Answers to Study Questions

1. Which of the following is an example of a negative feedback system?
   
   a. Hypothalamus secretes ACTH, stimulating the anterior pituitary to secrete TRH, which stimulates the thyroid gland to make TSH. The TSH then directly influences the anterior pituitary gland’s production of TRH.
   
   b. Hypothalamus secretes TSH, which stimulates the thyroid gland to secrete thyroxine (T4). The T4 levels indirectly stimulate the hypothalamus’ production of TSH.
   
   c. Anterior pituitary gland secretes triiodothyronine (T3), which stimulates the hypothalamus to secrete TRH, which stimulates the thyroid gland to make T4. The T4 then indirectly influences the anterior pituitary gland’s production of T3.
   
   d. Hypothalamus secretes TRH, which stimulates the anterior pituitary to secrete TSH. TSH stimulates the thyroid gland to produce triiodothyronine (T3) and thyroxine (T4). T3 and T4 directly stimulate the pituitary’s secretion of TSH.

   **Answer:** d. In a negative feedback loop, the master gland (the hypothalamus) secretes an inhibiting or, in this case, a releasing hormone that will influence the anterior pituitary gland. TRH, which is made by the hypothalamus, causes the pituitary gland to release TSH. TSH causes the thyroid gland to produce T3 and T4. The level of T3
and T4 will then influence directly the pituitary gland’s production of TSH and indirectly the hypothalamus gland’s production of TRH.

2. Common clinical characteristics of growth hormone deficiency in a school-age child are:
   
   a. short stature, rate of growth 6-7 cm/year, normal bone age, truncal obesity, history of hypoglycemia, delayed dentition.
   
   b. short stature, rate of growth 5-6 cm/year, delayed bone age, history of hyperglycemia, delayed dentition, delayed sexual maturation.
   
   c. short stature, rate of growth <4-5 cm/year, delayed bone age, history of hypoglycemia, delayed dentition, high-pitched voice.
   
   d. short stature, growth velocity <3 cm/90 days, advanced bone age, history of delayed dentition, family history of GHD.

**Answer:** c. Growth hormone deficiency is characterized with suboptimal growth velocity. A child over the age of 2 and prepubertal is expected to grow 5-7.5 cm/year. Bone age is delayed, and the child has a higher weight-to-height ratio. Additional clinical signs include increased fat in trunk area, delayed dentition (as evidenced by delayed maturation of bone age), history of hypoglycemia, and high-pitched voice. GHD is not a genetic disease, and therefore a family history is not common.

3. When measuring and recording the linear growth of a less than cooperative 2-year, 2-month-old boy, the nurse should:
a. use a supine measuring board. Ask the parent to hold the child’s shoulders in a vertical plane to the board and place a movable foot board against the feet. Record the height on the 2- to 18-year-old growth chart.

b. use a supine measuring board. Have a second, trained person hold the child’s head against the head board with the child’s face and hips in a horizontal plane. Place the movable foot board against the soles of the feet in a 90-degree angle. Record the height on a 0- to 36-month growth chart.

c. ask the parent to help keep the child cooperative with standing height. Have the child stand barefoot on a standing measuring board. With the child’s back and heels against the standing board obtain the measurement. Record the height on the 0- to 36-month growth chart.

d. lay child on exam table. With one person holding the child’s head in a horizontal plan, the second person will take a tape measure from the crown of the head to the sole of the heel. Record the measurement on the 0- to 36-month growth chart.

**Answer:** b. The growth charts from 0-36 months are based on supine measurements. The 2- to 18-year-old growth charts are based on standing heights. This boy is over 2 years of age and could ideally be measured standing. However, since he is uncooperative, the length measurement should be obtained in the supine position. This requires two trained personnel. One person holds the boy’s head against the headboard and another person places the footboard against the soles of the feet. This measurement would then be recorded on the 0- to 36-month growth curve.
4. In teaching a family about medication for treatment of congenital hypothyroidism (CH) in a newborn, instructions should include which one of the following?

a. Generic l-thyroxine is a viable option for all children with CH.

b. l-thyroxine comes in tablet form. Since the medication should not be taken with food, the tablet can be crushed and added to a small bottle of water. Give one hour before a feed or two hours after.

c. Compound pharmacies can prepare a liquid l-thyroxine for infants. Once a child is able to chew, the pill form can be used.

d. The l-thyroxine tablet should be crushed and made into a paste with a small drop of formula or breast milk. Stroke the paste on the infant’s tongue and feed the child in a normal fashion.

Answer: d. L-thyroxine comes in a crushable tablet. Liquid compounds made by a pharmacy are not stable and should not be prescribed. While food and drink impact absorption, giving it the same way each time will stabilize the thyroid hormone levels. In an infant, brand-name (not generic) l-thyroxine should be crushed and placed on the baby’s tongue with a feed immediately following. Once the child is older and can chew or swallow pills, the medication can be given in this manner.

5. One treatment option for hyperthyroidism is subtotal thyroidectomy. This option is:

a. typically considered once medication therapy has not resulted in a permanent remission.

b. typically considered after medication therapy has stabilized hyperthyroidism.
c. typically considered as a treatment of last resort, when all else fails.

d. is not an option in pediatrics. Its complications are severe and too risky for children.

**Answer:** a. Thyroidectomy is one of several treatment options for hyperthyroidism. Initial therapy uses medication to stabilize the hyperthyroidism. The second treatment option includes radioactive iodine therapy. Thyroidectomy is considered when medication therapy has not resulted in a permanent remission.

6. What are the clinical manifestations in a female of viralizing, salt-wasting congenital adrenal hyperplasia (CAH)?

   a. hypotonia, elevated androgens, normal genitalia, hirsutism

   b. hypertonia, hypernatremia, hyperkalemia, ambiguous genitalia

   c. hirsutism, acne, advanced bone age, adrenarche, normal genitalia

   d. hypotonia, hyponatremia, hyperkalemia, ambiguous genitalia

**Answer:** d. CAH-salt wasting is immediately evident in the newborn. Without treatment, the child would die by day 10-14 of life. Hypotonia, low sodium levels (hyponatremia), and markedly elevated potassium levels (hyperkalemia) are characteristic. In a female, the exposure to the elevated androgen in utero would result in virilization of the genitalia or ambiguous genitalia. While answer c is characteristic of adrenal hyperplasia, it describes atypical CAH, not a salt-wasting form.

7. When planning the education for the parents of a child with type 1 diabetes mellitus (DM), which of the following should the nurse include?
a. Restrict the activity of the child.

b. Rotate the insulin injection sites.

c. Avoid letting the child perform the home testing of blood sugar.

d. Encourage a high-carbohydrate diet.

**Answer:** b. Rotation of injection sites is one of the most important things to do in a child with type 1 DM. Rotating the site allows for the best absorption and most accurate dosing of insulin. Blood sugar testing is often one of the earliest skills a child with type 1 DM acquires. A high-carbohydrate diet would contribute to an elevated blood sugar level. Activity is important in the treatment and management of diabetes.

8. The nurse is admitting a child suspected of having acquired hypothyroidism. Which of the following assessments should the nurse evaluate as confirming the diagnosis?

a. goiter

b. exophthalmos

c. proptosis

d. hirsutism

**Answer:** a. Acquired hypothyroidism generally results from an autoimmune cause. The thyroid gland becomes inflamed, is infiltrated by antibodies, and is progressively destroyed. Goiter is an indication found in acquired hypothyroidism. Exophthalmos and proptosis are present in hyperthyroidism. Hirsutism is a clinical manifestation in congenital adrenal hyperplasia.
9. The parents of a child newly diagnosed with type 2 diabetes mellitus want to know more about the condition. The nurse should include which of the following?

a. Activity is not important with type 2 diabetes.

b. Daily insulin injections are required.

c. Type 2 diabetes does not require intervention.

d. Type 2 diabetes is increasing in frequency in children.

**Answer:** d. Type 2 diabetes is increasing in frequency, even in children. It generally can be controlled with oral hypoglycemic drugs, diet, exercise, and home glucose monitoring.

10. The nurse identifies which of the following adolescents with type 1 diabetes mellitus as being at greatest risk for complications? An adolescent:

a. with frequent *Candida albicans* urinary infections

b. who has an eating disorder

c. who has a fever and sore throat

d. who is sexually active and taking birth control

**Answer:** b. An eating disorder poses a serious health hazard in the management of diabetes. Not only do bulimic behaviors such as binging and vomiting pose serious complications, but starvation that occurs with anorexia nervosa also raises the potential for complications. The omission of insulin can lead to serious complications, too. A urinary tract infection with *Candida albicans* is often an early sign in adolescents that type 2 diabetes may be present. Sore throat and fever do not
necessarily pose serious health risks, but simply may indicate that an insulin adjustment may be necessary during the illness. Sexual activity and birth control do not directly alter an adolescent’s risk for complications.