

## AN ARTICLE ABOUT THE CONCEPT OF THE ANATOMICAL STRUCTURE AND PHYSIOLOGY OF THE BRAIN NEUROLOGICAL DISEASES

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**Annotation:** *In this article, we explore the anatomical structure and physiological role of the brain in the life of our body. In addition, the article contains information about common neurological diseases, their prevention and methods of their treatment.*

**Key words:** *Brain, cranium, blood-brain barrier, ventricles, cerebellum, cerebral cortex, medulla oblongata, pituitary gland, hypothalamus, thalamus, pineal gland, synapses, impulses, brain bridge, epilepsy, migraine, Parkinson's disease, hyperkinesis.*

The human brain is an extraordinary three-pound organ that controls all capacities of the body, deciphers statistics from the outside world, and encapsulates the substance of the intellect and soul. Insights, inventiveness, feeling, and memory are a number of the several matters represented by using the brain. Secured in the skull, the brain is composed of the cerebrum, cerebellum, and brainstem.

The brain receives records via our 5 faculties: find, heady scent, contact, flavor, and hearing - often numerous at one time. It amasses the messages in a way that has that means for us, and can keep that information in our reminiscence. The mind controls our contemplations, memory and discourse, improvement of the arms and legs, and the paintings of several organs inner our frame.

### **The brain is composed of the cerebrum, cerebellum, and brainstem.**

**Cerebrum:** is the largest a part of the brain and consists of right and left hemispheres. It performs higher capabilities like interpreting touch, vision and listening to, as well as speech, reasoning, emotions, getting to know, and excellent manage of movement. **Cerebellum:** is placed beneath the cerebrum. Its function is to coordinate muscle moves, preserve posture, and stability.

**Brainstem:** acts as a relay middle connecting the cerebrum and cerebellum to the spinal wire. It plays many computerized capabilities which include respiration, heart price, body temperature, wake and sleep cycles, digestion, sneezing, coughing, vomiting, and swallowing.

The brain is made up of kinds of cells: neurons and glial cells, additionally called neuroglia or glia. The neuron is liable for sending and receiving nerve impulses or signals. Glial cells are non-neuronal cells that provide support and nutrition, preserve homeostasis, form myelin and facilitate sign transmission within the apprehensive system. Within the human mind, glial cells outnumber neurons by way of approximately 50 to 1. Glial cells are the maximum common cells determined in number one brain tumors.

When someone is identified with a brain tumor, a biopsy may be done, in which tissue is eliminated from the tumor for identification purposes by way of a pathologist. Pathologists perceive the type of cells which might be found in this mind tissue, and mind

tumors are named based in this affiliation. The kind of brain tumor and cells concerned impact affected person diagnosis and treatment.

The mind represents 2% of the frame weight. It consumes 15% of the cardiac output and 20% of total body oxygen. The resting brain consumes 20% of the body's energy supply. If the mind performs a undertaking, the power consumption increases an additional five%. This fact suggests that most of the brain's power consumption gets used for intrinsic functions.

The brain makes use of glucose as its foremost supply of power. During low glucose states, the brain makes use of ketone bodies as its primary strength source. In the course of workout, the brain can use lactate as a source of electricity.

Inside the developing brain, neurons follow molecular signals from regulatory cells like astrocytes to decide their place, the sort of neurotransmitter it will secrete, and with which neurons it'll communicate, leading to the formation of a circuit between neurons so that it will be in place at some stage in adulthood. In the grownup brain, advanced neurons suit of their corresponding location and increase axons and dendrites to hook up with the neighboring neurons.

Neurons speak with every different via neurotransmitters launched into the synaptic area, which is a 20 to 50-nanometer space between neurons. The neuron that releases the neurotransmitter into the synaptic space is called the presynaptic neuron, and the neuron that gets the neurotransmitter is called the postsynaptic neuron. An movement ability within the presynaptic neuron leads to calcium influx and the subsequent launch of neurotransmitters from their storage vesicle into the synaptic area. The neurotransmitter then travels to the postsynaptic neuron and binds to receptors to influence its pastime. Neurotransmitters are swiftly eliminated from the synaptic space with the aid of enzymes.

The oligodendrocytes inside the CNS produce myelin. Myelin bureaucracy insulating sheaths round axons to allow the quick travel of electrical impulses thru the axons. There are areas on the axons that haven't any masking with myelin called nodes of Ranvier. These nodes permit for sodium inflow into the axon, which helps preserve the speed of the electric impulse touring thru the axon. This transmission is known as salutatory nerve conduction, that's the "jumping" of electrical impulses from one node to every other and guarantees that electrical indicators do no longer lose their velocity and might propagate long distances without deterioration of the signal.

Injury to the brain stimulates the proliferation of astrocytes; that is an immunological reaction to neurodegenerative problems called "reactive gliosis. Injury to neural tissue stimulates a series of molecular and morphological modifications because it's far the maximum important the upregulation of the glial fibrillary acidic protein (GFAP). On the other hand, epidermal growth factor receptor (EGFR) permits the transition from non-reactive to reactive astrocytes, and its inhibition improves axonal regeneration and fast recovery, so when astrocytes are reactive, they proliferate and hypertrophy leading to glial scar formation.

The microglia constitutes the immune and assists system of the CNS. They're neuroprotective within the young brain but can react abnormally to stimuli within the elderly mind and grow to be neurotoxic and negative, leading to neurodegeneration. As the mind a

long time, microglia accumulates an increasing number of inflammatory and cytotoxic phenotype, generating an unsafe environment for neurons. As a result, ageing is the maximum vital threat issue in growing numerous neurodegenerative diseases.

The mind is surrounded with the aid of cerebrospinal fluid and isolated from the bloodstream via the blood-brain-barrier (BBB). In cases like infectious meningitis and meningoencephalitis, acute inflammation reasons a breakdown of the BBB, leading to the inflow of blood-borne immune cells into the CNS. In different inflammatory mind problems including Alzheimer disease (AD), Parkinson disease (PD), Huntington disease (HD), or X-related adrenoleukodystrophy, the number one insult is due to degenerative or metabolic techniques and there's no breakdown of the BBB.

Oligodendrocyte loss can manifest because of the production of reactive oxygen species or the activation of inflammatory cytokines, and this leads to the decreased production of myelin, main to situations together with multiple sclerosis (MS).

Disturbances within the neurotransmitter systems are related to the production, launch, reuptake, or receptor impairments of these materials and might purpose neurologic or psychiatric disorders. Glutamate is the mind's maximum abundant excitatory neurotransmitter; meanwhile, GABA is the primary inhibitory transmitter in the brain. Glycine has a similar inhibitory action inside the posterior components of the mind. Acetylcholine helps in distinct methods like muscle stimulation on the neuromuscular junction (NMJ), digestion, arousal, salivation, and stage of interest. Dopamine is concerned inside the reward and motivational component, motor control, and the regulation of prolactin launch. Serotonin impacts mood, emotions of happiness, and anxiety. Norepinephrine is concerned in arousal, alertness, vigilance, and interest.

Cerebral oxygen transport and consumption rate are ten instances higher than global body values. Blood glucose represents the mind's primary energy source, and the BBB is pretty permeable for it. All through low glucose states, the frame has evolved more than one approach to maintain blood glucose inside the ordinary variety. As the level drops below 80 mg/dl, pancreatic beta-cells decrease insulin secretion to avoid similarly glucose decrease. If glucose drops further, pancreatic alpha-cells secrete glucagon and the adrenal medulla that releases epinephrine. Glucagon and epinephrine growth blood glucose ranges.

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