The **Adrenal Stress Test: Profile 1600** includes four salivary cortisol levels, DHEA and secretory IgA. Four-point cortisol measurements taken over the course of the day reflect a patient’s cortisol circadian rhythm and may be a better indicator of adrenal function than blood or urinary cortisol measurements. DHEA (dehydroepiandrosterone) is a natural steroid hormone that is synthesized from cholesterol by the adrenal glands.

Our **advanced profile** contains secretory IgA (sIgA). sIgA is a marker of intestinal integrity and gut immune health also helping to assess the impact of stress on the system.

The **adrenal glands** are located on top of the kidneys and are responsible for the synthesis of these hormones. In particular, cortisol regulates glucose levels, blood pressure, immune response, inflammation, and circadian rhythm (the sleep-wake cycle). It has often been called the “stress hormone” for its involvement in one’s reaction to stress and anxiety. A person’s response to stress can affect energy levels and has been linked to reductions in cancer and heart disease.

Prolonged exposure to stress can cause the adrenal glands to become fatigued. This causes a corresponding decrease in cortisol levels, thus hindering the body’s ability to respond. Normal cortisol levels are highest in the morning to wake us up and then decrease gradually until midnight, promoting relaxation and sleep. This is the cortisol circadian rhythm. Abnormalities in this rhythm can lead to fatigue, insomnia, anxiety, weight gain around the middle, poor coping skills, exercise intolerance, and depression.

**Symptoms of Adrenal Dysfunction:**
- Hormonal imbalance
- Hypoglycemic symptoms
- Allergies
- Headaches
- Dizziness
- Weight gain around the middle
- Poor coping skills
- Exercise intolerance
- Nausea
- Inflammation and pain
- Fatigue
- Insomnia
- Anxiety
- Depression
- Insomnia

**Low Cortisol at Any Time Point**
A person with normal adrenal function should have a peak of cortisol in the morning which slowly decreases throughout the day. This normal pattern sets our circadian rhythm so that we feel like waking in the morning but are ready to sleep by night. A low morning peak or a low cortisol at any point in the day indicates moderate adrenal fatigue.

When cortisol levels are low or low-normal throughout the day, one experiences fatigue, irritability, and sleep disturbance, among other symptoms.

This patient will typically have a poor stress response and will be at risk for depression, anxiety, insomnia, inflammation, and pain as well as other conditions.

**If CORTISOL is LOW consider:**
- **Adrenal Nutritional Support**
- **Adaptogenic Herbs**
- **Lifestyle Modifications**
- **Adrenal Glandular Support**

**Treatment**

**Adrenal Nutritional Support** includes vitamins B5, B6, Vitamin C, zinc, and carnitine. B vitamins, especially pantothenic acid and vitamin C are critical for adrenal function. The amino acid, L-tyrosine helps to build better levels of adrenaline. In patients who are prone to anxiety, L-phenylalanine can be used instead of L-tyrosine.

**Adaptogenic Adrenal Herbs** help regulate adrenal function; either to calm adrenals or raise adrenal activity, depending on the individual. Examples of these natural agents include ginseng, eleuthero, licorice, schisandra, and rhodiola. These herbs have been shown to support the body’s natural stress mechanisms and restore balance. Eleutherococcus and panax ginseng increase cortisol while licorice decreases the breakdown of cortisol. Example total daily dosages are: 150-300 mg American ginseng, 100-200 mg eleuthero, 100-200 mg licorice, and 100-200 mg of each schizandra and rhodiola.

**Lifestyle modifications** are often necessary to successfully heal the adrenals. Examples include: scheduled rest, meditation, vacations, and yoga. These patients often have to restructure their lifestyles in order to live within the capacity of their adrenal reserves. Short-term interventions should decrease stress in the patient’s life and encourage rest. For long-term resolution, patients must redesign their lives and minimize stressors. In this way, effective symptom resolution is possible, even after discontinuing treatment.

**Adrenal Glandular Support** is often used to naturally enhance cortisol production. The adrenal glands are needed for proper catecholamine production (dopamine, norepinephrine, and epinephrine). Formulas that contain adrenal glandulars and herbs support healthy adrenal function. This adrenal support can be taken in the morning to support and sustain the cortisol peak and one to two capsules can be taken in the afternoon if there is a lull in energy or severe energy impairment. This will improve well-being, stress response, reduce inflammation, and decrease histamine release. When taken twice daily at the recommended dosage, the resulting dose is 250-500 mg adrenal powder/day.
**Nutrients That Support Adrenal Function**

- Pantothenic acid (Vitamin B5)
- Vitamin B6
- Vitamin C
- Carnitine
- Zinc
- L-Tyrosine or L-Phenylalanine

**Low Cortisol at Any Time Point**

Low, High Cortisol (Morning, Noon or Evening)

Adrenal Nutrition Adaptogenic Herbs Lifestyle Modifications

Phosphatidylserine

High Midnight Cortisol

Ashwaganda Melatonin Calming Formulas Adrenal Nutrition Phosphatidylserine

DHEA, DHEA Supplementation, Phase I and Phase II Liver Detoxification Antioxidant Support

sgA, Serum Colostrum Derived Immunoglobins Gut Healing Formulas Gut Soothing Agents Probiotics Investigate Other Causes

Broad-spectrum Microbials Probiotics

Anti-gliadin Antibody, Gluten-free Diet Glutamine Probiotics

**High Cortisol (Morning, Noon, or Evening)**

**High cortisol** is a marker of the “fight or flight” response. During this period the adrenals are working on overdrive to produce cortisol. Should this heightened state be overextended, the patient will experience excessive stress and exhaustion.

A patient will have different symptoms depending on the time of day that a high cortisol peak is produced and this may dictate slightly different treatments. A high morning cortisol can cause symptoms of anxiety and make one feel less resistant to stress. High morning cortisol is often followed by a dramatic drop in levels by noon, which can contribute to feelings of exhaustion at mid-day.

A high cortisol level at noon can result in feelings of irritability or anxiety. If evening cortisol is higher than afternoon cortisol, it is sign of early adrenal fatigue. High cortisol at any time can be modulated using nutrition, adaptogenic herbs, ashwaganda, lifestyle modification, and phosphatidylserine.

High midnight cortisol will result in insomnia or poor sleep quality. If midnight cortisol is higher than evening cortisol, this can also contribute to insomnia and poor sleep quality. Treatments for sleep disruption due to high midnight cortisol include ashwaganda, melatonin, and calming formulas designed to increase gamma-aminobutyric acid (GABA).

**Treatment**

**Adrenal Nutritional Support** includes B vitamins, vitamin C, and carnitine. These vitamins should be used to normalize physiological response. (See previous discussion)

**Ashwagandha** (Withania somnifera) is an adaptogenic herb used to help relax and calm the adrenal glands. One to two doses of ashwagandha may be taken at any time when cortisol spikes during the day. Two additional doses may be taken as needed for flares of anxiety, irritability, or stress. In the case of an evening spike of cortisol, two capsules of ashwagandha may be taken in the evening. During chronic stress, ashwagandha is able to support normal thyroid and gonadal function. It also acts as a primary agent to restore proper function of the hypothalamic-pituitary-adrenal axis. Ashwagandha also works synergistically with other plant adaptogens to support brain function, the immune system and a healthy metabolism.

**Adaptogenic Adrenal Herbs** help regulate adrenal function. (See previous discussion)

**Lifestyle modifications** are often necessary to successfully heal the adrenals, as mentioned previously.

**Phosphatidylserine** is a fat-soluble phospholipid found in high concentrations in the brain and nervous tissue. Phosphatidylserine is a precursor for nerve cell function and supports normal cognitive and nervous system function. Phosphatidylserine blunts the stress-induced cortisol response. It improves the structure and function of brain cells, improves memory, learning, concentration, word recall, and mood in persons with dementia or decreased cognitive function.

**High Midnight Cortisol with Sleep Disruption**

High midnight cortisol will result in insomnia or poor quality sleep. A more subtle pattern, midnight cortisol higher than evening cortisol, can also contribute to insomnia and poor sleep quality.

High cortisol levels can cause

- Anxiety
- Poor Coping Ability
- Sleep Disruption
- Abdominal Weight Gain
- Irritability

**Ashwagandha** (Withania somnifera) is an adaptogenic herb used to help relax and calm the adrenal glands. (See previous discussion)

Melatonin helps promote healthy sleep patterns as well as antioxidant and immune activities. One tablet (5 mg) can be given before bed to reset the patient’s circadian rhythm and support restful sleep. Melatonin is naturally produced in the pineal gland in response to changes in light exposure. Melatonin support can help maintain normal levels of melatonin in the body. A controlled release melatonin can prevent the drop-off of melatonin that occurs about four hours after falling asleep. Ten mg of Vitamin B6 may be used with melatonin for quick release and extended support.

**Treatment (cont.)**

**Calming Formulas**, designed to control excess catecholamine production and up-regulate inhibitory neurotransmitters, can promote a calm, relaxed, physiological and emotional state. Calming formulas may contain inositol, taurine, L-theanine, magnesium, and GABA. This type of formula is typically given in the morning to balance neurotransmitters and the dose can be doubled if symptoms continue. Inositol is a precursor for the second-messenger phosphatidylinositol system, and may be therapeutic in depression, obsessive-compulsive disorder, and panic attacks. Taurine is thought of as neuroprotective and stabilizes cell membranes in the heart and brain. L-Theanine is notable for its ability to relax the mind without inducing drowsiness and may also support nerve health and cognition. Magnesium is sometimes referred to as the relaxation mineral...
and supplementation has been shown to support a healthy mood as well as PMS-related mood changes. Typically, one scoop is given in the morning if there are symptoms of impaired focus and concentration. One scoop can also be given in the evening if there are symptoms of insomnia or poor sleep quality. Example dosages are: 75 mg magnesium, 50 mg L-theanine, 500 mg taurine, 2 mg inositol, and 100 mg GABA.

**Adrenal Nutritional Support** includes B vitamins, vitamin C, and carnitine. These vitamins should be used to normalize physiological responses. (See previous discussion)

**High Cortisol Patterns:**
If evening cortisol is higher than afternoon cortisol, this is a sign of early adrenal fatigue.

If midnight cortisol is higher than evening cortisol, this can contribute to insomnia and poor sleep quality.

**Low DHEA**
DHEA (dehydroepiandrosterone) is a natural steroid hormone that is synthesized from cholesterol by the adrenal glands. DHEA is involved in a large variety of physiological processes including immune function, brain function, bone metabolism, blood lipid metabolism, energy metabolism, the regulation of normal blood sugar and insulin levels, and the maintenance of lean body mass. DHEA acts as an antagonist for glucocorticoid hormones (such as cortisol) and is the parent precursor for other important steroid hormones, such as estradiol and testosterone.

Low DHEA can cause fatigue, inflammation, increased risk of autoimmune conditions, weight gain and heightened allergies. Low DHEA levels can be used to identify early adrenal fatigue. Low DHEA will cause muscle weakness and hormonal imbalance. In women, optimum DHEA levels improve the transition into menopause.

**Treatment**
DHEA supplementation may be given.

**High DHEA**
Accumulation of DHEA, in someone who is not already supplementing, is a sign that the liver is not clearing hormones properly. A person with high DHEA is usually a poor detoxifier.

**Treatment**
Liver Detoxification Support is needed to ensure the body can properly eliminate toxins, especially hormones such as DHEA. Phase I and phase II detoxification is essential to overall health and vitality. Antioxidant Protection is necessary to minimize damaging effects of free radicals generated during phase I and phase II clearance of toxins. Natural products able to up-regulate glutathione and antioxidant capacity include broccoli extract, turmeric, green tea catechins, resveratrol, and black pepper extract. These agents turn on the genes that tell the body to make more glutathione. They activate the Nrf2 genetic pathway which helps produce important antioxidants such as glutathione and superoxide dismutase (SOD) and detoxification enzymes, such as glutathione-S transference. Activating this genetic pathway also reduces inflammatory factors such as NF-kB. One capsule a day is generally recommended and would give doses of 30 mg glucoraphanin from broccoli extract, 200 mg turmeric, 200 mg green tea extract, 2 mg pepper extract, and 50 mg pterostilbene (like resveratrol).

**Low sIgA**
Secretory sIgA is a marker of gastrointestinal integrity and immune health. Stress, malnutrition, celiac disease or a genetic IgA deficiency could contribute to low sIgA levels. sIgA decreases as the immune defenses of the gut are compromised and the lining becomes perforated or “leaky.” Maldigestion, chronic infection and even food allergies can contribute to low sIgA. Check the patient’s cortisol results to determine if abnormal sIgA is related to stress.

**Treatment**
Immunity and Healing Formulas comprised of immunoglobulins and other compounds found in colostrum and breast milk can promote tissue repair and improve immunity. Serum-derived or colostrum-derived immunoglobulin antibodies and immunoproteins can provide immune enhancement by directly boosting immunoglobulin levels in the GI tract while providing cysteine, an important amino acid for maintaining glutathione levels. Immunoglobulins close tight junctions and immediately help to heal the course of leaky gut. These immunoglobulins wall off endotoxins preventing die-off reactions and also increase sIgA.

Vitamin A is an important nutrient for health of the epithelial cells in the gastrointestinal tract. It is essential for vision, immune system function, bone and cartilage development, and the maintenance and repair of epithelial tissue. In the GI, it can help the immune system tolerate self-antigens and commensal flora while promoting the attack against infection.

Gut Soothing Agents/Demulcent and mucus-generating agents are important for repairing leaky gut and decreasing irritation. Aloe, deglycyrrhizinated licorice (DGL), slippery elm, or marshmallow root, as well as nutrients such as zinc carnosine help “heal and seal” the gastrointestinal lining.

**Probiotics** are beneficial microbes, integral to immune function and gastrointestinal health. Probiotics promote a healthy balance of organisms in the gastrointestinal tract, provide beneficial cross-talk with the gut-immune system, and strengthen the epithelial cells. Bifidobacteria, Lactobacillus, and Saccharomyces boulardii are probiotics that can help increase sIgA levels.

**High sIgA**
slgA levels elevate as a reaction to infections. High slgA indicates a heightened immune response and can be brought on by acute stress, celiac disease, and food allergies. Consider a stool culture to identify specific infection. Check the patient’s cortisol results to determine if abnormal slgA is related to stress. Treat infection accordingly.

**Treatment**
An Antimicrobial Formula can reduce bacteria, yeast, or parasites and support healthy gastrointestinal ecology. Examples of popular antimicrobial agents include berberine, wormwood, thyme leaf, olive leaf, oregano oil, grape fruit seed extract, uva ursi, and black walnut hulls. Berberine has been shown to possess antimicrobial activity against protozoa; wormwood has been used to expel parasites and thyme leaf extract has a broad spectrum of antimicrobial activity against both bacteria and fungi.

**Probiotics** are beneficial microbes, integral to immune function and gastrointestinal health. (See previous discussion)

Vitamin A is an important nutrient for health of the epithelial cells in the gastrointestinal tract, as mentioned previously.
Figure 1: Normal Adrenal Function. Should have a peak of cortisol in the a.m. and slowly decrease throughout the day. This pattern means that stress response is optimal. How we handle stress is critical to energy, reduction of heart disease and even cancer prevention. It is also this normal pattern that helps us to set our circadian rhythm so that we feel like waking in the morning, and slowly decrease throughout the day so that we stay alert but are ready to sleep by night.

Figure 2: Moderate Adrenal Fatigue. One of the most important pieces of adrenal function is to peak in the a.m. If this ability declines, shifts in well-being begin. A low a.m. peak or low cortisol at any point in the day is moderate adrenal fatigue.

Figure 3: Severe Adrenal Fatigue. In this state one is bottomed out, has no energy and has the greatest levels of symptoms. Adrenal exhaustion means we have poor stress response and are more at risk for many conditions.

Figure 4: Insomniac Adrenal Function. Cortisol increasing when it should be coming down. This will result in insomnia or poor sleep quality.