CHAPTER 12
NERVOUS SYSTEM

CHAPTER CONTENTS

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MEDIA LIBRARY

Student DVD-ROM
• Twelve different interactive learning games
• Flash card generator
• Audio Glossary
• Professional Profile video—Electroneurodiagnostics
• Body Rhythms
• Terminology Translator

Companion Website
• Multiple Choice, True/False, and Fill-in-the-Blank practice questions
• Labeling exercises
• Case study
• Additional Professional Profile information

IRDVD
• New York Times link for research into specific pathologies
• Web Destination activities
• Audio Glossary
• Link to VangoNotes
• Link to drug updates

• Animations
• 3D interactive animation of brain anatomy
• Multiple sclerosis
• Drag-and-drop labeling activity
• Central Nervous System
OBJECTIVE 1
Identify and define the combining forms and suffixes introduced in this chapter.

Text page: 388; PowerPoint slides: 6–9

LECTURE NOTES
Combining Forms
cephal/o  head
 cerebell/o  cerebellum
cerebr/o  cerebrum
encephal/o  brain
gli/o  glue
medull/o  medulla oblongata
m mening/o  meninges
meningi/o  meninges
myel/o  spinal cord
neur/o  nerve
phas/o  speech
poli/o  gray matter
pont/o  pons
radicul/o  nerve root
thalam/o  thalamus
thecl/o  sheath (meninges)
ventricul/o  brain ventricle

Suffixes
-algesia  pain, sensitivity
-esthesia  feeling, sensation
-paresis  weakness
-phasis  speech
-plegia  paralysis
-taxia  muscle coordination

TEACHING STRATEGIES
• Encourage/remind students to add new word parts to their flash cards.

Medical Terminology Bee
• Create PowerPoint flash cards of new combining forms and suffixes presented in this chapter; have all students stand and then define word part; if student is correct, he or she remains standing; if student is wrong, he or she sits down; continue until only one student is standing.

LEARNING ACTIVITIES
Worksheet 12A
• New Combining Form and Suffix Handout

Worksheet 12B
• Medical Term Analysis

Quiz 12A
• May be used as a worksheet

Text
• Practice Exercises

Student DVD-ROM
• Learning games
• Make flash cards

CW
• Practice questions

ASSESSMENTS
Quiz 12A—New Word Parts Quiz
Test Bank—Fill-in-the-Blank questions
OBJECTIVE 2
Correctly spell and pronounce medical terms and major anatomical structures relating to the nervous system.

**LECTURE NOTES**
Pronunciation for medical terms in this chapter can be found:
- In parentheses following key terms
- In the Audio Glossary on Student DVD-ROM
- In the Audio Glossary at Companion Website

**TEACHING STRATEGIES**
Emphasize to students:
- Importance of correctly spelling terms.
- How sounding out terms can assist in learning how to spell the terms.
Say each new term in class and have students repeat it.

**Pop Questions**
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension of spelling strategies.

**LEARNING ACTIVITIES**
**Worksheet 12B**
- Medical Term Analysis

**Terminology Checklist**
- Can be used to practice pronunciation using the Audio Glossary as reference

**Text**
- Practice Exercises

**Flash cards**
- Look at the definition and write out/pronounce terms

**Student DVD-ROM**
- Audio Glossary
- Spelling Challenge game
- Crossword and Word Search puzzles

**ASSESSMENTS**
**Quiz 12B—Spelling Quiz**
Suggested terms:
1. neurotransmitter
2. synapse
3. neuroglial
4. meninges
5. diencephalon
6. arachnoid
7. parasympathetic
8. anesthesiology
9. radiculopathy
10. hydrocephalus
11. paresthesia
12. syncope
13. unconscious
14. Alzheimer’s
15. cerebrovascular
16. amyotrophic
17. myelomeningocele
18. myasthenia
19. echoencephalography
20. endarterectomy

**Test Bank—questions**
OBJECTIVE 3
Locate and describe the major organs of the nervous system and their functions.
Text pages: 390–395; PowerPoint slides: 10; 22–50

LECTURE NOTES

• Responsible for coordinating all activity of body; first receives information from both external and internal sensory receptors; then uses information to adjust activity of muscles and glands to match needs of body
• Nervous system subdivided into central nervous system (CNS) and peripheral nervous system (PNS)
• Central nervous system consists of brain and spinal cord; sensory information comes into central nervous system, where it is processed; motor messages then exit central nervous system carrying commands to muscles and glands
• Nerves of peripheral nervous system are cranial nerves and spinal nerves: sensory nerves carry information to central nervous system and motor nerves carry commands away from central nervous system
• All portions of nervous system are composed of nervous tissue

Brain

• One of largest organs in body
• Coordinates most body activities; center for thought, memory, judgment, and emotion
• Each part of brain is responsible for controlling different body functions, such as temperature regulation, blood pressure, and breathing
• Four sections to brain: cerebrum, cerebellum, diencephalon, and brain stem (see Figure 12.3)
• Cerebrum—largest section of brain; located in upper portion of brain and is area that processes thoughts, judgment, memory, problem solving, and language; outer layer of cerebrum is cerebral cortex, composed of folds of gray matter; elevated portions of cerebrum, or convolutions, are called gyri and are separated by fissures, or valleys, called sulci; is subdivided into left and right halves called cerebral hemispheres; each hemisphere has four lobes; see Figure 12.4:
  1. Frontal lobe: most anterior portion of cerebrum; controls motor function, personality, and speech
  2. Parietal lobe: most superior portion of cerebrum; receives and interprets nerve impulses from sensory receptors and interprets language
  3. Occipital lobe: most posterior portion of cerebrum; controls vision
  4. Temporal lobe: left and right lateral portion of cerebrum; controls hearing and smell
• Diencephalon—located below cerebrum, contains two of most critical areas of the brain, thalamus and hypothalamus; thalamus is composed of gray matter and acts as center for relaying impulses from eyes, ears, and skin to cerebrum; pain perception is controlled by thalamus; hypothalamus located just below thalamus controls body temperature, appetite, sleep, sexual desire, and emotions; hypothalamus is responsible for controlling autonomic nervous system, cardiovascular system, digestive system, and release of hormones from pituitary gland

TEACHING STRATEGIES

Visual Aids
• Use full-size anatomical charts and models to illustrate different organs of nervous system, especially brain.
IRDVD
• See PowerPoint presentation on the Instructor’s Resource DVD for a drag-and-drop central nervous system anatomy activity; display on screen and have students discuss and place labels during class.
• See PowerPoint presentation on the Instructor’s Resource DVD for a 3D animation of the brain.

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES

Worksheet 12C
• Chapter Review
Text
• Practice Exercises
Student DVD-ROM
• Labeling exercises
• Learning games
CW
• Labeling exercise
• Practice questions
Quiz 12D
• May be used as worksheet

ASSESSMENTS

Quiz 12D—Labeling Diagrams
Test Bank—questions
• **Cerebellum**—second largest portion of brain; located beneath posterior part of cerebrum; aids in coordinating voluntary body movements and maintaining balance and equilibrium; cerebellum refines muscular movement that is initiated in cerebrum

• **Brain stem**—area has three components: midbrain, pons, and medulla oblongata; midbrain acts as pathway for impulses to be conducted between brain and spinal cord; pons—term meaning bridge—connects cerebellum to rest of brain; medulla oblongata is most inferior positioned portion of brain; connects brain to spinal cord; area contains centers that control respiration, heart rate, temperature, and blood pressure; also site where nerve tracts cross from one side of brain to control functions and movement on other side of body; with few exceptions, left side of brain controls right side of body and vice versa

• **Ventricles**—brain has four interconnected cavities; one in each cerebral hemisphere, one in thalamus, and one in front of cerebellum; contain **cerebrospinal fluid** (CSF), watery, clear fluid provides protection from shock or sudden motion to brain and spinal cord

**Spinal Cord**

• Function is to provide pathway for impulses traveling to and from brain

• Column of nervous tissue; extends from medulla oblongata of brain down to level of second lumbar vertebra within vertebral column

• 33 vertebrae of backbone line up to form continuous canal for spinal cord called **spinal cavity** or **vertebral canal**

• See Figure 12.5

• Also protected by cerebrospinal fluid; flows down center of spinal cord within **central canal**; inner core of spinal cord consists of cell bodies and dendrites of peripheral nerves and therefore is gray matter; outer portion of spinal cord is myelinated white matter; white matter is either **ascending tracts** carrying sensory information up to brain or **descending tracts** carrying motor commands down from brain to peripheral nerve

**Meninges**

• Three layers of connective tissue membranes; surround brain and spinal cord

• See Figure 12.6

• From external to internal, meninges are:
  1. **Dura mater**—meaning **tough mother**; forms tough, fibrous sac around central nervous system
  2. **Subdural space**—actual space between dura mater and arachnoid layers
  3. **Arachnoid layer**—meaning **spider-like**; thin, delicate layer attached to pia mater by web-like filaments
  4. **Subarachnoid space**—space between arachnoid layer and pia mater; contains cerebrospinal fluid that cushions brain from outside
  5. **Pia mater**—meaning **soft mother**; innermost membrane layer and is applied directly to surface of brain and spinal cord
OBJECTIVE 4
Describe the components of a neuron.
Text page: 390; PowerPoint slides: 11–19

LECTURE NOTES
- Consists of two basic types of cells: neurons and neuroglial cells
- Neurons—individual nerve cells; capable of conducting electrical impulses in response to stimulus
- Neurons have three basic parts: dendrites, nerve cell body, and axon (see Figure 12.1A)
- Dendrites—highly branched projections that receive impulses
- Nerve cell body—contains nucleus and many of other organelles of cell (see Figure 12.1B)
- Axon—neuron has only single axon; projection from nerve cell body that conducts electrical impulse toward destination
- Synapse—point at which axon of one neuron meets dendrite of next neuron; electrical impulses cannot pass directly across gap between two neurons, called synaptic cleft; require help of chemical messenger, called neurotransmitter
- Neuroglial cells—found in nervous tissue; each has different support function for neurons; for example, some neuroglial cells produce myelin, fatty substance that acts as insulation for many axons so that they conduct electrical impulses faster; neuroglial cells do not conduct electrical impulses.

TEACHING STRATEGIES
Visual Aids
- Use full-size anatomical charts and models to illustrate the structure of a nerve.

Pop Questions
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES
Worksheet 12C
- Chapter Review
Text
- Labeling exercise 12.B1
- Practice Exercises

Student DVD-ROM
- Labeling exercise
- Learning games

CW
- Labeling exercise
- Practice questions

Quiz 12C
- May be used as worksheet

ASSESSMENTS
Quiz 12C—Labeling Diagram
Test Bank—questions

OBJECTIVE 5
Distinguish between the central nervous system, peripheral nervous system, and autonomic nervous system.
Text pages: 390–398; PowerPoint slides: 20–21; 51–62

LECTURE NOTES
Central Nervous System
- Brain and spinal cord
- Receives impulses from all over body, processes this information, then responds with an action
- Consists of both gray and white matter
- Gray matter—comprised of unsheathed or uncovered cell bodies and dendrites
- White matter—myelinated nerve fibers (see Figure 12.2); myelin sheath makes nervous tissue appear white

TEACHING STRATEGIES
Visual Aids
- Use full-size anatomical charts and models to illustrate the organization of different parts of the nervous system.

Pop Questions
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.
• **Tracts**—bundles of nerve fibers interconnecting different parts of central nervous system
• Central nervous system is encased and protected by **meninges**

**Peripheral Nervous System (PNS)**

• 12 pairs of cranial nerves and 31 pairs of spinal nerves
• **Nerve**—bundle of axon fibers located outside central nervous system that carries messages between central nervous system and various parts of body
• Whether nerve is cranial or spinal is determined by where nerve originates; cranial nerves arise from brain, mainly at medulla oblongata; spinal nerves split off from spinal cord, and one pair (left and right) exits between each pair of vertebrae
• **Nerve root**—point where either type of nerve is attached to central nervous system
• Names of most nerves reflect either organ nerve serves or portion of body the nerve is traveling through
• Entire list of cranial nerves is found in Table 12.1; Figure 12.7 illustrates some major spinal nerves in human body
• Most nerves carry information to and from central nervous system, individual neurons carry information in only one direction; **afferent neurons**, also called **sensory neurons**, carry sensory information from sensory receptor to central nervous system; **efferent neurons**, also called **motor neurons**, carry activity instructions from central nervous system to muscles or glands out in body (see Figure 12.8)
• **Ganglion**—nerve cell bodies of neurons forming nerve are grouped together in knot-like mass; located outside central nervous system
• Nerves of peripheral nervous system are subdivided into two divisions, **autonomic nervous system** (ANS) and **somatic nerves**, each serving a different area of body

**Autonomic Nervous System**

• Involved with control of involuntary or unconscious bodily functions
• May increase or decrease activity of smooth muscle found in viscera and blood vessels, cardiac muscle, and glands
• Divided into two branches: **sympathetic branch** and **parasympathetic branch**
• Sympathetic nerves control “fight-or-flight” reaction during times of stress and crisis; increase heart rate, dilate airways, increase blood pressure, inhibit digestion, and stimulate production of adrenaline during crisis
• Parasympathetic nerves serve as counterbalance for sympathetic nerves, “rest-and-digest” reaction; cause heart rate to slow down, lower blood pressure, and stimulate digestion.

**Somatic Nerves**

• Serve skin and skeletal muscles
• Mainly involved with conscious and voluntary activities of body
• Large variety of sensory receptors found in dermis layer of skin use somatic nerves to send their information, such as touch, temperature, pressure, and pain, to brain
• Also carry motor commands to skeletal muscles

**LEARNING ACTIVITIES**

**Worksheet 12C**
• Chapter Review

**Text**
• Labeling exercise 12.B1
• Practice Exercises

**Student DVD-ROM**
• Learning games

**CW**
• Practice questions

**ASSESSMENTS**

**Quiz 12G**—Chapter Review
**Test Bank**—questions
OBJECTIVE 6
Build and define nervous system medical terms from word parts.

Text pages: 398–399; PowerPoint slides: 63–68

LECTURE NOTES
Combining

<table>
<thead>
<tr>
<th>Form</th>
<th>Medical Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>cephal/o</td>
<td>cephalalgia</td>
<td>head pain (headache)</td>
</tr>
<tr>
<td>cerebell/o</td>
<td>cerebellar</td>
<td>pertaining to cerebellum</td>
</tr>
<tr>
<td>cerebr/o</td>
<td>cerebral</td>
<td>pertaining to cerebrum</td>
</tr>
<tr>
<td>encephal/o</td>
<td>electroencephalogram (EEG)</td>
<td>record of brain's electricity</td>
</tr>
<tr>
<td>meningi/o</td>
<td>meningioma</td>
<td>meninges tumor</td>
</tr>
<tr>
<td>mening/o</td>
<td>meningeal</td>
<td>pertaining to meninges</td>
</tr>
<tr>
<td>myel/o</td>
<td>myelogram</td>
<td>record of spinal cord</td>
</tr>
<tr>
<td>neur/o</td>
<td>neural</td>
<td>pertaining to nerves</td>
</tr>
<tr>
<td>neur/o</td>
<td>neuralgia</td>
<td>nerve pain</td>
</tr>
<tr>
<td>neur/o</td>
<td>neurectomy</td>
<td>removal of nerve</td>
</tr>
<tr>
<td>neur/o</td>
<td>neurologist</td>
<td>specialist in nerves</td>
</tr>
<tr>
<td>neur/o</td>
<td>neura</td>
<td>nerve tumor</td>
</tr>
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<td>neur/o</td>
<td>neuropathy</td>
<td>nerve disease</td>
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<td>neur/o</td>
<td>neurectomy</td>
<td>removal of nerve</td>
</tr>
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<td>neur/o</td>
<td>neuroplasty</td>
<td>surgical repair of nerves</td>
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<td>pont/o</td>
<td>pontine</td>
<td>pertaining to pons</td>
</tr>
<tr>
<td>radicul/o</td>
<td>radiculitis</td>
<td>nerve root inflammation</td>
</tr>
<tr>
<td>radicul/o</td>
<td>radiculopathy</td>
<td>nerve root disease</td>
</tr>
<tr>
<td>thalam/o</td>
<td>thalamic</td>
<td>pertaining to thalamus</td>
</tr>
<tr>
<td>thec/o</td>
<td>intrathecal</td>
<td>pertaining to within meninges</td>
</tr>
</tbody>
</table>

Suffix

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Medical Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>-algesia</td>
<td>analgesia</td>
<td>absence of pain or sensation</td>
</tr>
<tr>
<td>-esthesia</td>
<td>anesthesia</td>
<td>lack of sensations</td>
</tr>
<tr>
<td>-hyperesthesia</td>
<td>hyperesthesia</td>
<td>excessive sensations</td>
</tr>
<tr>
<td>-paresis</td>
<td>monoparesis</td>
<td>weakness of one</td>
</tr>
<tr>
<td>-phasia</td>
<td>aphasis</td>
<td>lack of speech</td>
</tr>
<tr>
<td>-plegia</td>
<td>monoplegia</td>
<td>paralysis of one</td>
</tr>
<tr>
<td>-plegia</td>
<td>quadriplegia</td>
<td>paralysis of four</td>
</tr>
<tr>
<td>-taxia</td>
<td>ataxia</td>
<td>lack of muscle coordination</td>
</tr>
</tbody>
</table>

TEACHING STRATEGIES

- Reinforce how many nervous system terms can be constructed from word parts.
- Read aloud chapter terms that are made up of word parts; have students identify parts and define terms, either aloud or individually on paper.
- Write sentences on the board using common words; have students substitute correct medical terms.

Pop Questions

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES

Worksheet 12A
- New Word Parts handout

Worksheet 12B
- Med Term Analysis

Worksheet 12C
- Chapter Review

Quiz 12E
- May be used as worksheet

Text
- Practice Exercises
- Terminology Checklist

Student DVD-ROM
- Learning games
- Flash cards

CW
- Practice questions

ASSESSMENTS

Quiz 12E—Word Building Quiz
Quiz 12G—Chapter Review
Test Bank—questions
**OBJECTIVE 7**
Identify and define nervous system vocabulary terms.

**Term** | **Definition**
---|---
anesthesiology | branch of medicine specializing in anesthesia, including for surgical procedures, resuscitation measures, and management of acute and chronic pain; physician is anesthesiologist
aura | sensations, such as seeing colors or smelling unusual odor, occurring prior to epileptic seizure or migraine headache
coma | profound unconsciousness or stupor resulting from illness or injury
conscious | condition of being awake and aware of surroundings
convulsion | severe involuntary muscle contractions and relaxations; variety of causes, such as epilepsy, fever, and toxic conditions
delirium | abnormal mental state characterized by confusion, disorientation, and agitation
dementia | progressive impairment of intellectual function that interferes with performing activities of daily living; patients have little awareness of their condition; found in disorders such as Alzheimer’s
deleter | localized seizure often affecting one limb
hemiparesis | weakness or loss of motion on one side of body
hemiplegia | paralysis on only one side of body
neurology | branch of medicine concerned with diagnosis and treatment of diseases and conditions of nervous system; physician is neurologist
neurosurgery | branch of medicine concerned with treating conditions and diseases of nervous systems by surgical means; physician is neurosurgeon
palsy | temporary or permanent loss of ability to control movement
paralysis | temporary or permanent loss of function or voluntary movement
paraplegia | paralysis of lower portion of body and both legs
paresis | abnormal sensation such as burning or tingling
seizure | sudden, uncontrollable onset of symptoms; such as epileptic seizure
syncope | fainting
tremor | involuntary repetitive alternating movement of part of body
unconscious | condition or state of being unaware of surroundings, with inability to respond to stimuli

**TEACHING STRATEGIES**
- Write sentences on the board using common words; have students substitute correct medical terms.

**Jeopardy Game**
- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Pathology, Diagnostic, and Therapeutic terms.

**Pop Questions**
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**
**Worksheet 12C**
- Chapter Review

**Text**
- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

**Student DVD-ROM**
- Learning games
- Flash cards

**CW**
- Practice questions
- Case Study

**ASSESSMENTS**
**Quiz 12G**—Chapter Review
**Test Bank**—questions
**OBJECTIVE 8**
Identify and define selected nervous system pathology terms.
Text pages: 400–405; PowerPoint slides: 73–94

**LECTURE NOTES**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>absence seizure</td>
<td>type of epileptic seizure; lasts only few seconds to half minute; characterized by loss of awareness and absence of activity; also called petit mal seizure</td>
</tr>
<tr>
<td>Alzheimer's disease</td>
<td>chronic, organic mental disorder consisting of dementia; more prevalent in adults between ages 40 and 60; involves progressive disorientation, apathy, speech and gait disturbances, and loss of memory</td>
</tr>
<tr>
<td>astrocytoma</td>
<td>tumor of brain or spinal cord composed of astrocytes, one type of neuroglial cell</td>
</tr>
<tr>
<td>brain tumor</td>
<td>intracranial mass, either benign or malignant; benign tumor of brain can still be fatal since it grows and causes pressure on normal brain tissue</td>
</tr>
<tr>
<td>cerebral aneurysm</td>
<td>localized abnormal dilatation of blood vessel, usually artery; result of congenital defect or weakness in wall of vessel; ruptured aneurysm is common cause of hemorrhagic cerebrovascular accident</td>
</tr>
<tr>
<td>cerebral contusion</td>
<td>bruising of brain from blow or impact; symptoms last longer than 24 hours; include unconsciousness, dizziness, vomiting, unequal pupil size, and shock</td>
</tr>
<tr>
<td>cerebral palsy (CP)</td>
<td>nonprogressive brain damage resulting from defect, trauma, or oxygen deprivation at time of birth</td>
</tr>
<tr>
<td>cerebral aneurysm</td>
<td>localized abnormal dilatation of blood vessel, usually artery; result of congenital defect or weakness in wall of vessel; ruptured aneurysm is common cause of hemorrhagic cerebrovascular accident</td>
</tr>
<tr>
<td>concussion</td>
<td>injury to brain resulting from brain being shaken inside skull from blow or impact; can result in unconsciousness, dizziness, vomiting, unequal pupil size, and shock; symptoms last 24 hours or less</td>
</tr>
<tr>
<td>epilepsy</td>
<td>recurrent disorder of brain in which seizures and loss of consciousness occur as result of uncontrolled electrical activity of neurons in brain</td>
</tr>
</tbody>
</table>

**TEACHING STRATEGIES**

- Select two students to do 5-minute presentations of their Internet research in class.
- Write sentences on the board using common words; have students substitute correct medical terms.

**Jeopardy Game**

- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Diagnostic, and Therapeutic terms.

**IRDVD**

- See PowerPoint presentation on the Instructor's Resource DVD for videos on:
  - Epilepsy
  - Tonic-clonic seizure
  - Absence seizure
  - Parkinson's disease

**Pop Questions**

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**

**Internet Research**

- Have students select a specific pathology and use Internet resources to research its symptoms, diagnosis, and treatments.

**Worksheet 12C**

- Chapter Review

**Text**

- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

**Student DVD-ROM**

- Learning games
- Flash cards

**CW**

- Practice questions
- Case Study
hydrocephalus — accumulation of cerebrospinal fluid within ventricles of brain; causing head to be enlarged; treated by creating artificial shunt for fluid to leave brain; if untreated may lead to seizures and mental retardation

migraine — specific type of headache characterized by severe head pain, sensitivity to light, dizziness, and nausea

Parkinson's disease — chronic disorder of nervous system with fine tremors, muscular weakness, rigidity, and shuffling gait

Reye syndrome — combination of symptoms; includes acute encephalopathy and damage to various organs, especially liver; occurs in children under age 15 who have had viral infection and is associated with taking aspirin; for this reason, it's not recommended for children to use aspirin

tonic-clonic seizure — type of severe epileptic seizure characterized by loss of consciousness and convulsions; seizure alternates between strong continuous muscle spasms (tonic) and rhythmic muscle contraction and relaxation (clonic); also called grand mal seizure

transient ischemic attack (TIA) — temporary interference with blood supply to brain, causing neurological symptoms such as dizziness, numbness, and hemiparesis; may eventually lead to full-blown stroke (cerebrovascular accident)

Spinal Cord

amyotrophic lateral sclerosis (ALS) — disease with muscular weakness and atrophy due to degeneration of motor neurons of spinal cord; also called Lou Gehrig's disease, after New York Yankees' baseball player who died from disease

meningocele — congenital condition in which meninges protrude through opening in vertebral column; see spina bifida

myelomeningocele — congenital condition in which meninges and spinal cord protrude through opening in vertebral column; see spina bifida

poliomyelitis — viral inflammation of gray matter of spinal cord; results in varying degrees of paralysis, may be mild and reversible or may be severe and permanent; disease almost eliminated due to discovery of vaccine in 1950s

spina bifida — congenital defect in walls of spinal canal in which laminae of vertebra do not meet or close; may result in meningocele or myelomeningocele—meninges or spinal cord being pushed through opening

spinal cord injury (SCI) — damage to spinal cord as result of trauma; spinal cord may be bruised or completely severed

• Web Destination activities on Alzheimer's disease and cerebrovascular accidents
• New York Times link for research into specific pathologies

ASSESSMENTS
Quiz 12G—Chapter Review
Test Bank—questions
Nerves

Bell’s palsy  one-sided facial paralysis due to inflammation of facial nerve, probably viral in nature; patient cannot control salivation, tearing of eyes, or expression, but most will eventually recover

Guillain-Barré syndrome  disease of nervous system in which nerves lose myelin covering; may be caused by autoimmune reaction; characterized by loss of sensation and/or muscle control starting in legs; symptoms move toward trunk and may paralyze diaphragm

multiple sclerosis (MS)  inflammatory disease of central nervous system extreme weakness and numbness due to loss of myelin insulation from nerves

myasthenia gravis  disease with severe muscular weakness and fatigue due to insufficient neurotransmitter at synapse

shingles  eruption of painful blisters on body along nerve path; thought to be caused by Herpes zoster virus infection of nerve root

Meninges

epidural hematoma  mass of blood in space outside dura mater of brain and spinal cord

subdural hematoma  mass of blood forming beneath dura mater; meninges are torn by trauma; may exert fatal pressure on brain if hematoma is not drained by surgery

OBJECTIVE 9
Identify and define selected nervous system diagnostic procedures.

Text pages: 405–406; PowerPoint slides: 95–100

LEcTUrE nOTES

Term  Definition

Clinical Laboratory Tests

cerebrospinal fluid analysis  laboratory examination of clear, watery, colorless fluid from within brain and spinal cord; infections and abnormal presence of blood can be detected in this test

Diagnostic Imaging

brain scan  image of brain taken after injection of radioactive isotopes into circulation

cerebral angiography  X-ray of blood vessels of brain after injection of radiopaque dye

echoencephalography  recording of ultrasonic echoes of brain; useful in determining abnormal patterns of shifting in brain

TeACHING STRATEGIES

- Review actual laboratory CT scan, MRIs, or PET scans of brain.
- Write sentences on the board using common words; have students substitute correct medical terms.

IRDVD
- See PowerPoint presentation on the Instructor’s Resource DVD for video on the topic of electroneurodiagnostic technicians

Jeopardy Game
- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Pathology, and Therapeutic terms.

Pop Questions
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.
myelography injection of radiopaque dye into spinal canal; X-ray is taken to examine normal and abnormal outlines made by dye

positron emission tomography (PET) use of positive radionuclides to reconstruct brain sections; measurement taken of oxygen and glucose uptake, cerebral blood flow, and blood volume; amount of glucose brain uses indicates how metabolically active tissue is

Additional Diagnostic Tests

Babinski's reflex reflex test to determine lesions and abnormalities in nervous system; reflex is present if great toe extends instead of flexes when lateral sole of foot is stroked; normal response to this stimulation is flexion of toe

electroencephalography (EEG) recording electrical activity of brain by placing electrodes at various positions on scalp; used in sleep studies to determine if there is normal pattern of activity during sleep

lumbar puncture (LP) puncture with needle into lumbar area to withdraw fluid for examination and for injection of anesthesia; also called spinal puncture or spinal tap

erve conduction velocity test measures how fast impulse travels along nerve; can pinpoint area of nerve damage

Guest speaker
- Invite an electroneurodiagnostic technician to class to discuss training and different types of tests he or she conducts.

LEARNING ACTIVITIES

Worksheet 12C
- Chapter Review

Text
- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

Student DVD-ROM
- Learning games
- Flash cards

CW
- Practice questions
- Case Study
- New York Times link for research into specific diagnostic procedures

ASSESSMENTS

Quiz 12G—Chapter Review
Test Bank—questions

OBJECTIVE 10
Identify and define selected nervous system therapeutic procedures.

Text page: 407; PowerPoint slides: 101–102

LECTURE NOTES

Term Medical Procedures
nerve block injection of regional anesthetic to stop passage of sensory or pain impulses along nerve path

Surgical Procedures
carotid endarterectomy surgical procedure for removing obstruction within carotid artery, major artery in neck that carries oxygenated blood to brain; developed to prevent strokes, but is useful only in severe stenosis with transient ischemic attack
cerebrospinal fluid shunts surgical procedure in which bypass is created to drain cerebrospinal fluid; used to treat hydrocephalus by draining excess cerebrospinal fluid from brain and diverting it to abdominal cavity

TEACHING STRATEGIES
- Write sentences on the board using common words; have students substitute correct medical terms.

Jeopardy Game
- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Pathology, and Diagnostic terms.

Pop Questions
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES

Worksheet 12C
- Chapter Review

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## Objective 11

Identify and define selected medications relating to the nervous system.

Text page: 407; PowerPoint slides: 103–104

### Lecture Notes

<table>
<thead>
<tr>
<th>Classification</th>
<th>Action</th>
<th>Generic and Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>analgesic</td>
<td>non-narcotic medication; treats minor to moderate pain; includes aspirin, acetaminophen, and ibuprofen</td>
<td>aspirin, Bayer, Ecotrin; acetaminophen, Tylenol; ibuprofen, Aleve</td>
</tr>
<tr>
<td>anesthetic</td>
<td>produces loss of sensation or loss of consciousness</td>
<td>lidocaine, Xylocaine; pentobarbital, Nembutal; propofol, Diprivan; procaine, Novocain</td>
</tr>
<tr>
<td>anticonvulsant</td>
<td>reduces excitability of neurons and therefore prevents uncontrolled neuron activity associated with seizures</td>
<td>carbamazepine, Tegretol; phenobarbital, Nembutal</td>
</tr>
<tr>
<td>dopaminergic  drugs</td>
<td>treat Parkinson's disease by either replacing dopamine that is lacking or increasing strength of dopamine present</td>
<td>levodopa; L-dopa, Laro-dopa; levodopa/carbidopa, Sinemet</td>
</tr>
<tr>
<td>hypnotic</td>
<td>promotes sleep</td>
<td>secobarbital, Seconal; temazepam, Restoril</td>
</tr>
<tr>
<td>narcotic analgesic</td>
<td>treats severe pain; has potential to be habit forming if taken for prolonged time; also called opiates</td>
<td>morphine, MS Contin; oxycodone, Oxy-Contin; meperidine, Demerol</td>
</tr>
<tr>
<td>sedative</td>
<td>relaxing or calming effect</td>
<td>amobarbital, Amytal; butabarbital, Butisol</td>
</tr>
</tbody>
</table>

### Teaching Strategies

#### Pop Questions

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

#### Learning Activities

- Have students use a PDR and/or the Internet to look up additional information regarding these medications, such as dosage, side effects, and contraindications.

#### Worksheet 12C

- Chapter Review

### Assessments

#### Quiz 12G—Chapter Review

#### Test Bank—questions
OBJECTIVE 12
Define selected abbreviations associated with the nervous system.
Text page: 408; PowerPoint slides: 105–106

LECTURE NOTES
ALS    amyotrophic lateral sclerosis
ANS    autonomic nervous system
CNS    central nervous system
CP     cerebral palsy
CSF    cerebrospinal fluid
CVA    cerebrovascular accident
CVD    cerebrovascular disease
EEG    electroencephalogram, electroencephalography
HA     headache
ICP    intracranial pressure
LP     lumbar puncture
MS     multiple sclerosis
PET    positron emission tomography
PNS    peripheral nervous system
SCI    spinal cord injury
TIA    transient ischemic attack

TEACHING STRATEGIES
• Emphasize the importance of learning abbreviations and their full meanings; point out how some abbreviations, such as ANS, EEG, PET, and CNS are typically used rather than full terms.
• Encourage students to add abbreviations to their flash cards.
• Write sentences on the board using common words; have students substitute correct abbreviations.

Memory Game
• Have students assist in creating a memory game to play in class.

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES
Worksheet 12C
• Chapter Review

Quiz 12F
• May be used as a worksheet

Text
• Practice Exercises

Student DVD-ROM
• Learning games
• Flash cards

CW
• Practice questions

ASSESSMENTS
Quiz 12F—Abbreviations Quiz
Quiz 12G—Chapter Review
Test Bank—questions
Worksheet 12A
New Combining Form and Suffix Handout

Directions: For each combining form below, write out its meaning and then locate a new term from the chapter that uses the combining form or suffix.

<table>
<thead>
<tr>
<th>Combining Forms</th>
<th>Meaning</th>
<th>Chapter Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. cephal/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. cerebell/o</td>
<td></td>
<td></td>
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<tr>
<td>3. cerebr/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. encephal/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. gli/o</td>
<td></td>
<td></td>
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<tr>
<td>6. medull/o</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7. mening/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. meningi/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. myel/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. neur/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. phas/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. poli/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. pont/o</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>14. radicul/o</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15. thalam/o</td>
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<td></td>
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<tr>
<td>16. thec/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. ventricul/o</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Suffixes

<table>
<thead>
<tr>
<th>Suffixes</th>
<th>Meaning</th>
<th>Chapter Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. -algesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. -esthesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. -paresis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. -phasia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. -plegia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. -taxia</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Worksheet 12B

## Medical Term Analysis

Directions: Below are terms built from word parts used in this chapter that are not analyzed in the Word Building Table. Many are built from word parts you have learned in previous chapters. Analyze each term presented below and list and define the word parts used to build each term.

<table>
<thead>
<tr>
<th>Medical Term</th>
<th>Word Part Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. cranial</td>
<td></td>
</tr>
<tr>
<td>2. neuroglial</td>
<td></td>
</tr>
<tr>
<td>3. somatic</td>
<td></td>
</tr>
<tr>
<td>4. anesthesiology</td>
<td></td>
</tr>
<tr>
<td>5. hemiparesis</td>
<td></td>
</tr>
<tr>
<td>6. hemiplegia</td>
<td></td>
</tr>
<tr>
<td>7. neurology</td>
<td></td>
</tr>
<tr>
<td>8. amyotrophic</td>
<td></td>
</tr>
<tr>
<td>9. meningocele</td>
<td></td>
</tr>
<tr>
<td>10. myelomeningocele</td>
<td></td>
</tr>
<tr>
<td>11. poliomyelitis</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>myasthenia</td>
</tr>
<tr>
<td>13.</td>
<td>angiography</td>
</tr>
<tr>
<td>14.</td>
<td>electroencephalography</td>
</tr>
<tr>
<td>15.</td>
<td>analgesic</td>
</tr>
</tbody>
</table>
Worksheet 12C
Chapter Review

Anatomy and Physiology

1. The central nervous system consists of the ________________ and ________________.

2. ________________ are highly branched structures found on neurons that received impulses.

3. ________________ is a fatty substance that acts as insulation for many axons.

4. List the meninges in order from outer layer to inner layer: ________________.

5. The ________________ lobe of the cerebrum controls vision.

6. The elevated portions of the cerebral convolutions are called ________________ and they are separated by fissures called ________________.

7. The midbrain, pons, and medulla oblongata make up the ________________.

8. Pain perception is controlled by the ________________.

9. The point at which a nerve is attached to the central nervous system is called the ________________.

10. The ________________ branch of the ANS is the “fight-or-flight” branch and the ________________ branch of the ANS is the “rest-and-digest” branch.

Word Building

Directions: Build a term that means:

1. brain inflammation ___________________________________________________________________

2. head pain ___________________________________________________________________________

3. pertaining to the cerebrum and spine _____________________________________________________

4. meninges tumor ______________________________________________________________________

5. surgical repair of nerve __________________________________________________________________

6. absence of pain _______________________________________________________________________

7. difficult speech _______________________________________________________________________

8. paralysis of four ______________________________________________________________________

9. lack of muscle coordination ____________________________________________________________

10. removal of a nerve ____________________________________________________________________

(Continued)
Matching

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. absence seizure</td>
<td>a. uncontrolled electrical activity of the brain</td>
</tr>
<tr>
<td></td>
<td>2. aura</td>
<td>b. confusion, disorientation, agitation</td>
</tr>
<tr>
<td></td>
<td>3. coma</td>
<td>c. procedure removes pressure on spinal nerve</td>
</tr>
<tr>
<td></td>
<td>4. delirium</td>
<td>d. repetitive, alternating movements</td>
</tr>
<tr>
<td></td>
<td>5. focal seizure</td>
<td>e. controls seizures</td>
</tr>
<tr>
<td></td>
<td>6. dementia</td>
<td>f. unaware of surroundings</td>
</tr>
<tr>
<td></td>
<td>7. paresthesia</td>
<td>g. insufficient neurotransmitter</td>
</tr>
<tr>
<td></td>
<td>8. syncope</td>
<td>h. petit mal</td>
</tr>
<tr>
<td></td>
<td>9. tremor</td>
<td>i. associated with children taking aspirin</td>
</tr>
<tr>
<td></td>
<td>10. unconscious</td>
<td>j. bruising of the brain</td>
</tr>
<tr>
<td></td>
<td>11. astrocytoma</td>
<td>k. a stroke</td>
</tr>
<tr>
<td></td>
<td>12. cerebral aneurysm</td>
<td>l. profound unconsciousness</td>
</tr>
<tr>
<td></td>
<td>13. cerebral contusion</td>
<td>m. progressive spinal cord degeneration</td>
</tr>
<tr>
<td></td>
<td>14. CVA</td>
<td>n. fainting</td>
</tr>
<tr>
<td></td>
<td>15. Reye syndrome</td>
<td>o. impaired intellectual functioning</td>
</tr>
<tr>
<td></td>
<td>16. epilepsy</td>
<td>p. nerves lose myelin sheath</td>
</tr>
<tr>
<td></td>
<td>17. ALS</td>
<td>q. brain image made using radioactive isotopes</td>
</tr>
<tr>
<td></td>
<td>18. spina bifida</td>
<td>r. unusual sensation before a seizure</td>
</tr>
<tr>
<td></td>
<td>19. MS</td>
<td>s. spinal tap</td>
</tr>
<tr>
<td></td>
<td>20. myasthenia gravis</td>
<td>t. burning or tingling sensations</td>
</tr>
<tr>
<td></td>
<td>21. brain scan</td>
<td>u. promotes sleep</td>
</tr>
<tr>
<td></td>
<td>22. lumbar puncture</td>
<td>v. may cause a hemorrhagic stroke</td>
</tr>
<tr>
<td></td>
<td>23. laminectomy</td>
<td>w. affects only one limb</td>
</tr>
<tr>
<td></td>
<td>24. anticonvulsant</td>
<td>x. congenital defect</td>
</tr>
<tr>
<td></td>
<td>25. hypnotic</td>
<td>y. tumor of a neuroglial cell</td>
</tr>
</tbody>
</table>
Quiz 12A
New Word Parts Quiz
Directions: Define the combining form or suffix in the spaces provided.

1. cephal/o ____________________________________________________________________________
2. cerebell/o ___________________________________________________________________________
3. cerebr/o ____________________________________________________________________________
4. encephal/o ___________________________________________________________________________
5. gli/o _______________________________________________________________________________
6. mening/o ___________________________________________________________________________
7. myel/o _____________________________________________________________________________
8. neur/o _____________________________________________________________________________
9. phas/o ______________________________________________________________________________
10. poli/o _____________________________________________________________________________
11. pont/o _____________________________________________________________________________
12. radicul/o __________________________________________________________________________
13. thalam/o __________________________________________________________________________
14. ventricul/o _________________________________________________________________________
15. medull/o __________________________________________________________________________
16. -esthesia __________________________________________________________________________
17. -paresis _____________________________________________________________________________
18. -plegia ______________________________________________________________________________
19. -taxia _______________________________________________________________________________
20. -algiesia ___________________________________________________________________________
Quiz 12B
Spelling Quiz

Directions: Write each term as your instructor pronounces it.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
5. ____________________________
6. ____________________________
7. ____________________________
8. ____________________________
9. ____________________________
10. ____________________________
11. ____________________________
12. ____________________________
13. ____________________________
14. ____________________________
15. ____________________________
16. ____________________________
17. ____________________________
18. ____________________________
19. ____________________________
20. ____________________________
Quiz 12C
Labeling Diagram

Directions: Label the components of a neuron.

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
Quiz 12D
Labeling Diagram

Directions: Label the parts of the brain.
Quiz 12E
Word Building Quiz

Directions: Build a single medical term for each phrase below.

1. head pain ____________________________
2. pertaining to the cerebellum ____________________________
3. pertaining to the cerebrum ____________________________
4. record of brain's electricity ____________________________
5. pertaining to meninges ____________________________
6. pertaining to nerve ____________________________
7. inflammation of many nerves ____________________________
8. pertaining to the pons ____________________________
9. nerve root disease ____________________________
10. pertaining to the thalamus ____________________________
11. pertaining to within the meninges ____________________________
12. excessive sensations ____________________________
13. weakness of one ____________________________
14. lack of speech ____________________________
15. lack of muscle coordination ____________________________
16. nerve tumor ____________________________
17. pertaining to cerebrum and spine ____________________________
18. half weakness ____________________________
19. pertaining to nerve glue ____________________________
20. surgical repair of a nerve ____________________________
Quiz 12F
Abbreviation Quiz

Directions: Write the medical term for which each abbreviation stands.

1. ALS ____________________________________________________________
2. ANS ____________________________________________________________
3. CNS ____________________________________________________________
4. CP _____________________________________________________________
5. CSF _____________________________________________________________
6. CVA ____________________________________________________________
7. CVD ____________________________________________________________
8. EEG ____________________________________________________________
9. HA _____________________________________________________________
10. ICP _____________________________________________________________
11. LP _____________________________________________________________
12. MS _____________________________________________________________
13. PET _____________________________________________________________
14. PNS _____________________________________________________________
15. SCI _____________________________________________________________
16. TIA _____________________________________________________________
Quiz 12G
Chapter Review

PART I: Multiple Choice

Directions: Circle the correct answer.

1. The innermost layer of the meninges is the
   a. arachnoid layer.
   b. dura mater.
   c. pia mater.
   d. pons.

2. Afferent neurons
   a. carry impulses to the brain and spinal cord.
   b. carry impulses away from the brain and spinal cord.
   c. carry impulses to the brain but away from the spinal cord.
   d. carry impulses to the spinal cord but away from the brain.

3. The condition in which there is degeneration of the motor neurons of the spinal cord (Lou Gehrig's disease) is known as
   a. myasthenia gravis.
   b. multiple sclerosis.
   c. amyotrophic lateral sclerosis.
   d. Reye syndrome.

4. One-sided facial paralysis with an unknown cause is known as
   a. Reye syndrome.
   b. Lou Gehrig's disease.
   c. Parkinson's disease.
   d. Bell's palsy.

5. A profound state of unconsciousness resulting from an illness of injury is
   a. concussion.
   b. sleep disorder.
   c. coma.
   d. seizure.

6. The diagnostic term that means the process of X-ray filming the blood vessels of the brain is
   a. cerebral angiogram.
   b. ventriculogram.
   c. myelography.
   d. cerebral angiography.

7. The form of epilepsy in which there is a loss of awareness without muscle convulsions is
   a. absence seizure.
   b. palsy seizure.
   c. focal seizure.
   d. tonic-clonic seizure.

8. The medical term for fainting is
   a. palsy.
   b. syncope.
   c. dementia.
   d. delirium.

9. The condition characterized by nonprogressive paralysis from a defect or trauma at birth is
   a. autism.
   b. epilepsy.
   c. cerebral palsy.
   d. dementia.

10. The term for a disease affecting children and adolescents, typically following a viral infection, is
    a. Babinski's syndrome.
    b. cerebral palsy.
    c. multiple sclerosis.
    d. Reye syndrome.
PART II: Matching

Directions: Match the term with its definition.

   1. cerebrospinal fluid shunt a. can pinpoint nerve damage
   2. nerve block b. progressive dementia
   3. nerve conduction velocity c. conducts electrical impulse on nerve
   4. subdural hematoma d. injection of regional anesthetic to stop pain
   5. shingles e. awake and aware of surroundings
   6. Alzheimer's disease f. coordinates voluntary body movements
   7. conscious g. painful blisters along nerve path
   8. axon h. blood accumulating in meninges
   9. cerebellum i. treats severe pain
  10. narcotic analgesic j. treats hydrocephalus

PART III: Abbreviations

Directions: Write the full meaning of the following abbreviations.

1. ANS __________________________
2. CP __________________________
3. SCI __________________________
4. CVA __________________________
5. MS __________________________
Chapter 12 Answer Keys

Worksheet 12A Answer Key

Combining Forms

1. head
2. cerebellum
3. cerebrum
4. brain
5. glue
6. medulla oblongata
7. meninges
8. meninges
9. spinal cord
10. nerve
11. speech
12. gray matter
13. pons
14. nerve root
15. thalamus
16. sheath (meninges)
17. ventricle

Suffixes

18. pain, sensitivity
19. feeling, sensation
20. weakness
21. speech
22. paralysis
23. muscle coordination

Worksheet 12B Answer Key

1. crani/o = skull; -al = pertaining to
2. neur/o = nerve; gli/o = glue; -al = pertaining to
3. somat/o = body; -ic = pertaining to
4. an- = lack of; esthesi/o = sensation; -logy = study of
5. hemi- = half; -paresis = weakness
6. hemi- = half; -plegia = paralysis
7. neur/o = nerve; -logy = study of
8. a- = lack of; my/o = muscle; -trophic = development
9. mening/o = meninges; -cele = protrusion
10. myel/o = spinal cord; mening/o = meninges; -cele = protrusion
11. poli/o = gray matter; myel/o = spinal cord; -itis = inflammation
12. my/o = muscle; -asthenia = weakness
13. angi/o = vessel; -graphy = process of recording
14. elect/o = electricity; encephal/o = brain; -graphy = process of recording
15. an- = lack of; -algesic = pain

Worksheet 12C Answer Key

Anatomy and Physiology

1. brain; spinal cord
2. dendrites
3. myelin
4. dura mater, arachnoid layer, pia mater
5. occipital
6. gyri; sulci
7. brain stem
8. thalamus
9. nerve root
10. sympathetic; parasympathetic

Word Building

1. encephalitis
2. cephalalgia
3. cerebrospinal
4. meningioma
5. neuroplasty
6. analgesia
7. dysphasia
8. quadriplegia
9. ataxia
10. neurectomy

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Matching
1. h  14. k
2. r  15. i
3. l  16. a
4. b  17. m
5. w  18. x
6. o  19. p
7. t  20. g
8. n  21. q
9. d  22. s
10. f  23. c
11. y  24. e
12. v  25. u
13. j

Quiz 12A Answer Key
1. head 11. pons
2. cerebellum 12. nerve root
3. cerebrum 13. thalamus
4. brain 14. ventricle
5. glue 15. medulla oblongata
6. meninges 16. feeling, sensation
7. spinal cord 17. weakness
8. nerve 18. paralysis
9. speech 19. muscle coordination
10. gray matter 20. pain, sensitivity

Quiz 12B Answer Key
1. neurotransmitter 11. paresthesia
2. synapse 12. syncope
3. neuroglial 13. unconscious
5. diencephalon 15. cerebrovascular
6. arachnoid 16. amyotrophic
7. parasympathetic 17. myelomeningocele
8. anesthesiology 18. myasthenia
9. radiculopathy 19. echoencephalography
10. hydrocephalus 20. endarterectomy

Quiz 12C Answer Key
1. dendrites 5. nucleus
2. nerve cell body 6. axon
3. unmyelinated region 7. terminal end fibers
4. myelinated axon
Quiz 12D Answer Key
1. cerebrum 6. midbrain
2. diencephalon 7. cerebellum
3. thalamus 8. pons
4. hypothalamus 9. medulla oblongata
5. brain stem

Quiz 12E Answer Key
1. cephalalgia 11. intrathecal
2. cerebellar 12. hyperesthesia
3. cerebral 13. monoparesis
4. electroencephalogram 14. aphasia
5. meningeal 15. ataxia
6. neural 16. neuma
7. polynoeritis 17. cerebrospinal
8. pontine 18. hemiplegia
9. radiculopathy 19. neuroglial
10. thalamic 20. neuroplasty

Quiz 12F Answer Key
1. amyotrophic lateral sclerosis 9. headache
2. autonomic nervous system 10. intracranial pressure
3. central nervous system 11. lumbar puncture
4. cerebral palsy 12. multiple sclerosis
5. cerebrospinal fluid 13. positron emission tomography
6. cerebrovascular accident 14. peripheral nervous system
7. cerebrovascular disease 15. spinal cord injury
8. electroencephalogram or electroencephalography 16. transient ischemic attack

Quiz 12G Answer Key
Multiple Choice
1. C 6. D
2. A 7. A
3. C 8. B
4. D 9. C
5. C 10. D

Matching
1. j 6. b
2. d 7. e
3. a 8. c
4. h 9. f
5. g 10. i
## Abbreviations

1. autonomic nervous system
2. cerebral palsy
3. spinal cord injury
4. cerebrovascular accident
5. multiple sclerosis