

Human Brain Facts and Answers

» Neurological Conditions

By *Disabled World* - 2008-10-19

Questions answers and facts relating to the human brain and the study of the brain organ including the spinal cord.

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What is the Brain?

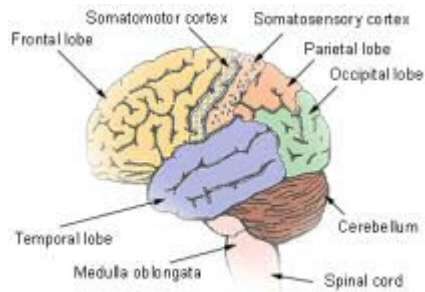
The brain is the center of the nervous system in animals. All vertebrates, and the majority of invertebrates, have a brain. Some "primitive" animals such as jellyfishes and starfishes have a decentralized nervous system without a brain, while sponges lack any nervous system at all.

In vertebrates, the brain is located in the head, protected by the skull and close to the primary sensory apparatus of vision, hearing, balance, taste, and smell. The human brain appears to have no localized center of conscious control. The brain seems to derive consciousness from interaction among numerous systems within the brain.

The human brain controls the central nervous system by way of the cranial nerves and **spinal cord**, the peripheral nervous system and regulates virtually all human activity. The brain is made up of over 100 billion nerve cells with each brain cell connected to around 10,000 other cells, which equals around 1000 trillion connections in your brain. Your brain is actually very soft, jelly-like, and not grey but a deep red in color.

The brain controls both involuntary, or "lower," actions, such as heart rate, respiration, and digestion. Complex, or "higher," mental activity, such as thought, reason, and abstraction, is consciously controlled.

Brain Facts and Figures:



Lobes of the cerebrum

Lobes of the cerebrum

How long is the spinal cord and how much does it weigh?

The average spinal cord is 45 cm long in men and 43 cm long in women. The spinal cord weighs approx. 35 grams.

How much does the brain weigh?

The human brain weighs on average three pounds, or 1.5 kg.

What size is an adult humans brain?

The human brain is about the size of a cantaloupe.

Average brain width = 140 mm
 Average brain length = 167 mm
 Average brain height = 93 mm

How much oxygen does the brain need to stay "conscious"?

An adults brain requires around 20% of the body's oxygen.

How much blood is needed by the brain?

Approximately 20% of the blood flowing from the heart is pumped to the brain. The brain needs constant blood flow in order to keep up with the heavy metabolic demands of the neurons.

What is the largest part of the brain?

The biggest part of the brain is the cerebrum which makes up 85% of the brain's weight. The cerebrum is the thinking part of the brain and it controls your voluntary muscles.

Does the brain work at the Speed of Light?

No, far from it. Axons, the long output connection from a cell, come in two types: myelinated and unmyelinated. Myelinated axons have an extra layer of "insulation," a fatty substance, which allows the impulse to travel about 10 to 100 meters per second. Unmyelinated axons only transmit at about 1 meter per second. When the signal reaches the end, it has to cross the synapse to influence the next cell, which adds about 5 ms. 10 meters per second = 22.356 mph and 100 meters per second = 223.561 mph. As you can see it is a lot slower than the speed of light in a vacuum which is exactly 299,792,458 metres per second, or 186 000 miles per second, or 670,616,629 mph.

Brain Questions and Answers

What are studies of the brain called?

The study of the brain and its functions is known as neuroscience.

Psychology is the scientific study of the mind and behavior.

Neurophysiology is the study of normal healthy brain activity.

Neurology and psychiatry are both medical approaches to the study of the mind and its disorders and pathology or mental illness respectively.

How many main parts to the brain are there?

The human brain can be divided into three main parts: the forebrain, midbrain, and hindbrain:

1/ The forebrain includes the several lobes of the cerebral cortex that control higher functions.

2/ Midbrain functions include routing, selecting, mapping, and cataloguing information, including information perceived from the environment and information that is remembered and processed throughout the cerebral cortex.

3/ Hindbrain - (rhombencephalon) is a developmental categorization of portions of the central nervous system in vertebrates. A rare disease of the rhombencephalon, "rhombencephalosynapsis" is characterized by a missing vermis resulting in a fused cerebellum. Patients generally present with cerebellar ataxia.

What is a neuron?

A neuron is a nerve cell in the brain. The human brain is made up of approximately 100 billion (100,000,000,000) neurons.

Is the brain an organ?

The brain is an organ as it controls the functions of the body. It is sometimes referred to as a muscle of thinking as the brain actually tells your muscles what to



Brain and Spinal Cord

do. The brain is the most important organ in the body because it controls all of the bodily functions as well as the other organs.

Do men have a larger brain than women?

Male humans have about a 10% larger brain than females. A study of 46 adults aged 22-49 years found an average brain volume of 1273.6cc for men, ranging from 1052.9 to 1498.5cc, and 1131.1cc for women, ranging from 974.9 to 1398.1cc. However differences in male and female brain weight and size do not mean differences in mental ability. There is evidence of a gradual increase in average brain size over the last centuries, estimated to have been around 0.5% per decade.

Is a computer smarter than a human brain?

The brain has a processing capacity of 0.1 quadrillion instructions per second. The fastest super computer in the world, called Roadrunner is capable of handling 1.026 quadrillion calculations per second. However the computational power of the human brain is difficult to ascertain, as the human brain is not easily paralleled to the binary number processing of computers. For while the human brain is calculating a math problem, it is subconsciously processing data from millions of nerve cells that handle the visual input of the paper and surrounding area, the aural input from both ears, and the sensory input of millions of cells throughout the body. The brain is also regulating the heartbeat, monitoring oxygen levels, hunger and thirst requirements, breathing patterns and hundreds of other essential factors throughout the body. It is simultaneously comparing data from the eyes and the sensory cells in the arms and hands to keep track of the position of the pen and paper as the calculation is being performed.

Can an adult grow more brain cells?

A landmark study in late 1998 by researchers from Sweden and the Salk Institute in La Jolla, California, showed for the first time that some brain cells in mature humans may regenerate under certain circumstances.

Do humans only use 10% of the brain?

No, we use all of our brain.

What are Neurodegenerative diseases?

Neurodegenerative diseases, such as [Alzheimer's disease](#), [Parkinson's disease](#), motor neurone disease, and Huntington's disease are caused by the gradual death of individual neurons, leading to decrements in movement control, memory, and cognition.

Does alcohol kill brain cells every time you drink?

The idea that alcohol kills brain cells has long been promoted. Drinking alcohol does not actually "kill" brain cells. Roberta Pentney, professor of anatomy and cell biology at the University at Buffalo, concludes that alcohol does not kill brain cells but it damages the dendrites, the branched ends of nerve cells that bring messages into the brain cell causing damage to the way the cells in the brain communicate. Luckily the damage is largely reversible and not permanent. However years of alcohol abuse can cause serious neurological damage, including Wernicke-Korsakoff syndrome.

In what part of the brain do you get brain tumors?

Brain tumors are classified depending on the exact site of the tumor, the type of tissue involved, benign or malignant tendencies of the tumor, and other factors. Primary (true) brain tumors are commonly located in the posterior cranial fossa in children and in the anterior two-thirds of the cerebral hemispheres in adults, although they can affect any part of the brain.

How are memories stored and retrieved?

Unfortunately we don't yet comprehend exactly how this happens or how memories are recalled years later for retrieval.

Define Consciousness:

A constellation of attributes of mind such as subjectivity, self-awareness, sentience, and the ability to perceive a relationship between oneself and one's environment.

Define Unconsciousness:

An alteration of mental state that involves complete or near-complete lack of responsiveness to people and other environmental stimuli. Being in a comatose state or coma is an illustration of unconsciousness. Fainting due to a drop in blood pressure and a decrease of the oxygen supply to the brain is an illustration of a temporary loss of consciousness.

How and why do we dream?

Dreams have fascinated nearly everyone for thousands of years. There are two different schools of thought as to why we dream: the physiological school, and the psychological school. While many theories have been proposed, not single consensus has emerged as to why we dream. Some researchers suggest that dreams serve no real purpose, while other believe that dreaming is essential to mental, emotional and physical well-being. One theory for dreaming suggests dreams serve to clean up clutter from the mind.

How does the brain control body temperature?

The Hypothalamus part of the brain regulates body temperature much like a thermostat. The hypothalamus knows what temperature your body should be (about 98.6 Fahrenheit or 37 Celsius), and if your body is too hot, the hypothalamus tells it to sweat. If you're too cold, the hypothalamus makes you start shivering. Shivering and sweating helps get your body's temperature back to normal.

Are humans born with all their brain cells?

Babies are born with around a 100 billion brain cells, but only a small number of neurons are actually connected. By three years of age a child's brain has formed about 1,000 trillion connections, about twice as many as adults have. At around 11 years, the brain begins to prune unused connections. Connections that are used repeatedly in the early years become permanent; those that are not are eliminated. Hence the saying, "use it or lose it."

How and why do we sleep?

We still don't fully understand the importance of sleep however we do know that sleep is the time when the body does most of its repair work; muscle tissue is rebuilt and restored and tissue building growth hormone is secreted during sleep. A good way to understand the role of sleep is to look at what happens when we don't get enough sleep.

Are IQ tests accurate measures of intelligence?

First you need to define intelligence, a very hard task, think about it. Intelligence is an encompassing term. "We cannot measure intelligence when we have not defined it" said journalist Walter Lippmann in the early 1920's. According to most current definitions intelligence is made up of the skills of logical reasoning, problem solving, critical thinking, and adaptation.

IQ tests are not very reliable and the scores may vary as much as 15 points from one test to another. The average IQ scores for many populations have been rising at an average rate of three points per decade since the early 20th century with most of the increase in the lower half of the IQ range.

When is the brain considered dead?

Brain death is the irreversible end of all brain activity (including involuntary activity necessary to sustain life) due to total necrosis of the cerebral neurons following loss of blood flow and oxygenation. A brain-dead individual has no clinical evidence of brain function upon physical examination. This includes no response to pain and no cranial nerve reflexes. Reflexes include pupillary response (fixed pupils), oculocephalic reflex, corneal reflex, no response to the caloric reflex test and no spontaneous respirations. The diagnosis of brain death needs to be rigorous to determine whether the condition is irreversible. Legal criteria vary, but it generally requires neurological exams by two independent physicians. The exams must show

complete absence of brain function, and may include two isoelectric (flat-line) EEGs 24 hours apart.

If tests show brain activity, the patient may be in a coma or vegetative state. A brain dead person doesn't show brain activity. It is important to distinguish between brain death and states that may mimic brain death. Some comatose patients can recover, and some patients with severe irreversible neurologic dysfunction will nonetheless retain some lower brain functions such as spontaneous respiration, despite the losses of both cortex and brainstem functionality. Thus, anencephaly, in which there is no higher brain present, is generally not considered brain death, though it is certainly an irreversible condition in which it may be appropriate to withdraw life support.

Today, both the legal and medical communities use "brain death" as a legal definition of death. Using brain-death criteria, the medical community can declare a person legally dead even if life support equipment keeps the body's metabolic processes working.

Do brain supplements work in enhancing memory and brain power?

As we age our brain is more susceptible to memory loss and diseases such as Alzheimer's disease. The functionality of the human brain can also be affected due to problems in nervous system or inadequate blood supply to the brain. Here are few [brain supplements](#) said to assist the brain.

Interesting Brain Facts:

- The diameter of an individual brain neuron is just 4 microns thick, you could fit 30,000 neurons on the head of a pin.
- Your brain generates nearly 25 watts of power while you're awake, which is enough to light up a light bulb.
- Alcohol interferes with brain processes by weakening connections between neurons.
- Every time you have a new thought, or recall a memory, a new brain connection is made between two or more brain cells.
- A living brain is so soft you could cut it with a table knife.
- Loss of oxygen for just 5 to 10 minutes can cause serious brain damage. The brain can stay alive for 4 to 6 minutes without oxygen. After that cells begin die.
- The average adult's brain weighs 3 - 4 lbs. but consumes 20% of the bodys oxygen supply.
- The human brain contains around 400 miles of blood vessels.
- There is no sense of pain within the brain itself which explains why brain surgeons can probe areas of the brain even when the patient is awake.

- The left side of your brain (left hemisphere) controls the right side of your body; and, the right side of your brain (right hemisphere) controls the left side of your body.
- Your cerebral cortex is about as thick as a doctors tongue depressor and it grows thicker as you learn more.
- You will lose consciousness in 10 seconds after the loss of blood supply to the brain.
- Of all creatures on earth humans have the most complex brain.
- Differences in brain weight and size do not equal differences in mental ability.
- If stretched out the cerebral cortex would be 0.23 sq. m or 2.5sq.ft.
- Average surface area of the cerebral cortex is 2,500 cm² or 2.69 sq.ft.
- There are about 100 billion neurons in the human brain, the same number of stars in our galaxy.

Questions we would all like answered:

How does memory work in the brain?

How is memory stored and then recalled at a later date, even decades later?

Why do we dream?

What causes the dreams we have and what is the purpose of dreams?

A. While dreaming brain tends to make up the time needed for repairs, thus creating virtual experiences. While dreaming brain also refreshes stored memories, deciding which ones to keep and which not.

Why do we sleep?

Why do we need to sleep and how does the brain enter and maintain the sleep stage?

A. We sleep in order to regenerate damaged parts of body and to dream (which is hard to do, and not recommended while awake and to avoid injury to one self if dreams are intense)

How do we think?

How do we make decisions, come to conclusions, and charter our course through life?

What makes us who we are?

How do we each have our own individual personalities and traits?

How can a memory be stored in a living cell or group of cells?

Is any work being done to create a computer using living cells for information storage and retrieval, possibly duplicating a brain.

TRUE / FALSE :

The brain cannot feel pain.

TRUE – brain interprets pain, but brain itself can't feel pain... – no sensory neurons in brain

Men have bigger brains than women.

TRUE – but differences are proportionate to or slightly less than differences in body size.

Within humans, brain size is related to intelligence.

FALSE -- within normal variation, there is no strong association between brain size and any measure of intelligence.

Intelligence is a measurable, heritable biological trait.

FALSE – "intelligence" is a measure on test scores, and cannot be measured without extreme cultural bias. Many different properties in "intelligence"

Humans have the largest and most wrinkled brains of any living animal.

Animal size (cc)

- Human 1300
- Bottlenose Dolphin 1700
- Elephant 6075
- Fin whale 7200
- Sperm whale 9200

However, humans do have the largest brains relative to their body size.