Chapter 10 Review, pages 508–513

Knowledge

1. b
2. c
3. c
4. a
5. b
6. d
7. c
8. a
9. b
10. d
11. d
12. d
13. c
14. c
15. a
16. True
17. True
18. False. Neurohormones are produced by neurons in the hypothalamus.
19. False. Thyroid hormones lower the levels of \( Ca^{2+} \) ions in the blood, inhibiting the ongoing release of calcium from the bone.
20. True
21. False. Treatment of diabetes requires constant monitoring of the blood glucose (sugar) level.
22. False. Frederick Banting and Charles Best knew from the work of earlier scientists that a healthy dog would contract diabetes if its pancreas was removed.
23. True
24. True
25. False. Reproduction is controlled by sex hormones, which are primarily produced in the gonads.
26. False. Spermatogenesis is controlled by the male androgen hormone testosterone.
27. (a) v
   (b) iv
   (c) ii
   (d) vi
   (e) i
   (f) iii
28. (a) vi
   (b) iv
   (c) i
   (d) v
   (e) iii
   (f) ii
29. Endocrine glands differ from exocrine glands in that endocrine glands are ductless and generally produce hormones. An example is the adrenal glands. Exocrine glands produce secretions that are released into tubular ducts or out of the body. An example is the sweat glands.

30. (a) Hormones can bind to receptors either inside the cell or on the plasma membrane surface.
   (b) The method of hormone binding is determined by the ability of the hormone to pass through the plasma membrane. Protein hormones cannot cross the plasma membrane and therefore attach to receptors on the membrane surface. Steroid hormones cross the plasma membrane and bind to receptors inside the cell.

31. (a) The gland that requires iodine to function properly is the thyroid gland. Iodine is needed to make thyroxine and other thyroid hormones.
   (b) If there is not enough iodine in the diet, the thyroid gland swells and produces a condition called goiter.

32. The group of hormones of the adrenal glands that regulates the metabolism of carbohydrates, proteins and fats are the glucocorticoids.

33. (a) Parathyroid hormone increases calcium levels in blood.
   (b) Parathyroid hormone increases calcium absorption in the intestines.

34. (a) The pineal gland is located in the centre of the brain.
   (b) The function of the pineal gland is to secrete melatonin, which helps synchronize the body’s biological clock with day length and may also inhibit gonadotropins and the initiation of puberty.

35. Four hormones involved in controlling the rate at which sugar is broken down are insulin, glucagon, cortisol, and epinephrine/norepinephrine.

36. Symptoms of hyperglycemia include excessive thirst, frequent urination, sugar in the urine, vision problems, fatigue, and weight loss.

37. (a) Gestational diabetes is a high blood glucose level similar to type 1 and type 2 diabetes, but occurs only in pregnant women.
   (b) Gestational diabetes differs from type 1 or type 2 diabetes in that it is a temporary condition.

38. Testosterone is a natural hormone, as it is produced by the body.

39. A masking agent is a drug or other product that can conceal the presence of a prohibited substance in urine or other samples.

40. An ovum is an unfertilized egg. After an ovum has been fertilized by a sperm cell, it is called a zygote.

Understanding

41. The endocrine system is made up of the endocrine glands and the hormones they secrete.

42. Insect juvenile hormone controls metamorphosis. When it is turned on, the insect remains larval. If it is absent the next moult is metamorphic, producing a pupa and then an adult in most insects.
43. The major hormones of the anterior pituitary gland and their target tissues are as follows: prolactin (PRL)—mammary glands; growth hormone (GH)—bone, soft tissue; thyroid-stimulating hormone (TSH)—thyroid gland; adrenocorticotropic hormone (ACTH)—adrenal cortex; follicle-stimulating hormone (FSH)—ovaries in females, testes in males; luteinizing hormone (LH)—ovaries in females, testes in males; melanocyte-stimulating hormone (MSH)—melanocytes in skin of some vertebrates.

44. Charts, tables, or diagrams should include:

<table>
<thead>
<tr>
<th>Endocrine gland</th>
<th>Hormone produced</th>
<th>Target tissue</th>
<th>Hormone function</th>
</tr>
</thead>
<tbody>
<tr>
<td>hypothalamus</td>
<td>releasing and inhibiting hormones, e.g., growth hormone-releasing hormone (GHRH) or growth hormone-inhibiting hormone (somatostatin)</td>
<td>anterior pituitary</td>
<td>regulates the secretion of anterior pituitary hormones</td>
</tr>
<tr>
<td>gonadotropin-releasing hormone (GnRH)</td>
<td>anterior pituitary</td>
<td>controls release of FSH and LH from the anterior pituitary gland</td>
<td></td>
</tr>
<tr>
<td>anterior pituitary</td>
<td>prolactin (PRL)</td>
<td>mammary glands</td>
<td>stimulates breast development and milk production</td>
</tr>
<tr>
<td>growth hormone (GH)</td>
<td>bone, soft tissue</td>
<td>stimulates the growth of bones and soft tissues; helps to control the metabolism of glucose and other fuel molecules</td>
<td></td>
</tr>
<tr>
<td>thyroid-stimulating hormone (TSH)</td>
<td>thyroid gland</td>
<td>stimulates the secretion of thyroid hormones and the growth of the thyroid gland</td>
<td></td>
</tr>
<tr>
<td>adrenocorticotropic hormone (ACTH)</td>
<td>adrenal cortex</td>
<td>stimulates the secretion of glucocorticoids by adrenal cortex</td>
<td></td>
</tr>
<tr>
<td>follicle-stimulating hormone (FSH)</td>
<td>ovaries in females, testes in males</td>
<td>stimulates egg growth and development, and the secretion of sex hormones in females; stimulates sperm production in males</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Hormone</td>
<td>Function and Target Tissues</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>luteinizing hormone (LH)</td>
<td>ovaries in females, testes in males</td>
<td>regulates ovulation in females and the secretion of sex hormones in males</td>
<td></td>
</tr>
<tr>
<td>melanocyte-stimulating hormone (MSH)</td>
<td>melanocytes in the skin of some vertebrates</td>
<td>promotes darkening of the skin</td>
<td></td>
</tr>
<tr>
<td>endorphins</td>
<td>pain pathways in the nervous system</td>
<td>inhibits the perception of pain</td>
<td></td>
</tr>
<tr>
<td>posterior pituitary</td>
<td>antidiuretic hormone (ADH)</td>
<td>increases blood volume and pressure by increasing water reabsorption in the kidneys</td>
<td></td>
</tr>
<tr>
<td>oxytocin</td>
<td>uterus, mammary glands</td>
<td>promotes uterine contractions; stimulates milk release from the breasts</td>
<td></td>
</tr>
<tr>
<td>thyroid</td>
<td>calcitonin</td>
<td>lowers the calcium concentration in the blood</td>
<td></td>
</tr>
<tr>
<td>thyroxine and triiodothyronine</td>
<td>most cells</td>
<td>increases the metabolic rate; essential for normal body growth</td>
<td></td>
</tr>
<tr>
<td>parathyroid</td>
<td>parathyroid hormone (PTH)</td>
<td>raises the calcium concentration in the blood; stimulates vitamin D activation</td>
<td></td>
</tr>
<tr>
<td>adrenal medulla</td>
<td>epinephrine and norepinephrine throughout the body</td>
<td>contributes to the body's responses to stress</td>
<td></td>
</tr>
<tr>
<td>adrenal cortex</td>
<td>aldosterone (mineralocorticoid)</td>
<td>helps to control the salt–water balance in the body by increasing Na$^+$ reabsorption and K$^+$ excretion in the kidneys</td>
<td></td>
</tr>
<tr>
<td>cortisol (glucocorticoid)</td>
<td>most body cells, particularly muscle, liver, and adipose cells</td>
<td>increases the blood glucose level by promoting breakdown of proteins and fats</td>
<td></td>
</tr>
<tr>
<td>Pineal Gland</td>
<td>Melatonin</td>
<td>Brain, Anterior Pituitary Gland, Reproductive Organs, Immune System, and Possibly Others</td>
<td>Helps to Synchronize the Body’s Biological Clock with Day Length; May Inhibit Gonadotropins and the Initiation of Puberty</td>
</tr>
<tr>
<td>---------------</td>
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<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pancreas—Beta Cells</td>
<td>Insulin</td>
<td>Most Tissues</td>
<td>Signals Tissues to Take Up Glucose from the Blood; Reduces Blood Glucose Levels</td>
</tr>
<tr>
<td>Pancreas—Alpha Cells</td>
<td>Glucagon</td>
<td>Liver</td>
<td>Stimulates and Promotes Breakdown of Glycogen in Liver; Increases Blood Glucose</td>
</tr>
<tr>
<td>Gonads</td>
<td>Estrogen (Estradiol)</td>
<td>Sex Organs</td>
<td>Stimulates Maturation of the Sex Organs at Puberty; The Development of Secondary Sex Characteristics; and Development of Sex Drive</td>
</tr>
<tr>
<td></td>
<td>Progesterone (Progestin)</td>
<td>Uterus</td>
<td>Prepares and Maintains Uterus for Implantation of Fertilized Egg; Growth and Development of Embryo; Controls Menstrual Cycle</td>
</tr>
<tr>
<td></td>
<td>Testosterone</td>
<td>Sex Organs, Other Tissues</td>
<td>Stimulates Puberty and Other Secondary Sex Characteristics; Spermatogenesis</td>
</tr>
</tbody>
</table>

45. Answers may vary. Sample answer: Once epinephrine is released into the bloodstream, it causes the heart rate to increase, and causes glycogen and fats to break down, releasing glucose and fatty acids into the blood as fuel molecules. In the heart, skeletal muscles, and lungs, the blood vessels dilate to increase blood flow. Elsewhere in the body, the blood vessels constrict, raising blood pressure, reducing blood flow to the intestine and kidneys, and inhibiting smooth muscle contractions, which reduces water loss and slows down the digestive system. Airways in the lungs also dilate, helping to increase the flow of air and the supply of oxygen to the bloodstream.

46. Parathyroid hormone assists in blood ion regulation by raising calcium concentration in the blood. Conversely, calcitonin lowers calcium concentration in the blood.
47. The hypothalamus is part of the nervous system. It receives input from sensory receptors and secretes hormones that travel in the bloodstream to affect the pituitary gland and cause it to secrete other hormones. By this mechanism, the hypothalamus and the pituitary gland work together to integrate the nervous system and the endocrine system to effect a response to stimuli.

48. (a) H: pancreas  
(b) F: thyroid  
(c) E: pineal gland  
(d) A: hypothalamus or B: pituitary  
(e) D: ovaries  
(f) B: pituitary gland  
(g) B: pituitary gland  
(h) B: pituitary gland

49. (a) Answers will vary and should include three of the following: Secondary sex characteristics in males include growth of facial hair, deepening of the voice, production of sperm, growth of pubic hair, and increased muscle mass.  
(b) Answers will vary and should include three of the following: Secondary sex characteristics in females include development of breasts, widening of hips, development of layer of fatty tissue under the skin, growth of pubic hair, and menstruation/ovulation.  
(c) The hormones that control the development of secondary sex characteristics are the gonadotropic hormones: testosterone (in males) and estrogen (in females).

Analysis and Application

50. The action of hormone A has increased the affinity of receptor sites for hormone B.

51. Tropic hormones have endocrine glands as their target while non-tropic hormones do not.

52. (a) The endocrine system is considered to be an integrative system in the body because the hormones the system produces act on, and integrate, many different organs of the body, receiving information from one part of the body and producing effects in another.  
(b) Answers may vary. Sample answer: Another body system that is considered to be integrative is the nervous system.

53. Answers may vary. Sample answer: I agree that the pituitary gland is the “master gland” because it releases many hormones that act on or control the secretions of other endocrine glands in the body. Thyroid hormones, for example, would not be produced if the pituitary gland did not release hormones initiating their production.

54. (a) Graph A shows the results for someone who is suffering from diabetes mellitus because the blood glucose rises after eating and without the appropriate insulin production it does not come back to normal, but instead remains elevated.  
(b) Graph D shows the results from someone who has too little glucagon. There is no rise in blood sugar after eating and blood glucose levels continue to drop because glucagon is the hormone responsible for raising blood sugar.  
(c) Graph B shows the results for someone who has a normally functioning pancreas because it shows a normal spike in blood sugar after eating which, if then moderated by glucagon and insulin, levels out quickly.
55. (a) Most people with diabetes must reduce the amount of carbohydrates they consume because carbohydrates are easily converted into glucose. Restricting carbohydrate intake reduces the supply of glucose in the individual’s bloodstream.

(b) Answers may vary. Sample answer: Some of the complications of uncontrolled diabetes include damage to veins, kidney disease, loss of vision or blindness, loss of circulation to the legs and feet. In the extreme, it could lead to diabetic coma and even death.

56. (a) Answers may vary. Sample answer: A possible hypothesis for this experiment is: If the pancreas is exposed to radiation, then the blood glucose level will increase because the insulin-producing cells in the pancreas will be damaged by the radiation.

(b) The independent variable is the length of exposure to radiation. The dependent variable is the blood glucose level.

(c) Answers may vary. Sample answer: It seems that age and sex were controlled.

(d) The observed trend in the data is that blood glucose levels increased in all of the subjects as the length of radiation exposure increased.

(e)

(f) Based on the data, one could conclude that radiation of the pancreas causes increased blood glucose levels.

(g) Based on the results, one might suspect that the radiation damaged the parts of the pancreas responsible for producing the hormones that regulate blood glucose.

(h) This experiment could be made more valid by controlling as many other variables as possible, such as health of the subjects, diet, etc. It could also be made more valid by testing more than three mice or by testing different levels of radiation.

57. The production of progesterone by the placenta during pregnancy is an advantage. Progesterone inhibits uterine contractions, which could initiate labour if they occurred. It also stimulates the development of a mucus plug, which keeps viruses, bacteria, and sperm cells from entering the uterus.

58. Based on the graph, one can conclude that initially, glucose absorption occurs more rapidly when there is a high level of thyroxine in the blood and that the percent of glucose absorbed is greater when a high level of thyroxine is present.
Evaluation

59. The hormone is most likely to be a protein hormone. Protein hormones are hydrophobic and bind to plasma membrane receptors.

60. Some individual hormones have multiple effects on different target tissues because there are many different cells in different tissues and each has specific receptors for the hormone.

61. (a) The endocrine glands that may be causing the patient’s symptoms are the anterior pituitary and the thyroid glands.

(b) Based on the patient’s symptoms and test results, the doctor probably suspects hypothyroidism.

(c) I would suggest that the patient be given thyroid hormone replacement in the form of a small pill, daily, for life. This can be given in the form of thyroxine or T4, a synthetic hormone that has few impurities, very few side effects and produces almost no allergic reactions.

62. A possible explanation for this observation is that goiter is the result of an enlarged thyroid gland, due to a lack of iodine in the diet. Today most salt sold in stores has had sodium iodide added so goiter is rare regardless of where you live.

63. Thyroid deficiency can result in the excess storage of fat because thyroid deficiency results in a lowered metabolism. In these conditions, nutrients oxidize more slowly and therefore sugar is broken down more slowly. The more slowly the sugar is used, the more quickly it builds up. Excess blood sugar is converted to glycogen in liver and muscle. When glycogen storage capacity is reached, the excess is converted to, and stored as, fat.

64. A fasting test gives the patient a “bottom line,” which is the lowest you can expect the sugar and cholesterol figures to be. If the patient has just eaten, the levels of sugar and cholesterol are determined by what was eaten, not by the body's ability to handle these substances. If a non-fasting level is high, it might not mean anything is wrong. If a fasting level is high, there is definitely something wrong.

65. (a) Answers may vary. Sample answer: I think that all four scientists, MacLeod, Banting, Best, and Collip, should have received the award. Insulin would not have been discovered if not for the collaborative effort of this group. For this reason, the award should have recognized all four of them.

(b) Answers may vary. Sample answer: Yes, I do think that giving the patent rights to the University of Toronto was a good move because academic research is not driven by the need to make money. For this reason, many findings of pharmaceutical companies are kept confidential until they are ready to be sold to the public in the form of a drug or treatment. By giving the patent to an academic institution, future findings regarding insulin research would be openly shared, allowing the field of research to advance more quickly.
### Reflect on Your Learning

**66.** Answers may vary. Sample answer:

<table>
<thead>
<tr>
<th>What I knew</th>
<th>What I learned</th>
<th>What I still want/need to know</th>
</tr>
</thead>
<tbody>
<tr>
<td>I knew that insulin was important after a meal.</td>
<td>I learned that insulin is secreted by the pancreas and instructs the body’s tissue to take up glucose from the blood to maintain blood glucose levels.</td>
<td>How does insulin cause the body’s tissues to take up the blood glucose?</td>
</tr>
<tr>
<td>I knew that females have a monthly cycle that involves menstruation.</td>
<td>I learned that the specific release of hormones at very specific times control the cycle from beginning to end.</td>
<td>What controls the division of cells such that a zygote (a fused sperm and egg) eventually becomes a multicellular organism?</td>
</tr>
<tr>
<td>I knew that insulin was discovered in Toronto by Banting and Best.</td>
<td>I learned that they used dogs to discover insulin.</td>
<td>Do they still use dogs for diabetes research?</td>
</tr>
<tr>
<td>I knew that steroids were used and abused by some athletes to gain a competitive edge.</td>
<td>I learned that there are two types of hormones, protein hormones and steroid hormones.</td>
<td>How does the binding of a protein hormone to a receptor result in a change in gene expression all the way in the nucleus? How is the signal converted from the membrane to the nucleus?</td>
</tr>
</tbody>
</table>

**67. (a)** Answers may vary. Sample answer: Yes, I do think it is fair to expect all countries to have the same drug-testing standards. Professional athletes compete at a world level. Athletes from one country will compete against athletes from other countries all over the world. To ensure an equal playing field, testing procedures should be the same worldwide to prevent the use of illegal drugs that might give one athlete, and therefore an entire nation, an advantage over another.

(b) Answers may vary. Sample answer: Factors that could affect the level of drug testing in a nation include the wealth of a country (i.e., countries that don’t have a lot of money may not be able to afford rigorous testing), the availability of people and doctors to perform the test (again, this might be limited in poorer nations), and the legislation, or laws that are in place to enforce drug testing.
(c) Answers may vary. Sample answer: No, I don’t think it is worth pursuing two levels of sports competition, which include drug-enhanced games, to attempt to prevent the use of drugs in sports. The athletes that use drugs do so to gain a competitive edge. Even with the creation of two levels (drug-free and drug-enhanced) some athletes will continue to use drugs in the drug-free games to gain that competitive edge. This will mean that rigorous drug testing will still be required to ensure that the drug-free games are, in fact, drug free. In which case, if we are still performing the drug testing, there is no point in creating the drug-enhanced level of sport. Additionally, by creating a drug-enhanced league, you would be encouraging people to use drugs, which can have potentially harmful, and long term, side effects, creating a much larger problem and drain on the healthcare system.

(d) Answers may vary. Sample answer: I think drug testing should begin at the level at which athletes are beginning to use the drugs. For example, if it turns out that students are using steroids and other performance enhancing drugs at the high school level, testing should begin in high school. This will hopefully prevent the drug use at a young age, which hopefully will create more drug-free elite athletes in the future.

(e) Answers may vary. Sample answer: The pros of drug testing below the elite level are that testing early could be a deterrent and therefore prevent drug use early on, and therefore there may be fewer elite athletes that use performance-enhancing drugs. Additionally, drug use by younger athletes can impede their physical and mental growth and development. Testing at a young age might prevent this type of side effect. The main con of testing at an earlier stage is the financial cost of this type of testing. Not many high schools and amateur sports clubs can afford to test their athletes for drug use.

68. (a) Answers may vary. Sample answer: Yes, I am concerned that I will have to deal with diabetes in the future. Obesity is one factor that can contribute to the development of diabetes. For this reason, I choose to eat well and exercise now to prevent diabetes in the future.

(b) Answers may vary. Sample answer: There are several lifestyle changes that would benefit Canadians as a whole. These include eating significantly fewer processed foods (including fast foods), being more active, and quitting smoking. To be more active, Canadians can simply move more. They could try walking to the store or to work more often, climbing the stairs instead of taking the elevator, or joining a recreational sports league.

(c) Answers may vary. Sample answer: I could certainly benefit from being more active. Currently, I walk to school every day, but that is only about 10 min a day. I should try to increase my activity to at least 30 min every day. I could also take the stairs more often to help increase my daily movement.
**Research**

69. Answers may vary, and should include information similar to the following:
Addison’s disease affects 39 to 60 people out of every million. It results from a gradual destruction of the adrenal cortex, usually from an autoimmune disorder in which the body attacks its own tissue. The diagnosis is often tricky because the symptoms typically develop and worsen over a period of years. Most characteristic is a gradual darkening of the skin and mucus membranes. With symptoms like loss of appetite and weight, fatigue, nausea and vomiting, diarrhea, dizziness, and abdominal pains, patients are often mistakenly thought to have anorexia nervosa. Patients with Addison’s disease may also experience intense salt cravings. Without a diagnosis and appropriate hormone replacement, Addison’s disease can result in extreme weakness, shock and death in response to even a minor infection. More serious stresses, like surgery or childbirth, are often life threatening. Once Addison’s disease is suspected, it is not hard to diagnose. The patient is given an injection of ACTH (adrenocorticotropic hormone), the pituitary hormone that tells the adrenal glands to release corticosteroids, and the resulting amount of cortisol is measured in the blood and urine. Once the disease is properly diagnosed, patients must take hydrocortisone or cortisol twice a day for life. Some patients must also take a synthetic form of aldosterone, fludrocortisone.

In Cushing’s syndrome, which occurs in 5 to 25 people per million, there is an excess of adrenal steroids in the blood. This most often results from large doses of corticosteroid drugs taken over a long period to treat another illness, like rheumatoid arthritis or asthma. Sometimes a tumor occurs in the pituitary gland, resulting in an excess of the hormone that stimulates cortisol release. The latter condition, which is very rare, is called Cushing’s disease; it mainly affects young to middle-aged women. Symptoms come on gradually, over a period of months. The face becomes fatter, round and red. The body, too, accumulates fat, especially a pad of fat between the shoulder blades that causes a round-shouldered appearance. Muscles in the arms and legs atrophy, and bones become thin and fracture easily. Fatigue, weakness, blotchy skin, and bruises are common symptoms. Treatment depends on the precise cause. Pituitary tumors are treated with surgery or radiation. Adrenal tumors usually require the surgical removal of the entire affected gland, but the remaining healthy gland can maintain normal hormone function. For someone who develops Cushing’s syndrome because of steroid medication taken for another illness, the doctor will have to adjust the patient’s dosages or find an alternative remedy. But a patient should never stop steroid drugs without a doctor’s advice; steroid drugs must be tapered off gradually under medical guidance to avoid sudden adrenal failure.

70. Reports may vary. Reports should include:
• The main cause of diabetes insipidus (DI) is a lack of ADH (antidiuretic hormone) production. ADH is made in the hypothalamus and stored and released from the pituitary gland. Lack of ADH production prevents the kidneys from conserving water as they filter blood. This can result from head injury, infection, surgery, or tumour, or it can be genetic.
• The signs and symptoms of DI are excessive thirst and dramatically increased urine output.
• The treatments for DI should involve treatment of the underlying condition that is causing the disease. DI can be controlled by administration of ADH.
• The differences between DI and diabetes mellitus (DM) are that DI is a disease that affects kidney function, whereas DM affects pancreatic function. DI affects the levels of water in the blood; DM affects the level of glucose in the blood. DI stems from an inability of the hypothalamus to secrete ADH; DM stems from an inability of the pancreas to secrete insulin.

71. Presentations will vary. Presentations should include:
• Gigantism is abnormally large growth due to an excess of growth hormone during childhood, before the bone growth plates have closed. Dwarfism results from growth hormone deficiency and refers to abnormally short height in childhood due to the lack of growth hormone.
• The signs and symptoms of gigantism include excessive growth for a child’s age, delayed puberty, double vision or difficulty with side (peripheral) vision, a prominent forehead and a prominent jaw, headache, increased sweating, irregular periods, large hands and feet with thick fingers and toes, release of breast milk, thickening of the facial features, and weakness.
• Acromegaly occurs when excess growth hormone is produced after normal bone growth has stopped; whereas gigantism occurs when excess growth hormone is produced before the growth plates have closed.
• The most common cause of too much growth hormone being released is a non-cancerous tumor of the pituitary gland. Other causes include Carney complex, MacCune-Albright syndrome, multiple endocrine neoplasia type 1, and neurofibromatosis. To treat gigantism, surgery to remove the tumor is a good choice and can cure many cases. Medication can also be used in cases where surgery is not an option. Radiation therapy has also been used to reduce growth hormone levels; however, it can take several years to see the results. Most medical experts will use radiation only if surgery and medication fail.
• Possible complications of gigantism include delayed puberty and low levels of other pituitary hormones (due to surgery or radiation treatment), which can cause adrenal insufficiency, diabetes insipidus, and hypothyroidism.
• There are two types of dwarfisms. Disproportionate dwarfism, which is characterized by one or more body parts being unusually large or small compared to the rest of the body, and proportionate dwarfism, which occurs when the body parts are proportionate, but significantly smaller than normal.
• The signs and symptoms of dwarfism include abnormally short height in childhood, slow or flat growth rate (less than 5 cm per year), younger appearance in the face, chubby build, and delayed or absent puberty.
• Treatment for dwarfism includes injections of growth hormone. The earlier the condition is treated, the better the chance that a child will grow to a near-normal adult height. Growth hormone replacement therapy does not work for all children.
• The complications of dwarfism, if left untreated, will lead to short stature and delayed puberty.
72. Pamphlets may vary. Pamphlets should include:
• The three stages of GAS are: Stage 1—Alarm. The threat or stressor is realized; adrenaline is produced, cortisol is released from the adrenal cortex, blood pressure and heart rate increase, and immune responses are reduced. Stage 2—Resistance. If the stressor persists, it becomes necessary to find a way of coping. The body attempts to adapt until all resources are depleted. Stage 3—Exhaustion. All resources are depleted and the body can no longer maintain normal function; racing heart and sweaty palms reappear.
• Stress is primarily facilitated by two hormones: cortisol and adrenaline. These stress activators and modulators play significant roles in preparing the mind and the body for response to an overwhelming situation.
• Stress causes inflammation in the body and is only meant to be a temporary state. Prolonged stress begins to affect vital body organs and systems in a negative way. In fact, cortisol has been linked to a variety of health problems, including damage to the prefrontal cortex and hippocampus.
• There are several ways to reduce stress in your life. Examples are: meditation, vacation, and frequent breaks or pauses from stressful situations.