Weill Cornell Medicine
Neurological Surgery

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This Is Your Brain with Dr. Phil Stieg
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Those of us who have had the good fortune to reach age 50 (or 60, or beyond) know that there are some significant changes that take place over time, even in the healthiest of bodies. We need to pay more attention to, and take better care of, our knees, heart, and other body parts as we get older, because they're just not as young as they used to be.

The brain is no exception. As your brain ages the cortex thins, processing speed slows, and signaling pathways weaken. The good news is that functional and cognitive decline are not inevitable. Just as a heart-healthy diet can stave off cardiac problems, a brain-healthy life can help prevent age-related diminishment in cognition, memory, speech, and even happiness. This guide explains how learning to manage stress can actually improve your brain's health, with practical advice on what to do—today and every day—to keep your brain working well.

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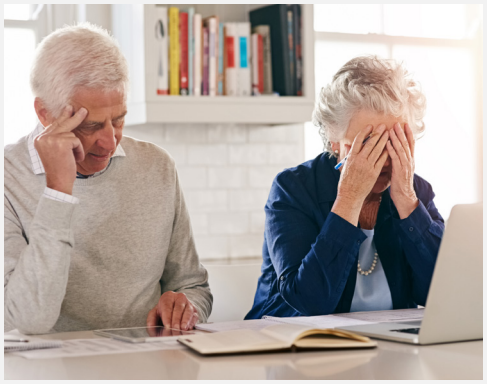
Your Guide to Stress

What Happens When You're Stressed?

Our brains are wired for stress—a little jolt of it is a good thing in an emergency, when it actually changes the chemical makeup of your brain. When you are faced with a threat, your adrenal glands release adrenaline and your hypothalamus tells your pituitary gland to release cortisol. These hormones help you get through a short-term threat: They get your heart pumping faster and they release sugar into the bloodstream, allowing you to react quickly. This can be useful, even life-saving, when another car drifts into your lane on the highway and you have to swerve suddenly to avoid an accident. And if you've ever had to do that, you probably also know that weak-in-the-knees feeling that usually follows. That's the normal aftereffect as those stress hormones subside when the threat is over. That's how acute stress is supposed to work, and it's good for your overall health—not to mention your odds of surviving a near miss on the road.

What About When Stress Is Constant?

Unlike acute stress, *chronic* stress is pretty awful for your health in general, and for your brain in particular. It's all too common these days for your brain to sense that it's always under some kind of threat: If you are sleep-deprived and overscheduled, worried about money and deadlines and the kids, or perennially irate about politics, you may be in a state of perpetual stress, with those stress hormones always surging, never subsiding.



That extended excess of stress hormones can be very damaging to your brain. Over time, too much cortisol can damage your brain's connectivity and actually kill off brain cells, especially in the hippocampus, which affects your memory. It can cause thinning of the frontal and prefrontal cortex, which affects cognitive function. It causes over-production of myelin, which your brain needs to protect neurons, but which in excess smothers them. And it decreases the number of cells that mature into healthy neurons. Stress can keep your blood pressure elevated, putting you at risk for a stroke. People with high levels of cortisol even have higher rates of depression. Those with long-term stress-related illnesses like PTSD show physical changes in their brain structure, with differences in the volume of gray matter vs white matter and the size of the amygdala and hippocampus when compared with the brains of those not exposed to trauma.

What to Do

It is critical to your brain's health that you learn ways to reduce your stress—to get those stress hormones down to normal levels. There are many ways to manage stress, including yoga, deep breathing, and exercise. Meditation and mindfulness are extremely effective at reducing stress and anxiety, thereby lowering cortisol levels in the brain. Functional MRI (fMRI) studies show that mindful meditation activates the anterior cingulate cortex, an area of the brain that is associated with empathy, executive function, and control of anxiety. Many studies show a dramatic connection between mindfulness and physical and physiological well-being.