

A&P Key Terms

13 Anatomy of the Nervous System

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4. Chapter: A&P Key Terms 13 Anatomy of the Nervous System

1. A&P Key Terms 13 Anatomy of the Nervous System Questions

abducens nerve	sixth cranial nerve; responsible for contraction of one of the extraocular muscles
alar plate	developmental region of the spinal cord that gives rise to the posterior horn of the gray matter
amygdala	nucleus deep in the temporal lobe of the cerebrum that is related to memory and emotional behavior
anterior column	white matter between the anterior horns of the spinal cord composed of many different groups of axons of both ascending and descending tracts
anterior horn	gray matter of the spinal cord containing multipolar motor neurons, sometimes referred to as the ventral horn
anterior median fissure	deep midline feature of the anterior spinal cord, marking the separation between the right and left sides of the cord
anterior spinal artery	blood vessel from the merged branches of the vertebral arteries that runs along the anterior surface of the spinal cord
arachnoid granulation	outpocket of the arachnoid membrane into the dural sinuses that allows for reabsorption of CSF into the blood
arachnoid mater	middle layer of the meninges named for the spider-weblike trabeculae that extend between it and the pia mater
arachnoid trabeculae	filaments between the arachnoid and pia mater within the subarachnoid space
ascending tract	central nervous system fibers carrying sensory information from the spinal cord or periphery to the brain
axillary nerve	systemic nerve of the arm that arises from the brachial plexus
Broca's area	region of the frontal lobe associated with the motor commands necessary for speech production and located only in the cerebral hemisphere responsible for language production, which is the left side in approximately 95 percent of the population
Brodmann's areas	mapping of regions of the cerebral cortex based on microscopic anatomy that relates specific areas to functional differences, as described by Brodmann in the early 1900s

basal forebrain	nuclei of the cerebrum related to modulation of sensory stimuli and attention through broad projections to the cerebral cortex, loss of which is related to Alzheimer's disease
basal nuclei	nuclei of the cerebrum (with a few components in the upper brain stem and diencephalon) that are responsible for assessing cortical movement commands and comparing them with the general state of the individual through broad modulatory activity of dopamine neurons; largely related to motor functions, as evidenced through the symptoms of Parkinson's and Huntington's diseases
basal plate	developmental region of the spinal cord that gives rise to the lateral and anterior horns of gray matter
basilar artery	blood vessel from the merged vertebral arteries that runs along the dorsal surface of the brain stem
brachial plexus	nerve plexus associated with the lower cervical spinal nerves and first thoracic spinal nerve
brain stem	region of the adult brain that includes the midbrain, pons, and medulla oblongata and develops from the mesencephalon, metencephalon, and myelencephalon of the embryonic brain
carotid canal	opening in the temporal bone through which the internal carotid artery enters the cranium
cauda equina	bundle of spinal nerve roots that descend from the lower spinal cord below the first lumbar vertebra and lie within the vertebral cavity; has the appearance of a horse's tail
caudate	nucleus deep in the cerebrum that is part of the basal nuclei; along with the putamen, it is part of the striatum
central canal	hollow space within the spinal cord that is the remnant of the center of the neural tube
central sulcus	surface landmark of the cerebral cortex that marks the boundary between the frontal and parietal lobes
cephalic flexure	curve in midbrain of the embryo that positions the forebrain ventrally
cerebellum	region of the adult brain connected primarily to the pons that developed from the metencephalon (along with the pons) and is largely responsible for comparing information from the cerebrum with sensory feedback from the periphery through the spinal cord

<u>cerebral aqueduct</u>	connection of the ventricular system between the third and fourth ventricles located in the midbrain
<u>cerebral cortex</u>	outer gray matter covering the forebrain, marked by wrinkles and folds known as gyri and sulci
<u>cerebral hemisphere</u>	one half of the bilaterally symmetrical cerebrum
<u>cerebrum</u>	region of the adult brain that develops from the telencephalon and is responsible for higher neurological functions such as memory, emotion, and consciousness
<u>cervical plexus</u>	nerve plexus associated with the upper cervical spinal nerves
<u>choroid plexus</u>	specialized structures containing ependymal cells lining blood capillaries that filter blood to produce CSF in the four ventricles of the brain
<u>circle of Willis</u>	unique anatomical arrangement of blood vessels around the base of the brain that maintains perfusion of blood into the brain even if one component of the structure is blocked or narrowed
<u>common carotid artery</u>	blood vessel that branches off the aorta (or the brachiocephalic artery on the right) and supplies blood to the head and neck
<u>corpus callosum</u>	large white matter structure that connects the right and left cerebral hemispheres
<u>cranial nerve ganglion</u>	sensory ganglion of cranial nerves
<u>cranial nerve</u>	one of twelve nerves connected to the brain that are responsible for sensory or motor functions of the head and neck
<u>descending tract</u>	central nervous system fibers carrying motor commands from the brain to the spinal cord or periphery
<u>diencephalon</u>	region of the adult brain that retains its name from embryonic development and includes the thalamus and hypothalamus
<u>direct pathway</u>	connections within the basal nuclei from the striatum to the globus pallidus internal segment and substantia nigra pars reticulata that disinhibit the thalamus to increase cortical control of movement
<u>disinhibition</u>	disynaptic connection in which the first synapse inhibits the second cell, which then stops inhibiting the final target

<u>dorsal (posterior) nerve root</u>	axons entering the posterior horn of the spinal cord
<u>dorsal (posterior) root ganglion</u>	sensory ganglion attached to the posterior nerve root of a spinal nerve
<u>dura mater</u>	tough, fibrous, outer layer of the meninges that is attached to the inner surface of the cranium and vertebral column and surrounds the entire CNS
<u>dural sinus</u>	any of the venous structures surrounding the brain, enclosed within the dura mater, which drain blood from the CNS to the common venous return of the jugular veins
<u>endoneurium</u>	innermost layer of connective tissue that surrounds individual axons within a nerve
<u>enteric nervous system</u>	peripheral structures, namely ganglia and nerves, that are incorporated into the digestive system organs
<u>enteric plexus</u>	neuronal plexus in the wall of the intestines, which is part of the enteric nervous system
<u>epineurium</u>	outermost layer of connective tissue that surrounds an entire nerve
<u>epithalamus</u>	region of the diencephalon containing the pineal gland
<u>esophageal plexus</u>	neuronal plexus in the wall of the esophagus that is part of the enteric nervous system
<u>extraocular muscles</u>	six skeletal muscles that control eye movement within the orbit
<u>facial nerve</u>	seventh cranial nerve; responsible for contraction of the facial muscles and for part of the sense of taste, as well as causing saliva production
<u>fascicle</u>	small bundles of nerve or muscle fibers enclosed by connective tissue
<u>femoral nerve</u>	systemic nerve of the anterior leg that arises from the lumbar plexus
<u>fibular nerve</u>	systemic nerve of the posterior leg that begins as part of the sciatic nerve
<u>foramen magnum</u>	large opening in the occipital bone of the skull through which the spinal cord emerges and the vertebral arteries enter the cranium

<u>forebrain</u>	anterior region of the adult brain that develops from the prosencephalon and includes the cerebrum and diencephalon
<u>fourth ventricle</u>	the portion of the ventricular system that is in the region of the brain stem and opens into the subarachnoid space through the median and lateral apertures
<u>frontal eye field</u>	region of the frontal lobe associated with motor commands to orient the eyes toward an object of visual attention
<u>frontal lobe</u>	region of the cerebral cortex directly beneath the frontal bone of the cranium
<u>gastric plexuses</u>	neuronal networks in the wall of the stomach that are part of the enteric nervous system
<u>globus pallidus</u>	nuclei deep in the cerebrum that are part of the basal nuclei and can be divided into the internal and external segments
<u>glossopharyngeal nerve</u>	ninth cranial nerve; responsible for contraction of muscles in the tongue and throat and for part of the sense of taste, as well as causing saliva production
<u>gyrus</u>	ridge formed by convolutions on the surface of the cerebrum or cerebellum
<u>hindbrain</u>	posterior region of the adult brain that develops from the rhombencephalon and includes the pons, medulla oblongata, and cerebellum
<u>hippocampus</u>	gray matter deep in the temporal lobe that is very important for long-term memory formation
<u>hypoglossal nerve</u>	twelfth cranial nerve; responsible for contraction of muscles of the tongue
<u>hypothalamus</u>	major region of the diencephalon that is responsible for coordinating autonomic and endocrine control of homeostasis
<u>indirect pathway</u>	connections within the basal nuclei from the striatum through the globus pallidus external segment and subthalamic nucleus to the globus pallidus internal segment/substantia nigra pars compacta that result in inhibition of the thalamus to decrease cortical control of movement
<u>inferior colliculus</u>	half of the midbrain tectum that is part of the brain stem auditory pathway

inferior olive	nucleus in the medulla that is involved in processing information related to motor control
intercostal nerve	systemic nerve in the thoracic cavity that is found between two ribs
internal carotid artery	branch from the common carotid artery that enters the cranium and supplies blood to the brain
interventricular foramina	openings between the lateral ventricles and third ventricle allowing for the passage of CSF
jugular veins	blood vessels that return "used" blood from the head and neck
kinesthesia	general sensory perception of movement of the body
lateral apertures	pair of openings from the fourth ventricle to the subarachnoid space on either side and between the medulla and cerebellum
lateral column	white matter of the spinal cord between the posterior horn on one side and the axons from the anterior horn on the same side; composed of many different groups of axons, of both ascending and descending tracts, carrying motor commands to and from the brain
lateral horn	region of the spinal cord gray matter in the thoracic, upper lumbar, and sacral regions that is the central component of the sympathetic division of the autonomic nervous system
lateral sulcus	surface landmark of the cerebral cortex that marks the boundary between the temporal lobe and the frontal and parietal lobes
lateral ventricles	portions of the ventricular system that are in the region of the cerebrum
limbic cortex	collection of structures of the cerebral cortex that are involved in emotion, memory, and behavior and are part of the larger limbic system
limbic system	structures at the edge (limit) of the boundary between the forebrain and hindbrain that are most associated with emotional behavior and memory formation
longitudinal fissure	large separation along the midline between the two cerebral hemispheres
lumbar plexus	nerve plexus associated with the lumbar spinal nerves

lumbar puncture	procedure used to withdraw CSF from the lower lumbar region of the vertebral column that avoids the risk of damaging CNS tissue because the spinal cord ends at the upper lumbar vertebrae
median aperture	singular opening from the fourth ventricle into the subarachnoid space at the midline between the medulla and cerebellum
median nerve	systemic nerve of the arm, located between the ulnar and radial nerves
meninges	protective outer coverings of the CNS composed of connective tissue
mesencephalon	primary vesicle of the embryonic brain that does not significantly change through the rest of embryonic development and becomes the midbrain
metencephalon	secondary vesicle of the embryonic brain that develops into the pons and the cerebellum
midbrain	middle region of the adult brain that develops from the mesencephalon
myelencephalon	secondary vesicle of the embryonic brain that develops into the medulla
nerve plexus	network of nerves without neuronal cell bodies included
neural crest	tissue that detaches from the edges of the neural groove and migrates through the embryo to develop into peripheral structures of both nervous and non-nervous tissues
neural fold	elevated edge of the neural groove
neural groove	region of the neural plate that folds into the dorsal surface of the embryo and closes off to become the neural tube
neural plate	thickened layer of neuroepithelium that runs longitudinally along the dorsal surface of an embryo and gives rise to nervous system tissue
neural tube	precursor to structures of the central nervous system, formed by the invagination and separation of neuroepithelium
neuraxis	central axis to the nervous system, from the posterior to anterior ends of the neural tube; the inferior tip of the spinal cord to the anterior surface of the cerebrum

occipital lobe	region of the cerebral cortex directly beneath the occipital bone of the cranium
occipital sinuses	dural sinuses along the edge of the occipital lobes of the cerebrum
oculomotor nerve	third cranial nerve; responsible for contraction of four of the extraocular muscles, the muscle in the upper eyelid, and pupillary constriction
olfaction	special sense responsible for smell, which has a unique, direct connection to the cerebrum
olfactory nerve	first cranial nerve; responsible for the sense of smell
optic nerve	second cranial nerve; responsible for visual sensation
orthostatic reflex	sympathetic function that maintains blood pressure when standing to offset the increased effect of gravity
paravertebral ganglia	autonomic ganglia superior to the sympathetic chain ganglia
parietal lobe	region of the cerebral cortex directly beneath the parietal bone of the cranium
parieto-occipital sulcus	groove in the cerebral cortex representing the border between the parietal and occipital cortices
perineurium	layer of connective tissue surrounding fascicles within a nerve
phrenic nerve	systemic nerve from the cervical plexus that enervates the diaphragm
pia mater	thin, innermost membrane of the meninges that directly covers the surface of the CNS
plexus	network of nerves or nervous tissue
postcentral gyrus	ridge just posterior to the central sulcus, in the parietal lobe, where somatosensory processing initially takes place in the cerebrum
posterior columns	white matter of the spinal cord that lies between the posterior horns of the gray matter, sometimes referred to as the dorsal column; composed of axons of ascending tracts that carry sensory information up to the brain
posterior horn	gray matter region of the spinal cord in which sensory input arrives, sometimes referred to as the dorsal horn

	input arrives, sometimes referred to as the dorsal horn
<u>posterior median sulcus</u>	midline feature of the posterior spinal cord, marking the separation between right and left sides of the cord
<u>posterolateral sulcus</u>	feature of the posterior spinal cord marking the entry of posterior nerve roots and the separation between the posterior and lateral columns of the white matter
<u>precentral gyrus</u>	primary motor cortex located in the frontal lobe of the cerebral cortex
<u>prefrontal lobe</u>	specific region of the frontal lobe anterior to the more specific motor function areas, which can be related to the early planning of movements and intentions to the point of being personality-type functions
<u>premotor area</u>	region of the frontal lobe responsible for planning movements that will be executed through the primary motor cortex
<u>prevertebral ganglia</u>	autonomic ganglia that are anterior to the vertebral column and functionally related to the sympathetic chain ganglia
<u>primary vesicle</u>	initial enlargements of the anterior neural tube during embryonic development that develop into the forebrain, midbrain, and hindbrain
<u>proprioception</u>	general sensory perceptions providing information about location and movement of body parts; the "sense of the self"
<u>prosencephalon</u>	primary vesicle of the embryonic brain that develops into the forebrain, which includes the cerebrum and diencephalon
<u>putamen</u>	nucleus deep in the cerebrum that is part of the basal nuclei; along with the caudate, it is part of the striatum
<u>radial nerve</u>	systemic nerve of the arm, the distal component of which is located near the radial bone
<u>reticular formation</u>	diffuse region of gray matter throughout the brain stem that regulates sleep, wakefulness, and states of consciousness
<u>rhombencephalon</u>	primary vesicle of the embryonic brain that develops into the hindbrain, which includes the pons, cerebellum, and medulla

sacral plexus	nerve plexus associated with the lower lumbar and sacral spinal nerves
saphenous nerve	systemic nerve of the lower anterior leg that is a branch from the femoral nerve
sciatic	nerve systemic nerve from the sacral plexus that is a combination of the tibial and fibular nerves and extends across the hip joint and gluteal region into the upper posterior leg
sciatica	painful condition resulting from inflammation or compression of the sciatic nerve or any of the spinal nerves that contribute to it
secondary vesicle	five vesicles that develop from primary vesicles, continuing the process of differentiation of the embryonic brain
sigmoid sinuses	dural sinuses that drain directly into the jugular veins
somatosensation	general senses related to the body, usually thought of as the senses of touch, which would include pain, temperature, and proprioception
spinal accessory nerve	eleventh cranial nerve; responsible for contraction of neck muscles
spinal nerve	one of 31 nerves connected to the spinal cord
straight sinus	dural sinus that drains blood from the deep center of the brain to collect with the other sinuses
striatum	the caudate and putamen collectively, as part of the basal nuclei, which receive input from the cerebral cortex
subarachnoid space	space between the arachnoid mater and pia mater that contains CSF and the fibrous connections of the arachnoid trabeculae
subcortical nucleus	all the nuclei beneath the cerebral cortex, including the basal nuclei and the basal forebrain
substantia nigra pars compacta	nuclei within the basal nuclei that release dopamine to modulate the function of the striatum; part of the motor pathway
substantia nigra pars reticulata	nuclei within the basal nuclei that serve as an output center of the nuclei; part of the motor pathway
subthalamus	nucleus within the basal nuclei that is part of the indirect pathway

pathway

<u>sulcus</u>	groove formed by convolutions in the surface of the cerebral cortex
<u>superior colliculus</u>	half of the midbrain tectum that is responsible for aligning visual, auditory, and somatosensory spatial perceptions
<u>superior sagittal sinus</u>	dural sinus that runs along the top of the longitudinal fissure and drains blood from the majority of the outer cerebrum
<u>sympathetic chain ganglia</u>	autonomic ganglia in a chain along the anterolateral aspect of the vertebral column that are responsible for contributing to homeostatic mechanisms of the autonomic nervous system
<u>systemic nerve</u>	nerve in the periphery distal to a nerve plexus or spinal nerve
<u>tectum</u>	region of the midbrain, thought of as the roof of the cerebral aqueduct, which is subdivided into the inferior and superior colliculi
<u>tegmentum</u>	region of the midbrain, thought of as the floor of the cerebral aqueduct, which continues into the pons and medulla as the floor of the fourth ventricle
<u>telencephalon</u>	secondary vesicle of the embryonic brain that develops into the cerebrum
<u>temporal lobe</u>	region of the cerebral cortex directly beneath the temporal bone of the cranium
<u>terminal ganglion</u>	autonomic ganglia that are near or within the walls of organs that are responsible for contributing to homeostatic mechanisms of the autonomic nervous system
<u>thalamus</u>	major region of the diencephalon that is responsible for relaying information between the cerebrum and the hindbrain, spinal cord, and periphery
<u>third ventricle</u>	portion of the ventricular system that is in the region of the diencephalon
<u>tibial nerve</u>	systemic nerve of the posterior leg that begins as part of the sciatic nerve
<u>transverse sinuses</u>	dural sinuses that drain along either side of the occipitalcerebellar space

<u>trigeminal ganglion</u>	sensory ganglion that contributes sensory fibers to the trigeminal nerve
<u>trigeminal nerve</u>	fifth cranial nerve; responsible for cutaneous sensation of the face and contraction of the muscles of mastication
<u>trochlear nerve</u>	fourth cranial nerve; responsible for contraction of one of the extraocular muscles
<u>ulnar nerve</u>	systemic nerve of the arm located close to the ulna, a bone of the forearm
<u>vagus nerve</u>	tenth cranial nerve; responsible for the autonomic control of organs in the thoracic and upper abdominal cavities
<u>ventral (anterior) nerve root</u>	axons emerging from the anterior or lateral horns of the spinal cord
<u>ventricles</u>	remnants of the hollow center of the neural tube that are spaces for cerebrospinal fluid to circulate through the brain
<u>vertebral arteries</u>	arteries that ascend along either side of the vertebral column through the transverse foramina of the cervical vertebrae and enter the cranium through the foramen magnum
<u>vestibulocochlear nerve</u>	eighth cranial nerve; responsible for the sensations of hearing and balance