stein-Leventhal syndrome, Ovarian tumor, Obesity, Hormone (estrogen) therapy; Endometrial atrophy: Postmenopausal, Prolonged progestin or oral contraceptive administration; Local factors: Endometrial polyps, Endometrial neoplasia, Adenomyosis/endometriosis, Uterine myomata (fibroids), Intrauterine device (IUD), Uterine sarcoma; Coagulation disorders: Thrombocytopenia, platelet disorders, von Willebrand's disease, Leukemia, Ingestion of aspirin or anticoagulants, Renal failure/dialysis.

Risk factors include: Obesity, Anovulation, Estrogen administration (without progestin), Prior treatment with progestational agents or oral contraceptives increases the risk of endometrial atrophy, but decreases the risk of endometrial hyperplasia or neoplasia

## Conventional Lab Tests

Conventional lab tests include: a Pregnancy test and CBC to assess severity of blood loss, and exclude thrombocytopenia and leukemia. In selected cases: TSH - elevated in hypothyroidism; Platelet count, bleeding time, prothrombin time (PT), partial thromboplastin time (PTT) for coagulation screen; Creatinine, BUN; Serum progesterone.

## Specialty Lab Tests

Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Premenstrual Syndrome, PMS

## Description

Premenstrual syndrome is a constellation of symptoms that occurs prior to menstruation and is severe enough to interfere significantly with the patient's life. The premenstrual symptom complex can be divided into four subgroups.

The most common subgroup, PMS Type A, consists of premenstrual anxiety, irritability and nervous tension, sometimes expressed in behavior patterns detrimental to self, family and society. Elevated blood estrogen and low progesterone have been observed in this subgroup.

The second-most-common subgroup, PMS Type H, is associated with symptoms of water and salt retention, abdominal bloating, mastalgia and weight gain. The severe form of PMS Type H is associated with elevated serum aldosterone.

PMS Type C is characterized by premenstrual craving for sweets, increased appetite and indulgence in eating refined sugar followed by palpitation, fatigue, fainting spells, headache and sometimes the shakes. PMS Type C patients have increased carbohydrate tolerance and low red-cell magnesium.

PMS Type D is the least common but most dangerous because suicide is most frequent in this subgroup. The symptoms are depression, withdrawal, insomnia, forgetfulness and confusion. PMS Type D has been associated with low estrogen and high progesterone levels, and high lead levels in hair tissue and chronic lead intoxication..

## Conventional Lab Tests

There are no specific lab tests for PMS.

## Specialty Lab Tests

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Elemental Analysis provides a convenient and accurate window for gauging both long and short-term toxic exposure and nutrient deficiencies. The test includes measures of pervasive and potentially damaging toxins such as lead, mercury and cadmium, along with crucial mineral nutrients like zinc, calcium, and magnesium. Test reports come with a unique index that clearly displays the likelihood of external contamination for each element, placing results into their proper perspective and ensuring the highest degree of accuracy.



# Uterine Fibroids

## Description

Uterine leiomyomas or fibroleiomyomas (uterine fibroids) are well circumscribed, pseudo-encapsulated benign tumors composed mainly of smooth muscle but with varying amounts of fibrous connective tissue. There are three major types: Submucous: 5% of total, susceptible to abnormal uterine bleeding, infection and occasionally protrude from cervix; Subserous: Common, may become pedunculated and rarely parasitic; and Intramural: Common, may cause marked uterine enlargement.

## Causes

Uterine fibroids may arise from totipotential cells normally giving rise to muscle and connective tissue cells, or they may arise from small immature smooth muscle cell nests. There is a positive correlation with estrogen stimulation (i.e., uterine fibroids are not seen before menarche, may grow rapidly during pregnancy, with use of oral estrogen, and with estrogen producing tumors. Myomas regress following pregnancy and after menopause.)

Risk factors for uterine fibroids include: Later reproductive and perimenopausal age groups. The incidence is 3-9 times higher among African-Americans.

## Conventional Lab Tests

Standard lab tests include a pregnancy test; CBC with differential count; SED rate; and a CA-125 (which may be slightly elevated in some cases of uterine myomas, but generally is more useful in differentiating myomas from various gynecologic adenocarcinomas).

Diagnostic imaging includes ultrasonography (which shows a characteristic hypoechoic appearance). A CT scan or MRI may help to differentiate complex cases. An Intravenous pyelogram (IVP) or barium enema may be ordered.

Presumptive diagnosis can be made by abdominal and pelvic examination. A fractional D & C aids in ruling out cervical, uterine carcinomas. Hysteroscopy may help diagnose submucous myomas. Laparoscopy may be useful in complex cases and in ruling out other pelvic pathology.

## Specialty Lab Tests

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

In addition to analysis of hormones included in the Female Hormone Profile, the Comprehensive Female Hormone Profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

The Women's Hormonal Health Assessment provides an in-depth understanding of sex steroid metabolism. Measurements are made of progesterone, sex-hormone-binding globulin (SHBG), DHEA-S, testosterone, estrone (E1), estradiol (E2), estriol (E3), 2-hydroxyestrone, and 16-alpha-hydroxyestrone.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

## **Obstetrics**

# Infertility

## Definition

Infertility is defined as failure to conceive after one year of unprotected intercourse.

## Causes

Most couples have than one factor.

Genital or pelvic infections (e.g., pelvic inflammatory disease, Chlamydia, Gonorrhoea) are often associated with an obstruction of reproductive tract. Other disorders include cervical dysplasia, dysmenorrhea, chronic salpingitis, and endometriosis.

Endocrine dysfunction (e.g., hypothyroidism, hypogonadism, abnormal puberty, hyperprolactinemia, hypopituitarism) often associated with abnormalities of ovulation or spermatogenesis.

Sexual dysfunction (e.g., premature ejaculation) may contribute to the problem

Anovulatory cycles are frequently irregular, without premenstrual symptoms nor dysmenorrhea. Some patients may have features (e.g., hirsutism) suggestive of polycystic ovarian syndrome.

Endometriosis is often associated with cyclic premenstrual pain and dysmenorrhea.

Semen abnormalities can be caused by: Cimetidine, Spironolactone, Furadantin, Sulfasalazine, Marijuana, Chemotherapeutic agents, Cocaine, and Occupational or environmental hazards

Infertility is associated with SLE, celiac disease. Infertility may also be due to autoimmune disease (anti-sperm antibodies). Current medical research focuses on the therapeutic action of prostaglandins in infertility.

## Conventional Lab Tests

Semen analysis is usually the first test. The post-coital test examines cervical mucus after intercourse during the fertile period for the number of sperm, their movement and direction.

Basal body temperature charting assesses ovulation and adequacy of the luteal phase of menstruation. Morning temperature should rise about one degree Fahrenheit at the time of ovulation and remain elevated for 13-14 day.

Serum progesterone levels on day 25-27 of a 28 day cycle assesses ovulation and corpus luteum function. A level of 15 or greater correlates with normal corpus luteum function.

An endometrial biopsy assesses ovulation, function of the corpus luteum, and normalcy of the endometrium.

The following tests are useful to evaluate underlying causes of anovulation or low sperm counts: Thyroid stimulating hormone (TSH) and prolactin (elevations associated with suppressed gonadal function); Testosterone (decreased in primary gonadal failure); Follicle stimulating hormone (FSH) and luteinizing hormone (LH) (elevated in primary gonadal failure, decreased in hypopituitarism).

## Specialty Lab Tests

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyronine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

# Prenatal Support

## Description

The prenatal period encompasses the nine months after conception to the birth of your child. Many people, however, begin a prenatal nutritional program when they first plan on having a child.

## Conventional Lab Tests

Laboratory tests for pregnancy should include a CBC; STS (syphilis); serum test for hepatitis B virus; culture for gonorrhea and chlamydia; blood typing for the major blood groups and Rh factor and screening for antibodies; a rubella antibody titer (unless a previous titer was positive); a complete urinalysis and screening test for bacteria in the urine; and a Papanicolaou test of the cervix. Black patients should be tested for sickle cell trait or disease.

At 15 to 16 weeks, an alpha-fetoprotein (AFP) test should be offered. At 28 weeks all women should be screened for abnormal carbohydrate metabolism with the glucose tolerance test. The first examination should also include a full pelvic exam with a cytologic smear. Follow-up visits should occur at 4-week intervals until 32nd week of pregnancy, at 2-week intervals until the 36th week, and then weekly until delivery.

Ultrasonography is the imaging method of choice in obstetrics. Many obstetricians believe at least one ultrasonic examination should be performed in each pregnancy to ensure that progress is satisfactory.

## Normal Weight Gain

Weight gain during pregnancy should be about 25 to 30 pounds total, or 2 to 3 pounds per month. About 250 kcal should be added to the patient's daily diet to provide for fetal nutrition. Although protein should supply most of these calories, the diet should be well balanced, including fresh fruits and vegetables.

## What to Avoid

It is well known that alcohol and tobacco have a detrimental effect on the fetus. X-ray exposure should be avoided during pregnancy, especially during the first 3 months. Drugs, including aspirin, should be discouraged. Antibiotics during pregnancy should also be avoided. According to some studies, excessive consumption of wheat and caffeine should be avoided.

## What to Add

Most women need an iron supplement during pregnancy. Ferrous sulfate 300 mg orally 2x/day is usually recommended. Iron citrate or picolinate can be substituted for those seeking higher quality and absorbability. Folic acid (800 mcg per day) is well-known to prevent neural tube defects.

The RDA's during pregnancy are increased, with the most important being 60 grams of protein a day. For comparison, four ounces of meat (beef, chicken, turkey, pork) contains about 28 grams of protein. One large egg contains 14 grams. The easiest way to get adequate protein is to drink an extra protein shake or two a day. Most protein powders offer about 15 grams of protein per serving.

Essential fatty acids (high quality oils) and riboflavin (Vitamin B2) have been shown to prevent pre eclampsia.

## Specialty Lab Tests

Several studies have shown that high homocysteine levels are associated with increased risk of pre eclampsia.

**Men**

# Benign Prostatic Hypertrophy

## Description

Benign prostatic hypertrophy is a growth of prostate which may result in bladder outlet obstruction. It is a universal pathologic phenomenon seen in older men (50% of men over the age of 50; and 80% of men over the age of 70).

## Causes

The exact etiology (cause) is unknown, but evidence suggests BPH arises from a systemic hormonal alteration which may or may not act in combination with growth factors stimulating stromal or glandular hyperplasia

Risk factors for BPH include: Intact testes (BPH is rare in eunuchs); and Aging (BPH is rare in men under the age of 40 years). No dietary, environmental, or sexual practices have been implicated yet.

## Conventional Lab Tests

BPH is a pathologic diagnosis - lab data is only suggestive. Prostate specific antigen (PSA) may be elevated but usually < 10 ng/mL (10 µg/L). Urinalysis shows pyuria and pH changes due to chronic residual urine. Urine culture is positive (sometimes due to chronic residual urine). Increased post-void residual (> 100 cc). Elevated serum creatinine (if obstructive uropathy present).

## Specialty Lab Tests

The Male Hormone Profile analyzes 4 saliva samples over a 24-hour period for levels of testosterone. Elevated levels suggest androgen resistance, while decreased levels can result from such causes as hypogonadism, hepatic cirrhosis, lipid abnormalities and aging.

The Comprehensive Male Hormone Profile profile includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how testosterone is influenced by cortisol, DHEA, and melatonin.

# Impotence

## Definition

Impotence is defined as the inability of the male to achieve and/or maintain penile erection and thus engage in copulation.

## Causes

A decrease in sexual desire, or libido, may be due to androgen deficiency (arising from either pituitary or testicular disease), psychological disturbance, or to some types of prescribed or habitually abused drugs.

Organic causes of erectile impotence include Endocrine causes: Testicular failure (primary or secondary) and Hyperprolactinemia; Drugs: Antiandrogens including Histamine (H2) blockers (e.g., cimetidine), Spironolactone, Ketoconazole, and Finasteride; Antihypertensives including Central-acting sympatholytics (e.g., clonidine and methyldopa), Peripheral-acting sympatholytics (e.g., guanadrel), Beta blockers, and Thiazides; Anticholinergics; Antidepressants: Monoamine oxidase inhibitors, and Tricyclic antidepressants; Antipsychotics; Central nervous system depressants: Sedatives (e.g., barbiturates) and Antianxiety drugs (e.g., diazepam); and Drugs of habituation or addiction: Alcohol, Methadone, and Heroin.

Many types of neurologic disorders cause impotence, including lesions in the anterior temporal lobe, spinal cord disorders, insufficiency of sensory input as in tabes dorsalis, or damage to parasympathetic nerves, for example, following surgical procedures such as radical (total) prostatectomy or cystectomy.

As many as half of men with diabetes mellitus develop impotence within 6 years of the onset of diabetes, and impotence may be the first clinical manifestation of diabetic neuropathy.

Androgen deficiency results in a decrease in secretions of the prostate and seminal vesicles and in a decrease in the volume of ejaculate. Drugs such as guanethidine, phenoxybenzamine, phentolamine, and sertraline primarily impair ejaculation.

Men with vasculogenic impotence may present with total erectile impotence, decreased penile rigidity, or loss of erection during intercourse. Vascular insufficiency may be due to aortic occlusion (Leriche syndrome) or to more distal atherosclerotic disease in the hypogastric, pudendal, and cavernosa arteries.

## Conventional Lab Tests

Standard labs include CBC, Glucose, potassium, sodium, Albumin, BUN/creatinine, TSH, Prolactin, and Testosterone. A 24 hour urine zinc may be ordered.

## Specialty Lab Tests

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

Male Hormone Profile analyzes 4 saliva samples over a 24-hour period for levels of testosterone. Elevated levels suggest androgen resistance, while decreased levels can result from such causes as hypogonadism, hepatic cirrhosis, lipid abnormalities and aging.

The Comprehensive Cardiovascular Assessment analyzes blood for levels of HDL, LDL and total cholesterol, ratios, triglycerides, lipoprotein(a), homocysteine, apolipoprotein A1, apolipoprotein B, fibrinogen, and C-reactive protein. Together, these markers provide a thorough assessment of cardiovascular health status.

## Neurology



# Amyotrophic Lateral Sclerosis

## Description

Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's Disease, is a rapidly progressive neuromuscular disease caused by the destruction of nerve cells in the brain and spinal cord. This causes loss of nervous control of the voluntary muscles, resulting in the degeneration and atrophy of the muscles. Eventually the respiratory muscles are affected which leads to death from an inability to breath.

## Causes

There are three types of ALS: sporadic, familial, and Guamanian. The most common form is sporadic. A small number of cases are inherited genetic disorders (familial). A large number of cases, however, occur in Guam and other Pacific territories. The familial type of ALS is caused by a genetic defect in superoxide dismutase, an antioxidant enzyme that continuously removes the highly toxic free radical, superoxide.

The causes of sporadic and Guamanian ALS are unknown. Several hypothesis have been proposed including: Glutamate toxicity; Oxidative stress; Mitochondrial dysfunction; Autoimmune disease; Infectious diseases (Lyme disease, poliomyelitis, HIV, and Tertiary syphilis); Toxic chemical exposure (pesticides); Heavy metals toxicity (lead, mercury, aluminum, and manganese); Calcium and magnesium deficiency; Carbohydrate metabolism; and Growth factor deficiency.

## Conventional Lab Tests

There are no specific lab tests for ALS, although there may be a deficiency in hexosaminidase.

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. This test is offered by itself or included in the Comprehensive Detoxification Profile. It is especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

The Cellular Energy Profile evaluates organic acids that play a pivotal role in the generation of cell energy. The test can reveal metabolic distress associated generalized pain and fatigue, which may arise in response to toxic exposure, nutrient imbalances, digestive dysfunction and other causes. Plants synthesize and store energy from sunlight and nutrients. How efficiently the human body recovers this energy from plants or animals that eat plants can have a profound effect on physiological function.

IGF-1 (Insulin-like Growth Factor-1 or Somatomedin C) (serum) mediates many of the in vivo cell division and metabolic effects of growth hormone. IGF-1 is a valuable diagnostic tool for the evaluation of suspected growth hormone disorders.

# Alzheimer's Disease

## Description

Alzheimer's disease is a degenerative organic mental disease characterized by progressive brain deterioration and dementia; usually occurring after age 65. The diagnosis is made on clinical grounds after ruling out treatable disorders with similar characteristics.

## Causes

The exact cause of Alzheimer's disease is unknown. Toxic beta-amyloid deposits in neuritic plaques and arteriolar walls appear critical to pathogenesis. The beta-amyloid precursor gene is localized to chromosome 21.

Several mechanisms have been proposed, including: slow virus, metals (aluminum), acceleration in normal aging, and autoimmune attack.

Risk factors include: Aging, Head trauma, Low education level, Down syndrome, Positive family history, and Inheritance of the E4 allele of apolipoprotein E gene on chromosome 19.

## Conventional Lab Tests

Conventional lab tests are used to help rule out other causes of dementia: CBC, Chemistry panel, Thyroid function studies, Folate and B-12 levels, VDRL, Urinalysis, ECG (atrial fibrillation), and HIV antibody (in selected cases).

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Elemental Analysis, Toxic Elements, Urine evaluates (random or 24-hour) for levels of 10 toxic elements - Aluminum, Cadmium, Heavy Metals (Antimony, Arsenic, Mercury), Lead, Nickel, Tin and Uranium.

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes include: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites.

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. This test is offered by itself or included in the Comprehensive Detoxification Profile. It is especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

# Headache, Tension and Cluster

## Description

Tension headache can be divided into two types: Episodic - usually associated with some stressful event, is of moderate intensity, self-limited, and usually responds to nonprescription preparations; and Chronic - often recurring daily, bilateral location, usually occipito-frontal and associated with contracted muscles of the neck and scalp.

A cluster headache is characterized by attacks of severe, unilateral headache around the eye and temple with ipsilateral lacrimation, rhinorrhea, ptosis, miosis and nasal stuffiness. Attacks last approximately 30-120 minutes and occur 1-3 times per day (often waking the patient) at the same time of day for up to 12 weeks typically followed by 1-24 months without an attack.

## Causes

Tension headaches can be caused by: poor posture; stress and/or anxiety; depression (found in 70% of those with daily headache); low platelet serotonin; cervical osteoarthritis; or intramuscular vasoconstriction. Risk factors for tension headaches include: obstructive sleep apnea; medications; and excess caffeine.

The exact cause of cluster headaches is unknown. Several mechanisms have been proposed, including: disorder of arterial tone in cerebral arteries; disturbance of circadian rhythm based in hypothalamus; disorder of serotonin metabolism or transmission in CNS; and disorder of histamine concentrations or receptors. Risk factors include: male sex; age > 30 years; and previous head injury or surgery. Attacks may be triggered by nitroglycerine or alcohol.

## Conventional Lab Tests

Standard labs include a CBC, SMAC-20, and Thyroid studies. An ESR is ordered for those over 50 years of age. Imaging studies include an X-ray of cervical spine. A CT or MRI of the head is necessary only when headache pattern has recently changed or there is a positive finding on neurological exam.

## Specialty Lab Tests

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes include: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underly anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period.

The Comprehensive Melatonin Profile analyzes 3 saliva samples for the secretion pattern of melatonin. Melatonin imbalance has been associated with Seasonal Affective Disorder, infertility, sleep disorders, and compromised immune function.

# Insomnia

## Definition

Insomnia is a broad term for difficulties with sleep, including the inability to fall asleep or to stay asleep. Brief periods of insomnia are common, and it is estimated that one-third of adults suffer from some form of insomnia.

## Causes

About half of all cases of insomnia do not have an identifiable cause (i.e. idiopathic insomnia). Specific causes of insomnia include: Substance abuse: caffeine, alcohol, recreational drugs, long-term sedative use, stimulants, decongestants, and bronchodilators; Disruption of circadian rhythms: usually caused by working late-night shifts or travel across time zones; Menopause: Insomnia is present in 30-40% of menopausal women; Older age: Elderly people experience a normal decrease in depth, length and continuity of sleep; Medical illness: gastro-esophageal reflux disease (GERD), fibromyalgia, hyperthyroidism, dementia, arthritis and other painful conditions are associated with insomnia. Transient situational insomnia is caused by stress at work or school, or by family illness. Insomnia may also be caused by hormonal imbalances in cortisol and melatonin. Melatonin is formed from serotonin, which is formed from tryptophan or 5-HTP.

Cortisol secretions are characterized by a steep increase in the morning, peaking at approximately 8 a.m., followed by a gradual tapering off until about midnight, when circulating levels are at their lowest. Rapid eye movement (REM) sleep occurs primarily when cortisol levels are decreasing, and wakefulness and Stage 1 sleep are associated with increased plasma cortisol concentrations.

Melatonin is the main modulator of neuroendocrine function and regulates the Hypothalamic-Pituitary-Adrenal axis. Patients with low cortisol exhibit decreased melatonin levels with a disrupted circadian rhythm. Melatonin has a pivotal role in regulating body temperature, the sleep-wake cycle, female reproductive hormones, and cardiovascular function. Hence disrupted secretion rhythms are widespread in many degenerative illnesses.

## Conventional Lab Tests

There are no specific lab tests for insomnia. Diagnosis can be confirmed by polysomnography, particularly if sleep apnea is suspected.

## Specialty Lab Tests

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underlie anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period.

The Comprehensive Melatonin Profile analyzes 3 saliva samples for the secretion pattern of melatonin. Melatonin imbalance has been associated with Seasonal Affective Disorder, infertility, sleep disorders, and compromised immune function.

The Menopause Profile examines four salivary samples over a 2-week period to determine levels of  $\beta$ -estradiol, progesterone, and testosterone for women who are peri- or post-menopausal.

# Memory Loss

## Definition

Memory loss is considered a symptom of an underlying disease.

## Causes

Alzheimer's disease, Amnesia, Dementia, Depression, Dissociative disorders, Epilepsy, Huntington's chorea, Hypertriglyceridemia, Hypothyroidism, Multiple sclerosis, Multiple chemical sensitivity, Pick's disease, Schizophrenia, Sleep apnea, Brain injury (head trauma, concussion, stroke, electric shock), Brain anoxia (oxygen deprivation), Infections (Limbic encephalitis, HIV, Syphilis, Lyme disease, Chronic meningitis, Whipple's disease), Toxic exposure (Carbon monoxide), Drug intoxication (Amphetamine, Triazolam). Alcohol causes a mild impairment of recent memory.

Early thiamin (vitamin B1) deficiency causes fatigue, irritation, poor memory, sleep disturbances, precordial pain, anorexia, abdominal discomfort, and constipation. Continued carbohydrate ingestion gradually exhausts thiamine stores in critical areas of the thalamus and brainstem reticular formation.

Pellagra (niacin, vitamin B3 deficiency) is typically associated with dermatitis, dementia, and diarrhea. Fatigue, insomnia, and apathy may precede the development of an encephalopathy characterized by confusion, disorientation, hallucination, loss of memory, and eventually, organic psychosis.

Cobalamin (vitamin B12) deficiency without hematologic abnormalities is surprisingly common, especially in the elderly. These patients may present with neuropsychiatric abnormalities, including peripheral neuropathies, gait disturbance, memory loss, and psychiatric symptoms

Aluminum is readily absorbed into blood and accumulates in brain, bone, and erythroid tissues and can cause disabling neurologic, skeletal, and hematologic manifestations including malaise, memory loss, asterixis (involuntary jerking), dementia, twitches, and other manifestations of metabolic encephalopathy, including seizures and death.

Chronic exposure to metallic mercury produces a characteristic intention tremor and mercurial erethism, a constellation of findings including excitability, memory loss, insomnia, timidity, and sometimes delirium.

Cognitive function can be impacted in several ways, including: The damaging effects of years of free radical exposure (oxidative stress); Hormonal imbalances and decreased levels of key hormones, especially pregnenolone, DHEA and melatonin; Declining energy output of brain cells (mitochondrial stress); Essential fatty acid deficiencies (the brain is composed almost entirely of fatty acids).

## Specialty Lab Tests

The Elemental Analysis, Provocative Challenge evaluates urine before and after administration of chelating agents. It measures levels of 10 toxic and 8 nutrient minerals. This test is used to evaluate mineral levels and to monitor the effectiveness of chelation therapy.

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.

The Female Hormone Profile analyzes the levels of  $\beta$ -estradiol, progesterone, and testosterone. The Comprehensive version includes the Adrenocortex Stress Profile and the Comprehensive Melatonin Profile to reveal how the sex hormones are influenced by cortisol, DHEA, and melatonin.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate). In the Comprehensive version, the urine is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge.

# Migraine

## Description

Migraines are paroxysmal, usually unilateral, severe headache lasting 2-72 hours, accompanied by gastrointestinal, visual, or other neurological signs, and with complete freedom from symptoms between episodes. Episodes vary in frequency from weekly to less than one per year. Common migraines (without aura) affects 80% of patients, whereas the classic migraine (with aura - consistent warning symptoms before the headache) affects less than 20% of patients.

## Causes

Exact cause of migraines is unknown unknown. Several mechanisms have been proposed, including: Abnormality of serotonin metabolism; Disturbance of regional cerebral blood flow; and Dilatation of scalp arteries. Individual attacks may be precipitated by: Specific foods (chocolate, cheese, smoked meats) or alcohol (red wine); Missing meals; Menstrual cycle or Oral contraceptives; Fatigue or excessive sleep; Excessive or flickering light; or Stress or relief of stress (the "weekend migraine").

Risk factors include: Family history of migraine; Female sex; Young age; and a Personal history of childhood recurrent abdominal pain, cyclical vomiting, or motion sickness.

Food additives can produce systemic symptoms (monosodium glutamate); asthma (metabisulfite, tartrazine—a yellow dye); and possibly urticaria (tartrazine). Aspartame (Nutrasweet) in diet sodas can also cause headaches.

Migraines may also be caused by valvular heart disease (mitral valve prolapse) which causes orthostatic hypotension and excess sympathetic tone (catecholamine release).

Serotonin metabolism is the focus of recent research. The mechanism is related to episodic reductions in serotonin which causes intracranial arterial vasodilation. Prodromal symptoms may be due to intracerebral vasoconstriction, and some attribute the head pain to substances released by the dilation of scalp arteries.

## Conventional Lab Tests

Standard lab tests are used to rule out other causes of headaches. A SED rate will be elevated in temporal arteritis. A complete blood count is ordered if meningitis or encephalitis is suspected. Imaging studies may be ordered to rule out cerebral tumor or vascular malformation.

## Specialty Lab Tests

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods. Vegetarian food categories include dairy, eggs, fruits, nuts and grains, and vegetables. The Inhalants Profile is an ELISA test of IgE antibodies to 36 region-specific pollens and environmental inhalants.

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Metabolic Analysis Profile evaluates four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Analytes include: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites. Specimen Requirements: First morning urine collection; 2 tubes (samples frozen).

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone.

# Multiple Sclerosis

## Description

Multiple sclerosis is a recurrent (occasionally progressive) inflammatory demyelination of the white matter of the brain and spinal cord resulting in multiple and varied neurological symptoms. The usual course is intermittent, progressive and relapsing. Multiple sclerosis predominantly affects young men between the ages of 16 and 40.

## Causes

The cause is unknown. Several theories have been proposed. The autoimmune theory (autoimmune attack of myelin basic protein by T cells or tumor necrosis factor alpha) is supported by HLA linkage, hereditary pattern, immunocytes in plaques, and changes in peripheral blood immunocytes. The viral theory is supported by increasing incidence of disease at higher latitudes, clusters of cases with families, geographical clusters of cases, and animal studies of infectious diseases of myelin. The combined theory involves an autoimmune disorder triggered by environmental exposure to toxin or virus early in life.

Risk factors for multiple sclerosis include: Living in temperate zone; Northern European descent; and a Family history of the disease.

## Conventional Lab Tests

Tests of the cerebrospinal fluid show an abnormal colloidal gold curve, elevated gamma globulin IgG, mild mononuclear pleocytosis (less than 40 cells/mL), myelin debris, and normal or slightly elevated protein of 50-100 mg/100 mL (50-100 mg/dL [500-1000 mg/L]). Serology for syphilis is negative.

Tests to exclude other disorders include: Fluorescent treponemal antibody absorption (FTA-ABS); Sedimentation rate; Screens for clinically suspected vasculitic disorders; and Human T-lymphotropic virus-1 (HTLV-1) serology.

## Specialty Lab Tests

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

In the Comprehensive version of this profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Oxidative Stress Analysis (Blood & Urine) identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. Offered by itself or included in the Comprehensive Detoxification Profile. Especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

# Myasthenia Gravis

## Description

Myasthenia gravis is characterized by episodic muscle weakness, chiefly in muscles innervated by cranial nerves, and characteristically improved by cholinesterase-inhibiting drugs. It is a disorder of the neuromuscular junction resulting in a pure motor syndrome characterized by weakness and fatigue particularly of the extraocular, pharyngeal, facial, cervical, proximal limb and respiratory musculature. The disease predominates in women, most commonly presents between 20 and 40 yr of age, but may occur at any age.

## Causes

Myasthenia gravis is caused by humoral and cellular immune-mediated injury of the post-synaptic neuromuscular junction acetylcholine receptors.

Risk factors include: Female; Age 20-40; Familial myasthenia gravis; D-penicillamine ingestion (which can produce SLE and other autoimmune reactions); and other autoimmune diseases.

Aminoglycoside and polypeptide antibiotics decrease both presynaptic acetylcholine release and sensitivity of the postsynaptic membrane to acetylcholine. Especially at high serum levels, these antibiotics may increase neuromuscular block in patients with latent or manifest defects in neuromuscular transmission. Long-term penicillamine treatment may cause a reversible syndrome that clinically and electrically resembles myasthenia gravis.

The toxin produced by *Clostridium botulinum* spores, which destroys terminal cholinergic nerve twigs, causes symptoms that may be confused with the Guillain-Barré syndrome, poliomyelitis, stroke, myasthenia gravis, tick paralysis, and poisoning due to curare or belladonna alkaloids. Pets may develop botulism from eating the same contaminated food.

Organophosphate insecticides and most nerve gases block neuromuscular transmission by depolarizing postsynaptic receptors by excessive acetylcholine. Miosis, bronchorrhea, and myasthenic-like weakness occurs.

Acute thiamine deficiency (pellagra) is characterized by cutaneous, mucous membrane, CNS, and GI symptoms. The complete syndrome of advanced deficiency includes scarlet stomatitis and glossitis, diarrhea, dermatitis, and mental aberrations. In severe alcoholism, continued carbohydrate ingestion gradually exhausts thiamine stores in critical areas of the thalamus and brainstem reticular formation.

## Conventional Lab Tests

The specific test for myasthenia gravis is the acetylcholine receptor antibody. In generalized myasthenia it is 80% positive; and in ocular myasthenia it is 50% positive; with myasthenia + thymoma it is 100% positive; in congenital myasthenia it is 0% positive. There is no clear correlation between antibody titer and disease severity. Thyroid function tests should be checked.

Diagnosis is confirmed by improvement with anticholinesterase drugs: Edrophonium. Cholinergic drugs include: Pyridostigmine, Neostigmine, Atropine, Propantheline, and Ephedrine.

## Specialty Lab Tests

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).



# Parkinson's Disease

## Description

Parkinson's disease is an adult onset neurodegenerative disorder of the extrapyramidal system characterized by a combination of tremor at rest, rigidity, stiffness and bradykinesia. Shuffling gait and en bloc turning are key signs. Postural hypotension and constipation are also common symptoms. The diagnosis requires therapeutic response to levodopa which implies normal striatal neurons. This is the only neurodegenerative disease which is treatable long term.

## Causes

The specific cause of Parkinson's disease is unknown. There is an increased loss of dopaminergic neurons in the substantia nigra with rate of loss 1% per year in patients with Parkinson's versus 0.5% in normal aging. Parkinson's disease is most likely not genetic. It may be toxic or infectious. Exposure to the toxic substance is MPTP (1-methyl-4 phenyl-1,2,5,6-tetrahydropyridine) is known to cause Parkinson's disease. Pesticide exposure is also implicated. Other non-dopaminergic neurons can also be effected.

Free radical damage has also been implicated as a possible cause of neuronal cell death in Parkinson's disease. It is theorized that an environmental toxin, perhaps in genetically susceptible patients, may cause free radical formation that destroys cells in the substantia nigra.

Tremors can be caused by several mechanisms, including: Creutzfeldt-Jakob Disease (a slow virus), Pheochromocytoma, Magnesium deficiency, Zinc deficiency, Porphyria, Hyperthyroidism, Lithium toxicity, Fructose intolerance, Resorcinol poisoning (a formaldehyde resin used in glues and rubber), heavy metal toxicity (Manganese, Tin, Mercury, Copper, Lead), Hypoglycemia, Insulinoma, Respiratory acidosis, Shy-Drager syndrome (plasma norepinephrine does not increase on standing), Carbon disulfide poisoning, and Toxaphene poisoning (DDT).

## Conventional Lab Tests

Parkinson's disease is diagnosed by clinical symptoms. As such, there are no specific lab tests. A CT or MRI can eliminate disorders that mimic Parkinson's. A PET scan may also be ordered.

## Specialty Lab Tests

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes include: Creatinine and 39 organic acids ratioed to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

In the Comprehensive Detoxification Profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Restless Leg Syndrome

## Description

Restless legs syndrome refers to an irresistible urge to move the legs when awake and inactive, especially when lying in bed just prior to sleep. This interferes with the ability to fall asleep. Often there is a creeping or crawling sensation deep within the calves or thighs, or sometimes even in the upper limbs, that is only relieved briefly by movement, particularly walking. The severity of this chronic, idiopathic disorder may wax and wane with time and can be exacerbated by caffeine and pregnancy. Nearly all patients with restless legs also experience periodic limb movement disorder during sleep, although the reverse is not the case. Restless legs syndrome occurs most commonly in middle-aged women.

The restless sensation may be accompanied by myoclonic jerks of muscle. These myoclonic jerks are similar to the myoclonus observed in normal individuals entering REM sleep.

## Causes

Restless leg syndrome often has a familial basis, with evidence of autosomal dominant inheritance. Restless leg syndrome can be caused by iron or folic acid deficiency anemia and renal failure. Certain conditions are characterized by a compulsion to move the extremities. Akathisia, or motor restlessness, occurs in Parkinson's disease and other disorders of the basal ganglia, including drug-induced movement disorders. Restless leg syndrome is also associated with fibromyalgia.

## Conventional Treatment

Symptoms may respond to treatment with dopaminergic medication (such as levodopa or bromocriptine), benzodiazepines (diazepam or clonazepam), or opiates (codeine, propoxyphene, or oxycodone).

## Conventional Lab Tests

Lab tests would include a complete blood count, tests for iron status (Iron or Ferritin; Iron or Transferrin Saturation; Total Iron Binding Capacity), folic acid levels, and kidney function tests (BUN, phosphorous, LDH, creatinine, creatinine clearance, uric acid, total protein, A/G ratio, albumin, globulins, calcium, glucose, and cholesterol).

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

Hormone testing is indicated by the relationship with pregnancy and predilection for middle-aged women. The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The detoxification profile is indicated due to the association with caffeine. The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

# Seizures

## Definition

Seizures are defined as sudden alteration of behavior, characterized by a sensory perception or motor activity without or with change in awareness or consciousness, due to aberrant cortical electrical activity. Partial seizures begin locally without impairment of consciousness, and with complex symptoms (with impairment of consciousness). Generalized seizures occur bilaterally, symmetrically and are without local onset. A third classification of seizures are unclassified epileptic seizures.

## Causes

Causes of seizures include: Brain tumor, Cerebral hypoxia (breath holding, carbon monoxide poisoning, anesthesia), Cerebrovascular accident (infarct or hemorrhage), Convulsive or toxic agents (lead, alcohol, cocaine, camphor, chloroquine, pentylenetetrazol, picrotoxin, strychnine), Eclampsia (during pregnancy), Exogenous factors (sound, light, cutaneous stimulation), Head injury, Hyperpyrexia (acute infection, heat stroke), Metabolic disturbances (hypoglycemia, hypoparathyroidism, phenylketonuria, uremia, hepatic failure, electrolyte abnormality) or Anaphylaxis (foreign serum or drug allergy). Convulsions may also occur as a withdrawal symptom after chronic use of alcohol, hypnotics, or tranquilizers.

## Conventional Lab Tests

Conventional lab tests include serum tests for glucose, sodium, potassium, calcium, phosphorus, magnesium, BUN, and ammonia; Anticonvulsant levels (inadequate level of anticonvulsant medication is the most common cause of recurrent seizures in children, and many adults); Drug and toxic screens (including alcohol); and a complete blood count (which may be helpful in evaluating infection).

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Amino Acids Analysis examines fasting blood or 24-hour urine samples for 40+ amino acids and provides information on a wide spectrum of metabolic and nutritional disorders, including: protein inadequacy, gastrointestinal insufficiencies, inflammatory responses, vitamin and mineral dysfunctions, detoxification impairments, cardiovascular disease, ammonia toxicity, food and chemical sensitivities, depression, neurological dysfunction, and inborn errors of metabolism.

# Trigeminal Neuralgia

## Description

Trigeminal neuralgia (tic douloureux) is a disorder of the sensory nucleus of the 5th cranial nerve (trigeminal nerve) which causes bouts of severe lancinating pain along the nerve. Trigeminal neuralgia is often precipitated by stimulation of well-defined trigger paths, usually around the mouth and nose, and, occasionally inside the mouth. Trigeminal neuralgia usually affects only one side (ipsilateral).

## Causes

Trigeminal neuralgia is most commonly compression of the trigeminal nerve by arteries or veins of the posterior fossa. Inflammatory and degenerative changes are often found in the semilunar ganglion.

Causes of neuralgia include: Chronic intoxication (alcohol, arsenic, lead, other drugs); Viral infections (post-herpetic); Bacterial infections (Shigella, Brucella, Leptospirosis, Lyme, Secondary syphilis, Mycobacterium leprae); Metabolic and inflammatory disorders (diabetes, gout, rheumatoid arthritis, systemic lupus erythematosus); Vitamin deficiencies (B1, B12, B3, B6, E); Drug reaction (chloramphenicol, nitrofurantoin, sulfonamides, isoniazid) and serum sickness (an allergic reaction to drugs); Multiple sclerosis (optic neuritis).

## Conventional Lab Tests

An MRI or CT scan is usually ordered to rule out neoplasm in cerebellopontine angle. An ESR is ordered to rule out arteritis. A VDRL for syphilis is sometimes ordered (secondary syphilis causes cranial nerve lesions).

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.

## **Dermatology**

# Acne

## Description

Acne is an androgenically stimulated, inflammatory disorder of the sebaceous glands, resulting in comedones (whiteheads and blackheads), papules, inflammatory pustules and, occasionally, scarring. Virtually 100% of adolescents are affected to some degree, although only 15% will seek medical advice. Males tend to be more severely affected, due to the association with male hormones (androgens).

## Causes

Acne is caused by androgens (testosterone and andosterone) which stimulate the rate of keratin turnover in the sebaceous gland. The keratin plug, visible as a comedone, causes an accumulation of sebum in the gland. The presence of *Propionibacterium acnes* stimulates an inflammatory response to the sebum, which results in papule and pustule formation.

Risk factors include: Adolescence; Male sex; Androgenic steroids (e.g. steroid abuse and some birth control pills); Oily cosmetics, including cleansing creams, moisturizers, oil-based foundations; Rubbing or occluding the skin surface, as may occur with sports equipment (helmets and shoulder pads), holding the telephone or hands against the skin; Drugs (iodides or bromides, lithium, phenytoins); Systemic corticosteroids; Virilization disorders; and a Hot, humid climate.

## Conventional Lab Tests

No lab tests are recommended.

## Specialty Lab Tests

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The Male Hormone Profile analyzes 4 saliva samples over a 24-hour period for levels of testosterone. Elevated levels suggest androgen resistance, while decreased levels can result from such causes as hypogonadism, hepatic cirrhosis, lipid abnormalities and aging.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Alopecia - Hair Loss

## Description

Alopecia is the absence of the hair from skin areas where it normally is present. There are several types of alopecia, each with their own characteristic appearance and cause(s).

## Causes

Telogen effluvium can be postpartum or caused by drugs (oral contraceptives, anticoagulants, retinoids, beta blockers, chemotherapeutic agents, interferon), stress (physical or psychological), hormonal (hypo- or hyperthyroidism, hypopituitarism), nutritional (malnutrition, iron deficiency, zinc deficiency), or diffuse alopecia areata.

Anagen effluvium can be caused by Mycosis fungoides, X-ray treatment, drugs (chemotherapeutic agents, allopurinol, levodopa, bromocriptine), or poisoning (bismuth, arsenic, gold, boric acid, thallium).

Cicatricial alopecia can be caused by congenital and developmental defects, infection (leprosy, syphilis, varicella-zoster, cutaneous leishmaniasis), basal cell carcinoma, epidermal nevi, physical agents (acids and alkali, burns, freezing, radiodermatitis), cicatricial pemphigoid, lichen planus, or sarcoidosis.

Androgenic alopecia can be caused by adrenal hyperplasia, polycystic ovaries, ovarian hyperplasia, carcinoid, pituitary hyperplasia, or drugs (testosterone, danazole, ACTH, anabolic steroids, progestones)

Alopecia areata can be idiopathic (of unknown cause), but may be autoimmune in nature.

Traction alopecia can be caused by trichotillomania (direct self-pulling of the hair) or tight rollers or braids.

Tinea capitis can be caused by fungal infection with *Microsporum* species or *Trichophyton* species.

## Conventional Lab Tests

Standard labs include thyroid function tests, complete blood count, free testosterone and DHEA-S in women with androgenic alopecia, Serum ferritin, VDRL or RPR for syphilis, and Lymphocyte T and B cell numbers (which are sometimes low in patients with alopecia areata)

A potassium hydroxide (KOH) examination of the scale, if present, will be positive in tinea capitis. A fungal culture of the scale may identify the causative species. A scalp biopsy with routine microscopy and direct immunofluorescence will aid in the diagnosis of tinea capitis, diffuse alopecia areata, and the scarring alopecias due to lupus erythematosus, lichen planus, and sarcoidosis. A microscopic examination of the hair shaft may be ordered. The "light hair-pull test" will be positive in alopecia areata.

## Specialty Lab Tests

Yeast Culture & Sensitivity evaluates and quantitates presence of yeast. The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone.

The Comprehensive Thyroid Assessment measures TSH, free T4, free T3, Reverse T3, anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. Four salivary samples of cortisol are taken over a 24-hour period.

# Pemphigus vulgaris

## Description

Pemphigus vulgaris is an uncommon, debilitating, potentially fatal skin disorder characterized by intraepidermal bullae that appear on normal appearing skin without surrounding inflammation.

## Causes

Pemphigus is associated with HLA-A10 and HLA-DR4 antigens. There is a higher incidence among persons of Jewish or Mediterranean descent.

Pemphigus is an autoimmune disorder with specific IgG antibodies and sometimes complement which are deposited at sites of epidermal cell damage. Many medications (particularly penicillamine) can cause pemphigus.

Pemphigus may be an adverse reaction to thiol groups found in most drugs and the Allium family, which includes garlic, onions and leeks.

Serum IgG and IgA gliadin antibodies have been found to be increased in patients with pemphigus. This may be due to increased intestinal permeability. Alternatively gliadin may somehow precipitate the autoimmune process.

Dysfunctional calcium metabolism may also be present in pemphigus. The pemphigus foliaceus antigen appears to contain a calcium-sensitive epitope, and in pemphigus vulgaris, alteration in the function of calcium-sensitive cadherins may play a role in the production of acantholysis.

Pemphigus may have a hormonal component. Pemphigus is also associated with pregnancy, and studies have shown increased levels of estradiol and reduced ones of testosterone. Lowered DHEA levels have also been found. DHEA deficiency is often found in autoimmune diseases, and may contribute to their etiology and/or pathophysiology. Increased levels of ACTH and hydrocortisone have been found in patients with pemphigus.

## Conventional Lab Tests

Autoantibody titers (by immunofluorescent studies) are routinely ordered. Titer corresponds to severity of the disease

Causative antigens are located on the exterior surface of the cytoplasmic membrane of epithelial cells. Biopsy shows acantholytic intraepidermal bullae. Light microscopy shows suprabasal cleft formation and acantholysis (tumor formed by proliferation of epithelial squamous cells).

## Specialty Lab Tests

Anti-Gliadin Antibody Assay assays a single saliva specimen for immune reaction to gluten.

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods.

The Intestinal Permeability Assessment analyzes urinary clearance of two non-metabolized sugars. It is used to identify “leaky gut syndrome” and malabsorption.

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. Four salivary samples of cortisol are taken over a 24-hour period.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.



# Psoriasis

## Description

Psoriasis is a genetically determined (sporadic) common, chronic, epidermal proliferative disease clinically characterized by erythematous, dry scaling patches, recurring remissions and exacerbations. Flares may be related to systemic and environmental factors. Psoriasis usually appears between ages 10 and 30, but can develop in infants and in the elderly. There are several clinical forms: Discoid or plaque psoriasis is the most common. Patches appear on scalp, trunk and limbs. The nails may be pitted and/or thickened. Guttate psoriasis occurs most frequently in children, numerous small papules over wide area of skin, but greatest on the trunk. Pustular psoriasis has small pustules over the body or confined to one area (i.e., palms and soles) or arranged in annular patterns (especially children). Inverse flexural psoriasis affects the flexural areas, lesions are moist and without scales (common in older people). Erythroderma (exfoliative psoriasis or red man syndrome) patients skin turns red, may result from a flare of pre-existing dermatosis. Ostraceous is grossly hyperkeratotic.

## Causes

Risk factors for psoriasis include: Local trauma; Local irritation; Infection (streptococcal pharyngitis can stimulate acute guttate psoriasis, HIV); Endocrine changes; Stress (physical and emotional); Sudden withdrawal of systemic and/or potent topical steroids; Alcohol use; and Obesity.

## Conventional Lab Tests

Standard lab tests include a latex fixation test; fungal studies (which may show a superimposed infection); Uric acid (increased in 10-20%); and a rheumatoid factor (to rule out arthritis). Leukocytosis and increased sedimentation rate often seen, especially in pustular psoriasis. In severe cases, anemia, B12, folate and iron deficiency can be present.

## Specialty Lab Tests

The Yeast Culture & Sensitivity evaluates and quantitates presence of yeast and may include a sensitivity panel of drugs and botanicals on all pathogens.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

# Scleroderma

## Description

Scleroderma (progressive systemic sclerosis) is a chronic disease of unknown etiology, characterized by diffuse fibrosis, degenerative changes, and vascular abnormalities in the skin, articular structures and other organs (kidneys, lung, heart, gastrointestinal and skeletal muscles). The majority of manifestations have vascular features (e.g., Raynaud's phenomenon), but frank vasculitis is rarely seen. It can range from a mild disease, affecting the skin, to a systemic disease that can cause death in a few months. Scleroderma predominantly affects women (Female:Male = 4:1). Symptoms usually appear in the 3rd to 5th decade.

The CREST syndrome (calcinosis, Raynaud's phenomenon, esophageal dysmobility, sclerodactyly, telangiectasia) often occurs. Associated syndromes include Rheumatoid arthritis, Systemic lupus erythematosus, and Polymyositis.

Treatment is symptomatic and supportive. Dialysis may be necessary as the disease progresses.

## Causes

The cause of scleroderms is unknown. Several mechanisms have been proposed, including alterations in immune response. There are some association with quartz mining, quarrying, vinyl chloride, and hydrocarbons. Treatment with bleomycin (an antibiotic which splits single and double-stranded DNA) has caused a scleroderma-like syndrome.

## Conventional Lab Tests

Scleroderma results in several altered lab tests: Increased ESR; ; Normocytic Normochromic anemia; Positive ANA; Anti-centromere antibody; Anti-Scl-70 (topoisomerase antibody); Positive nucleolar immunofluorescence; Albuminuria; Microscopic hematuria; Eosinophilia; Hemolysis; Hypergammaglobulinemia. Respiratory function tests show decreased maximum breathing capacity; Increased residual volume; and a Diffusion defect. Positive rheumatoid factor test is found in 33%.

## Specialty Lab Tests

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

In the Comprehensive version of this profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

Oxidative Stress Analysis (Blood & Urine) identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. Offered by itself or included in the Comprehensive Detoxification Profile. Especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

## **Immune**

# Allergies

## Description

Allergies are caused by the immune system's over-reaction to everyday substances, which the body identifies as foreign invaders. The invaders are not viruses or bacteria. They are harmless substances: pollens, dust, mold spores or harmless microscopic bugs called dust mites that live in carpets, clothing and bedding. Hay fever (allergic rhinitis), one of the most common allergies, is triggered by pollens.

The acute allergic response is mediated by IgE receptors on mast cells that respond to specific antigens, such as dust or pollen. The antigen (foreign particle) and antibody unite and initiate a cascade of events in the mast cell culminating in its degranulation and production of inflammatory mediators including histamine, leukotrienes, prostaglandins, proteases and platelet activating factor. An immediate symptomatic response occurs followed by a more prolonged, persistent late phase reaction. This involves the infiltration into the reactive region of eosinophils, neutrophils, basophils and mononuclear cells.

Standard medical treatment for allergies involves taking decongestants and antihistamines. Decongestants open clogged nasal passages and have drying action. Antihistamines suppress the body's release of histamine. Decongestants can cause insomnia and raise blood pressure. Antihistamines may cause drowsiness. Both may lose effectiveness after a while. They also interfere with, and according to some experts, weaken the immune system.

## Conventional Lab Tests

A complete blood count with show eosinophilia. Epicutaneous (prick or puncture) allergy skin tests are useful in documenting IgE mediated immunologic hypersensitivity. Radioallergosorben (RAST) testing can also detect specific IgE antibodies to offending foods.

## Specialty Lab Tests

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Inhalants Profile is an ELISA test of IgE antibodies to 36 region-specific pollens and environmental inhalants.

# Chronic Fatigue Syndrome

## Description

Chronic fatigue syndrome (CFS) is characterized primarily by profound fatigue, in association with multiple systemic and neuropsychiatric symptoms, lasting at least 6 months, and severe enough to reduce/impair daily activity.

## Causes

The cause of CFS is unknown. Multiple immunologic abnormalities suggestive of viral reactivation syndrome have been reported, but no one source identified. Attention is given most to herpes (Epstein Barr Virus and Human Herpes Virus-6) and other enteroviruses, possibly in concert, possibly with environmental factors.

Several mechanisms have been proposed by researchers, including: Immune system activation, particularly by viruses; Oxidative stress and glutathione deficiency; Endocrine dysfunction, including adrenal fatigue, thyroid deficiency and hypothalamic-pituitary axis abnormalities; Neurotransmitter deficiencies; and Drug-induced fatigue.

Paul Cheney has proposed that CFS may be due to viruses, especially herpes viruses (like Epstein-Barr virus, cytomegalovirus, and human herpes virus 6), which make proteins that activates the immune system to fight bacteria instead of viruses. In this way the viruses are able to “fool” the immune system and remain untouched by the bodies natural defenses.

Dr. Martin L. Pall has proposed that chronic infections cause a chain of events leading to excessive inflammation and free radical production. Chronic infections induce excessive production of inflammatory cytokines, which induce nitric oxide synthase to synthesize excessive amounts of nitric oxide, which reacts with superoxide to produce the potent oxidant peroxynitrite (nitrogen dioxide), which acts to increase the levels of both nitric oxide and superoxide which react to produce more peroxynitrite.

## Conventional Lab Tests

Initial lab studies include: Chemistry panel; CBC; Urinalysis; and Thyroid function tests. Additional studies include: ESR; ANA; VDRL; Rheumatoid factor; Purified protein derivative; Serum cortisol; HIV; Immunoglobulin; and Epstein-Barr serology.

## Specialty Lab Tests

The Adrenocortex Stress Profile accurately measures unbound levels of both cortisol and DHEA, and provides a complete circadian analysis of cortisol activity. Controlled collection times allow for accurate baseline testing and effective monitoring of hormone replacement therapy.

The Detoxification Profile from Great Smokies Diagnostic Laboratory assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

Oxidative Stress Analysis (Blood & Urine) identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. Offered by itself or included in the Comprehensive Detoxification Profile. Especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

# HIV and AIDS

## Description

AIDS is caused by the HIV (Human Immunodeficiency Virus) virus, a virus found primarily in blood, semen, vaginal secretions, and breast milk. The HIV virus weakens the immune system by infecting and often killing T-helper cells (CD4 lymphocytes), making the body more vulnerable to a host of other infections. Fever, weight loss, swollen lymph glands, and the development of various cancers and infections are all symptomatic of the disease. As of 1993 all HIV infected persons with < 200 CD4 cells are categorized as AIDS.

## Causes

Risk factors for HIV infection include: Sexual activity: Homosexual men are at greatest risk, but all sexually active people are at risk, dependent on the risk factors of, and number of, sexual partners; Injection drug use (sharing of contaminated needles); Recipients of blood products: Highest risk from 1975 to March 1985 when HIV screening of blood was instituted. Transmission outside this time period is less likely. Hemophiliacs who have received pooled plasma products are at high risk. (Neither gamma globulin nor Hepatitis B vaccine produced in the United States have been identified with HIV transmission.); Children of HIV-infected women: About 30% of the children of women with HIV infection during pregnancy will be infected; Breast feeding is a possible route of transmission and therefore not recommended for infected mothers. Prenatal, intrapartum and postpartum zidovudine significantly decreases the risk of HIV transmission from mother to child. Health care workers greatest risk is needle stick (estimate 1 in 250 for hollow needles)

## Conventional Lab Tests

Many illnesses mimic HIV infection. Standard HIV lab tests are the ELISA, which is reported as reactive or non-reactive. Reactive tests should be repeated. Repeatedly reactive tests are confirmed by another type of test (most commonly the Western Blot). Sensitivity and specificity of ELISA test is > 98% and may approach 100%.

The Western blot (WB) test results are positive, negative, or indeterminate (indeterminate tests result from non-specific reactions of HIV-negative sera with some HIV proteins). Currently the CDC recommends reaction with two of the following three bands as criteria for positivity: P24; gp41, and gp 120/160. If the WB is indeterminate, perform follow-up testing at three and six months.

## Specialty Lab Tests

Protecting the body against free radical damage can help it better fend off viruses and may slow the progression of AIDS.

AIDS patients often suffer from serious health complications related to impaired digestive function. Many individuals with AIDS present with "leaky gut"—damage to the GI barrier that can further compromise health by increasing the penetration of toxins and allergens.

Adrenal Hormones: Some researchers believe that imbalances of the adrenal hormones cortisol and DHEA suppress immune response and make the body more vulnerable to the viral infections associated with AIDS.

Nutritional imbalances of fatty acids are critical, because they play such a key role in regulating the body's immune response.

Males with low circulating levels of testosterone may be more prone to muscle wasting and other symptoms of a more aggressive infection.

## **Musculoskelatal**

# Ankylosing Spondylitis

## Description

Ankylosing spondylitis is a chronic, usually progressive, condition in which inflammatory changes and new bone formation occurs at the attachment of tendons and ligaments to bone (enthesopathy). Sacroiliac joint involvement (which limits lumbar flexion) is the hallmark of ankylosing spondylitis, although 20-30% of patients also have larger peripheral joint involvement.

## Causes

The cause of ankylosing spondylitis is unknown. Risk factors include HLA-B27 tissue antigen, and a positive family history.

Ankylosing spondylitis may be associated with psoriasis, Reiter's syndrome (venereal and dysenteric), inflammatory bowel disease (ulcerative colitis and Crohn's disease), uveitis and iritis.

Elevated serum titers of antibodies to certain enteric bacteria, particularly *Klebsiella pneumoniae*, are common in ankylosing spondylitis patients. There is an antigenic interrelatedness between B27 and certain enteric bacteria.

Recent research has established a link between sex hormones (elevated luteinizing hormone, inversion of estradiol/testosterone ratio, and diminished testicular reserve for testosterone, and slightly increased for estradiol) in ankylosing spondylitis.

## Conventional Lab Tests

The erythrocyte sedimentation rate (ESR) is elevated in 80% of cases, but it correlates poorly with disease activity and prognosis. Rheumatoid factor is negative. The synovial fluid shows mild leukocytosis and decreased viscosity. Cerebrospinal fluid has increased protein. An EKG will show conduction defects. The Wright-Schober test for lumbar spine flexion is abnormal. Measurement of respiratory excursion of chest wall is decreased. Less than 2.5 cm is virtually diagnostic.

Imaging studies (radiographs) of the lumbar spine and sacroiliac joint will show degenerative changes. An early sign is sclerosis on both sides of the sacroiliac joint, followed by ankylosis. The "squaring" of vertebral bodies and ossification of annulus fibrosis gives a characteristic appearance of "bamboo spine". Symmetric erosive changes will appear in larger joints, including pericapsular ossification, sclerosis, and a loss of joint space.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status. The CDSA includes: Digestive Function Analysis, Microbiology Analysis, Bacteriology Culture, Fecal Fat Analysis, and a Yeast Culture.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Male Hormone Profile analyzes 4 saliva samples over a 24-hour period for levels of testosterone. Elevated levels suggest androgen resistance, while decreased levels can result from such causes as hypogonadism, hepatic cirrhosis, lipid abnormalities and aging.



# Bursitis

## Description

Bursitis is defined as inflammation of bursa. A bursa is a sac that is formed or found in areas subject to friction, such as locations where tendons pass over bony landmarks. The most common sites are subdeltoid (upper arms), olecranon (elbows), prepatellar (knees), trochanteric (legs), and radiohumeral (lower arms). They essentially lubricate the region with synovial fluid. Large bursae usually communicate with joints and are responsible for retaining the synovial fluid in place. Bursae are fluid-filled sacs that serve as a cushion between tendons and bones. Bywaters, an English rheumatologist, found at least 78 bursae symmetrically placed on each side of the body.

## Causes

Individuals who engage in repetitive and vigorous training or others who suddenly increase their level of activity (e.g., "weekend warriors") are at higher risk of developing bursitis. Also, improper or over-zealous stretching may lead to injury.

Bursitis may be acute or chronic, and its etiology is often unknown. There are many types of bursitis, including infectious, traumatic, inflammatory or gouty. Less often rheumatoid disease or tuberculosis as well as gout and pseudogout.

## Conventional Lab Tests

Standard lab testing aids in differentiating soft tissue disease from rheumatic and connective tissue disease: CBC; ESR; Serum protein electrophoresis; Rheumatoid factor (RF); Serum uric acid; Calcium; Phosphorus; Alkaline phosphatase; VDRL; and Joint fluid analysis (when available)

## Specialty Lab Tests

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

In the Comprehensive version of this profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

# Carpal Tunnel Syndrome

## Description

Carpal tunnel syndrome is the most common cause of peripheral nerve compression. The median nerve is compressed as it traverses the carpal tunnel in the wrist and hand. The tunnel is composed of the carpal bones dorsally and the transverse carpal ligament ventrally. It contains flexor tendons and the median nerve.

Carpal tunnel syndrome tends to affect the dominant hand but over half the patients experience bilateral symptoms. The predominant age is 40 to 60 and it is more common in women (Female:Male = 3-6:1).

Symptoms include tingling or prickling sensations in the fingers and burning pain in the fingers particularly at night (acroparesthesias). Symptoms characteristically are confined to the thumb, index and middle finger but many patients do not distinguish this localization and feel the entire hand is affected.

## Causes

Causes include disorders which affect the musculoskeletal system in the region of the wrist, including trauma or Colles' fracture, degenerative joint disease, rheumatoid arthritis, ganglion cyst, scleroderma. Hypothyroidism and diabetes are frequently associated with this condition which also occurs with increased frequency during pregnancy. Other miscellaneous causes includes acromegaly, lupus erythematosus, leukemia, pyogenic infections, sarcoidosis, primary amyloidosis and Paget's disease. Hyperparathyroidism and hypocalcemia are also associated.

Risk factors include jobs which involve repetitive flexion and extension of the wrist may influence the development of carpal tunnel syndrome. Occupation as a seamstress, and more recently, that of computer operator may aggravate carpal tunnel syndrome. There is, however, no universal agreement that carpal tunnel syndrome is job related.

## Conventional Lab Tests

No lab tests are specific. Glucose levels and thyroid tests may be helpful.

## Specialty Lab Tests

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

# Duputryen's Contracture

## Description

Duputryen's contracture of the palmar fascia is due to fibrous proliferation resulting in flexion deformities and loss of function.

## Causes

The cause of Duputryen's contracture is unknown. Several mechanisms have been proposed. It may be caused by ischemia to the fascia with oxygen free radical formation. It may be related to the release of angiogenic basic fibroblast growth factor, or to microhemorrhage and release of growth factors.

Risk factors include: Smoking, Alcohol intake, Increasing age, Male/Caucasian, Diabetes mellitus, Epilepsy, Chronic illness (e.g., pulmonary tuberculosis, liver disease), Hypercholesterolemia, Liver disease, and HIV infection.

## Conventional Lab Tests

Standard labs are not usually ordered.

## Specialty Lab Tests

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. This test is offered by itself or included in the Comprehensive Detoxification Profile. It is especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Metabolic Lipid Profile evaluates blood for levels of triglycerides, total cholesterol, LDL, HDL and uric acid.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

IGF-1 (Insulin-like Growth Factor-1 or Somatomedin C) (serum) mediates many of the in vivo cell division and metabolic effects of growth hormone. IGF-1 is a valuable diagnostic tool for the evaluation of suspected growth hormone disorders.

# Fibromyalgia

## Description

Fibromyalgia is a rheumatic disorder characterized by aching pain, tenderness, and stiffness of muscles, areas of tendon insertions, and adjacent soft-tissue structures. These symptoms may be primary, or concomitant with another associated or underlying condition. Fibromyalgia is often related to overuse. Any of the fibrous muscular tissues may be involved, but those of the occiput, low back (lumbago), neck (neck pain or spasm), shoulders, thorax (pleurodynia), and thighs (aches and charley horses) are especially affected.

Fibromyalgia occurs mainly in females. It may be induced or intensified by physical or mental stress, poor sleep, trauma, exposure to dampness or cold, and occasionally by a systemic, usually rheumatic, disorder. A viral or other systemic infection (e.g., Lyme disease) may precipitate the syndrome.

## Causes

Fibromyalgia is considered to be multifactorial. Several mechanisms have been proposed: Cellular energy imbalances; Adrenal Stress; IGF-1 deficiency; Amino Acid Imbalances; Toxic exposure; Thyroid dysfunction; Allergies; Gastrointestinal dysfunction; Melatonin disturbance.

## Specialty Lab Tests

The Adrenocortex Stress Profile accurately measures unbound levels of both cortisol and DHEA, and provides a complete circadian analysis of cortisol activity. Controlled collection times allow for accurate baseline testing and effective monitoring of hormone replacement therapy.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

In the Comprehensive Detoxification Profile, the urine specimen is analyzed for levels of lipid peroxides. In addition, various oxidative markers are assessed from fasting blood specimens taken the morning after the challenge. These tests are sensitive indicators of biological detoxification status.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyronine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

# Gout

## Description

Gout is an inflammatory reaction to urate crystals in joints, bones and subcutaneous structures. Initially, it is a hyperacute arthritis which may progress to a chronic arthritis. Rarely it may present as a chronic arthritis. Recognition of the crystals in fluid is pathognomonic. Gout occurs predominantly in men aged 30-60 years.

## Causes

Primary gout, the most common form, is caused by an underexcretion or overproduction of uric acid. Secondary gout may be related to myeloproliferative diseases or their treatment, therapeutic regimens producing hyperuricemia, renal failure, renal tubular disorders, lead poisoning, hyperproliferative skin disorders, or enzymatic defects (e.g., deficient hypoxanthine guanine phosphoribosyltransferase, glycogen storage diseases)

Causes of gout include: Hyperuricemia; Dietary excess (e.g., anchovies, sardines, sweetbreads, kidney, liver and meat extracts); Inborn errors of metabolism; and Lead poisoning (Saturnine gout from moonshine).

Risk factors for gout include: Ethanol ingestion; Family history; Polynesian extraction (e.g., Samoan gout); Medications - aminophylline, caffeine, corticosteroids, cytotoxic drugs, diazepam, diphenhydramine, diuretics, L-dopa, dopamine, epinephrine, ethambutol, methaqualone, alpha-methyl dopa, nicotinic acid, probenecid (low dose), pyrazinamide, salicylates (< 10/dL blood levels), sulfinpyrazone (low dose), vitamins B12 and C.; Diuretics may be responsible for 20% of secondary gout; Ketosis; Surgery or trauma; Obesity (50%); Hypertension (50%); Vascular disease; Diabetes; Renal failure; Hypothyroidism; Hyperparathyroidism; hypoparathyroidism; Hyperlipidemia types II, IV, V; Paget's disease; Hyperproliferative skin disorders (e.g., psoriasis); Lymphoproliferative disorders; Calcium pyrophosphate deposition disease; Sarcoidosis; Hemolytic anemia; Hemoglobinopathies; Pernicious anemia; Radiation treatment; Type I glycogen storage disease; Down syndrome; and Gut sterilization by antibiotics.

## Conventional Lab Tests

Hyperuricemia may be present, although it is not diagnostic. WBC usually elevated with left shift during acute attacks. ESR usually elevated during acute attacks

## Specialty Lab Tests

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

# Osteoarthritis

## Description

Osteoarthritis (OA) is the most common form of joint disease. Osteoarthritis is the leading cause of disability in those over age 65. Osteoarthritis involves progressive loss of articular cartilage and reactive changes at joint margins and in subchondral bone.

## Causes

Primary osteoarthritis is idiopathic (of unknown cause) and is divided into subsets depending on clinical features.

Secondary osteoarthritis can be caused by several mechanisms, including: Childhood anatomic abnormalities (e.g., congenital hip dysplasia, slipped femoral epiphyses); Inheritable metabolic disorders (e.g., alkaptonuria, Wilson's disease, hemochromatosis); Neuropathic arthropathy (Charcot's joints); Hemophilic arthropathy; Acromegalic arthropathy; Paget's disease; Hyperparathyroidism; Noninfectious inflammatory arthritis (e.g., rheumatoid arthritis, spondyloarthropathies); Gout, calcium pyrophosphate deposition disease (pseudogout); Septic or tuberculous arthritis; and Post-traumatic. Biomechanical, biochemical, inflammatory, and immunological factors are all implicated in pathogenesis of osteoarthritis.

Risk factors include: Age over 50; Obesity (weight bearing joints); Prolonged occupational or sports stress (Injury to a joint).

## Conventional Lab Tests

Standard lab tests are not helpful.

Joint aspiration may be helpful to distinguish between OA and chronic inflammatory arthritides. OA shows cell count usually  $< 500$  cells/mm<sup>3</sup>, predominantly mononuclear. Inflammatory arthritis shows cell counts usually  $> 2000$  cells/mm<sup>3</sup>, predominantly neutrophils.

Synovial fluid may have a slightly increased white blood cell count, predominantly mononuclear. Calcium pyrophosphate dihydrate and/or apatite crystals may occasionally be seen in effusions and require polarized light microscopy or special techniques to see. X-rays are usually normal early. Later they often show narrowed joint space, osteophyte formation, subchondral bony sclerosis, and cyst formation. Erosions may occur on surface of distal interphalangeal (DIP) and proximal interphalangeal (PIP) joints when OA is associated with inflammation (erosive osteoarthritis).

## Specialty Lab Tests

The Bone Resorption Assessment is a simple, direct urinary assay of pyridinium and deoxypyridinium crosslinks, useful in identifying current bone loss, lytic bone disease, and efficacy of bone support therapies.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

# Osteoporosis

## Description

Osteoporosis is a multifactorial skeletal disease characterized by severe bone loss and disruption of skeletal micro-architecture sufficient to predispose to atraumatic fractures of the vertebral column, upper femur; distal radius, proximal humerus, pubic rami and ribs.

## Causes

Postmenopausal osteoporosis (Type I) is the most common form in Caucasian and Asian women. It is due to excessive and prolonged acceleration of bone resorption following menopausal loss of estrogen secretion. Involutional osteoporosis (Type II) occurs in both sexes above age 75. It is due to a subtle, prolonged imbalance between rates of bone resorption and formation. A mixture of Types I and II are common.

Idiopathic osteoporosis is a rare form of primary osteoporosis occurring in premenopausal women and in men below age 75. Not related to secondary causes or risk factors predisposing to bone loss. The cause is unknown.

Secondary osteoporosis is severe bone loss sufficient to cause atraumatic fractures due to extrinsic factors such as corticosteroid excess, rheumatoid arthritis, chronic liver or kidney disease, malabsorption syndromes, systemic mastocytosis, hyperparathyroidism, hyperthyroidism, a variety of hypogonadal states, and others

Dietary risk factors for osteoporosis include inadequate calcium, excessive phosphate or protein; and inadequate vitamin D intake in the elderly. Physical risk factors for osteoporosis include immobilization, and a sedentary lifestyle. Social risk factors for osteoporosis include alcohol, cigarettes, and caffeine. Medical risk factors for osteoporosis include chronic diseases, and endocrine disorders. Genetic or familial risk factors include suboptimal bone mass at maturity, and "familial fast bone losers"

Drug induced risk factors for osteoporosis include corticosteroids, excess thyroid hormone replacement, chronic heparin, chemotherapy, loop diuretics, anticonvulsants, and radiation therapy.

## Conventional Lab Tests

All "routine" tests usually normal. Alkaline phosphatase (bone specific and total) may be transiently increased following fractures. Serum osteocalcin, if high, indicates high turnover type.

Urine calcium levels are normal. Serum and/or urine protein electrophoresis are normal. Thyroid function tests and urinary free cortisol normal in primary types. Urinary pyridinium and N-telopeptide collagen crosslinks, if high, indicates high turnover type.

## Specialty Lab Tests

The Bone Resorption Assessment is a simple, direct urinary assay of pyridinium and deoxypyridinium crosslinks, useful in identifying current bone loss, lytic bone disease, and efficacy of bone support therapies.

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

The Vitamin Profile examines a blood sample, using vitamin-sensitive and specific microbes to determine levels of vitamins in the body. The test is indicated when insufficiencies are suspected. Available for 12 or 17 vitamins.

# Rheumatoid Arthritis

## Description

Rheumatoid arthritis is a chronic systemic inflammatory disease of the peripheral joints. Articular inflammation may be remitting. Continued inflammation usually results in joint damage and disability. Certain extra-articular manifestations are characteristic, including rheumatoid nodules, arteritis, neuropathy, scleritis, pericarditis, and splenomegaly.

## Causes

The exact cause of rheumatoid arthritis is unknown. There are several causes of chronic inflammation, including persistent infections, prolonged exposure to toxic elements, and autoimmune disease.

The immune system is activated in rheumatoid arthritis. Arthritogenic stimuli activate both humoral and cellular immune systems in the susceptible host. Antibodies (IgG, IgM, IgA anti-immunoglobulins) made by B cells and plasma cells in the joint space are complexed and fix complement, resulting in an inflammatory process. Infiltrating lymphocytes; primarily CD4 helper T-cells.

Risk factors for rheumatoid arthritis include HLA-DR4 (a genetic marker), family history, native American ethnicity, and female gender, age 20-50 years.

## Conventional Lab Tests

A CBC will usually show mild anemia. The sedimentation rate (ESR) is usually elevated and is helpful to follow disease activity. Increased rheumatoid factor is detectable in 70-80% of patients. Antinuclear antibodies (ANA) are present in 20-30%.

Complement (CH50), C3, C4 are useful to detect persons with early rheumatoid arthritis from those with early lupus, in whom complement levels are decreased.

The synovial fluid has a variety of changes. The fluid is yellowish-white, turbid, with poor viscosity. A "Mucin clot" poor due to degradation of hyaluric acid by lysosomal enzymes is often found. Synovial WBC is increased (3500-50,000). Synovial total hemolytic complement assay (CH50) is lower than serum. Synovial protein is approximately 4.2 g/dL (42 g/L). The serum-synovial glucose difference is 30 mg/dL (1.67 mmol/L).

## Specialty Lab Tests

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Detoxification Profile assesses the body's capacity to carry out detoxification through functional challenges (caffeine, acetaminophen, and salicylate) which evaluate specific aspects of the detoxification process and free radical damage. These functional assessments provide a comprehensive profile of the body's detoxification capacity and potential susceptibility to oxidative damage.

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen. This test is offered by itself or included in the Comprehensive Detoxification Profile. It is especially useful in cases of chronic fatigue, xenobiotic exposure, and chronic illnesses.

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.



## **Blood Disorders**

# Thrombocytopenia

## Description

Thrombocytopenia is a decrease in the circulating number of platelets (< 100,000 per microliter) in absence of toxic exposure or a disease associated with a low platelet count. It occurs as a secondary effect of peripheral platelet destruction as well as decreased platelet production. It is a diagnosis of exclusion.

Acute ITP is a common disease of childhood which usually follows an acute infection and has spontaneous resolution within 2 months. Chronic ITP is a disease which persists after 6 months without a specific cause. Usually seen in adults and persists for months to years.

## Causes

ITP is caused by IgG autoantibodies on platelet surface. Risk factors include: Acute infection; Age; Cardiopulmonary bypass; Hypersplenism; Antiphospholipid antibody syndrome; Preeclampsia; and HIV infection. Over 150 drugs have been implicated in immune thrombocytopenia.

Low platelets can be caused by anemia (pernicious, aplastic, hemolytic), infections (viral, bacterial, rickettsial, malaria), exposure to DDT and other chemicals, liver disease, hyperthyroidism, and hypothyroidism.

The most common causes of immunologic thrombocytopenia are viral or bacterial infections, drugs, and a chronic autoimmune disorder referred to as idiopathic thrombocytopenic purpura (ITP). Patients with immunologic thrombocytopenia do not usually have splenomegaly and have an active bone marrow with an increased number of megakaryocytes. Most drugs induce thrombocytopenia by eliciting an immune response in which the platelet is an innocent bystander. The platelet is damaged by complement activation following the formation of drug-antibody complexes.

Decreases in platelet count have been found after ingestion of Canola oil. Marine oils, particularly cod liver oil and olive oil, caused changes in platelet membranes that are favorably antithrombotic. Melatonin has been shown to stimulate thrombopoiesis.

Thrombocytopenia can result from an autoimmune disease triggered by the measles vaccine.

## Additional Lab Tests

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods.

Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Anti-Chemical Antibodies Profile assays blood for systemic exposure and sensitivity to formaldehyde, tremolitic anhydride, toluene, phthalic anhydride and benzene ring.

The Comprehensive Melatonin Profile analyzes 3 saliva samples for the secretion pattern of melatonin. Melatonin imbalance has been associated with Seasonal Affective Disorder, infertility, sleep disorders, and compromised immune function.

# **Psychology**

# Attention Deficit Hyperactivity Disorder

## Description

Attention deficit hyperactivity disorder (ADHD) is a behavior problem characterized by a short attention span, low frustration tolerance, impulsivity, distractibility, and usually, hyperactivity. This can result in poor school performance, difficulty in peer relationships, and conflict between parent and child .

## Causes

Recent research indicates neurotransmitter abnormalities, e.g., decreased activity or stimulation in upper brainstem and frontal-midbrain tracts. Toxins, neurologic immaturity, and environmental problems have also been hypothesized.

Many factors generate symptoms that closely resemble ADHD, including sensitivities to food additives (artificial food colors, flavorings, and preservatives), intolerances to foods (corn, wheat, milk, soy, oranges, eggs, or chocolate), nutrient deficiencies and imbalances, heavy metal intoxication, and toxic pollutant burden. Also, evidence is mounting that abnormal thyroid responsiveness, perhaps engendered perinatally by environmental pollutants, is on the rise and predisposes to ADHD.

Sugar intake makes a marked contribution to hyperactive, aggressive, and destructive behavior. A large study found that 74 percent of hyperactive children manifested abnormal glucose tolerance in response to a sucrose meal.

Children exposed acutely or chronically to lead, arsenic, aluminum, mercury, or cadmium are often left with permanent neurological sequelae that include attentional deficits, emotional lability, and behavioral reactivity.

ADHD is associated with poor prenatal health (preeclampsia, drug and alcohol use, smoking). ADHD is associated with, but not caused by: Learning disabilities, Tourette's, Mood disorders, Oppositional defiant disorder, and Conduct disorder.

Lead poisoning and Medication reactions (decongestant, antihistamine, theophylline, phenobarbital) may cause similar symptoms.

## Specialty Lab Tests

The Hair Elemental Analysis examines hair samples for levels of toxic and nutrient elements. Toxicity and nutrient insufficiencies are identified, allowing for precise intervention.

The Food Allergy (Antibody) Profile is an ELISA test of IgE and IgG antibodies for 96-combined foods or 100 vegetarian foods. Vegetarian food categories include dairy, eggs, fruits, nuts and grains, and vegetables.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants, allowing patients to moderate exposure to allergens. Includes separate IgE & IgG profiles. Various add-on panels are also available, including a 24-spice panel.

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Inhalants Profile is an ELISA test of IgE antibodies to 36 region-specific pollens and environmental inhalants.

The Cotinine Assay examines urine to determine the presence of cotinine, a nicotine metabolite, which is an indicator of exposure to second-hand smoke. This test is useful in cases of recurrent infections or allergy in children of smokers.

# Anxiety and Panic

## Description

Anxiety disorders are illnesses that cause people to feel frightened and apprehensive for no apparent reason. There are several types of anxiety: Acute situational anxiety (a response to recent stressful event, usually transient symptoms), Adjustment disorder with anxious mood (persistent, maladaptive reaction following psychosocial stress, lasting up to six months), Generalized anxiety disorder (Persistent underlying anxiety or adjustment disorder with anxious mood and significant symptoms of motor tension, autonomic hyperactivity and hypervigilance, lasting more than six months), Panic disorder (Recurrent unexpected attacks with at least one attack or more associated with persistent concern about additional attacks, worries about implications of the attack or a significant change in behavior related to the attack; often leads to agoraphobia), Post-traumatic stress disorder (Recurrent flashbacks or nightmares of catastrophic event by survivors, often associated with autonomic symptoms), Phobias (Intense recurrent fear of, and avoidance of, an object or situation or of public embarrassment), Obsessive-compulsive disorder (Persistent unwanted and disturbing thoughts and recurrent behavioral patterns which interfere with daily life).

Panic disorder is characterized by repeated episodes of intense fear of sudden onset, often occurring without warning and with varying frequency. Symptoms of panic disorder include chest pains, heart palpitations, sweating palms, dizziness, shortness of breath, a sense of unreality, or an uncontrollable fear of death. Panic disorder affects between three and six million Americans and is twice as likely to occur in women. Onset may occur at any age but generally begins in early adulthood.

## Causes

Anxiety and panic attacks can be produced by caffeine and many drugs, including corticosteroids (Cortisone, Dexamethasone, Hydrocortisone, Prednisone); birth control pills (Brevicon, Demulen), progesterone (Provera); antidepressants (Wellbutrin, Diazepam, Prozac, Haldol, Paxil, Effexor); and many others.

Perhaps the most significant biochemical disturbance noted in people with anxiety and panic attacks is an elevation in lactic acid, which is formed from glucose (blood sugar) when there is a lack of oxygen (anaerobic glycolysis).

## Conventional Lab Tests

Laboratory tests for anxiety are usually minimal, with more extensive workup depending on clinical picture. Laboratory tests often normal in anxiety disorders. Standard labs would include basic chemistry; CBC; urinalysis and thyroid function studies.

## Specialty Lab Tests

The Metabolic Dysglycemia Profile includes two-hour pre- and post-prandial analyses of glucose and insulin tolerance, salivary assessment of bioavailable DHEA and cortisol, and fasting blood assays of hemoglobin A1c, fructosamine, and IGF-1. Available with an optional add-on lipid profile.

The Oxidative Stress Analysis identifies markers of hydroxyl radical activity, urine lipid peroxides, reduced glutathione, superoxide dismutase, and glutathione peroxidase, following a challenge dose of aspirin and acetaminophen.

# Depression

## Description

Depression results when a person experiences more frustration and anger than he or she can handle. Each person is capable of handling a different amount of frustration or anger. The result is an abnormal receptor-neurotransmitter relationship at the synapse mainly in the limbic system in the brain.

The presynaptic receptors deal primarily with the storage, release and uptake of the neurotransmitter. The primary neurotransmitters, both monoamines, are serotonin and norepinephrine. The available antidepressants, according to the latest theory, may increase the sensitivity of the post-synaptic receptor sites and decrease the presynaptic receptor sites. It is thought by some that the antidepressants may work by blocking the uptake of the neurotransmitters, thereby upgrading the synapse by having more available.

Bipolar depression describes mood disorders in which both manic and depressive episodes occur. Unipolar depression describes mood disorders in which only depressive episodes occur

## Causes

Causes of depression include: Impaired synthesis of the neurotransmitters; Increased breakdown or metabolism of the neurotransmitters; Increased pump uptake of the neurotransmitters. When a person experiences anger or frustration these chemicals are released at the synapse. The action potential is passed on from neuron to neuron. Following this the neurotransmitter is (1) reabsorbed into the neuron where it is either destroyed by an enzyme or actively removed by a reuptake pump and stored until needed or (2) destroyed by monoamine oxidase (MAO) located in the mitochondria.; Lack of these neurotransmitters causes certain types of depression, e.g., decreased norepinephrine causes dullness and lethargy, while decreased serotonin causes irritability, hostility and suicide ideation

Risk factors for depression include: Females more likely to develop depressive illness than males; Strong family history (depression, suicide, alcoholism, other substance abuse); Presence of chronic disease, especially multiple diseases; Migraine headaches; Back pain; Chronic pain; Recent myocardial infarction; Peptic ulcer disease; Insomnia; Stressful situations; Adolescence; Advancing age; Retirement; Children with behavioral disorders, especially hyperactivity

Methoxyhydroxyphenylglycol (MHPG), the metabolite of norepinephrine, can be measured in urine and in some laboratories in the CSF. Similarly the major CNS metabolite of serotonin, 5-hydroxyindoleacetic acid (5-HIAA), can be measured in the urine and CSF. These tests are not a good reflection of the levels in the central nervous system, but rather in the peripheral nervous system.

## Specialty Lab Tests

The Amino Acids Analysis tests for 40+ amino acids and provides information on a wide spectrum of metabolic and nutritional disorders. Results can provide valuable biochemical information about many disorders, including chronic fatigue, learning disabilities, depression and immune problems.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders. By knowing the various fatty acid levels, one can reestablish a balance using nutritional intervention.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyronine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

## **Pediatrics**

# Autism

## Description

Autism is a pervasive developmental disorder of early childhood characterized by severe impairment in: Effective social skills; Absent or impaired language development; and Repetitive and/or stereotyped activities and interests, especially inanimate objects.

## Causes

The specific cause of autism is unknown. It is associated with increased risks during pregnancy, labor and delivery, and maternal rubella (German measles). Autistic children have a markedly higher incidence of epilepsy which increases with age.

CT scans have isolated a subgroup of autistic children with enlarged ventricles. Use of MRI recently identified a subgroup of autistic adults with hypoplasia of the cerebellar vermis. Individual cases of autism have been associated with the congenital rubella syndrome, cytomegalic inclusion disease, phenylketonuria, and the fragile X syndrome.

Autism is associated with errors in purine metabolism, including an autosomal recessive deficiency of adenylosuccinate lyase; histidase enzyme deficiency; pyrimidine nucleotide deficiency, Rett syndrome, and Lesch-Nyhan syndrome. Purine metabolism is directly involved in DNA synthesis and involves folate, cobalamin, cysteine, homocysteine, and methionine. Disorders in sulphur metabolism (low cysteine and glutathione) have also been found in autism. Autism is associated with hyperserotonemia, which occurs in 35-50% of cases with evidence of central 5-HT abnormalities.

Several controversial etiologies have been proposed, including: environmental pollution (especially the use of antimony as a flame-retardent in carpets, blankets and clothes); vaccinations (especially the MMR); and the use of mercury (Thimerosal) as a preservative in vaccinations.

## Conventional Lab Tests

Standard lab tests are used to rule out other disorders. An EEG is often recommended to rule-out brain damage and associated conditions.

Psychological testing is often performed. Intellectual level needs to be established and monitored, as it is one of the best measures of prognosis. Comprehensive language assessments are also recommended.

## Specialty Lab Tests

The Comprehensive Digestive Stool Analysis (CDSA) evaluates digestion and absorption, bacterial balance and metabolism, yeast and immune status.

The Amino Acids Analysis examines fasting blood or 24-hour urine samples for 40+ amino acids and provides information on a wide spectrum of metabolic and nutritional disorders.

The Comprehensive Allergy (Antibody) Profile assays blood for immediate and delayed reactions to 96 combined foods or 100 vegetarian foods, and 36 region-specific inhalants.

The Essential and Metabolic Fatty Acids Analysis evaluates the level of red cell membrane or plasma fatty acids, imbalances which significantly affect inflammatory and other disorders.

The Detoxification Profile uses functional challenges (caffeine, acetaminophen, and salicylate) to evaluate specific aspects of the detoxification process and free radical damage.

The Cellular Energy Profile evaluates organic acids that play a pivotal role in the generation of cell energy.

The Metabolic Analysis Profile evaluates four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance.



## General

# Obesity

## Definition

Obesity is a condition of increased body weight (consisting of both lean and fat tissue). It is also defined as weight 20% greater than an individual's desirable weight as defined by the Metropolitan Life Insurance Company. Android obesity (male pattern or abdominal obesity) is associated with higher risk and gynoid obesity (female pattern or gluteal obesity) is associated with lower risk for long-term health problems. The night-eating syndrome consists of morning anorexia, evening hyperphagia, and insomnia.

## Causes

The cause of obesity is multifactorial. Idiopathic obesity is assumed to be due to an imbalance between food intake and energy expenditure (physical activity and metabolic rate). Risk factors for obesity include: parental obesity, pregnancy, a sedentary lifestyle, high fat diet, and low socioeconomic status.

Endocrine disorders can cause obesity. These would include: excess insulin (insulinoma), excess cortisol (Cushing's syndrome or corticosteroid drug use), hypothyroidism, and hypothalamic disorders. Adipose tissue proliferation in hyperadrenocorticism is due to corticosteroid excess and leads to increased gluconeogenesis and a correspondingly greater demand for insulin, which, in turn, stimulates lipogenesis. There are three known predictors of future weight gain: a low metabolic rate; a high RQ (respiratory quotient), indicating carbohydrate oxidation and the need to eat to replace carbohydrate; and insulin resistance.

Hormonal disorders may also cause obesity. According to the "estrogen dominance theory" android obesity is thought to be caused by excessive amounts of estrogen as compared to testosterone in men, or progesterone in women.

## Conventional Lab Tests

Lab tests are not needed for diagnosis. Thyroid function tests and cardiac risk factors (cholesterol, triglycerides, and glucose) are usually ordered.

## Specialty Lab Tests

The Glucose/Insulin Tolerance Test employs a glucose challenge and blood samples over a 4 hour period to assess the relationship of insulin and glucose. The test provides important information about hypoglycemia, hyperglycemia and insulin resistance.

The Adrenocortex Stress Profile evaluates bioactive levels of the body's important stress hormones, cortisol and DHEA. This profile serves as a critical tool for uncovering biochemical imbalances that can underlie anxiety, chronic fatigue, obesity, diabetes and a host of other clinical conditions. Four salivary samples of cortisol are taken over a 24-hour period.

The Comprehensive Thyroid Assessment provides a thorough analysis of thyroid secretion and metabolism, including peripheral thyroid conversion and thyroid autoimmunity. By measuring hypersensitive thyroid-stimulating hormone (TSH), free serum thyroxine (fT4), free triiodothyroine (fT3), Reverse T3 (rT3), anti-thyroglobulin antibodies (anti-TG), and anti-thyroid peroxidase antibodies (anti-TPO).

The Female Hormone Profile analyzes 11 saliva samples over a 28-day period for the levels of  $\beta$ -estradiol, progesterone, and testosterone, providing clues about menstrual irregularities, infertility, endometriosis, breast cancer, and osteoporosis.

# Pain

## Description

Pain is felt when sensory neurons throughout the body react to pressure, mechanical trauma, heat, cold, and other stimuli. The sensory neurons also respond to prostaglandins, histamine, and other chemicals released by injured or inflamed body tissue. Whether sensory neurons are stimulated depends on how powerful, prolonged, and widespread the heat, pressure, or other stimuli are. When sensory neurons are stimulated, the nerves “fire,” sending off messages that travel along the nervous system to the brain. Acute pain is the pain that tells you something is harming, or about to harm, your body. Chronic pain may be a dull ache that never goes away. Often the source of chronic pain is unknown.

Aspirin is the most well-known remedy for pain. Unfortunately aspirin has a host of side effects, including heartburn, nausea, vomiting, ringing in the ears, loss of hearing, hives and itching. Other side effects include vomiting blood, blood in the urine or stool, drowsiness, confusion, loss of vision and jaundice. Aspirin should not be taken by those with a bleeding disorder, ulcers, gout, asthma, liver or kidney disease, women who are pregnant or breast feeding, or anyone soon to undergo surgery. Neither should you take aspirin if you are taking blood-thinning medications for prevention or treatment of stroke, heart attacks, atrial fibrillation or blood clots. And if you are on long-term aspirin therapy, you must have your blood tested regularly by a physician to make sure the medicine is not harming your liver.

Acetaminophen is an effective treatment for moderate pain and fever, but it does not act against inflammation, swelling, or redness. Potential side effects include trembling, light-headedness, fatigue, itching, fever, sore throat, unexplained bruises or bleeding, blood in the urine, and pains in the side or lower back. Long-term use may cause anemia, along with liver and kidney damage. Acetaminophen causes massive free radical damage to the liver that can be ameliorated with nutrients like N-acetyl-cysteine (NAC).

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) are used for pain, stiffness, and swelling of the joints, and for painful menstrual periods. Potential side effects include stomach pains, gastritis, peptic ulcers, gastrointestinal bleeding, headaches, nausea, dizziness, depression, drowsiness, ringing in the ears, vomiting, diarrhea, cramps, convulsions, blood in the urine and stool, chest tightness, rapid heart-beat, fainting, and chills. Ironically, these medicines can actually cause pain, the very thing they are taken to eliminate. Long-term use can damage the eyes and ears, and cause weight gain.

## Specialty Lab Tests

The Cellular Energy Profile evaluates organic acids that play a pivotal role in the generation of cell energy. The test can reveal metabolic distress associated generalized pain and fatigue, which may arise in response to toxic exposure, nutrient imbalances, digestive dysfunction and other causes. Plants synthesize and store energy from sunlight and nutrients. How efficiently the human body recovers this energy from plants or animals that eat plants can have a profound effect on physiological function.

The Metabolic Analysis Profile assesses urine metabolites to evaluate four critical areas of metabolism: gastrointestinal function, cellular energy production, neurotransmitter processing, and amino acid-organic acid balance. Test results can be used to address chronic systemic complaints: fatigue and mood disorders to headaches, muscular/joint pain, and digestive problems. Analytes: Creatinine and 39 organic acids ratios to creatinine, including: 8 gastrointestinal metabolites, 13 cellular energy metabolites, 4 neurotransmitter metabolites, and 14 amino acid metabolites. Specimen Requirements: First morning urine collection; 2 tubes (samples frozen).

# Heavy Metal Toxicity

## Description

Heavy metals include: Antimony, Arsenic, Barium, Bismuth, and Mercury. Other potentially toxic metals include: Aluminum, Cadmium, Cesium, Gadolinium, Gallium, Lead, Nickel, Niobium, Platinum, Rubidium, Thallium, Thorium, Tin, Tungsten, and Uranium.

## Causes

Accumulations of these toxics can occur in the human body in response to occupational exposures or to environmental exposures from toxic release in air, soil, or industrial waste streams.

## Symptoms

Signs of mercury toxicity include: chronic fatigue; poor memory and cognitive function; emotional instability; peripheral numbness and tingling, decreased senses of touch, hearing or vision, hypersensitivity and allergies, persistent infections including chronic yeast overgrowth, compromised immune function, and cardiovascular disease.

Signs of lead toxicity include: fatigue; loss of appetite; headaches; poor memory; inability to concentrate; irritability; ADD/ADHD; aberrant behavior; decreased coordination; pain in the abdomen, bones and muscles; gout; and anemia.

Signs of aluminum include: hypertension; anemia; atherosclerosis; fatigue; muscle and joint pain, osteomalacia; lumbar pain; kidney damage with associated urinary loss of essential minerals, amino acids and protein.

Signs of arsenic toxicity include: malaise; muscle weakness; eczema; dermatitis; increased salivation and strong “garlic breath”; peripheral vascular problems, vascular collapse.

Signs of cadmium toxicity include: dry and scaly skin, emphysema, hair loss; heart disease, hypertension; kidney stones; loss of appetite, loss of sense of smell, yellow teeth; anemia, fatigue, depressed immune response, joint pain; lung cancer, and pain in the back and legs.

Signs of nickel toxicity include: apathy, cancer, fever; blue colored lips, diarrhea, gingivitis, nausea, stomatitis, vomiting; headache, dizziness, insomnia; contact dermatitis, and skin rashes (redness, itching, blisters).

## Specialty Lab Tests

The Toxic Element Exposure Profile assesses levels of 20 potentially damaging elements using a hair sample.

The Toxic Element Clearance Profile (24 hr and Random/Timed) measures urinary excretion of 20 toxic metals. This test should be implemented when only a focused evaluation of exposure to toxic metals is desired.

The Total Elemental Clearance Profile measures urinary excretion of 20 toxic metals. This test should be implemented when only a focused evaluation of exposure to toxic metals is desired.

The Elemental Analysis, Provocative Challenge evaluates urine before and after administration of chelating agents. It measures levels of 10 toxic and 8 nutrient minerals. This test is used to evaluate mineral levels and to monitor the effectiveness of chelation therapy.

The Creatinine Clearance Profile allows health care providers to assess their patient's kidney function before they attempt to remove toxins via urine. The Creatinine Clearance Profile reports a urine and serum creatinine value, as well as a creatinine clearance value, using a timed urine (2-24 hour collection) and a non-fasting serum collection. Patient height and weight are also required to perform this test.

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