

## Homeostasis and the Cascading Effects of Stress

Homeostasis - The state of metabolic equilibrium between the stimulating and the tranquilizing chemical forces in your body.

The sympathetic nervous system (SNS) turns on the fight or flight response. In contrast, the parasympathetic nervous system (PNS) promotes the relaxation response. The SNS and PNS carefully maintain metabolic equilibrium by making adjustments whenever something disturbs this balance. These processes are facilitated by hormones. The trouble is, however, that some stress hormones don't know when to quit working. They remain active in the brain for too long – injuring and even killing cells in the hippocampus, the area of your brain needed for memory and learning. Because of this hierarchical dominance of the SNS over the PNS, it often requires conscious effort to initiate your relaxation response and reestablish metabolic equilibrium.

The primary area of the brain that deals with stress is its limbic system. Because of its enormous influence on emotions and memory, the limbic system is often referred to as the “emotional brain”. It is also called the mammalian brain, because it emerged with the evolution of our warm-blooded relatives, and marked the beginning of social cooperation in the animal kingdom. Whenever you perceive a threat, imminent or imagined, your limbic system immediately responds via your autonomic nervous system – the complex network of endocrine glands that automatically regulates metabolism.

Your sympathetic nervous system does an excellent job of rapidly preparing you to deal with what is perceived as a threat to your safety. Its hormones initiate several metabolic processes that best allow you to cope with sudden danger. Your adrenal glands release adrenaline (also known as epinephrine) and other hormones that increase breathing, heart rate, and blood pressure. This moves more oxygen-rich blood faster to the brain and to the muscles needed for fighting or fleeing. And, you have plenty of energy to do either, because adrenaline causes a rapid release of glucose and fatty acids into your bloodstream. Also, your senses become keener, your memory sharper, and you are less sensitive to pain.

Other hormones shut down functions unnecessary during the emergency. Growth, reproduction, and the immune system all go on hold. Blood flow to the skin is reduced. That's why chronic stress leads to sexual dysfunction, increases your chances of getting sick, and often manifests as skin ailments. □ With your mind and body in this temporary state of metabolic overdrive, you are now prepared to respond to a life-threatening situation.

After a perceived danger has passed, your body then tries to return to normal. But this may not be so easy, and becomes even more difficult with age. Although the hyperactivating sympathetic nervous system jumps into action immediately, it is very slow to shut down and allow the tranquilizing parasympathetic nervous system to calm things down. Once your stress response has been activated, the system keeps you in a

state of readiness.

Bear in mind that an appropriate stress response is a healthy and necessary part of life. One of the things it does is to release norepinephrine, one of the principal excitatory neurotransmitters. Norepinephrine is needed to create new memories. It improves mood. Problems feel more like challenges, which encourages creative thinking that stimulates your brain to grow new connections within itself. Therefore, stress management is the key, not stress elimination. The challenge in this day and age is to not let the sympathetic nervous system stay chronically aroused. This requires knowledge of techniques that work to activate your relaxation response.