ENDOCRINE BASICS

1. Why are some hormones active at the cell surface as opposed to the nucleus?
2. Endocrine glands are _____ glands that secrete hormones.
3. The effects of a hormone is dependent on its _____.
4. What hormones are active at the nucleus and what can they bind to?
5. What is the key site of endocrinology in the brain for hormone release?
6. Hormones from the hypothalamus are known as _____ or _____.
7. Hormones from the anterior pituitary are a.k.a. _____; from the target gland a.k.a. _____.
8. The target gland produces a _____ feedback on both the anterior pituitary and hypothalamus.
9. Using Estrogen, show a negative feedback loop?
10. What are most water-soluble hormones? Give 3 example hormones.
11. Lipid soluble proteins are transported how?
12. Name the lipid-soluble hormones.
13. Nuclear receptors are located in the _____ causing _____ and leading to _____.
14. Give the chain of events to yield a physiological response via plasma membrane receptors?
15. Name the secondary messengers of plasma receptors.
16. The Pituitary 'Master' Gland secretes what via its posterior lobule?
17. The anterior pituitary gland secretes what?
18. How does the anterior pituitary connect to the hypothalamus?
19. How does the posterior pituitary connect to the hypothalamus?
20. What stimulates the hypothalamus to release hormones?
21. Hypothalamic neurons travel through the _____ and _____ until it releases a hormone.
22. The hypothalamus is the _____ for the brain.
23. What are the major hypothalamic nuclear subdivisions and how are they connected?
24. What areas are unique to efferent output as opposed to afferent input?
25. The hypothalamus receives nerve tracts from the _____, _____, _____, _____, and _____.
26. What can integrate multiple simultaneous pituitary responses with each other?
27. What are the neurotransmitters involved in afferent impulses to the hypothalamus?
28. Inhibiting and releasing hormones of the hypothalamus would effect what and why?
29. The hypothalamic regulatory center regulates pituitary function in accordance to what?

HORMONES

30. What cell produces LH and FSH? What about hGH?
31. What is the effect of oxytocin from the pars nervosa (posterior pituitary)?
32. What does prolactin act on? What controls it?
33. What is the effect of thyroid-stimulating hormone (TSH)? What controls it?

34. What is the effect of ACTH? What controls it?
35. What is the effect of LH and FSH? What controls it?
36. What is secreted from the pars intermedia (intermediate lobe)?
37. What are the releasing/inhibitory hormones synthesized by the hypothalamus?
38. How is ACTH produced?
39. What produces the essential hormones for growth, somatotropin and GH/hGH?
40. hGH which is difficult to measure in _____, decreases after _____.
41. Where does most GH bind and what may it be then converted into?
42. What are some of the important functions of GH?
43. What is another name for somatomedian-C?
44. GH stimulates protein anabolism, thus it _____, _____, and _____.
45. What is GH's effect on fat metabolism?
46. What is GH's effect on carbohydrate metabolism?
47. Prolactin stimulates the growth of what structure that actually secretes the milk?
48. What stimulates transcription of milk proteins along with prolactin?
49. How is prolactin related to immune function?
50. What produces TSH/Thyrotropin and when do they develop?
51. Why is the TSH secreted in a steady pulsatile fashion?
52. Since TSH binds to plasma membrane receptors, it needs _____ to mediate its effects.
53. In addition to TH secretion, what does TSH promote?
54. What are the functions of Thyroid hormones?
55. ACTH has great control over the adrenal secretion of _____, and little control over _____.
56. Stimulated by _____, ACTH, a.k.a. _____, is secreted in response to _____.
57. ACTH activates the _____ to increase cAMP.
58. POMC breakdown eventually results in 3 types of _____. Which version results from ACTH?
59. In addition to synthesis and secretion of steroids, what does the ACTH do?
60. Since MSH is produced in the ACTH/POMC sequence, what happens to skin pigmentation?
61. MSH acts on _____, which results in the release of _____.
62. Since MSH is a peptide hormone, it binds on the _____, produces _____, and stimulates _____.
63. ADH, a.k.a. _____, is a _____ peptide hormone.
64. What vesicular carrier protein is ADH packaged and released with? What about oxytocin?
65. How does ADH reduce the output and formation of urine?
66. What does ADH open allowing for water reabsorption? How does this effect osmolarities?
67. What tissues secrete the 9 amino acid peptide hormone, Oxytocin?
68. For milk ejection to occur, what cells need to be stimulated to contract by oxytocin?
69. What is associated with the increased spasticity of the uterus during late gestation?

70. When is oxytocin released during labour and for what purpose?
71. What is the final function of oxytocin?

THYROID & PARATHYROID GLAND HORMONES

72. What is prohormone T_4 known as and what combines to produce it?
73. What is the _____ hormone T_3 known as and what combines to produce it?
74. What is the largest endocrine gland and what connects its two lobes?
75. What does the thyroid follicles produce?
76. What combines to form colloid, what does it fill, and what is it a precursor of?
77. The peptide hormone, Calcitonin, is produced by _____ of the thyroid gland.
78. Calcitonin ____ blood Ca levels, thus calcitonin is the agonist to _____.
79. Calcitonin is regulated by a humoral negative feedback mechanism. What does that mean?
80. TH is concerned directly in _____, _____, _____, and _____.
81. TH may also play a role in what activities (just to name a few)?
82. If a tissue does not boost Oxygen consumption when exposed to TH, it is _____.
83. Although calorigenesis and O_2 consumption do not increase, the _____ is thyroid responsive.
84. In addition to $\uparrow O_2$ and metabolic rate, what genomic activity is seen?
85. What are the Neurological effects of TH?
86. Children with a TH deficiency have _____.
87. More & larger mitochondria increases _____, which increases _____.
88. What happens to BMR in hypothyroidism?
89. What occurs when extremely high levels of TH are present?
90. What occurs when BMR effect Oxygen consumption and calorigenesis?
91. What happens when intracellular K+ rises?
92. What is calorigenesis due to?
93. What is the metabolic effect of TH on protein?
94. The metabolic effects of TH on carbohydrates are due to what?
95. What are the metabolic effects of TH on carbohydrates?
96. Although TH stimulates _____, it can also increase _____ since it is lipolytic.
97. Why does triglyceride clearance in plasma decrease due to TH?
98. TH _____ cholesterol biosynthesis and _____ LDLs.
99. Can the TH lower plasma cholesterol concentration?
100. TH increases _____, i.e. leads to gene expression.
101. TH causes _____ receptor stimulation, thus it is an overall stimulant.
102. A negative feedback relationship exists between TH and _____.
103. What two major organs/systems are unaffected by TH?

104. T3's action is mediated by what two gene products?
105. In the brain, _____ are taken up from the choroid into the CSF.
106. Where are Iodothyronines taken up into from the CSF during development? During adulthood?
107. What is hypothyroidism and what is it due to?
108. What is hyperthyroidism and what is it a form of?
109. What are three diseases that can cause hyperthyroidism?
110. What occurs in congenital hypothyroidic infants?
111. Hypothyroidism may lead to goiter, which is an _____.
112. Severe or long standing hypothyroidism can result in Myxedema; what is it?
113. How does Graves disease cause hyperthyroidism?
114. What is Toxic Multinodular goiter?
115. What are some symptoms of Hyperthyriodism?
116. The Parathyroid gland has _____ and _____ arranged in cords.
117. The PT gland chief cells secrete _____, which regulates _____.
118. How does PTH increase blood Ca^{2+} levels?
119. What corticosteroid is produced by zona glomerulosa of the adrenal cortex?
120. What corticosteroid is produced by zona fasciculate of the adrenal cortex?
121. What corticosteroid is produced by zona reticularis of the adrenal cortex?
122. The adrenal medulla is actually _____ tissue that acts as part of the _____.
123. How does the mineralcorticoid, Aldosterone, regulate electrolyte concentration?
124. What stimulates Aldosterone secretion?
125. What peptide inhibits the activity of the zona glomerulosa?
126. What hormone causes a *small* increase of Aldosterone during stress?
127. What mechanism stimulates Aldosterone release?
128. The Glucocorticoid, Cortisol, helps the body resist _____ by _____ and _____.
129. Cortisol may provoke _____, and thus rises in _____, _____, and _____.
130. Androgens contribute to _____, _____, and _____.
131. The most important androgen is _____.
132. After menopause, androgens can convert into _____.
133. What are the cells of the adrenal medulla and what do they secrete?
134. Epinephrine is the most potent stimulator of the _____ and _____.
135. NE is the most influential for _____, thus _____.

PANCREAS, GONADS, PINEAL, THYMUS

136. What are the cells of the endocrine islets of langerhhauns and what does each produce?
137. The 29 amino acid Glucagon is a potent _____ agent whose major target is the _____.

138. Glucagon promotes _____, _____, and _____.
139. Proinsulin is excised into what 51 amino protein?
140. The insulin receptor is a _____ enzyme.
141. What are the general functions of insulin?
142. After glucose enters a cell, what enzymatic activities are triggered by insulin?
143. What are the three cardinal signs of diabetes mellitus?
144. What is hyperinsulinism and what does it result in?
145. What hormones do the ovaries produce?
146. What is the secretory product of the pineal gland and what is the product involved in?
147. What is estrogen and progesterone responsible for?
148. The sternum located thymus produces what hormones? What are their function?

REPRODUCTION

149. What are the three cell types of the testes? Which synthesizes testosterone?
150. Sertoli cells synthesize what glycoprotein hormone for what purpose?
151. What is the order of delivery for sperm?
152. What are the male accessory sex glands?
153. The testes _____ sperm while the Seminiferous tubules _____ sperm.
154. The _____ conveys sperm to the _____, which then leave via efferent ductules to the epididymis.
155. What are the small glands inferior to the prostate? What do they do?
156. What are the three types of ovarian cells?
157. What do germ cells produce?
158. What do the theca cells produce?
159. What do the granulose cells produce?
160. What is the purpose of the fallopian tube extensions over the ovaries, the Fimbriae?
161. Briefly describe the three layers of the uterus from outside in.
162. What are the female accessory sex organs?
163. _____ is the physical characteristics of the internal genital tract & external genitalia.
164. Penile erection is initiated by the PNS. What neurotransmitters are involved?
165. Ejaculation is initiated by the _____, thus regulated by _____.
166. What are included n the internal genital tract of men?
167. What are the internal genitalia of women?
168. During embryogenesis, what duct does testosterone work ipsilaterally to help differentiate?
169. Testosterone does not develop external male genitalia, what does?
170. What occurs in the absence of AMH?
171. What is also necessary for the normal growth and development of female genitalia?

172. If female gonads are exposed to high levels of androgens, what may occur?

GAMETOGENESIS

173. What are the three major steps of spermatogenesis?
174. Gametes are _____ cells with _____ chromosomes.
175. Meiosis I & II _____ the number of chromosomes in the _____ daughter cells.
176. What are the outermost cells which are in contact with the epithelial basal lamina?
177. Mitotic division of spermatogonia results in 2 types of cells.
178. Where are Type A cells found and what is their purpose?
179. Where are Type B cells found and what is their purpose?
180. Primary spermatocytes undergo meiosis I forming _____.
181. Secondary spermatocytes undergo meiosis II forming _____ which are small cells near lumen.
182. What is the major physical difference between spermatids and sperm?
183. What allows the sperm to penetrate and enter the egg?
184. Describe the midpiece of sperm.
185. Where are the Sertoli cells found? What do they help form?
186. What does the basal compartment of the ST contain?
187. Sertoli cells secrete _____ that binds to _____, thus concentrating it in the tubules.
188. What does the adluminal compartment of the ST contain?
189. _____ stimulates spermiogenesis through its receptors on the _____ cells.
190. How do sertoli cells produce the FSH negative feedback?
191. When are 6-7 million oogonia produced?
192. At the end of gestation Oogonia become _____ and begin meiosis but arrest in _____.
193. _____ of oocytes are oculated, the rest undergo _____.
194. What do primary follicles contain?
195. In response to ____ some follicles enter the ovarian cycle and produce layers of _____.
196. A secondary follicle with its vesicles becomes a graafian follicle when?
197. What happens to the primary oocyte in a graafian follicle?
198. The newly divided secondary oocyte arrests at _____ unless it is _____.
199. What is the mound formed by granulosa cells called? What sits on it?
200. The 2nd oocyte is ringed by the _____, with the _____ in between each.
201. What is the purpose of the zona pellucid?
202. About 2 weeks after menstruation, ___ follicle survives, the others die and become _____.
203. The surviving graafian follicle will secrete _____ and later the _____.
204. What happens to the egg if not fertilized?

ENDOCRINE REGULATION OF REPRODUCTION

205. _____ (Hypothalamus) → _____ (Ant. Pitutary) → Sperm & Inhibin (ST)
206. _____ (Hypothalamus) → _____ (Ant. Pitutary) → Testosterone
207. What provides the negative inhibition of LH and GnRH?
208. Testosterone and its derivatives are called _____ because they stimulate muscle growth.
209. What stimulates the growth of the larynx, bone, and hemoglobin levels?
210. Testosterone and local peptide play a _____ in supporting spermatogenesis.
211. In females, LH causes an empty follicle to become the _____ in the _____ phase.
212. What does the corpus luteum secrete, and what does it become if unfertilized?
213. What is the span of the follicular phase? What is secreted and what is its effects?
214. When does ovulation occur?
215. What phase occurs between days 15-28. What occurs here?
216. What hormones do the ovaries produce?
217. When does menstruation occur during the uterine cycle and for what reason?
218. When and what happens during the proliferative phase?
219. The _____ phase occurs between day 15-28. During which the endometrium _____ & _____.
220. Fertilization occurs in the _____, and then the zygote embeds in the _____.
221. What hormone does the placenta produce and what is its function?