Chapter 48 – Nervous System

An overview of the nervous systems

1. Name the three stages in the processing of information by the nervous system
2. Distinguish among sensory neurons, interneurons, and motor neurons
3. List and describe the major parts of a neuron and explain the function of each
4. Describe the function of astrocytes, radial glia, oligodendrocytes, and Schwann cells.

The nature of nerve signals

5. Define a membrane potential and a resting potential
6. Describe the factors that contribute to a membrane potential
7. Explain why the membrane potential of a resting neuron is typically around 260 -280 mV
8. Explain the role of the sodium-potassium pump in maintaining the resting potential.
9. Distinguish between gated and ungated ion channels and among stretch-gated ion channels, ligand-gated ion channels, and voltage-gated ion channels.
10. Define a graded potential and explain how it is different from a resting potential or an action potential.
11. Describe the characteristics of an action potential. Explain the role of voltage-gated ion channels in this process.
12. Describe the two main factors that underlie the repolarizing phase of the action potential
13. Define the refractory period
14. Explain hwo an action potential is propagated along an axon.
15. Describe the factors that affect the speed of action potentials along an axon and describe adaptations that increase the speed of propagation.
16. Describe salutatory conduction
17. Compare an electrical synapse and a chemical synapse
18. Describe the structures of a chemical synapse and explain how they transmit an action potential from one cell to another
19. Explain how excitatory postsynaptic potentials (EPSP0 and inhibitory postsynaptic potentials (ISPS) affect the postsynaptic membrane potential.
20. Define summation and distinguish between temporal and spatial summation. Explain how summation applies to EPSP and IPSP
21. Explain the role of the axon hillock.
22. Describe the role of signal transduction pathways in indirect synaptic transmission
23. Describe the specific properties of the neurotransmitters acetylcholine and biogenic amines
24. Identify and describe the functions of the four amino acids and several neuropeptides that work as neurotransmitters.
25. Explain how endorphins function as natural analgesics
26. Describe the roles of nitric oxide and carbon monoxide as local regulators