

Chapter 3 Reading Guide

1. Distinguish between eustress and distress; think about how you have experienced each. □
2. What is "homeostasis," and how does it relate to stress? What is "GAS?" □
3. Describe the 3 stages of the GAS. Be sure to mention the important hormones released during each phase. What hormone is especially elevated during chronic stress?
4. Based on the description in the text, do you think the GAS is designed to help you survive an attack from a predator, or to survive constant impending deadlines at your desk job? Explain. (either way, your physiological response is the same)
5. What are some specific health problems related to chronic stress? Describe how stress can contribute to these issues.
6. How might chronic stress be related to fat storage?
7. Discuss the many sources of stress in our lives.
8. What is PTSD?
9. Discuss the many ways one can manage, reduce, and/or prevent the negative effects of chronic stress. Be sure to also talk about relaxation techniques.
10. How does poor time management contribute to stress? Describe several methods for improving time management; could any of these help you? □

-from the supplemental lectures and/or required link "Worried Sick"-

11. What benefit does cortisol offer the body?
12. Why is exercise a great way to minimize the physical effects of stress?
13. Where is one place in your body in which cells cannot use fat for fuel?
14. Discuss how the human ability to think about future events might contribute to our vulnerability to the negative effects of chronic stress.
15. Explain some of the factors that determine stress levels in rhesus macaques. Do dominant or subordinate members of a troop tend to be more "stressed out?" Why?
16. Explain how personality can affect your vulnerability to the negative effects of chronic stress.
17. Describe the studies conducted at Ohio State University designed to determine whether stress in relationships and college contributed to reduced immune function. What were the conclusions?
18. Describe some of the methods for reducing/managing/preventing stress discussed in "Worried Sick"

Supplemental Lecture

I. Stress in general- Keep in mind that your body's physiological responses to stress are designed for a hunter-gatherer lifestyle. Stress in those times included: long-term fasting, long-term exercise, social maneuverings, fighting or running from predators or competitors, illness and injury. The vast majority of our physiological responses are designed for the PHYSICAL stressors (exercise, fighting, fasting, etc). Today, most of

our stressors are social/emotional, NOT physical. Yet, our bodies have a hard time knowing the difference between a physical stressor and an emotional one.

Since **the body's GAS response is designed to get you through exercise or fasting**, two of the best things you can do to minimize the physical effects of stress are to EXERCISE and eat healthfully. Exercising will also help to metabolize (use/get rid of) the stress hormones faster, and reduce their release once you are finished exercising. Exercise is one of the best ways to maximize "bounce back" and reduce your baseline levels of stress hormones.

II. Cortisol, the hormone we love to hate

Hormones, by the way, are chemicals that travel throughout the body in the blood. These chemicals are like little messengers; they tell individual cells of the body what to do, based on what the whole body needs. Cortisol is a hormone that tells cells (directly or indirectly) how much fuel to use, and what kind of fuel to use. It is particularly important during times of fasting and long-term exercise.

Cortisol gets a bad rap as the "stress hormone." In fact, you would die quickly without it. You always have some travelling in your blood, and the amount varies normally and predictably throughout the day. It becomes a problem only when there is TOO MUCH, TOO OFTEN.

So, what is **the role of cortisol when it is cycling normally**? Cortisol makes sure that the right types of fuel sources are available to your body's cells at the right time.

Here's some background information: after you eat, there is plenty of sugar (in the form of glucose) in your blood available for cells. Glucose is one fuel source. During this time, most cells of your body will use glucose for energy. Liver cells will store some excess glucose, and fat cells will store any excess fuel (glucose, fat and protein) as fat. But then several hours after eating, the supply of glucose runs low. Most cells of the body can then start using the fat that was stored, but brain cells will only use glucose.

This is where cortisol comes in: cortisol makes sure that blood glucose levels always remain high enough to feed the brain. This can be during a long-term fast or exercise. For example, once the liver has released all of its stored glucose, and you're STILL not eating, the liver can make brand new glucose from protein. Cortisol tells liver cells to go ahead and do that. Cortisol also encourages other cells of the body to slow down and not use so much energy; this is thought to be the reason immune function is impaired by excess cortisol over long periods of time.

When you experience a stressful event, cortisol is released in higher doses just in case the event turns out to be a long-term problem. For example, if you are a hunter, you may see a herd of bison and experience a "rush" of adrenaline (epinephrine). This amps you up to start the hunt, but you may have to follow the herd for hours before you make a kill, and

then have to drag the bison home to your family before you actually get to eat. Cortisol ensures your brain will have enough fuel to get you through the whole ordeal.

***If a stressful event is psychological and not physical** (like when you've got 3 exams on the same day, a sick child, and deadlines at your desk job), levels of cortisol do not go back to normal as quickly as they do when the event is physical. So, long-term exercise is actually good for you even though you have elevated levels of cortisol for that time. When you finish exercising, cortisol levels quickly go back down to normal. Long-term emotional stress, on the other hand, elevates cortisol but does not allow it to go back to normal as quickly. □