

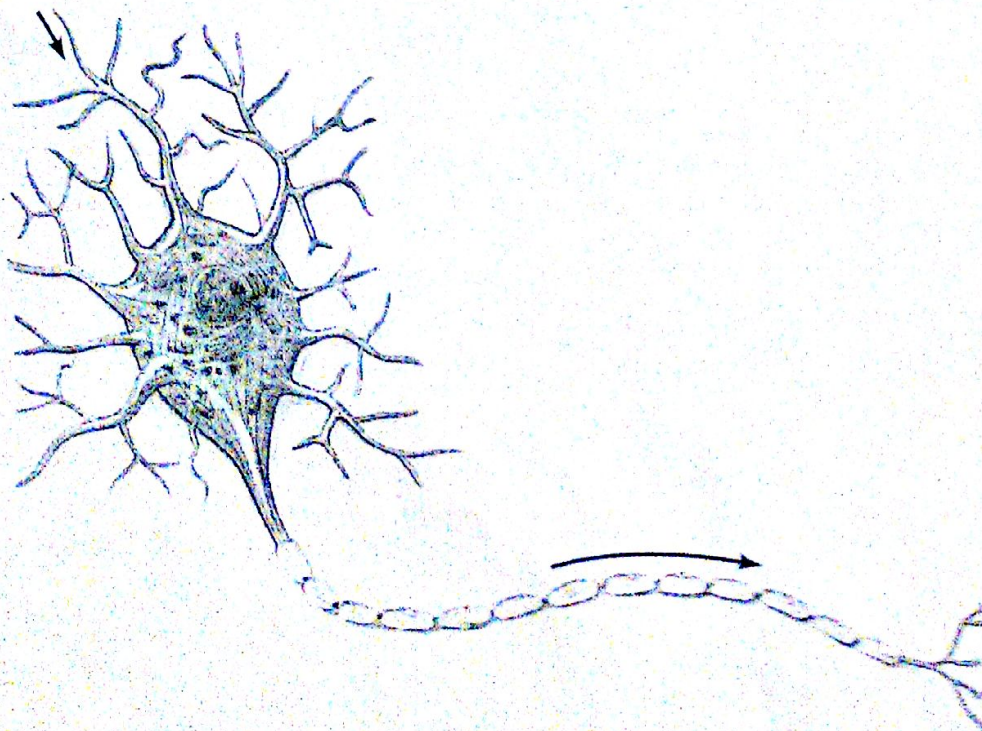
As your eyes scan these words, the light and dark patterns printed on the page stimulate light-sensitive cells in your eyes. Changes occur in the membranes of nerve cells in the optic nerve, causing ions to pass in and out of the cells. The changes are transmitted like waves along the nerve cells all the way to visual areas in the back of the brain, in the cerebral cortex. In association areas of the cortex, these words are interpreted, compared with images and memories, and perhaps stored in memory themselves. At the end of each line of text, the brain's motor cortex sends nerve impulses to tiny muscles to move the eyes back to the beginning of the next line. At the same time, other areas of the brain monitor body temperature and blood pressure. They send impulses out by way of the spinal cord to your heart, blood vessels, and sweat glands to maintain homeostasis. In this way, your nervous system senses the environment, interprets it, and directs responses to your muscles and glands. Your nervous system will enable you to read and understand Chapter 28, which is all about nervous systems.

Organizing Your Knowledge

Exercise 1 (Module 28.2)

Web/CD Activity 28A *Neuron Structure*

Review the structure of a neuron by labeling and coloring this diagram. Label the cell body, axon, myelin sheath, dendrites, synaptic terminals, and a node of Ranvier. Color the dendrites green, the cell body blue, the axon red, and the myelin sheath yellow.



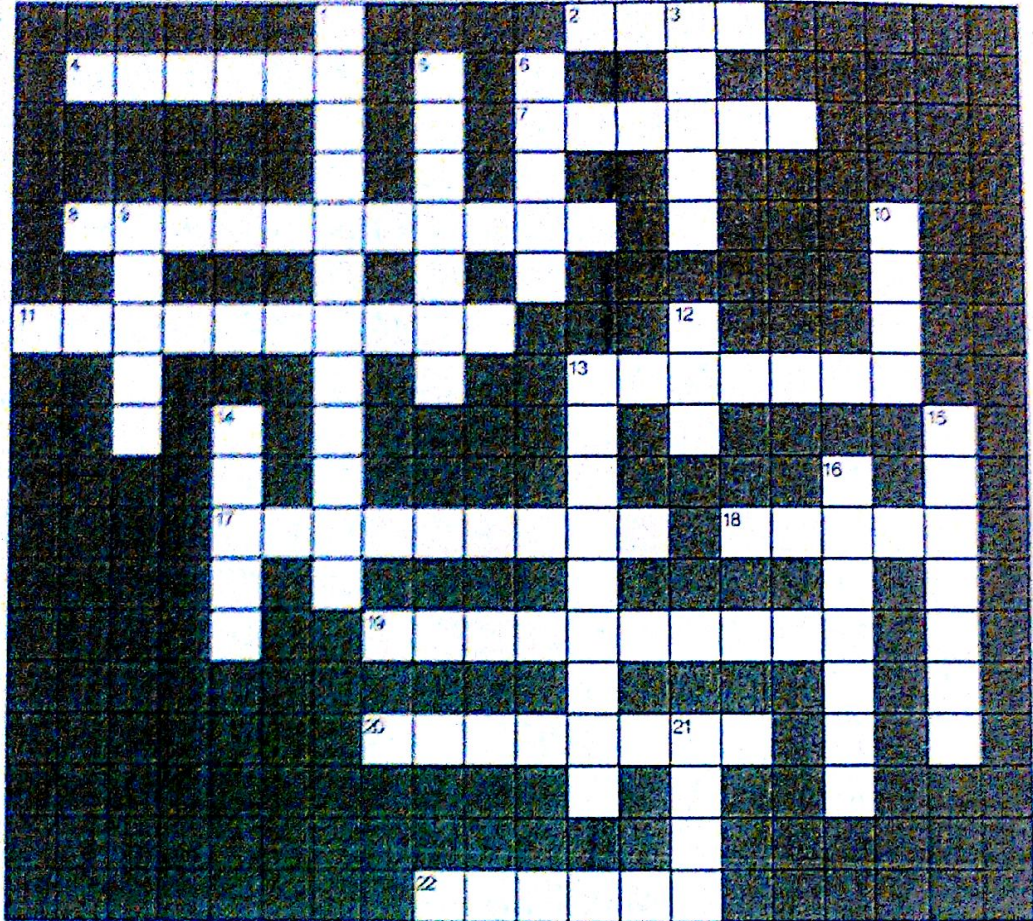
Exercise 2 (Modules 28.1 - 28.2)

Web/CD 28A Neuron Structure

These modules describe the structures and functions of nervous systems and neurons. Review them by completing this crossword puzzle.

Across

- 2. Supporting cells, or _____, help neurons do their jobs.
- 4. A _____ is a cell specialized for carrying signals.
- 7. Motor _____ is conduction of signals from integration centers to effectors.
- 8. _____ is the interpretation of sensory signals and formulation of responses.
- 11. The _____ nervous system (PNS) consists of nerves outside the CNS.
- 13. _____ neurons carry information from sensory receptors in the CNS.
- 17. _____ receive messages and carry them to the neuron cell body.
- 18. The CNS consists of the _____ and spinal cord.
- 19. A Schwann cell is one type of _____ cell.
- 20. An axon has many branches, each with a synaptic _____ at its end.
- 22. A _____ sheath insulates a neuron.

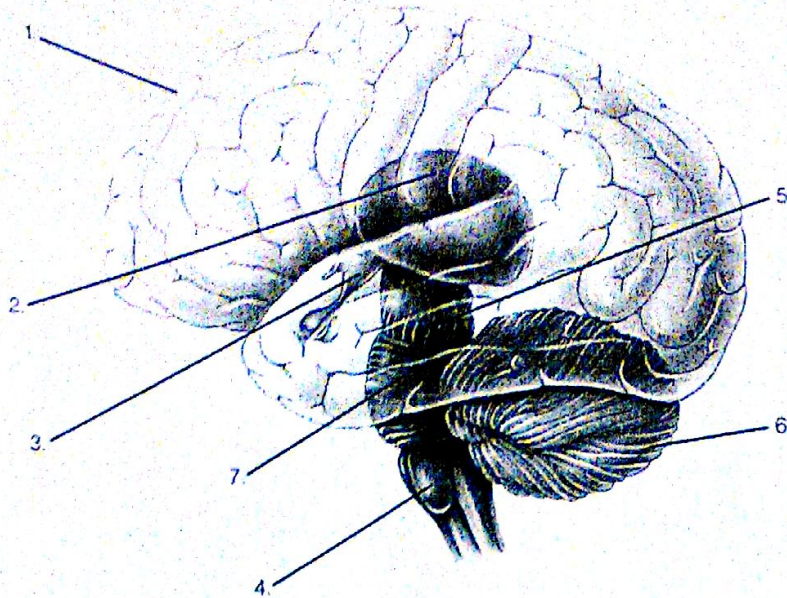


Down

- 1. _____ in the central nervous system integrate data.
- 3. Sensory _____ is conduction of signals from sensory receptors to the brain.
- 5. The _____ nervous system is abbreviated "CNS."
- 6. _____ neurons carry signals from the CNS to effectors.
- 9. A _____ is a bundle of neuron extensions wrapped in connective tissue.
- 10. The nucleus of a neuron is in the cell _____.
- 12. Interneurons are entirely within the _____.
- 13. The myelin sheath is destroyed in multiple _____.
- 14. Signals go faster when they jump along a neuron, between _____ of Ranvier.
- 15. The site of contact between two nerve cells is called a _____.
- 16. _____ are clusters of cell bodies belonging to neurons making up a nerve.
- 21. The _____ carries signals toward another neuron or an effector.

Exercise 10 (Modules 28.14 – 28.15)

Name each of the structures identified by numbers on this diagram of the human brain. Then match each structure or area with its function (A-G).



- A. Coordination, balance, motor memory
- B. Controls breathing
- C. Visual reflexes, integrates auditory data
- D. Controls breathing, circulation, swallowing, and digestion
- E. Memory, learning, speech, emotions
- F. Sorts and relays information to higher brain centers
- G. Body temperature, hunger, thirst, sex, biological clock

	Function
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____

Exercise 11 (Modules 28.15 – 28.19)

These modules outline activities of various parts of the cerebrum. Review these activities and other aspects of the nervous system by filling in the blanks in the following story.

Liz appeared to be sleeping quietly, but she was dreaming, and her mind was active. Beneath her closed eyelids, her eyes darted back and forth rapidly, showing that she was in a state called ¹ _____ sleep. Outside her window, a car squealed around a corner. An area in Liz's ² _____ triggered arousal, and Liz woke up. She opened her eyes and looked at the clock—3:00 A.M. Then she remembered her dream. She had been riding her bike between two rows of trees as fluffy clouds passed overhead. "That's it! The idea for my art project," she thought. She fumbled for the light switch, grabbed a pencil and sheet of paper from the bookcase, and scribbled *clouds*. As she wrote, the movement of her hand was controlled by the ³ _____ cortex in the ⁴ _____ lobe of her cerebrum, which sent nerve impulses to the muscles of her arm via ⁵ _____ neurons. The ⁶ _____ helped the cerebrum by making the movements smooth and coordinated. Liz clicked off the light and soon went back to sleep.