

## CHAPTER FOURTEEN

### Answers to WHAT DID YOU LEARN?

1. (1) The PNS collects information. (2) The CNS processes and evaluates information. (3) The PNS and CNS both respond to information.
2. Dendrites are usually small and branching, and they may be quite numerous. Most neurons have only a single axon, and it may be very long.
3. Interneurons are housed entirely within the CNS. They process, store, and retrieve information, and “decide” how the body responds to stimuli.
4. The sensory (afferent) division of the nervous system is responsible for receiving sensory information *from* the body and transmitting this information *to* the CNS. Thus, afferent describes “input” and means transmission of information toward the CNS. In contrast, the motor (efferent) division is responsible for transmitting motor information *from* the CNS *to* muscles and glands. Thus, efferent describes “output” and means transmission of information from the CNS.
5. Collectively, the glial cells physically protect and isolate the neurons, provide an organized supporting framework for all the nervous tissue, and contribute some immune protection to neurons.
6. The perivascular feet of astrocytes completely ensheath capillary walls to strictly control the substances from the blood that reach neurons in the brain.
7. Microglia appear to be related to macrophages of the immune system. They wander through the CNS and phagocytize cellular debris from dead nervous tissue, microorganisms, waste products, and other foreign matter.
8. Satellite cells are located in PNS ganglia. They are flattened and arranged around the cell bodies of neurons, where they support the neurons, separate them from the surrounding interstitial fluid, and regulate the exchange of nutrients and waste between the neurons and their environment.
9. Neurolemmocytes myelinate PNS axons; oligodendrocytes myelinate CNS axons. Additionally, in the PNS a neurolemmocyte can myelinate only a small part of a single axon (about 1 millimeter along the length of the axon), whereas a single oligodendrocyte within the CNS can myelinate small parts of several axons.
10. Neurofibril nodes, or nodes of Ranvier, are the gaps along myelinated axons between the myelin wrapping.
11. PNS axon regeneration is dependent on (1) the amount of drainage, (2) the secretion of nerve growth factors, and (3) the distance from the damaged site to the effector.
12. The perineurium is a cellular and fibrous connective tissue layer that wraps around nerve fascicles.
13. The two types of synapses are electrical and chemical.
14. The rate of nerve impulse conduction is influenced by the diameter of the axon and the presence (or absence) of a myelin sheath.
15. A diverging circuit spreads information from one presynaptic neuron to several postsynaptic neurons, or from one pool to multiple pools. Reverberating circuits utilize feedback to produce a repeated, cyclical stimulation of a neuronal pathway or circuit, which continues until inhibitory stimuli or synaptic fatigue break the cycle of stimulation.