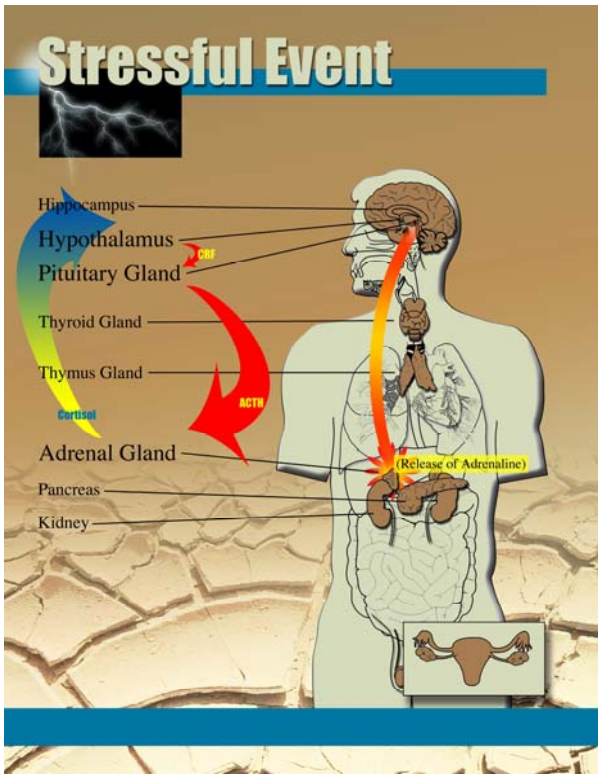
UK COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

# Calming the Storm

## The Body's Response to Stress

What happens to your body when you encounter a stressful event or situation? Follow the process below to understand how your body responds to stress in normal and distressed situations.

- As an immediate response to a "normal" stressful event or situation, the **hypothalamus,** through a circuit of nerves, alerts the **adrenal gland** of danger.
- The **adrenal gland** releases **adrenaline** (or epinephrine), the first of two major stress hormones.
- **Adrenaline** causes an increase in heart rate, while oxygen rushes through the bronchial tubes, dilating them, and thus sending more oxygen to the lungs.
- At the same time, more oxygen enters the brain – helping you remain alert or even hyper-vigilant.
- Next, to insure further defense against harm, the **hypothalamus**, **pituitary gland**, and the **adrenal gland** team up to provide additional backup (also known as the HPA axis).
- The **hypothalamus** produces corticotrophin-releasing factor (CRF), which moves through the blood vessels to stimulate the **pituitary gland**.
- The **pituitary gland** then releases **adrenocorticotropic hormone (ACTH)**, which travels through the bloodstream to the **adrenal gland**.
- The **adrenal gland** produces **cortisol**, the second major stress hormone, into the **circulatory system**.
- **Cortisol** replenishes the energy stores depleted by the **adrenaline** "rush".
- Once the energy is replenished and the level of immune activity is adequate, **cortisol** informs the brain (through the **hypothalamus** to the **pituitary gland**) and the stress response is adjusted. **Adrenaline** is then reduced to a normal level.




- While this process is occurring, other parts of your brain are working to adjust to and interpret the event or situation that has produced the stress reaction. The **hippocampus** and the **amygdala** (parts of the emotion and memory centers of the brain) are interacting with the **hypothalamus** to register and record the event or situation.
- This process allows you to manage "normal" and even traumatic stress experiences in your life.

**HOWEVER, chronic (constant or near constant) stress disrupts this fragile process causing the production of too much of the stress hormones adrenaline and cortisol. Over-production of stress hormones can have *negative* effects. Refer to the information below to see how too much adrenaline and cortisol can affect your health negatively.**

## ➢ Too much ***adrenaline*:**

- creates surges in blood pressure which can damage the blood vessels of the heart and brain.
- creates lesions that encourage the build up of plaque which restricts blood flow to the organs.
- **This is a major risk factor for heart attack and stroke.**

## ➢ Too much ***cortisol*:**

- suppresses the immune system, thus, decreasing the body's ability to fight off illness and infection.
- blocks the action of insulin to stimulate muscle and take up glucose.
- encourages the storage of fat around the middle of the body, a risk factor for heart disease.
- contributes to the loss of protein from muscles and converts it to fat.
- causes loss of minerals from bone.

For more information on health issues in Kentucky, please visit:

**www.ca.uky.edu/HEEL**

**Sources:** Bruno, Leonard. *Stress Reduction*. Health A to Z (Medical Network, Inc.). Retrieved September 30, 2003. http://www.healthatoz.com
McEwen, Bruce. (2000). *The end of stress as we know it.* Washington, D.C.: Joseph Henry Press.

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