**MULTIPLE CHOICE QUESTIONS**

1. **Which is the main difference between exocrine and endocrine glands?**
2. Exocrine glands secrete substances (ions, water, enzymes, sweat, saliva, digestive juices) into a ductal system to an epithelial surface.
3. Exocrine glands secrete hormones directly into the bloodstream.
4. Endocrine glands secrete substances (ions, water, enzymes, sweat, saliva, digestive juices) into a ductal system to an epithelial surface.
5. **The pancreas and the gonads (testes and ovaries) are:**
6. Endocrine glands
7. Exocrine glands
8. Heterocrine or mixed glands
9. **Which of the following hormones is/are steroid hormone(s)?**
10. Cortisol
11. Vasopressin (ADH)
12. Insulin
13. Melatonin
14. All of the above
15. **Which of the following hormones is/are glycoprotein hormone(s)?**
16. Prostaglandin E2
17. TSH
18. LH
19. TSH and LH
20. Cortisol
21. **Which of the following hormones are derived from tyrosine?**
22. Adrenaline
23. Melatonin
24. Thyroxine
25. Adrenaline and thyroxine
26. Testosterone
27. **Which of the following hormones is derived from tryptophan?**
28. Dopamine
29. Adrenaline
30. Melatonin
31. Retinoic acid
32. Glucagon
33. **Which of the following hormones is a secosteroid?**
34. Cortisol
35. Estradiol
36. Calcitriol
37. Progesterone
38. Aldosterone
39. **Which of the following hormones is NOT derived from cholesterol?**

A. Cortisol

B. Insulin

C. Calcitriol

D. Progesterone

E. Estradiol

1. **Which of the following hormones has mainly paracrine effects/signaling?**
2. Testosterone
3. Adrenaline
4. Prostaglandin E2
5. Calcitriol
6. Cortisol
7. **Action is mediated by a second messenger for which of these hormones?**
8. Cortisol
9. Aldosterone
10. Both cortisol and aldosterone
11. Neither cortisol nor aldosterone
12. **Which of the following hormones is produced from the pro-opiomelanocortin (POMC) gene?**
13. Vasopressin
14. Oxytocin
15. Both oxytocin and vasopressin
16. Neither oxytocin nor vasopressin
17. **Which of the following hormones binds to nuclear receptors?**
18. Thyroxine
19. Melatonin
20. Adrenaline
21. Dopamine
22. Parathormone
23. **Which of the following hormones are derived from arachidonate (eicosanoid hormones)?**
24. Calcitriol
25. Thromboxanes
26. Parathormone
27. Thyroxine
28. Melatonin
29. **Which of the following hormones acts via cell surface receptors?**
30. Testosterone
31. Estradiol
32. Adrenaline
33. Thyroxine
34. Retinoid
35. **Which of the following hormones activates a cytosolic enzyme: guanylyl cyclase?**
36. Calcitriol
37. Thyroxine
38. Adrenaline
39. Insulin
40. Nitric oxide
41. **Which of the following hormones has a circadian rhythm with levels peaking in the morning between 08.00 and 09.00 (before the individual wakes up)?**
42. Growth hormone
43. Cortisol
44. Melatonin
45. Oxytocin
46. Thyroxine
47. **A 22-year-old infertile man receives intramuscular testosterone. How does testosterone act in the cell?**
48. It binds to cell membrane receptors
49. It acts directly without receptors in the cell nucleus
50. It is a water-soluble hormone
51. It needs a second messenger to enhance its signal
52. It binds to specific nuclear receptors of steroid hormones, which alter gene expression and are responsible for androgenic actions
53. **A 3-year-old boy with a mutation in the leptin receptor gene presents with binge eating and morbid obesity. Which of the following actions is correct regarding the action of leptin in the body?**
54. Leptin through its receptors, which belong to the group of receptors with 7 transmembrane regions, stimulates the production of neuropeptide Y (NPY)
55. Leptin through its nuclear receptors inhibits the production of mitochondrial uncoupling protein-thermogenin (UCP) in adipose cells
56. Leptin via the JAK-STAT system stimulates the transcription of the POMC (pro-opiomelanocortin) gene and α-MSH production in anorexigenic neurons of the arcuate nucleus of the hypothalamus.
57. Leptin via the JAK-STAT system inhibits β-oxidation of fatty acids in adipocytes
58. **A 28-year-old man with a BMI of 41 kg/m2 underwent an abdominal MRI where a large amount of visceral fat was found. Which of the following hormones are mainly produced by adipose tissue?**
59. Leptin
60. Adiponectin
61. Leptin and Adiponectin
62. Adrenaline
63. Growth hormone
64. **Dopamine is derived from:**
65. Tryptophan
66. Tyrosine
67. Cholesterol
68. Arachidonate
69. Adrenaline
70. **A high concentration of a steroid hormone was found in a urine toxicology test in a 37-year-old woman. Which of the following hormones belong to the steroid hormone family?**
71. testosterone, estradiol and insulin
72. aldosterone, cortisol and parathormone
73. ACTH, cortisol and testosterone
74. cortisol, aldosterone, testosterone and estradiol
75. **How does calcium circulate in blood?**
76. Ionized (free) biologically active
77. Complexed with phosphate, bicarbonate and citrate
78. Protein-bound, biologically inactive
79. All of the above
80. **Which of the following calcium forms in blood is biologically active?**

A. Ionized (free)

B. Complexed with phosphate, bicarbonate and citrate

C. Protein-bound

D. All of the above

1. **Which of the following hormones are the main hormones regulating calcium homeostasis?**
2. Parathormone, Calcitriol and Calcitonin
3. Parathormone, Insulin and Glucagon
4. Calcitriol, estradiol and testosterone
5. Parathormone-related protein, parathormone and testosterone
6. Calcitonin, vitamin D and oxytocin
7. **Parathormone is secreted from:**
8. Thyroid gland
9. Parathyroid glands
10. Thymus
11. Parathyroid and thyroid glands
12. **Which of the following statements is correct regarding the regulation of parathormone (PTH) secretion?**
13. High Ca2+ increases PTH
14. Low Ca2+ decreases PTH
15. Intracellular Ca2+ regulates the transcription and secretion of PTH through the Calcium Sensing Receptors
16. High levels of 1,25 dihydroxyvitamin D3 inhibit the transcription of PTH
17. **Which of the following circulating parathormone forms is the most active form**?
18. Intact PTH
19. N-truncated PTH
20. Carboxyterminal fragments of PTH
21. None of the above
22. **Which of the following statements is NOT correct regarding parathormone actions?**
23. PTH decreases phosphate
24. PTH increases Ca2+ absorption in the small intestine
25. PTH acts on kidney to increase calcium excretion and phosphate reabsorption via Gs protein-coupled receptors
26. PTH stimulates the transcription of 1-alpha hydroxylase for Vitamin D activation in the kidney
27. **Which of the following statements is correct about Parathyroid Hormone related Protein (PTHrP)?**
28. It is the main calciotropic hormone that regulates calcium homeostasis
29. It acts on a nuclear receptor
30. It does not activate the PTH receptor
31. It plays a physiological role in lactation, possibly as a hormone for the mobilization and/or transfer of calcium to the milk
32. **Which of the following statements is correct about Calcitonin?**
33. It is produced by the parafollicular C cells of the parathyroid glands
34. It inhibits osteoclast mediated bone resorption
35. It decreases serum Ca2+
36. It promotes renal reabsorption of Ca2+ and phosphate
37. It promotes intestinal absorption of Ca2+
38. **Where is synthesized cholecalciferol?**
39. In the kidneys
40. In the liver
41. In the skin from 7-dehydrocholesterol under the action of UVB radiation
42. In the blood from 7-dehydrocholesterol
43. **Which of the following statements is correct about calcitriol’s metabolic actions?**
44. It decreases the reabsorption of Ca2+ and phosphate in kidneys
45. It suppresses the production of parathormone (PTH)
46. It facilitates the excretion of Ca2+ from the intestinal villi by induction of a transport system.
47. It decreases the absorption of phosphate in the intestine
48. **Which of the following are calcium binding proteins that can transport calcium into the intestinal cell or prevent its entry?**
49. Calbindins
50. vitamin D-binding protein
51. calcitonin
52. calcitriol
53. **Which of the following statements is correct about calcitriol’s molecular mechanism?**
54. It binds to cell membrane receptors (VDR receptors)
55. It acts directly without receptors in the cell nucleus
56. Its receptor (VDR) modulates the expression of genes by forming a heterodimer complex with retinoid-X-receptors (RXR)
57. It needs a second messenger to enhance its signal
58. **Who are at risk of vitamin D deficiency?**
59. People with chronic diseases, in institutions and with inadequate nutrition
60. Obese individuals
61. People with dark skin
62. Breastfeeding infants
63. All of the above
64. **Which of the following statements is correct about body mass index?**
65. It is a suitable indicator for very tall people
66. It is a suitable index for athletes
67. It is a suitable indicator of body mass in people >65 years old
68. It cannot estimate fat distribution
69. It can distinguish fat mass from lean, muscle mass
70. **Beige adipocytes:**
71. Can be converted by hot exposure into cells very similar to brown adipocytes
72. Do not have multiple lipid droplets
73. Are richer in mitochondria than white adipocytes
74. Cannot produce uncoupling protein 1 (UCP1)
75. **Which is false about neuropeptide Y (NPY)?**
76. It is produced by orexigenic neurons
77. It gives the signal: Eat!
78. High concentration of NPY leads to bulimia and obesity
79. It is produced by anorexigenic neurons
80. **Which of the following statements is correct about adiponectin?**
81. It inhibits fatty acid uptake and oxidation
82. It stimulates fatty acid synthesis
83. It desensitizes muscle and liver to insulin
84. It stimulates the AMP-activated protein kinase (AMPK), which mediates many effects of adiponectin
85. **Which of the following statements is false regarding peroxisome proliferator-activated receptors (PPARs)?**
86. It’s a family of ligand-activated transcription factors that respond to changes in dietary lipid by altering the expression of genes involved in fat and carbohydrate metabolism
87. They from heterodimers in the nucleus with RXR
88. Ligands are proteins and carbohydrates
89. Ligands are fatty acids or fatty acid derivatives
90. Three main PPAR (γ, α, δ) isoforms regulate lipid and glucose homeostasis
91. **Which of the following statements is correct regarding ghrelin?**
92. It is a peptide hormone produced in hypothalamus
93. It acts on orexigenic neurons in the arcuate nucleus to stimulate hunger
94. It works on a longer time scale than leptin and insulin
95. It acts through nuclear receptors
96. Ghrelin concentration in the blood peaks just after a meal
97. **Which of the following hormones and neuropeptides are orexigenic?**
98. Ghrelin
99. PYY 3-36
100. Ghrelin and NPY
101. α-MSH
102. α-MSH and PYY3-3