

facts on

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Protecting the Brain

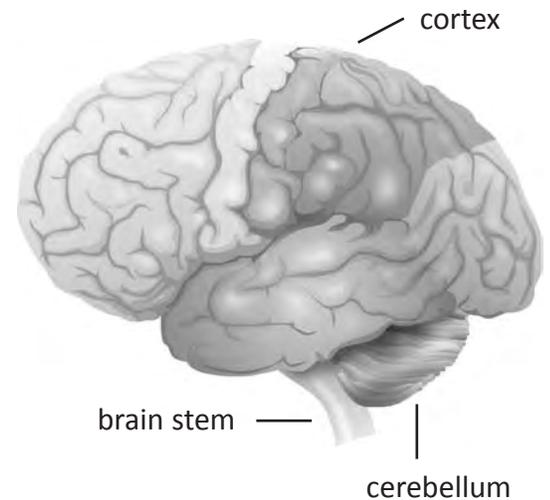
The brain enables us to do everything that we do - breathe, walk, plan for our futures. It is important to understand the function of the brain so that the brain will be protected as well as it should.

How is the brain organized?

The brain is divided into three main components: the cortex (cerebrum), the cerebellum and the brain stem. Each component has a specific function. The cortex is the largest part of the brain. The cortex is divided into the left and right hemispheres. The left hemisphere, which is the dominant hemisphere for the majority of people, controls the right side of the body and also controls language functions. The right hemisphere, the non-dominant hemisphere for most people, controls visual memory, spatial orientation and the ability to construct things.

The cortex is divided into four lobes. The frontal lobes work to organize and control behaviour. They also have many connections to the rest of the brain. The parietal lobes, which are located directly behind the frontal lobes, control muscle tone, strength and physical sensations. The parietal lobes are also involved with speech, reading and writing, perception, and drawing among other things. The temporal lobes, which are located beneath the frontal, parietal and occipital lobes, have memory functions and control the muscular components of speech. The occipital lobes, which are at the back of the brain, have their function in vision.

The cerebellum is located at the base of the brain and regulates balance, posture and coordination.



The brain stem relays stimuli from the body to the brain and responses from the brain to the body. It contains the centres which control breathing, heart rate and blood pressure. The brain stem is also the nerve centre for sight and hearing, and it controls the muscles of the face, mouth and neck. The brain stem also connects the two hemispheres of the brain to the spinal cord.

How is the brain naturally protected?

The brain is encased within the rigid structure of the skull. Thin membranes, the dura mater and pia-arachnoid, also work to protect the brain. The brain, which is attached by the brain stem to the spinal cord, floats in cerebrospinal fluid inside the skull. The cerebrospinal fluid acts as a protector for the brain. The skull also protects the brain and the cerebrospinal fluid. The outer surface of the skull is smooth but the inner surface of the skull is rough with sharp edges which can damage the brain in injuries where the brain continues to move forward after the body and head have come to a sudden stop.

How can we protect our brains and the brains of our children?

The brain can be injured in a traumatic incident, from spontaneous bleeding, from lack of oxygen or from prenatal exposure to teratogens such as alcohol or other drugs. Becoming aware of the ways that the brain can be injured is an important step in avoiding risks which may cause a brain injury.

Naturally, we think of helmets of various kinds as providing protection for the brain. Helmets do provide protection and it is important to use them in a variety of sport and work-related activities. It is also important to use other safety devices such as seat belts to protect us in the event of a car crash or safety gates to protect infants and toddlers from falls in the home. The brain of a developing fetus must be protected by providing the fetus a healthy environment free from alcohol, tobacco smoke and other drugs. Infants and young children must never be shaken, as this can result in brain injury.

We only have one chance with the brain that we have. If the cells of the brain are damaged, they will not be replaced. In all situations, precaution must be taken to keep the brain as safe as possible.



Information for this fact sheet was adapted from:

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Safe Kids Canada, Head Injury: Prevention, 2004.

Neuro Trauma Nexus Law, Brain Injury, 2004.

Gronwall, D. Wrightson, P., & Waddell, P. Head Injury: The Facts, A Guide for Families and Care-givers, Oxford University Press, Oxford, 1990.