

Endocrine System

Section One: Multiple-choice

1. The hormone that regulates the menstrual cycle **and** stimulates the development of the mammary glands is
 - a) oxytocin.
 - b) prolactin.
 - c) estrogen.
 - d) progesterone.

2. Aldosterone is released from the
 - a) adrenal cortex.
 - b) adrenal medulla.
 - c) posterior pituitary.
 - d) anterior pituitary.

3. The male hormone that regulates the twenty secondary sexual characteristics is referred to as
 - a) estrogen.
 - b) androgen.
 - c) testosterone.
 - d) none of the above.

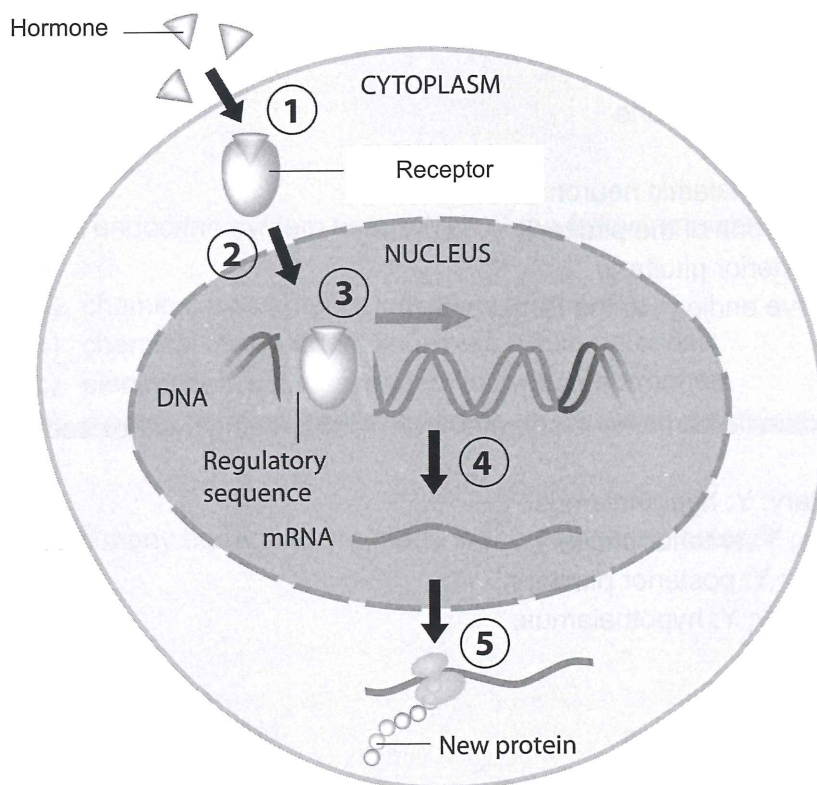
4. Parathyroid hormone results in
 - a) increased blood calcium by causing bone resorption.
 - b) increased blood calcium by causing bone deposition.
 - c) decreased blood calcium by causing bone resorption.
 - d) decreased blood calcium by causing bone deposition.

5. Identify the correct statement concerning hormones.
 - a) hormones are chemical messengers.
 - b) hormones are released from endocrine and exocrine glands.
 - c) hormones can be secreted into a duct.
 - d) hormones are made by exocrine structures and secreted by endocrine glands.

6. How many hormones are released from the posterior pituitary?
- a) 0.
 - b) 2.
 - c) 4.
 - d) 6.
7. Select the most correct statement.
- a) the alimentary glands are exocrine glands that secrete hormones.
 - b) the alimentary glands are endocrine glands that secrete hormones.
 - c) the ovaries are exocrine glands that secrete hormones.
 - d) the ovaries are endocrine glands that secrete hormones.
8. How many hormones are released from the anterior pituitary?
- a) 0.
 - b) 2.
 - c) 4.
 - d) 6.
9. The endocrine system uses which of the following messengers?
- a) chemical messengers known as hormones.
 - b) chemical messengers known as action potentials.
 - c) electrochemical messengers known as hormones.
 - d) electrochemical messengers known as action potentials.
10. How many hormones are made in the posterior pituitary?
- a) 0.
 - b) 2.
 - c) 4.
 - d) 6.
11. Select the most correct statement concerning hormone action.
- a) there are three classes of hormones: amines, proteins, and steroids. Amines and steroids work in the same way; proteins have a different mechanism of action.
 - b) there are three classes of hormones: amines, proteins, and steroids. Proteins and steroids work in the same way; amines have a different mechanism of action.
 - c) there are three classes of hormones: amines, proteins, and steroids. Amines and proteins work in the same way; steroids have a different mechanism of action.
 - d) there are three classes of hormones: amines, proteins, and steroids. Amines and proteins enter the cell; steroids activate a secondary messenger.

12. The pituitary gland has
- anterior and posterior lobes; the anterior lobe is not a true gland.
 - anterior and posterior lobes that release hormones.
 - anterior and posterior lobes that produce the same hormones.
 - anterior and posterior lobes; both lobes produce hormones.
13. Which of the following correctly regards the relationship between the pituitary gland and the hypothalamus?
- the hypothalamus sends releasing factors to the anterior lobe only, causing the release of a certain hormone.
 - the hypothalamus sends releasing factors to the posterior lobe of the pituitary gland only, causing the release of a specific hormone.
 - the hypothalamus sends releasing factors to both lobes of the pituitary gland, causing the release of a specific hormone.
 - the anterior lobe is the gland that sends releasing factors, like thyroid-stimulating hormone (TSH), to specific endocrine glands.
14. Gonadotrophin-releasing hormone
- is produced in hypothalamic neurons.
 - is released by neurons of the pituitary.
 - is stored in the anterior pituitary.
 - travels down nerve endings to the target organ.
15. In a desert rat, antidiuretic hormone is secreted from X after being synthesised from Y.
- X: anterior pituitary; Y: hypothalamus.
 - X: hypothalamus; Y: anterior pituitary.
 - X: adrenal glands; Y: posterior pituitary.
 - X: posterior pituitary; Y: hypothalamus.
16. Hypothalamic releasing hormones
- control the release of oxytocin and ADH from the posterior pituitary.
 - travel via neuron axons from the hypothalamus to the anterior pituitary.
 - are carried in the capillaries of the hypothalamic-pituitary axis.
 - are released on positive feedback via anterior pituitary hormones.

17. Administering LH to a healthy male will cause
- increased spermatogenesis.
 - the secretion of FSH.
 - the secretion of androgens by the male reproductive glands.
 - none of the above.
18. Progesterone is
- released by the posterior lobe of the pituitary gland.
 - required for the development of follicles.
 - involved in the positive feedback mechanism during childbirth.
 - generally required for pregnancy.
19. Which class of hormone is depicted below?



- amine.
- protein.
- steroid.
- there is not enough information to determine the class of hormone.

Section Two: Short Answer

Question 20.

(6 marks)

- a) List the three classes of hormones. (1 mark)

- b) Which hormone affects both sodium ion and potassium ion concentrations? (1 mark)

- c) Which hormone results in the development of T-cells? (1 mark)

Hormones bind to specific receptors to produce their effect. When they are no longer required, they are degraded.

- d)
i) Which organ(s) are responsible for the degradation of hormones? (2 marks)

- ii) Which term describes the degrading or inactivation of a hormone? (1 mark)

Question 21.

(10 marks)

a) Irrespective of the class of hormone, list **two** properties that all hormones possess.

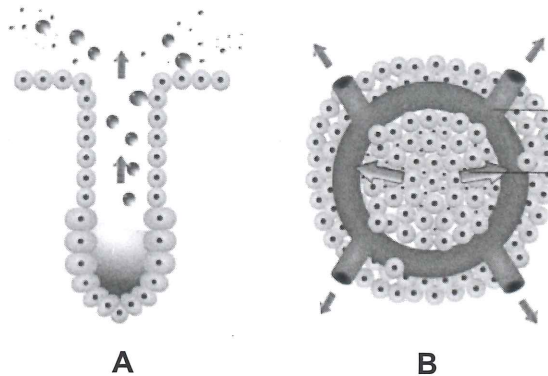
(2 marks)

b) Which hormone class(es) directly enter the cell? Why are they able to do this?

(3 marks)

c) Correctly identify the type of glands in the following diagram.

(2 marks)



Label	Name of structure

d) Outline **three** differences between the glands depicted above.

(3 marks)

Question 22.

(11 marks)

- a) List the hormone(s) released from the posterior pituitary gland. (2 marks)

- b) Define 'releasing factors.' Include an example in your explanation. (3 marks)

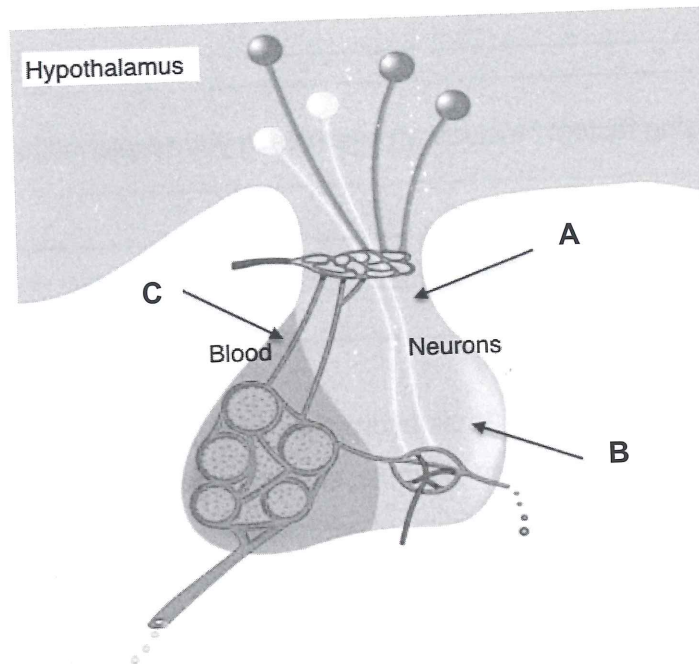
- c) Hormones are often referred to as hydrophilic or hydrophobic, and as amines, proteins or steroids. Using cortisol as an example, explain how steroids work to produce a change in cell function. Include a description of cortisol's effects and targets. (6 marks)

Review Page 5 of the Coursebook.

Question 23.

(18 marks)

- a) Correctly identify the structures in the following diagram of the brain. **(3 marks)**



Label	Name of structure

- b) Complete the table below. **(15 marks)**

Name of hormone	Stimulus	Function	Target organ(s)
Glucagon			
Adrenocorticotrophic hormone			
	Low blood calcium		
		Uterus contractions and milk secretion (lactation)	
			Thyroid gland

Section Three: Extended Answer

Question 24.

(20 marks)

Homeostasis is maintained by the synergistic actions of the endocrine and nervous systems. In particular, the endocrine system uses hormones to maintain homeostasis.

Define and describe hormones. Your answer should include details relating to the following:

- a) the origin and nature of hormones. (4 marks)
- b) how hormones cause a change in cell function. (2 marks)
- c) the classes of hormones. (6 marks)

Hormone production and release are highly regulated processes. Without tight control over these events, dysregulation occurs, and metabolic conditions can result.

- d) Using thyroxine as an example, explain in detail the steps involved in its release. Your answer must make reference to any releasing factors, stimuli, target cells and effects. (8 marks)

Review Page 3 of the Coursebook.

Marking Key

Question	Answer	Explanation
1	D	Progesterone stimulates mammary glands and regulates the menstrual cycle in preparation for/during pregnancy.
2	A	Adrenal cortex secretes cortisol and aldosterone.
3	C	Testosterone is a major androgen.
4	A	Bone resorption (breaking down bone) occurs.
5	A	Hormones are only released by endocrine glands and are secreted into the blood.
6	B	Posterior pituitary releases ADH and oxytocin.
7	D	Exocrine glands do not produce hormones. Alimentary glands (exocrine) and ovaries (endocrine).
8	D	Anterior hormones: LH, FSH, GH, TSH, ACTH, PRL.
9	A	Hormones are chemical messengers.
10	A	Posterior lobe makes 0 hormones but releases 2.
11	C	Amines and proteins are water-soluble; steroids are lipid-soluble.
12	B	Posterior pituitary makes 0 hormones and releases 2; anterior lobe makes and releases 6 hormones.
13	A	Releasing factors are only sent from the hypothalamus to the anterior pituitary.
14	A	GnRH is produced in the hypothalamus and travels through capillaries in the hypothalamic-pituitary axis to the anterior lobe.
15	D	ADH is produced in the hypothalamus, sent via nerve endings to the posterior pituitary, and secreted into systemic blood.
16	C	Hypothalamic releasing factors are secreted into the portal circulation and are specific for an anterior hormone.
17	C	LH causes the production of androgens (testosterone).
18	D	Progesterone is released by the ovaries to promote pregnancy.
19	C	The hormone is a steroid since it enters the cell, binding to intracellular receptors.