

High Yield Hints- Brain and Sense Organs

1. Nervous system control and coordinate the activities of the body by producing electro-chemical excitations called Impulses.
2. Neurons are the functional units of the nervous system, which contains cell body, axon and dendrites.
3. Nissl granules are RNA rich bodies present in the cell body of neurons.
4. Neurons lack cell division and shows minimum power of regeneration.
5. Nervous system is divided into Central Nervous system (CNS) Peripheral nervous system (PNS) and Autonomous nervous system (ANS). Brain and Spinal cord are the parts of CNS. Cranial and Spinal nerves constitute PNS and Sympathetic and Parasympathetic systems constitute ANS.
6. In mammals, three Meninges are found covering the brain. These are outer Dura matter, Inner Pia matter and middle Arachnoid membrane. Between the pia matter and arachnoid membrane there is Cerebrospinal fluid.
7. Brain has three regions namely forebrain, midbrain and hind brain. A nervous band on the ventral side called Corpus callosum interconnects cerebral hemispheres. It is found only in mammals. The Gyri are ridges present on the surface of cerebrum and Sulci are depressions.
8. Neuroglia is the non-nervous cells forming the supportive framework of brain.
9. Motor area of brain cortex is located in the frontal lobe and is responsible for controlling voluntary activities. Sensory area or Somaesthetic area is on the parietal lobe to sense temperature pain touch etc. Brocas area is concerned with speech. Occipital lobe of the brain form visual pattern and visual images.
10. Hypothalamus is the regulatory center and is concerned with emotion, thirst etc.
11. Hippocampus and Amygdala are the parts of Limbic system and are responsible for emotional feelings. Red nuclei are also present in limbic system.
12. Crura cerebri are two bundles of nerves connecting the cerebrum with the hind brain. It also control Muscle tone. Cerebellum is the " Little Brain ". It maintains posture, balance and voluntary movements. Brain stem consists of Pons varoli and Medulla.
13. Cavities of the brain (Ventricles) are filled with Cerebrospinal fluid (CSF), which is secreted by Choroid plexus. Foramen of Monro connects lateral ventricles with third ventricle and Aqueduct of Sylvius connects third and fourth ventricles.
14. Filum terminale is the tapering end of spinal cord. The Central canal of the spinal cord contains CSF. Spinal cord is involved in Reflex action.
15. There are 12 pairs of cranial and 31 pairs of spinal nerves in man. There are three sensory nerves, five motor nerves and four mixed nerves. Fifth cranial nerve is called Trigeminal (Mixed) and is responsible for cutaneous sensation and muscle movement. Abducens nerve (6th) is a motor nerve to the eyeball. 9th cranial nerve is called Glossopharyngeal and is concerned with taste.
16. Neurotransmitters like Acetylcholine, Adrenaline etc are collectively called as Catecholamines. Glutamine act as neurotransmitter in Invertebrates.
17. Ramus communicans is a small nerve connecting the Pre-ganglionic fibres and Sympathetic ganglia. Sympathetic and Parasympathetic systems control involuntary activities.
18. There are 6 muscles to control eye movements. These are 4 Recti muscles and 2 Oblique muscles. Cornea of eye lack blood vessels. Rods are used for dim vision and Cones for bright vision and color vision. In the Blind spot of the retina Rods and Cones are absent. It is the region from which the Optic nerve arise. Fovea centralis or Macula lutea (Yellow Spot) contains only Cones. It is responsible for sharp and central vision.
19. Ceruminous glands of auditory canal secrete wax. Malleus, Incus and Stapes (MIS) are the Ear ossicles. Malleus is attached to the tympanum, Stapes to the Fenestra ovalis and Incus between malleus and stapes. Perilymph is the fluid present in the bony labyrinth. Cupola is the ciliary bundle present inside the semicircular canals. Cochlea is the only hearing part of the internal ear and consists of three canals namely Scala vestibuli, Scala media and Scala tympani. Reissners

membrane separates Scala vestibuli and Scala media. Organ of Corti is present in Scala media and detects sound vibrations. Human ear can detect sound of 20 – 20,000 cycles per second. Ultrasonic sound is not audible because the tympanum will not vibrate as fast as the ultrasonic vibrations.

20. Olfactory organs are “ Distant receptors and can detect more than 2000 substances. They are connected to the First cranial nerve (Olfactory). There are 7 primary Odours. These are Musk, Floral, Peppermint, Camphor, Pungent, Ether like and Putrid. Anosmia is the loss of smell.

Additional points

1. Parkinson’s disease is due to mal functioning of synapses. It is characterized by muscle tremors.
2. Pathetic trochlear (4th) is the smallest nerve.
3. Sharpest night vision is seen in Owl because its retina contains only Rods. Tapetum lucidum is the reflecting layer present in retina of nocturnal animals. It contains Guanine granules. Acute vision is found in Vulture.
4. Glaucoma is caused by the accumulation of Aqueous humour in the eye which increases pressure in the eyes.
5. Alexia is the inability to read and Insomnia is the inability to sleep. Alzheimer’s disease leads to lack of memory due to the accumulation of Amyloid protein between the brain cells. Aphasia is the inability to form words.