Section 13.3: Review Answers

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1. See chart.

	Short-term response	Long-term response
Part of adrenal gland	adrenal medulla	adrenal cortex
System responsible for stimulating & hormones involved	sympathetic nervous system: neurons	hypothalamus–anterior pituitary complex: adrenocorticotropic hormone (ACTH)
Substances secreted	epinephrine and norepinephrine (also called adrenaline and noradrenaline)	glucocorticoids (cortisol) and mineralocorticoids (aldosterone)
Effects on the body	■ heart rate and blood pressure increase ■ blood flow to the heart and muscles increases ■ breathing rate increases ■ rate of metabolism increases ■ blood glucose rises	■ blood volume and pressure increase ■ protein and fat metabolism is stimulated, which releases glucose ■ inflammation is reduced, and immune cells are suppressed

2. (a) It would be beneficial for the soccer player because the fight-or-flight response increases heart rate and blood pressure, increases breathing rate, and increases blood flow to the heart and skeletal muscles. All of these would help the soccer player compete.

(b) The student writing the final exam would need to remain calm, so the fight-or-flight response would likely be detrimental.

(c) The fight-or-flight response would be beneficial if you are late for your bus because it increases heart rate and blood pressure, increases breathing rate, and increases blood flow to the heart and skeletal muscles. All of these would help you run to catch your bus.

(d) The fight-or-flight response might be beneficial if you need to get "psyched up" before going on stage, but it might be detrimental if you get too excited before going on stage.

3. A long-term stress situation could involve a high-pressure job or having to deal with a family member or friend who is gravely ill. This can be detrimental to your health because in response to long-term stress situations, the cells of the adrenal cortex secrete cortisol into the blood for long periods of time. Cortisol is a natural anti-inflammatory in the body, which is probably why sustained high levels of cortisol make people more susceptible to infections.

4. The body responds to stress by increasing blood glucose levels and increasing metabolism. The result is a depletion of "sugar" in the body which could trigger a craving for sweets.

5. Cortisol is an anti-inflammatory that is used to reduce inflammation associated with joint injuries. Long term use of cortisol, however, is harmful because it inhibits the regeneration of connective tissue.

6. Norepinephrine is both a hormone released by the adrenal medulla and a neurotransmitter released by neurons associated with the sympathetic nervous system.

7. An adrenaline rush is associated with the fight-or-flight response. Adrenaline (epinephrine) is released by both the sympathetic nervous system and the adrenal glands.

The body's response to the adrenaline rush is:

- heart rate and blood pressure increase
- blood flow to the heart and muscles increases
- breathing rate increases
- rate of metabolism increases
- blood glucose rises