MULTIPLE CHOICE

1. Exhaustion occurs if stress continues when which stage of the general adaptation syndrome is *not* successful?
   a. Flight or fight
   b. Alarm
   c. Adaptation
   d. Arousal

   ANS: C
   Exhaustion occurs if stress continues and adaptation is not successful, ultimately causing impairment of the immune response, heart failure, and kidney failure, leading to death. The other stages occur before the adaptation stage.

   PTS: 1 DIF: Cognitive Level: Remembering

2. Which organ is stimulated during the alarm phase of the general adaptation syndrome (GAS)?
   a. Adrenal cortex
   b. Hypothalamus
   c. Anterior pituitary
   d. Limbic system

   ANS: B
   The alarm phase of the GAS begins when a stressor triggers the actions of the hypothalamus and the sympathetic nervous system (SNS). The other organs are not stimulated by the alarm phase of GAS.

   PTS: 1 DIF: Cognitive Level: Remembering

3. During an anticipatory response to stress, what is the reaction from the limbic system stimulated by?
   a. The retronucleus of the anterior pituitary
   b. The anterior nucleus of the hippocampus
   c. The paraventricular nucleus of the hypothalamus
   d. The prefrontal nucleus of the amygdala

   ANS: C
   The paraventricular nucleus (PVN) of the hypothalamus must be stimulated to cause the limbic system to be stimulated. The other areas are not involved in the stimulation of the limbic system.

   PTS: 1 DIF: Cognitive Level: Remembering

4. Which hormone prompts increased anxiety, vigilance, and arousal during a stress response?
   a. Norepinephrine
   b. Epinephrine
   c. Cortisol
   d. Adrenocorticotropic hormone (ACTH)

   ANS: A
   The release of norepinephrine promotes arousal, increased vigilance, increased anxiety, and other protective emotional responses. Epinephrine's effects are primarily on the cardiovascular system. Cortisol's chief effects involve metabolic processes. By inhibiting the use of metabolic substances while promoting their formation, cortisol mobilizes glucose, amino acids, lipids, and fatty acids and delivers them to the bloodstream. ACTH binds with specific receptors on the adrenal glands which causes the release of the glucocorticoids.

   PTS: 1 DIF: Cognitive Level: Remembering

5. Perceived stress elicits an emotional, anticipatory response that begins where?
   a. Prefrontal cortex
   b. Anterior pituitary
   c. Limbic system
   d. Hypothalamus

   ANS: C
   The perception of stress initiates a series of events in the central and peripheral nervous systems. In the brain, stress elicits an anticipatory response that activates the limbic system; the brain area is responsible for motivation, emotions, and cognition.

   PTS: 1 DIF: Cognitive Level: Remembering

6. A student asks the healthcare professional how immunity is decreased by stress. The professional responds that during a stress response, the helper T (Th) 1 response is suppressed by which hormone?
   a. ACTH
   b. Cortisol
   c. Prolactin
   d. Growth hormone

   ANS: B
   Cortisol acts to suppress the activity of Th1 cells, which leads to a decrease in innate immunity and the proinflammatory response. Cortisol also stimulates the activity of Th2 cells, which increases adaptive immunity and the antiinflammatory response. ACTH binds with specific receptors on the adrenal glands which causes the release of the glucocorticoids. Prolactin is secreted in response to a variety of stressful stimuli and acts as a second messenger for IL-2 and has a positive influence on B-cell activation and differentiation. Growth hormone affects protein, lipid, and carbohydrate metabolism; counters effects of insulin; and is involved in tissue repair.

   PTS: 1 DIF: Cognitive Level: Understanding

7. Stress-induced sympathetic stimulation of the adrenal medulla causes the secretion of what?
   a. Epinephrine and aldosterone
   b. Norepinephrine and cortisol
   c. Epinephrine and norepinephrine
   d. Acetylcholine and cortisol

   ANS: C
   The sympathetic nervous system is aroused during the stress response and causes the medulla of the adrenal gland to release catecholamines (80% epinephrine and 20% norepinephrine) into the bloodstream. Sympathetic stimulation of the adrenal medulla does not cause the secretion of aldosterone, cortisol, or acetylcholine.

   PTS: 1 DIF: Cognitive Level: Remembering

8. A severely stressed patient has cold, clammy skin. The healthcare professional quizzes the student about this effect. The student correctly answers that this effect is directly from which action?
   a. Epinephrine dilating blood vessels leading to the vital organs
   b. Norepinephrine constricting blood vessels in the skin
   c. Dilating the airways to increased oxygenation of the tissues
   d. Dysfunctional temperature regulation from cortisol secretion

   ANS: B
   In a stress response, the actions of norepinephrine and epinephrine are complementary. While epinephrine dilates blood vessels to the vital organs (among other things), norepinephrine constricts blood vessels in the viscera and skin, providing more blood supply for those vital organs. The clinical result is cold, clammy skin. Epinephrine can also dilate airways, but this does not produce the skin changes as described. Temperature dysregulation is not the cause of the cold, clammy skin.

   PTS: 1 DIF: Cognitive Level: Understanding

9. Released stress-induced cortisol results in the stimulation of gluconeogenesis by affecting which structure?
   a. Adrenal cortex
   b. Pancreas
   c. Liver
   d. Anterior pituitary

   ANS: C
   One of the primary effects of cortisol is the stimulation of gluconeogenesis through stimulation of the liver. The adrenal cortex, pancreas, and anterior pituitary do not produce stimulation of gluconeogenesis when exposed to cortisol.

   PTS: 1 DIF: Cognitive Level: Remembering

10. What effect of increased secretions of epinephrine, glucagon, and growth hormone would the healthcare professional assess for?
    a. Hyperglycemia
    b. Hypertension
    c. Bronchodilation
    d. Pupil dilation

    ANS: A
    Cortisol enhances the elevation of blood glucose promoted by other hormones, such as epinephrine, glucagon, and growth hormone. Increases in glucagon and growth hormone do not lead to increases in blood pressure, bronchodilation, or pupil dilation although epinephrine does.

    PTS: 1 DIF: Cognitive Level: Remembering

11. A severely stressed patient has hypoglycemia each time the patient's blood glucose is checked. The healthcare professional should order laboratory tests to measure which hormone in the patient's blood?
    a. Epinephrine
    b. Norepinephrine
    c. Cortisol
    d. Growth hormone

    ANS: C
    One of the primary effects of cortisol is the stimulation of gluconeogenesis or the formation of glucose from noncarbohydrate sources, such as amino or free fatty acids in the liver. Neither reaction is a result of the effects of any of the other hormones.

    PTS: 1 DIF: Cognitive Level: Applying

12. What effect do androgens have on lymphocytes?
    a. Suppression of B-cell responses and enhancement of T-cell responses
    b. Suppression of T-cell responses and enhancement of B-cell responses
    c. Suppression of B- and T-cell responses
    d. Enhancement of B- and T-cell responses

    ANS: C
    Androgens suppress T- and B-cell responses. Androgens do not enhance either B- or T-cell responses.

    PTS: 1 DIF: Cognitive Level: Remembering

13. The action of which hormone helps explain increases in affective anxiety and eating disorders, mood cycles, and vulnerability to autoimmune and inflammatory diseases in women as a result of stimulation of the CRH gene promoter and central norepinephrine system?
    a. Progesterone
    b. Cortisol
    c. Estrogen
    d. Prolactin

    ANS: C
    Of the options provided, only estrogen directly stimulates the CRH gene promoter and the central noradrenergic (norepinephrine) system, which may help explain adult women's slight hypercortisolism, increases in affective anxiety and eating disorders, mood cycles, and vulnerability to autoimmune and inflammatory disease, all of which follow estradiol fluctuations.

    PTS: 1 DIF: Cognitive Level: Remembering

14. Which statement is *true* concerning the differences between stress-induced hormonal alterations of men and women?
    a. After injury, women produce more proinflammatory cytokines than men, a profile that is associated with poor outcomes.
    b. Androgens appear to induce a greater degree of immune cell apoptosis after injury, creating greater immunosuppression in injured men than in injured women.
    c. Psychologic stress associated with some types of competition decreases both testosterone and cortisol, especially in athletes older than 45 years of age.
    d. After stressful stimuli, estrogen is increased in women, but testosterone is decreased in men.

    ANS: B
    Androgens appear to induce a greater degree of immune cell apoptosis after injury, a mechanism that may elicit a greater immunosuppression in injured men vs. injured women. Men produce more proinflammatory cytokines. Competitive stress increases testosterone and cortisol. Estrogen is not increased in women after stressful stimuli.

    PTS: 1 DIF: Cognitive Level: Remembering

15. A patient perceives living in a state of chronic stress. What will diagnostic blood work ordered by the healthcare professional likely demonstrate?
    a. Decreased Th lymphocytes
    b. Increased erythrocytes
    c. Decreased Tc cells
    d. Increased platelets

    ANS: C
    Illustrating the influence of chronic stress appraisal on the physiologic processes, a meta-analysis of the relationships between stressors and immunity found that a higher *perception* of stress was associated with reduced T cytotoxic (Tc)-cell cytotoxicity, although not with levels of circulating Th or Tc lymphocytes. Research has not shown this relationship with changes in Th lymphocytes, erythrocytes, or platelets.

    PTS: 1 DIF: Cognitive Level: Remembering

16. What are the signs that a patient is in the adaptive stage of the general adaptation syndrome?
    a. He or she begins to experience elevated heart and respiratory rates.
    b. He or she finds it difficult to concentrate on a solution for the stress.
    c. The patient perceives his or her only options are to run away or fight back.
    d. The patient has exceeded his or her ability to cope with the current situation.

    ANS: C
    Fight-or-flight behaviors are characteristic of the more advanced adaptive stage, whereas the remaining options are noted in the initial alarm stage and are mediated by the sympathetic nervous system.

    PTS: 1 DIF: Cognitive Level: Remembering

17. What is the most influential factor in whether a person will experience a stress reaction?
    a. General state of physical health
    b. Spiritual belief system
    c. Intellectual abilities
    d. Ability to cope

    ANS: D
    A person does not have a stress reaction unless the stress exceeds his or her coping abilities. General health, spiritual belief systems, and intellectual abilities do not have the same degree of influence on stress reactions.

    PTS: 1 DIF: Cognitive Level: Remembering