

Note on Central Nervous System

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Opinion Article

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DESCRIPTION

The Central Nervous System (CNS) is the part of the nervous system that consists primarily of the brain and spinal cord. The brain is referred to as the CNS because it integrates received information and coordinates and influences the activity of all parts of the bodies of bilaterally symmetric and triploblastic animals that is all multicellular animals except sponges and diploblasts. It is a nervous tissue structure that runs from the rostral to the caudal axis of the body, with an enlarged section at the rostral end that is a brain. Only arthropods, cephalopods, and vertebrates have true brains.

The Central Nervous System (CNS) is made up of two major structures: the brain and the spinal cord. By encasing the brain in the skull, the cranium protects it. The spinal cord is caudal to the brain and is connected to it. It is protected by the vertebrae. The spinal cord extends from the base of the skull, passes through or begins below the foramen magnum, and ends near the first or second lumbar

vertebra, occupying the upper sections of the vertebral canal. Astrocytes may be involved in metabolite clearance as well as the transport of fuel and other beneficial substances from capillaries in the brain to neurons. When the CNS is injured, astrocytes proliferate and cause gliosis, a type of neuronal scar tissue devoid of functional neurons.

The brain is composed of a cortex, which is composed of neuron-bodies that form grey matter and more white matter that forms tracts and commissures. There is also subcortical grey matter, which contains a variety of nuclei, in addition to cortical grey matter. Spinal nerves are peripheral nervous system projections from and to the spinal cord. The nerves connect the spinal cord to the skin, joints, muscles, and other structures, allowing efferent motor and afferent sensory signals and stimuli to be transmitted. This allows for both voluntary and involuntary muscle movements as well as sensory perception. There are 31 spinal nerves that project from the brain stem in total, with some of them forming plexa as they branch out, such as the brachial plexa and sacral plexa. Although each spinal nerve carries both sensory and motor signals, the nerves synapse in different areas of the spinal cord, either from the periphery to sensory relay neurons that relay information to the CNS or from the CNS to motor neurons that relay information out. The spinal cord transmits information to the brain *via* spinal tracts to the thalamus, and then to the cortex *via* the final common pathway. Aside from the spinal cord, peripheral nerves of the PNS synapse directly on the CNS *via* intermediaries or ganglia. These 12 nerves are found in the head and neck region and are known as cranial nerves. Cranial nerves transmit data to and from the CNS as well as to specific muscles (such as the trapezius muscle, which is innervated by accessory nerves as well as certain cervical spinal nerves). The olfactory and optic nerves are two pairs of cranial nerves that are commonly regarded as CNS structures. Because they synapse directly on CNS neurons rather than peripheral ganglia, this is the case. The brain is located at the anterior end of the spinal cord. The majority of the CNS is made up of the brain. It is frequently referred to as the main structure when discussing the nervous system as a whole. The brain is the CNS's primary functional unit. While the spinal cord has some processing ability, such as spinal locomotion, and can process reflexes, the brain is the nervous system's primary processing unit. The brainstem is divided into three sections: the medulla, pons, and midbrain. The medulla is a spinal cord extension with similar organizational and functional properties. Tracts that connect the spinal cord to the brain pass through this area. Two of the medulla nuclei's regulatory functions are blood pressure control and breathing control. Other nuclei are involved in balance, taste, hearing, and muscle control in the face and neck. The pons is the next structure rostral to the medulla, located on the ventral anterior side of the brainstem. The pons' pontine nuclei collaborate with the cerebellum to transmit information between the cerebellum and the cerebral cortex. The dorsal posterior pons contains nuclei that are involved in the functions of breathing, sleep, and taste. The midbrain, also known as the mesencephalon, is situated above and to the rostral side of the pons. It is made up of nuclei that connect various parts of the motor system, including the cerebellum, basal ganglia, and both cerebral hemispheres. The midbrain also houses parts of the visual and auditory

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systems, as well as the control of automatic eye movements. The brainstem provides entry and exit points to the brain for a variety of pathways for motor and autonomic control of the face and neck via cranial nerves. The tenth cranial nerve regulates the autonomic functions of the organs.