

Adrenal Fatigue and Cortisol 101

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Introduction

Dr. Hotze is founder of the Hotze Health & Wellness Center and author of the book *Hormones, Health, and Happiness*. He has enabled thousands of women and men to achieve optimal health using his customized 8-Point Treatment Regimen. If you would like a free evaluation regarding your health, you can contact his office by calling 877-698-8698.

Notice: This book is intended as a reference guide, not as a medical manual. The information given here is designed to help you make informed decisions about your health. It is not intended as a substitute for any treatment that may have been prescribed to you by your doctor or therapist. If you suspect that you have a medical or emotional problem, we urge you to seek competent medical or psychiatric help.

The names of those whose cases are presented in this book have been changed to preserve their privacy.

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Adrenal Fatigue: The Cortisol Connection

Cortisol is essential to life. Laboratory animals that have had their adrenal glands removed can no longer produce cortisol, and they are very fragile creatures. They can function reasonably well if their environment is kept perfectly stable. However, even the slightest variation in their environment—a drop in room temperature, for example—can spell death for these creatures. With the loss of their adrenal glands, they have lost their ability to adapt.

Human beings are not laboratory animals, and the environments we live in are seldom stable. We are exposed to a constant onslaught of stressors—noise, pollution, traffic, inclement weather, injuries, illnesses, emotional conflicts, deadlines, and on and on. We may heap stress on top of stress by smoking, eating refined carbohydrates, drinking coffee, or going without adequate sleep. Chronic, unrelenting stress, whether physical or psychological or both, eventually leads to adrenal fatigue. The adrenals simply cannot produce enough cortisol to meet the demands. The result? We feel “stressed out”—because we are.

As you might expect, some of the effects of suboptimal cortisol levels are the opposite of those seen with high cortisol levels. Instead of hyperglycemia, or elevated blood sugar, individuals with mild adrenal fatigue often have hypoglycemia, or low blood sugar. Instead of high blood pressure, they may have low blood pressure. Instead of feeling mentally stimulated, they may have trouble concentrating. But the number one symptom of adrenal insufficiency is fatigue. Whereas individuals with optimal cortisol levels have energy to burn, those with low cortisol levels drag themselves through the day, feeling exhausted.

If you have adrenal fatigue, you may function reasonably well when your life is stable but fall apart if stress is added. You are likely to be more vulnerable to infections and to heal more slowly than those with healthy adrenal glands. You may suffer from headaches, heart palpitations, or joint and muscle pain. You may develop allergies or chemical sensitivities or experience a worsening of existing allergies or asthma.

The Adrenal Glands: Two Organs in One

The two adrenal glands, which derive their name from their location in the body (“ad” means near; “renal” means kidney), are key players in your body’s response to stress. Situated on top of the kidneys, these pyramid-shaped organs, the size of walnuts, are actually two endocrine glands in one: an inner medulla, which orchestrates your short-term stress response, and an outer cortex, which mediates your adaptation to chronic stress.

Figure 10. The Adrenal Glands.

The pyramid-shaped adrenal glands rest on top of the kidneys. The inner medulla secretes a short-acting hormone called epinephrine (adrenalin), while the outer cortex secretes cortisol, a hormone with more prolonged effects.

The primary hormone of the medulla is epinephrine, also called adrenalin. This powerful, short-acting hormone is secreted in response to the four E’s: exercise, excitement, embarrassment, and emergency. The flood of adrenaline that is unleashed in these situations causes a number of dramatic physical changes throughout your body: your heart beats more rapidly and forcefully; your pupils dilate; and blood is shunted toward your skeletal muscles, heart, and brain. Glycogen in your liver is converted into glucose to be used for quick energy. You may break out into a cold sweat and begin breathing more rapidly. In short, your body is mobilized for action. This is why adrenaline is known as the “fight or flight” hormone.

Adrenaline’s effects are dramatic and unmistakable, but because this hormone does not linger in your body, its effects are also relatively short-lived. On the other hand, cortisol, the stress hormone produced by the outer cortex, has more prolonged effects on your body. If adrenaline is like the whip that drives the horse faster and faster, cortisol is like the rider’s boot, digging into the flank, keeping the horse going even when it’s ready to quit.

The primary function of cortisol is to promote gluconeogenesis, the conversion of fats and proteins to sugar (glucose). Gluconeogenesis is an essential component of your body’s adaptation to chronic stress, ensuring that your vital organs, especially your brain, heart, and skeletal muscles, have enough energy to meet the increasing workload. In addition, cortisol assists adrenaline in stimulating the cardiovascular system, increasing the heart rate and pumping capacity and

temporarily raising blood pressure. Cortisol also decreases inflammation, which is why this hormone and its counterfeit derivatives have been used to treat inflammatory conditions, such as allergies, asthma, arthritis, and skin disorders.

Due to its metabolic effects, high levels of cortisol can be extremely damaging. People with chronically elevated levels of cortisol may have high blood sugar and insulin levels and high blood pressure; they may gain weight, especially around the abdomen; and they have a greater risk of heart disease. However, just because high levels of cortisol are harmful doesn't mean that low levels are healthy. As with all hormones, balance is the key.

My Background Regarding Cortisol

The Cortisol Connection

The addition of natural, bioidentical hormone therapy to my treatment regimen made a world of difference for the vast majority of my patients. But there was still a small group of patients who did not respond as expected, despite the comprehensiveness of my approach. Even with the proper balance of estrogen and progesterone, a small number of female patients still experienced menstrual irregularities, anxiety, and depression.

Even when taking natural thyroid hormone, some patients with hypothyroidism continued to suffer from low energy and "brain fog." Even with allergy treatment, some patients still had recurrent sinus infections. And nearly all of them told me that they felt "stressed out."

I was frustrated by my inability to get to the root cause of these patients' health problems and asked myself, "What piece of the puzzle am I missing?" I knew there must be a common factor underlying the diverse symptoms that these patients were experiencing. Was the common factor stress, or the way their bodies responded to stress?

A Serendipitous Discovery

In 1998, I learned that Dr. Broda Barnes had often prescribed natural cortisol along with Armour Thyroid. At that time, I knew little about the therapeutic use of cortisol. I knew that it was a stress hormone secreted by the adrenal glands. I knew that it had been promoted in the 1950s as a treatment for rheumatoid arthritis, but that its use had eventually been supplanted by counterfeit corticosteroids produced by the drug companies.

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Like all physicians, I was aware of the potential risks of very high doses of corticosteroids, which are often prescribed for arthritis and other inflammatory conditions. However, I was not aware that very low replacement doses of the body's most important corticosteroid, cortisol, were safe and highly beneficial to patients with a wide range of symptoms.

In medical school I learned about Addison's disease, a relatively rare condition in which the adrenal gland is unable to produce adequate cortisol. But there was no mention of mild adrenal insufficiency or adrenal fatigue, its effects on immunity and on the function of other hormones, or its treatment. It was as if this condition did not exist.

I respected Dr. Barnes immensely, and since I was eager to find ways to help the patients who were not responding to my comprehensive treatment program, I decided to research the topic of natural cortisol replacement. In the fall of 1998, I purchased a medical text named, appropriately enough, *Safe Uses of Cortisol*. In this book, William McK. Jefferies, M.D., outlined the role of the adrenal glands in the body's response to stress and documented the connection between adrenal insufficiency and menstrual problems, infertility, allergies, asthma, rheumatoid arthritis, viral infections, chronic fatigue, hypothyroidism, and other ailments. Throughout the book, Dr. Jefferies presented compelling case histories from his fifty years of experience using natural cortisol.

As I read Dr. Jefferies' textbook, I became increasingly intrigued. Like my other mentors, Dr. Jefferies was a physician who challenged conventional thought. He recognized that health is a continuum from extreme disease to a condition of optimal health. Instead of assuming that only life-threatening adrenal insufficiency merited attention, he maintained that even mild adrenal insufficiency could impair health and should be treated.

Throughout his book, Dr. Jefferies made a clear - cut distinction between very high pharmacologic doses of counterfeit corticosteroids, which have severe adverse effects, and physiologic replacement doses, which safely reestablish the body's optimal levels of cortisol. He emphasized the difference between the synthetic, counterfeit corticosteroids produced by drug companies and naturally occurring cortisol produced by the body. Although he measured his patients' blood levels of cortisol, he did not rely solely on blood tests for diagnosis or

treatment. He maintained, as I do, that a patient's clinical history is the best indicator of adrenal function.

Symptoms and Signs of Adrenal Fatigue

- Chronic fatigue
- Low blood sugar (hypoglycemia)
- Low blood pressure (hypotension)
- Dizziness or lightheadedness upon standing
- Muscle and/or joint pain
- Recurrent infections
- Allergies and/or asthma
- Irregular menstrual cycles
- Infertility
- Low libido
- Headaches
- Hair loss
- Dry skin
- Anxiety or panic attacks
- Depression
- Heart palpitations
- Difficulty "bouncing back" from stress
- Cold and heat intolerance

If you think that many of these symptoms sound similar to those of hypothyroidism, you're right. Although they are clinically distinct conditions, adrenal insufficiency and hypothyroidism are both metabolic problems that result in a slowdown of the body's functions and a decline in energy. Some people have only one of these conditions, but many people have both. If your hypothyroidism is complicated by adrenal insufficiency, then it's important to address this underlying problem at the same time. Let me explain why.

The Adrenal Glands and the Thyroid: Partners in Health

As I mentioned at the beginning of this chapter, some patients with hypothyroidism do not regain their energy even when they are taking natural thyroid. I was puzzled by this phenomenon until I learned about Dr. Barnes's use of natural cortisol and read Dr. Jefferies' book. Dr. Jefferies had found that

adrenal fatigue often occurs in conjunction with hypothyroidism, and that, in the absence of adequate cortisol, thyroid hormone replacement was less effective.

The reason is that when the adrenal glands are weak, even normal thyroid activity is a burden. Adding supplemental thyroid hormone may result in initial improvement in energy levels and other symptoms, but as the adrenal glands become more exhausted, energy production is shut down. The solution is not more thyroid hormone. What is called for is adrenal support with small doses of cortisol.

In my experience, as well as that of Drs. Jefferies and Barnes, low-dose cortisol can make a tremendous difference in the energy and well-being of patients with hypothyroidism. Not only does it improve energy, raise body temperature, and increase resistance to infection, it also helps the body utilize thyroid hormone. Natural cortisol is especially helpful for patients with autoimmune thyroiditis, an extremely common cause of hypothyroidism that I discussed in chapter 6. Like other autoimmune conditions, autoimmune thyroiditis can develop when the adrenal glands are stressed, especially following pregnancy or at menopause. As documented in Dr. Jefferies' book, natural cortisol actually reduces levels of thyroid antibodies, enhancing the effectiveness of thyroid hormone.

Adrenal Fatigue and Women

Like hypothyroidism, adrenal fatigue affects women much more frequently than men. The reason women develop estrogen dominance is discussed in chapter 1. High levels of estrogen cause a corresponding increase in levels of cortisol-binding globulin. Like other hormone-binding globulins, cortisol-binding globulin interferes with hormone function. It circulates in the bloodstream, binds to cortisol, and renders it inactive. A woman with estrogen dominance may have adequate levels of total cortisol in her bloodstream, but her free, available cortisol level may be very low. Only free cortisol can pass through cell membranes and activate receptors inside the cell.

Estrogen impairs adrenal function in another way: it interferes with the release of cortisol from the adrenal cortex. In laboratory animals, when estrogen levels are high, the adrenal cortex fails to respond to signals from the brain. In other words, even though the brain is emitting a cry of alarm—"Send more cortisol!"—the gland responsible for meeting this demand does not "receive" it.

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Just as estrogen dominance can contribute to adrenal insufficiency, adrenal insufficiency can contribute to estrogen dominance. Cortisol is made in the adrenal cortex from progesterone. If progesterone levels are low, then cortisol levels are likely to be low as well. Because the body considers cortisol more important to survival than progesterone, whatever progesterone is available in the adrenal cortex is going to be converted into cortisol. This means that a woman whose ovaries are producing less progesterone will not be able to call upon her adrenal glands to produce adequate amounts of cortisol.

As we age, our adrenal glands produce less cortisol. This inevitably leads to adrenal fatigue to one degree or another.

Adrenal Fatigue and Allergies

Adrenal fatigue is also a common underlying problem in patients with allergies, especially when these allergies have been poorly managed. As I explained in chapter 4, out-of-control allergies often lead to recurrent sinus infections, which lead to repeated courses of antibiotic therapy, which lead to yeast overgrowth and impaired immunity. This cycle of infection, antibiotic treatment, impaired immunity, and reinfection adds stress to the body, weakening the adrenals, and reducing cortisol levels.

This in turn worsens allergies, because cortisol is the body's antiallergy hormone of choice. Cortisol is both a natural antihistamine and a natural anti-inflammatory. Prednisone, dexamethasone, and other high-dose counterfeit corticosteroids that are used to alleviate the inflammation of bronchial asthma, rheumatoid arthritis, and other autoimmune conditions are simply the drug companies' counterfeit versions of the body's own natural anti-inflammatory hormone, cortisol.

Though I don't prescribe cortisol to every patient with allergies, I have found that those with long-standing, unmanaged allergies are usually suffering from adrenal fatigue. The addition of cortisol to their treatment regimen lessens the likelihood of recurrent sinus infections and helps them regain energy more quickly.

The Importance of Adrenal Support

The use of physiologic, subreplacement doses of cortisol has proven to be a godsend for many of my patients with these and other conditions. A young, healthy person produces 20–30 mg of cortisol per day. My starting dose of slow-

release biologically identical cortisol is 1.25–2.5 mg per day, and I adjust the dosage incrementally as symptoms warrant. Along with this, I also recommend that patients take dehydroepiandrosterone (DHEA), another hormone produced by the adrenal glands. The amount of DHEA produced by the adrenal cortex is greater than that of any of the other adrenal hormones, including the androgens (androstenedione and testosterone) and the estrogens (estradiol, estrone, and estriol).

Levels of DHEA and its derivative, DHEAS, peak in young adulthood and then begin to decline. By the age of seventy, your DHEA level may be less than a fifth of what it was at the age of twenty. In elderly adults, higher levels of DHEA correspond with better health and longevity. When blood levels are low, supplemental DHEA often enhances energy, immunity, and libido.

Figure 11. Age-related Decline in DHEAS.

Levels of DHEAS, a blood marker of DHEA status, peak around age seventeen in women and age twenty-two in men. After the age of thirty, levels of DHEAS decline about 2 percent per year.

A healthy diet is also important for anyone with adrenal insufficiency. If low blood sugar is a problem, you may find it helpful to eat several small meals during the day. Make sure to include adequate protein and reduce or eliminate refined carbohydrates, caffeine, and alcohol, all of which stress the adrenal glands.

Nutritional supplements are also vital. You can find more on this important topic in appendix C, but for now, I want to mention one nutrient in particular that is crucial to healthy adrenal glands: vitamin C. The adrenal cortex has the highest concentration of vitamin C of all the organs in the body, and the cells of this gland use it at a higher rate than any other cells. Vitamin C enhances immunity, which is often impaired in those with adrenal insufficiency. During times of stress, our bodies excrete vitamin C more rapidly, making our need for this vitamin even greater.

I advise all of my adult patients to supplement with 3,000–6,000 mg of vitamin C per day. A slow-release buffered form is best to prevent over acidity of the stomach and to ensure sustained blood levels throughout the day.

Can Stress Be a Good Thing?

Hans Selye, M.D., the endocrinologist who is considered the father of modern stress research, said: “I cannot and should not be cured of my stress, but merely taught to enjoy it.”

There is simply no avoiding physical and psychological stress in our daily lives. If we're fortunate, the amount of stress in our lives is manageable, and if we're very fortunate, our lives include just the right amount of “good stress.” Good stress is the kind of stress that brings out the best in us. It stimulates us to perform at a higher level.

Maybe the following example will help you understand what I mean. The Christmas season can be stressful; planning for parties, purchasing and wrapping gifts, decorating and making the home ready for guests, preparing meals, and entertaining relatives. But many women find the experience gratifying. This is good stress, and it allows them to bring out nurturing aspects of their personalities.

Too much stress can be overwhelming to both the body and the soul, but too little stress can be “underwhelming,” resulting in boredom and a lack of vital energy. While I would never wish harmful stress—distress—upon anyone, I do encourage you to find sources of good stress in your life. Seek out activities that challenge your mind, engage your senses, and make you feel more alive. This is the kind of stress that will keep you young and make your life exhilarating.