Medical terminology:
Nervous system

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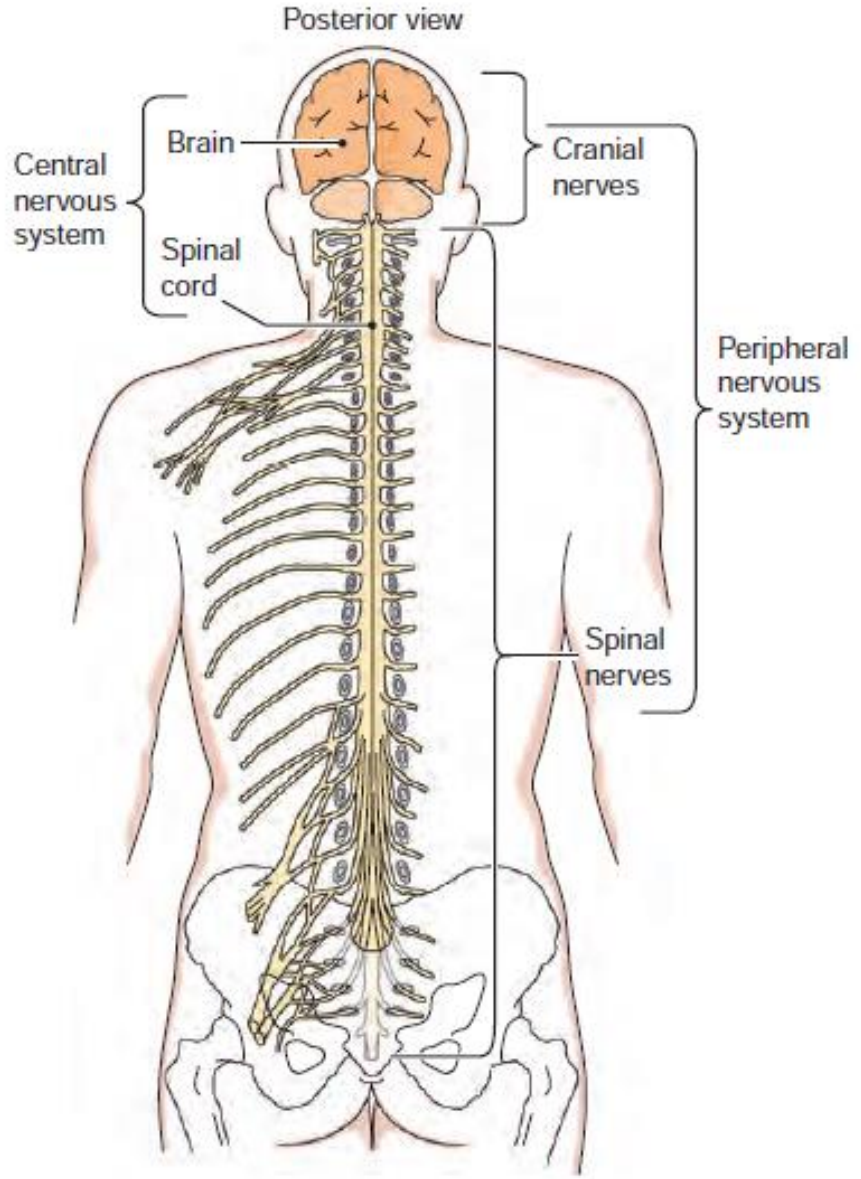
Nervous System

For study purposes, the nervous system may be divided **structurally** into two parts:

- The **central nervous system (CNS)**, consisting of the **brain** and **spinal cord**
- The **peripheral nervous system (PNS)**, consisting of all nervous tissue outside the brain and spinal cord

Functionally, the nervous system can be divided into the:

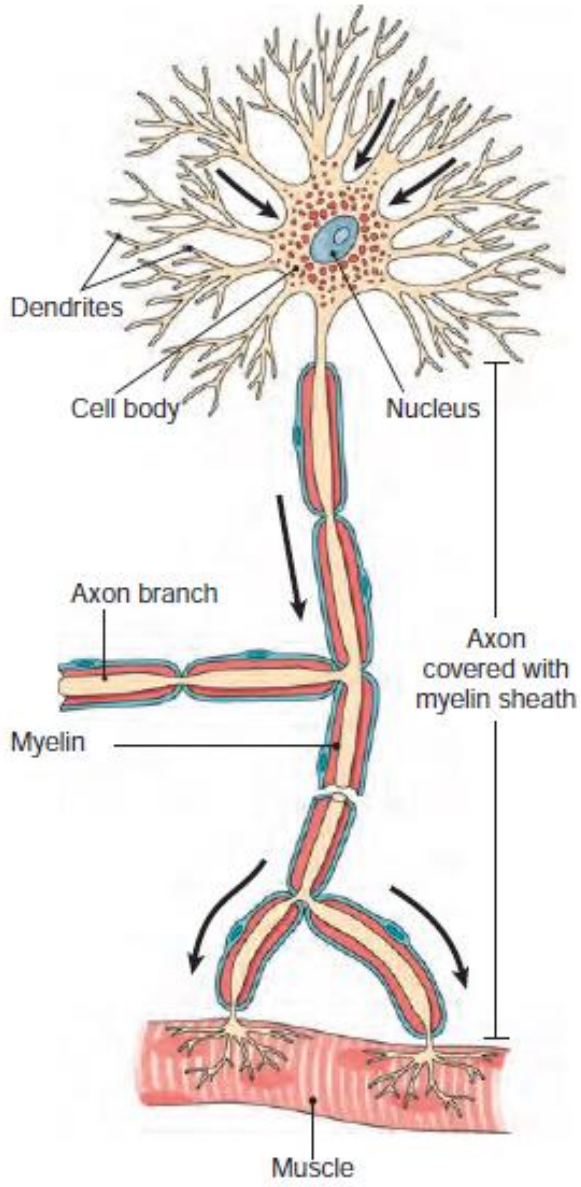
- **Somatic nervous system**, which controls skeletal muscles
- **Visceral** or **autonomic nervous system (ANS)**, which controls smooth muscle, cardiac muscle, and glands.



Neurons

The ANS regulates responses to stress and helps to maintain homeostasis.
Two types of cells are found in the nervous system. **Neurons**, or nerve cells, make up the conducting tissue of the nervous system. **Neuroglia** are the cells that support and protect nervous tissue.

The neuron is the nervous system's basic functional unit. Each neuron has two types of fibers extending
from the cell body:
■ The **dendrite** carries impulses toward the cell body.

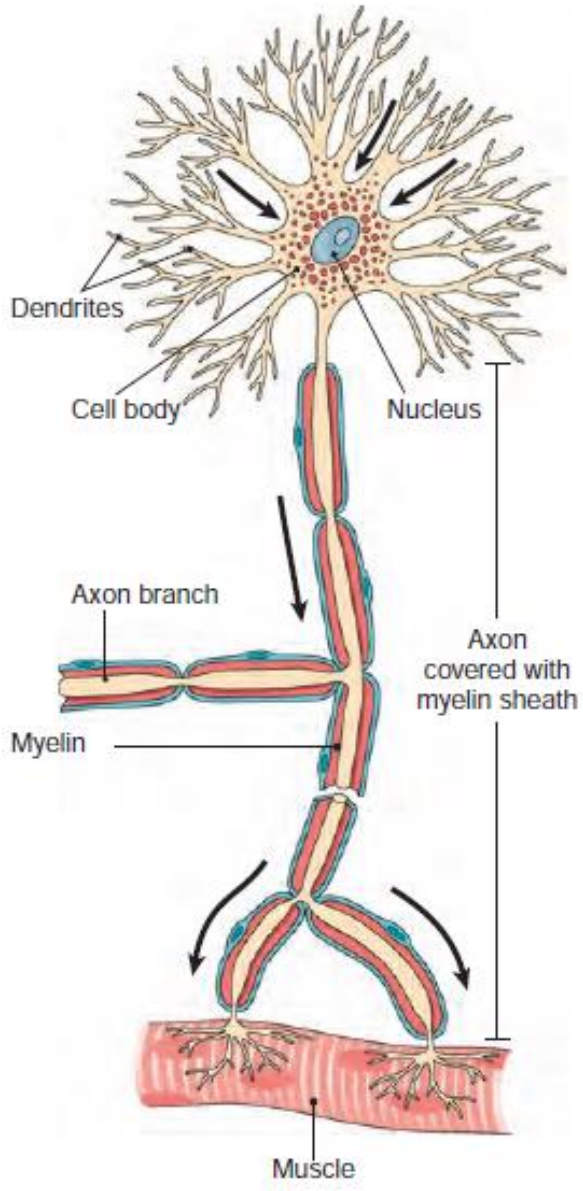


Neurons

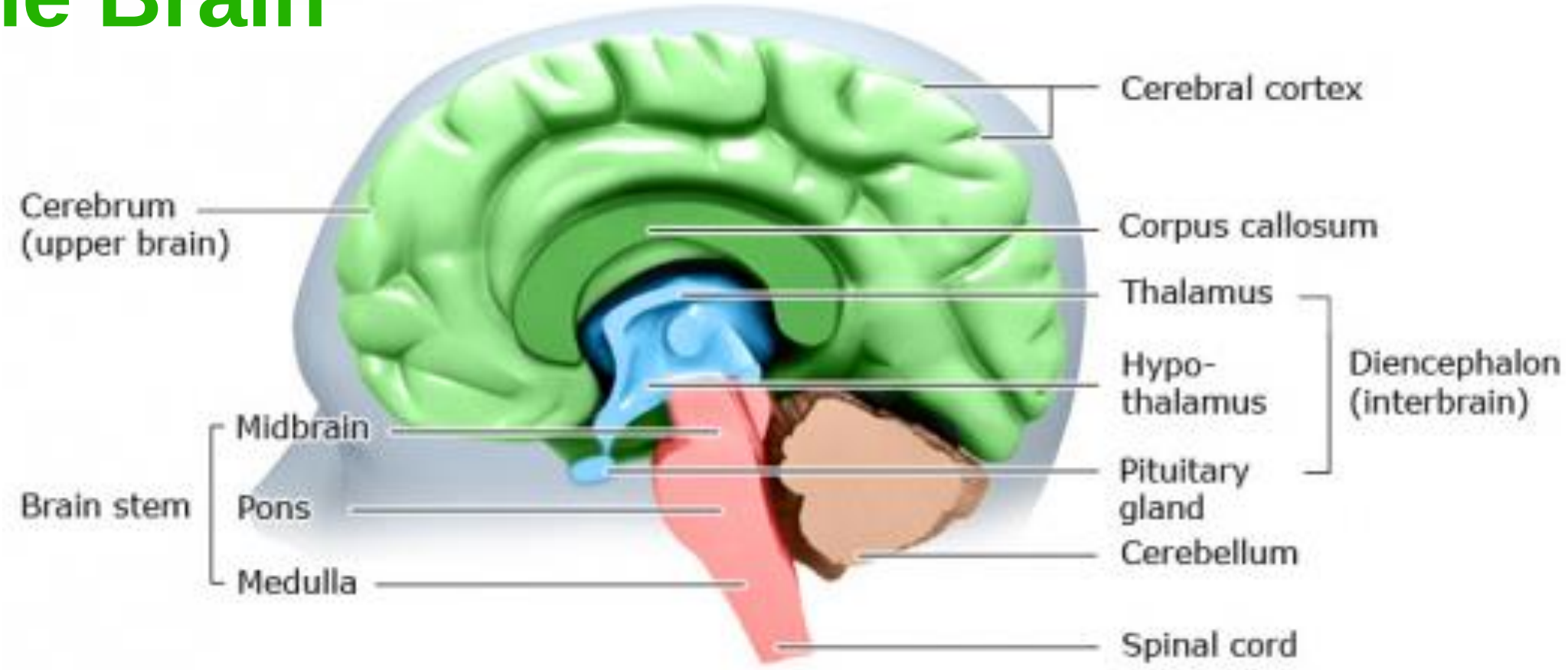
Some axons are covered with **myelin**, a whitish, fatty material that insulates and protects the axon and speeds electric conduction. Axons so covered are described as *myelinated*, and they make up the **white matter** of the nervous system. Unmyelinated tissue makes up the nervous system's **gray matter**.

Each neuron is part of a pathway that carries information through the nervous system. A neuron that transmits impulses toward the CNS is a **sensory**, or **afferent**, neuron; a neuron that transmits impulses away from the CNS is a **motor**, or **efferent**, neuron. There are also connecting cells within the CNS called **interneurons**.

A **synapse** is the point of contact between two neurons. At the synapse, energy is passed from one cell to another, usually by means of a neurotransmitter and sometimes by direct transfer of electric current.



The Brain



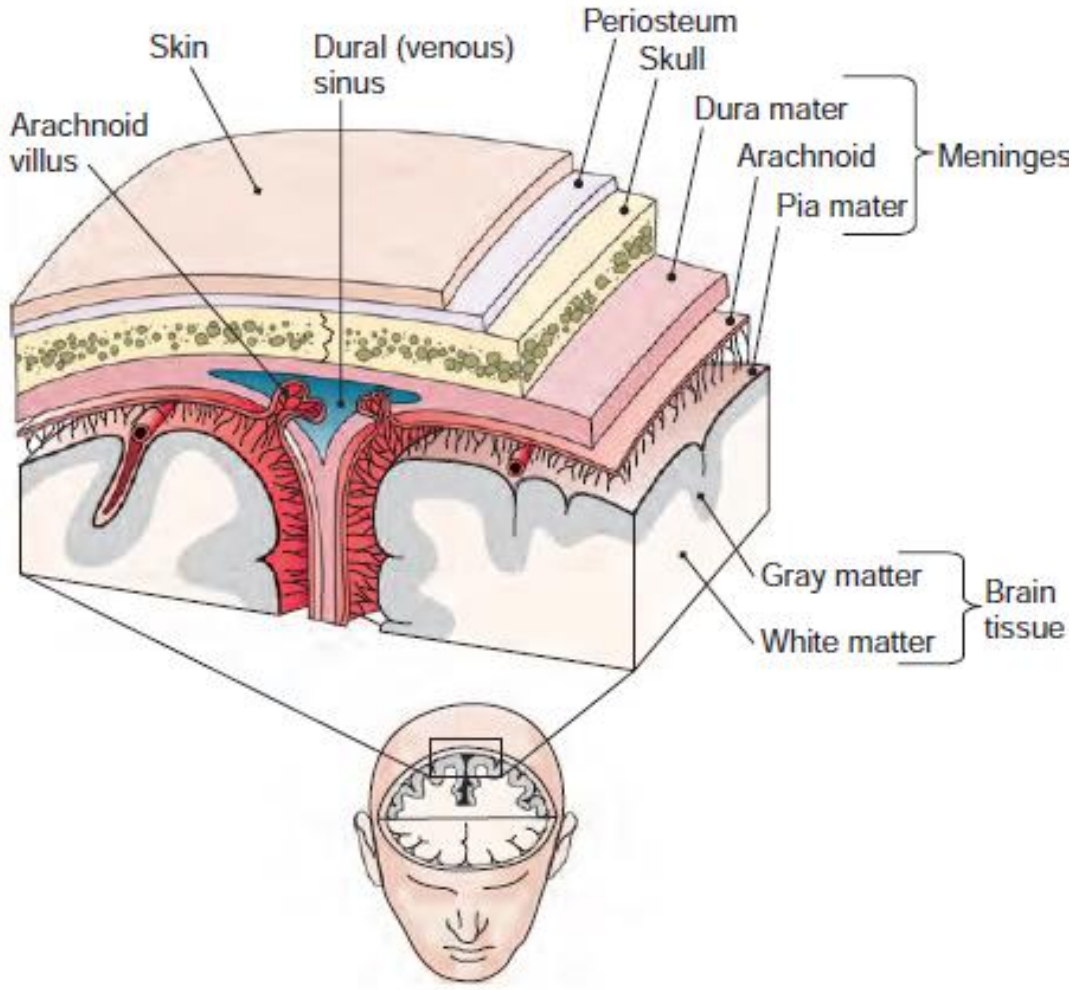
The brain is nervous tissue contained within the cranium. It consists of the **cerebrum**, **diencephalon**, **brainstem**, and **cerebellum**. The cerebrum is the largest part of the brain; it is composed largely of white matter with a thin outer layer of gray matter, the **cerebral cortex**. It is within the cortex that the higher brain functions of memory, reasoning, and abstract thought occur.

PROTECTING THE BRAIN

Within the brain are four **ventricles** (cavities) in which **cerebrospinal fluid (CSF)** is formed. This fluid circulates around the brain and spinal cord, acting as a protective cushion for these tissues.

Covering the brain and the spinal cord are three protective layers, together called the **meninges**. All are named with the Latin word *mater*, meaning "mother," to indicate their protective function. They are the:

- **Dura mater**, the outermost and toughest of the three. *Dura* means "hard."
- **Arachnoid mater**, the thin, web-like middle layer. It is named for the Latin word for spider, because it resembles a spider web.
- **Pia mater**, the thin, vascular inner layer, attached directly to the tissue of the brain and spinal cord. *Pia* means "tender."



The Cranial Nerves

NUMBER	NAME	FUNCTION
I	**olfactory** ol-FAK-tō-rē	carries impulses for the sense of smell
II	**optic** OP-tik	carries impulses for the sense of vision
III	**oculomotor** ok-ū-lō-MŌ-tor	controls movement of eye muscles
IV	**trochlear** TROK-lē-ar	controls a muscle of the eyeball
V	**Trigeminal** trī-JEM-i-nal	carries sensory impulses from the face; controls chewing muscles
VI	**abducens** ab-DŪ-sens	controls a muscle of the eyeball
VII	**Facial** FĀ-shal	controls muscles of facial expression, salivary glands, and tear glands; conducts some impulses for taste

The Cranial Nerves

NUMBER	NAME	FUNCTION
VIII	**vestibulocochlear** *ves-tib-ū-lō-KOK-lē-ar*	conducts impulses for hearing and equilibrium; also called auditory or acoustic nerve
IX	**glossopharyngeal** *glos-ō-fa-RIN-jē-al*	conducts sensory impulses from tongue and pharynx; stimulates parotid salivary gland and partly controls swallowing
X	**vagus** *VĀ-gus*	supplies most organs of thorax and abdomen; controls digestive secretions
XI	**spinal accessory** *ak-SES-ō-rē*	controls muscles of the neck
XII	**hypoglossal** *hī-pō-GLOS-al*	controls muscles of the tongue

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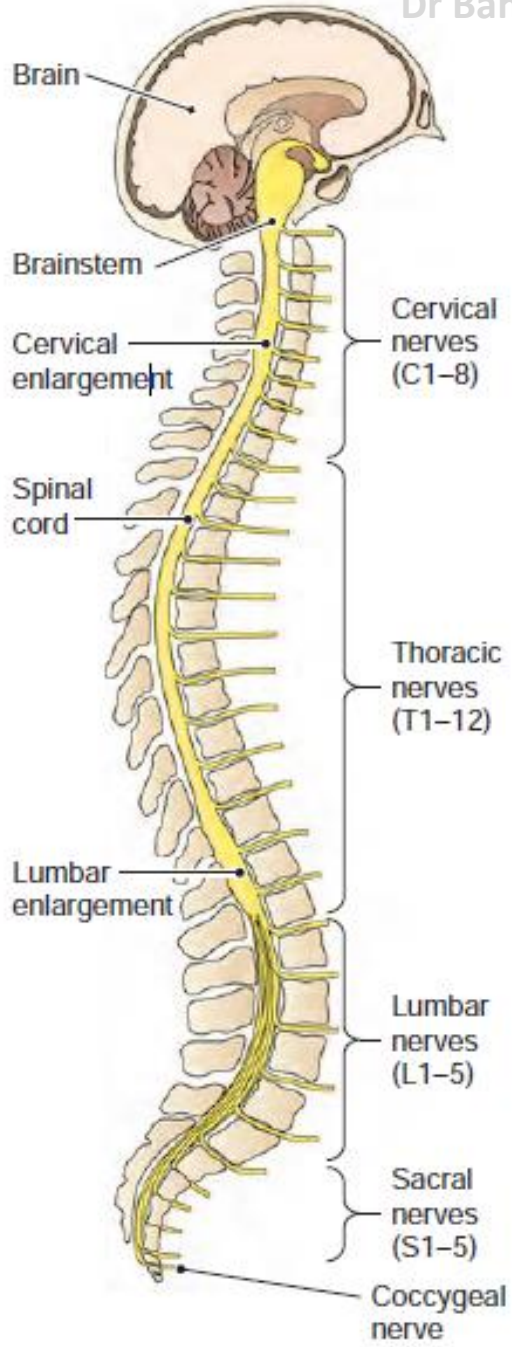
THE SPINAL NERVES

Thirty-one pairs of spinal nerves connect with the spinal Cord. These nerves are grouped in the segments of the cord as follows:

- Cervical: 8
- Thoracic: 12
- Lumbar: 5
- Sacral: 5
- Coccygeal: 1



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Roots for the Nervous System and the Spinal Cord

Root	Meaning	Example	Definition of Example
neur/o, neur/i	nervous system, nervous tissue, nerve	Neurotrophin *nū-rō-TRŌ-fin*	factor that promotes nerve growth (*troph/o* means "nourish")
gli/o	neuroglia	glial *GLĪ-al*	pertaining to neuroglia
gangli/o, ganglion/o	ganglion	ganglioma *gang-glē-Ō-ma*	tumor of a ganglion
mening/o, meninge/o	meninges	meningocele *me-NING-gō-sēl*	hernia of the meninges
myel/o	spinal cord (also bone marrow)	hematomyelia *hē-ma-tō-mī-Ē-lē-a*	hemorrhage into the spinal cord
radicul/o	spinal nerve root	radiculopathy *ra-dik-u--LOP-a-the*	Any disease of a spinal nerve root

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Roots for the Brain

Root	Meaning	Example	Definition of Example
encephal/o	brain	Anencephaly *an-en-SEF-a-le*	absence of a brain
cerebr/o	cerebrum (loosely, brain)	infracerebral *in-fra-SER-e-bral*	below the cerebrum
cortic/o	cerebral cortex, outer portion	*corticospinal* *kor-ti-ko--SPI--nal*	pertaining to the cerebral cortex and spinal cord
cerebell/o	cerebellum	supracerebellar su--pra-ser-e-BEL-ar	above the cerebellum
thalam/o	thalamus	thalamotomy thal-a-MOT-o—me	Incision of the thalamus
ventricul/o	cavity, ventricle	intraventricular in-tra-ven-TRIK-u--lar	within a ventricle
medull/o	medulla oblongata (also spinal cord)	medullary MED-u--lar-e	pertaining to the medulla

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Roots for the Brain

Root	Meaning	Example	Definition of Example
medull/o	medulla oblongata (also spinal cord)	medullary MED-u--lar-e	pertaining to the medulla
psych/o	mind	psychogenic sī-kō-JEN-ik	originating in the mind
narc/o	stupor, unconsciousness	narcosis nar-KŌ-sis	state of stupor induced by drugs
somn/o, somn/i	sleep	somnolence SOM-nō-lens	sleepiness

Suffixes for the Nervous System

Suffix	Meaning	Example	Definition of Example
-phasia	speech	*heterophasia* *het-er-ō-FĀ-zē-a*	uttering words that are different from those intended
-lalia	speech, babble	*coprolalia* *kop-rō-LĀ-lē-a*	compulsive use of obscene words (copro- means “feces”)
-lexia	reading	*bradylexia* *brad-ē-LEK-sē-a*	slowness in reading
-plegia	paralysis	tetraplegia tet-ra-PLE--jē-a	paralysis of all four limbs
-paresis*	partial paralysis, weakness	hemiparesis hem-i-pa-RĒ-sis	partial paralysis of one side of the body
-lepsy	seizure	narcolepsy NAR-kō-lep-sē	condition marked by sudden episodes of sleep
-phobia*	persistent, irrational fear	agoraphobia ag-o-ra-FŌ-bē-a	fear of being in a public place (from Greek agora, meaning “marketplace”)
-mania*	excited state, obsession	megalomania meg-a-lō-MĀ-nē-a	exaggerated self-importance; “delusions of grandeur”

*May be used alone as a word.

Key terms

Term	Definition
afferent AF-er-ent	Carrying toward a given point, such as the sensory neurons and nerves that carry impulses toward the CNS (root fer means “to carry”)
efferent EF-er-ent	Carrying away from a given point, such as the motor neurons and nerves that carry impulses away from the CNS (root fer means “to carry”)
axon AK-son	The fiber of a neuron that conducts impulses away from the cell body
gray matter	Unmyelinated tissue of the nervous system
white matter	Myelinated tissue of the nervous system
synapse *SIN-aps*	The junction between two neurons; also the junction between a motor neuron and a muscle or gland
concussion *kon-KUSH-un*	Injury resulting from a violent blow or shock; a brain concussion usually results in loss of consciousness
confusion *kon-FŪ-zhun*	A state of reduced comprehension, coherence, and reasoning ability resulting in inappropriate responses to environmental stimuli

Key terms

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Term	Definition
seizure SĒ-zhur	A sudden attack, as seen in epilepsy. The most common forms of seizure are tonic–clonic, or grand mal (gran mal) (from French, meaning “great illness”); absence seizure, or petit mal (pet-Ē mal), meaning “small illness;” and psychomotor seizure
epilepsy EP-i-lep-sē	A chronic disease involving periodic sudden bursts of electric activity from the brain, resulting in seizures
convulsion kon-VUL-shun	A series of violent, involuntary muscle contractions. A tonic convulsion involves prolonged muscle contraction; in a clonic convulsion, there is alternation of contraction and relaxation. Both forms appear in grand mal epilepsy
encephalitis *en-sef-a-LĪ-tis*	Inflammation of the brain
dementia dē-MEN-shē-a	A gradual and usually irreversible loss of intellectual function
hemiplegia *hem-i-PLĒ-jē-a*	Paralysis of one side of the body
meningitis *men-in-JĪ-tis*	Inflammation of the meninges
narcolepsy *NAR-kō-lep-sē*	Brief, uncontrollable episodes of sleep during the day