

BRAIN: THE MOST PERFECT ORGAN

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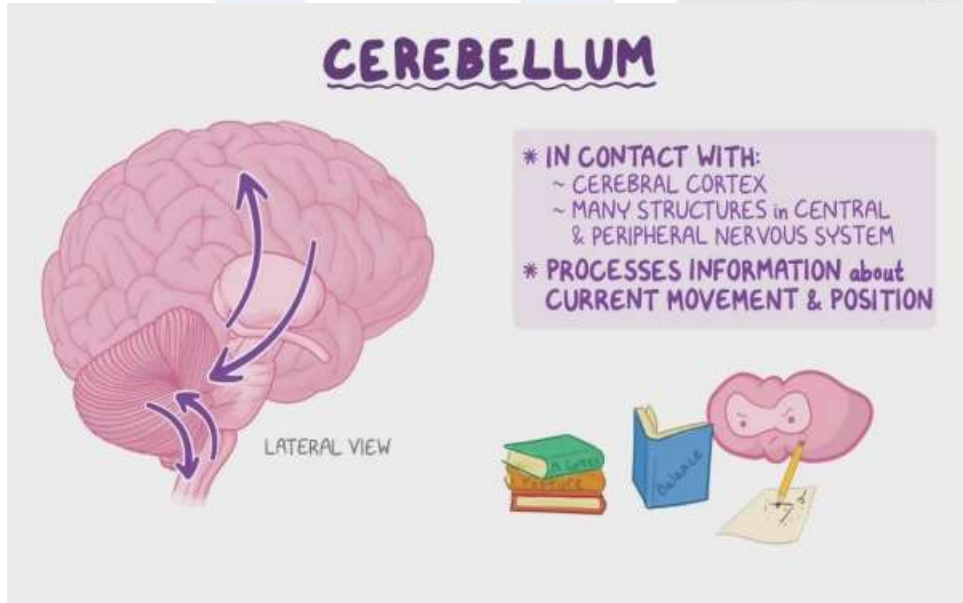
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**Abstract.** The brain is one of the most complex organs in the human body and is the central part of the nervous system. It controls bodily functions, enables us to think, feel, memorize, make decisions, and express creativity. Our brain changes and develops throughout life, making its health and maintenance essential.

**Key words:** brain, cerebellum, movement, neurons, damage, heartbeat.

**Structure and Functions of the Brain.** The brain weighs approximately 1.3-1.4 kg and consists of neurons. It is divided into the following main parts:

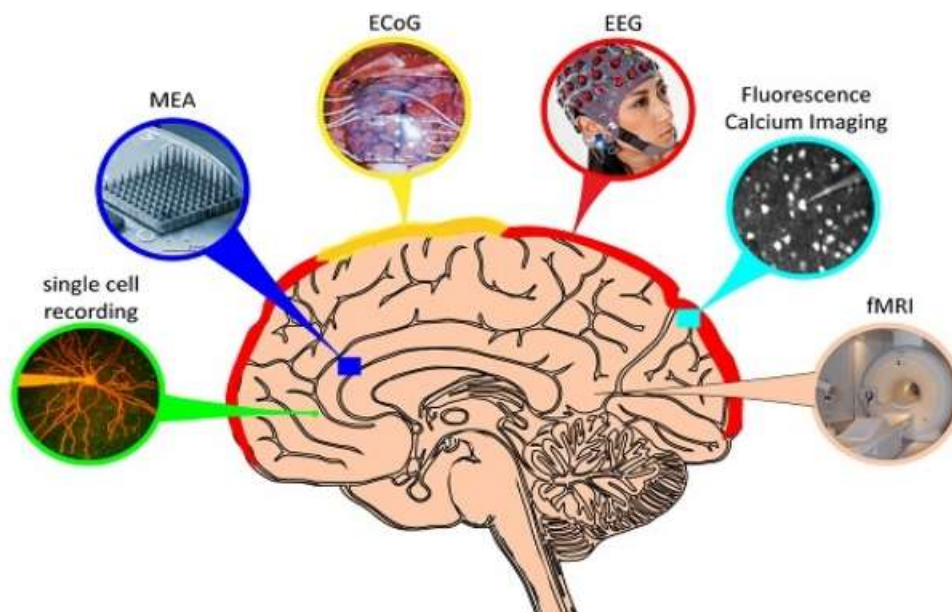
1. Cerebrum: divided into right and left hemispheres, this part is responsible for language, thinking, creativity, and processing sensory signals.
2. Cerebellum: maintains balance, coordinates movements, and ensures precision.



3. Brainstem: Controls vital processes like heart rate, breathing, and body temperature.

**Brain Activity.** The brain continuously generates electrical impulses. Signals sent through neurons reach different parts of the body within milliseconds. Each neuron connects to millions of other neurons, enabling complex thinking and emotional processing. The brain is one of the most active organs in the human body, constantly processing information and regulating bodily functions. Even during rest, the brain continues to function, maintaining essential processes like breathing and heartbeat.

Brain activity is driven by billions of neurons that communicate through electrical impulses and chemical signals.



**Figure 1.** Commonly used techniques for recording brain activity. From left to right, temporal resolution decreases, from  $<1$  ms for single cell and multielectrode array (MEA) recordings to  $\sim 1$  sec for fMRI. The colours indicate the approximate physical scale of the activity that can be recorded with each approach, as well as the approximate depth limits of each technique. ECoG, EEG, and fluorescence imaging are limited to recording from the brain's outer surface. Note that human recording techniques (ECoG, EEG and fMRI) cover much larger areas than technologies used in animals. This comes at the expense of detail.

Different brainwaves represent various states of activity.

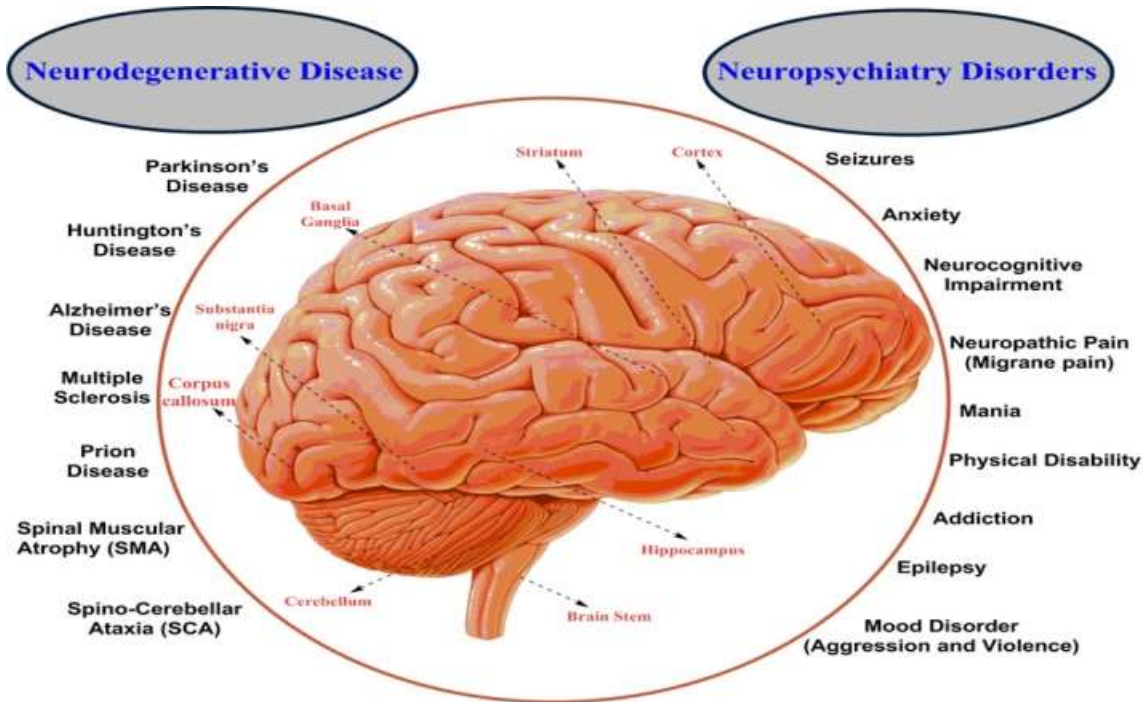
For example, beta waves dominate during active thinking and decision-making, while alpha waves are associated with relaxation and calmness. Theta waves appear during light sleep or moments of creativity, whereas delta waves are most prominent in deep sleep, aiding in recovery and healing.

The brain's activity is responsible for both voluntary actions, like speaking or walking, and involuntary functions, such as digestion or blood circulation. It plays a vital role in memory, learning, emotions, and problem-solving. Advanced tools like EEG (electroencephalogram) help scientists study brain activity, leading to better understanding and treatment of neurological disorders.

This continuous activity highlights the brain's complexity and its central role in every aspect of human life.

**Brain Diseases.** Brain diseases are conditions that affect the structure or function of the brain, leading to physical, emotional, or cognitive impairments. These can result from genetics, infections, trauma, aging, or lifestyle factors. Common examples include Alzheimer's disease, which causes memory loss and confusion; Parkinson's disease, which affects movement and coordination; and strokes, which occur when blood flow to the brain is disrupted. Other conditions, such as depression and anxiety, also impact brain health. Maintaining a healthy lifestyle, early diagnosis, and proper treatment are essential for managing brain diseases effectively.

Due to its complex structure, the brain is susceptible to various diseases. Below are some common brain disorders:



1. Alzheimer's Disease: Primarily affects older individuals and leads to memory loss and reduced cognitive ability as brain cells gradually die.
2. Parkinson's Disease: Affects movement control. This disease results from the loss of dopamine-producing cells in the brain.
3. Stroke: Occurs when the brain's blood supply is disrupted, leading to paralysis, speech difficulties, and other severe complications.
4. Epilepsy: Characterized by seizures caused by irregular electrical signals in the brain.
5. Migraine: A severe headache often accompanied by nausea and sensitivity to light.

### Symptoms of Brain Diseases



Epilepsy



Numbness



Paralysis



Headache

This image illustrates the "Symptoms of Brain Diseases". The following symptoms are shown:

1. Epilepsy: seizures caused by abnormal electrical activity in the brain.
  2. Numbness: loss or reduction of sensation in certain parts of the body.
  3. Paralysis: loss of the ability to control movement, usually resulting from brain or nervous system damage.
  4. Headache: one of the most common symptoms associated with various brain disorders or issues.
- Alzheimer's disease is a neurodegenerative disease that impairs memory and other important cognitive functions. Today, it affects about 5.3 million Americans and is the sixth leading cause of death in the U.S. The number is alarming and continues to increase each year. Before it's too late,

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take extra steps on keeping your brain young and healthy. Here are seven things you can do. (h/t to GreenMedInfo.com).

**Take bacopa:** As an Ayurvedic medicine, bacopa (*Bacopa monnieri*) is often used as a memory and learning enhancer, a sedative, and anti-epileptic. A study in the *Journal of Complementary and Alternative Medicine* revealed that bacopa, also known as water hyssop, has positive effects on several measures of cognitive performance. Another study, which was published in the journal *Psychopharmacology*, found that participants aged 65 or older who took 300 mg of bacopa every day for 12 weeks experienced improvements in their recall memory, reaction times, and ability to ignore irrelevant information. Bacopa supplementation also reduced the participants' heart rate, depression, and anxiety.

**Consume ginkgo biloba:** Ginkgo biloba is associated with memory enhancement, acting as a free radical scavenger that protects neurons from oxidation. Additionally, it enhances microcirculation in the brain and reduces platelet aggregation. A study published in the *Archives of Medical Research* showed that those who took ginkgo biloba regularly experienced improvements in mental health, cognition, motor skills, and quality of life. The herb was also helpful for alertness, attention, memory loss, mental fluidity, and vigilance, according to a study in the French journal *Annales Pharmaceutiques Françaises*. Ginkgo biloba was also found to be just as effective as the prescription drug donepezil for mild to moderate Alzheimer's disease, according to a study in the *European Journal of Neurology*.

**Maintaining Brain Health.** To ensure the brain functions properly, the following measures should be taken:

**Mental Activity:** reading, learning new languages, and solving complex problems exercise the brain.

**Physical Activity:** walking and physical exercises improve blood circulation and oxygen supply to the brain.

**Healthy Nutrition:** foods like fruits, vegetables, nuts, and fish support brain health.

**Reducing Stress:** meditation and relaxation prevent excessive pressure on the brain.

**Adequate Sleep:** sleep helps the brain organize information and restore cells. Maintaining brain health is essential for cognitive function, memory, and overall well-being. Here are key strategies to keep your brain healthy:

**Nutrition for Brain Health.** Eat a Mediterranean Diet: Rich in fruits, vegetables, whole grains, nuts, fish, and olive oil, this diet is linked to better cognitive function. Consume Omega-3 Fatty Acids: Found in salmon, flaxseeds, and walnuts, omega-3s support brain function. Antioxidants: Blueberries, dark chocolate, and green tea help reduce oxidative stress. Stay Hydrated: Dehydration can impair brain function. Aim for at least 8 glasses of water daily.

**Conclusion.** The brain is the control center of the human body, enabling all thinking, feeling, and movement. To keep it functioning well, one must maintain a healthy diet, stay mentally active, and lead a stress-free lifestyle. Early detection and treatment of brain diseases are also crucial for ensuring long-term health.

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