



The Biology of Stress

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The last in a series on the physical impact of stress. Here's a recap of what we've learned, plus some ways to reduce damage.

The first three parts of this series outlined the physical elements of the body's stress response and described various ways acute and chronic stress impact physical health. In this final installment, we bring it all together and examine ways to assess and manage the stressors you encounter.

We launched this series on the biology of stress by pointing out that scientists are increasingly exploring stress as a key factor in the origin of illness. Research has linked the long-range physical effects of stress to the development of heart conditions, high blood pressure, weight problems, diabetes, early cognitive decline and other conditions. Recent studies have also shown a higher prevalence of CFS in people with increased measures of cumulative wear and tear on the body from stress.

In fact, the body experiences stress as a cascade of physical reactions that call multiple systems and chemical messengers into play—from brain impulses and hormone release to heart rate and circulation changes all the way down to a flurry of cellular activity that affects energy conversion and immune function. While we often view stress as an external force, we ultimately experience it within all the major systems of the body.

What do we know about stress and the body?

Already in this series we've explored how acute stress—the famed “fight or flight” response—taxes the body by sending multiple systems into battle mode. We also know that chronic stress affects can impede the body's ability to regain balance (homeostasis or allostasis). Over time the body can accumulate what's called allostatic load—the physical wear from a chronically activated stress response. Think of it like a clothes dryer where the lint trap never gets fully emptied. As the residual lint

appears to be through increased production of chemical messengers called cytokines, particularly the ones that create inflammation.

Normally “proinflammatory” cytokines aid in the healing process by calling other immune cells to the site of infection or injury to repair damage or “fight off” a biologic invader—often producing fatigue, achiness, fever and slowed cognition as a by-product of the battle. But research shows that people under stress can produce too many of these cytokines, actually making them feel worse and prolonging the healing

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builds up, the machine has to work harder, and ultimately this can damage the unit.

We've also looked at how stress affects the immune system by disrupting the tightly orchestrated process of specialized organs and cells that protect us. Research shows that stress makes it harder to fend off illness, makes symptoms worse when we *do* get sick and even slows our ability to heal wounds. One way this occurs

process. This may be particularly significant to people with CFS, some of whom exhibit higher than normal levels of cytokines as well as lower production of cortisol, a hormone that can help contain proinflammatory activity.

So it's not hard to see how stress plays itself out in our bodies and how, through science, we're realizing that the phrase “can't handle the pressure” is more accurately applied to our bodies than our minds.

What can we do to minimize stress?

The notion of stress management has spawned a multibillion-dollar industry, but that doesn't necessarily mean meaningful help is readily available. Commercial products may aid some people in reducing their stress levels, but more success is likely to come from looking inward.

Different things stress different people, and we each develop unique ways of addressing the stress we encounter. Sometimes these learned reactions can influence the degree and duration of our body's stress response. So there's a practical benefit to understanding what your unique stressors are and recognizing the ways you currently respond to them.

Make a list. There are a number of stress diary and journaling techniques touted on websites and in self-help books, but they basically boil down to making a list of what stresses you (for example, "too many chores to complete in a day"), to what degree (on a scale where 10 is totally stressed) and how it affects your health or lifestyle ("kept me awake thinking about what was left to do"). Some sources suggest creating this list in real time or once a day for several weeks. Others propose reflecting on recent events and creating the list in one or two sittings. But the goal is always the same: to objectively identify your specific sources of stress and how they currently affect you.

Assert control. Gaining a sense of control can be a powerful stress mitigator, and often people have more control than they think, especially at the incremental level.

Find things on your list that you can do something about. Perhaps you can minimize the amount of chores

you generally plan for one day. Or maybe you'll recognize a need to sign up for community services to help you care for an aged parent. Even small but well-targeted adjustments can change the landscape considerably.

Pay attention, as well, to events on your list that you *can't* control and examine how you react to them. Increasing your awareness and gradually modifying how you respond to these events can be the most empowering factor of all.

Set limits. The key to setting limits is first to set priorities. Make a list of "must haves" too—if only to give yourself a chance to focus on what things add meaning and enjoyment to your life. Decide what's most important for your sense of well-being and put those things at the forefront of your mind and your decisions. For everything that falls outside your priority list, ask yourself, "What's the worst thing that would happen if I didn't do this?" If you can live with the answer, then let it go at least until

GADGETS AND TOOLS

Americans spend about \$11 billion a year on products to reduce their stress. Here's a rundown of a few items on the market:

Stress balls: If your stress manifests itself by making you restless, a stress ball may help use up extra energy. Otherwise, it's of little benefit.

Aromatherapy: This has been shown to help with relaxation and mild stress headaches. One of the benefits comes simply from the ritual of it and by taking time out to employ the process.

Meditation recordings: Studies show that meditation can alleviate stress and boost your immune system, but many people don't have time or focus to devote to authentic meditative practices. Recordings aren't a substitute for true meditation, but they can help you slow down, breathe deeply and separate yourself from the stress at hand. This, in turn, can help initiate your body's relaxation response.

Biofeedback machines: This device monitors body signals and notifies you when you reach a relaxed state. Over time this can help you condition yourself to initiate this state more effectively.

Massage: Studies show that massage can alleviate tension. It can also bolster your immune system by helping toxins work their way through the lymphatic system. Therapeutic and relaxation massage is often worth the time and cost involved, particularly when more than one session is employed. Even the simple act of making time for yourself to enjoy a massage can improve your overall well-being.

Acupuncture: Several studies have shown that acupuncture can relieve stress. For instance, patients given acupuncture before cataract surgery experience less anxiety related to the experience. But treatment can be expensive and can require repeated sessions. Ear acupuncture is emerging as a less expensive and effective way to reduce tension.