

# 27 REVIEW SHEET

## EXERCISE

NAME \_\_\_\_\_

LAB TIME/DATE \_\_\_\_\_

# Functional Anatomy of the Endocrine Glands

## Gross Anatomy and Basic Function of the Endocrine Glands

1. Both the endocrine and nervous systems are major regulating systems of the body; however, the nervous system has been compared to a text message, and the endocrine system to mailing a letter. Briefly explain this comparison.

The nervous system uses rapidly propagated electrical "messages," whereas endocrine system "messages" (hormones) are liberated into the blood to travel much more slowly to the target organs.

2. Define *hormone*. A chemical substance liberated into the extracellular fluid that enters blood for transport throughout the body. Hormones alter "target cell" metabolism in a specific manner.

3. Chemically, hormones belong chiefly to two molecular groups, the steroids and the Amino acid-based molecules.

4. Define *target cell*. Cell responding to a particular hormone in a specific way.

5. If hormones travel in the bloodstream, why don't all tissues respond to all hormones? The proper "hormone" receptors must be present on the plasma membrane or within the cells for the tissue cells to respond.

6. Identify the endocrine organ described by each of the following statements.

thyroid gland 1. located in the anterior neck; produces key hormones for metabolism

hypothalamus 2. produces the hormones that are stored in the posterior pituitary

pancreas 3. a mixed gland, located behind the stomach and close to the small intestine

testes 4. paired glands suspended in the scrotum

pituitary 5. bilobed gland located in the sella turcica

ovaries 6. found in the pelvic cavity of the female, concerned with ova and female hormone production

thymus 7. found in the upper thorax overlying the heart; large during youth

pineal gland 8. found in the roof of the third ventricle of the brain

7. The table below lists the functions of many of the hormones you have studied. From the keys below, fill in the hormones responsible for each function, and the endocrine glands that produce each hormone. Glands may be used more than once.

**Hormones Key:**

ACTH            glucagon            T<sub>3</sub>/T<sub>4</sub>  
 ADH             insulin                testosterone  
 aldosterone    LH                      TSH  
 cortisol         oxytocin  
 epinephrine    progesterone  
 estrogens       prolactin  
 FSH              PTH

**Glands Key:**

adrenal cortex        parathyroid glands  
 adrenal medulla     posterior pituitary  
 anterior pituitary    testes  
 hypothalamus        thyroid gland  
 ovaries  
 pancreas

Function	Hormone(s)	Synthesizing gland(s)
Regulate the function of another endocrine gland (tropic)	1. <i>FSH</i> 2. <i>LH</i> 3. <i>ACTH</i> 4. <i>TSH</i>	<i>anterior pituitary</i>
Maintain salt and water balance in the extracellular fluid	1. <i>aldosterone</i>	<i>adrenal cortex</i>
	2. <i>ADH</i>	<i>hypothalamus (stored in the posterior pituitary)</i>
Directly involved in milk production and ejection	1. <i>oxytocin</i>	<i>hypothalamus (stored in the posterior pituitary)</i>
	2. <i>prolactin</i>	<i>anterior pituitary</i>
Controls the rate of body metabolism and cellular oxidation	1. <i>T<sub>3</sub>/T<sub>4</sub></i>	<i>thyroid</i>
Regulates blood calcium levels	1. <i>PTH</i>	<i>parathyroid gland</i>
Regulate blood glucose levels; produced by the same “mixed” gland	1. <i>insulin</i>	<i>pancreas</i>
	2. <i>glucagon</i>	
Released in response to stressors	1. <i>cortisol</i>	<i>adrenal cortex</i>
	2. <i>epinephrine</i>	<i>adrenal medulla</i>
Drive development of secondary sex characteristics in males	1. <i>testosterone</i>	<i>tests</i>
Directly responsible for regulation of the menstrual cycle	1. <i>estrogen</i>	<i>ovaries</i>
	2. <i>progesterone</i>	

8. Although the pituitary gland is sometimes referred to as the master gland of the body, the hypothalamus exerts control over the pituitary gland. How does the hypothalamus control both anterior and posterior pituitary functioning?

Produces “releasing and inhibiting hormones” that control the production and release of anterior pituitary hormones; forms hormones ADH and oxytocin that are transported to the posterior pituitary and later released on nervous stimulation from the hypothalamus.

9. Indicate whether the release of the hormones listed below is stimulated by (A) another hormone; (B) the nervous system (neurotransmitters, or neurosecretions); or (C) humoral factors (the concentration of specific nonhormonal substances in the blood or extracellular fluid).

<u>A</u>	1. ACTH	<u>C</u>	4. insulin	<u>A</u>	7. T <sub>4</sub> /T <sub>3</sub>
<u>C</u>	2. calcitonin	<u>B</u>	5. norepinephrine	<u>A</u>	8. testosterone
<u>A</u>	3. estrogens	<u>C</u>	6. parathyroid hormone	<u>A</u>	9. TSH, FSH

10. Name the hormone(s) produced in *inadequate* amounts that directly result in the following conditions.

<u>PTH</u>	1. tetany
<u>ADH</u>	2. excessive urine output without high blood glucose levels
<u>insulin</u>	3. loss of glucose in the urine
<u>growth hormone (GH)</u>	4. abnormally small stature, normal proportions

11. Name the hormone(s) produced in *excessive* amounts that directly result(s) in the following conditions.

<u>growth hormone (GH)</u>	1. in the adult: large bones of the hands, feet, and face
<u>T<sub>3</sub>/T<sub>4</sub> (thyroid hormone)</u>	2. nervousness, irregular pulse rate, sweating
<u>PTH</u>	3. demineralization of bones, spontaneous fractures

## Microscopic Anatomy of Selected Endocrine Glands

12. Choose a response from the key below to name the hormone(s) produced by the cell types listed.

Key: a. calcitonin	d. glucocorticoids	g. PTH
b. GH, prolactin	e. insulin	h. T <sub>4</sub> /T <sub>3</sub>
c. glucagon	f. mineralocorticoids	i. TSH, ACTH, FSH, LH

<u>a</u>	1. parafollicular cells of the thyroid	<u>d</u>	6. zona fasciculata cells
<u>h</u>	2. follicular cells of the thyroid	<u>f</u>	7. zona glomerulosa cells
<u>e</u>	3. beta cells of the pancreatic islets	<u>g</u>	8. parathyroid cells
<u>c</u>	4. alpha cells of the pancreatic islets	<u>b</u>	9. acidophil cells of the anterior pituitary
<u>i</u>	5. basophil cells of the anterior pituitary		

15. Identify the endocrine glands, and name all structures indicated by a leader line.

Thyroid gland

