

**Cortisol:**  
**The Stress, Aging, and Obesity Hormone**  
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Stress. We all know what it feels like. We also know that it affects our health, but how? Understanding the relationship between stress, the adrenals, and cortisol, a major adrenal hormone, can explain many of the effects of prolonged stress.

**Understanding Stress**

Stress is defined as when a system is pushed to its limits. Bridges are designed to handle the stress of a fixed weight, no more. However, living systems, when subjected to normal amounts of stress, grow stronger. In fact, stress is necessary for optimal development, growth and fun. Homework and sports are examples of how controlled stress, or challenge, makes us better. All systems of our body are designed to handle stress and grow stronger (even into old age) so that we can survive and procreate. The adrenals orchestrate this response.

**Acute vs. Chronic Stress**

In general, we think of stress as acute (seconds to minutes to hours) and chronic (days to weeks to months to years). As discussed in prior articles, there is an important difference between intermittent and chronic stress. Most animals evolved with episodes of stress—such as fighting for one's life or running from a predator, so-called "fight or flight". For most animals, after a stressor, such as a battle, they would either rest, or rest-in-peace (sic!) and not procreate—survival of the fittest. Watching how our dogs, cats, and even lions live demonstrates this pattern of extreme activity followed by prolonged periods of rest.

However, unlike animals, humans can use their minds to create and perpetuate stress. Worrying about money, the future, the planet; chronic anger, depression and anxiety are modern psycho-spiritual stressors that are new to our physiology.

In addition to emotional stressors, modern life provides continuous physiological stressors. Waking up after 6 hours of sleep with an alarm and coffee, listening to the news, eating toxic and deficient meals, working for 16 hours under fluorescent lights, not varying our cycles with the seasons, watching action movies, and even excessive aerobics, are all perceived as stressors by the body. It is interpreting and responding to these experiences with ancient mechanisms that have evolved over billions of years. These systems don't know that what is on the LCD screen is not happening here and now.

**Adrenal Gland Basics**

The ad-renal glands sit on top of the kidneys and are the first-line responders, the shock-absorbers, for acute stress. They have two functional subsystems--the outer cortex (which makes cortisol and cortisone) and the inner medulla (which makes epinephrine and adrenaline). All adrenal hormones prepare the body for "fight or flight", and help it recover. The

cortex is primarily controlled by chemicals released by the hypothalamus and pituitary glands, deep ancient parts of the brain that affect emotion, sleep, survival and other core functions. The medulla is controlled by the sympathetic nervous system, which speeds up the body neurologically and physiologically.

It is helpful to think of these adrenal subsystems like email and snail-mail. Each has a purpose. The cortex is slower in reacting and longer-lasting (minutes to hours). The medulla is quick-acting and short-lasting (seconds to minutes). Like email cannot replace a beautiful three-dimensional card sent by snail mail, the cortical system has important, different effects than the quicker and shorter medullary system.

**Cortisol and Chronic Stress**

Cortisol is an important hormone that affects every cell and system of the body. In the short-term, it helps the body respond and recover from acute stress, by releasing and shunting resources (sugar, amino acids, fat), from certain tissues such as muscle. However, these same effects, if continuous, essentially accelerate aging (see table). In chronic stress, cortisol is not only higher, it is released earlier, to a greater extent, and with more sensitivity. In addition, the normal daily (circadian) pattern of cortisol, which should peak at 4-5am shifts to earlier in the night. This sets off a cascade of other effects which perpetuate and magnify this pattern.

Cortisol is so important to the body, it will rob Peter to pay Paul. The body will alter and steal from other hormone systems to maintain cortisol levels. Even in prolonged Adrenal Fatigue (see prior article), cortisol levels are often "normal". This "normal" is actually a fatigued high. Once a body is in this mode, many things that we try, such as extreme diets and exercise after cortisol-based weight gain, deepen the rut. In addition to abdominal weight gain, there is also weakness, atrophy of the skin, muscle,

irritability, poor sleep, fatigue, illness, etc.

**Caffeine and Sugar**

Caffeine (coffee, tea, chocolate, soda, etc) and other stimulants such as sugar are often resorted to when one gets into this rut, because in the short term, they generate energy by raising blood sugar and moving it into cells. Caffeine magnifies and perpetuates the effect of the adrenal hormones. However, this borrowed energy is like credit card debt, in that the long-term cost is so great that the systems may not recover.

**Wired and Tired**

When stuck in this rut, other systems, such as the adrenal medulla, thyroid and sex hormone systems and brain-gut systems often kick in to help deal with the stress. However, they cannot compensate for the root imbalance and just add to

<b>Cortisol: Short- and Long-Term Effects*</b>		
<b>System or Tissue</b>	<b>Effect</b>	<b>"Disease"</b>
Abdominal fat	increases	Obesity, diabetes
Appetite	increases	Obesity
Blood pressure	raises	Hypertension
Blood sugar	raises	Diabetes
Bone	weakens	Osteoporosis
Brain: hormones	changes balance	See other hormones
Brain: neurotransmitters	Imbalance	Anxiety, depression, poor concentration
Brain: Sleep (circadian)	shallow, interrupted, early arousal	Insomnia, fatigue, diabetes, hypertension, depression, etc.
Brain: structure	atrophy	Cognitive and memory deficits, dementia
Cholesterol	raises total and triglycerides	High cholesterol
Estrogen	decreases effective value (free)	PMS, Endometriosis, Infertility, Menopause (Peri)
Eyes	cataract, glaucoma	Cataract, glaucoma
Hair and nails	thinning	
Hormone systems	lowers pregnenolone and DHEA	Autoimmune disease, cognitive deficits, PCOS
Immune system	suppresses	Recurrent infections: sinus, urinary, yeast, herpes, cancer, etc.
Immune system	aggravates	Allergy, autoimmune disease
Libido	decreases	
Muscle	atrophy, weakness	Falls, fractures, muscle and tendon injuries
Sex Hormone function	lowers effective estrogen and testosterone	See separate hormones
Skin	thinning, poor healing	
Stomach Lining	weakens	Ulcers, GERD, H Pylori infection, malabsorption, food allergies
Testosterone	decreases effective value (free)	ED, Infertility, Depression, weakness, decreased libido
Thyroid function	blocks function, may cause antibody formation	Hypothyroid symptoms
* a more complete list is available at <a href="http://www.cheikin.com">www.cheikin.com</a> (Free Articles)		

the problem. Often a person in this situation feels "wired and tired"--they cannot muster energy but they can't sleep either. An analogy is driving a car with a problem with the engine, by pressing both the gas and the brake at the same time.

### Conventional Medicine and the Adrenals

Conventional medicine currently can only diagnose adrenal abnormalities when there is total failure (Addison's Disease) or blatant excess (Cushing's Disease). Many patients go to endocrinologists with "borderline" or even abnormal values of thyroid, adrenal and sex hormones, to be told that the only treatment is anti-depressants. This experience, which contradicts the body's inner message that something needs to be fixed, as well as vanity-challenging weight gain and aging, is what often drives a patient to holistic medicine for evaluation and treatment.

### Measuring Cortisol and other Stress Markers

These imbalances usually cannot be detected by conventional testing, because "normal" ranges of hormones are too large, and values are transient. This is like trying to detect diabetes or blood pressure with a single measurement. In addition, since this condition is not yet recognized by conventional medicine, there are no high-tech drugs in development, therefore there are few funds for research. However, there are some specialty tests, such as salivary hormones, or indirect measures, such as urine organic acids, that can demonstrate imbalances. Oftentimes the story is clear--but proof is needed to convince a reluctant patient to give up the sugar and caffeine, to sleep more, to take a yoga class, or to take a leave from school or a stressful job.

### Stress in Kids

If detecting these imbalances in adults is difficult, it is even more so in kids. However, kids are more vulnerable to stress since they don't have the emotional, cognitive or physiological mechanisms to handle stressors. Global warming, violence, and loss of three-dimensional contact with others are growing problems that are difficult enough for adult consciousness to handle--is there any surprise that our kids are now over-diagnosed and over-medicated (with adult medications) for anxiety, depression and problems concentrating. In addition, toxins and deficient diets add to kids physiological stress. These stressors cause such accelerated aging that kids are now being diagnosed with "adult" conditions of obesity, diabetes, high cholesterol and high blood pressure!

### How to Decrease Cortisol

1. The best way to decrease cortisol, long-term, is to de-stress. However, if you stress yourself to de-stress, then this will not work. Also, we cannot begin by fixing the world's problems. Therefore the approach has to begin with the individual.
2. Quality and quantity of sleep is non-negotiable. Whatever it takes to improve sleep is critical. While the subject of a separate article, general principles are: consistent bed and wake time 7 days per week, a pitch-black silent chamber, no stimulating activities for at least an hour before sleep, light meals several hours before bedtime, reducing stimulants, and wind-down rituals including music, baths, journaling, etc.
3. There are several important and necessary nutritional interventions. As discussed above, severely limiting or preferably eliminating stimulating foods such as caffeine and sugar, and known toxins such as alcohol, drugs, nitrates, MSG, etc, is often critical. Many people have food allergies (often the foods we crave), which act as a stressor and have to be eliminated and detoxified before substantial healing can occur.

Essential vitamins, minerals and oils as well as special supplements are often needed to restore balance.

4. Classic yoga, preferably in a class setting, is critical for re-balancing these complex and subtle systems. Gym yoga will not work as its emphasis is often physical. Adrenal yoga is slow and not strenuous. It should follow any stressor including aerobic exercise.
5. Body and energy work including acupuncture, massage, Reiki and other methods can facilitate a resetting but will not work without working on sleep, diet etc.
6. Psycho-spiritual work, which can be in the form of yoga, or more focused as with journaling or psychotherapy is important to learn about the self and how we are violent to ourselves. Sometimes people are stuck in neuro-energetic emotional ruts that require psychotherapy or more specialized techniques such as EMDR, NET and NMT.
7. Testing for heavy metals, nutritional deficiencies, chronic infections (Lymes, yeast, parasites), other hormonal imbalances, immune dysfunction and other toxins and stressors is often necessary.
8. In many cases, working with a holistic practitioner who is knowledgeable in testing, special supplements and modalities to re-balance these systems is necessary. In addition, such a practitioner can gently challenge a patient to re-think priorities, change and limit excuses. Such "coaching" is often needed to counteract the huge forces that encourage us to chronically stress ourselves into dis-ease.

**IMPORTANT NOTE: This educational material may not be used to make decisions about medical care without the help of an experienced practitioner.**

### For More Information (Books followed by ISBN #'s)

- See Dr. Cheikin's website, [www.cheikin.com](http://www.cheikin.com), for related articles on: Adrenal Fatigue, Stress as well as other topics.
- Dr. Cheikin offers workshops in several holistic health topics for adults and children. Please call for more information.
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