Quiz Answers : Sarkar : "You will come to my office and we will mate[meet]."

BASIC CONCEPTS - HOMEOSTASIS

1. Function always reflects structure
2. Concentration gradient for energy source
3. Anatomical and functional units made up of 2 or more primary tissues
4. Ability for an organism to maintain a stable internal environment
5. Reception, integration, effects
6. Receptor, control center, effector
7. Determines the set point at which a variable will be kept
8. Negative feedback loops
9. Intrinsic (in organ regulated), Extrinsic (outside regulation, e.g. nervous/endocrine)
10. Sensor (detect dev/ from setpoint), Intergration center (determines response), effector (effect)
11. Blood glucose (rise when fasting, drop when eating), Blood clotting (platelets attract platelets)
12. Destructive positive mechanisms take over

NERVOUS SYSTEM BASICS

13. Sensory input, integration, motor output
14. Visceral
15. Autonomic
16. Voluntary control
17. Short pre-ganglionic and long post-ganglionic neurons
18. System counteraction and smoothing
19. Glial cells (for homeostasis)
20. Axoplasmic flow, nerve endings
21. Long pre-ganglionic and short post-ganglionic neurons
22. Moves large & insoluble compounds bidirectionally along microtubules. Very fast.
23. Anterograde
24. Generate/transmit APs, secrete neurotransmitters from axonal terminals
25. Specialized capillary tight junctions allowing only certain compounds to enter brain
26. Action potentials
27. Highly irritable
28. Stimulus
29. Large cations trapped in cell, Na/K pump, Na^+ outside, K^+ inside & negatively attracted
30. Cholinergic, Ach
31. End-plate potentials
32. Open voltage gated channels beneath the end plate causing muscle contraction
33. Curare

34. Inhibitory interactions that stabilize the central nervous system
35. Increased Cl^- conductance of postjunctional membrane
36. ↑ conductance of the postsynaptic membrane to Na^+ and K^+ responding to a neurotransmitter

RECEPTORS

37. GABA and Glycine
38. Cl^- channel
39. Metatropic receptor
40. Glutamate
41. AMPA, NMDA (permits flow of Na^+ K^+ and Ca^{2+}, blocked by Mg), Kinate, L-AP4
42. α-amino-3-hydroxy-5-methyl-4-isoazole
43. N-methyl-D-aspartate
44. IP3, Ca^{2+}
45. Guanine nucleotide-binding protein (g-proteins)
46. Binding is saturable reversible, and of high affinity, specificity, physiological action, multiplicity
47. [R] + [L] ↔ [RL] : R = concentration of receptors, L = concentration of ligand, RL is the complex
48. Limited number of protein molecules
49. K_d = [R] * [L] / [RL] : Binding constant
50. K_a = [RL] / [R] * [L]
51. Less than a micromolar concentration : a small quantity is needed to saturate a receptor
52. By the pharmacological agent(s) that binds to it
53. Compete, boost ligand production
54. Continually excite, destroy a receptor and associated neuropeptide
55. A specific cellular function is accomplished
56. Polarization of membrane according to ion permeability
57. More than 1
58. When different concentrations of the NT is released at the site
59. GTP-binding proteins (g-proteins)
60. Heterotrimeric : α, β, γ
61. Stimulatory α_s and Inhibitory α_i
62. GDP
63. Intrinsic GTPase activity, GTP hydrolysis producing GDP, inactivating
64. Adenylate cyclase (AC) & Phospholipase C
65. cAMP
66. Inositol triphosphate (IP3)
67. Amplify a signal which is sent on a cascade till a physiological action is produced

68. First

NEUROTRANSMITTERS & NEUROPEPTIDES

69. Ach, NorEpi, Epi, Dopamine, 5HT, histamine, purine, GABA, glutamate, aspartate, glycine, NO_2
70. Active reuptake and enzymatic metabolism
71. Clathrin-mediated endocytosis
72. Na and Mg
73. Synthesis of NT, vesicle storage, synaptic release, receptor stimulation, termination of NT
74. Voltage gated Ca^{2+}
75. Calcium channels opening, mitochondria/ER/calcisome release of stored calcium
76. Small fast neurotransmission NT synaptic vesicles
77. Large dense neuropeptides and proteins
78. Pre & post synaptic, inhibit or enhance exocytosis
79. Dopamine, NorEpi, Glutamate, and GABA
80. Ach, and peptides
81. Glutamate
82. Tyrosine, Tryptophan, Arginine
83. Digestion
84. IP3, DAG, Secondary Messanger Molecules
85. Fast, on another neuron within a short distance
86. In small quantities, in a quantal fashion
87. Specific action, binding protein
88. Saturable, reversible
89. Vesicular hypothesis of quantal neurotransmitter release
90. Vesicle
91. Phosphorylation of Synapsin-I proteins, synaptic vesicular membrane
92. First the outside OH, then the two inside OH's : Kinases
93. Several enzymes by Varying sources of starting material
94. The cell body, nerve terminal
95. Synaptic vesicles
96. Muscarinic, Nicotinic
97. Substance P, Enkephalin, Lutenizing hormone, Neurotensin, Somatostatin
98. Membrane bound and soluble
99. In the cleft
100. Curare, Atropine
101. Neuromuscular junction, adrenal medulla

102. Influx Na, Efflux K
103. Heart, smooth muscle, and glands
104. Calcium influx (may be due to Ca Store depletion)
105. Adenylate cyclase, decreased levels and production of cAMP and slower rate of depolarization
106. Glutamic acid & aspartic acid
107. GABA
108. ATP, secondary messenger
109. Inhibitory, Cl^-, strychnine
110. Thyroid hormone, steroid, and BZ
111. Wide range of effects, open ion channels
112. Neuromodulators, learning and neural plasticity
113. Satiety following meals
114. Pain
115. Endorpins, enkephalins, and dynorphin
116. Naloxone, opiate antagonist
117. Neuropeptide Y : inhibits glutamate in hippocampus, stimulates appetite
118. Endocannabinoids : analgesic effects similar to that of THC in marijuana
119. NO and CO
120. Act through gCAMP secondary messenger system
121. Smooth muscle contraction
122. Enzymatic destruction
123. NorEpi, dopamine, and serotonin
124. G-protein cascade to affect ion channels and/or other membrane proteins
125. G-protein subunits (α, β, δ), GTP bonds with α
126. Adenylate cyclase, Cyclic AMP, ATP
127. Protein kinases, opens ion channels
128. Adenylate cyclase is inhibits, so less cAMP and protein kinase activation
129. 90%, Monoamine oxidase (MAO)
130. Antidepressants
131. Mood, behavior, appetite, sleep, cerebral circulation
132. LSD
133. Block reuptake of serotonin, Prozac, Zoloft, Paxil, Luvox
134. Brain and postganglionic sympathetic neurons
135. Periphery, kidney
136. N-methylation of NE, adrenal gland
137. Organs, brainstem

138. Motor control and emotional reward, D1-D5 (5)
139. Parkinson's disease
140. Schizophrenia
141. Sympathetic
142. General level of arousal
143. Amphetamines
144. Basis of the response against a series of sympthomimetic amines
145. Excitatory, inhibitory
146. Skin & splanchnic vacular SM, GI & bladder sphincters
147. Excitatory, formation of IP_3 & Increase of Ca^{2+}
148. Walls of GI tract fat cells and platlets
149. Inhibitory, inhibit adenylate cyclase (AC) & decreases cAMP
150. Heart
151. Excitatory, produces cAMP and activates AC
152. GI tract & bladder, vascular & bronchial smooth muscle, cerebellum and uterus
153. Relaxation (trick!), produces cAMP and activates AC
154. Postsynaptic, phenylephrine, prazosin
155. Postsynaptic, Clonidine, Yohimbine & phentolamine
156. Postsynaptic, isoproterenol and propranolol
157. Isuprel (cardiac stimulant)
158. Inderal (antihypertensive)

AUTONOMIC NERVOUS SYSTEM

159. All, Ach, Cholinergic nicotinic receptors
160. Most, NE, adrenergic
161. Most, Ach, cholinergic muscarnic receptors
162. Visceral effector organs
163. All together, activate where/when needed
164. Rest and Digest
165. Pupil dilation due to NE receptor activation
166. Constriction due to Muscarinic Ach
167. Hypothalamus
168. Sympathetic nervous system
169. Hypothalamus, combined autonomic ganglion and postsynaptic sympathetic nerve
170. Epinephrine (80%), and NE (20%)

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MUSCULAR SYSTEM BASICS

171. Single alpha motor neuron
172. Single stimulus
173. Muscle fiber, sarcomere, myofibril, myofilament
174. Sarcomere
175. Dark myosin filament (thick)
176. Light actin filament (thin)
177. Z-disc
178. Area in center of sarcomere where myosin and actin do not overlap
179. G-actin
180. actin filament formed from g-actin) with an ADP molecule bound
181. Tropomyosin
182. Troponin
183. TnC (binds Ca^{2+}), TnI (blocks cross bridges from binding to actin), TnT (binds to tropomyosin)
184. Myosin heads interacting with actin
185. It binds to ATP
186. Hydrolyzes ATP into ADP + P_i
187. Tropomyosin
188. Troponin
189. Troponin changes, Tropomyosin moves, cross-bridges may form and allow contraction
190. Along the sarcolemma & down transverse tubules until they reach the sarcoplasmic reticulum
191. Terminal cisternae of the SR, Myoplasm
192. Na^+
193. Single AP eliciting a single contraction
194. Repeated stimulus resulting in increased force
195. Ability to increase F of contraction by repeated stimulation w/out relaxation
196. Motor unit recruitment, Ca^{2+} conc., frequency, degree of muscle stretch, area, age, fiber type

SKELETAL MUSCLE

197. High myosin ATPase activity, Glycolytic
198. Pale, fatigue rapidly, 2-3 times faster
199. Sarcoplasmic Reticulum Calcium ATPase
200. Lactic Acid
201. The TCA cycle
202. Rigor Mortis
203. Slow-acting myosin ATPase, Oxidative phosphorylation (aerobic)

204. Dark-red, myoglobin
205. Smaller, slower
206. Large mitochondria, fatigue-resistant
207. Isotonic, and Isometric
208. Remains constant
209. Shortens, remain constant
210. Moving and lifting objects
211. Eccentric (lengthening to greater load than force), Concentric (shortening)
212. Remains constant, load and bone
213. Sarcomere shorten to develop tension
214. Direct phosphorylation, Glycolysis, and oxidative phosphorylation
215. Creatine phosphate, creatine kinase
216. ATP + Pyruvate, Lactic Acid
217. ATP + CO_2
218. Anaerobically, 45-90 seconds
219. Aerobic respiration of fatty acids
220. Fatty acids and glucose
221. Glycogenolysis
222. Muscle cell plasma membrane, carrier protein that transports glucose into cell
223. Oxygen debt
224. 3x more
225. Electrically, not-electrically
226. Contracts a single unit, continuously active
227. Muscle spindle
228. Detects tension, inhibits agonist & stimulates antagonist to prevent damage

SMOOTH MUSCLE

229. Ca^{2+} concentration decreases
230. Dephosphorylated, form cross-bridges
231. Slow, Latch state (prolonged binding for maintained force with little energy)
232. Calmodulin (CaM), Myosin light chain kinase (MLCK)
233. Light chains on myosin heads, myosin ATPase activity
234. Invaginations of SM membrane, increase surface area of cells
235. Regulation of intercellular Ca^{2+}
236. IP_3-Gated and Ryanodine receptor
237. Ca^{2+} from calmodium

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238. Accumulation of extracellular K^+
239. ST fibers deplete glycogen, FT are recruited producing Lactic acid which blocks Ca^{2+} transport
240. Brain is unable to activate muscles even if they are not-fatigued
241. ACE inhibitors
242. Vasoconstriction, NE