

Table 3.1 Anatomical Subdivisions of the Brain

Major Division	Ventricle	Subdivision	Principal Structures
Forebrain	Lateral	Telencephalon	Cerebral cortex
			Basal ganglia
			Limbic system
	Third	Diencephalon	Thalamus
			Hypothalamus
Midbrain	Cerebral aqueduct	Mesencephalon	Tectum Tegmentum
Hindbrain	Fourth	Metencephalon	Cerebellum Pons
		Myelencephalon	Medulla oblongata

The Forebrain: Telencephalon

LO 3.3 Identify the locations and functions of the structures of the telencephalon.

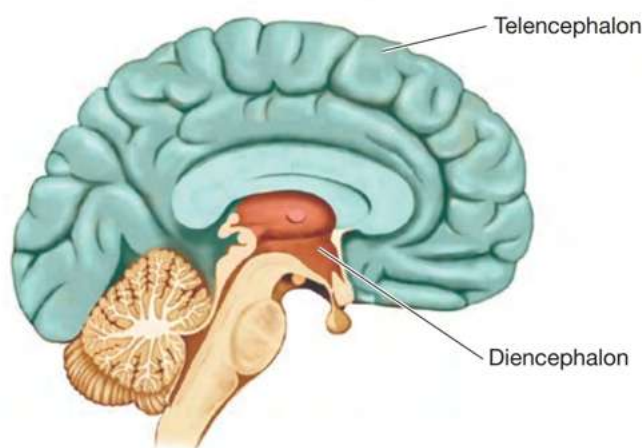
The forebrain contains two subdivisions: the **telencephalon** and the **diencephalon**. (See Figure 3.7.) We will begin with the structures of the telencephalon. Diencephalon structures will be discussed in the following module.

The telencephalon includes most of the two symmetrical **cerebral hemispheres**. These hemispheres make up the **cerebrum**. The cerebral hemispheres are made up of the cerebral cortex, the limbic system, and the basal ganglia. The limbic system and basal ganglia are primarily in the **subcortical regions** of the brain, located beneath the cerebral cortex.

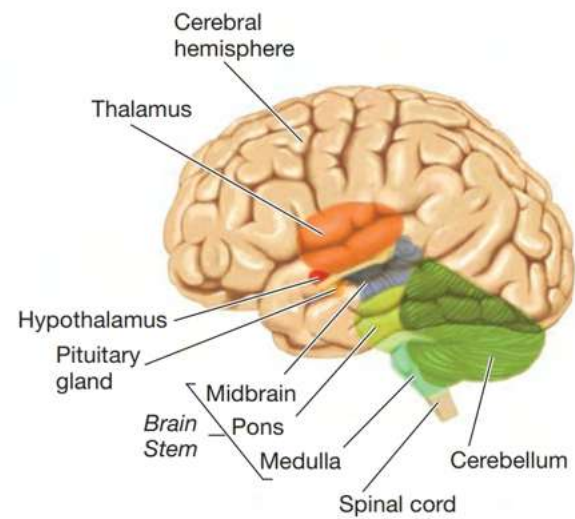
CEREBRAL CORTEX The cerebral cortex surrounds the cerebral hemispheres like the bark of a tree. In humans, the cerebral cortex appears folded, or convoluted. These convolutions, consisting of **sulci** (small grooves), **fissures** (large grooves), and **gyri** (bulges between adjacent sulci or

Figure 3.7 Forebrain

The forebrain is the most dorsal division of the brain. The forebrain consists of the telencephalon and the diencephalon.

**Figure 3.6** Structures of the Human Brain

This is a lateral view of the left side of a semitransparent human brain with the brain stem "ghosted in." The colors in Table 3.1 denote corresponding regions.



fissures), help enlarge the surface area of the cortex, compared with a smooth brain of the same size. The presence of these convolutions triples the area of the cerebral cortex. The total surface area is approximately 2360 cm^2 (2.5 ft.^2), and the thickness is approximately 3 mm. The cerebral cortex consists mostly of glia and the cell bodies, dendrites, and interconnecting axons of neurons. Because cell bodies predominate, giving the cerebral cortex a grayish tan appearance, it is referred to as *gray matter*. (See Figure 3.8.) Beneath the cerebral cortex are millions of axons that connect the neurons of the cerebral cortex with those located elsewhere in the brain. The large concentration of myelin gives this tissue, called *white matter*, an opaque white appearance.

Lobes of the Cerebral Cortex Discussing the various regions of the cerebral cortex is easier if we have names for them. The cerebral cortex is divided into four areas, or *lobes*, named for the bones of the skull that cover them: the frontal lobe, parietal lobe, temporal lobe, and occipital lobe. The brain contains two of each lobe, with one lobe in each hemisphere. The **frontal lobe** (the "front") includes everything in front of the central sulcus. The **parietal lobe** (the "wall") is located on the side of the cerebral hemisphere, just behind the central sulcus, caudal to the frontal lobe. The **temporal lobe** (the "temple") juts forward from the base of the brain, ventral to the frontal and parietal lobes. The **occipital lobe** (from the Latin *ob*, "in back of," and *caput*, "head") lies at the very back of the brain, caudal to the parietal and temporal lobes. Figure 3.9 shows these lobes in three views of the cerebral hemispheres: a ventral view (a view from the bottom), a midsagittal view (a view of the inner surface of the right hemisphere after the left hemisphere has been removed), and a lateral view.