HUMAN BODY NERVE SYSTEM pdf

1: Human nervous system | anatomy | www.enganchecubano.com

The nervous system has two major parts: the central nervous system (CNS) and the peripheral nervous system (PNS). The central system is the primary command center for the body, and is comprised of.

The spinal cord The spinal cord is an elongated cylindrical structure, about 45 cm 18 inches long, that extends from the medulla oblongata to a level between the first and second lumbar vertebrae of the backbone. The terminal part of the spinal cord is called the conus medullaris. The spinal cord is composed of long tracts of myelinated nerve fibres known as white matter arranged around the periphery of a symmetrical butterfly-shaped cellular matrix of gray matter. The gray matter contains cell bodies, unmyelinated motor neuron fibres, and interneurons connecting either the two sides of the cord or the dorsal and ventral ganglia. Many interneurons have short axons distributed locally, but some have axons that extend for several spinal segments. Some interneurons may modulate or change the character of signals, while others play key roles in transmission and in patterned reflexes. The gray matter forms three pairs of horns throughout most of the spinal cord: The white matter forming the ascending and descending spinal tracts is grouped in three paired funiculi, or sectors: Lower cervical segment of the spinal cordIn this photograph of a cross section, the white matter is shown stained dark. An Atlas of Structures, Sections, and Systems, 4rd ed. On this basis the spinal cord is divided into the following segments: Spinal nerve roots emerge via intervertebral foramina; lumbar and sacral spinal roots, descending for some distance within the subarachnoid space before reaching the appropriate foramina, produce a group of nerve roots at the conus medullaris known as the cauda equina. Two enlargements of the spinal cord are evident: The spinal nerves and the area that they innervate are described in the section The peripheral nervous system: Created and produced by QA International. Laminae I to V, forming the dorsal horns, receive sensory input. Lamina VII forms the intermediate zone at the base of all horns. Lamina IX is composed of clusters of large alpha motor neurons , which innervate striated muscle , and small gamma motor neurons, which innervate contractile elements of the muscle spindle. Axons of both alpha and gamma motor neurons emerge via the ventral roots. In addition, cells surrounding the central canal of the spinal cord form an area often referred to as lamina X. All primary sensory neurons that enter the spinal cord originate in ganglia that are located in openings in the vertebral column called the intervertebral foramina. Peripheral processes of the nerve cells in these ganglia convey sensation from various receptors, and central processes of the same cells enter the spinal cord as bundles of nerve filaments. Fibres conveying specific forms of sensation follow separate pathways. Impulses involved with pain and noxious stimuli largely end in laminae I and II, while impulses associated with tactile sense end in lamina IV or on processes of cells in that lamina. Signals from stretch receptors i. Virtually all parts of the spinal gray matter contain interneurons , which connect various cell groups. Ascending spinal tracts Sensory tracts ascending in the white matter of the spinal cord arise either from cells of spinal ganglia or from intrinsic neurons within the gray matter that receive primary sensory input. Dorsal column The largest ascending tracts , the fasciculi gracilis and cuneatus, arise from spinal ganglion cells and ascend in the dorsal funiculus to the medulla oblongata. The fasciculus gracilis receives fibres from ganglia below thoracic 6, while spinal ganglia from higher segments of the spinal cord project fibres into the fasciculus cuneatus. The fasciculi terminate upon the nuclei gracilis and cuneatus, large nuclear masses in the medulla. Cells of these nuclei give rise to fibres that cross completely and form the medial lemniscus ; the medial lemniscus in turn projects to the ventrobasal nuclear complex of the thalamus. By this pathway, the medial lemniscal system conveys signals associated with tactile, pressure, and kinesthetic or positional sense to sensory areas of the cerebral cortex. Spinothalamic tracts Fibres concerned with pain , thermal sense, and light touch enter the lateral-root entry zone and then ascend or descend near the periphery of the spinal cord before entering superficial laminae of the dorsal hornâ€"largely parts of laminae I, IV, and V. Cells in these laminae then give rise to fibres of the two spinothalamic tracts. Those fibres crossing in the ventral white commissure ventral to the central canal form the lateral spinothalamic tract, which, ascending in the ventral part of the lateral funiculus, conveys signals related to pain and thermal sense. The anterior spinothalamic tract arises from fibres that cross the midline in the same fashion but ascend more anteriorly in the spinal cord; these fibres convey impulses related to light touch. At medullary levels the two spinothalamic tracts merge and cannot be distinguished as separate entities. Many of the fibres, or collaterals, of the spinothalamic tracts terminate upon cell groups in the reticular formation, while the principal tracts convey sensory impulses to relay nuclei in the thalamus. Spinocerebellar tracts Impulses from stretch receptors are carried by fibres that synapse upon cells in deep laminae of the dorsal horn or in lamina VII. The posterior spinocerebellar tract arises from the dorsal nucleus of Clarke and ascends peripherally in the dorsal part of the lateral funiculus. The anterior spinocerebellar tract ascends on the ventral margin of the lateral funiculus. Both tracts transmit signals to portions of the anterior lobe of the cerebellum and are involved in mechanisms that automatically regulate muscle tone without reaching consciousness. Descending spinal tracts Tracts descending to the spinal cord are involved with voluntary motor function, muscle tone, reflexes and equilibrium , visceral innervation, and modulation of ascending sensory signals. The largest, the corticospinal tract, originates in broad regions of the cerebral cortex. Smaller descending tracts, which include the rubrospinal tract, the vestibulospinal tract, and the reticulospinal tract, originate in nuclei in the midbrain, pons , and medulla oblongata. Most of these brainstem nuclei themselves receive input from the cerebral cortex, the cerebellar cortex, deep nuclei of the cerebellum, or some combination of these. In addition, autonomic tracts, which descend from various nuclei in the brainstem to preganglionic sympathetic and parasympathetic neurons in the spinal cord, constitute a vital link between the centres that regulate visceral functions and the nerve cells that actually effect changes. Corticospinal tract The corticospinal tract originates from pyramid-shaped cells in the premotor, primary motor, and primary sensory cortex and is involved in skilled voluntary activity. Containing about one million fibres, it forms a significant part of the posterior limb of the internal capsule and is a major constituent of the crus cerebri in the midbrain. As the fibres emerge from the pons, they form compact bundles on the ventral surface of the medulla, known as the medullary pyramids. In the lower medulla about 90 percent of the fibres of the corticospinal tract decussate and descend in the dorsolateral funiculus of the spinal cord. Of the fibres that do not cross in the medulla, approximately 8 percent cross in cervical spinal segments. As the tract descends, fibres and collaterals branch off at all segmental levels, synapsing upon interneurons in lamina VII and upon motor neurons in lamina IX. Approximately 50 percent of the corticospinal fibres terminate within cervical segments. The decussation of the medullary pyramids and the formation of the corticospinal tract in the spinal cord. At birth, few of the fibres of the corticospinal tract are myelinated; myelination takes place during the first year after birth, along with the acquisition of motor skills. Because the tract passes through, or close to, nearly every major division of the neuraxis, it is vulnerable to vascular and other kinds of lesions. A relatively small lesion in the posterior limb of the internal capsule, for example, may result in contralateral hemiparesis, which is characterized by weakness, spasticity, greatly increased deep tendon reflexes, and certain abnormal reflexes. Rubrospinal tract The rubrospinal tract arises from cells in the caudal part of the red nucleus , an encapsulated cell group in the midbrain tegmentum. Fibres of this tract decussate at midbrain levels, descend in the lateral funiculus of the spinal cord overlapping ventral parts of the corticospinal tract , enter the spinal gray matter, and terminate on interneurons in lamina VII. Through these crossed rubrospinal projections, the red nucleus exerts a facilitating influence on flexor alpha motor neurons and a reciprocal inhibiting influence on extensor alpha motor neurons. Because cells of the red nucleus receive input from the motor cortex via corticorubral projections and from globose and emboliform nuclei of the cerebellum via the superior cerebellar peduncle , the rubrospinal tract effectively brings flexor muscle tone under the control of these two regions of the brain. Vestibulospinal tract The vestibulospinal tract originates from cells of the lateral vestibular nucleus, which lies in the floor of the fourth ventricle. Fibres of this tract descend the length of the spinal cord in the ventral and lateral funiculi without crossing, enter laminae VIII and IX of the anterior horn, and terminate upon both alpha and gamma motor neurons, which innervate ordinary muscle fibres and fibres of the muscle spindle see below Functions of the human nervous system: Cells of the lateral vestibular nucleus receive facilitating impulses from labyrinthine receptors in the utricle of the inner ear and from fastigial nuclei in the cerebellum. In addition, inhibitory influences upon these cells are conveyed by direct projections from Purkinje cells in the anterior lobe of the cerebellum. Thus, the vestibulospinal tract mediates the influences of the vestibular end organ and the cerebellum upon extensor muscle tone. A smaller number of vestibular projections, originating from the medial and inferior vestibular nuclei, descend ipsilaterally in the medial longitudinal fasciculus only to cervical levels. These fibres exert excitatory and inhibitory effects upon cervical motor neurons. Reticulospinal tract The reticulospinal tracts arise from relatively large but restricted regions of the reticular formation of the pons and medulla oblongata â€”the same cells that project ascending processes to intralaminar thalamic nuclei and are important in the maintenance of alertness and the conscious state. The pontine reticulospinal tract arises from groups of cells in the pontine reticular formation , descends ipsilaterally as the largest component of the medial longitudinal fasciculus, and terminates among cells in laminae VII and VIII. Fibres of this tract exert facilitating influences upon voluntary movements, muscle tone, and a variety of spinal reflexes. The medullary reticulospinal tract, originating from reticular neurons on both sides of the median raphe, descends in the ventral part of the lateral funiculus and terminates at all spinal levels upon cells in laminae VII and IX. The medullary reticulospinal tract inhibits the same motor activities that are facilitated by the pontine reticulospinal tract. Both tracts receive input from regions of the motor cortex. Autonomic tracts Descending fibres involved with visceral and autonomic activities emanate from groups of cells at various levels of the brainstem. For example, hypothalamic nuclei project to visceral nuclei in both the medulla oblongata and the spinal cord; in the spinal cord these projections terminate upon cells of the intermediolateral cell column in thoracic, lumbar, and sacral segments. Preganglionic parasympathetic neurons originating in the oculomotor nuclear complex in the midbrain project not only to the ciliary ganglion but also directly to spinal levels. Some of these fibres reach lumbar segments of the spinal cord, most of them terminating in parts of laminae I and V. Pigmented cells in the isthmus, an area of the rostral pons, form a blackish-blue region known as the locus ceruleus ; these cells distribute the neurotransmitter norepinephrine to the brain and spinal cord. Fibres from the locus ceruleus descend to spinal levels without crossing and are distributed to terminals in the anterior horn, the intermediate zone, and the dorsal horn. Other noradrenergic cell groups in the pons, near the motor nucleus of the facial nerve , project uncrossed noradrenergic fibres that terminate in the intermediolateral cell column that is, lamina VII of the lateral horn. Postganglionic sympathetic neurons associated with this system have direct effects upon the cardiovascular system. Cells in the nucleus of the solitary tract project crossed fibres to the phrenic nerve nucleus in cervical segments three through five , the intermediate zone, and the anterior horn at thoracic levels; these innervate respiratory muscles.

2: Human body - Wikipedia

The nervous system, essentially the body's electrical wiring, is a complex collection of nerves and specialized cells known as neurons that transmit signals between different parts of the body.

Dendrite There are literally hundreds of different types of synapses. In fact, there are over a hundred known neurotransmitters, and many of them have multiple types of receptors. Molecular neuroscientists generally divide receptors into two broad groups: When a chemically gated ion channel is activated, it forms a passage that allows specific types of ions to flow across the membrane. Depending on the type of ion, the effect on the target cell may be excitatory or inhibitory. When a second messenger system is activated, it starts a cascade of molecular interactions inside the target cell, which may ultimately produce a wide variety of complex effects, such as increasing or decreasing the sensitivity of the cell to stimuli, or even altering gene transcription. Nevertheless, it happens that the two most widely used neurotransmitters, glutamate and GABA , each have largely consistent effects. Glutamate has several widely occurring types of receptors, but all of them are excitatory or modulatory. Similarly, GABA has several widely occurring receptor types, but all of them are inhibitory. Strictly speaking, this is an abuse of terminologyâ€"it is the receptors that are excitatory and inhibitory, not the neuronsâ€"but it is commonly seen even in scholarly publications. One very important subset of synapses are capable of forming memory traces by means of long-lasting activity-dependent changes in synaptic strength. This change in strength can last for weeks or longer. Since the discovery of LTP in , many other types of synaptic memory traces have been found, involving increases or decreases in synaptic strength that are induced by varying conditions, and last for variable periods of time. Neural circuits and systems The basic neuronal function of sending signals to other cells includes a capability for neurons to exchange signals with each other. Networks formed by interconnected groups of neurons are capable of a wide variety of functions, including feature detection, pattern generation and timing, [47] and there are seen to be countless types of information processing possible. Warren McCulloch and Walter Pitts showed in that even artificial neural networks formed from a greatly simplified mathematical abstraction of a neuron are capable of universal computation. Descartes believed that all of the behaviors of animals, and most of the behaviors of humans, could be explained in terms of stimulus-response circuits, although he also believed that higher cognitive functions such as language were not capable of being explained mechanistically. The circuit begins with sensory receptors in the skin that are activated by harmful levels of heat: If the change in electrical potential is large enough to pass the given threshold, it evokes an action potential, which is transmitted along the axon of the receptor cell, into the spinal cord. There the axon makes excitatory synaptic contacts with other cells, some of which project send axonal output to the same region of the spinal cord, others projecting into the brain. One target is a set of spinal interneurons that project to motor neurons controlling the arm muscles. The interneurons excite the motor neurons, and if the excitation is strong enough, some of the motor neurons generate action potentials, which travel down their axons to the point where they make excitatory synaptic contacts with muscle cells. The excitatory signals induce contraction of the muscle cells, which causes the joint angles in the arm to change, pulling the arm away. In reality, this straightforward schema is subject to numerous complications. Furthermore, there are projections from the brain to the spinal cord that are capable of enhancing or inhibiting the reflex. Although the simplest reflexes may be mediated by circuits lying entirely within the spinal cord, more complex responses rely on signal processing in the brain. The initial sensory response, in the retina of the eye, and the final motor response, in the oculomotor nuclei of the brain stem, are not all that different from those in a simple reflex, but the intermediate stages are completely different. Instead of a one or two step chain of processing, the visual signals pass through perhaps a dozen stages of integration, involving the thalamus, cerebral cortex, basal ganglia, superior colliculus, cerebellum, and several brainstem nuclei. These areas perform signal-processing functions that include feature detection , perceptual analysis, memory recall , decision-making , and motor planning. At each stage, important information is extracted from the signal ensemble and unimportant information is discarded. By the end of the process, input signals representing "points of light" have been transformed into a neural representation of objects in the surrounding world and their properties. The most sophisticated sensory processing occurs inside the brain, but complex feature extraction also takes place in the spinal cord and in peripheral sensory organs such as the retina. Intrinsic pattern generation Although stimulus-response mechanisms are the easiest to understand, the nervous system is also capable of controlling the body in ways that do not require an external stimulus, by means of internally generated rhythms of activity. Because of the variety of voltage-sensitive ion channels that can be embedded in the membrane of a neuron, many types of neurons are capable, even in isolation, of generating rhythmic sequences of action potentials, or rhythmic alternations between high-rate bursting and quiescence. When neurons that are intrinsically rhythmic are connected to each other by excitatory or inhibitory synapses, the resulting networks are capable of a wide variety of dynamical behaviors, including attractor dynamics, periodicity, and even chaos. A network of neurons that uses its internal structure to generate temporally structured output, without requiring a corresponding temporally structured stimulus, is called a central pattern generator. Internal pattern generation operates on a wide range of time scales, from milliseconds to hours or longer. One of the most important types of temporal pattern is circadian rhythmicity â€"that is, rhythmicity with a period of approximately 24 hours. All animals that have been studied show circadian fluctuations in neural activity, which control circadian alternations in behavior such as the sleep-wake cycle. Experimental studies dating from the s have shown that circadian rhythms are generated by a "genetic clock" consisting of a special set of genes whose expression level rises and falls over the course of the day. Animals as diverse as insects and vertebrates share a similar genetic clock system. The circadian clock is influenced by light but continues to operate even when light levels are held constant and no other external time-of-day cues are available. The clock genes are expressed in many parts of the nervous system as well as many peripheral organs, but in mammals, all of these "tissue clocks" are kept in synchrony by signals that emanate from a master timekeeper in a tiny part of the brain called the suprachiasmatic nucleus. Mirror neurons A mirror neuron is a neuron that fires both when an animal acts and when the animal observes the same action performed by another. Such neurons have been directly observed in primate species. Some researchers also speculate that mirror systems may simulate observed actions, and thus contribute to theory of mind skills, [66] [67] while others relate mirror neurons to language abilities. Development of the nervous system In vertebrates, landmarks of embryonic neural development include the birth and differentiation of neurons from stem cell precursors, the migration of immature neurons from their birthplaces in the embryo to their final positions, outgrowth of axons from neurons and guidance of the motile growth cone through the embryo towards postsynaptic partners, the generation of synapses between these axons and their postsynaptic partners, and finally the lifelong changes in synapses which are thought to underlie learning and memory. The gastrula has the shape of a disk with three layers of cells, an inner layer called the endoderm , which gives rise to the lining of most internal organs, a middle layer called the mesoderm , which gives rise to the bones and muscles, and an outer layer called the ectoderm , which gives rise to the skin and nervous system. The inner portion of the neural plate along the midline is destined to become the central nervous system CNS , the outer portion the peripheral nervous system PNS. As development proceeds, a fold called the neural groove appears along the midline. This fold deepens, and then closes up at the top. At this point the future CNS appears as a cylindrical structure called the neural tube , whereas the future PNS appears as two strips of tissue called the neural crest , running lengthwise above the neural tube. The sequence of stages from neural plate to neural tube and neural crest is known as neurulation. In the early 20th century, a set of famous experiments by Hans Spemann and Hilde Mangold showed that the formation of nervous tissue is "induced" by signals from a group of mesodermal cells called the organizer region. Induction of neural tissue requires inhibition of the gene for a so-called bone morphogenetic protein , or BMP. Specifically the protein BMP4 appears to be involved. Two proteins called Noggin and Chordin , both secreted by the mesoderm, are capable of inhibiting BMP4 and thereby inducing ectoderm to turn into neural tissue. It appears that a similar molecular mechanism is involved for widely disparate types of animals, including arthropods as well as vertebrates. In some animals, however, another type of molecule called Fibroblast Growth Factor or FGF may also play an important role in induction. Induction of neural tissues causes formation of neural precursor cells, called neuroblasts. A GMC divides once, to give rise to either a pair of neurons or a pair of glial cells. In all, a neuroblast is capable of generating an indefinite number of neurons or glia. As shown in a study, one factor common to all bilateral organisms including humans is a family of secreted signaling molecules called neurotrophins which regulate the growth and survival of neurons. DNT1 shares structural similarity with all known neurotrophins and is a key factor in the fate of neurons in Drosophila. Because neurotrophins have now been identified in both vertebrate and invertebrates, this evidence suggests that neurotrophins were present in an ancestor common to bilateral organisms and may represent a common mechanism for nervous system formation. Psychiatry Layers protecting the brain and spinal cord. The central nervous system is protected by major physical and chemical barriers. Physically, the brain and spinal cord are surrounded by tough meningeal membranes, and enclosed in the bones of the skull and vertebral column , which combine to form a strong physical shield. Chemically, the brain and spinal cord are isolated by the bloodâ€”brain barrier , which prevents most types of chemicals from moving from the bloodstream into the interior of the CNS. Although nerves tend to lie deep under the skin except in a few places such as the ulnar nerve near the elbow joint, they are still relatively exposed to physical damage, which can cause pain, loss of sensation, or loss of muscle control. Damage to nerves can also be caused by swelling or bruises at places where a nerve passes through a tight bony channel, as happens in carpal tunnel syndrome. If a nerve is completely transected, it will often regenerate , but for long nerves this process may take months to complete. Many cases have no cause that can be identified, and are referred to as idiopathic. It is also possible for nerves to lose function temporarily, resulting in numbness as stiffnessâ€”common causes include mechanical pressure, a drop in temperature, or chemical interactions with local anesthetic drugs such as lidocaine. Physical damage to the spinal cord may result in loss of sensation or movement. If an injury to the spine produces nothing worse than swelling, the symptoms may be transient, but if nerve fibers in the spine are actually destroyed, the loss of function is usually permanent. Experimental studies have shown that spinal nerve fibers attempt to regrow in the same way as nerve fibers, but in the spinal cord, tissue destruction usually produces scar tissue that cannot be penetrated by the regrowing nerves. Principles of Anatomy and Physiology 15th edition.

HUMAN BODY NERVE SYSTEM pdf

3: Brain Facts For Kids | Human Nervous System | DK Find Out

The nervous system is the part of an animal that coordinates its actions by transmitting signals to and from different parts of its body. The nervous system detects environmental changes that impact the body, then works in tandem with the endocrine system to respond to such events.

Check new design of our homepage! Nerves of the Body Nerves of the body are a part of a very complicated organ system of the human body, known as the nervous system. They basically form a network of signal carriers, that carry signals to and from the brain to various organs. Bodytomy Staff Last Updated: Dec 31, Technically, a nerve is "an enclosed, cable-like bundle of peripheral axons the long, slender projections of neurons. A nerve provides a common pathway for the electrochemical nerve impulses that are transmitted along each of the axons. Nerves are found only in the peripheral nervous system. In the central nervous system, the analogous structures are known as tracts". Flowchart of Nerve Classification The nerves are the important components of human nervous system. It consists of the brain and the spinal cord. It consists of the nerves; there are hundreds and thousands of nerves that carry signals to and from the brain and make normal human functioning possible. Nerves of the human body work like the wires in an electric circuit. Each and every nerve is responsible for carrying a set of signals, that convey many messages like pain, hunger, cold etc. Once the signal is received by the brain, it decides the particular action to be taken and sends back the signals defining the same. They are the control system of the body and the central nervous system functions as their boss. From deciding what to do, to how to do, everything is handled by this complete nervous system. The signals that are communicated through the nerves are electrochemical nerve impulses carried by the neurons, also known as the nerve cells. Nerves control both voluntary and involuntary reflex actions of the body. Our body has various types of muscles and organs that coordinate and work together to make a normal human life possible. The example of voluntary muscles are the ones in our limbs and the involuntary ones are the muscles in our internal organs. The voluntary muscles are also prone to involuntary actions like when our hand or leg produces an automatic jerk near a dangerous object. This is the involuntary reaction of the nerves of the arm or the nerves of the legs. So, the muscles of the body are controlled by both voluntary and involuntary nerves. Based on this working principle, the peripheral nervous system is further divided into autonomic nervous system and somatic nervous system. The autonomic nervous system is responsible for all the involuntary actions that happen inside the human body. The somatic nervous system controls the motor nerves and is responsible for the voluntary actions of the muscles. The autonomic nervous system is further divided into sympathetic nervous system and parasympathetic nervous system. Types of Nerve Cells Nerve cells or neurons of the body are classified on the basis of two criteria. So, let us understand the different types of neurons based on these criteria. These neurons carry the impulses from human senses, like; nose, eyes, ears, tongue and skin to the central nervous system. Motor Neurons or Efferent Neurons: Motor neurons carry information from the central nervous system to the various organs in the body. These neurons work as the communication system between the above 2 types of nerve cells, that is, between sensory neurons and motor neurons. So, interneurons send information between sensory neurons and motor neurons, and help in their proper working. Based on their Body Extensions Bipolar Neurons: Bipolar neurons have two extensions coming out from their body. These cells specialize in the transfer of senses like smell, taste and vestibular functions. The most common examples of these type of cells are bipolar cells of the retina and ganglia of the vestibulocochlear. These cells have two axons unlike other cells that have only one. One axon extends towards the spinal cord and the other one extends to the muscle. An example of this type of cell is, dorsal root ganglion cells. Multipolar neurons have multiple processes coming out of the cell body. These type of cells have only one axon. Some examples are pinal motor neurons and pyramidal neurons. Types of Nerves in the Body Nerves are classified in various categories based on their working and the direction in which they carry the neurons. The following are the two major types of nerve classification. Based on Flow of Impulse Nerves of the body transfer the neurons in both the directions. That is, from body organs and parts to the brain and vice versa. Based on this, the nerves are divided into two types. Afferent Nerves or Sensory Nerves: The neurons in these nerves carry the signals from sensory organs to the central nervous system. These nerves play the main role in the involuntary actions of the body and belong to the autonomic nervous system. Efferent Nerves or Motor Nerves: These nerves contain motor neurons that carry signals from the central nervous system to the various organs in the body. These nerves are a part of somatic nervous system, which is responsible for the voluntary actions of the skeletal muscles in the body. Mixed nerves carry the neurons in both the directions, i. Thus, they relay both the incoming signals and the outgoing commands. Based on Connecting Point Nerves are also categorized according to which part of the central nervous system they connect to. All the main nerves either connect to the spinal cord or to the brain. So, based on this attribute, all the major nerves are divided into two types; spinal nerves and cranial nerves. These nerves connect to the spinal cord through the vertebra in the spinal column. These nerves directly connect to the brain. Human beings have 12 pairs of cranial nerves, out of which, 2 come from the cerebrum and the rest of the 10 pairs connect to the brain stem. Nerves in the Human Body This section is wholly dedicated to the nerves in our body that control and organize all the organs.

4: Nervous System: Explore the Nerves with Interactive Anatomy Pictures

The nervous system consists of the brain, spinal cord, sensory organs, and all of the nerves that connect these organs with the rest of the body. Together, these organs are responsible for the control of the body and communication among its parts.

Click here to read more about the human brain. Functions of the brain: This is how your brain does it; Step 1: Collects signals sent to it Step 2: Makes sense of the information that the signals contain Step 3: Decides what to do Step 4: Sends signals to the muscles to make them take the necessary action What is the spinal cord? The column of nerve tissue that runs down the base of the brain to just below the waist is your spinal cord What is spinal cord made of? The spinal cord is made up of bundles of nerves that connect the brain to other parts of the body. It runs down from the brain through a canal in the centre of the doughnut-shaped bones of the spine backbone. These bones which surround and protect the spinal cord are called vertebrae. Function of the brain and the spinal cord: Your brain and your spinal cord together act as the control centre of your body and make up the central nervous system. Nerves Nerves are made up of bundles of neurons also called nerve cells. These neurons lie next to one another and link up to form the network of nerves, that carry messages to and from the central nervous system to other parts of the body. What are neurons nerve cells? Your neurons or nerve cells are very thin. Also, they can be very long, in fact some of your nerve cells stretch all the way from your big toe to your spine. Neurons carry electrical signals back and forth between the brain and the rest of the body. There are three main types of neurons.

5: Nervous system - Wikipedia

Link to the body through 31 pairs of spinal nerves Each nerve has a dorsal root (contains sensory neurons) and a ventral route (contains motor neurons) Peripheral nervous system.

Efferent nerves in the PNS carry signals from the control center to the muscles, glands, and organs to regulate their functions. Nervous System Anatomy Nervous Tissue The majority of the nervous system is tissue made up of two classes of cells: Neurons Neurons, also known as nerve cells, communicate within the body by transmitting electrochemical signals. Neurons look quite different from other cells in the body due to the many long cellular processes that extend from their central cell body. The cell body is the roughly round part of a neuron that contains the nucleus, mitochondria, and most of the cellular organelles. Small tree-like structures called dendrites extend from the cell body to pick up stimuli from the environment, other neurons, or sensory receptor cells. Long transmitting processes called axons extend from the cell body to send signals onward to other neurons or effector cells in the body. There are 3 basic classes of neurons: Also known as sensory neurons, afferent neurons transmit sensory signals to the central nervous system from receptors in the body. Also known as motor neurons, efferent neurons transmit signals from the central nervous system to effectors in the body such as muscles and glands. Interneurons form complex networks within the central nervous system to integrate the information received from afferent neurons and to direct the function of the body through efferent neurons. Each neuron in the body is surrounded by anywhere from 6 to 60 neuroglia that protect, feed, and insulate the neuron. Because neurons are extremely specialized cells that are essential to body function and almost never reproduce, neuroglia are vital to maintaining a functional nervous system. Brain The brain , a soft, wrinkled organ that weighs about 3 pounds, is located inside the cranial cavity, where the bones of the skull surround and protect it. The approximately billion neurons of the brain form the main control center of the body. The brain and spinal cord together form the central nervous system CNS , where information is processed and responses originate. The brain, the seat of higher mental functions such as consciousness, memory, planning, and voluntary actions, also controls lower body functions such as the maintenance of respiration, heart rate, blood pressure, and digestion. Spinal Cord The spinal cord is a long, thin mass of bundled neurons that carries information through the vertebral cavity of the spine beginning at the medulla oblongata of the brain on its superior end and continuing inferiorly to the lumbar region of the spine. The white matter of the spinal cord functions as the main conduit of nerve signals to the body from the brain. The grey matter of the spinal cord integrates reflexes to stimuli. Nerves Nerves are bundles of axons in the peripheral nervous system PNS that act as information highways to carry signals between the brain and spinal cord and the rest of the body. Each axon is wrapped in a connective tissue sheath called the endoneurium. Individual axons of the nerve are bundled into groups of axons called fascicles, wrapped in a sheath of connective tissue called the perineurium. Finally, many fascicles are wrapped together in another layer of connective tissue called the epineurium to form a whole nerve. The wrapping of nerves with connective tissue helps to protect the axons and to increase the speed of their communication within the body. Afferent, Efferent, and Mixed Nerves. Some of the nerves in the body are specialized for carrying information in only one direction, similar to a one-way street. Nerves that carry information from sensory receptors to the central nervous system only are called afferent nerves. Other neurons, known as efferent nerves, carry signals only from the central nervous system to effectors such as muscles and glands. Finally, some nerves are mixed nerves that contain both afferent and efferent axons. Mixed nerves function like 2-way streets where afferent axons act as lanes heading toward the central nervous system and efferent axons act as lanes heading away from the central nervous system. Extending from the inferior side of the brain are 12 pairs of cranial nerves. Each cranial nerve pair is identified by a Roman numeral 1 to 12 based upon its location along the anterior-posterior axis of the brain. Each nerve also has a descriptive name e. The cranial nerves provide a direct connection to the brain for the special sense organs, muscles of the head , neck, and shoulders, the heart, and the GI tract. Extending from the left and right sides of the spinal cord are 31 pairs of spinal nerves. The spinal nerves are mixed nerves that carry both sensory and motor signals between the spinal cord and specific regions of the body. The 31 spinal nerves are split into 5 groups named for the 5 regions of the vertebral column. Thus, there are 8 pairs of cervical nerves, 12 pairs of thoracic nerves , 5 pairs of lumbar nerves , 5 pairs of sacral nerves , and 1 pair of coccygeal nerves. Each spinal nerve exits from the spinal cord through the intervertebral foramen between a pair of vertebrae or between the C1 vertebra and the occipital bone of the skull. Meninges The meninges are the protective coverings of the central nervous system CNS. They consist of three layers: Made of dense irregular connective tissue, it contains many tough collagen fibers and blood vessels. It lines the inside of the dura mater and contains many thin fibers that connect it to the underlying pia mater. These fibers cross a fluid-filled space called the subarachnoid space between the arachnoid mater and the pia mater. Containing many blood vessels that feed the nervous tissue of the CNS, the pia mater penetrates into the valleys of the sulci and fissures of the brain as it covers the entire surface of the CNS. CSF is formed from blood plasma by special structures called choroid plexuses. The choroid plexuses contain many capillaries lined with epithelial tissue that filters blood plasma and allows the filtered fluid to enter the space around the brain. Newly created CSF flows through the inside of the brain in hollow spaces called ventricles and through a small cavity in the middle of the spinal cord called the central canal. CSF also flows through the subarachnoid space around the outside of the brain and spinal cord. CSF is constantly produced at the choroid plexuses and is reabsorbed into the bloodstream at structures called arachnoid villi. Cerebrospinal fluid provides several vital functions to the central nervous system: CSF absorbs shocks between the brain and skull and between the spinal cord and vertebrae. This shock absorption protects the CNS from blows or sudden changes in velocity, such as during a car accident. The brain and spinal cord float within the CSF, reducing their apparent weight through buoyancy. The brain is a very large but soft organ that requires a high volume of blood to function effectively. The reduced weight in cerebrospinal fluid allows the blood vessels of the brain to remain open and helps protect the nervous tissue from becoming crushed under its own weight. CSF helps to maintain chemical homeostasis within the central nervous system. It contains ions, nutrients, oxygen, and albumins that support the chemical and osmotic balance of nervous tissue. CSF also removes waste products that form as byproducts of cellular metabolism within nervous tissue. What are known as the special sensesâ€”vision, taste, smell, hearing, and balanceâ€”are all detected by specialized organs such as the eyes , taste buds , and olfactory epithelium. Sensory receptors for the general senses like touch, temperature, and pain are found throughout most of the body. All of the sensory receptors of the body are connected to afferent neurons that carry their sensory information to the CNS to be processed and integrated. These signals are then passed on to the central nervous system CNS for further processing by afferent neurons and nerves. The process of integration is the processing of the many sensory signals that are passed into the CNS at any given time. These signals are evaluated, compared, used for decision making, discarded or committed to memory as deemed appropriate. Integration takes place in the gray matter of the brain and spinal cord and is performed by interneurons. Many interneurons work together to form complex networks that provide this processing power. Once the networks of interneurons in the CNS evaluate sensory information and decide on an action, they stimulate efferent neurons. Efferent neurons also called motor neurons carry signals from the gray matter of the CNS through the nerves of the peripheral nervous system to effector cells. The effector may be smooth, cardiac, or skeletal muscle tissue or glandular tissue. The effector then releases a hormone or moves a part of the body to respond to the stimulus. Did you know that DNA testing can help you discover your genetic risk of acquiring certain health conditions that affect the organs of our nervous system? The CNS acts as the control center of the body by providing its processing, memory, and regulation systems. The CNS is also responsible for the higher functions of the nervous system such as language, creativity, expression, emotions, and personality. The brain is the seat of consciousness and determines who we are as individuals. Peripheral Nervous System The peripheral nervous system PNS includes all of the parts of the nervous system outside of the brain and spinal cord. These parts include all of the cranial and spinal nerves, ganglia, and sensory receptors. The SNS is the only consciously controlled part of the PNS and is responsible for stimulating skeletal muscles in the body. The ANS controls subconscious effectors such as visceral muscle tissue, cardiac muscle tissue, and glandular tissue. There are 2 divisions of the autonomic nervous system in the body: The sympathetic division increases respiration and heart rate, releases adrenaline and other stress hormones, and decreases digestion to cope with these situations. The parasympathetic works to undo the work of the sympathetic division after a stressful situation. Among other functions, the parasympathetic division works to decrease respiration and heart rate, increase digestion, and permit the elimination of wastes. The ENS receives signals from the central nervous system through both the sympathetic and parasympathetic divisions of the autonomic nervous system to help regulate its functions. Action Potentials Neurons function through the generation and propagation of electrochemical signals known as action potentials APs. An AP is created by the movement of sodium and potassium ions through the membrane of neurons. See Water and Electrolytes. At rest, neurons maintain a concentration of sodium ions outside of the cell and potassium ions inside of the cell. This concentration is maintained by the sodium-potassium pump of the cell membrane which pumps 3 sodium ions out of the cell for every 2 potassium ions that are pumped into the cell. The ion concentration results in a resting electrical potential of millivolts mV , which means that the inside of the cell has a negative charge compared to its surroundings. If a stimulus permits enough positive ions to enter a region of the cell to cause it to reach mV, that region of the cell will open its voltage-gated sodium channels and allow sodium ions to diffuse into the cell. Sodium carries a positive charge that causes the cell to become depolarized positively charged compared to its normal negative charge. The depolarization of the cell is the AP that is transmitted by the neuron as a nerve signal. The positive ions spread into neighboring regions of the cell, initiating a new AP in those regions as they reach mV. The AP continues to spread down the cell membrane of the neuron until it reaches the end of an axon. The loss of potassium along with the pumping of sodium ions back out of the cell through the sodium-potassium pump restores the cell to the mV resting potential. At this point the neuron is ready to start a new action potential. Synapses A synapse is the junction between a neuron and another cell.

6: Human Nervous System Structure and Functions Explained With Diagrams

The 5 Minute MIND EXERCISE That Will CHANGE YOUR LIFE! (Your Brain Will Not Be The Same) - Duration: Your Youniverse 1,, views.

Biology for Kids The Nervous System The nervous system is made up of the brain , the spinal cord, and a large network of nerves that covers all parts of the body. Together the nervous system helps different parts of our body communicate and allows our brain to control what is going on. Without the nervous system our brain would be mush. The brain and the spinal cord make up what is called the central nervous system. The rest of the nerves together are called the peripheral nervous system. Nerves - Peripheral Nervous System Nerves are sort of like wires that carry communication signals or impulses around the body. Inside each nerve is a bundle of nerve fibers. Some nerves are really long, like the ones that go all the way from your feet to your spinal cord. Nerve cells are called neurons. There are two main types of nerves: Motor nerves - Motor nerves allow the brain to control our muscles. The brain sends signals over the motor nerves to tell our muscles to expand or contract so we can move. Sensory nerves - The second type of nerves are called sensory nerves. These nerves carry signals to the brain to tell it about what is going on in the outside world. They come from our skin touch , eyes sight , tongue taste , nose smell , and ears hear. In each case, the signals only go in one direction: The motor nerve signals travel from the brain to the muscle and the sensory nerve signals travel from the senses to the brain. Within the peripheral nervous system there are also two main sets of nerves: Autonomic nervous system - This set of nerves works automatically. It would take a lot of concentration if we had to constantly tell our heart to beat or our digestive system to release certain enzymes. Fortunately, the autonomic nervous system takes care of this for us. Somatic nervous system - These are the nerves that we actively control, like jumping with our legs or moving our arms. The Neuron Each nerve is made up of many cells called neurons. Each motor neuron has three important parts: Dendrites are branches off the main cell body. They talk to dendrites from the cell next to them over something called a synapse. Axons connect to the muscles and tell them what to do. Reflex Our bodies are super smart. So our body just bypasses the brain. This happens when we touch something hot. Our hand actually moves before the brain tells it to. The brain eventually finds out what is going on, but our body has done the smart thing and moved first. Your doctor will test out your reflex by hitting your knee in a certain place to see if your leg will move without you thinking about it.

7: Structure of the nervous system (video) | Khan Academy

The Nervous System of the Human Body The nervous system of the human body is responsible for sending, receiving and processing nerve impulses. It controls the actions and sensations of all the parts of the human body as well as your thoughts, emotions and memories.

To relay information to and from your central nervous system Actions: Your peripheral nerves transmit voluntary and involuntary actions Sympathetic nervous system: Fight or flight Parasympathetic nervous system: Rest and digest Network outside your central nervous system All the nerves and nerve cells outside your central nervous system make up your peripheral nervous system. Its task is to relay information from your brain and spinal cord to the rest of your body and from your body to your brain and spinal cord. Your peripheral nervous system consists of 12 pairs of cranial nerves, which emerge from your brain and mainly serve your head and neck. It also contains 31 pairs of spinal nerves, which branch off from your spinal cord and supply the rest of your body. Voluntary and involuntary actions With the help of your peripheral nerves, you are able to carry out voluntary and involuntary actions. If you pick up a mug, clap your hands or lift weights in the gym, you are performing voluntary actions. Your brain receives nerve impulses and analyses them before you decide what to do next. In contrast, your heart beats and your intestines digest without your conscious control. Involuntary actions such as these are regulated by your autonomic nervous system. The autonomic part of your peripheral nervous system ensures that all your internal organs and glands function smoothly. Your autonomic nervous system has two parts: Both supply essentially the same organs but cause opposite effects. This is because their activating chemicals, or neurotransmitters, are different. It shunts your blood to your muscles and increases your blood pressure, heart rate and breathing rate, enabling you to cope with stressful situations. Rest and digest Your parasympathetic nervous system maintains and restores your energy. It directs blood to your digestive tract and makes sure you actively digest food. It also maintains your blood pressure, heart rate and breathing rate at a low level.

8: Nerves of the Body

The central nervous system coordinates the functioning of all parts of the human body and is the largest part of the nervous system. It is enveloped by a set of membranes known as meninges that protect the brain and the spinal cord.

Check new design of our homepage! They remind me of school textbooks which used to have plenty of them, providing a visual aid to understanding difficult subjects. Bodytomy Staff Last Updated: Studying human anatomy became interesting, thanks to her. She used to say, "The human body systems are the most accurately engineered machines that possess an intellect of their own. Look at the brain, for example; man will never be able to replicate its intricate design or recreate intelligence and emotion". It was wonderful to pick up the intricacies of a seemingly boring subject like human anatomy from her. Reading this article will be like reading about the human nervous system from your science textbook as this article carries a labeled human nervous system diagram to help you understand its design and working. For me, diagrams and illustrations that textbooks carried, were always of great help in understanding the topic. It was the skeletal system diagram that helped me understand the "skeleton" of human bodies. And it was when I first studied the diagram of a human heart, I realized that the heart is not exactly heart-shaped! Coming back to the point, let me start explaining the human nervous system function and parts with the help of a labeled diagram. Before going to the details of the structure and functioning of the human nervous system, you should know what the nervous system actually is and what it does. The nervous system is a network of special cells, neurons and ganglia, that work together to carry out the transmission and reception of signals between different parts of our body. The signals are transmitted in the form of electrochemical waves or chemicals. Before you proceed to understand the human nervous system function and parts, you might like to go through some human nervous system facts. So here are some interesting facts about the nervous system. Neurons Neuron can be considered as the basic unit of the nervous system, which processes and transmits information by means of electrochemical signals. Sensory neurons respond to external stimuli that affect the sensory organ cells. Motor neurons, on receiving signals from the central nervous system, bring about responses at the target organs. Interneurons act as the connectors between neurons. Neurons are of different shapes and sizes and their complex interconnections add to the complexity of the nervous system. The human brain contains The glial cells surround the neurons to hold them in place, supply them with oxygen and nutrients, isolate the neurons from one another and remove dead neurons. The human brain contains about The human nervous system can be divided into two parts, central and peripheral. The central nervous system CNS consists of the brain and the spinal cord, while the peripheral nervous system PNS consists of sensory neurons, ganglia clusters of neurons and nerves. Here is a diagram that you can refer to, while you read about the human nervous system function and parts. Central Nervous System The central nervous system coordinates the functioning of all parts of the human body and is the largest part of the nervous system. It is enveloped by a set of membranes known as meninges that protect the brain and the spinal cord. They also have their own protective covers! The skull protects the brain while the vertebrae and spinal cavity shield the delicate spinal cord. To be precise, the brain is placed in the cranial cavity and the spinal cord in the spinal cavity. Brain The brain is the center of the human nervous system and is a highly complex organ. The human brain is about three times larger than the brain of a typical mammal. The brain can be said to have three main parts, the brain stem, the cerebrum and the cerebellum. The cerebrum is associated with information storage and processing; the cerebellum is responsible for balance, posture and coordination of movements; and the brain stem plays a vital role in controlling breathing and heart rate along with some other important body processes. Along with the skull, the brain is also protected by the cerebrospinal fluid in which it is suspended. For a detailed study of brain anatomy and its functions, read: Spinal Cord The spinal cord is a long tubular structure composed of nervous tissue and support cells. It is around 45 cm long in men and 43 cm long in women. It extends from the brain up to the space between the first and the second lumbar vertebrae. It transmits neural signals between the brain and other body parts. It is the spinal cord which connects the brain and the peripheral nervous system. It consists of about 13,, neurons. Peripheral Nervous System How does the central nervous system communicate with the other body organs? It is through the peripheral nervous system. Functionally, the peripheral nervous system can be divided into two parts; the somatic nervous system and the autonomic nervous system, the somatic nervous system is responsible for bodily activities that are under conscious control. For example, controlling body movements and receiving external stimuli. The autonomic nervous system is further divided into sympathetic, parasympathetic and enteric nervous systems. The sympathetic nervous system governs the bodily responses to impending dangers, while the parasympathetic system is responsible for bodily actions that help in relaxation of body organs that are hyperactive. The enteric nervous system specifically manages the functioning of the digestive system. Nerves Cable-like in appearance, the nerves serve as paths for the transmission of nerve impulses along axons. Nerves are found only in the peripheral nervous system. Depending on the direction of the signals they conduct, they are classified into afferent and efferent nerves. The afferent ones conduct signals from sensory neurons to the central nervous system, while the efferent ones conduct signals from the central nervous system along motor neurons to muscles or glands. There are some nerves which can function like both afferent and efferent ones. They are called mixed nerves. Musculocutaneous Nerve It is a part of the brachial plexus. It runs through the neck, the armpit area and ends in the arm. It serves the bicep muscles and the skin of the forearm. Radial Nerve It is also a part of the brachial plexus. It supplies the triceps brachii muscle of the arm and a part of the forearm along with its associated joints and skin. Median Nerve It is one of the main nerves that originate from the brachial plexus. It runs down the arm and enters the forearm. The median nerve is the only nerve passing through the carpal tunnel. Iliohypogastric Nerve It originates from the first lumbar nerve and supplies the abdominal muscles along with skin of some parts of the abdominal wall. Obturator Nerve It is a mixed nerve that arises from the lumbar plexus. It supplies the adductor, gracilis and obturator externus muscles. It also supplies a part of the skin of the thigh, hip and knee joints. Genitofemoral Nerve It arises in the lumbar plexus and bifurcates into two branches, namely, genital and femoral. Its branches run through the skin of the scrotum and to the upper anterior aspect of the thigh. Ulnar Nerve It runs near the ulna bone and is directly connected to the little finger and half of the ring finger. It supplies the tips of these fingers and the far back of the fingernail beds. It is the largest nerve which is unprotected by muscle or bone. Common Peroneal Nerve Also known as the common fibular nerve, it is half the size of the tibial nerve and originates from the branches of the lumbar and sacral nerves. It runs obliquely along the side of the depression at the back of the knee joint to the head of the calf bone. Deep Peroneal Nerve Also known as the deep fibular nerve, it originates at the bifurcation of the common peroneal nerve, comes above the middle of the leg and then to the front of the ankle joint. The deep peroneal nerve supplies muscular branches to some parts of the leg and the ankle joint. Superficial Peroneal Nerve It supplies the peroneus longus, a muscle in the lateral compartment of the leg and the peroneus brevis, a smaller muscle lying under the peroneus longus. This nerve supplies musclular branches to the longus and the brevis muscles and cutaneous filaments to the skin of the lower part of the leg. Tibial Nerve The tibial nerve is a branch of the sciatic nerve. It passes through the depression at the back of the knee joint, where it gives off an articular branch to the knee joint and a cutaneous branch that becomes the sural nerve. Saphenous Nerve It is the largest cutaneous branch of the femoral nerve. It supplies cutaneous branches to the skin of the leg and foot in the region between the knee and the ankle. Sciatic Nerve Also known as the ischiatic nerve, the sciatic nerve is a nerve fiber that begins in the lower back and ends in the lower limb. It supplies the skin of the leg and the muscles of the leg, foot and back of the thigh. Pudental Nerve Originating in the sacral region of the spinal cord, it is formed from the second, third and fourth sacral nerves. It is located in the pelvic region and it supplies the external genitalia of both men and women. Femoral Nerve It is located inside the leg and supplies muscles that help in bending and straightening the leg. It is the largest branch of the lumbar plexus. Subcostal Nerve It is the vertical branch of the 12th thoracic nerve and supplies some parts of the abdominal muscles. It supplies branches to the skin of the lower abdominal wall and the gluteal region. It passes along the border of the 12th rib. Intercostal Nerves The ventral branches of the thoracic nerves are known as intercostal nerves. The first two intercostal nerves supply fibers to the upper limb, the next four, to the thorax and the lower five to the thorax and abdomen. Plexus The literal meaning of plexus is network. In human beings, rather all vertebrates, the area where nerves branch and rejoin, is known as a plexus. The four main nerve plexuses in the human body are cervical plexus, brachial plexus, lumbar plexus and sacral plexus.

HUMAN BODY NERVE SYSTEM pdf

9: BBC Science & Nature - Human Body and Mind - Nervous System Layer

nervous system is composed of excitable nerve cells (neurons) and synapses that form between the neurons and connect them to centers throughout the body or to other neurons.

Outline of human anatomy and Anatomy Human anatomy is the study of the shape and form of the human body. The human body has four limbs two arms and two legs , a head and a neck which connect to the torso. The spine at the back of the skeleton contains the flexible vertebral column which surrounds the spinal cord , which is a collection of nerve fibres connecting the brain to the rest of the body. Nerves connect the spinal cord and brain to the rest of the body. All major bones, muscles, and nerves in the body are named, with the exception of anatomical variations such as sesamoid bones and accessory muscles. Blood vessels carry blood throughout the body, which moves because of the beating of the heart. Venules and veins collect blood low in oxygen from tissues throughout the body. From here, the blood is pumped into the lungs where it receives oxygen and drains back into the left side of the heart. Here blood passes from small arteries into capillaries , then small veins and the process begins again. Blood carries oxygen , waste products, and hormones from one place in the body to another. Blood is filtered at the kidneys and liver. The body consists of a number of different cavities, separated areas which house different organ systems. The brain and central nervous system reside in an area protected from the rest of the body by the blood brain barrier. The lungs sit in the pleural cavity. The intestines , liver , and spleen sit in the abdominal cavity Height, weight, shape and other body proportions vary individually and with age and sex. Body shape is influenced by the distribution of muscle and fat tissue. Outline of physiology and Physiology Human physiology is the study of how the human body functions. This includes the mechanical, physical, bioelectrical , and biochemical functions of humans in good health, from organs to the cells of which they are composed. The human body consists of many interacting systems of organs. These interact to maintain homeostasis , keeping the body in a stable state with safe levels of substances such as sugar and oxygen in the blood. Some combined systems are referred to by joint names. For example, the nervous system and the endocrine system operate together as the neuroendocrine system. The nervous system receives information from the body, and transmits this to the brain via nerve impulses and neurotransmitters. At the same time, the endocrine system releases hormones, such as to help regulate blood pressure and volume. Together, these systems regulate the internal environment of the body, maintaining blood flow, posture, energy supply, temperature, and acid balance pH.

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