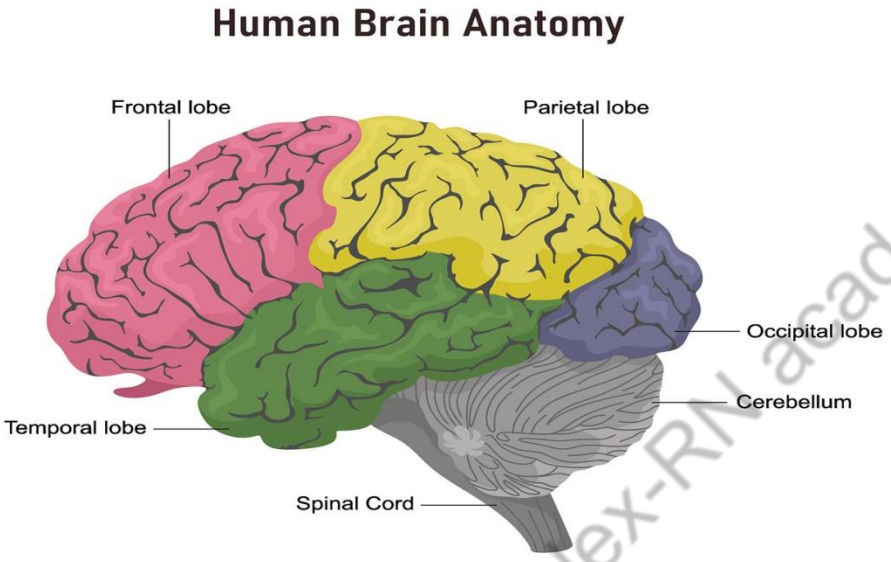
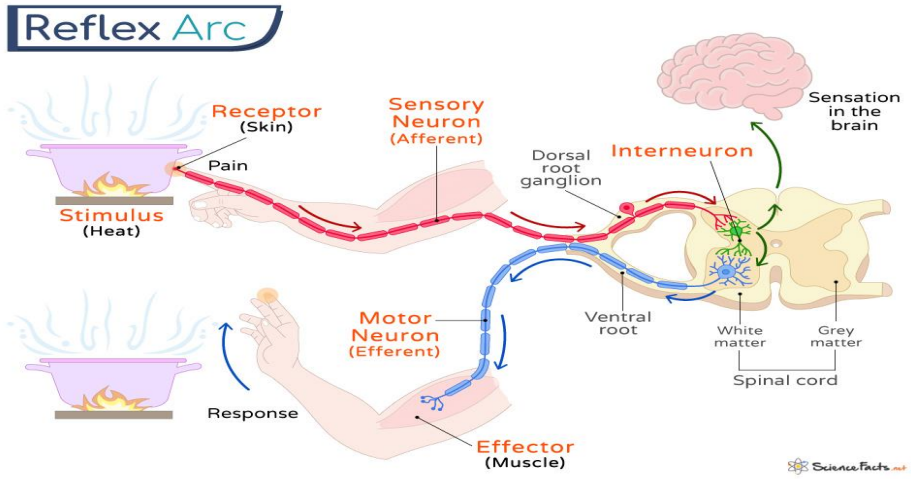
Neuro



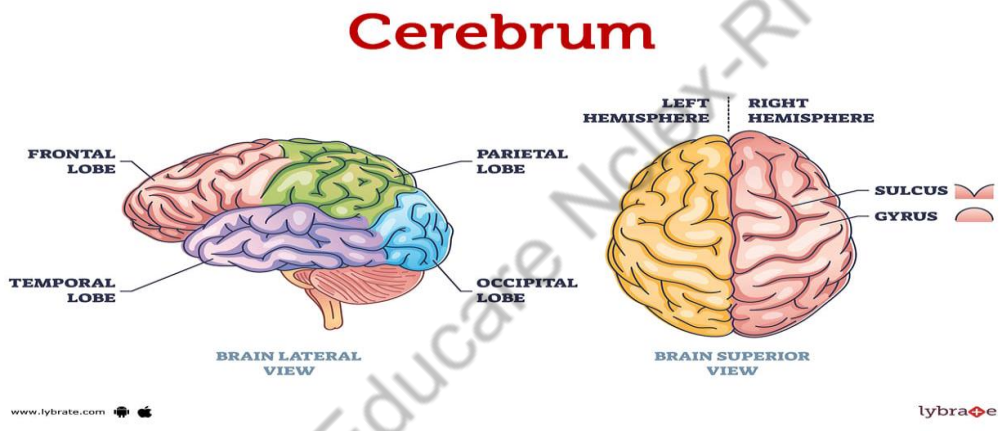
The central nervous system consists of the brain, spinal cord and cranial nerve 1 and 2.

The peripheral nervous system consists of cranial nerves 3 to 8.

A reflex is an involuntary response to stimuli. In the spinal cord, reflex arcs play an important role in maintaining muscle tone, which is essential for body posture.



Cerebrum: The cerebrum is composed of right and left cerebral hemispheres and divided into four lobes.



The frontal lobe control the higher cognitive function, memory retention, voluntary eye movements, voluntary motor movement and speech in **Broca's area. The temporal lobe** integrates somatic, visual and auditory data and contains **Wernicke's speech area. The parietal lobe** interprets spatial information and contains the **sensory cortex.**

Meninges: Consist of three protective membranes that surround the brain and spinal cord **(dura matter, arachnoid and pia matter).**

Acetylcholine: A decrease in acetylcholine secreting neurons is seen in **Alzheimer's disease. MS** results from a reduction in acetylcholine receptors.

Epinephrine and norepinephrine: Is both a hormone and neurotransmitter. Critical component of fight or flight response of CNS.

Serotonin: Primarily found in GI tract, platelets and CNS. Involved in moods, emotions and sleep.

Dopamine: produced in several areas of the brain. Involved in emotions and moods and regulating motor control. Parkinson's disease results from destruction of dopamine secreting neurons (HC, mania and schizophrenia it increased).

GABA decrease: Seizures. Glutamate increase: Brain damage (cause neurodegenerative disorder: ALS).

ICP : Normal ICP ranges from 0-15mmhg. A sustained pressure greater than 20mmhg is considered abnormal and must be treated.

CPP= MAP-ICP. Normal mean arterial pressure of 70mmhg (lower limit) and 150 mmhg (upper limit). When the pressure is exceeded, the vessels are maximally constricted and further vasoconstrictor response is lost.

Normal CPP: 60-100mmmhg. Less than 50 is associated with ischemia and neuronal death. A cpp of less than 30mmhg results in ischemia and is incompatible with life.

Clinical manifestations of increased ICP.

LOC, headache, projectile vomiting, slowing of speech and slurred speech, pupil dilated and fixed, nystagmus, papiledema, seizures.

Cushing's triad: systolic hypertension with a widening pulse pressure, bradycardia with a full and bounding pulse and irregular respirations. It's a medical emergency.

Noxious (Painful) stimuli may also elicit decorticate (flexor) or decerebrate (extensor) posturing.

Noxious stimuli: purposeful movement-purposeless movement-decorticate-decerebrate.

ICP Monitoring: Ventriculostomy and subarachnoid bolt. Greatest risk is infection. No loose connections and keep dressings dry.

Treatment: if increased ICP is caused by a mass lesion (tumor, hematoma), surgical removal of the mass is the best treatment. The reduction of the tissue volume related to cerebral tissue swelling and cerebral edema includes the use of diuretics and corticosteroids.

Mannitol and hypertonic saline solutions.

High dose of **barbiturates** such as pentobarbital, thiopental are used in patient with increased ICP. Barbiturates decrease cerebral metabolisms.

Any patient with the GCS of 8 or less or an altered LOC who is unable to maintain patent airway or effective ventilation needs intubation and mechanical ventilation. Elevation of the head of the bed to 30 degree enhances respiratory exchange and aids in decreasing cerebral edema. Burr hole craniotomy is done if not treated with medications.

Turn the patient slow gentle movement.

Keep suctioning to a minimum and less than 10 seconds in duration.

Head injury

Battle's sign and periorbital ecchymosis (raccoon eyes), Rhinorrhea or otorrhea may be present (if present, inform the physician immediately). Test the leaking fluid with dextrostix to determine whether glucose is present. If blood present Halo sign.

Injury can be classified as minor (GCS 13-15), moderate (GCS 9-12) or severe (GCS 3-8).

Signs include: decreased LOC, Increased ICP, decortication or decerebration and global cerebral edema. Approximately 90% of patients with DAI (Diffuse axonal injury) remain in a persistent vegetative state.

CT scan is the best diagnostic test to evaluate for head trauma (without contrast CT). Seizure disorders are seen in approximately 5% of patients with a non-penetrating head injury. Seizures are most likely to develop during the first week of head injury.

Teach no policy: no drinking of alcoholic beverages, no driving, no use or firearms, no working with hazardous implements and machinery and no unsupervised smoking. **Teach Role reversal or change.**

Brain tumors

Brain tumors can occur in any part of the brain stem or spinal cord. Tumors of the brain may be primary, arising from tissues within the brain, or secondary, resulting from a metastasis from a malignant neoplasm elsewhere in the body.

Clinical manifestations: Headache is a common problem. Tumor related headaches tend to be worse at night and may awaken the patient. The headaches are usually dull and constant.

Diagnostic test: CT, PET,MRI and for 100% confirmation biopsy is indicated.

Treatment: Complication: Increased ICP managed with high dose of steroids. Chemotherapy and targeted therapy has been limited by difficulty getting drugs across the BBB. **Temozolomide** is the first oral chemotherapy agent found to cross BBB. It cause mylosupression, before using, it is recommended that absolute neutrophil and platelet count should be in the blood. Best time to take it in the empty stomach to reduce nausea and vomiting.

Bacterial meningitis

Meningitis is an acute inflammation of the meningeal tissues surrounding the brain and spinal cord. College students living in dormitories and individuals living in institutions (e.g, prisoners) are also at a high risk for contracting meningitis.

Bacterial meningitis is considered a medical emergency. Untreated bacterial meningitis has a mortality rate near 100%.

Clinical manifestations: fever, severe headache, nausea, vomiting and nuchal rigidity are key signs of meningitis. Photophobia, a decreased LOC and signs of increased ICP may also be present. If the infecting organisms is a meningococcus, a skin rash is common and petechiae may be seen. Hearing loss may be permanent after bacterial meningitis.

Waterhouse friderichsen syndrome: is a complication of meningococcal meningitis. The syndrome is manifested by petechiae, disseminated intravascular coagulation, adrenal hemorrhage and circulatory collapse.

Proteins levels in the CSF are usually elevated and are higher in bacterial than in viral meningitis. The CSF glucose concentration is commonly decreased in bacterial meningitis but may be normal in viral meningitis. The **CSF is purulent and turbid in bacterial meningitis but it may be the same or clear in viral meningitis.**

Prevention: Meningococcal polysaccharide vaccine : older than 55 years. Meningococcal conjugate vaccine: 55 years of age or younger.

Person who has close contact with anyone who has bacterial meningitis should be given prophylactic antibiotic. It generally requires respiratory isolation until the cultures are negative. Residual effects can result in sequelae such as dementia, seizures, deafness, hemiplegia and hydrocephalous.

Encephalitis

Is an acute inflammation of the brain. Tics and mosquitoes transmit epidemic encephalitis. West Nile encephalitis. Cytomegalovirus encephalitis is a common complication in patients with AIDS. The best diagnostic test for west Nile virus is a blood test that detect viral RNA. **Acyclovir and Vidarabine** are used to treat encephalitis caused by HSV infection.

Rabies any warm blooded animals, including livestock, can carry rabies. Throughout the world, rabid dogs are the most common disease vector. However in developed countries, raccoons, bats and foxes are the primary animal carriers.

Treatment: Muscle relaxant, Painkiller, anti rabies even on scratch.

Trigeminal neuralgia

Is sudden, usually unilateral, severe, brief, stabbing, recurrent episodes of pain in the distribution of the trigeminal nerve (CN 5).

The classic features of trigeminal neuralgia is an abrupt onset of paroxysms of excruciating pain described as a burning, knifelike, upper or lower gums, cheek, forehead and sides of the nose. The painful episodes are usually initiated by a triggering mechanism of light touch at a specific point, chewing, tooth brushing, feeling a hot or cold blast of air on face, washing the face, yawing or even talking.

Treatment: Antiseizure drug therapy may reduce pain. First line drugs include carbamazepine, topiramate, clonazepam, phenytoin, lamotrigine and divalproex.

Teach the patient about the importance of nutrition, hygiene and oral care. A small soft toothbrush or a warm mouthwash assists in promoting oral care.

Interventions: chew food on unaffected side, avoid hot foods or beverages, check oral cavity after meals to remove food particles, protect the face against extreme of temperature, use an electric razor, wear a protective eye shield or avoid rubbing eyes.

Bell's palsy

Inflammation of the CN 7 on one side of the face in the absence of any other disease such as a stroke. Viral infection such as viral meningitis or activation of herpes simplex virus may trigger Bell 's palsy. Bell's palsy is considered benign with full recovery in 3-6 months, especially if treatment begun immediately. The onset of bell's palsy is often accompanied by an outbreak of herpes vesicles in or around the ear.

Clinical manifestations: widened palpebral fissure, flattening of nasolabial fold and inability to smile, frown or whistle.

Treatment: moist heat, gentle message and electrical stimulation of the nerve and prescribed exercises. Stimulation may maintain muscle tone and prevent atrophy. Corticosteroid are started immediately, with best result if corticosteroids are initiated before paralysis is complete. Acyclovir (Zovirax) alone or in conjunction with prednisone, may be used. Warm wet packs can reduce the discomfort of hepatic lesions, aid circulation and relieve pain.

Guillain barre syndrome

Ascending polyneuropathic paralysis is an acute rapidly processing and potentially fatal form of polyneuritis.

Campylobacter jejuni gastroenteritis is thought to precede Guillain Barre syndrome in approximately 30% of cases. Weakness of the lower extremities

occurs over hours to days to weeks, usually peaking about the fourteenth day. Paralysis is common, with paralysis usually following in the extremities. Hypotonia (reduced muscle tone) and areflexia (lack of reflexes) are common manifestations. Pain is a common symptoms and appear worse at night. Most sever complication is respiratory failure. UTI and skin infections are also common due to immobility.

Treatment: management of Guillian- barre syndrome is aimed at supportive care, particularly ventilatory support, during the acute phase.

Botulism

Botulism is rare but the most serious type of food poisoning. It is caused by GI absorption of the neurotoxin produced by clostridium botulinum. The organism is found in the soil and the spores are difficult to destroy. Home canned food-frothy bubbles.

It is thought that neurotoxins destroys or inhibits the neurotransmission of acetylcholine at the myoneural junction. **Descending paralysis** with muscle incoordination and weakness. Difficulty swallowing, seizures and respiratory muscle weakness that can rapidly deteriorate to respiratory and/or cardiac arrest will develop.