

Your Amazing Adrenal Glands!

If you know a little Latin, you might guess (without looking at our diagram!) where in the body the small but critical adrenal glands sit.

One of the meanings of the common Latin prefix “ad” is “in addition to,” and “renal” refers to the kidneys. So “ad renal” means “an addition to the kidneys.” Specifically, these triangular-shaped, gold-colored, three-inch-long glands sit atop your kidneys.

The adrenal glands form part of the endocrine system, a related group of glands that secrete hormones that instruct cells, tissues, and organs to perform certain functions: the pituitary regulates growth; the thyroid, energy use; and the pancreas, glucose levels.

The small adrenal glands produce several hormones that are responsible for the proper balance of salts in the body, blood pressure, the “fight or flight” response to danger, and the swelling produced after an injury. They also produce a chemical precursor to the male sex hormone testosterone.

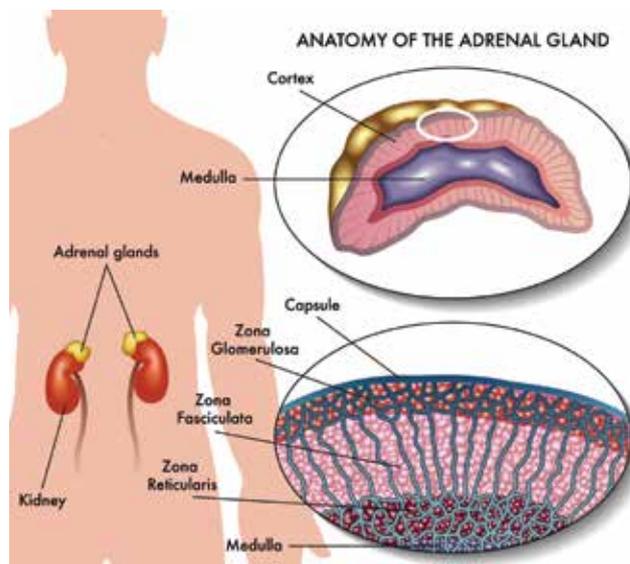
A Closer Look

- ✓ **Cortex**—The outer part of the adrenal gland produces cortisol (that regulates stress, metabolism, and the immune response), aldosterone (blood pressure and mineral balance), and androstenedione (the precursor to testosterone).
- ✓ **Cortex Detail**—The complex adrenal cortex has three distinct layers: the zona glomerulosa (where mineralocorticoids, such as aldosterone, are made); the zona fasciculata (where glucocorticoids, such as cortisol, are made); and the zone reticularis (where androstenedione is made).
- ✓ **Medulla**—The inner part of the gland produces epinephrine and norepinephrine (also called adrenaline and noradrenaline) that are responsible for the “fight or flight” response to danger and stress.

If you're keeping count, that's five critical hormones—not even the complete list of what the adrenal glands produce!

DID YOU KNOW?

President John F. Kennedy had Addison's Disease, although this was largely kept a secret during his lifetime. Kennedy also had hypothyroidism, and a recent retrospective diagnosis by a US Navy doctor claims these two disorders were caused by a rare autoimmune disorder.



What Can Go Wrong?

A dysfunctional adrenal gland often creates symptoms associated with the production of too much or too little of one or more hormones. One notorious disease is named after British doctor Thomas Addison (1793-1860), whose observations of symptoms in patients with diseased adrenal glands cracked the mystery of the function they have in the body.

- ✓ **Addison's Disease**—People with damaged adrenal glands suffer a host of debilitating, sometimes lethal symptoms, including fatigue, dizziness, muscle weakness, weight loss, nausea, sweating, and mood swings.
- ✓ **Adenoma**—These noncancerous, or benign, tumors are relatively common, and if they are small, they can be left alone. Some testing may be required to determine if they are producing too much of a particular hormone, in which case they are designated a “functional” adenoma. If they begin to affect hormone secretion, minimally invasive surgery can remove them.
- ✓ **Cushing's Syndrome**—Harvey Cushing found the reason for another host of symptoms associated with diseased adrenal glands. In 1832, he wrote that obesity, hypertension, excess hair growth, kidney stones, and menstrual irregularity can be caused by too much cortisol.
- ✓ **Adrenocortical Carcinoma**—Like most organs in the body, sometimes the adrenal gland can develop cancer. Sometimes these tumors can overproduce hormones as well. These are diagnosed by imaging and certain laboratory examinations and often treated through minimally invasive surgery.