

Adrenal Gland Dysfunction: A Common Cause of Puzzling Health Problems (Part 1)

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What organ system imbalance in our body could be the root cause of the following symptoms?

- Difficulty getting to sleep at night even when you're tired ("tired and wired")
- Waking up at 2 or 3 AM for no apparent reason with difficulty going back to sleep
- Difficulty waking up by 7 or 8 AM even though you've gone to bed by about 10 PM
- Your deepest sleep being 1-2 hours before you wake up in the morning
- Not feeling rested when you wake up even though you've slept 7 to 8 hours
- Just feeling awake at about 10 AM even though you've been up for 3 hours
- Low thyroid function, or low normal thyroid function
- Unresponsive thyroid function even with treatment of hypothyroidism
- PMS: Bloating with "crabbiness", constipation, cramping and chocolate cravings
- Sexual dysfunction, lack of libido, infertility (for both men and women)
- Increased perimenopause and menopausal signs and symptoms
- Inability to lose weight even though exercising regularly
- Inability to gain muscle mass even with heavy weight training
- Chronic Fatigue Syndrome
- Emotional irritability, instability, decreasing motivation to excel and depression
- Light-headed/dizzy upon arising from a lying to standing position, or from bending over to standing up
- Poor wound healing
- Frequent colds, flu and infections
- Decreasing athletic performance
- Lack of stamina
- Increased likelihood of heart attack and decreased likelihood to survive a heart attack
- General feeling of "unwellness"

Well, from the title of this article as you've correctly guessed it is adrenal gland dysfunction. More specifically it's imbalance of the hypothalamic-pituitary-adrenal-thyroid-gonadal gland axis. Maladaptation to stress is the key to this axis going out of whack.

The Stress Response

Hans Selye is the scientist who is credited with bringing the concept of stress to the forefront of public and scientific thought. In his book *The Stress of Life* written for the lay audience, he formed what he called the general Adaptation Syndrome (G.A.S.). Though simplifying a very complex orchestration of hormonal and physiologic interactions, the G.A.S. is a useful model summarizing these interactions. The G.A.S. has three stages:

1. The alarm reaction otherwise known as the "fight or flight" response. This initial stage is to give us energy to react to potentially life threatening situations. It primarily involves activation of a portion of the nervous system, called the sympathetic nervous system, to prepare our bodies for

quick physical and emotional action. This also stimulates secretion of cortisol by the adrenal glands.

2. The stage of resistance. This stage involves our body adapting to stress by changing the set point of activation of the sympathetic nervous system and secretion of cortisol by the adrenal glands. In a maladapted stress response the set point is almost always set at a higher level than each person's body can healthfully adapt to.

3. The stage of exhaustion. This stage involves the depletion of the adrenal glands ability to make cortisol and other key hormones. In this stage many of the listed symptoms noted above will begin to be noticed.

All stress is not "bad-stress". "Good-stress" occurs with enjoyable surprises, passion and exercise, to name a few. It is when our systems are overwhelmed by "bad-stress" or maladaptation to stress that is harmful.

The Adrenal Glands

The adrenal glands can be thought of as the key glands that are activated in response to stress. They are small glands on top of each of the kidneys. Each gland has two parts, the outer part called the adrenal cortex, and the inner part called the adrenal medulla. For the purpose of simplicity we will only discuss the outer part, the adrenal cortex.

The adrenal cortex produces nearly 30 steroid hormones. The adrenocortical hormone we will primarily focus on is cortisol.

Cortisol secretion is regulated by feedback loops by parts of the brain and the pituitary gland at the base of the brain. A part of the brain called the hypothalamus secretes corticotropin-releasing factor (CRF) in response to various "stressors". CRF triggers the pituitary gland to release adrenocorticotropic hormone (ACTH), which then increases adrenal gland secretion of cortisol. In turn, increasing cortisol levels feedback to the hypothalamus and pituitary gland to slow production of CRF and ACTH, respectively. Therefore when this loop works normally, cortisol production slows as CRF and ACTH decreases. For this reason this feedback loop is often called the hypothalamic-pituitary-adrenal axis (HPA axis).

Because alterations in the HPA axis have feedback loops with thyroid hormones and gonadal (ovaries or testes) hormones, doctors trained in Functional Medicine often refer to this as the hypothalamic-pituitary-adrenal-thyroid-gonadal axis (HPATG axis).

What Does Cortisol Do?

Cortisol has widespread actions throughout the body and a detailed description of each of the effects on different systems is beyond the scope of this article. A summary of the effects of cortisol is this: To allow the body to respond to and recover from stress. Maladaptation to stress occurs over time with either an elevated set point of cortisol release, or as the problem progresses in a depleted stage where not enough cortisol is released. All of the lists of symptoms at the beginning of this article are often seen at some stage of imbalanced cortisol output.

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How Is Cortisol Measured?

Cortisol can be measured in the blood, urine or saliva. Briefly, to get the most accurate levels the body tissues are exposed to it is best to measure salivary cortisol levels. This is controversial to many conventionally trained physicians, but research studies support the collection of salivary samples to most accurately measure tissue cortisol levels.

Saliva as a medium for measurement of cortisol is also an excellent way to take multiple samples, which is necessary since cortisol levels change significantly depending on the time of day. Using this non-invasive method, we can easily measure the variation of cortisol output during a day. The normal daily range of cortisol output is known. Since morning cortisol levels should be at their highest after we wake up, with a dramatic drop by noon, and a gradual decrease until midnight, it is best to take 4 saliva samples during a normal day to ascertain each individual's output. I often see altered cortisol response and it often correlates very closely with each individual's signs and symptoms.

It is very important to determine if someone is presently in an elevated cortisol pattern or if someone is in a stage of relative adrenal exhaustion because the treatment for each stage is quite different. If you treated someone in the stage of adrenal exhaustion as if they were in an elevated cortisol pattern, you could significantly harm the person by further suppressing cortisol output. Likewise, if you treated someone "locked" into an elevated set point of cortisol output as if they were in the stage of adrenal exhaustion, you could induce high blood pressure and other significant problems in that individual. For this reason, salivary laboratory testing is often essential. However, there are in-office tests that can be performed along with a thorough medical history that have high accuracy to help determine the stage of HPA axis dysfunction someone is presently in. In my approximately 2 decades of practice I can often get a good idea of the stage which someone is in through medical history and examination, though I often prefer to confirm this with salivary hormonal testing.

"Stressed Out? How Did This Happen?"

How a maladapted cortisol response occurs is usually over some period of time being involved in distress. It may be after a relatively short period of multiple stressors (example: Moving, getting married or divorced, death of a close relative, loss of a child, and a major injury all within a year) or it may be after many years of poor diet and lifestyle habits, surgery, and reliance on pharmaceuticals that lead to depressed cortisol output. Nevertheless, the pattern is that there is initially an elevated set point of cortisol output, which remains elevated over time, where finally there begins to be a decrease and inadequate output of cortisol.

When the adrenal glands get to a stage where they are unable to make adequate cortisol to respond to even normal stress of everyday life, this is often termed "adrenal exhaustion". There are relative ranges of adrenal exhaustion, and with a complete shutdown of cortisol output, death would occur. However many people have some range of inadequate output of cortisol once they begin to have noticeable symptoms. With the reliance on pharmaceutical drugs by many people, along with inadequate nutrition, poor exercise habits, stress producing dietary habits and already stressful lifestyle habits, and now with the additional stress of a global downturn in the economy, adrenal gland dysfunction is already pervasive among many unsuspecting victims of this disorder.

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Conclusions

This brief overview of adrenal gland dysfunction has only been presented as a lay reader oriented discussion of a very complex topic. This is meant to give a general understanding to those unfamiliar with this common disorder. Only a trained health professional experienced in resolving this disorder should be consulted with for treatment of such a problem as this. With the pervasiveness of adrenal gland dysfunction in our society, and the poor recognition of this as the potential origin of the underlying cause of many of the associated symptoms, proper treatment becomes essential. In part 2 of this paper I will discuss the treatment methods for each stage of adrenal gland dysfunction using a functional medicine and chiropractic approach.

About the Author: Dr. Douglas Husbands graduated from San Francisco State University with a Bachelor of Science degree in Biology/Human Physiology in 1983. He later graduated from Cleveland Chiropractic College of Los Angeles in 1991. In 1996 he earned his post-graduate board certification as a Certified Clinical Nutritionist with the International and American Associations of Clinical Nutritionists, and in 2000 as a board certified Anti-Aging Health Care Practitioner with the American Board of Anti-Aging Health Practitioners. In 2003, he completed training in Functional Medicine with the Institute for Functional Medicine. Dr. Husbands has been sought for expert opinion by national health magazines and been published in peer-reviewed journals. He has taught many classes and lectured extensively to a wide variety of audiences on natural health topics and functional medicine. Dr. Husbands returned to his birthplace, the San Francisco Bay Area in 2004 and practices natural health care in San Carlos, CA at Athens Chiropractic Clinic. His website is www.drhusbands.com.