These review questions are for the Endocrine system lecture topic. The questions were adapted from several sources, including 1700+ Review Questions for Anatomy and Physiology II (3rd edition) by R. Michael Anson, Ph.D.

Multiple choice review questions:

1) Which of the following general chemical categories is *not* represented by a group of hormones?
   A) amines
   B) polypeptides and proteins
   C) nucleic acids
   D) steroids

2) Which statement about physiological regulation by hormones is false?
   A) Target cells must have specific receptor proteins with which the hormones combine.
   B) When hormones bind to target cells, the target cell is pre-programmed to react in a certain way.
   C) The hormone travels from its source to the target cell in the bloodstream
   D) The target cell depolarizes by allowing Na^+ ions to enter

3) The anterior pituitary gland is unable to
   A) synthesize and release tropic hormones.
   B) respond to tropic hormones from the hypothalamus.
   C) secrete oxytocin.
   D) secrete hormones that alter the activity of the adrenal cortex and thyroid gland.

4) The anterior pituitary hormone associated with dwarfism, gigantism, and acromegaly is
   A) Thyroxine.
   B) GH.
   C) Cortisone
   D) Cortisol

5) Which is not true about thyroxine
   A) It is the major hormone secreted by the thyroid gland
   B) It travels in the blood.
   C) It regulates the body's metabolic rate
   D) It contains chlorine atoms

6) Which hormone directly controls how much energy a person feels that they have by controlling their basal metabolic rate?
   A) Cortisone
   B) Cortisol
   C) Thyroid hormone
   D) Growth hormone

7) A person who is experiencing a goiter can be treated with dietary supplements of
A) calcium.
B) ADH.
C) corticosteroids.
D) iodine.

8) Which of the following hormones contain the element iodine?
A) thyroxin
B) epinephrine
C) steroids
D) corticosteroids

9) Parathyroid hormone controls…
A) Calcium levels
B) Metabolic rate
C) Long term stress
D) Short term stress

10) Which hormones are *not* secreted by the adrenal cortex?
A) aldosterone
B) sex steroids: testosterone and estrogen
C) hydrocortisone and other glucocorticoids
D) epinephrine and some norepinephrine

11) Glucocorticoids main function is to _____. These hormones carry out this function by _____.
A) Heal wounds, Increasing heart rate and cardiac output.
B) Keep blood pressure steady, Causing vasoconstriction that elevates blood pressure.
C) Keep body fluids in homeostasis, Increasing blood volume and altering electrolyte balance.
D) Deal with long term stress, increasing blood sugar.

12) Which of the following is a deleterious effect produced by the glucocorticoids made during prolonged stress?
A) increased parasympathetic activity
B) suppression of growth hormone secretion and action
C) increased thyroid hormone production and secretion
D) Decreased immune activity

13) Which disease is caused by oversecretion of thyroid hormone?
A) Cretinism
B) Graves disease
C) Cushing's syndrome
D) Addison's disease

14) The adrenal medulla secretes
A) corticosteroids: aldosterone and cortisol among others.
B) thyroxine.
C) epinephrine and norepinephrine.
D) ADH and oxytocin.

15) Which disease is caused by oversecretion of glucocorticoids?
A) Cretinism
B) Graves disease
C) Cushing's syndrome
D) Addison's disease

Answers to multiple choice review questions:

1 = C	6 = C	11 = D
2 = D	7 = D	12 = D
3= C	8 = A	13 = B
4 = B	9 = A	14 = C
5 = D	10 = D	15 = C

Fill-in-the-blank review questions:

1) The _____ system and the _____ system are both organ systems for communication between body parts, but of the two, the _____ system's effects tend to be slower and longer lasting.

2) A(n) _____ is any structure in the body that makes and secretes a substance.

3) Glands that release hormones are known as _____ glands.

4) Hormones are defined as _____ that travel in the _____.

5) In general, the effects of hormones are to regulate the body's functions of _____, _____, _____, and _____.

6) The three general chemical classes of hormones are _____, _____, and _____.

7) _____ hormones are made from modified amino acids.

8) _____ hormones are chains of linked amino acids.

9) _____ hormones are lipids whose backbone is made of _____.

10) Fill in the blanks in the following description of how the endocrine system works:

> Hormones are released from structures in the body called _____. (The pituitary, the thyroid, and the adrenal are all examples of these structures). After it is released, a hormone travels in the _____ to its target tissue, which is the tissue that will respond to the hormone. The target tissue is able to respond to the hormone that because the cells of the target tissue have _____, which bind to the hormone and trigger the cells to take a specific action in response to it.

11) When a hormone's target organ is another endocrine gland, and the hormone regulates that gland's release of hormone, the first hormone is called a _____ hormone.

12) The pituitary gland is below and connected to the _____. The amount and types of hormones made by the pituitary gland are controlled by _____ hormones from the _____.

13) The pituitary gland has two parts: The _____ pituitary and the ____ pituitary.

14) The posterior/anterior (circle one) pituitary synthesizes the majority of the pituitary hormones.

15) The two hormones released by the posterior pituitary are _____ and _____.

16) The _____ is sometimes called the "master gland" of the body because it releases many hormones that control other endocrine glands. What is the term for a hormone that controls another endocrine gland? _____

17) Growth hormone is secreted by the _____ gland (be as specific as possible).

18) Because growth hormone is the body's major growth regulator, too little results in _____ and too much (before puberty) results in _____.

19) Growth hormone causes growth by increasing ____ tissue and ____ tissue, but it decreases _____ tissue.

20) The major hormone secreted by the thyroid gland is called _____ hormone.

21) Thyroid hormone is also called _____ and _____.

22) The hormone thyroxine has _____ (a type of atom) attached to the basic structure of the hormone molecule.

23) The number 4 in "T4" refers to the number of _____ atoms bound to the hormone.

24)Thyroid hormone is an unusual hormone in that _____ are its target cells.

25) In response to T4, cells increase their use of _____ for energy.

26) If a person gets too little iodine in their diet, their thyroid will swell, a condition known as having a _____.

27) Hyperthyroidism is also known as _____ and results these symptoms: _____, _____, and _____.

28) If a person's thyroid is making too little thyroxin, that person is said to be _____. The usual symptoms of this condition are:_____, _____, and _____.

29) If a child's thyroid is making too little thyroxin, two severe symptoms (not seen in hypothyroid adults) can occur: _____ and _____. The child with this condition is said to have _____.

30) Parathyroid hormone is the only hormone secreted by the parathyroid glands; and its primary action is to increase/decrease (circle one) the concentration of _____ in the bloodstream.

31) When the body is low on calcium, the _____ gland releases _____hormone to increase calcium levels. When the body has excess calcium, the _____ gland releases _____hormone to increase calcium levels.

32) PTH stimulates cells in _____ tissue that _____.

33) Calcitonin stimulates cells in _____ tissue that _____.

34) When two hormones have opposite effects on their target organ, they are said to be _____ hormones.

35) The thyroid gland is controlled by tropic hormones from the _____ gland, but these tropic hormones are in turn controlled by tropic hormones released from the _____.

36) The outer portion of the adrenal glands is called the adrenal _____, whereas the inner portion of the adrenal gland is called the adrenal _____.

37) The inner portion of the adrenal glands is made of _____ tissue.

38) The adrenal cortex synthesizes two different steroid hormones in large amounts: _____ and _____.

39) Cortisol and cortisone are together called _____. The first part of the name comes from the fact that they help to regulate the concentration of _____. The second part of the name comes from the fact that they are secreted by the adrenal _____, and the final part of the name comes from the fact that they are steroid hormones.

40) _____ disease is when too little of all the adrenal cortex hormones are made. President Kennedy had this disease.

41) The adrenal _____ (a part of the adrenal gland) secretes the hormone _____, which regulates _____ (an ion) levels in the blood.

42) _____ are hormones released by the adrenal cortex in response to long-term stress.

43) Glucocorticoids provide energy to deal with stress by converting _____ and _____ into _____, but they also inhibit the _____ system.

44) Although mostly made in the testes, the male hormone _____ is present in both genders because the _____ produces a little of it.

45) A female patient has the following symptoms: High blood sugar, slender legs but fat deposits on the face and neck, and depressed immune system. A hormone-releasing tumor in what gland is most likely the cause? _____

46)The adrenal cortex is controlled by tropic hormones from the _____ gland, but these tropic hormones are in turn controlled by tropic hormones released from the _____.

47) A patient with _____ syndrome has elevated hormone secretion from the adrenal cortex.

48) Prolonged stress lowers the activity of the _____ system.

49) The adrenal _____ (a part of the adrenal gland) secretes the hormone _____ and the neurotransmitter _____ into the bloodstream in response to short-term stress. This is sometimes called the "fight or flight" response.

50) Many of the hormones we discussed in lecture affect the concentration of glucose in the blood. In the blank space after each hormone, write Up if the hormone raises the concentration of glucose. Write Down if it lowers the concentration of glucose. Write 0 if the hormone does not change glucose levels.

Cortisol _____
Thyroid hormone _____
Epinephrine _____
Cortisone _____
Calcitonin _____

51) The adrenal medulla releases the neurotransmitter norepinephrine and the hormone epinephrine directly into the blood when stimulated by nerve signals from the _____ division of the nervous system.

Answers to fill-in-the-blank review questions:

1) Endocrine
    Nervous
    Endocrine
2) Gland
3) Endocrine gland
4) Signal molecules
    Blood
5) Growth
    Development
    Metabolism
    Reproduction
6) Amine hormones
    Protein/Peptide hormone
    Steroid hormones
7) Amine hormones
8) Protein/Peptide hormones
9) Steroid
    Four fused rings of carbon atoms
10) Endocrine glands
    Bloodstream
    Receptor proteins
11) Tropic
12) Hypothalamus
    Tropic
    Hypothalamus
13) Anterior
    Posterior
14) Anterior
15) Oxytocin
    Antidiuretic hormone
16) Pituitary gland
    Tropic hormone
17) Anterior pituitary
18) Dwarfism
    Giantism

19) Bone
    Muscle
    Fatty
20) Thyroid hormone
21) Thyroxine
    T4
22) Iodine
23) Iodine
24) All cells in the body
25) Glucose
26) Goiter
27) Graves disease
    High body temperature
    Weight loss
    Excess nervousness and energy
28) Hypothyroid
    Weight gain
    Low body temperature
    Low energy/Apathy
29) Stunted growth
    Mental retardation
    Cretinism
30) Increase
    Calcium
31) Parathyroid
    Parathyroid hormone
    Thyroid
    Calcitonin
32) Bone
    Dissolve bone
33) Bone
`   Make bone
34) Antagonistic
35) Pituitary
    Hypothalamus
36) Cortex
    Medulla
37) Nervous
38) Aldosterone
    Glucocorticoids
39) Glucocorticoids
    Glucose
    Cortex
40) Addison's
41) Cortex
    Aldosterone
    Na^+
42) Glucocorticoids

43) Fat
Muscle
Glucose
Immune
44) Adrenal cortex
45) Adrenal gland
46) Pituitary
Hypothalamus
47) Cushing's syndrome
48) Immune
49) Medulla
Epinephrine (adrenaline)
Norepinephrine
50) Up
Down
Up
Up
0
51) Sympathetic

Short answer questions:

1) Explain briefly how it is possible that hormones can circulate throughout the entire body yet they only cause changes in their specific target tissue.

2) Explain why excess growth hormone before puberty causes giantism but excess puberty after puberty does not.

3) Name the disease caused by excess growth hormone after puberty and explain why excess growth hormone causes enlarged jaw and fingers, the major symptoms of the disease.

4) Explain why thyroid hormone is sometimes called T4.

5) A patient was found to have chronically low calcium levels in the blood due to elevated calcitonin hormone. One explanation for the elevated calcitonin might be a calcitonin-producing tumor in the thyroid gland, the gland that makes the hormone.

a) If tests showed no tumor in the thyroid gland, name another gland that might have a tumor and explain how a tumor in that gland could cause elevated calcitonin.

b) If tests showed no tumor in the gland that you named in question (a), name yet another gland that might have a tumor and explain how a tumor in that gland could cause elevated calcitonin.

6) The hormones calcitonin and parathyroid hormone both help regulate calcium levels. Explain how calcitonin lowers blood calcium, and parathyroid hormone increases blood calcium.

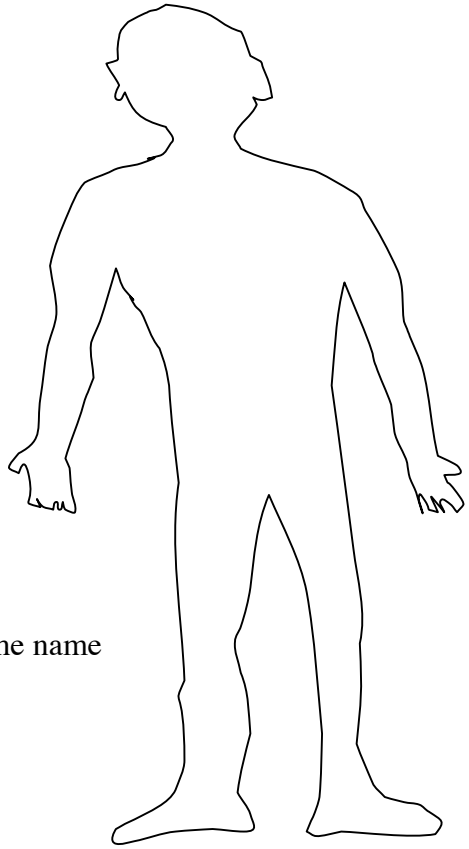
7) On the figure to the right…

a) Draw an X where the hormone that increases calcium is made. Label the name that gland on the drawing.

b) Draw a + where the hormone that controls our basal metabolic rate is made. Label the name of that gland on the drawing.

c) Draw an O where many tropic hormones are made. Label the name of that gland on the drawing.

d) Draw a G where the gluco-corticoid hormones are made. Label the name of those glands on the drawing.



8) A female patient has Cushing's syndrome because of a tumor in her adrenal cortex. The major symptoms are high blood sugar, slender legs but fat deposits on the face and neck, and a depressed immune system. This patient, however, also shows increased facial hair, increased musculature, and a deeper voice. Explain briefly how these last three symptoms are related to the tumor.

<u>Answers to short answer questions:</u>

1) The cells of the hormone's target organ have a receptor protein that specifically binds the hormone. This allows the target organ to respond to the hormone. The organs in the body that do not respond to the hormone do not have a receptor to bind the hormone.

2) Growth hormone causes growth of the bones by stimulating the epiphyseal plates (cartilage growth centers within the bones). The epiphyseal plates, however, become non-functional around the time of puberty, and therefore growth hormone (even excess amounts) cannot cause any bone growth after puberty.

3) Acromegaly is the disease caused by excess growth hormone after puberty. Although it does not cause any bone growth, the excess growth hormone stimulates growth of cartilage. In particular, there is growth of the cartilage in the jaw and fingers.

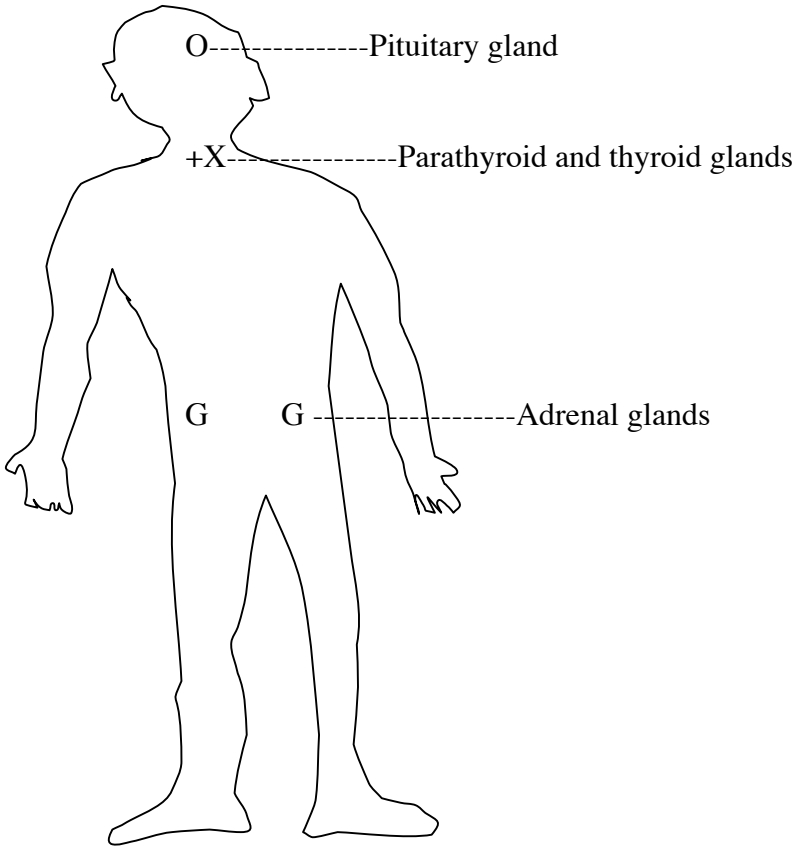
4) Thyroid hormone contains four iodine atoms as part of its molecular structure.

5) (a) The pituitary gland controls calcitonin release from the thyroid gland by way of tropic hormones. A tumor in the pituitary gland that overproduced the tropic hormone that controls calcitonin release could explain the patient's symptoms.

(b) The hypothalamus uses tropic hormones to control the amount of hormones released by the pituitary gland. A tropic-hormone releasing tumor in the hypothalamus could cause the pituitary to release too much of the pituitary's own tropic hormones, including the tropic hormone that stimulates the thyroid gland to release calcitonin.

6) Calcitonin lowers the levels of calcium in the blood by stimulating the activity of bone-building cells. Parathyroid hormone increases the levels of calcium in the blood by stimulating the activity of bone-dissolving cells.

7)



8) The testes make large amounts of testosterone, the male hormone, which causes the larger muscles, facial hair growth, and deeper voice that are characteristic of males. In both sexes, however, the adrenal gland produces small amounts of testosterone. This small amount of testosterone is normally not sufficient to cause male characteristics in females. A tumor in the adrenal gland, however, may cause excess secretion of all adrenal hormones (including testosterone) and therefore can cause masculine characteristics in a female patient.