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f. The general name of the ion channels found along an axon membrane that is responsible for the movement of the action potential along that axon. _____

g. A class of hormones synthesized 'on-demand' from cholesterol within the gonads.

h. I am released by a modified neuron into the circulatory system. _____

i. A specialized structure in which neurons contact blood vessels. _____

3. The resting membrane potential of most animal cells is _____ (charge?) inside compared to _____ outside based primarily upon membrane permeability to _____ ions moving through _____ (type of?) channels that are continuously open as this ion follows its _____ gradient to the outside. (1 mark each blank)

4. True or False: circle appropriate response (1 mark each)

a. The posterior pituitary (or neurohypophysis or neural lobe) is composed of endocrine cells that release the tropic hormone oxytocin into the blood. **True or False**

b. The vagus or Xth cranial nerve is the longest parasympathetic nerve innervating basically all visceral organs of the body. **True or False**

c. Surgical removal of significant parts of the forebrain of a mammal does not impair survival but destruction of even a small part of the hindbrain usually causes death. **True or False**

d. The Na⁺,K⁺-ATPase found on the axon membrane is responsible for membrane repolarization following the propagation of an action potential. **True or False**

e. All (known?) neurohormones of the hypothalamus are peptide hormones with the exception of prolactin-inhibiting hormone which is a catecholamine. **True or False**

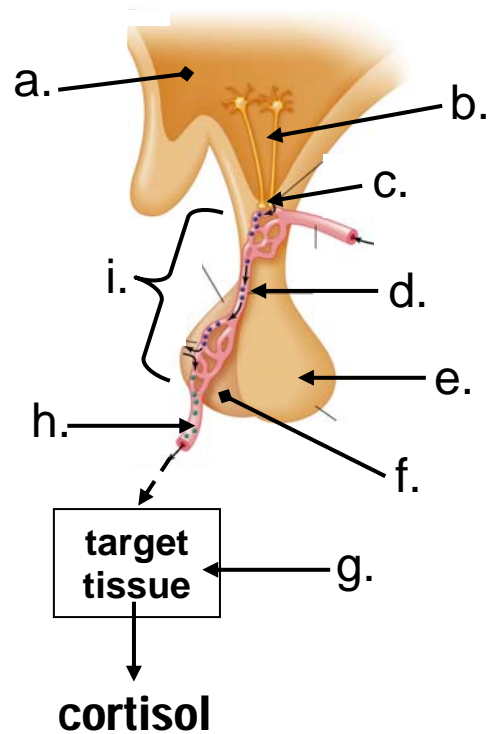
f. Ben Johnson was 'busted' based upon high levels of testosterone found in his urine as the synthetic androgen stanozolol acted as an agonist on skeletal muscle to increase muscle mass. **True or False**

Defend your T or F answer to c., above (2 marks)

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5. Fill in the blanks based upon **cortisol** being the endproduct of the pathway: (1 mark per blank; the abbreviated or entire hormone name are appropriate)

- a. (the structure) _____
- b. (the neurons) _____
- c. (the hormone) _____
- d. (the structure) _____
- e. (the structure) _____
- f. (the structure) _____
- g. (the gland) _____
- h. (the hormone) _____
- i. (the structure) _____
- j. **Cortisol** is a _____ (chemical type?) hormone whose mode of action in receptive cells includes 1) binding to a receptor found in the _____ of the cell; 2) this cortisol-receptor complex travels to the _____ where 3) it binds to specific regions of the DNA to initial specific gene _____.
- k. The hormone-type noted in c. (above) is called a _____ hormone as it induces endocrine tissue to release another hormone.



6. A synaptic potential and an action potential are very different; provide 3 differences between these two potentials (1 mark each).

- a. ___
- b. ___
- c. ___

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9. Nicotine is the favorite drug of some individuals. This question deals with the consequence of using nicotine.
- a. Nicotine is an agonist of what specific receptor found within the peripheral nervous system? (**1 mark**)
 - b. Specifically state the **three** locations within the peripheral nervous system where this receptor is found? (**1 mark each**)
 - i. _
 - ii. _
 - iii. _
 - c. One characteristic of nicotine intake is an increase in heart rate but this increase can be blocked (eliminated) by applying a β -blocker (for example propranolol) at the same time as nicotine; explain? (**3 marks**)
10. Insulin is a classic protein hormone critical in humans (other mammals) to regulate levels of blood glucose; its absence results in diabetes. Answer the following questions related to insulin.
- a. Name the Canadian duo who first isolated insulin then used their product to treat a diabetic individual? (**1 mark**)
 - b. During which decade in the 20th century did one of these individuals receive the Noble Prize in Physiology? (**1 mark**)

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- c. Insulin acts by what is called a 'direct endocrine loop'; diagram this feedback loop showing the stimulus for release, the endocrine tissue involved, the body tissue effected, and the response. **(4 marks)**

- d. Insulin is also released as a result of a 'feedforward' reflex; this represents a classic autonomic nervous system reflex arc. Diagram this reflex arc naming each component part (note: you can assume that the central nervous system is a single box; no need to identify the parts of this system). **(4 marks)**