DOWNLOAD PDF NERVOUS SYSTEM AND ITS CONSERVATION

Chapter 1 : Sympathetic nervous system | anatomy | calendrierdelascience.com

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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.

Chapter 2 : The Nervous System and its Conservation

This book consists of twenty-three brief chapters, as follows: Introduction. The minute structure of the nervous tissues. The elements of nerve physiology.

Structure[edit] The parasympathetic nerves are autonomic or visceral [4] [5] branches of the peripheral nervous system PNS. Parasympathetic nerve supply arises through three primary areas: From these four ganglia the parasympathetic nerves complete their journey to target tissues via trigeminal branches ophthalmic nerve , maxillary nerve , mandibular nerve. The vagus nerve does not participate in these cranial ganglia as most of its parasympathetic fibers are destined for a broad array of ganglia on or near thoracic viscera esophagus , trachea , heart , lungs and abdominal viscera stomach , pancreas , liver , kidneys , small intestine , and about half of the large intestine. The vagus innervation ends at the junction between the midgut and hindgut, just before the splenic flexure of the transverse colon. The pelvic splanchnic efferent preganglionic nerve cell bodies reside in the lateral gray horn of the spinal cord at the TL1 vertebral levels the spinal cord terminates at the L1-L2 vertebrae with the conus medullaris , and their axons exit the vertebral column as S2-S4 spinal nerves through the sacral foramina. The parasympathetic ganglion where these preganglionic neurons synapse will be close to the organ of innervation. This differs from the sympathetic nervous system, where synapses between pre- and post-ganglionic efferent nerves in general occur at ganglia that are farther away from the target organ. As in the sympathetic nervous system, efferent parasympathetic nerve signals are carried from the central nervous system to their targets by a system of two neurons. The first neuron in this pathway is referred to as the preganglionic or presynaptic neuron. Its cell body sits in the central nervous system and its axon usually extends to synapse with the dendrites of a postganglionic neuron somewhere else in the body. The axons of presynaptic parasympathetic neurons are usually long, extending from the CNS into a ganglion that is either very close to or embedded in their target organ. As a result, the postsynaptic parasympathetic nerve fibers are very short. The oculomotor PNS fibers originate in the Edinger-Westphal nucleus in the central nervous system and travel through the superior orbital fissure to synapse in the ciliary ganglion located just behind the orbit eye. From the ciliary ganglion the postganglionic parasympathetic fibers leave via short ciliary nerve fibers, a continuation of the nasociliary nerve a branch of ophthalmic division of the trigeminal nerve. The short ciliary nerves innervate the orbit to control the ciliary muscle responsible for accommodation and the iris sphincter muscle , which is responsible for miosis or constriction of the pupil in response to light or accommodation. The parasympathetic aspect of the facial nerve controls secretion of the sublingual and submandibular salivary glands , the lacrimal gland , and the glands associated with the nasal cavity. The preganglionic fibers originate within the CNS in the superior salivatory nucleus and leave as the intermediate nerve which some consider a separate cranial nerve altogether to connect with the facial nerve just distal further out to it surfacing the central nervous system. Just after the facial nerve geniculate ganglion general sensory ganglion in the temporal bone , the facial nerve gives off two separate parasympathetic nerves. The first is the greater petrosal nerve and the second is the chorda tympani. The greater petrosal nerve travels through the middle ear and eventually combines with the deep petrosal nerve sympathetic fibers to form the nerve of the pterygoid canal. The parasympathetic fibers of the nerve of the pterygoid canal synapse at the pterygopalatine ganglion , which is closely associated with the maxillary division of the trigeminal nerve CN V2. The postganglionic parasympathetic fibers leave the pterygopalatine ganglion in several directions. One division leaves on the zygomatic division of CN V2 and travels on a communicating branch to unite with the lacrimal nerve branch of the ophthalmic nerve of CN V1 before synapsing at the lacrimal gland. These parasympathetic to the lacrimal gland control tear production. A separate group of parasympathetic leaving from the pterygopalatine ganglion are the descending palatine nerves CN V2 branch , which include the greater and lesser palatine nerves. The greater palatine parasympathetic synapse on the hard palate and regulate mucus glands located there. The lesser palatine nerve synapses at the soft palate and controls sparse taste receptors and mucus glands. Yet another set of divisions from the pterygopalatine ganglion are the posterior, superior, and inferior lateral nasal nerves; and the nasopalatine nerves all branches of CN V2, maxillary division of the trigeminal nerve that bring parasympathetic innervation to glands of the nasal mucosa. The second parasympathetic branch that leaves the facial nerve is the chorda tympani. This nerve carries secretomotor fibers to the submandibular and sublingual glands. The chorda tympani travels through the middle ear and attaches to the lingual nerve mandibular division of trigeminal, CN V3. After joining the lingual nerve, the preganglionic fibers synapse at the submandibular ganglion and send postganglionic fibers to the sublingual and submandibular salivary glands. The glossopharyngeal nerve has parasympathetic fibers that innervate the parotid salivary gland. The preganglionic fibers depart CN IX as the tympanic nerve and continue to the middle ear where they make up a tympanic plexus on the cochlear promontory of the mesotympanum. The tympanic plexus of nerves rejoin and form the lesser petrosal nerve and exit through the foramen ovale to synapse at the otic ganglion. From the otic ganglion postganglionic parasympathetic fibers travel with the auriculotemporal nerve mandibular branch of trigeminal, CN V3 to the parotid salivary gland. Vagus nerve[edit] The vagus nerve, named after the Latin word vagus because the nerve controls such a broad range of target tissues â€" vagus in Latin literally means "wandering" , has parasympathetic that originate in the dorsal nucleus of the vagus nerve and the nucleus ambiguus in the CNS. Another peculiarity is that the vagus has an autonomic ganglion associated with it at approximately the level of C1 vertebra. The vagus gives no parasympathetic to the cranium. The vagus nerve is hard to track definitively due to its ubiquitous nature in the thorax and abdomen so the major contributions will be discussed. Several parasympathetic nerves come off the vagus nerve as it enters the thorax. One nerve is the recurrent laryngeal nerve , which becomes the inferior laryngeal nerve. From the left vagus nerve the recurrent laryngeal nerve hooks around the aorta to travel back up to the larynx and proximal esophagus while, from the right vagus nerve, the recurrent laryngeal nerve hooks around the right subclavian artery to travel back up to the same location as its counterpart. These different paths are a direct result of embryological development of the circulatory system. Each recurrent laryngeal nerve supplies the trachea and the esophagus with parasympathetic secretomotor innervation for glands associated with them and other fibers that are not PN. Another nerve that comes off the vagus nerves approximately at the level of entering the thorax are the cardiac nerves. These cardiac nerves go on to form cardiac and pulmonary plexuses around the heart and lungs. As the main vagus nerves continue into the thorax they become intimately linked with the esophagus and sympathetic nerves from the sympathetic trunks to form the esophageal plexus. This is very efficient as the major function of the vagus nerve from there on will be control of the gut smooth muscles and glands. As the esophageal plexus enter the abdomen through the esophageal hiatus anterior and posterior vagus trunks form. The vagus trunks then join with preaortic sympathetic ganglion around the aorta to disperse with the blood vessels and sympathetic nerves throughout the abdomen. The extent of the parasympathetic in the abdomen include the pancreas , kidneys , liver , gall bladder , stomach and gut tube. The vagus contribution of parasympathetic continues down the gut tube until the end of the midgut. The midgut ends two thirds of the way across the transverse colon near the splenic flexure. Unlike in the cranium, where one parasympathetic is in charge of one particular tissue or region, for the most part the pelvic splanchnics each contribute fibers to pelvic viscera by traveling to one or more plexuses before being dispersed to the target tissue. These plexuses are composed of mixed autonomic nerve fibers parasympathetic and sympathetic and include the vesical, prostatic, rectal, uterovaginal, and inferior hypogastric plexuses. The preganglionic neurons in the pathway do not synapse in a ganglion as in the cranium but rather in the walls of the tissues or organs that they innervate. The visceral tissues in the pelvis that the parasympathetic nerve pathway controls include those of the urinary bladder, ureters, urinary sphincter, anal sphincter, uterus, prostate, glands, vagina, and penis. Unconsciously, the parasympathetic will cause peristaltic movements of the ureters and intestines, moving urine from the kidneys into the bladder and food down the intestinal tract and, upon necessity, the parasympathetic will assist in excreting urine from the bladder or defecation. Stimulation of the parasympathetic will cause the detrusor muscle urinary bladder wall to contract and simultaneously relax the internal sphincter muscle between the bladder and the urethra, allowing the bladder to void. Also, parasympathetic stimulation of the internal anal sphincter will relax this muscle to allow defecation. There are other skeletal muscles involved with these processes but the parasympathetic plays a huge role in continence and bowel retention. A study published in , suggests that all sacral autonomic output may be sympathetic; indicating that the rectum, bladder and reproductive organs may only be innervated by the sympathetic nervous system. This suggestion is based on detailed analysis of 15 phenotypic and ontogenetic factors differentiating sympathetic from parasympathetic neurons in the mouse. Assuming that the reported findings most likely applies to other mammals as well, this novel perspective suggests a simplified, bipartite architecture of the autonomic nervous system, in which the parasympathetic nervous system receives input from cranial nerves exclusively and the sympathetic nervous system from thoracic to sacral spinal nerves.

Chapter 3 : The Nervous System and Its Conservation. | JAMA | JAMA Network

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

Like you, your brain is quite the juggler. Anatomy of the Nervous System If you think of the brain as a central computer that controls all bodily functions, then the nervous system is like a network that relays messages back and forth from the brain to different parts of the body. It does this via the spinal cord, which runs from the brain down through the back and contains threadlike nerves that branch out to every organ and body part. When a message comes into the brain from anywhere in the body, the brain tells the body how to react. For example, if you accidentally touch a hot stove, the nerves in your skin shoot a message of pain to your brain. The brain then sends a message back telling the muscles in your hand to pull away. Luckily, this neurological relay race takes a lot less time than it just took to read about it. Considering everything it does, the human brain is incredibly compact, weighing just 3 pounds. It extends from the lower part of the brain down through spine. Along the way, various nerves branch out to the entire body. Both the brain and the spinal cord are protected by bone: This fluid helps protect the nerve tissue, keep it healthy, and remove waste products. All About the Brain The brain is made up of three main sections: The Forebrain The forebrain is the largest and most complex part of the brain. It consists of the cerebrum â€" the area with all the folds and grooves typically seen in pictures of the brain â€" as well as some other structures beneath it. The cerebrum contains the information that essentially makes us who we are: Specific areas of the cerebrum are in charge of processing these different types of information. These are called lobes, and there are four of them: The cerebrum has right and left halves, called hemispheres, which are connected in the middle by a band of nerve fibers the corpus callosum that enables the two sides to communicate. Though these halves may look like mirror images of each other, many scientists believe they have different functions. The left side is considered the logical, analytical, objective side. The right side is thought to be more intuitive, creative, and subjective. The outer layer of the cerebrum is called the cortex also known as "gray matter". Information collected by the five senses comes into the brain from the spinal cord to the cortex. This information is then directed to other parts of the nervous system for further processing. For example, when you touch the hot stove, not only does a message go out to move your hand but one also goes to another part of the brain to help you remember not to do that again. In the inner part of the forebrain sits the thalamus, hypothalamus, and pituitary gland. The thalamus carries messages from the sensory organs like the eyes, ears, nose, and fingers to the cortex. The hypothalamus controls the pulse, thirst, appetite, sleep patterns, and other processes in our bodies that happen automatically. It also controls the pituitary gland, which makes the hormones that control our growth, metabolism, water and mineral balance, sexual maturity, and response to stress. The Midbrain The midbrain, located underneath the middle of the forebrain, acts as a master coordinator for all the messages going in and out of the brain to the spinal cord. The Hindbrain The hindbrain sits underneath the back end of the cerebrum, and it consists of the cerebellum, pons, and medulla. The cerebellum â€" also called the "little brain" because it looks like a small version of the cerebrum â€" is responsible for balance, movement, and coordination. The pons and the medulla, along with the midbrain, are often called the brainstem. How the Nervous System Works The basic functioning of the nervous system depends a lot on tiny cells called neurons. The brain has billions of them, and they have many specialized jobs. For example, sensory neurons take information from the eyes, ears, nose, tongue, and skin to the brain. Motor neurons carry messages away from the brain and back to the rest of the body. All neurons, however, relay information to each other through a complex electrochemical process, making connections that affect the way we think, learn, move, and behave. Intelligence, learning, and memory. At birth, the nervous system contains all the neurons you will ever have, but many of them are not connected to each other. As you grow and learn, messages travel from one neuron to another over and over, creating connections, or pathways, in the brain. The pathway became established. But as we age, the brain has to work harder to make new neural pathways, making it more difficult to master new tasks or change established behavior patterns. Memory is another complex function of the brain. As these messages travel through the brain, they too create pathways that serve as the basis of our memory. Different parts of the cerebrum are responsible for moving different body parts. The left side of the brain controls the movements of the right side of the body, and the right side of the brain controls the movements of the left side of the body. A part of the peripheral nervous system called the autonomic nervous system is responsible for controlling many of the body processes we almost never need to think about, like breathing, digestion, sweating, and shivering. The autonomic nervous system has two parts: The sympathetic nervous system prepares the body for sudden stress, like if you see a robbery taking place. When something frightening happens, the sympathetic nervous system makes the heart beat faster so that it sends blood more quickly to the different body parts that might need it. It also causes the adrenal glands at the top of the kidneys to release adrenaline, a hormone that helps give extra power to the muscles for a quick getaway. The parasympathetic nervous system does the exact opposite: It prepares the body for rest. It also helps the digestive tract move along so our bodies can efficiently take in nutrients from the food we eat. None of your senses would be useful without the processing that happens in the brain. Sight probably tells us more about the world than any other sense. Light entering the eye forms an upside-down image on the retina. The retina transforms the light into nerve signals for the brain. The brain then turns the image right-side up and tells us what we are seeing. Every sound we hear is the result of sound waves entering our ears and causing our eardrums to vibrate. These vibrations are then transferred along the tiny bones of the middle ear and converted into nerve signals. The cortex then processes these signals, telling us what we are hearing. The tongue contains small groups of sensory cells called taste buds that react to chemicals in foods. Taste buds react to sweet, sour, salty, and bitter. Messages are sent from the taste buds to the areas in the cortex responsible for processing taste. Olfactory cells in the mucous membranes lining each nostril react to chemicals we breathe in and send messages along specific nerves to the brain â€” which, according to experts, can distinguish between more than 10, different smells. The skin contains more than 4 million sensory receptors â€” mostly concentrated in the fingers, tongue, and lips â€” that gather information related to touch, pressure, temperature, and pain and send it to the brain for processing and reaction. Inherited diseases, brain disorders associated with mental illness, and head injuries all can affect the way the brain works and upset the daily activities of the rest of the body. Problems that can affect the brain include: A brain tumor is an abnormal tissue growth in the brain. A tumor in the brain may grow slowly and produce few symptoms until it becomes large, or it can grow and spread rapidly, causing severe and quickly worsening symptoms. Brain tumors in children can be benign or malignant. A malignant tumor is cancerous and more likely to grow rapidly and spread. It affects the motor areas of the brain. A person with cerebral palsy may have average intelligence or can have severe developmental delays or intellectual disability. Cerebral palsy can affect body movement in many different ways. In mild cases of cerebral palsy, there may be minor muscle weakness of the arms and legs. In other cases, there may be more severe motor impairment â€” a child may have trouble talking and doing basic movements like walking. This condition includes a wide variety of seizure disorders. Partial seizures involve specific areas of the brain, and symptoms vary depending on the location of the seizure activity. Other seizures, called generalized seizures, involve a larger portion of the brain and usually cause uncontrolled movements of the entire body and loss of consciousness when they happen. Although the specific cause is unknown in many cases, epilepsy can be related to brain injury, tumors, or infections. The tendency to develop epilepsy may run in families. Migraines happen with or without warning and may last for several hours or days. There seems to be an inherited risk for migraines and certain triggers that can lead to them. People with migraines may have dizziness, numbness, sensitivity to light, and nausea, and may see flashing zigzag lines before their eyes. These infections of the brain and spinal cord are usually caused by bacteria or viruses. Meningitis is an inflammation of the coverings of the brain and spinal cord, and encephalitis is an inflammation of the brain tissue. Both conditions may cause permanent injury to the brain. Mental illnesses are psychological and behavioral in nature and involve a wide range of problems in thought and function. Certain mental illnesses are now known to be linked to structural abnormalities or chemical dysfunction of the brain. But often the cause is unknown. Injuries to the brain and chronic drug or alcohol abuse also can trigger some mental illnesses. Signs of chronic mental illnesses such as bipolar disorder or schizophrenia may first show up in childhood. Mental illnesses that can be seen in younger people include depression , eating disorders such as bulimia or anorexia nervosa, obsessive-compulsive disorder OCD , and phobias. Head injuries fit into two categories: Internal injuries may involve the skull, the blood vessels within the skull, or the brain.

Chapter 4 : Brain and Nervous System

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Chapter 5 : Nervous system - Wikipedia

Excerpt. There are several excellent books devoted to the anat omy of the nervous system, there are others which treat of its physiology in an illuminating way, and others still which deal with its hygiene.

Chapter 6 : Parasympathetic nervous system - Wikipedia

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Chapter 8 : The Nervous System, and Its Conservation

its perikaryon it inevitably a fact which has proved most helpdegenerates. ful to the investigators who have sought to unravel the tangled fabric of the nervous system. Regeneration. When a nerve has been cut and degeneration has taken place, regeneration remains a possiThis requires months for its accomplishment. bility.

Chapter 9 : The Parasympathetic Nervous System

The sympathetic nervous system normally functions to produce localized adjustments (such as sweating as a response to an increase in temperature) and reflex adjustments of the cardiovascular system. Under conditions of stress, however, the entire sympathetic nervous system is activated, producing an.