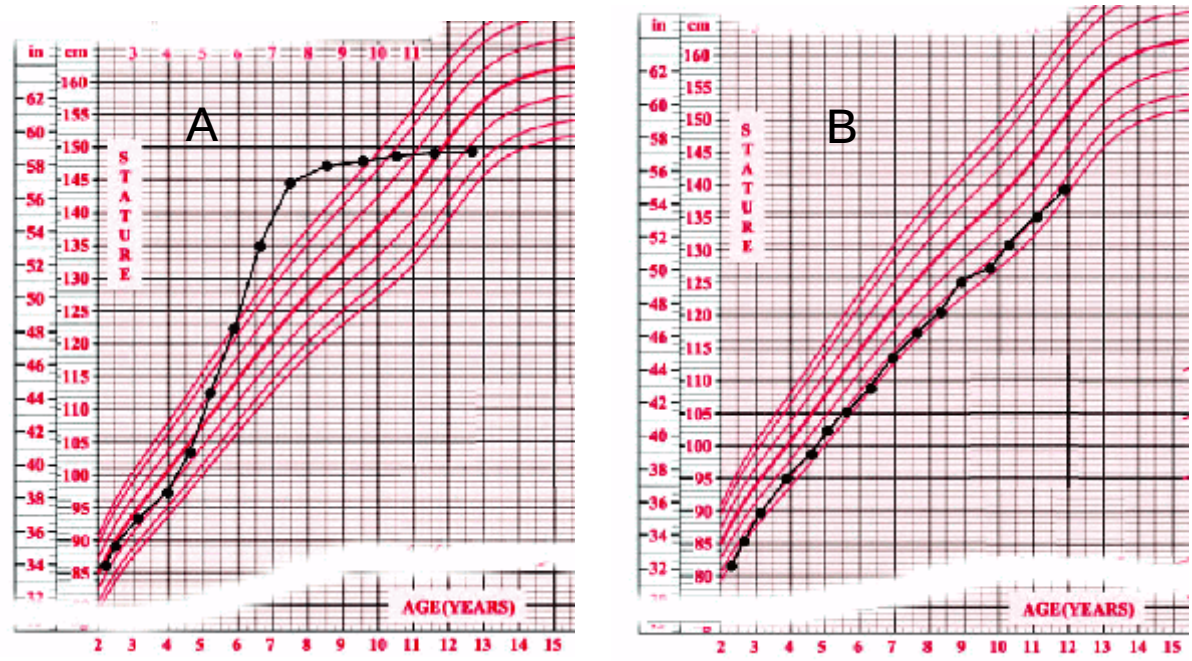
# 2001 Endocrine Exam Questions

**TTUHSC Physiology**
**Thomas A. Pressley, Section Leader**

**Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the *one* that is *best* in each case.**




Figures A and B are copies of standard pediatric growth charts in which height is plotted as a function of age. Confidence limits for a normal population of girls are indicated by the seven lines running from lower left to upper right. The darker line in the middle of these fainter lines indicates the fiftieth percentile. In each chart, a patient's growth is depicted by the continuous line with closed circles.

41. The growth rate of the girl depicted in Figure A is the result of

A. dwarfism.
B. gigantism.
C. hypothyroidism.
D. normal maturation.
E. precocious puberty.

42. The growth rate of the girl depicted in Figure B is the result of

A. a deficiency of insulin-like growth factor I (IGF-I) receptors.
B. dwarfism.
C. hypothyroidism.
D. normal maturation.
E. precocious puberty.

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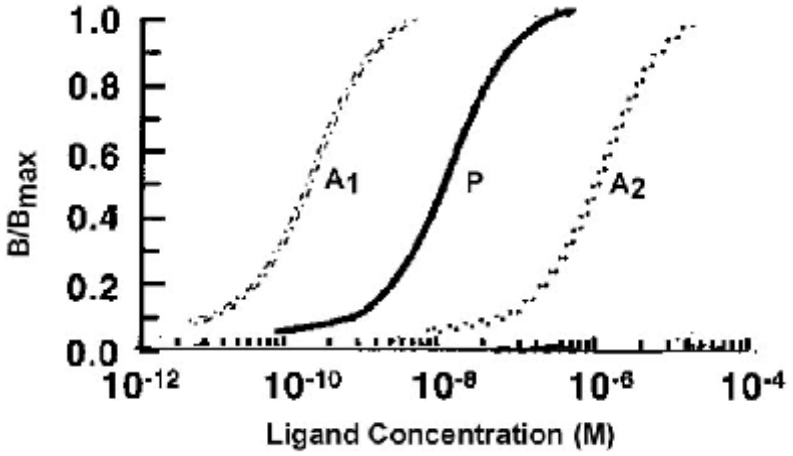


43. The graph depicts the results from a hypothetical equilibrium binding experiment using radiolabeled progesterone (P) and two labeled agonists ($A_1$ and $A_2$). Based on this data, you can conclude that

A. $A_1$ binds with greater cooperativity than $A_2$.
B. $A_1$ is an antagonist.
C. binding of $A_2$ is irreversible.
D. progesterone at a concentration of $10^{-10}$ M would nearly saturate the receptor.
E. the receptor has a greater affinity for progesterone than for $A_2$.

44. Local communication between cells of the same type is described as

A. autocrine.
B. endocrine.
C. paracrine.
D. paradoxical.
E. redundant.

45. The insulin receptor

A. acts as a ligand-responsive transcription factor.
B. has a single subunit.
C. has tyrosine kinase activity.
D. is an ion channel.
E. is coupled to adenylate cyclase.

**Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the *one* that is *best* in each case.**

46. Oxidation of free fatty acids promotes

A. decreased glucose utilization by muscle.
B. increased glucose uptake by adipocytes.
C. increased hepatic glycolysis.
D. increased hepatic lipogenesis.
E. all of the above.

47. A respiratory quotient of 0.86 is measured in a patient. This value implies that the patient is

A. an uncontrolled Type I diabetic.
B. fasting.
C. oxidizing more carbohydrate, relative to normal.
D. oxidizing more fat, relative to normal.
E. oxidizing more protein, relative to normal.

48. Glucagon

A. enhances glycogen synthesis in the liver.
B. inhibits protein synthesis in muscle.
C. produces C-peptide when degraded.
D. promotes hepatic gluconeogenesis.
E. stimulates lipogenesis in adipocytes.

49. Stimulation of the adenylate cyclase cascade in hepatocytes

A. activates glycogen synthase.
B. dephosphorylates phosphorylase kinase.
C. encourages glycolysis.
D. phosphorylates glycogen phosphorylase.
E. promotes conversion of glucose to pyruvate.

50. Rapid intravenous administration of glucose will increase the secretion of

A. cortisol.
B. glucagon.
C. growth hormone (GH).
D. insulin.
E. norepinephrine.

**Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the *one* that is *best* in each case.**

51. Thyroxine ($T_4$)

A. decreases basal metabolic rate (BMR).
B. is a metabolite of triiodothreonine ($T_3$).
C. is required for normal maturation of the central nervous system.
D. all of the above.
E. none of the above.

52. A laboratory rat is injected with an unidentified substance, X. Within a couple of minutes, heart rate, mean systemic blood pressure, and rate of breathing increase. A blood sample reveals an elevated concentration of circulating glucose. What is X?

A. cortisol
B. epinephrine
C. glucagon
D. growth hormone (GH)
E. insulin

53. A second rat is injected daily with an unidentified substance, Y. Over the next two weeks, the animal becomes increasingly lethargic and nonresponsive. Examination of its thyroid reveals hyperplasia and hypertrophy. What is Y?

A. thiocyanate
B. thyroglobulin
C. thyroid stimulating hormone (TSH)
D. thyrotropin releasing hormone (TRH)
E. triiodothreonine ($T_3$)

54. 17" -hydroxylase deficiency is characterized by a(n)

A. greatly elevated secretion of adrenocorticotrophic hormone (ACTH).
B. impaired androgen synthesis.
C. mineralocorticoid insufficiency.
D. male phenotype.
E. overproduction of cortisol.

**Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the *one* that is *best* in each case.**

55. Uncontrolled Type I diabetes mellitus (IDDM or juvenile-onset) is characterized by

A. autoimmune destruction of the pancreatic " cells.
B. decreased insulin sensitivity.
C. hypoglycemia.
D. increased glucose utilization.
E. ketoacidosis.

56. Insulin was first isolated by the research team of

A. Banting and Best.
B. Burns and Allen.
C. Michaelis and Menten.
D. Post and Albers.
E. Rebo and Zooty.

57. Unlike liver, muscle cannot release glucose into the bloodstream. This is because muscle lacks the enzyme

A. glucose 6-phosphatase.
B. glycogen phosphorylase.
C. hexokinase.
D. thiophorase.
E. transaminase.

58. In a fifty-yard dash, the major source of energy is

A. anerobic glycolysis.
B. degradation of muscle protein.
C. liver glycogen.
D. mixed oxidation of carbohydrates and fat.
E. oxidation of ketone bodies.

59. Rapid intraveneous administration of calcium would increase the secretion of

A. 1,25$(OH)_2$-cholecalciferol (1,25$(OH)_2D_3$).
B. 24,25$(OH)_2$-cholecalciferol (24,25$(OH)_2D_3$).
C. 25(OH)-cholecalciferol (25$(OH)D_3$).
D. calcitonin.
E. parathyroid hormone (PTH).

**Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the *one* that is *best* in each case.**

60. The onset of fever (the "chill") in a room at normal temperature is accompanied by

A. a closed posture.
B. an increased thermoregulatory setpoint.
C. a relatively thick insulating shell.
D. shivering.
E. all of the above.

61. The timing of ovulation during the normal menstrual cycle is determined by

A. acceleration of the gonadotropin releasing hormone (GnRH) pulse generator.
B. depression of the hypothalamic-gonadotrophs-ovarian regulatory axis.
C. estrogen secretion by the ovary.
D. progesterone secretion by the ovary.
E. summation of follicle stimulating hormone (FSH) pulses.

**Directions: Each of the questions below consists of five statements. Select the *one* that is *FALSE* in each case.**

62. Insulin enhances glucose utilization by

A. increasing ketone body production.
B. its permissive effect on glucokinase synthesis.
C. its stimulation of protein synthesis.
D. promoting translocation of GLUT4 to the plasmalemma.
E. stimulating glycogen synthase.

63. Relative to the typical postabsorptive period of an individual who eats regularly, prolonged starvation,

A. depends on triglycerides as the primary fuel source.
B. leads to increasing concentrations of counter-regulatory hormones.
C. promotes increased oxidation of ketone bodies.
D. promotes the degradation of protein to provide gluconeogenic substrates.
E. utilizes hepatic glycogen as the source of circulating glucose.

64. In the $ cells of the pancreatic islets, excitation-secretion coupling

A. depends upon oxidation of glucose.
B. is mediated by entry of $Ca^{++}$ through voltage-gated channels.
C. is stimulated by sulfonylureas.
D. requires membrane hyperpolarization.
E. results in exocytosis of secretory granules.

65. In the fasciculata of the adrenal cortex, secretion of cortisol

A. depends upon synthesis of hormone from cholesterol.
B. is blocked in 11-hydroxylase deficiency.
C. is inhibited by metyrapone.
D. is stimulated by adrenocorticotrophic hormone (ACTH).
E. requires exocytosis of secretory granules.

66. Thermoregulatory responses to a warm environment include

A. behavioral changes such as an open posture.
B. inhibition of nonshivering thermogenesis.
C. piloerection.
D. shunting of blood to the cutaneous circulatory system.
E. stimulation of the sudomotor response.

**Directions: Each group of questions below consists of five lettered headings or a diagram with five lettered components, followed by a list of numbered words, phrases, or statements. For each numbered word, phrase, or statement, select the *one* lettered component that is *most closely* associated with it. Note that a lettered heading or component may be used more than once.**

A. alanine cycle
B. Cori cycle
C. glucose/fatty acid cycle
D. heat stroke cycle
E. Krebs cycle

67. Exchange of metabolic substrates between liver and muscle that accompanies anaerobic exercise

68. Scavenging of carbon skeletons from protein degradation for gluconeogenesis

69. Impairment of hypothalamic thermostat by elevated body temperature

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A. 21-hydroxylase deficiency
B. acromegaly
C. hypothyroidism
D. pseudohyperaldosteronism
E. testicular feminization

70. Inhibition of 11$-hydroxysteroid dehydrogenase

71. Cretinous dwarf

72. Congenital adrenal hyperplasia

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A. Addison's disease
B. Conn's syndrome
C. Graves' disease
D. Kallman's syndrome
E. Turner's syndrome

73. Adrenalcortical insufficiency

74. Autoimmune stimulation of thyrotropin receptors

75. Primary hyperaldosteronism

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A. adrenocorticotropic hormone (ACTH) and glucagon
B. calcitonin and parathyroid hormone (PTH)
C. follicle stimulating hormone (FSH) and luteinizing hormone (LH)
D. growth hormone (GH) and prolactin
E. inhibin and testosterone

76. Antagonistic actions

77. Synthesized in the same cell type

78. Synthesized as larger precursors that are hydrolyzed to yield multiple hormones

79. Heterogenous dimers with a common subunit

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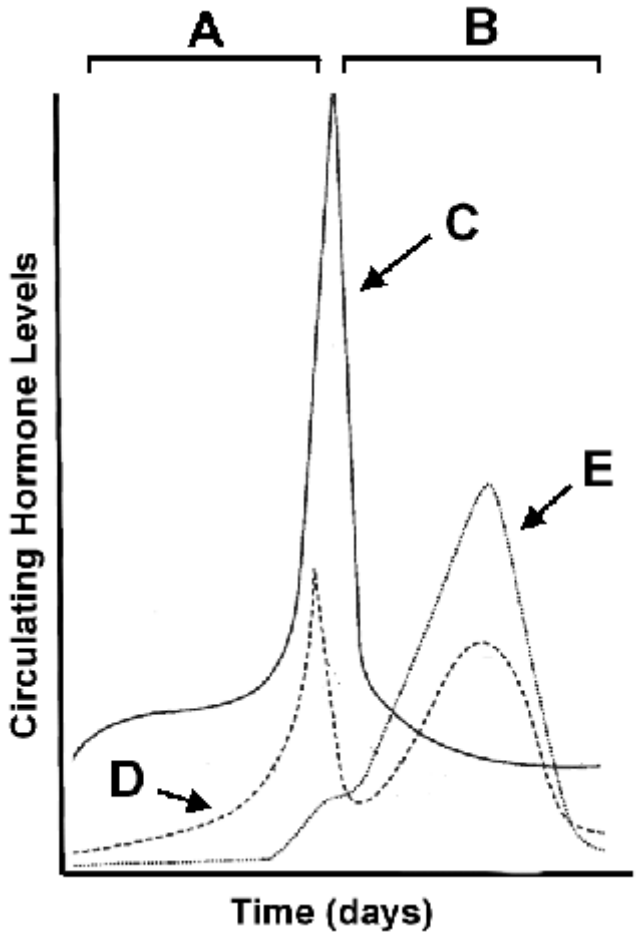


The figure above depicts an idealized human menstrual cycle.

80. Follicular phase

81. Secreted by the corpus luteum

82. Thermogenic

83. Increase in concentration is initiated by positive feedback regulatory loop.

**Directions: Each group of questions below consists of five lettered headings or a diagram with five lettered components, followed by a list of numbered words, phrases, or statements. For each numbered word, phrase, or statement, select the *one* lettered component that is *most closely* associated with it. Note that a lettered heading or component may be used more than once.**

A. chorionic gonadotropin
B. estradiol
C. oxytocin
D. progesterone
E. prolactin

84. First endocrine recognition of pregnancy

85. Secreted by the neurohypophysis

86. Stimulates milk synthesis and secretion

87. "Rescue" of the corpus luteum

**Directions: Each group of questions below consists of five lettered word or phrase pairs, followed by a list of numbered word or phrase pairs. Consider carefully the relationships between the members of each pair. For each numbered word or phrase pair, select the *one* lettered pair whose relationship is *most* similar. Note that a lettered pair may be used more than once**.

A. 1,25$(OH)_2$-cholecalciferol (1,25$(OH)_2D_3$) : 1,24,25$(OH)_3$-cholecalciferol (1,24,25$(OH)_3$ $D_3$)
B. 25(OH)-cholecalciferol (25-OH $D_3$) : 1,25$(OH)_2$-cholecalciferol (1,25$(OH)_2D_3$)
C. testosterone : dihydrotestosterone
D. testosterone : estradiol
E. thyroxine ($T_4$) : reverse triiodothreonine ($rT_3$)

88. thyroxine ($T_4$) : triiodothreonine ($T_3$)

89. corticosterone : aldosterone

90. 25(OH)-cholecalciferol (25-OH $D_3$) : 24,25$(OH)_2$-cholecalciferol (24,25$(OH)_2$ $D_3$)

91. angiotensin I : angiotensin II

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A. adrenal medulla : sympathetic postganglionic neuron
B. graafian follicle : corpus luteum
C. hypothalamus : adenohypophysis
D. osteoblasts : osteoclasts
E. thyroid : parathyroid

92. wolffian duct : male reproductive tract

93. thyrotrophs : thyroid follicular epithelium

**Directions: Each set of lettered headings below is followed by a list of numbered words or phrases. For each numbered word or phrase select**

**A. if the item is associated with (a) only.**
**B. if the item is associated with (b) only.**
**C. if the item is associated with both (a) and (b).**
**D. if the item is associated with neither (a) nor (b).**

(a) aldosterone
(b) cortisol

94. Enhanced secretion when stimulated with angiotensin II

95. Pregnenolone is a precursor.

96. Stimulates NaCl absorption in the sweat ducts upon long-term acclimation to a hot climate

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(a) Sertoli cells
(b) Leydig cells

97. Secretes testosterone

98. Stimulated by luteinizing hormone (LH)

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(a) iodide deficiency
(b) Graves' disease

99. Stimulation of thyrotropin (TSH) secretion

100. Goiter

Answers:

41. E
42. D
43. E
44. A
45. C
46. A
47. C
48. D
49. D
50. D
51. C
52. B
53. A
54. B
55. E
56. A
57. A
58. A
59. D
60. E
61. C
62. A
63. E
64. D
65. E
66. C
67. B
68. A
69. D
70. D
71. C
72. A
73. A
74. C
75. B
76. B
77. C
78. A
79. C
80. A
81. E
82. E
83. C
84. A
85. C
86. E
87. A
88. B
89. D
90. E
91. B
92. B
93. C
94. A
95. C
96. A
97. B
98. B
99. A
100. C