



## How Stress Effects Your Body

Stress is a fact of life. We all experience challenging situations that call on us to take action. But not all stress is bad – in fact, some stress is necessary for life. However, too much stress makes the nervous system go haywire. Over time, it can cause harmful chemicals to accumulate in your body. Gaining an understanding of these effects and what can counteract them can help you make more informed choices about how you take care of yourself.

**Automatic Pilot:** In order to understand how stress affects the body, we need to look at the nervous and endocrine systems. Our nervous system is divided into two parts: the somatic system, which has to do with consciousness, intelligence and decision-making; and the autonomic nervous system, which functions as our “automatic pilot.” The autonomic nervous system, or ANS, controls the basic processes that keep us alive, all hidden below our level of consciousness. The beating of your heart, the acidity of your stomach, and the amount of sugar in your blood are all regulated by the ANS, leaving you time to do more interesting things. Some autonomic functions have a manual override option so you can decide to blink your eyes or take a deep breath, but these things usually happen whether you think about them or not. The autonomic nervous system is also divided into two parts: the sympathetic nervous system, or SNS, and the parasympathetic nervous system, or PNS. The sympathetic nervous system helps us to respond to stressors, like a near-miss on the highway or a demanding boss, while the parasympathetic nervous system helps us to recover from stressors. These components of our automatic pilot help us to sort out our responses to things that happen to us. The brain interprets a stimulus, like a sharp pain or a soothing caress, and creates a response in the body. For instance, we will probably have a sympathetic response to a wasp sting and a parasympathetic response to a back massage. Most of it happens below the conscious level.

**The Sympathetic Reaction:** “Watch out: here it comes!” The sympathetic, or “fight or flight” branch of the nervous system gets a lot of attention these days, because we are all becoming more aware of how stress affects our lives. The sympathetic nervous system enforces stress on the body: it causes our hearts to pound, our blood pressure to soar, and adrenaline to flood our system. In a sympathetic response our muscles tense up for running or fighting. We get a dry mouth and an upset stomach. In short, we direct fuel and energy toward large muscles and away from internal organs. Although it may seem like these are all



bad things, they are really not. These responses give our body the best possible chances of survival in the face of physical danger. Without these lightning-fast reactions to threats in our world, we could not possibly survive. The problems begin when the sympathetic response becomes “normal;” we are simply not designed to live that way! When we do, our bodies start to wear out faster and faster and become unnecessarily fragile.

**“Fight or Flight” Chemicals:** During a sympathetic reaction, many different hormones are secreted by the adrenal glands. The two that have the greatest impact on every aspect of our health – from the chemistry of our blood to the tension in our muscles – are adrenaline and cortisol. Adrenaline reinforces the fight or flight reaction by giving chemical orders all over the body to help us react quickly to threatening situations. It raises blood pressure, increases the heart rate and the respiratory rate, shuts down the digestive system, directs blood to the biggest muscles for quick action, and tells the liver to release stored sugar into the blood for extra fuel. Cortisol is secreted by the adrenal glands in response to long-term stress. It is commonly found in elevated levels in the blood under very stressful conditions. Patients in burn-rehab hospitals have high levels of cortisol, as do those who are clinically depressed. It is the main substance that is measured as an indicator of long-term stress. When it lingers in the body for prolonged periods, cortisol has been seen to weaken many types of tissue – especially muscles, tendons and ligaments – raising the risk of chronic back, neck and other injuries. It can also suppress the immune system, making it more difficult for us to heal when we are injured and making us more vulnerable to getting sick. But when it is secreted in moderation, cortisol is very beneficial chemical that acts as a powerful anti-inflammatory agent. In fact, manmade versions of cortisol, called corticosteroids, are frequently prescribed to treat inflammatory conditions. There is a tendency to view both adrenaline and cortisol as dangerous, harmful substances, just as we tend to view the sympathetic nervous system as the source of all our problems in this stressful world. But the fact is that these chemicals are important to our health. It is true that when too much adrenaline or cortisol floods our system for a long time, we can get seriously ill or become vulnerable to pain and injury. But without these chemicals we would also have serious problems. The human body works best in a constant, shifting, dynamic balance. Too much or too little of any hormone throws us out of that balance.

**The Parasympathetic Nervous System:** “Whew! I’m glad that’s over!” The sympathetic nervous system is designed to work in concert with mechanisms that help us recover from our emergency mode. Those mechanisms are under the



control of the parasympathetic nervous system (PNS). This system, which runs almost entirely by one huge nerve dangling from the brain down into the chest and abdomen, undoes our “fight or flight” responses. It slows the heart rate, drops blood pressure, reroutes blood back into internal organs, and contributes to an overall feeling of pleasure and well-being. These are all things people experience when they engage in stress-reducing activities like regular therapeutic massage, daily exercise, yoga and meditation. On a chemical level, the PNS suppresses the release of adrenaline, cortisol and other stress hormones to return us to a healthy stress response, as well as stimulating the secretion of other substances that improve and deepen sleep. It also strengthens our immune response and improves our resistance to injury and disease. Once again, all these functions are important, but you can have too much of a good thing. Without the sympathetic nervous system to provide balance, we would not have the alertness we need to drive a car, play a sport, or even walk down the street.

**The Balancing Act:** The balance between the parasympathetic nervous system and the sympathetic nervous system is not a battle between good and evil in which one must triumph while the other suffers defeat. It is an ongoing, constant shifting from one state to the other – always, we hope, in proportion to the kinds of stimuli that surround us. The only problem is, this system was designed for people who lived around 40,000 years ago. Back when we were all hunter gatherers, we could live for long periods with very little stress, and for short periods with very high stress (like when we were being chased by a bear). Our body is perfectly adapted for this lifestyle, but it is no longer how most people live. Consequently, the average stockbroker has a stress response system that is better suited to running away from a bear than to losing \$5 million on the exchange floor. Probably the greatest difference we have in the stressors we deal with today, compared to our hunter-gatherer ancestors, are that we look at paying rent, passing an exam, or meeting a deadline in the same way that our ancestors saw attacking carnivores or the threat of tribal famine. In other words, they dealt with physical stressors, but we deal primarily with psychological stressors. Our bodies go through all the same chemical and neurological changes that theirs did, but we do not have the physical outlets that help to get rid of the stress-related chemicals we secrete. Action, like running or fighting, helps the body to flush out and neutralize stress hormones. So does therapeutic massage, as it helps the tissues to exchange waste products for fresh nutrients. It is these hormones, when they accumulate for prolonged periods that can make us seriously ill. The fact remains that not only are we destined to have some stress in our lives, but we would get sick without any at all. The trick is to find a way to



monitor our stressors to make us stronger and more versatile while building in regular activities to reduce our stress to normal levels. This may include changes such as starting a daily exercise regimen alternating between aerobic, strength building and flexibility exercises; having weekly massage therapy sessions to reduce cortisol levels; and sitting down for three balanced meals a day in a relaxed environment instead of eating on the run – in short, creating a life that is lived instead of rushed through.

Source: Ben Benjamin, Ph.D & Ruth Werner