Neocortex

Also called Cortex or Pallium

Psychology 372

Physiological Psychology

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1

Neocortex

- Is the most developed in Humans
- Has many folds and fissures
  - The folds of tissue are called gyri or a gyrus (single)
  - The fissures or valleys are called sulci or a sulcus (single)
- Is what you see when you look at a brain from the outside.
- Provides more surface area for neurons

2

Neocortex

- Structures are divided into several section or lobes.
- Each lobe has a different function
- Cortex is separated in half by a fissure called the central fissure.
- Splits the brain into left and right halves called hemispheres.

3

Hemispheres

- Brain controls the contralateral side of body.
  - Left Hemisphere controls the right side of the body
  - Right Hemisphere controls the left side of the body

4

Hemispheric Specialization

- Left tends to be for more serial tasks
  - Events that occur one after the other
  - Verbal behavior, reading, writing
- Right is more specialized for combining elements.
  - Visual-spatial activities
- Work together because of the corpus callosum connects the sides.

5

Landmarks for Lobe Separation

- Each lobe is separated by a fissure or a sulcus. For us three are important.
- Central Sulcus
  - Separates the Frontal and Parietal lobe
- Lateral Sulcus
  - Separates the Temporal lobe from the Frontal and Parietal lobe
- Parietal Occipital Sulcus
  - Separates the Parietal lobe from the Occipital lobe

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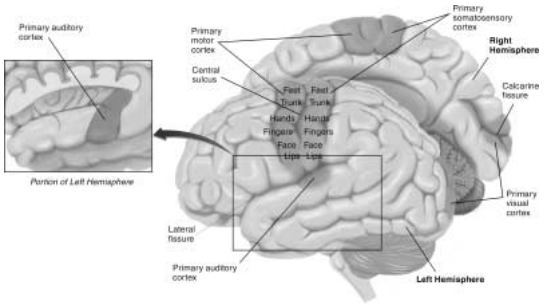
Each Hemisphere Contains 4 lobes

- Frontal
- Parietal
- Temporal
- Occipital

Frontal Lobe

- Contains a variety of structures
- Precentral Gyrus (Primary Motor Cortex)
- Also called Area 4
  - Is responsible for voluntary motor movement
- Areas 6 and 8
  - Called Premotor Cortex
  - Is responsible for muscle tone and getting Area 4 to work correctly.

Frontal Lobe



To Get Movement

- Premotor areas prepare muscle to contract.
- Area 4 causes the muscle to contract
  - Basal Ganglia, Cerebellum, and other structures help smooth out the movement.

Broca's Area

- Is located at the bottom of areas 4, 6 & 8.
- Is concerned with speech
  - When damaged, the person can understand speech, but they cannot talk well.
- Called Broca's Aphasia

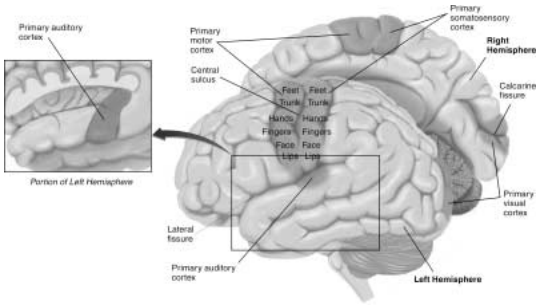
Association Area

- Remainder of the Frontal Lobe
- Is more important for thought processes, memory formation and problem solving.
- When damaged have problems with memory.

Parietal Lobe

- Also contains a variety of structures
- Somatosensory area (Area 3)
  - Is concerned with sensory functioning.
  - Is where you feel pain, temperature etc.
- Area 1, Area 2, and association cortex
  - Interprets what is happening in Area 3

Parietal Lobe



Temporal Lobe

- Is below the Lateral Sulcus
- Is concerned with hearing and patterning of sound (speech).
- Wernicke's Area
  - Is a sub-area of the Temporal Lobe

Wernicke's Area

- Is concerned with the integration and comprehension of speech.
- Also receives information from other areas such as the occipital lobe
- When damaged, you can speak fluently but the content is Nonsense
  - Called Wernicke's Aphasia
- When damaged, it is also hard to comprehend and understand written stimuli (reading).

Arcuate Fasiculus

- Is a set of fibers that look like an arc
- These fibers connect Wernicke's area with Broca's Area
- When damaged, the symptoms look similar to Wernicke's Aphasia

Occipital Lobe

- Is concerned with vision
- Area 17
  - Is the primary visual cortex
  - With damage you go blind
  - Is where visual information goes first

Areas 18 and 19

- Visual Association Cortex
- Helps with organization of visual stimuli
- With damage you cannot recognize stimuli.
- Information is then sent to other lobes
  - E.g., Temporal Lobe

Island of Reil

- Also called the Insular Lobe
- Is located under the lateral Sulcus
- Is concerned with smell

Conclusion

- The Brain has lots of structures
- Each structure is involved with lots of functions
- Is very resistant to damage
- When damaged, individuals can have lots of problems
- Problems can identify where the brain is damaged.