Biological Psychology 2nd edition Higgs Test Bank

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Lecturer Resource
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Test Bank

Chapter 2: Structure and communication in the nervous system

Multiple Choice

1. Which of the following statement about efferent neurons is correct?

a. They are only found in the spinal nerves.

b. They convey information from one region of the brain to another.

c. They convey information from the central nervous system to the periphery.

d. They convey sensory information from the head to the spinal cord.

Ans: C

2. The central nervous system is composed of _____.

a. the brain and spinal cord

b. the cranial nerves and brain

c. the spinal cord and cranial nerves

d. the spinal nerves and cranial nerves

Ans: A

3. Sensory information can also be described as _____.

a. afferent information

b. cranial information

c. efferent information

d. external information

Ans: A

4. The nerves that innervate the heart to increase the rate at which it beats can be described as _____.

a. autonomic efferent nerves

b. cranial nerves

c. sensory afferent nerves

d. somatic nerves

Ans: A

5. The autonomic nervous system can be further subdivided into _____.

a. the parasympathetic, somatic and cranial divisions

b. the spinal, sympathetic and parasympathetic divisions

c. the sympathetic, cranial and enteric divisions

d. the sympathetic, parasympathetic and enteric divisions

Ans: D

6. The usual direction of information flow through a neuron is _____.

a. axon, terminal, soma

b. dendrite, soma, terminal

c. soma, terminal, dendrite

d. terminal, axon, dendrite

Ans: B

7. Grey matter appears darker in colour than white matter because _____.

a. it has a greater density of blood vessels

b. the neurons are pigmented

c. there is a greater density of neurons

d. there is less myelin

Ans: D

8. Astrocytes are _____.

a. a type of glia cell that forms the blood–brain barrier

b. a type of glia cell that insulates the axons

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c. large neurons found in the spinal cord

d. star-shaped neurons

Ans: A

9. The resting membrane potential of a neuron comes about because _____.

a. neuronal membranes are unusually impermeable compared to the membranes of other cell types

b. of the unequal distribution of ions between the outside and inside of the neuron

c. the concentration of ions within the brain is different to other tissues

d. the neuronal membranes contain ion transporters which are more active than in other cell types

Ans: B

10. During the depolarization phase of a neuronal action potential, _____.

a. the Na^+-K^+ ATPase is turned off

b. there is an increase in sodium influx through ion channels

c. there is an increase in the amount of ion exchange by the Na^+-K^+ ATPase

d. there is decreased efflux of potassium through ion channels

Ans: B

11. The role of the myelination is to _____.

a. amplify the size of the action potentials

b. ensure that the sodium ions are at a high concentration on the outside of the neuron

c. increase the rate of conduction of action potentials along the axon

d. reduce the chance that the neuron will become depleted of potassium ions

Ans: C

12. Signal transduction refers to the process by which _____.

a. action potentials are generated in axons

b. chemicals are released from nerve terminals

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c. myelination affects action potential conduction

d. sensory information is converted into electrical signals

Ans: D

13. Action potentials are described as being ‘all-or-none’. This property means that _____.

a. action potentials do not vary in size dependent upon the size of the stimulus

b. an axon can only fire one action potential at a time

c. for an action potential to be triggered all of the sodium channels in the membrane need to open

d. if a sensory neuron experiences a stimulus below the threshold potential it will produce a small action potential

Ans: A

14. The term ‘presynaptic neuron’ refers to a neuron which _____.

a. has a primary role to detect neurotransmitter

b. is firing action potentials

c. is below threshold but depolarising

d. releases neurotransmitter from its terminals

Ans: D

15. A postsynaptic cell _____.

a. can respond to all neurotransmitters

b. computes all of the inputs it receives to bring about an appropriate change in its activity

c. must be a neuron

d. only receives input from one presynaptic cell

Ans: B

16. Neurotransmitters _____.

a. are all members of the same chemical class

b. Are only ever involved in communication from the pre- to the postsynaptic cell

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c. bind to only one type of receptor

d. can be excitatory or inhibitory

Ans: D

17. Neurotransmitter receptors can be described as being ligand-gated ion channels. This means that if they bind to their neurotransmitter, _____.

a. then an action potential will be generated in the postsynaptic cell

b. they only open if sodium levels outside the cell are also high

c. they undergo a structural change that causes an ion channel to open

d. they will cause the postsynaptic cell membrane to depolarise

Ans: C

18. Retrograde signalling is where _____.

a. action potentials can directly be transferred from one neuron to another

b. action potentials can travel from the terminals to the dendrites to influence their sensitivity to incoming neurotransmitters

c. the neurotransmitter binding to its receptor causes a change in intracellular signalling cascades in the postsynaptic cell

d. the postsynaptic cell releases a substance detected by the presynaptic cell

Ans: D

19. The term tripartite synapse refers to _____.

a. the ability of synapses to alter their function in response to changing inputs

b. the ability of the postsynaptic cell to express more than one kind of neurotransmitter receptor

c. the extremely small gap between the pre- and postsynaptic cells

d. the involvement of astrocytes in neurotransmission at synapses

Ans: D

20. Which of the following statements about the monoamine neurotransmitters is correct?

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a. Although produced by a relatively small number of neurons their actions are widespread throughout the brain.

b. Their receptors are mostly ligand-gated ion channels.

c. Their receptors are only found postsynaptically.

d. Their receptors are usually found on separate populations of neurons to the receptors for GABA and glutamate.

Ans: A

Short Answer Questions

1. Discuss how the structure of a neuron allows it to perform its function.
2. Give an account of the gross anatomical arrangement of the human nervous system.
3. Give an account of the major neurotransmitters found in the human brain and how their organisation allows the diversity of functions that the brain has.
4. What is meant by the term synaptic plasticity and why is it an important process for determining behaviour?
5. What is meant by the term ‘structure–function’ relationship? Using examples, discuss the validity of this term for the brain.

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