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Pathology

Third Edition

Paul Harrison Duray

- 500 board-type multiple-choice questions
- Comprehensive explanations
- Thorough, up-to-date references and bibliography

Physiology:
PreTest® Self-Assessment and Review

Third Edition

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Introduction

Physiology: PreTest® Self-Assessment and Review has been designed to provide medical students, as well as physicians, with a comprehensive and convenient instrument for self-assessment and review within the field of physiology. The 500 questions provided have been designed to parallel the format and degree of difficulty of the questions contained in Part I of the National Board of Medical Examiners examinations, the Federation Licensing Examination (FLEX), the Visa Qualifying Examination, and the ECFMG examination.

Each question in the book is accompanied by an answer, a paragraph explanation, and a specific page reference to either a current journal article, a textbook, or both. A bibliography, listing all the sources used in the book, follows the last chapter.

Perhaps the most effective way to use this book is to allow yourself one minute to answer each question in a given chapter; as you proceed, indicate your answer beside each question. By following this suggestion, you will be approximating the time limits imposed by the board examinations previously mentioned.

When you finish answering the questions in a chapter, you should then spend as much time as you need verifying your answers and carefully reading the explanations. Although you should pay special attention to the explanations for the questions you answered incorrectly, you should read every explanation. The contributors to this book have designed the explanations to reinforce and supplement the information tested by the questions. If, after reading the explanations for a given chapter, you feel you need still more information about the material covered, you should consult and study the references indicated.

This book meets the criteria established by the AMA's Department of Continuing Medical Education for up to 22 hours of credit in category 5D for the Physician's Recognition Award. It should provide an experience that is instructive as well as evaluative; we also hope that you enjoy it. We would be very happy to receive your comments.

We are grateful to Professor William F. Ganong for helpful suggestions concerning the chapter on the gastrointestinal system.

NOTICE

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required. The editors and the publisher of this work have made every effort to ensure that the drug dosage schedules herein are accurate and in accord with the standards accepted at the time of publication. Readers are advised, however, to check the product information sheet included in the package of each drug they plan to administer to be certain that changes have not been made in the recommended dose or in the contraindications for administration. This recommendation is of particular importance in regard to new or infrequently used drugs.

Contents

Metabolism and Endocrinology

DIRECTIONS: Each question below contains five suggested answers. Choose the **one best** response to each question.

1. Paracrine communication refers to interactions between cells resulting from

(A) direct contact of cells at tight junctions
(B) transmission of mechanical forces via extracellular filaments
(C) release of chemical mediators in localized synaptic junctions
(D) release and diffusion of chemical mediators through extracellular fluid to target cells
(E) release of chemical mediators into blood to act upon specific receptors in distant target tissues

2. Oxytocin, a hormone formed primarily in the paraventricular nucleus of the neurohypophysis (posterior pituitary), is responsible for

(A) decreasing excretion of water by the kidneys
(B) causing contraction of the uterus
(C) preventing release of milk
(D) stimulating melanocytes to produce melanin
(E) causing acromegaly

3. The supraoptic nucleus of the hypothalamus is believed to control secretion of which of the following hormones?

(A) Antidiuretic hormone
(B) Oxytocin
(C) Growth hormone
(D) Adrenocorticotropic hormone
(E) Follicle-stimulating hormone

4. An excess secretion of growth hormone in adults will result in

(A) toxic adenoma
(B) colloid goiter
(C) myxedema
(D) acromegaly
(E) gigantism

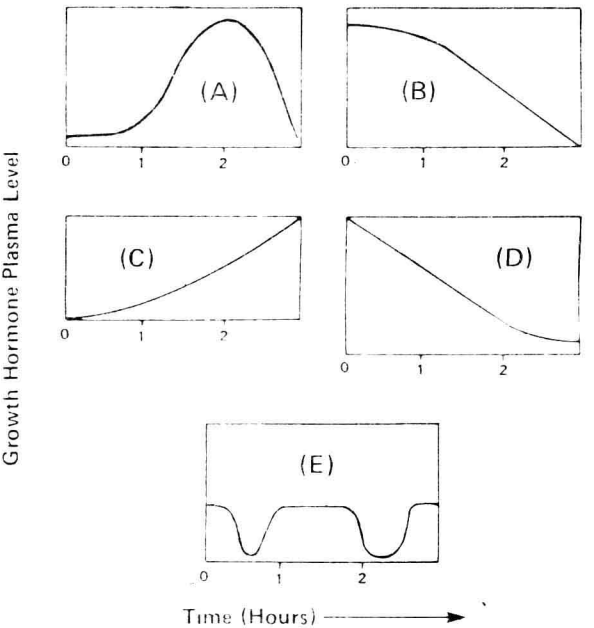
5. Normal plasma levels of calcium in mammals are maintained primarily by which of the following hormones?

(A) Thyroxine
(B) Insulin
(C) Glucagon
(D) Calcitonin
(E) Parathormone

6. A hormone that significantly affects the absorption and metabolism of calcium is the active form of vitamin

(A) A
(B) B complex
(C) C
(D) D
(E) E

7. In a normal individual, which of the curves shown below best fits the dynamics of human growth hormone? (Insulin administration starts at time = 0.)



(A) Curve A
(B) Curve B
(C) Curve C
(D) Curve D
(E) Curve E

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8. Plasma calcium concentration is regulated most rapidly by which of the following hormones?

(A) Parathyroid hormone
(B) Thyroxine
(C) Thyrocalcitonin
(D) Adrenocorticotropin
(E) Insulin

9. The most potent thyroid hormone is

(A) L-thyroxine
(B) D-thyroxine
(C) monoiodotyrosine
(D) triiodothyronine
(E) tetraiodothyropropionic acid

10. Injection of thyroid hormone into a normal laboratory animal will produce all the following effects EXCEPT

(A) an increase in the rate of oxygen consumption
(B) an increase in the rate of muscle protein synthesis
(C) an increase in the need for vitamins
(D) a decrease in the plasma concentration of cholesterol
(E) a decrease in the rate of lipolysis

11. Which of the following metals is associated with the insulin molecule?

(A) Magnesium
(B) Zinc
(C) Potassium
(D) Sodium
(E) Iron

12. The effect of insulin on glucose transport is to

(A) permit transport against a concentration gradient
(B) enhance transport across the cell membrane
(C) enhance transport across the tubular epithelium of the kidney
(D) enhance transport into the brain
(E) enhance transport through the intestinal mucosa

13. Glucagon is a hormone that opposes insulin. Actions of glucagon include all the following EXCEPT for

(A) increasing hepatic glycogenolysis
(B) increasing gluconeogenesis
(C) decreasing insulin secretion
(D) increasing lipolysis
(E) indirectly stimulating peripheral proteolysis

14. The effect of thyroxine on the gastrointestinal absorption and the cellular utilization of glucose is to

(A) increase the rate of absorption and the rate of utilization
(B) increase the rate of absorption and decrease the rate of utilization
(C) decrease the rate of absorption and increase the rate of utilization
(D) decrease the rate of absorption and the rate of utilization
(E) do none of the above

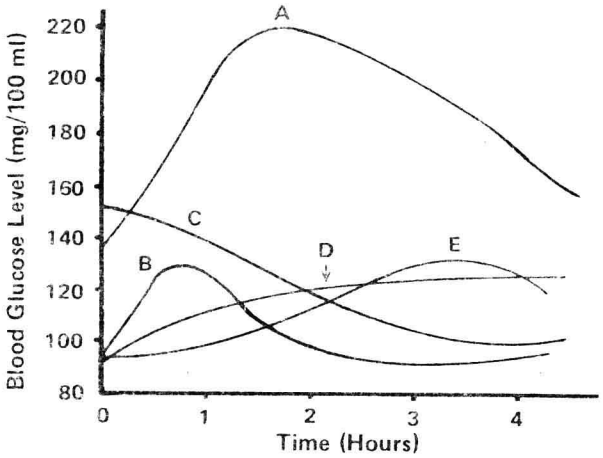
15. Cortisol increases blood glucose level by

(A) increasing gluconeogenesis alone
(B) increasing gluconeogenesis and decreasing glucose utilization
(C) increasing gluconeogenesis and glucose utilization, with a greater increase in gluconeogenesis than in glucose utilization
(D) decreasing glucose utilization alone
(E) decreasing gluconeogenesis and glucose utilization, with a greater decrease in glucose utilization than in gluconeogenesis

16. Aldosterone is a mineralocorticoid that acts directly on the distal tubule, the collecting tubule, and on at least part of the loop of Henle in the kidney. Aldosterone secretion is affected by all the following stimuli EXCEPT

(A) low plasma concentration of sodium ions
(B) infusion of an excess concentration of potassium ions
(C) infusion of a high concentration of sodium ions
(D) infusion of angiotensin
(E) withdrawal of adrenocorticotropic hormone (ACTH)

17. The normal response to an oral dose of glucose (at time 0) is best represented by which of the glucose tolerance curves shown below?



(A) A
(B) B
(C) C
(D) D
(E) E

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18. Administration of pharmacologic doses of aldosterone to a dog will have which of the following effects upon blood pressure, body weight, and plasma potassium levels?

	Blood Pressure	Body Weight	Plasma Potassium
(A)	Increased	Decreased	Increased
(B)	Increased	Increased	Decreased
(C)	Increased	Decreased	Decreased
(D)	Decreased	Increased	Decreased
(E)	Decreased	Decreased	Increased

19. Following injection with a pharmacologic dose of dexamethasone (a potent glucocorticoid), a patient's production of 17-hydroxycorticosteroids (17-OHCS) is measured daily and shows no change. From a knowledge of the pituitary-adrenal axis, it can be concluded that this patient

(A) is normal
(B) does not produce sufficient 17-OHCS
(C) does not produce sufficient ACTH
(D) produces 17-OHCS independent of pituitary function
(E) produces 17-OHCS in response to pituitary function

20. The portion of the adrenal gland responsible for producing aldosterone is the

(A) medulla
(B) zona reticularis
(C) zona fasciculata
(D) zona glomerulosa
(E) capsule

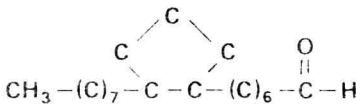
21. Glucocorticoids affect the metabolism of catecholamines in the adrenal medulla by

(A) enhancing the conversion of norepinephrine to epinephrine
(B) inhibiting the conversion of norepinephrine to epinephrine
(C) inhibiting the synthesis of both epinephrine and norepinephrine
(D) stimulating the conversion of epinephrine to tyramine
(E) feed-back inhibition, which decreases epinephrine release in the presence of cortisol excess

22. Removal of the adrenal glands generally has all the following consequences EXCEPT for

(A) a tendency to hyperglycemia with decreased insulin sensitivity
(B) poor mobilization and utilization of fatty tissues
(C) poor water excretion by the kidneys and sodium loss in the urine
(D) poor resistance to infection or shock
(E) psychic changes such as depression or decreased alertness

23. The basic carbon structure shown below is that of

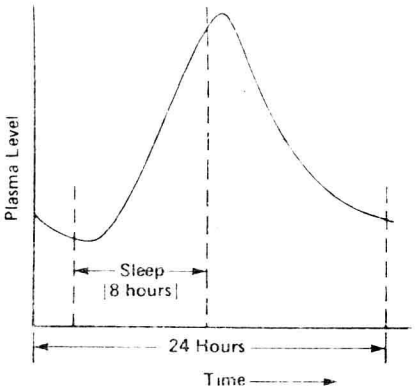


(A) ACTH
(B) prostaglandin
(C) oxytocin
(D) vasopressin
(E) thyroxine

24. In normal, ovulating women the corpus luteum secretes

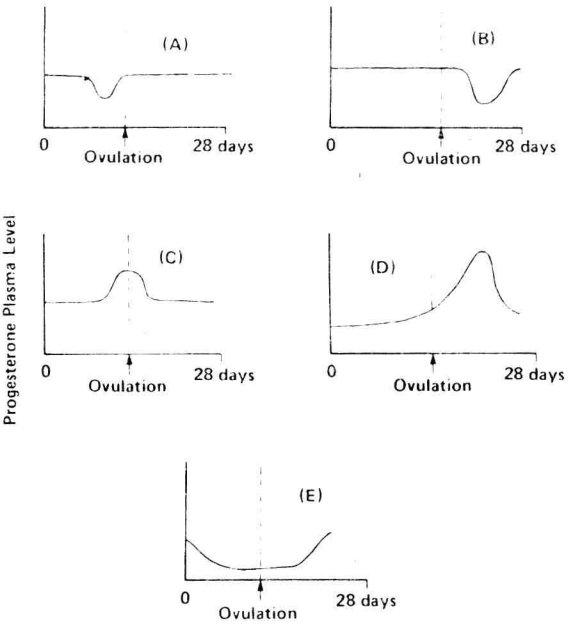
(A) progesterone only
(B) estrogen only
(C) luteinizing hormone only
(D) progesterone and estrogen
(E) progesterone, estrogen, and luteinizing hormone

25. The graph shown below demonstrates diurnal variation in the plasma level of



(A) thyroxine
(B) insulin
(C) testosterone
(D) cortisol
(E) estrogen

26. The normal pattern of progesterone secretion during the menstrual cycle is exhibited by which of the curves shown below?



(A) A
(B) B
(C) C
(D) D
(E) E

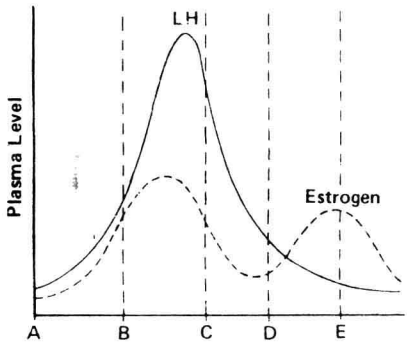
27. The metabolism of 10 grams of carbohydrate would yield a caloric value of

(A) 93 kcal
(B) 53 kcal
(C) 41 kcal
(D) 24 kcal
(E) 10 kcal

28. Although the precise areas of hypothalamic control centers have not been fully delineated, the hypothalamus is believed to control the secretion of all the following EXCEPT

(A) thyrotropin
(B) somatomedin
(C) ACTH
(D) follicle-stimulating hormone (FSH)
(E) luteinizing hormone (LH)

29. In the graph shown below of plasma hormone levels as a function of time, ovulation takes place at which of the following lettered points on the time axis?



(A) A
(B) B
(C) C
(D) D
(E) E

30. Iodides are stored in the thyroid follicles mainly in the form of

(A) thyroxine
(B) thyroglobulin
(C) monoiodotyrosine
(D) diiodotyrosine
(E) 3,5,3′-triiodothyronine

31. Hypothyroidism that develops in adulthood results in

(A) cretinism
(B) myxedema
(C) thyrotoxicosis
(D) Graves' disease
(E) Hashimoto's thyroiditis

32. Almost all the active thyroid hormone entering the circulation is in the form of

(A) triiodothyronine
(B) thyroxine
(C) thyroglobulin
(D) thyrotropin
(E) long-acting thyroid stimulator (LATS)

33. Physiologically active thyroxine exists in which of the following forms?

(A) Bound to albumin
(B) Bound to prealbumin
(C) Bound to globulin
(D) As a glucuronide
(E) Unbound

34. High levels of parathyroid hormone are consistent with all the following disorders EXCEPT

(A) chronic renal failure
(B) parathyroid adenoma
(C) parathyroid hyperplasia
(D) pseudohypoparathyroidism
(E) osteoporosis

35. Which of the following statements about the effect of insulin on protein metabolism is true?

(A) It is totally a result of carbohydrates metabolized for energy acting as protein sparers
(B) It is totally a result of increased protein anabolism
(C) It is partially a result of increased amino acid transport through the cell membrane
(D) It is partially due to the antiketogenic effect of insulin
(E) It is partially a result of increased hepatic gluconeogenesis acting to promote protein catabolism

36. Insulin increases glucose uptake in all the following structures EXCEPT

(A) adipose tissue
(B) cardiac muscle
(C) skeletal muscle
(D) intestinal mucosa
(E) the uterus

37. Hyperglycemia is induced by all the following hormones EXCEPT

(A) epinephrine
(B) thyroxine
(C) ACTH
(D) glucagon
(E) aldosterone

38. In the blood, most cortisol is bound tightly to an α glycoprotein called

(A) angiotensin I
(B) angiotensin II
(C) albumin
(D) neurophysin
(E) transcortin

39. All the following compounds are catecholamine metabolites EXCEPT

(A) dihydroxyphenylalanine
(B) metanephrine
(C) methoxytyramine
(D) vanillylmandelic acid
(E) dihydroxymandelic acid

40. In men, the majority of urinary 17-ketosteroids originate in the

(A) testes
(B) liver
(C) pituitary
(D) pancreas
(E) adrenals

41. Prolonged ACTH deficiency produces which of the following changes in the adrenal cortex?

(A) Marked atrophy of all regions of the adrenal gland
(B) Atrophy of the zona fasciculata and reticularis
(C) Atrophy of the zona fasciculata and marked hypertrophy of the zona glomerulosa
(D) Hypertrophy of the zona fasciculata and atrophy of the zona reticularis
(E) Hypertrophy of the zona fasciculata and reticularis

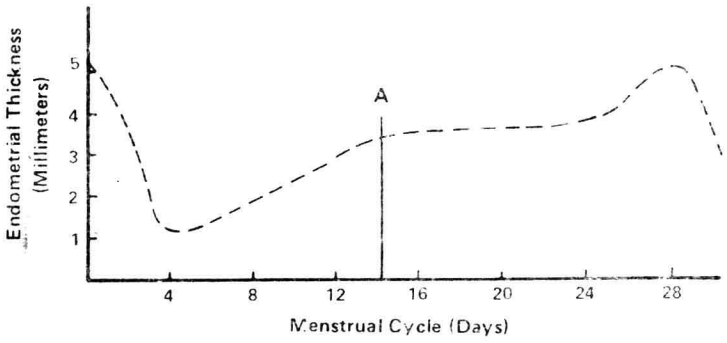
42. Which of the following hormones is responsible for the development of ovarian follicles prior to ovulation?

(A) Interstitial cell stimulating hormone (ICSH)
(B) Luteinizing hormone (LH)
(C) Follicle stimulating hormone (FSH)
(D) Chorionic gonadotropin (hCG)
(E) Estradiol

43. The actions of angiotensin II include all the following EXCEPT

(A) direct constriction of peripheral arterioles
(B) promotion of salt excretion by renal tubules
(C) stimulation of aldosterone secretion
(D) inhibition of renin secretion
(E) stimulation of the subfornical organ of the diencephalon

44. In the graph shown below of changes in endometrial thickness during a normal 28-day menstrual cycle, the event designated "A" corresponds most closely to



(A) the menstrual phase
(B) the maturation of the corpus luteum
(C) the early proliferative phase
(D) the secretory phase
(E) ovulation

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45. All of the following statements about somatostatin are true EXCEPT that

(A) it inhibits gastrin secretion
(B) it is secreted by the hypothalamus
(C) it is secreted by pancreatic islet cells
(D) it is released following vagal blockade
(E) its effects are prolonged

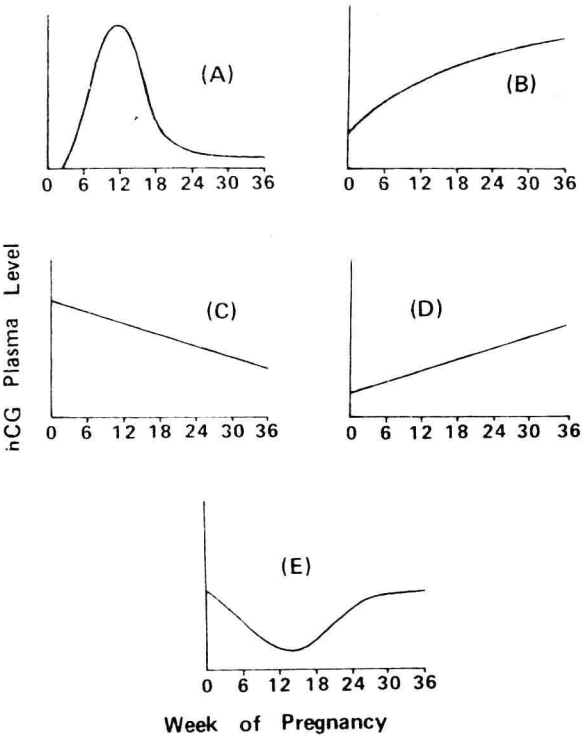
46. Thyroid gland function is best monitored by which of the following?

(A) Basal metabolic rate
(B) Total thyroxine and triiodothyronine resin uptake
(C) Level of protein-bound iodine
(D) Level of thyroid-stimulating hormone
(E) Thyroid biopsy

47. Goiter, a general term used to describe thyroid enlargement, can occur as a consequence of all the following EXCEPT

(A) iodine deficiency
(B) pituitary adenoma
(C) Graves' disease
(D) excessive intake of exogenous thyroxine
(E) excessive intake of cabbage and turnips

48. In a normal pregnancy, human chorionic gonadotropin (hCG) prevents the involution of the corpus luteum that normally occurs at the end of the menstrual cycle. Which of the curves shown below approximates the level of this hormone during pregnancy?



(A) A
(B) B
(C) C
(D) D
(E) E