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Nervous tissue is the main component of the nervous system, which includes the brain, spinal cord and nerves. Describe the characteristics of Key Takeaways Key Points Nervous Tissue is one of the four major classes of tissues and makes up the central nervous system and peripheral nervous system. Integration and communication are the two major functions of nervous tissue. Nervous tissue contains two categories of cells - neurons and neuroglia. Neurons are highly specialized nerve cells that generate and conduct nerve impulses. Neuroglia are support ingcells that provide physical sports, remove debris, and provide electrical insulation. Key terms myelin: A substance produced by neuroglia cells that increases the speed of impulses along the axon of the neural fiber. Nervous tissue: The main constituent of the central and peripheral nervous system, encompassed neurons and neuroglia cells. brain: The central nervous system control center, located in the skull. Nervous tissue is one of the four major classes of tissues. It is specialized tissue found in the central nervous system and peripheral nervous system. It consists of neurons and support cells called neuroglia. The nervous system is responsible for controlling the body and communicating between its parts. Nervous tissue contains two categories of cells - neurons and neuroglia. Neurons Neurons are highly specialized nerve cells that generate and conduct nerve impulses. A typical neuron consists of dendrites, the cellular body, and an axon. Dendrites Dendrites are responsible for responding to stimuli; receive incoming signals to the body of the cell. Axons are responsible for transmitting pulses over long distances from the cellular body. The cellular body is like a factory for the neuron. Produces all proteins and contains specialized organelles, such as the nucleus, granules and Nissl bodies. Neuron: This image illustrates parts of a neuron. Dendrites receive incoming signals as axons propagate signals away from the body of neuron cells. The myelin tea surrounds and isolates the axon. Dendrite Axon is surrounded by a whitish, fatty layer called the myelin tea. Outside the myelin bee there is a cellular layer called neulerma. Schwann cells in the peripheral nervous system, Schwann cells are neuroglial cells that support neuronal function by increasing the rate of impulse propagation. Schwann cells are underted by the medullary tea. The medullary tea is interrupted at intervals by the nodes of Ranvier. Illustration of Schwann cells and myelin tea: the electronic transmission micrograph of a myelinated axon. The myelin (concentric) layer surrounds the axon of a neuron, showing the Schwann cells. The nervous system consists of nervous tissue, which is composed of two main types of cells called neuron and neuroglia. Describe the main cells that make up Key Key Tissue Nervous Tissue is composed of neurons and support cells called neuroglia, or glial cells. There are six types of neuroglia. Four are found in the central nervous system, while two are found in the peripheral nervous system. The four types of neuroglia found in the central nervous system are astrocytes, microglial cells, ependymal cells, and oligodendrocytes. The two types of neuroglia found in the peripheral nervous system are satellite cells and Schwann cells. Neurons are the other type of cell that comprises nerve tissue. Neurons have cellular bodies, dendrites, and axons. Neuron Key Terms: The main type of cells in the nerve tissue. neuroglia: Supporting cells in nervous tissue. Nervous tissue, one of the four main types of tissues, is composed of neurons and supporting cells called neuroglia. Neuroglia are also called glial cells. Neuroglia There are six types of neuroglia-four in the central nervous system and two in the NPS. These glial cells are involved in many specialized functions besides the support of neurons. Neuroglia in CNS include astrocytes, microglial cells, ependymal cells and oligodendrocytes. In PNS, satellite cells and Schwann cells are the two types of neuroglia. Astrocytes Astrocytes are star-shaped and are the most abundant glial cells in the CNS. They have many radiating processes that help to hang neurons and capillaries. They support and brace neurons and anchor them to the nutrient supply lines. They also help in guiding the migration of young neurons. Astrocytes control the chemical environment around neurons. Microglial cells Microglial cells are small and ovoid form un with thorny processes. They are found in the CNS. When invading the microorganism or dead neurons are present, microglial cells can turn into a phagocytic macrophage and help clean up neural debris. Ependymal cells Ependymal cells are ciliated and line the central cavities of the brain and spinal cord where they form a fairly permeable barrier between the cerebrospinal fluid that fills these cavities and the tissue cells of the CNS. Oligodendrocytes Oligodendrocytes line along the nerves and produce an insulating cap called the myelin tea. They are found in the CNS. Satellite Cells Satellite cells surround the bodies of neuron cells in the peripheral nervous system (PNS). They are similar to astrocytes in the CNS. Schwann Schwann cells surround all nerve fibers in the peripheral nervous system and form myelin tees around nerve fibers. They are found in the NPS. Their function is similar to oligodendrocytes. Neurons Neurons consist of the cellular body and one or more thin processes. The body of neural cells consists of a nucleus and hard endoplasmic reticulum or Nissl bodies. The cellular body is the main biosynthetic center of a neuron and contains the usual organelles for the synthesis of proteins and other Chemical. Arm as the processes extend from the cellular body to all neurons. The two types of neuron neuron processes called dendrites and axons. Dendrites are motor neurons that are short and have a large area for receiving signals from other neurons. Dendrites transmit incoming messages to the body of the cell and are therefore called the receptive input region. The axon comes from the cone-shaped portion of the cellular body called hillock axon. Functionally, the axon is the leading region of the neuron and is responsible for generating and transmitting impulses usually away from the cellular body. A single axon directs the nerve impulse from the cellular body to another neuron or effector organ. The axon can have many terminal branches, so every time the nerve fires, it can stimulate more than one cell. 1. The diagram below is of a nerve cell or neuron. 1. Add the following labels to the chart. Axon; Myelin tea; Cellular body; Dendrite; Muscle fibres; ii. If you want, color the diagram, as suggested below. Axon - violet; Myelin tea - yellow; Cell body - blue; Dendrite - green; Muscle fibres - red; iii. Now indicates the direction in which the nerve impulse is moving. 2. There are three different types of neuron or nerve cells. Match each type with its function. A. Motor neuron; B. Sensory neuron; C. Neuron relay. A kind of neuron Function B. Neuron sensory nerve cell that carries impulses from a sense receptor to the brain or spinal cord. C. Neuron relay The nerve cell that connects sensory neurons and motors A. Neuron motor nerve cell that transmits impulses from the brain or spinal cord to a muscle or gland 3. Match the descriptions in the table below with the terms in the list. Term function B. Axon 1. The long fiber that carries the nerve impulses. J. Nerve 2. A pack of axons. A. Synapse 3. The connection between adjacent neurons. K. Neurotransmitter 4. The chemical secreted in the difference between neurons to a synapse. G.Reflex 5. A quick automatic response to a stimulus. C. Myelin tea 6. Coverage of fatty material that accelerates the passage of nerve impulses. Terminal L. Axon 7. The structure at the end of an axon that produces neurotransmitters to transmit nerve impulse over the synapse. D. Nervous Impulse 8. High-speed signals passing along the axons of nerve cells. I. Dendrite 9. The branched filaments that drive the nerve impulses to the cell. E. Sense Receiver 10. The sense organ or cells that receive stimuli inside and outside the body. F. Answer 11. Reaction to a stimulus by a muscle or gland. H. Cellular body 12.The part of the nerve cell containing the nucleus. 4. The diagram below shows a cross-section of the spinal cord. Add the following labels to the chart. Central channel; White matter; Dorsal root; Grey matter; Ventral root; Skin; Muscle; Sensory neuron; Neuron relay; Motor neuron; Skin pain receptors 5. a) List 3 different neurons involved in a reflex arc from stimulus to response. Sensory stimulation neuron relay motor neuron response b) Name 3 different reflexes animals. Reflex 1. Blink reflex. Reflex 2. The tip reflex of the lathe. Reflex 3. Swallow reflex, plus more. 6. The diagram below shows the nervous system of a horse. Add the following tags. Brain; Spinal cord; Cranial nerves; Spinal nerves; Sciatic nerve; Nerves of the autonomic nervous system; Vague nerve; Network of nerves to the forelimbs. 7. Indicate whether the following parts of the nervous system are part of the CNS of the central nervous system) or the peripheral nervous system (NSP). Part of the CNS or PNS nervous system? Brain CNS Autonomous Nervous System PNS Spinal Nerves PNS Spinal Marrow CNS Cranial Nerves PNS 8. The diagram below shows a section of a dog's brain. Add the labels in the list below, and if you want, color the chart as you suggested. Cerebel - blue; Spinal cord - green; Medulla oblongata - orange; Hypotalamus - violet; Pituitary gland - red; Brain hemispheres - yellow. 9. Match the descriptions below with the terms in the list. You may need to use a few terms several times. Description of the term E. Hipotalamus 1. Controls water balance and body temperature. D.Medulla oblongata 2. If the respiratory rate is controlled. C. Cerebellum 3. If the posture, balance and voluntary muscle movements are controlled. A. Brain hemispheres 4. Contains centers that govern mental activity, including intelligence, memory and learning. H. Meninges 5. The hard fibrous envelope that grobs the brain and spinal cord. F. Hypophysis 6. The master gland of the endocrine system. Cerebral hemispheres/cortex 7. Responsible for instigating voluntary movements. J. Cerebrospinal fluid 8. The fluid that surrounds the brain and spinal cord. G. Grey matter 9. Composed of cellular bodies and nuclei. B. White matter 10. Compound of axons. Cerebral hemispheres/cortex 11. If the sensations of sight, sound, taste, etc. are interpreted. I. Ventricles 12. Spaces in the brain filled with cerebral spinal fluid. K. Sulcus 13. A bend in the cerebral cortex. L. Carotid artery 14. The artery that supplies the brain with oxygenated blood. 10. Match the descriptions below with the parts of the nervous system in the list. You may need to use a few terms several times. Description Part of the nervous system 1. Part of the nervous system that is composed of cranial and spinal nerves. C. Peripheral nervous system 3. The part of the peripheral nervous system that regulates the activity of the heart and smooth muscle. A. Autonomous nervous system 4. The part of the autonomic nervous system that increases the heart and respiratory rhythm, increases blood flow to the skeletal muscles and dilates the pupils of the eye. E. Sympathetic nervous system 5. The part of the autonomic nervous system that increases intestinal activity and decreases heart and respiratory rates. D. System parasympathetic 11. Name the nerves described below by using the options in the list. Description of nerve nerve 1. The 8th cranial nerve that carries impulses from the organs of balance and hearing to the brain. Optical nerve 2. The second cranial nerve that carries nerve impulses from the retina of the eye to the brain. Sciatic nerve 3. The largest nerve in the body serving the leg muscles. The olfactory nerve 4. The first cranial nerve that carries impulses from the odor organ from the nose to the brain. Nerve 5. The 10th cranial nerve that feeds the pharynx, lungs, heart, stomach and most abdominal organs. 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