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HEALTHY LIVING

Adrenaline, Cortisol, Norepinephrine: The Three Major Stress Hormones, Explained

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Thanks to the work of our sympathetic nervous system, the “fight or flight” system that takes over when we’re stressed, when you see your boss’s name in your inbox late at night, your body reacts like there’s a lion on the loose.

Behind the wide range of both physical and mental reactions to stress are a number of hormones that are in charge of adding fuel to the fire.

Adrenaline

What It Is: Commonly known as [the fight or flight hormone](#), it is produced by the adrenal glands after receiving a message from the brain that a stressful situation has presented itself.

What It Does: Adrenaline, along with norepinephrine (more on that below), is largely responsible for the *immediate* reactions we feel when stressed. Imagine

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you're trying to change lanes in your car, says Amit Sood, M.D., director of research at the Complementary and Integrative Medicine and chair of Mayo Mind Body Initiative at Mayo Clinic. Suddenly, from your blind spot, comes a car racing at 100 miles per hour. You return to your original lane and your heart is pounding. Your muscles are tense, you're breathing faster, you may start sweating. That's adrenaline.

Along with the increase in heart rate, [adrenaline also gives you a surge of energy](#) — which you might need to run away from a dangerous situation — and also focuses your attention.

Norepinephrine

What It Is: A hormone similar to adrenaline, released from the adrenal glands and also from the brain, says Sood.

What It Does: The primary role of norepinephrine, like adrenaline, is arousal, says Sood. "When you are stressed, you become more aware, awake, focused," he says. "You are just generally more responsive." It also helps to shift blood flow away from areas where it might not be so crucial, like the skin, and toward more essential areas at the time, like the muscles, so you can flee the stressful scene.

Although norepinephrine might seem redundant given adrenaline (which is also sometimes called epinephrine), Sood imagines we have both hormones as a type of backup system. "Say your adrenal glands are not working well," he says. "I still want *something* to save me from acute catastrophe."

Depending on the long-term impact of whatever's stressing you out — and how you personally handle stress — it could take anywhere from half an hour to a couple of days to return to your normal resting state, says Sood.

Cortisol

What It Is: A steroid hormone, commonly known as [the stress hormone](#), produced by the adrenal glands.

What It Does: It takes a little more time — minutes, rather than seconds — for you to feel the effects of cortisol in the face of stress, says Sood, because the release of this hormone takes a multi-step process involving two additional minor hormones.

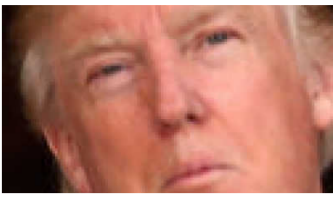
First, the part of the brain called the [amygdala](#) has to recognize a threat. It then sends a message to the part of the brain called the [hypothalamus](#), which releases corticotropin-releasing hormone (CRH). CRH then tells the pituitary gland to release adrenocorticotrophic hormone (ACTH), which tells the adrenal glands to produce cortisol. Whew!

In survival mode, the *optimal* amounts of cortisol can be life saving. It helps to maintain fluid balance and blood pressure, says Sood, while regulating some body functions that aren't crucial in the moment, like reproductive drive,

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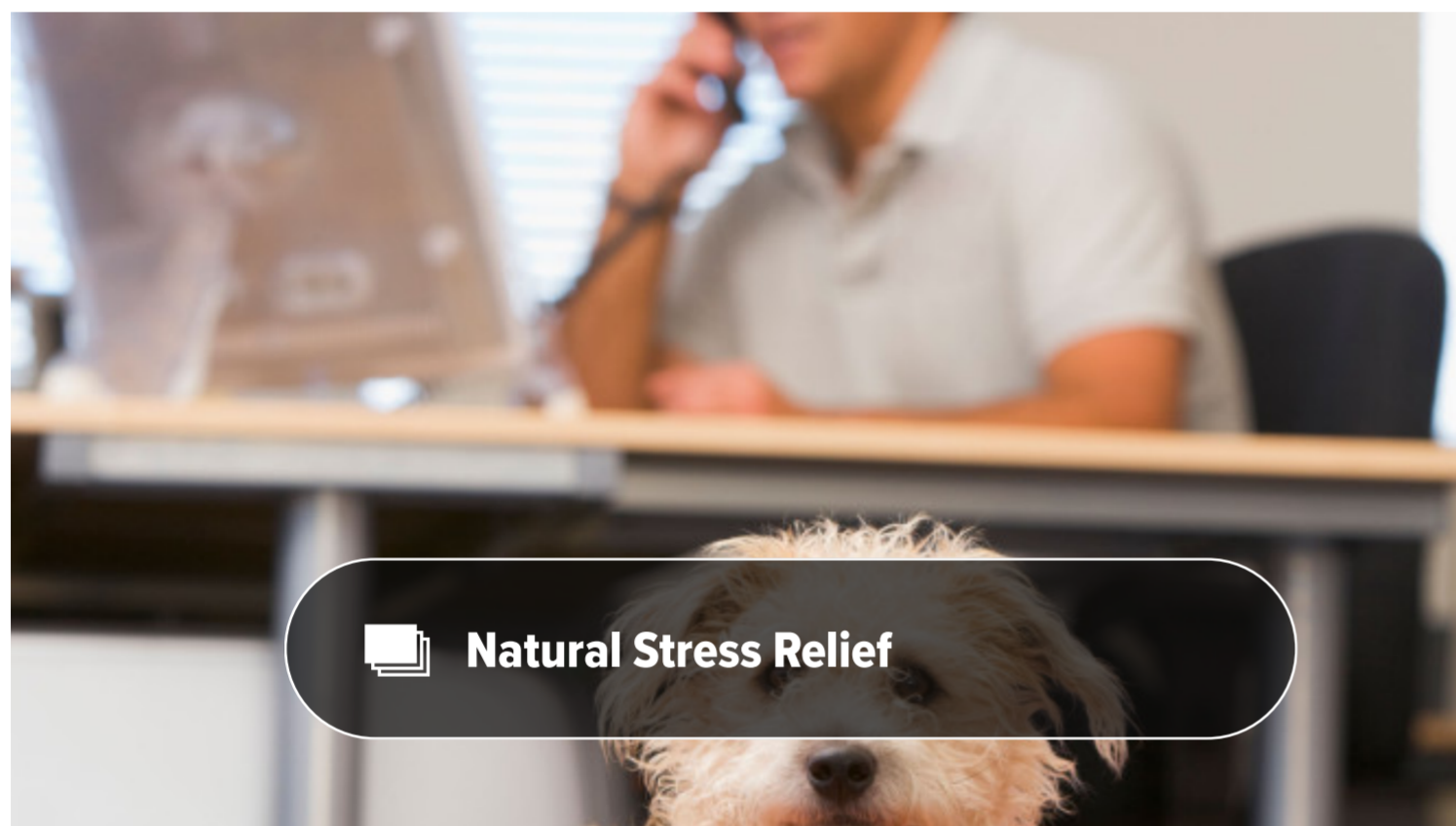
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But when you stew on a problem, the body *continuously* releases cortisol, and [chronic elevated levels can lead to serious issues](#). Too much cortisol can suppress the immune system, increase blood pressure and sugar, decrease libido, produce acne, contribute to obesity and more.

“Ducks walk out of a lake, flap their wings and they fly off,” says Sood. “When you face something stressful, particularly if it’s not likely to repeat or doesn’t have a huge long-term impact, you want to be able to shake it off and move on with life.”

Of course, he adds, estrogen and testosterone are also hormones that affect how we react to stress, as are the neurotransmitters dopamine and serotonin. But the classic fight-or-flight reaction is mostly due to the three major players mentioned above. How do you react to stress? Let us know in the comments.

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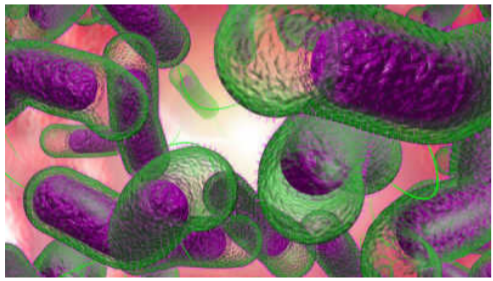
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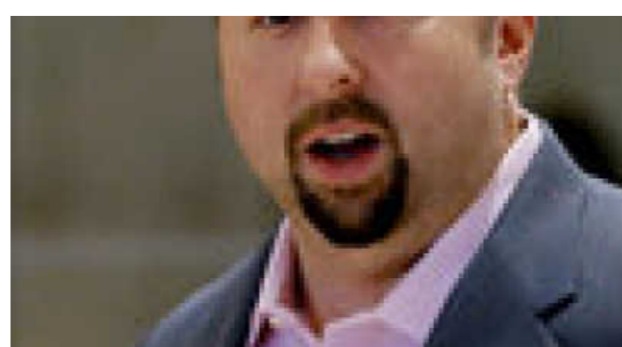
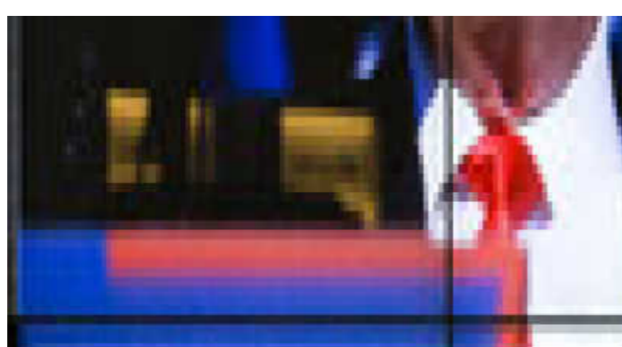
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