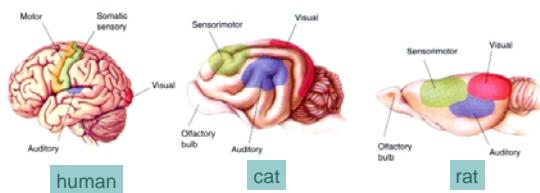


Cerebral Cortex

Medical Neuroscience
Dr. Wiegand

Comparative Anatomy



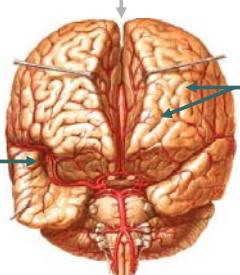
Human cortical expansion not strictly due to enlarged motor or primary sensory areas



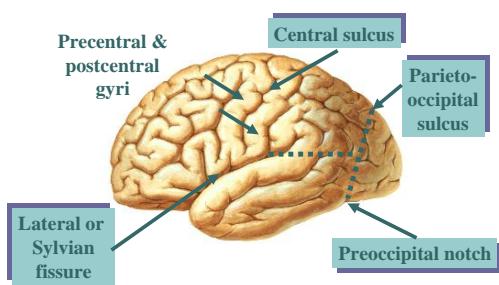
Longitudinal fissure

Lateral or
Sylvian
fissure

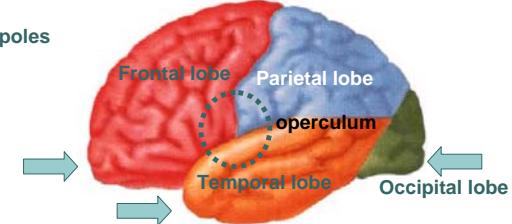
Gyri &
sulci



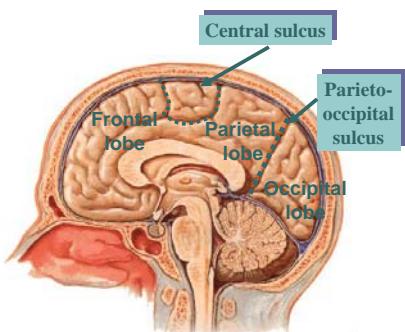
• • • | Landmarks

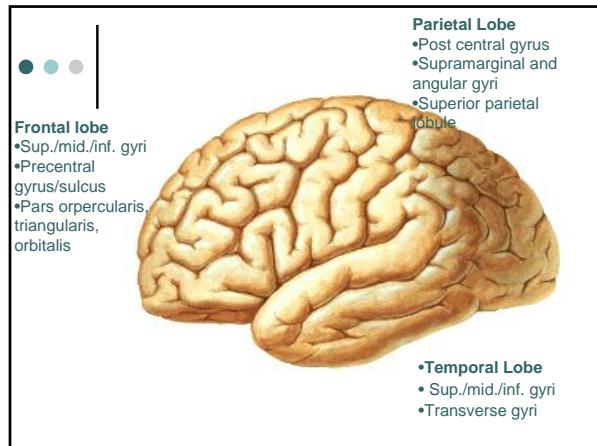


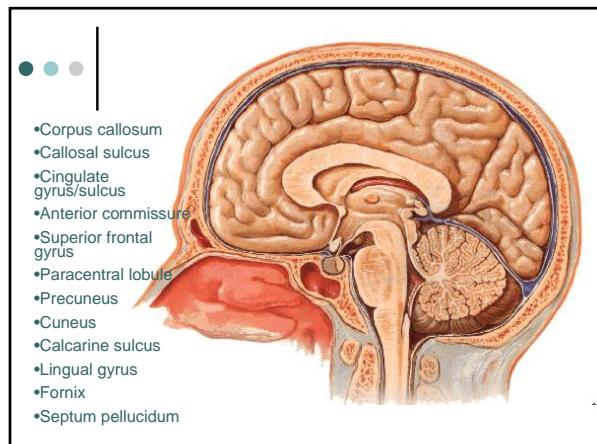
• • • | Lobes

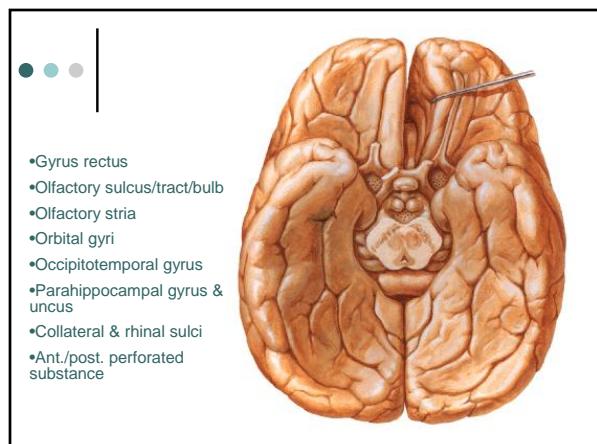


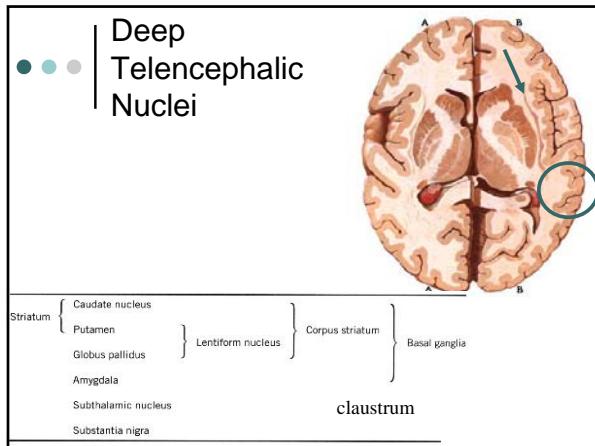
• • • | Medial Surface

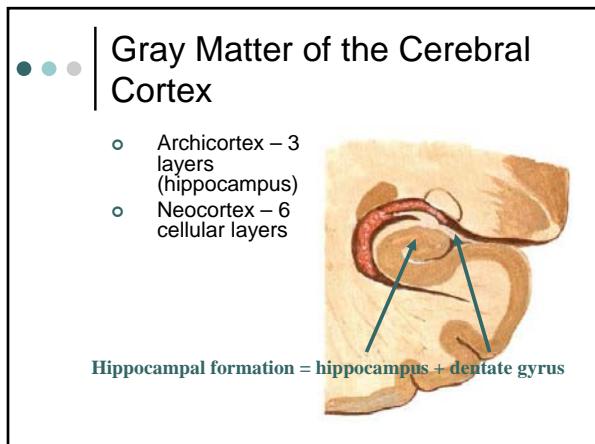


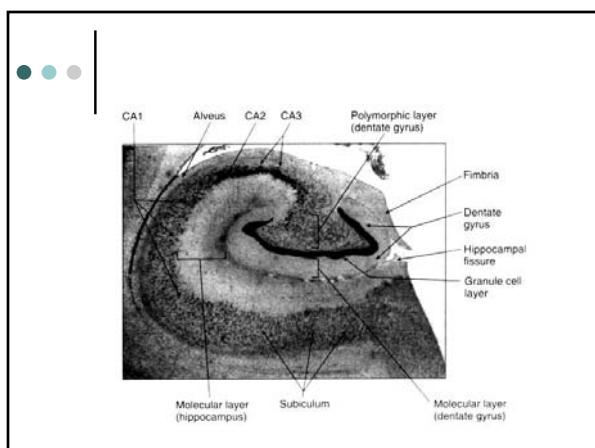






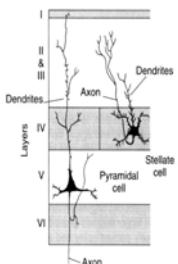






Neocortex

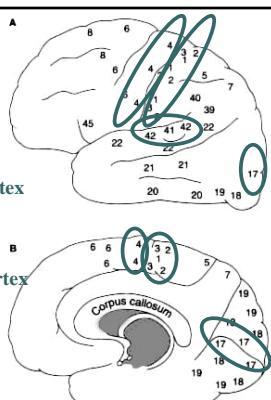
- o Neocortex – 6 cellular layers
 - I. Molecular layer – mostly neuropil
 - II. External granular layer – stellate cells
 - III. External pyramidal layer – small pyramidal cells
 - IV. Internal granular layer – stellate cells
 - V. Internal pyramidal layer – large pyramidal cells
 - VI. Multiform layer – multiple cell types



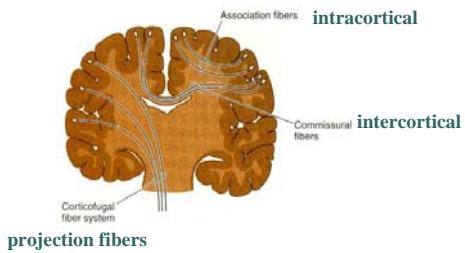
The diagram illustrates the six layers of the cerebral cortex (I-VI) across three vertical columns: sensory, association, and motor. The layers are color-coded: I (yellow), II (light blue), III (dark blue), IV (grey), V (pink), and VI (light pink).
 - **Sensory Column:** Labeled 'sensory' at the top. It shows 'SPECIFIC AREAS' (yellow) receiving 'Thalamocortical afferents' (black arrows from the left) and projecting to 'ASSOCIATION FIBERS' (black arrows pointing right).
 - **Association Column:** Labeled 'association' at the top. It shows 'ASSOCIATION AREAS' (pink) receiving 'CORTICOFRAGAL efferents' (black arrows pointing right) and projecting to 'ASSOCIATION FIBERS' (black arrows pointing right).
 - **Motor Column:** Labeled 'motor' at the top. It shows 'MOTOR AREAS' (light pink) receiving 'CORTICOFRAGAL efferents' (black arrows pointing right) and projecting to 'MOTOR FIBERS' (red arrows pointing right).
 - **Vertical Labels:** On the far left, vertical labels indicate the layers: I, II, III, IV, V, VI. On the far right, horizontal labels identify the fiber types: 'Thalamocortical afferents', 'Corticothalamic efferents', and 'Corticothalamic efferents'.
 - **Bottom Labels:** At the bottom, labels identify specific cortical regions: 'SPECIFIC AREAS', 'ASSOCIATION FIBERS', 'ASSOCIATION AREAS', 'ASSOCIATION FIBERS', 'MOTOR AREAS', and 'MOTOR FIBERS'.
 - **Legend:** A legend on the left identifies the colors: 'White matter' (white), 'gray matter' (grey), 'Pyramidal cells' (blue), 'Interneurons' (green), and 'Axons' (black).

Brodmann Areas

- Area 4 = primary motor cortex
 - Areas 3, 1,2 = primary somatosensory cortex
 - Area 17 = primary visual cortex
 - Areas 41, 42 = primary auditory cortex

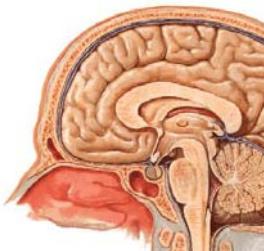


White Matter



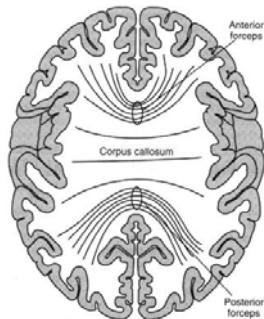
Commissural Fibers

- Anterior Commissure
 - Inf. & mid. temporal gyri, olfactory areas
- Posterior Commissure
 - Preoptic nuclei (vision)
- Habenular Commissure
 - Habenular nuclei (olfaction)
- Corpus Callosum
 - Connects hemispheres
 - Rostrum, genu, body & splenium



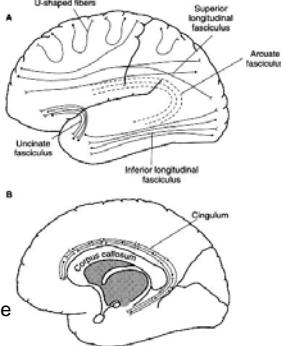
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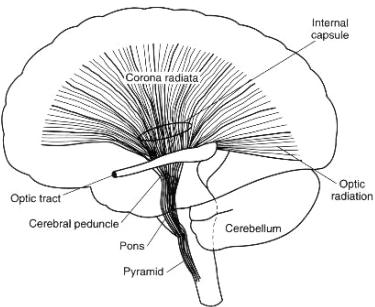


Association Fibers

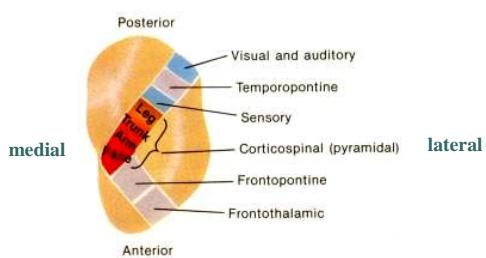
- Short fibers – connect adjacent gyri
- Long fibers
 - Superior longitudinal fasc.
 - Arcuate fasciculus
 - Inferior longitudinal fasc.
 - Cingulum – septal area, cingulate and parahippocampal gyri
 - Uncinate fasc. – orbital frontal gyri to temporal pole



Projection Fibers



Internal Capsule Organization



Cortical Functional Organization

