Session Three Notes

Name:_____
Date:_____

Directions: As you watch the presentation, take notes on this sheet. Also, list any information you hear on this week's "brain words."

Notes	"Brain Words"
Basal Ganglia problems:_____	Basal Ganglia:_____
Basal Ganglia help:_____	Deep Limbic System:_____
Deep Limbic Problems:_____	Temporal Lobes:_____
Deep Limbic help:_____	Parietal Lobes:_____
Temporal Lobe problems:_____	Cerebellum:_____
Temporal Lobe help:_____	
Parietal Lobe problems:_____	
Parietal Lobe help:_____	
Cerebellum problems:_____	
Cerebellum help:_____	

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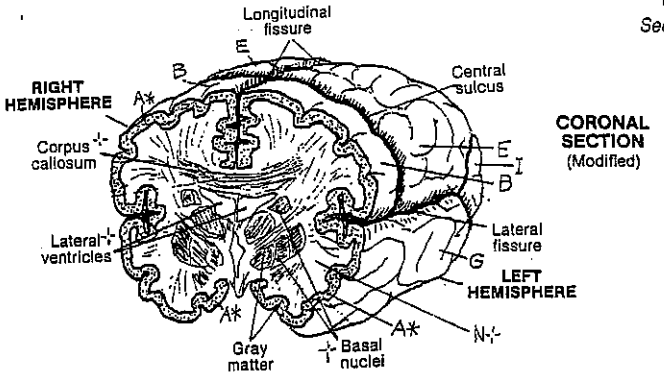
See 70

CEREBRAL HEMISPHERES

CN: Use light colors for B, E, I, and J. (1) Color the coronal section; most of the frontal lobe and part of the temporal lobe have been removed. Color the cerebral cortex (A) gray. In the two large hemispheres the stippled areas of specialized function are parts of lobes, but receive their own colors. Color the arrows identifying the major fissures and sulcus. (3) Color gray the diagram illustrating how the convolutions provide increased surface area in a smaller space.



CEREBRAL CORTEX (GRAY MATTER) A*

FRONTAL LOBE B

PRINCIPAL SPEECH AREA C

PRIMARY MOTOR AREA (PRECENTRAL GYRUS) D

PARIETAL LOBE E

PRIMARY SENSORY AREA (POSTCENTRAL GYRUS) F

TEMPORAL LOBE G

AUDITORY AREA H

OCCIPITAL LOBE I

VISUAL AREA J

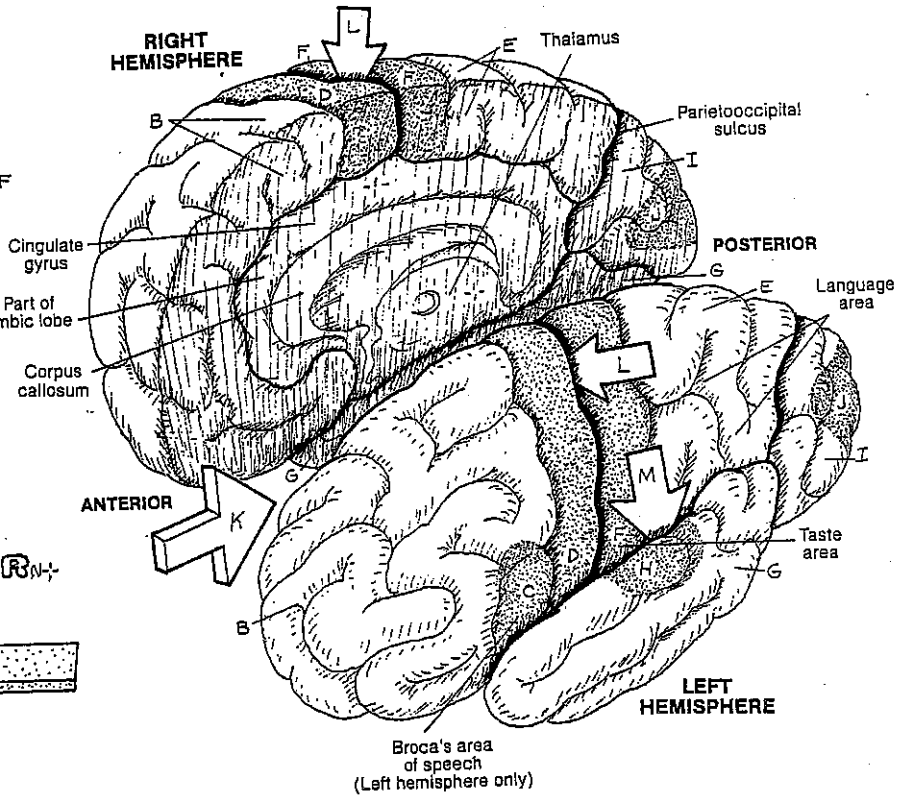
MAJOR FISSURES/SULCUS +

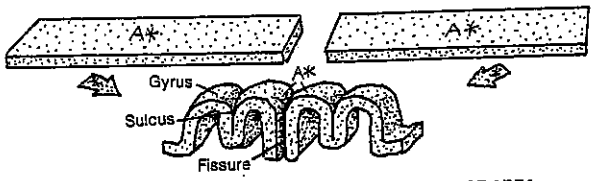
LONGITUDINAL FISSURE K

CENTRAL SULCUS L

LATERAL FISSURE M

SUBCORTICAL WHITE MATTER N+





CORTICAL CONVOLUTIONS: INCREASED SURFACE AREA

The paired cerebral hemispheres (cerebrum), derivatives of the embryonic telencephalon (see Plate 169), consist of four major elements: (1) an outer cerebral cortex of gray matter, the topography of which reveals fissures (deep grooves), gyri (hills), and sulci (furrows); (2) underlying white matter consisting of numerous tracts destined for or leaving the cortex and oriented along three general directions (Plate 74); (3) discrete masses of gray matter at the base of the cerebrum (basal nuclei) that subserve motor areas of the cortex (Plate 74); (4) paired cavities called lateral ventricles (Plate 80). The cerebral cortex is the most highly evolved area of the brain. About 2–4 mm (roughly 1/6 inch) thick, the cortex is divided into lobes distinctly bordered by sulci; the lobes are generally related to the cranial bones that cover them: frontal, parietal, temporal, occipital. The exception is the limbic lobe (part of which is shown); it incorporates parts of other (frontal, temporal, parietal) lobes.

Cortical mapping experiments (based on electrical stimulation and clinical/pathologic data) have been the principal methods by which functions of the cortex have been discovered. All parts of the cortex are concerned with storage of experience (memory), exchange of impulses with other cortical areas (association), and the two-way transmission of impulses with subcortical areas (afferent/efferent projections).

The frontal lobe is concerned with intellectual functions such as reasoning and abstract thinking, aggression, sexual behavior, olfaction (smell), articulation of meaningful sound (*speech*), and voluntary movement (*precentral gyrus*). The *central sulcus* separates the frontal lobe from the parietal lobe. The *parietal lobe* is concerned with body sensory awareness, including taste (*postcentral gyrus*), the use of symbols for communication (language), abstract reasoning (e.g., mathematics), and body imaging. The *temporal lobe* is partly limbic and here is concerned with the formation of emotions (love, anger, aggression, compulsion, sexual behavior); the non-limbic portion of the temporal lobe is concerned with interpretation of language and awareness and discrimination of sound (hearing; *auditory area*); it constitutes a major memory processing area. The *occipital lobe* is concerned with receiving, interpreting, and discriminating visual stimuli from the optic tract and associating those visual impulses with other cortical areas (e.g., memory).

The limbic lobe or system is the oldest part of the cortex, in evolutionary terms. It is the center of emotional behavior. The limbic neurons occupy parts of the inferior and medial cortices of each hemisphere, and some subcortical areas as well. Certain limbic areas are closely related topographically to the olfactory tracts.

The cerebral hemispheres appear structurally as mirror images of one another; functionally they are not. The speech area develops fully only on one side, usually the left. In general, the left hemisphere tends to deal with certain higher functions (mathematical, analytical, verbal) while the right concentrates on visual, spatial, and musical orientations. The matter of cerebral "dominance" (left hemisphere, left speech center, righthandedness, or vice versa) is quite controversial.