

# FOUNDATION OF HEALTH: THE THREE BODY SYSTEMS

## The Hormonal System

Your complete health analysis begins with assessment of the hormonal system provided by the Functional Adrenal Stress Profile.

## Stress Hormone Lab Assessments

The first step in assessing your hormonal system's condition is to measure the functioning of your adrenal glands with the Functional Adrenal Stress Profile test. The saliva samples you submit to the laboratory are put through sophisticated hormonal assays that measure the levels of cortisol and DHEA hormones over a 24-hour period. This test analyzes how well your body is managing stress.

## Causes of Stress

The Functional Adrenal Stress Profile measures adrenal stress caused by lifestyle issues such as working long hours, poor eating habits, lack of exercise or lack of rest. Adrenal stress can also be caused by internal organ dysfunction such as poor digestion or inadequate detoxification ability. When the sum total of all your stresses reaches a critical threshold, the adrenals react in a predictable pattern.

## Symptoms of Stress

The most commonly experienced symptoms of adrenal stress include: fatigue, depression, inability to lose weight, sweet cravings, decreased sex drive, insomnia, poor memory, anxiety, PMS, weakened immune response, recurrent infections, unexplained nervousness or irritability and joint or muscle pain. As you experience these external symptoms, profound physiological changes are taking place inside your body.

## Three Stages of Burnout

### Stage 1 - Stress Overload

Whatever the source of stress, your body's initial reaction is the same: the adrenal glands make more of the stress hormones cortisol and DHEA. This first stage of hormonal maladaptation is called hyperadrenia, or overactivity of the adrenal glands. Normally, when the stress dissipates, the glands have time to recondition and prepare for the next stressful event. However, if your stress levels remain chronically high, your body will remain locked in this first stage of adrenal stress. If your stress hormone levels remain elevated for extended periods of time, your body's ability to recover can be reduced, and the ability of your adrenals to make cortisol and DHEA can be compromised.

Another way to look at this is to think of your adrenal reserve as a savings account. If you continually withdraw money from savings and don't replace it, you are eventually unable to recover financially. Fatigue and other adrenal symptoms are signs that your body's reserve has been overdrawn and your adrenals are becoming exhausted. If the stress continues, the high levels of cortisol and DHEA begin to drop. As the high levels of these hormones can no longer be sustained, a person enters into stage two of adrenal exhaustion.

### Stage 2 - Fatigue

Some individuals have genetically strong adrenal glands and can maintain health under high levels of stress for many years. Others may enter into stage two more quickly. Eventually, if we continue to experience excess stress, we enter into stage two of adrenal exhaustion. This transition period usually lasts between six and eighteen months during which the stress response of the adrenal glands is gradually compromised. Under chronic stress conditions the adrenals eventually "burn out." At this point the glands become fatigued and can no longer sustain an adequate response to stress. This condition ultimately leads to stage three or hypoadrenalism.

### Stage 3 - Exhaustion

In stage three of adrenal maladaptation the glands have been depleted of their ability to produce cortisol and DHEA in sufficient amounts and now it becomes more and more difficult for the body to recover. Constant fatigue and low-level depression can appear in otherwise emotionally healthy people because cortisol and DHEA help maintain mood, emotional stability and energy levels. As cortisol and DHEA levels are

depressed, people experience depressed mental function. Brain function suffers as these hormones are depleted. Both poor memory and mental confusion can be a direct result of adrenal hormone depletion.

## **Stress and Sex Hormone Production and Sex Drive**

Because all steroid hormone production is linked by biochemical pathways, cortisol and DHEA depletion impacts the female hormones progesterone and estrogen, as well as the predominant male hormone, testosterone. In both men and women hormonal symptoms such as mood swings, irritability, sweet cravings and headaches can be related to the failure of the adrenals to adapt to stress. Female hormone symptoms such as menstrual cramping, infertility, night sweats and hot flashes can also be adrenal related. Many women feel they are on an emotional roller coaster with their female hormones, yet rarely is the role the adrenals play in female hormones explored. Testosterone levels in men also suffer as a result of weak adrenal output. Since sex hormone levels drop as cortisol and DHEA levels drop, sex drive diminishes in both men and women.

## **Bone Loss, Pain and Inflammation**

When cortisol levels are abnormal due to chronic stress, bone loss can occur. This is because excessive cortisol blocks mineral absorption. If you are taking calcium supplements to help protect you from bone loss and your cortisol is elevated, you will be unable to absorb the calcium. Calcium can then precipitate in the body and deposit in joints causing arthritis or deposit in the blood vessels increasing your risk for hardening of the arteries. Many people experience increased neck, back and joint pain from imbalances in cortisol.

Two major aspects of healthy immune function are mucosal and humoral immunity. The mucosal immune system consists of the lining tissues of the body that defends us against infectious organisms such as bacteria, virus, yeast, parasites and food antigens. The mucosal immune system also protects us from the entry of harmful toxins from chemicals and heavy metals. Our humoral, or blood immunity, represents the ability of immune cells in the blood to fight and neutralize harmful agents.

These two basic functions of the immune system can be easily measured using Functional Diagnostic lab tests. The strength of our mucosal barrier function, or our mucosal immunity can be assessed with the salivary mucosal barrier screen test. The humoral immune system's reaction to candida can be measured by the Candida

antibodies/DNA panel. Both mucosal and humoral immunity are required for our body's ability to fight infections and handle food antigens.

Symptoms of suppressed mucosal immunity include chronic sinus infections or sinus congestion, susceptibility to colds and flus, intestinal upset, food allergies and environmental allergies to pollens and animals. Suppressed humoral immunity is a more advanced condition that results from mucosal barrier dysfunction. This condition is common in people with chronic health problems such as chronic fatigue, Fibromyalgia, depression and food reactions.

Further immune system function can be measured by testing antibodies to gluten, dairy and soy. Food reactions are the most frequent hidden cause of immune system problems. Genetic, autoimmune conditions such as gluten intolerance affect millions of Americans. Lactose intolerance and cow's milk dairy allergies are a leading cause of sinus problems and excessive mucous production. Corn and soy allergies are also increasingly common.

Salivary testing also detects the level of secretory immunoglobulin A, referred to as 'SigA,' a vital, if long unrecognized component of the immune system. In a healthy body, SIgA protects us from opportunistic infections (e.g., parasites, bacteria, yeast, virus) and reactions to foods. SIgA is a thin, healthy, mucous-like substance that provides a physical barrier of defense in all the lining tissues of the body. SIgA defense is found in the lining of the gastrointestinal tract, respiratory tract, sinus passages, throat, mouth, vaginal tract and urogenital system. When SIgA is depressed, we become susceptible to a wide range of infectious organisms, environmental allergens such as pollens and molds, and can become reactive to the very foods we eat.

## Stress and Immune Function

Cortisol, the "stress hormone," directs the production of special immune cells called immunocytes, which produce SigA, our first line immune defense. If cortisol values are abnormal, the ability of immune cells to produce adequate SigA is compromised. This is one reason we get sick so easily when we are stressed. Simply put, prolonged stress results in adrenal exhaustion and depressed first line immune defense opening the door for opportunistic infections.

## Physiological Effects of Stress

### Repair (Anabolic)

The repair/breakdown or anabolic/catabolic dynamic is one of the most important health principles. Depending on our physical and emotional health we are at all times shifting between a repair (anabolic) or breakdown (catabolic) state. Being in an anabolic state means you are rebuilding, repairing, literally re-constructing your body's tissues. Being in a repair state is like renovating a house by painting, landscaping and replacing a leaky roof. Anabolic refers to your immune system's rebuilding processes. When you are anabolic your body is in a state of constant regeneration, repairing blood vessels and heart tissue, rebuilding old bone and even destroying cancerous cells.

### Breakdown (Catabolic)

The opposite process, a breakdown state, is referred to as a catabolic state. The word catabolic is from the same Greek root as the word cataclysm, meaning disaster. It is a well-chosen term since too much time spent in a catabolic state has disastrous effects on your health. This breakdown or destruction phase occurs when your body is operating under stressful conditions and isn't able to repair itself adequately. Under catabolic conditions we breakdown our own muscle, our own organs and our own bone. This breakdown ultimately leads to degenerative diseases.

We maintain a strong immune system when our bodies spend more time in repairing than breaking down. A healthy immune system prevents the development of many chronic degenerative diseases. For example, we have cancer cells that grow in us each day and it's our immune system's job to destroy those cells so that tumors don't develop. Our blood vessels and heart require constant renewal to prevent the plaquing that causes cardiovascular disease. Our bodies are constantly breaking down and repairing bone and joint tissue; if this breakdown process is blocked, osteoporosis and arthritis occur. Prolonged immune system stress can lead the body to attack itself resulting in autoimmune diseases such as lupus, multiple sclerosis and rheumatoid arthritis.

Your health status, whether you are predominantly in a repair state or breakdown state, can be measured by a variety of lab tests. This information allows you to address chronic degenerative diseases in their earliest stages, long before a pathological condition has developed.

## The Digestive System

### Importance of Healthy Digestion

The foundation of good health lies in proper digestive function. All other health factors can be undermined if you don't digest and absorb nutrients well. Assimilation of vitamins, minerals, proteins and essential fatty acids from the foods you eat and the supplements you take is required for optimum health. Any therapeutic program you may use will be of limited value without good digestive function.

### Digestive Function: Lab Testing

The first step is to take a look at how well your body is digesting. The second step, if a problem is detected, is to determine why your body is not digesting well. Several different types of lab tests are available to assess the function of different organs of the digestive system.

### Digestive Enzymes

The inability to digest protein may reflect a deficiency of stomach acid and digestive enzymes. Without sufficient enzymes your body cannot break down the food you eat for assimilation. Low stomach acid and low digestive enzymes are common problems due to our poor diets and high stress levels.

One method to determine digestive function is BioHealth's Metabolic Assessment lab that detects protein digestion problems. You may also require further testing if you have chronic digestive symptoms such as constipation, diarrhea, bloating after meals, intestinal gas, heartburn and food cravings.

The enzymes present in raw fruits and vegetables help us digest foods more easily. However, these enzymes are destroyed in the cooking process. Your body's own production of digestive enzymes will become depleted if you eat too many cooked foods. When your digestive enzymes decrease, your body's other enzymes -- which are critical for proper immune regulation and systemic cellular processes -- get pulled from the blood stream back into the digestive system. This pattern leads to depletion of your enzyme reserve in other body systems not directly related to digestion. Enzymes are involved in every process in your body, and depletion of enzymes is a depletion of health.

## Effects of Low Enzymes

If you have low levels of digestive enzymes, the food you eat is not completely utilized. Any foods you don't digest because of insufficient enzymes become toxic to your body. These partially digested foods provide a substrate or fuel supply for harmful microorganisms like yeast, bacteria, and parasites. Health-sustaining enzymes are abundant in raw and lightly cooked vegetables and fruits, and these should be part of your daily food intake.

## Replenishing Enzymes

If you have depleted your reserve of digestive enzymes through poor eating habits you can support your digestion with digestive enzymes until your reserve is built back up. The right dietary supplements will help keep you in a rebuilding state. Supplemental enzymes will help you to properly digest protein, fats, and carbohydrates, which are essential to maintaining stable blood sugar and overall health.

## Dysbiosis and Hidden Digestive Problems

A positive Metabolic Assessment test or Gastro-test can also point to dysbiosis, an imbalance in the healthy organisms that inhabit the intestinal tract. Dysbiosis can be caused by parasitic infections, bacterial overgrowth, or invasive yeast often referred to as Candida. Hidden or subclinical inflammatory conditions can also interfere with digestion and cause dysbiosis. 'Subclinical' refers to problems that are frequently not detected because they do not cause obvious symptoms.

## Leaky Gut Syndrome

Another common manifestation of digestive stress is "Leaky Gut Syndrome," in which the integrity of the intestinal lining is compromised and is no longer as discerning as it should be between what is absorbed into the blood stream and what is kept out of the blood stream. Therefore, molecules "leak" into the blood that should not be present and are attacked by our immune system, causing inflammation and tissue damage. When food antigens "leak" into our blood stream, the immune system thinks they are foreign invaders and mounts an immune response that we experience as an allergic reaction. Yeast and bacteria can also "leak" into the blood stream and cause significant immune system activity.

## Gluten and Dairy

Food sensitivities are a common cause of hidden, or subclinical, inflammation in the gastrointestinal tract. For example, some people are sensitive to grains containing gluten such as wheat, barley and rye. Others react to lactose found in milk and dairy products; many people react poorly to soy. These types of hidden food reactions are frequently found in people with chronic health problems. The food sensitivity test, or GI/Gluten food profile allows you to determine if food related problems are a significant factor in your overall health picture. Other examples of commonly undiagnosed gastrointestinal problems are parasitic infections.

## Parasites

Many people think of parasites as a problem that only occurs when traveling abroad. However, through recent improvements in diagnostic testing methods, doctors are now discovering high levels of parasite infections in the United States. Parasites are usually acquired by self-inoculation. This can occur when you eat at restaurants where the staff has poor hygiene, or when you eat from salad bars and buffets where food is left sitting out. Handling money, shaking hands with people and using public restrooms are all ways we are exposed to potential parasitic infections.

## Protecting Against Parasites

When several people are exposed to the same pathogen, or infectious organism, one person may be able to fight it off while another may become infected. This has been widely seen in the press with various bacterial organisms, most notably the toxic E. coli outbreaks. The E. coli bacteria is found most often in beef products and has caused severe digestive illness and, in rare cases, death. While many people are exposed to the same tainted meat, some people react more severely than others. This difference in susceptibility to intestinal pathogens such as E. coli is a reflection of the status of SIgA, or first line mucosal immune defense.

When you have strong mucosal immunity (normal SIgA production), the lining of your gastrointestinal tract is able to defend you from invading pathogens. Research studies have shown that if you have lowered mucosal immunity you will have a decreased ability to fight pathogens successfully.

To combat this growing problem with weakened immunity and parasitic infections,



new technologies have been created to detect these infectious organisms. One such test, called a stool antigen test, is highly effective in determining acute and chronic parasitic infections that were previously undetected with older testing methods. Bacterial overgrowth and invasive yeast and fungal infections of the intestines are also frequent causes of digestive stress. These too require additional testing to assess.

## **The Detoxification System**

The third major body system is based on both anti-oxidant protection and liver detoxification. These body functions are the physiological mechanisms that protect you from free radical damage and chemical toxicity. The initial assessment for the detoxification system is the Organix Metabolic Assessment. Further testing includes determining heavy metal burdens from lead, mercury, arsenic, cadmium and other toxic metals as well as chemical sensitivities.

The Metabolic Assessment evaluates your level of free radical damage and oxidative stress. If the lipid peroxides levels are elevated, you have high oxidative stress, accelerated free radical activity and need anti-oxidant protection. The second portion of the test, sulfate/creatinine, assesses your liver's ability to detoxify and eliminate harmful substances. A low value on sulfate means you are slow to eliminate toxins and need support for the liver detoxification pathways. Inadequate detoxification leads to allergies, asthma, joint pain, skin problems, headaches, inability to concentrate, and alcohol intolerance.

## **Anti-Oxidants and Free Radicals**

What exactly are free radicals? Free radicals are unstable molecules that attack and destroy healthy tissues. Stable molecules have electrons that exist in pairs. If a molecule loses a paired electron, it becomes unstable and reactive: a free radical. This unstable molecule will now steal an electron from another molecule, causing it to also become a free radical. One free radical can initiate a destructive cycle that is difficult for your body to stop. This process of destruction of healthy tissue is called oxidative stress.

## **Effects of Free Radicals and Oxidative Stress**

Oxidation occurs frequently in nature: for example, an apple slice turning brown or a

nail rusting. Both of these are oxidative reactions. The same thing happens inside our bodies; our tissues are gradually destroyed by oxidation from free radicals.

## Causes of Free Radicals

Free radicals are formed in our bodies from normal physiological processes like digestion, breathing and exercise. These free radicals are a natural result of the generation of cellular energy that our bodies require as fuel. Cellular energy comes from oxygen mixing with other substances. This cellular energy supplies our brain cells and muscles with fuel so we can work and think. But this energy production also forms free radicals, which are generated inside us. Free radical formation from cellular energy production is much like the formation of sparks that spit out of a burning fire. While free radical formation is a natural side effect of the creation of cellular energy, the effects of excessive, uncontrolled, free radical-induced oxidative stress is implicated in the development of heart disease and many cancers.

While a certain amount of free radicals are formed from biochemical reactions in a healthy body, their levels can greatly increase with poor internal organ function or illnesses. Poor digestive function or liver detoxification generates huge numbers of free radicals, which, if not controlled, can easily overwhelm our natural defenses. Oxidation of our cell's DNA by free radicals leads to structural damage of the DNA, a process that can cause cells to mutate and become cancerous. Oxidation of lipids/fats causes damage that results in plaquing to blood vessels, compromised blood flow, heart attack, stroke and high blood pressure. This is why antioxidants like Vitamin A, Vitamin C, Vitamin E, beta-carotene, zinc, lipoic acid, and selenium are so important. These antioxidants prevent free radicals from damaging your body's cells by stepping in and acting like a shield between the reactive free radicals and your healthy tissue. The anti-oxidants "put out the sparks" before they can create a problem. Because these nutrients prevent oxidative stress from free radicals they are called 'ANTI'-oxidants.

## The Detoxifying Role of the Liver

Why is your liver so important? One major role of the liver is to function much like a filter. If your body has to handle too many toxins, or waste products, the filter become clogged and ineffective. If toxins are not eliminated they recirculate through your blood and affect many organ functions. Toxins can affect nervous system and mental function, leading to fatigue, depression or anxiety. This build up of toxins can

cause allergies and skin reactions. Inadequate detoxification leads to accelerated aging and promotes the onset of degenerative diseases.

## Sources of Toxins

Our bodies must deal with toxins from many sources. One major source of toxic exposure is through the digestive tract. High fat diets, alcohol, caffeine, sugar, artificial sweetener consumption and the use of medications also contribute to the total burden placed on the liver. Hormones and antibiotics fed to animals, preservatives and dyes used in food processing can all cause serious symptoms and side effects. Heavy metal toxicity from dental fillings, contaminated food and water and other environmental exposure also add to the total toxic load on the body.

Most tap water in the United States comes from municipal water systems that are the repositories of millions of tons of chemicals, waste products, fertilizers, herbicides and pesticides from water run off. Much of this finds its way into our food supply. Approximately three thousand chemicals are added to our food. Thousands more, in the form of emulsifiers and preservatives, are used in processing and storage.

It is impossible to completely avoid exposure to the environmental pollutants (car exhaust, cigarette smoke and industrial waste) that have accumulated in our air, water, food and soil. Chemical toxicity has been linked to breast cancer. Lead in paint has been linked to serious nervous system damage. More than 69 million Americans live in communities with smog levels that exceed national safety standards. Our bodies can easily become overwhelmed and unable to discard these toxic compounds fast enough to maintain our health.

## Poisonous Homes

There are some types of toxic exposure that are avoidable. In 1989 the Environmental Protection Agency found that the toxic chemicals in common household cleaners, often in the form of fumes, are three times more likely to cause cancer than are other air pollutants. The EPA also reported to Congress that our indoor air contains the nation's worst pollution: the typical American home has chemical contamination levels seventy times greater than contamination levels found in the air outside. The quality of indoor air is being degraded by the products most of us are using to clean our homes.

## Deadly Toxins

We have no way to protect ourselves if our bodies are exposed to these harmful substances and unable to discard them quickly. Constant exposure to toxic chemicals in our food, air and water has been demonstrated to lower our resistance to disease and cause multiple nutritional deficiencies and altered liver enzyme function. Birth defects, infertility, neurological disorders, hyperactivity, attention deficit disorder and other learning and behavioral disorders have been linked to excessive chemical exposure.

## Eliminating Toxic Exposures

Despite all the work it has to do everyday, the liver has an amazing ability to regenerate. It's the only human organ that can re-grow if a section of it is cut away. Your sulfate/creatinine ratio assesses your liver's ability to remove toxic compounds. If your toxic exposure level is high and your ability to eliminate these poisons is compromised, nutritional supplementation can reverse a dangerous situation. If your ability to detoxify is strong, then simple avoidance of obvious sources of toxic exposure will help keep it that way. Methods of avoidance include using non-toxic cleaning agents that are safe and effective, eating organic foods, avoiding excessive alcohol and caffeine, avoiding second hand cigarette smoke and avoiding any unnecessary use of over the counter medications.

## Detoxification Lab Assessments

### Measuring Free Radical Activity

Your Organic Acids test includes a measurement of your level of free radicals and lets you know the level at which you need anti-oxidant support. Not everyone needs anti-oxidants and taking them if they are not needed can cause muscle weakness and fatigue. That is why appropriate testing before supplementation is so critical. If your tests demonstrate a need for anti-oxidant support, you can supplement and then retest at a future date to evaluate the success of your program.

### Measuring Liver Detoxification Pathways

The urinary test measuring your sulfation pathway assesses your liver's ability to detoxify. If your detoxification abilities are over taxed, destructive chemical compounds will build up in your body. If you have a low sulfate/creatinine ratio, you

have low liver detoxification ability, and additional nutritional support is required to improve this condition. The Organic Acids profile has 46 test parameters in all which in total create an excellent tool for over all assessment that includes energy production, fat and carb metabolism, B vitamins and many other factors.