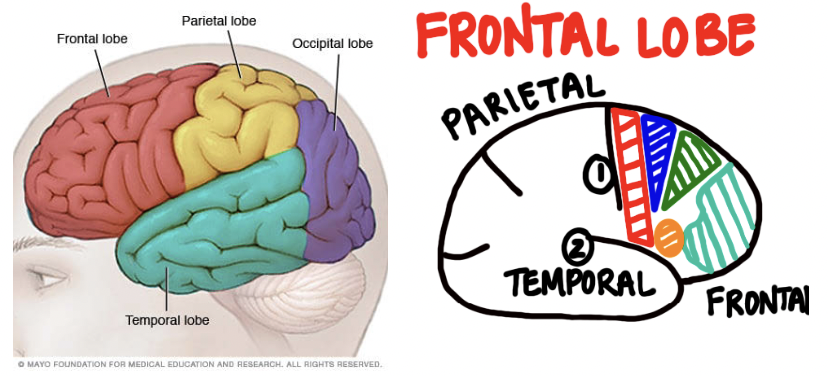
**Cerebral Cortex – Parietal Lobe Anatomy and Function**



**Outline**

* Parietal Lobe Anatomy
* Primary Somatosensory Cortex
* Somatosensory Association Area
* Posterior Association Area
* Review Questions
* References

**PARIETAL LOBE ANATOMY**

**Boundaries of Parietal Lobe**

* Anteriorly→ Separated from frontal lobe by central sulcus
* Inferiorly→ Separated from temporal lobe by lateral sulcus
* Posteriorly→ Separated from occipital lobe by parieto-occipital sulcus

Logo

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**Functional Areas**

* Primary Somatosensory Cortex
  + Conscious awareness of somatic sensation (touch, pain, temperature, vibrations, pressure, proprioception)
* Somatosensory Association Cortex
  + Analyzing and recognition of somatic sensations
  + Memory storage of somatic sensations
  + It is providing meaning to what we feel
* Posterior Association Area
  + Overlaps parts of occipital and temporal lobes
  + Integration of somatic, visual and auditory sensations
  + Also called the parietal-occipital-temporal cortex
    - From the parietal lobe it is getting somatic sensations
    - From the occipital lobe it is getting visual sensations
    - From the temporal lobe it is getting auditory sensations
  + All these sensations come together in one area and is giving information on spatial coordination

**Primary Somatosensory Cortex**

* Also known as Brodmann Area 1,2,3
* It is involved with conscious awareness of somatic sensations
* Receives sensory information through:
  + Dorsal Column Medial Lemniscus Pathway - Information on:
    - Fine Touch and Discriminative Touch
    - Proprioception
    - Vibration
  + Fibers decussate at the medulla and arrive at the contralateral side of the cortex
* Spinothalamic Tract Pathways - Information on:
  + Pain
  + Temperature
  + Crude touch
  + Pressure
  + Fibers decussate at the spinal cord and arrive at the contralateral side of the cortex
* Contributes to 40% of motor function through:
  + Corticobulbar tracts - From the cortex to the pons
  + Corticospinal tracts - From the cortex to the spinal cord

**Diagram

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**Somatotopy Of Parietal Lobe**

* The point-to-point correspondence of an area of the body to a specific point on the central nervous system
* In the somatosensory Homunculus:
  + Medial cortex corresponds to lower extremities
  + Lateral cortex corresponds to upper extremities and face
  + The bigger a structure, the more sensitivity that area has

Diagram

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**Sensory Homunculus**

* Sensations from lower leg goes to medial part of the primary somatosensory cortex
* Sensations from upper extremity to lateral part of the primary somatosensory cortex

**The Internal Carotid Artery**

* Branches off into an Anterior Cerebral Artery
  + Goes to lower extremities because it is the medial part of the primary somatosensory cortex
* Also branches of into a middle cerebral artery
  + Goes to the upper extremities, head and neck because it is the lateral part of the primary somatosensory cortex

**Clinical Correlation- Stroke**

* The symptoms of a stroke differ depending on the affected area in the brain:
  + A lesion of the Anterior Cerebral Artery (A.C.A)
    - Reduces blood flow to the medial cortex
    - Results in weakness and loss of sensation of the contralateral lower extremities
  + A lesion of the Middle Cerebral Artery (M.C.A.)
    - Reduces blood flow to the lateral cortex
    - Results in weakness and loss of sensation of the contralateral upper extremities and face

**Somatosensory Association Cortex**

* Receives somatosensory information from primary association cortex
* Analyzes this information to determine
  + Size of an object
  + Texture
  + Weight of an object
  + Position in 3D space
* Compares this information to previous experiences to determine what you are touching (pattern recognition)
* Stores the new information in memory

**Lesions of Somatosensory Association Cortex**

* Astereognosis - Inability to identify an object only by touch
* Agraphesthesia - Inability to recognize letters or numbers drawn on the skin
* Astatognosis - Inability to identify body part position
* Abarognosis - Inability to recognize weight differences

**Posterior Association Area**

* Receives somatosensory information from primary association cortex
* This is a multimodal association area (Integrates stimuli from various areas of your brain)
* Receives information from somatosensory, auditory and visual association cortices
* Puts the information together to:
  + Make sense of the situations around us
  + Develop spatial co-ordination
* Communicates with the Pre-frontal cortex and the Motor cortex

**Review Questions**

1. What artery is most likely to be affected in a stroke that affects sensation to the right leg?
   1. Right middle cerebral artery
   2. Left anterior cerebral artery
   3. Left middle cerebral artery
   4. Right anterior cerebral artery
2. Which of the following structures/areas is NOT located in the parietal lobe?
   1. Post-central gyrus
   2. Brodmann Area 1,2,3
   3. Motor Cortex
   4. Posterior Association Area
3. Which of the following somatosensory information is carried to the brain by the spinothalamic tract?
   1. Vibration
   2. Pain
   3. Discriminative Touch
   4. Proprioception

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Diagram

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