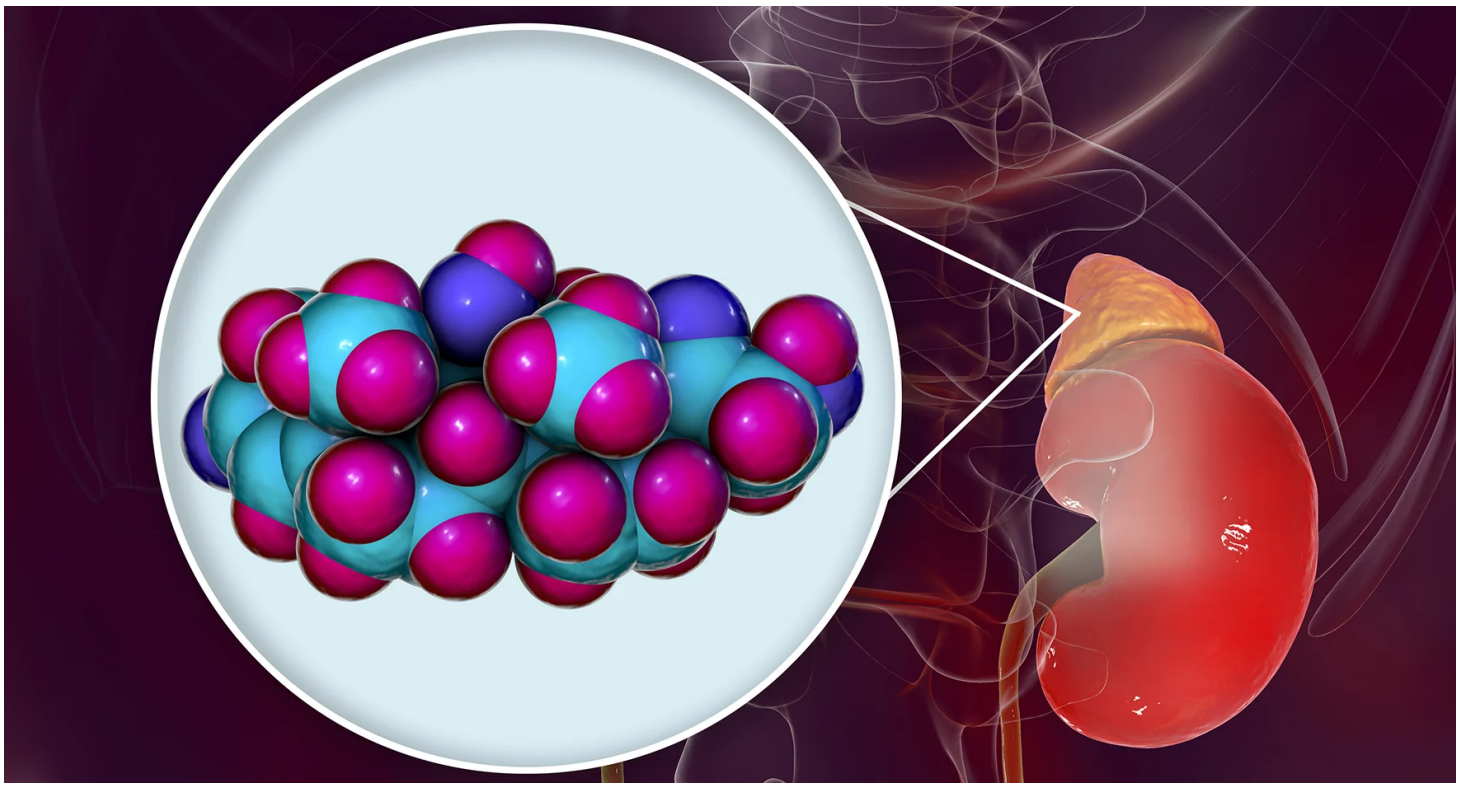

PATIENT RESOURCES

Adrenal Hormones

January 23, 2022

The adrenal (suprarenal) glands are located at the top of both kidneys. The produce hormones that regulate the immune system, blood pressure, metabolism, and the stress response. In addition, also helps your body do the following:

- Promoting proper cardiovascular function
- Helps in how we respond to stress
- Properly utilizing carbohydrates and fats

- Helps distribute stored fat
- Gives you body odor and pubic hair
- Promotes healthy gastrointestinal functions

▸ **Adrenaline**

Adrenaline is produced in the medulla in the adrenal glands as well as some of the central nervous system's neurons. Within a couple of minutes during a stressful situation, adrenaline is quickly released into the blood, sending impulses to organs to create a specific response.

What is the Function of Adrenaline?

Adrenaline triggers the body's fight-or-flight response. This reaction causes air passages to dilate to provide the muscles with the oxygen they need to either fight danger or flee. Adrenaline also triggers the blood vessels to contract to re-direct blood toward major muscle groups, including the heart and lungs. The body's ability to feel pain also decreases as a result of adrenaline, which is why you can continue running from or fighting danger even when injured. Adrenaline causes a noticeable increase in strength and performance, as well as heightened awareness, in stressful times. After the stress has subsided, adrenaline's effect can last for up to an hour.

Adrenaline is an important part of your body's ability to survive, but sometimes the body will release the hormone when it is under stress but not facing real danger. This can create feelings of dizziness, light-headedness, and vision changes. Also, adrenaline causes a release of glucose, which a fight-or-flight response would use. When no danger is present, that extra energy has no use, and this can leave the person feeling

restless and irritable. Excessively high levels of the hormone due to stress without real danger can cause heart damage, insomnia, and a jittery, nervous feeling.

Medical conditions that cause an overproduction of adrenaline are rare, but can happen. If an individual has tumors on the adrenal glands, for example, he/she may produce too much adrenaline; leading to anxiety, weight loss, palpitations, rapid heartbeat, and high blood pressure. Too little adrenaline rarely occurs, but if it did it would limit the body's ability to respond properly in stressful situations.

Adrenaline rarely causes problems, but ongoing stress can cause complications associated with adrenaline. Addressing these problems starts with finding healthy ways to deal with stress.

Consider asking your doctor:

- How can I tell if I am dealing with excessive adrenaline?
- How can I reduce stress in my life?
- Could adrenaline be causing my symptoms?
- What affect is adrenaline function and stress having on my overall health?

An endocrinologist is the best type of doctor to talk to when dealing with hormonal issues. Use our helpful form to locate one in your area.

▸ **Aldosterone**

Aldosterone is produced in the cortex of the adrenal glands, which are located above the kidneys. It affects the body's ability to regulate blood

pressure. It sends the signal to organs, like the kidney and colon, that can increase the amount of sodium the body sends into the bloodstream or the amount of potassium released in the urine. The hormone also causes the bloodstream to re-absorb water with the sodium to increase blood volume. All of these actions are integral to increasing and lowering blood vessels. Indirectly, the hormone also helps maintain the blood's pH and electrolyte levels.

Aldosterone is closely linked to two other hormones: renin and angiotensin, which create the renin-angiotensin-aldosterone system. This system is activated when the body experiences a decrease in blood flow to the kidneys, such as after a drop in blood pressure, or a significant drop in blood volume after a hemorrhage or serious injury. Renin is responsible for the production of angiotensin, which then causes the release of aldosterone. Once the body is rehydrated and has proper salt levels in the blood, renin levels fall, and aldosterone levels lower as a result.

What Can Go Wrong With Aldosterone?

In a healthy individual, the renin-angiotensin-aldosterone system functions without interference, helping to regulate and control blood pressure levels naturally. However, individuals can have too-high or too-low amounts of aldosterone, and both of these can impact aldosterone function.

Individuals with high levels of aldosterone have a condition known as hyperaldosteronism, and this is typically caused by small, benign tumors on the adrenal glands. Hyperaldosteronism can cause high blood pressure, low potassium levels and an abnormal increase in blood volume because of the way the hormone affects the body.

It's also possible to have low levels of aldosterone. Primary adrenal insufficiency, a disease that causes a general loss of adrenal function, can be a cause. Patients with primary adrenal insufficiency causing low levels of aldosterone may experience low blood pressure, increased potassium levels, and lethargy.

Genetic mutations can also affect the production of aldosterone. Patients with this rare genetic disorder will experience symptoms similar to primary adrenal insufficiency but the symptoms are typically less severe.

If you are struggling with maintaining a healthy blood pressure, and also have changes in blood potassium levels, you may want to talk to your doctor about aldosterone. Consider asking your doctor if your hormones could be the cause of your blood pressure and potassium struggles, especially if lifestyle changes are not helping. If aldosterone levels are not where they should be, talk to your doctor about changes or treatments that are possible to help your condition.

▸ **Cortisol**

Cortisol is often called the "stress hormone" because of its connection to the stress response, however, cortisol is much more than just a hormone released during stress. Understanding cortisol and its affect on the body will help you balance your hormones and achieve good health.

Cortisol is one of the steroid hormones and is made in the adrenal glands. Most cells within the body have cortisol receptors. Secretion of the

hormone is controlled by the hypothalamus, the pituitary gland, and the adrenal gland, a combination glands often referred to as the HPA axis.

What Does Cortisol Do?

Most bodily cells have cortisol receptors, it affects many different functions in the body. Cortisol can help control blood sugar levels, regulate metabolism, help reduce inflammation, and assist with memory formulation. It has a controlling effect on salt and water balance and helps control blood pressure. In women, cortisol also supports the developing fetus during pregnancy. All of these functions make cortisol a crucial hormone to protect overall health and well-being.

Problems Associated with High Cortisol Levels

Sometimes tumors on the pituitary or adrenal glands can contribute to a condition known as Cushing syndrome, which is characterized by high levels of cortisol in the blood. Individuals with Cushing syndrome will experience rapid weight gain in the face, abdomen, and chest. Often doctors will notice this because of the individual's slender arms and legs compared to the heavy weight in the core of the body. Cushing syndrome also causes a flushed face, high blood pressure, and changes in the skin. Osteoporosis and mood swings are also a factor considered with Cushing disease.

High cortisol levels can also contribute to changes in a woman's libido and menstrual cycle, even without the presence of Cushing disease. Anxiety and depression may also be linked to high cortisol levels.

Low cortisol levels can cause a condition known as primary adrenal

insufficiency or Addison disease. While rare, primary adrenal insufficiency is an autoimmune disease that causes damage to the adrenal glands. Symptoms may start slowly, but they can be quite serious. Patients with primary adrenal insufficiency can experience fatigue, muscle loss, weight loss, mood swings, and changes to the skin.

Consider asking your doctor:

- How do cortisol levels vary throughout the day?
- What underlying conditions could be affecting my cortisol levels?
- How can I manage cortisol levels to regain my health?
- What testing is needed to determine the cause of my symptoms?

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▸ **Dehydroepiandrosterone (DHEA)**

The brain controls the production of DHEA. The body uses a unique mechanism known as negative feedback to control the production of DHEA. Negative feedback tells your brain that once DHEA levels drop in your body, the mechanism is switched “on” and begins to produce more of the hormone. Once DHEA levels begin to rise, negative feedback is switched “off”.

DHEA and Anti-Aging

There are many rumors and claims that taking DHEA can also help slow down the process of aging. Claims include that DHEA can also increase energy and muscle strength, boosts immunity, and decrease body weight. However, these claims have yet to be medically proven. Does DHEA have a

role in treating certain health problems? Some researchers have suggested that DHEA might be used to treat:

- Adrenal insufficiency (Addison's disease)
- Depression
- Lupus
- Obesity
- Alzheimer's disease
- Osteoporosis
- Crohn's disease
- Infertility
- Problems linked to menopause DHEA also might help induce labor in childbirth.

What Problems Can Occur with DHEA?

Research has shown that women with hirsutism and polycystic ovary syndrome may have higher levels of DHEA. Children diagnosed with congenital adrenal hyperplasia also have high levels of DHEA, as well as some cancer patients. Lower levels of DHEA have been linked to a decreased life span in men. In women, low DHEA levels are often associated with a lower libido and osteoporosis.

DHEA has not yet been approved by the fda as a treatment for these health problems. More research is needed to study the potential benefits and the long-term risks of DHEA.

▸ **Norepinephrine**

Norepinephrine also called noradrenaline is both a hormone, produced by the adrenal glands, and a neurotransmitter, a chemical messenger which transmits signals across nerve endings in the body. Norepinephrine is produced in the inner part of the adrenal glands, also called the adrenal medulla. The adrenal medulla also makes adrenaline (also known as epinephrine). Norepinephrine, adrenaline and dopamine belong are part of the catecholamine family.

Adrenal glands are making primarily adrenaline and most of the norepinephrine in the blood comes from nerve endings. It plays a role in your mood and ability to concentrate. Together with other hormones, norepinephrine helps the body respond to stress and exercise. Other hormones include:

- Adrenaline
- Cortisol
- Corticotropin releasing hormone
- Adrenocortical hormone

What Does Norepinephrine Do?

Together with adrenaline, norepinephrine increases heart rate and blood pumping from the heart. It also increases blood pressure and helps break down fat and increase blood sugar levels to provide more energy to the body.

In the brain, norepinephrine plays a role in the sleep-wake cycle, helping you to wake up, in increasing attention and focusing on performing a task ,and in memory storage. It is also important for emotions. Problems with

norepinephrine levels are associated with depression, anxiety, post-traumatic stress disorder and substance abuse. Bursts of norepinephrine can lead to euphoria (very happy) feelings but are also linked to panic attacks, elevated blood pressure, and hyperactivity. Low levels can cause lethargy (lack of energy), lack of concentration, attention deficit hyperactivity disorder (ADHD), and possibly depression. Some anti-depressant medications affect norepinephrine levels in the brain. In stressful situations, norepinephrine increases as part of the fight or flight response to mobilize the brain and body for action.

Norepinephrine can be used to treat low blood pressure (hypotension) that can occur during certain medical procedures or life-threatening situations where cardiopulmonary resuscitation (CPR) is needed.

How Can you Increase Norepinephrine Naturally?

Norepinephrine and serotonin are a great pair. These chemicals help combat antidepressant effects and have therapeutic benefits. Serotonin, also called a “feel-good” hormone, improves mood and norepinephrine improves alertness and energy. You can boost these chemicals naturally through:

- Exercise
- Sleep
- Small accomplishments
- Music
- Meditation
- Eating dopamine rich foods such as chocolate

Consider asking your healthcare provider:

- How does norepinephrine affect my mood?
- How can I improve my norepinephrine and serotonin levels?
- Is my high blood pressure due to too much norepinephrine or adrenaline?

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