

## Physiological Stress Response <sup>[1]</sup>

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The process of physiological stress response starts from the moment the body realizes the presence of the stressor, followed by the sending of signals to the brain, and to the specific sympathetic and hormonal responses to eliminate, reduce or cope with the stress.

### **The Nervous System**

When your body senses that a particular stressor is present, signals about that stimulus are sent to your brain. The master gland called the hypothalamus is then alerted to arouse the Autonomic Nervous System (ANS). The ANS is the system which controls most of the major organs of your body: the heart, lungs, stomach, glands and even the blood vessels. With these organs, you'll readily notice that the ANS is responsible for the unconscious regulation of the heart beat and breathing.

The ANS is further divided into two subsystems: the Sympathetic Nervous System (SNS), and the Parasympathetic Nervous System (PNS). The PNS is responsible for the conservation of energy, as well as in defending our body by controlling gland secretions such as gastric acid, tears, saliva and mucus. It's opposite, the SNS, is the one that we can call the "action system", because it is the system that is very active during a stressful situation.

### **Sympathetic Response**

The SNS surely likes things to go very quickly when you are faced with stress. The neurotransmitter noradrenaline is released by the nerve endings and is sent to the SNS so that the latter can:

1. **Enhance the strength of your skeletal muscles.** Have you heard news about people who were able to carry heavy furniture or equipments outside their house during fire? Well, fire is a very stressful situation, and thankfully we have our sympathetic response to aid us during these circumstances.
2. **Increase heart rate.** During stressful moments, your heart beats faster than it usually does so that the parts of your body which are needed to cope up with the stress would be supplied by enough oxygenated blood to remain functional until the stressful situation subsides.
3. **Shoot up sugar and fat levels.** We all know that sugar and fat provides our body with energy. During stressful situations, we need more energy to cope up, and so the SNS assists us to have more energy.

Furthermore, the SNS also:

- Enhances mental activity
- Slows down blood clotting time
- Decreases intestinal movements
- Limits digestive secretions and tears
- Dilates Pupils
- Constricts peripheral blood vessels, especially those that are not needed to cope up with the stress at hand

## Hormonal Response

Other than the nervous system, the body's stress response also includes the help of the adrenal glands. Situated on top of each kidney, the adrenal glands are also included in the physiologic stress response because the adrenal medulla (the center part of the glands) has nerves that connect the gland to the SNS. The SNS stimulates the adrenal medulla to start releasing adrenaline and noradrenaline into the blood circulation. This action results in the "fight or flight" response, which is manifested by the increase in heart rate, dilation of bronchial airways and enhancement of the metabolic rate so more of the stored energy can be used.

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