

Adrenal Fatigue



Lack of energy in the morning. Waking in the morning fatigued.



Tendency to tremble when under pressure. Light headed



Panic attacks, depression, insomnia, inability to lose weight.

Tulsa Natural
Health Spa

Adrenal Fatigue: Stress and Estrogen Dominance

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INTRODUCTION

Fatigue and lethargy is one of the most common complaints amongst adult patients. If you have symptoms such as fatigue, waking in the morning fatigued after sleeping for 8 hours, fearfulness, allergies, frequent influenza, arthritis, anxiety, panic attacks, depression, insomnia, inability to lose weight or gain excessive weight around the belly, craving for salty food, or unable to tolerate bright lights, you may be suffering from adrenal fatigue or hypoadrenia.

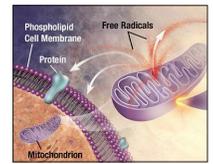
Adrenal fatigue has a broad spectrum of non-specific, yet often debilitating symptoms. The onset of this disease is often slow and insidious. Patients are often told that they are experiencing stress and should learn to relax more. We all know the damage chronic stress can inflict, so the questions is; what are the solutions? The real truth is that stress is not some mysterious entity. Our bodies are designed to deal with it. The ability to handle stress is a key to survival, and the control center in our bodies is the adrenal glands. Adrenal fatigue was first recognized in the medical texts in the 1800's as a clinical condition. It was one of the most common symptoms afflicting almost every adult in one way or another.

Despite sophisticated diagnostic tools and treatment programs, most traditional physicians were simply not informed, nor prepared to treat adrenal fatigue as a serious threat to health. Adrenal fatigue was seldom diagnosed as a sickness for the past 50 years. Instead, it was considered as a condition whereby no treatment was available, other than tell the patients to relax or prescribe anti-depressants. The reason for this is laboratory tests were not available to detect any abnormality. Today, adrenal fatigue can be accurately diagnosed and treated. Adrenal fatigue, however, should not be confused with Addison's disease; Addison's disease is a rare endocrine, or hormonal disorder that affects about 1 in 100,000 people. It occurs in all age groups and afflicts men and women equally.

The disease is characterized by weight loss, muscle weakness, fatigue, low blood pressure, and sometimes darkening of the skin in both exposed and non-exposed body parts. Addison's disease occurs when the adrenal glands do not produce enough of the hormone "cortisol" and in some cases, the hormone "aldosterone." For this reason, the disease is sometimes called, chronic adrenal insufficiency, or hypocortisolism. Adrenal fatigue is the non-Addison's form of adrenal dysfunction. Unfortunately, conventional medicine only recognizes Addison's disease as hypoadrenia despite the fact that adrenal fatigue is a fully recognizable condition. As such, do not be surprised if your doctor is unfamiliar with this condition.

Signs and Symptoms of Adrenal Fatigue

- Tendency to gain weight and unable to lose it, especially around the waist.
- High frequency of getting the flue and other respiratory diseases with symptoms lasting longer than usual.
- Tendency to tremble when under pressure.
- Reduced sex drive.
- Light headed when rising from a lying down position.
- Poor memory.
- Morning fatigue, and fatigue in the afternoon between 3 to 5 PM.
- Feel better suddenly for a brief period after a meal.
- Often feel tired between 9-10 PM, but resist going to bed.
- Need coffee or other stimulants to get going in the morning.
- Craving for salty and fatty foods such as meat and cheese.
- Increased PMS symptoms, periods heavy then stops, or almost stopped on the 4th day.
- Pain in the upper back or neck with no apparent reasons.
- Difficulties in getting up in the morning



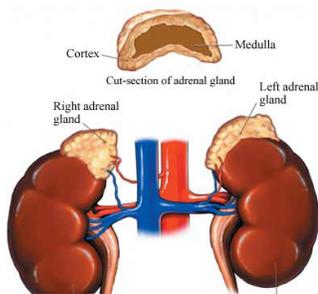
Other signs and symptoms include:

- Mild depression
- Food and or inhalant allergies
- Decreased ability to handle stress
- Dry and thin skin
- Hypoglycemia
- Low body temperature
- Nervousness
- Palpitation
- Unexplained hair loss

If you are experiencing some, or most of these signs and symptoms, you should consider adrenal fatigue as a possible cause, after you have ruled out other organic pathologies. Note, the signs or symptoms by themselves are not a definitive diagnosis of adrenal fatigue. Collectively these signs and symptoms are indicative of a person under a lot of stress. Most of these signs and symptoms are the end result of acute, severe or chronic stress and the inability of the body to handle such stress.

Stress, once a “catch all” phrase used by physicians to explain non-specific symptoms undetectable by conventional blood test, is of no mystery to the body at all. The ability to handle stress, physical or emotional is a cornerstone to human survival. Our body has a complete set of stress modulation systems in place, and the control center is the adrenal glands. When this gland becomes dysfunctional, our body’s ability to handle stress reduces, and symptoms will arise.

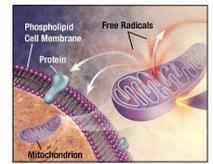
ADRENAL GLAND BASICS



The adrenal glands are two small glands, each about the size of a large grape. They are situated on top of the kidneys. Their purpose is to help the body cope with stress and ensure survival. Each adrenal gland has two compartments. The inner or medulla modulate the sympathetic nervous system through secretion and regulation of two hormones called *epinephrine* and *nor-epinephrine* that are responsible for the flight or fight response. The outer adrenal cortex comprises 80 percent of the adrenal gland and is responsible for producing over 50 different types of hormones in three major classes—*glucocorticoids*, *mineral corticoids* and *androgens*.

The most important glucocorticoid is *cortisol*. If cortisol is insufficient, the body will be unable to deal with stress. Mineral corticoids such as *aldosterone* modulate the delicate balance of minerals in the cell, especially sodium and potassium. It therefore regulates our blood pressure. Stress increases the release of aldosterone, causing sodium retention (leading to water retention and high blood pressure) and loss of potassium and magnesium. Magnesium is involved in over 300 enzymatic reactions in the body. When the body lacks magnesium, it will suffer from a variety of pathological conditions such as cardiac arrhythmias, uterine fibroids and osteoporosis.

The adrenal cortex is also responsible for producing all sex hormones, although in small amounts. One exception is DHEA, a weak androgenic hormone that is made in large amounts in both sexes. DHEA, together with testosterone and estrogen, are made from pregnenolone, which in turn is synthesized from cholesterol. Pregnenolone also leads to the production of progesterone and as one of the intermediary steps in the production of cortisol. Pregnenolone is therefore one of the most important intermediate hormones being produced in the hormonal cascade. Prolonged deficiencies in pregnenolone will lead to reduction of both glucocorticosteroids and mineral corticoids such as cortisol and aldosterone respectively.



CORTISOL: THE MOST IMPORTANT ANTI-STRESS HORMONE IN THE BODY.

NORMALIZING BLOOD SUGAR: Cortisol increases blood sugar levels in the body, thus providing the energy for the body to physically escape threat of injury or death. Cortisol works in tandem with *insulin* from the pancreas to provide adequate glucose to the cells for energy. More energy is required when the body is under stress from any source, and cortisol is the hormone that makes it happen. With adrenal fatigue, more cortisol is secreted during the early stages. In later stages (when the adrenal glands become exhausted), cortisol output is reduced, and blood sugar balance becomes a problem.

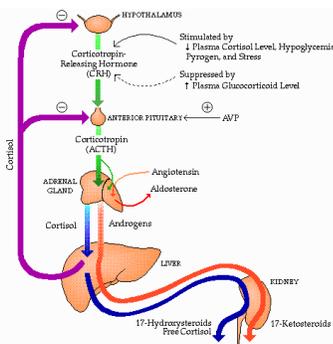
ANTI-INFLAMMATION RESPONSE: Cortisol is a powerful anti-inflammatory agent. When we have a minor injury or a muscle strain, our body's inflammatory cascade is initiated leading to swelling and redness commonly seen when an ankle is sprained, or with an insect bite. Cortisol is secreted as part of the anti-inflammatory response. It's objective is to remove and prevent swelling and redness of nearly all tissues. These anti-inflammatory responses prevent mosquito bites from enlarging, bronchial trees and eyes from swelling shut as a result of an allergic reaction.

IMMUNE SYSTEM SUPPRESSION: People with high cortisol levels are much weaker from an immunological point of view. Cortisol influences most cells that participate in the immune reaction, especially white blood cells. Cortisol suppresses *white blood cells, natural killer cells, monocytes, macrophages* and mast cells. It also suppresses the autoimmune system response to foreign insult.

VASO-CONSTRICTION: Cortisol contracts mid-size arteries. People with low cortisol (in advanced stages of adrenal fatigue) typically suffer with low blood pressure and reduced reactivity to other body agents that constrict blood vessels. Cortisol tends to increase blood pressure that is moderated by calcium and magnesium.

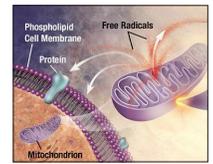
PHYSIOLOGY OF STRESS: People with adrenal fatigue cannot tolerate stress and will then succumb to severe stress. As their stress levels increase, progressively higher levels of cortisol are required. When the cortisol level cannot rise in response to stress, it is impossible to maintain the body in optimum stress response.

Cortisol Regulation



The adrenal glands are controlled via the hypothalamus-pituitary-adrenal (HPA) axis. There is an existing negative feedback loop that governs the amount of adrenal hormones secreted under normal circumstances. For example, the HPA axis adjusts cortisol levels according to the body's need via a hormone called *adrenal corticotrophic hormone (ACTH)* that is secreted from the pituitary gland in response to signals from the hypothalamus. When the ACTH binds to the walls of the adrenal cells, a chain reaction occurs within the cell. This leads to the release of cholesterol where it is manufactured into pregnenolone...the first hormone in the adrenal cascade. After this, cortisol is released into the blood stream where it travels in the circulatory system to all parts of the body and back to the hypothalamus where it is measured. This completes the negative feedback loop.

Cortisol and ACTH are not secreted uniformly throughout the day. They follow a diurnal pattern, with the highest level secreted at around 8:00 a.m. in the morning after which there is a gradual decline throughout the day. Episodic spikes during the day can also occur when the body is stressed, or when certain foods are taken. The cortisol level is at its lowest between midnight and 4 a.m.



COMMON CAUSES OF ADRENAL FATIGUE

Chronic stress is very common in Western society. The most common causes of stress are work pressure, death of a loved one, moving, changing jobs, illness and marital disruptions. Adrenal fatigue occurs when the amount of stress overextends the capacity to compensate and recover from stress.

Stressors that can lead to adrenal fatigue include:

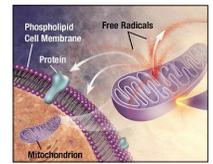
- Anger
- Chronic illness
- Chronic pain
- Depression
- Excessive exercise
- Fear and guilt
- Gluten intolerance
- Low blood sugar
- Digestive problems
- Toxic exposure
- Severe or chronic stress
- Surgery
- Sleep deprivation
- Excessive caffeine or sugar in the diet

One of the most commonly overlooked causes of adrenal fatigue is chronic, or severe infection that gives rise to an inflammatory response. Such infection can occur sub-clinically with no obvious signs at all. Parasitic and bacterial infections including *Giardia* and *H. pylori* are the main culprits.

How Stressors Affect The Body

When a person is stressed, the body reacts by mounting a stress response through the stimulation of the sympathetic nervous system. This is also called the “fight or flight” response as the body arms itself to face what it perceives as danger. When this happens, *epinephrine* is secreted from the adrenal medulla, and the hypothalamus-pituitary axis is stimulated to release ACTH, which in turn causes the adrenal cortex to increase production of the anti-stress hormone cortisol.

When a person experiences chronic stress, the cortisol level may increase to the point the adrenal becomes exhausted. At the same time, DHEA, a hormone normally produced in the adrenal glands will start to decrease without hitting a peak first (as in the case of cortisol). With chronic stress, there is decompensation of DHEA with concurrent rise of cortisol. As a result, the ratio of cortisol to DHEA increases.



How stressors affect the body contd.

As with most hormonal systems, there is a negative feedback system in the body to limit the production of each hormone. The same occurs in the case of cortisol, with one exception. During prolonged or acute stress when the body perceives that its survival is at stake, the excessive cortisol output actually blunts the negative feedback response. In other words, instead of a negative feedback system to shut down cortisol production when the total cortisol is high, the body reacts in the opposite way. As cortisol is the anti-stress hormone, the body will interpret a very high cortisol level and impending danger. When this happens, the high cortisol exerts a dampening effect on the negative feedback system in order that we can survive this threat. More cortisol will therefore be produced. This is the body's way to ensure that we can cope with the on-going stress that threatens its survival.

When our body is stressed, our cortisol levels rise in an environment where the negative feedback system is dampened. While this is happening, our DHEA level continues to drop. The result is a high cortisol to DHEA ratio and:

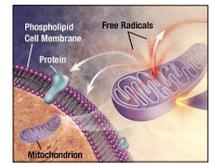
1. Reduced insulin sensitivity, reduced glucose utilization and increased blood sugar.
2. Reduced secretory IgA (the main cellular defense factor), natural killer (NK) cell and T-lymphocyte activity. This leads to increased chances of getting infections such as Herpes, yeast overgrowth, and viral infections.
3. Increased loss in bone mass as calcium absorption is blocked and demineralization of bone occurs, thus leading to osteoporosis.
4. Increased fat accumulation around the waist (central obesity) and protein breakdown.
5. Increased water and salt retention, leading to hypertension.
6. Estrogen dominance, leading to PMS, uterine fibroids, and breast cancer.

Stress response from a hormonal perspective

At work, what happens if your boss screams at you? Let us now examine some of the effects within our body from a hormonal perspective.

- Your hypothalamus signals your pituitary gland to release ACTH.
- The ACTH will stimulate the adrenal medulla to secrete epinephrine, and the adrenal cortex to secrete cortisol, among other hormones.
- Your cortisol level will increase and convert more stored glycogen into blood sugar for energy. Energy is also increased from the release of epinephrine from the adrenals.
- Your heart rate will increase (from the epinephrine).
- You will tend to sweat more (from cortisol).
- Your muscle tension will increase (from cortisol and epinephrine).
- Your digestion will slow down as blood is diverted away to more important issues. Your bladder and rectum muscle may relax.

When the above physiological response occurs over a long duration, or in certain cases when there is acute stress, then adrenal fatigue can result as the adrenal glands become worn out.



ADRENAL FATIGUE PROGRESSION

Diseases progress through stages normally as the body decompensates. Let's take a closer look:

Stage 1: Alarm Reaction (Flight or Fight Response)

In this stage, the body is alarmed by the stressors and mounts an aggressive anti-stress response to reduce stress levels. Some doctors called this the early fatigue stage. Typically, there is an increased ACTH from the pituitary gland that stimulates the adrenal glands into full gear, like a 747 in takeoff mode to mount a retaliation response. The adrenal medulla is stimulated to secrete more epinephrine, and the total cortisol output from the adrenal cortex is increased from the excitatory stimulus. There is a corresponding reduction in DHEA production. During this period, the body needs cortisol to overcome stress, and production of cortisol is therefore increased. After some time, the adrenals will experience difficulties in meeting the body's ever increasing demand for cortisol.

Stage 2: Resistance Response

With chronic or severe stress, the adrenals eventually are unable to keep up with the body's demand for cortisol. As such, the cortisol output will start to decline from a high back to a normal level, while the ACTH remains high. With protracted ACTH and adrenal fatigue, less cortisol is produced due to the adrenal becoming exhausted. While the morning, noon or afternoon cortisol levels are often low, the nighttime cortisol level is usually normal. A phenomenon called pregnenolone steal (also called cortisol shunt) sets in. Cortisol production becomes the predominant pathway of hormone production as the body favors the production of this hormone.

Other hormones such as pregnenolone output is reduced, but total cortisol output continues to be maintained at a normal level. Careful analysis of the daily diurnal cycle of cortisol shows a dysfunctional pattern of abnormally low cortisol in the morning. This is a time when cortisol is needed the most. Nighttime cortisol is usually still normal.

Stage 3: Exhaustion

Despite rising ACTH, the adrenals are no longer able to keep up the increased demand for cortisol production. This may happen over a few years. Total cortisol output is therefore reduced, and DHEA falls far below average. The nighttime cortisol level is usually reduced as the hypothalamic-pituitary-adrenal axis "crash" and the body is unable to maintain homeostasis. Severe sex hormonal imbalances (estrogen, progesterone, and androgens) are common and a precursor to adrenal failure.

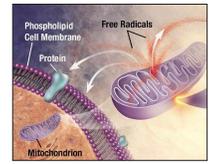
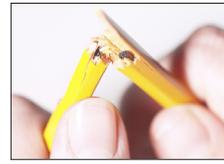
Stage 4: Failure

Eventually, the adrenals are totally exhausted. Patients at this stage have a high chance of cardiovascular collapse and death.

Why Conventional Medicine Missed Diagnosing Adrenal Fatigue

Despite sub-clinical adrena with its various stages was recognized as a distinct clinical syndrome since the turn of the 20th century, most doctors are unfamiliar with this condition for the simple reason that it is difficult to diagnose effectively by traditional blood test. Normal blood tests are designed to detect severe absolute deficiency of adrenal hormones known as Addison's disease. This disease afflicts only four out of 100,000 and is often the result of autoimmune disease or infectious origin. Blood tests are also useful to detect extreme excessive levels of adrenal hormones in a condition known as Cushing's disease.

Adrenal hormones are low in the case of adrenal fatigue, but still within the "normal" range and not low enough to warrant the diagnosis of Addison's disease by regular blood tests. In fact, your adrenal hormones can be half of the optimum level and still be labeled "normal". Such "normal" level of adrenal hormones does not mean that the patient is free from adrenal fatigue. Conventional doctors are not taught the significance of sub-clinical adrenal fatigue.



LABORATORY TEST

Adrenal fatigue has been demonstrated in laboratory studies of surrogate markers of adrenal function. Two such markers used are cortisol and DHEA. The best way to test your adrenal health is to measure your level of free key adrenal hormones such as cortisol and DHEA. The best way to test your adrenal health is to measure your level of free key adrenal hormones such as cortisol and DHEA. Saliva testing is preferred as it measures the amount of free and circulating hormones instead of the bound hormone commonly measured in blood test.

DHEA can be measured anytime during the day. Cortisol, on the other hand, is the highest in the morning and lowest in the evening before bedtime. Taking 4 samples of cortisol (at 8 am, noon, 5 PM, and before bedtime) is the most accurate. With multiple samples taken throughout the day, we are able to map the daily diurnal curve of free cortisol in the body relative to DHEA levels. This will give us a much clearer picture of adrenal function.

If you are taking oral or applying topical supplemental hormone creams such as DHEA or pregnenolone, you should advise your doctor prior to taking the test.

Women and Adrenals

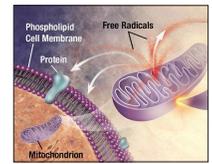
The adrenals contribute about 35 percent of female hormones pre-menopausal and almost 50 percent post-menopausal. Furthermore, without the proper functioning of the adrenal glands, pregnancy cannot occur.

Estrogen Dominance: In the past 40 years we have seen a dramatic rise in female related illnesses never seen before in history. Women often have exhausted adrenal glands by the time they reach their mid-thirties or early forties due to a stressful lifestyle. Stress is primarily regulated by our adrenal glands. In early stages of adrenal fatigue, cortisol output is elevated as the body attempts to neutralize the stress. Multiple health problems are caused by excess cortisol production. For example, cortisol blocks progesterone receptors, making them less responsive to progesterone. Progesterone normally produced by the adrenals comes to a halt in favor of cortisol. Insufficient progesterone production leads to an imbalance of estrogen to progesterone. With reduced progesterone to offset estrogen, the body may experience estrogen dominance and a host of undesirable side effects associated with excessive estrogen. This leads to a condition known as estrogen dominance.

- Today, we see the age of puberty dropping precipitously to as low as 10 years of age.
- Endometriosis afflicting 10% of all perimenopausal women.
- Uterine fibroids affecting close to 25% of women from age 35 to 50.
- Breast cancer afflicting close to 10% of all women.

The underlying problem is a relative excess of estrogen and an absolute deficiency in progesterone. In the west, the prevalence of estrogen dominance syndrome approaches 59 percent in women over 35 years old. Typical complaints and symptoms of estrogen dominance are:

- My breast are swollen and getting bigger
- I can't put my rings on my fingers
- I am more impatient now than ever
- I miss my periods regularly
- I have PMS
- I have fibroids
- I feel tired all the time



Estrogen dominance contd.

- Allergies, including asthma, hives, rashes and sinus congestion
- Autoimmune disorders (SE-Lupus) and thyroiditis
- Gallbladder disease
- Syndrome X (insulin resistance)
- Infertility
- Polycystic ovaries
- Magnesium deficiency
- Women have a later menopause because of excess estrogen production

It is no coincidence that we see a proliferation of conditions associated with excessive estrogen such as PMS, fibroids, and pre-menopausal syndrome when a woman reaches their mid thirties and early forties. Adrenal normalization should precede hormone modulation. The adrenal glands deal with the daily stresses of life. A woman must normalize her adrenal glands in order to have a total body hormonal balance. In fact, replacement of deficient hormones alone without addressing the overall health of the adrenal gland is a band-aid approach and often ineffective in the long run.

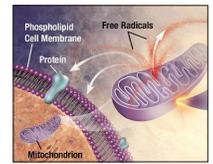
The normalization process can begin with investigating and eliminating stressors. Stressors are often chronic in nature, and can be related to lifestyle, dietary, mental, and inflammatory causes. Women with heavy menstrual bleeding and adrenal exhaustion can normalize their adrenal functions with natural cortisol, adequate sleep, proper diet, and nutritional supplementation before considering progesterone therapy. Progesterone may make their bleeding even heavier. This is usually only temporary and occurs in the beginning when the estrogen sites are being re-sensitized. Women under stress can paradoxically have high cortisol and adrenal insufficiency (stage 1) at the same time before they get to the adrenal fatigue stage where the cortisol level eventually drops (stage 2-3).

Most post-menopausal women who are experiencing hair loss have an adrenal function problem. Hair loss is a sign of excessive androgen. Some women tend to produce too much androstenedione, which then gets converted into estrone and testosterone. Estriol can be given to offset the testosterone effects as estrogen balances testosterone in the body. Cortisol is also very helpful and can be used as a first line natural medicine. It keeps the adrenal glands from getting stuck in the androgen part of the stress cycle. Cortisol also complements the use of progesterone as well.

ADRENAL FATIGUE PROTOCOL

Adrenal fatigue can be reversed. You may need to allow 6 months to 2 years for the recovery process to take place. These are some of the important steps.

1. **Removal of the stressors:** This is the most important step. Emotional stressors such as marital, family, relationship, or financial problems needs to be dealt with and normalized.
2. **Sleep:** The most important step is to have enough rest. It is important to go to sleep by 10 PM every night. Why? This is because our adrenal glands kick in for a "second wind" to keep us going from 11PM to 1 AM. This puts tremendous stress on the adrenals. When we rest early, our adrenals are fully rested and the high gear is avoided. Between 10 PM and 1 AM, our adrenals work the hardest to repair the body. We should also try to sleep in until 8:30 AM or 9 AM if possible. This is because our cortisol level rises to its peak from 6:00 AM to 8:00 AM in order to wake us up and get us going for the day.
3. **Avoid Coffee or Caffeinated Beverages:** Coffee and tea act as stimulants and interrupt sleep pattern. Herbal tea is acceptable because it does not contain caffeine.
4. **Avoid TV and Computers:** Some people may be photosensitive. Watching television or working at the computer may prevent the melatonin level from rising to induce sleep. If you are one of these people, you should turn off your television or computer by 8 PM.



5. **Exercise:** The ShapeXpress workout is a wonderful stress reducer and a tremendous oxygenator. Exercise reduces depression, increases blood flow, normalizes levels of cortisol, insulin, blood glucose, growth hormones, thyroid, and makes you feel generally much better. Simple exercises such as a brisk walk, or climbing stairs are easy to do and can be done almost anywhere. You should vary your routine so that exercise becomes fun. Plan to burn about 2,000 or 3,000 calories each week. When exercising, you should cover the following three categories:
 1. **Aerobics:** such as fast walking, stair climbing, Nordic track, swimming, treadmill and ShapeXpress circuit training
 2. **Anerobics:** such as weight lifting, pinned weights, push-ups, sit-ups, chin-ups
 3. **Flexibility:** such as stretching, yoga and tai chi
6. **Eating Pattern:** When our cortisol levels are at its peak from 6 AM to 8 AM, we may have no appetite. Many people skip breakfast because “they are not hungry.” This is because our bodies need sugar to run on. Furthermore, our body’s energy requirement does not change during this period. Even a small snack is better than nothing at all and will provide the needed energy even though there is no urge to eat.

Skipping breakfast is not a good idea. If you are low on sugar, the adrenals are instructed to secrete cortisol because cortisol activates gluconeogenesis to increase blood sugar level and allow the body to function. It is therefore important to have a healthy breakfast soon after waking and not later than 10 AM. This will prevent the body from being put in a position to play “catch-up” for the rest of the day.

The best time for lunch is from 11 AM to 11:30 AM. Sometimes, a nutritious snack between 2 to 3 PM will be needed to sustain our bodies through the dip in cortisol levels that occurs between 3 to 4 PM. Evening meals should be around 5 to 6 PM and should consist of a good quality protein and low glycemic index foods to avoid the steep rise in blood sugar. High glycemic index foods will cause the blood sugar to rise and a corresponding increase in insulin output. Over time, insulin secretion becomes dysfunctional, resulting in a hypoglycemic state in the middle of the night.

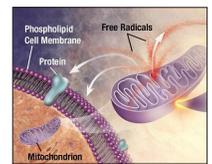
These symptoms are characterized by nightmares, anxiety and night sweats. When this occurs, the body will have to activate the adrenals to put out more cortisol in order to raise the blood sugar back to its normal level. This will eventually put an excessive burden onto the already fatigued adrenal gland if carried on year after year.

7. **Diet:**

Glucose: is simple sugar found in food. It is an essential nutrient that provides energy for the proper functioning of the body’s cells. After meals, food is digested in the stomach and is broken down into glucose and other nutrients. The glucose is absorbed by the intestinal cells, carried by the bloodstream to cells throughout the body. However, glucose cannot enter the cells alone, it needs assistance from insulin in order to penetrate the cell walls. Insulin therefore acts as a regulator of glucose transport and metabolism in the body.

Insulin is called the “hunger hormone.” As the blood sugar level increases after a meal, the corresponding insulin level rises with the eventual lowering of the blood sugar level and glucose is transported from the blood into the cell for energy. As energy is produced by the cell, the blood glucose level is slowly lowered and insulin release from the pancreas is stopped. As energy continues to be generated, the blood sugar level continues to drop. When it drops below a certain level, hunger is felt. This often occurs a few hours after the meal. This drop in blood sugar triggers the adrenals to make more cortisol. Cortisol then increases the blood sugar by converting protein and fat into its component parts. With this, the blood sugar rises to provide a continuous supply of energy for our use between meals. Cortisol therefore works hand in hand with insulin to provide a steady blood sugar level 24 hours a day and keep blood glucose levels in a tightly controlled range.

When the adrenal gland is in a state, the amount of cortisol production drops below the normal level, and the amount of sugar available to the cell is reduced. With less sugar, less energy is available to the body, and fatigue is experienced. As the sugar level drops below a critical point, dizziness and light-headedness can be experienced. These are common symptoms of low blood sugar. Low blood sugar is most likely experienced between meals at 10 AM to 12 PM, as well as 3 to 4 PM.



To make things worse, the body's automatic response when more sugar is needed during a stress response is to make more insulin in an attempt to move the sugar into the cell from the blood stream to create more energy. Insulin opens up the cell membrane to push the glucose in, resulting in further reduction in blood glucose. This worsens the already existing hypoglycemic state. Those with adrenal fatigue often report symptoms such as dizziness and weakness, as the blood sugar drops below a comfortable level for the body to function normally. To overcome this, the quick fix solution is to take food that is high in refined sugar such as donuts or other sweets, or drinks that stimulate the adrenal gland to pump out more cortisol, such as coffee, tea or cola drinks. This gives the body a short-lived burst of energy.

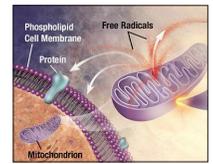
However, this hypoglycemic symptom relief only lasts for about 1-2 hours. Inevitably, it is followed by a crash to an even lower blood level. Those suffering from adrenal fatigue are constantly on a roller coaster ride in terms of their blood sugar levels throughout the day. The sugar level tends to increase after each quick fix, but drops after a few hours. By the end of the day, the body is totally exhausted. A diet that maintains a constant sugar level in the blood is a critical consideration in adrenal fatigue recovery. This can be done by taking a variety of low-glycemic index foods that releases sugar slowly to sustain the body during and between meals. Starchy carbohydrates that are converted quickly into glucose (such as pasta and bread) should be limited. Soda drinks should be totally avoided.

Salt: The amount of salt in the body is highly dependant and regulated by a hormone called aldosterone. This chemical is manufactured in the adrenal cortex under the direction of another hormone called ACTH (adrenocorticotrophic hormone). ACTH is produced by the anterior pituitary gland. ACTH stimulates the adrenal cortex to secrete a wide variety of hormones including aldosterone as well as cortisol. Like cortisol, aldosterone follows a diurnal pattern of secretion, peaking at 8 AM and at it's lowest between 12-4 AM. Aldosterone is a very specific compound that is responsible to maintain the concentration of sodium and potassium in the cell as well as outside the cell.

This in turn has a direct effect on the amount of fluid in the body. Aldosterone therefore plays a significant role in regulation of blood pressure. It is important to note that in our body, sodium and water goes hand in hand. Where sodium goes, water follows. As the concentration of aldosterone rises in the body, the concentration of sodium and water rises, more fluid is retained in the body, and blood pressure rises. Conversely, when the level of aldosterone lowers, the amount of sodium and water in the body is reduced. The blood pressure goes down.

During the early stages of adrenal fatigue, blood pressure is often normal if all other body functions are well balanced. If the body is unable to overcome the aldosterone and epinephrine response, then the blood pressure is elevated. It is common to find those under stress with elevated blood pressure. As adrenal fatigue progresses to more advanced stages, the amount of aldosterone production reduces. Sodium and water retention is compromised. As the fluid volume is reduced, low blood pressure ensues. Cells get dehydrated and become sodium deficient. With advanced adrenal fatigue there is low blood pressure as well as craving salt or salty foods. Craving salt is due to the deficiency of sodium in the body. Both are due to the lack of aldosterone. In order to compensate for this, potassium is leaked out of the cells so that the sodium to potassium ratio remains constant. This loss of potassium is less than that of sodium, and as a result the potassium to sodium ratio is increased. This imbalance causes another set of problems.

Those suffering from adrenal fatigue often have a low body fluid volume accompanied by salt craving due to sodium deficiency as well as a normal to high potassium level. While lost fluids should be replaced, it has to be done carefully. When the fluid is replaced without adequate sodium, the amount of sodium in the body actually gets diluted, therefore resulting in an even lower sodium level. This is called dilutional hyponatremia, a dangerous condition that can be deadly. It is therefore important to add salt liberally to fluids that are taken by anybody suffering from adrenal fatigue. Commercially available electrolyte replacement drinks such as Gatorade are designed for people who have normal adrenal and excessive loss of potassium during exercise. These drinks are designed to be high in potassium and low in sodium. They can be taken in as fluid replacement if adrenal fatigue is very mild. Sufferers of advanced adrenal fatigue usually have a low cortisol and sodium level and should consult their practitioner for an advanced protocol.



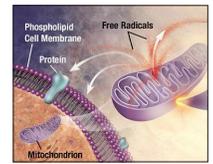
Carbohydrate, Protein and Fats: It is very important for adrenal fatigue patients to balance their intake of *protein, fat and carbohydrate*. As compared to a normal person, the adrenal fatigue person has an immediate need for sugar when hunger strikes. As the same time, they also need good quality protein (lean meat, eggs, fish, turkey) as well as a balance of the omega 3-6-9 fats until the next meal. The primary diet should be high in raw food and have a low-glycemic index. “The Last Diet You Will Ever Need” meets most of the nutritional needs required by someone with weak adrenals. Fruit juices should be avoided. Even with the “Last Diet” whole fruits should be limited, especially melons, which are high in sugar and causes sugar spikes soon after food enters the body.

Vegetarians who have adrenal fatigue have a much higher challenge. Legumes (beans) must be eaten with whole grains, seeds, or nuts to make a complete protein. It is important for vegetarians to add eggs, miso, as well as combining beans, seeds, and nuts with a small amount of whole grain. About 50-60 percent of the diet should consist of raw food. Seeds and nuts are critical elements of fatty acids that the adrenal glands need in order to manufacture cholesterol, a precursor to all adrenal steroid hormones. The key is to take nuts and seeds that are raw and free of rancid oils. Raw nuts should be taken on a liberal basis and should be soaked overnight in water. Nuts such as cashews, almonds, brazil, pecans, walnuts and chestnuts are excellent. Olive oil should be used for light-cooking. The cooking heat should be low to moderate.

Vegetables high in natural sodium include, kelp, black olives, red hot peppers, spinach, zucchini, celery, and Swiss chard. Fruits should be eaten in moderation. If you feel worse after food consumption, that is the body’s way of telling you that you are on the wrong track. Organic fruits such as papaya, mango, apples, grapes, and cherry are recommended. Bananas, dates, figs, raisins, and grapefruit are high in potassium and should be limited. Many people with adrenal fatigue also have a lower level of hydrochloric (HCL), which is necessary to break down protein. Symptoms of this problem include gas, bloating, and heaviness in the stomach after eating a meal containing protein. In such case, the use of digestive enzymes, probiotics, as well as HCL replacement is indicated.

Dietary Tips:

1. Always eat breakfast, and do it before 10 AM. The body’s glycogen supply needs to be replenished after fasting all night. Try to eat lunch before noon followed by a nutritious snack between 2-3 PM. The evening meal should be consumed before 7 PM. Just before bedtime, a few bites of high quality snacks are also recommended.
2. Combine small amounts of whole grains with generous portions of protein and fat at every meal. This will ensure sustained energy at and between meals.
3. Eat 20-25 percent whole grain, 30-40 percent above the ground vegetables (fifty percent) of which should be raw), 10-15 percent beans, nuts and seeds, 10 percent animal food, 10-15 percent good fat, 5-10 percent whole fruits (except banana and fruits in the melon family).
4. Whole fruits are permitted in lunch and dinner except banana, figs and those in the melon family.
5. Sprinkle pink sea salt liberally to food, provided that blood pressure is normal.
6. Eat 5-6 frequent small meals instead of 3 large meals.
7. Take small amounts of healthy snacks high in protein and healthy fats, such as cottage cheese.



ADRENAL FATIGUE DIETARY RECOMMENDATIONS

GOALS

- 1) Eat before 10 AM
- 2) Eat frequent, small meals: 6-8 (breakfast), 12 noon (lunch), Snacks - 10 AM, 3 PM, and Bedtime
- 3) Eat 30-40% whole grains, 30-40% Vegetables (50% should be raw), 10-15% Beans, seeds & nuts, 10-20% animal foods, 5-10% fruit.

AVOID

Banana, dried figs, raisins, dates, oranges, grapefruit
 Fruit and juices in the morning
 Refined flour products: pasta, white rice, bread, pastry, baked goods
 Honey, sugar, syrups and soft drinks
 Dried fruits and fruit juices
 Coffee, tea, black tea, hot chocolate, alcohol, colas and chocolates
 Avoid deep-frying and browning, hydrogenated fats and oils

MOST BENEFICIAL

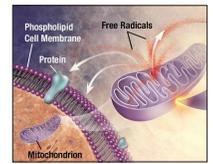
Eat before 10 AM
 Eat frequent small meals
 Bedtime snack
 Combine fat, protein and whole grains at every meal
 Mix 1-2 tablespoons EFA's with grains and vegetables
 Consume good quality protein (meat, eggs, fish, fowl, dairy etc.)
 Take digestive enzymes and probiotics with meals
 Eat 6-8 servings of a wide variety of brightly colored veggies
 Sea vegetables
 Monosaturated fats
 Fresh and Raw nuts & seeds (soak in water)

EFFECTS

High in potassium, can make adrenal fatigue worse
 High in potassium and fructose
 Drops blood sugar too fast, robbed of nutrients
 Drops blood sugar too fast in one hour
 Drops blood sugar too fast
 Drops blood sugar too fast in one hour
 Trans fats

EFFECTS

Replenish waning glycogen supply
 Promotes stable blood sugar
 Helps to prevent hypoglycemic event in early morning hours
 Provides balanced source of nutrients for longer energy reserve
 Provides balance of essential fats
 Good source of amino acids
 Helps to properly break down protein, fats and carbs
 Provides phytonutrients, vitamins, minerals and fiber
 Rich in trace minerals and good vegetable proteins
 Used for low heat cooking
 Good source of essential fatty acids

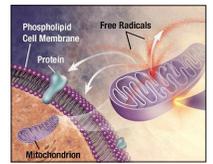


CONCLUSION

Adrenal fatigue is a reduction in the adrenal gland's ability to carry out its normal function. The chief symptoms are fatigue, excitability, or depression.

Adrenal fatigue is commonly caused by chronic stress from any source (including emotional, physical, mental, or environmental) that exceeds the body's capacity to adjust appropriately to the demands placed on it by stress. It is a condition that afflicts children as well as adults. Adrenal glands can be restored to optimum health naturally by adhering to healthy living principals. Proper rest, together with specific nutritional diets and removal of stressors are key components to adrenal fatigue recovery. The road to adrenal recovery is not a linear or straightforward path because of the complexity of our internal hormonal and stress-regulation system. Most people who suffer from adrenal fatigue also have multiple endocrine imbalances including sub-clinical hypothyroidism, insulin resistance, and estrogen dominance.

These need to be optimized and balanced as well. Adrenal recovery is a process akin to running a marathon. The process is long, but it can be done easily and painlessly, one step at a time. Most will find some improvement in a matter of weeks, depending on the degree of preexisting damage and the clinical skills of the health professional. Because the amount of hormonal balancing is intricate and is highly sensitive, the process can take anywhere from 3 months to 3 years. Recovery should not be expected in a few weeks. Patience is the key.



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