

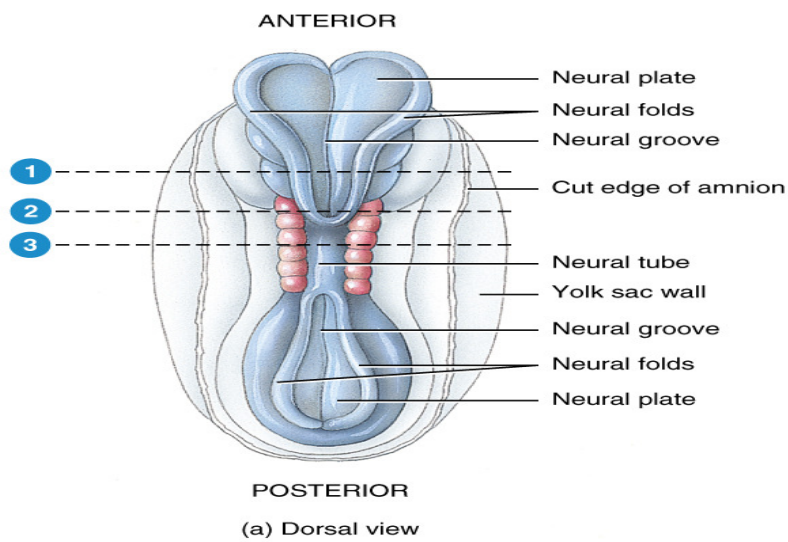
# Bio& 241 A&P

## Unit 4 Lecture 2



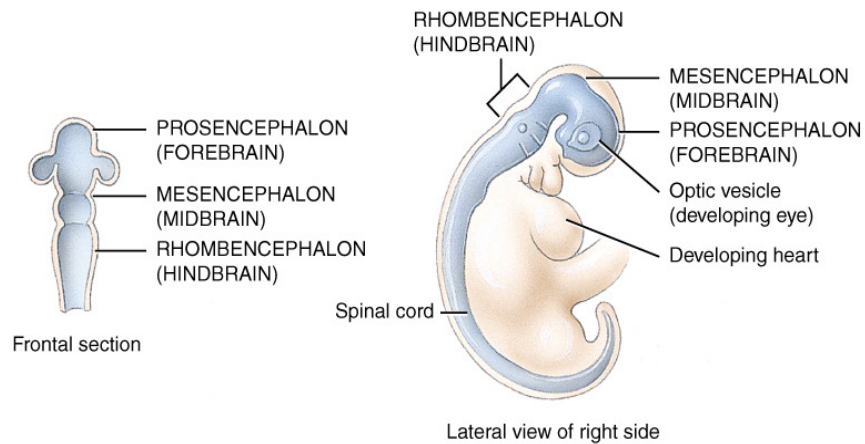
Granule Cell

## Embryonic Development of the Brain and Spinal Cord



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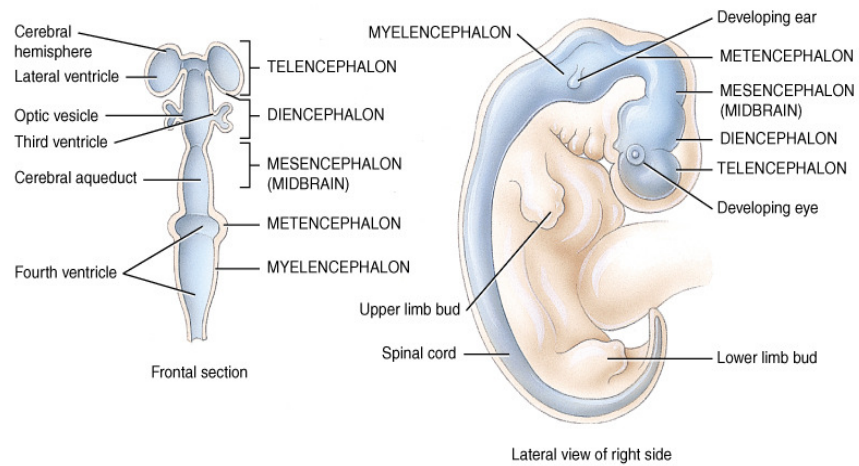
# Embryonic Development of the Brain and Spinal Cord, Primary Structures



(a) 3–4 week embryo showing primary brain vesicles

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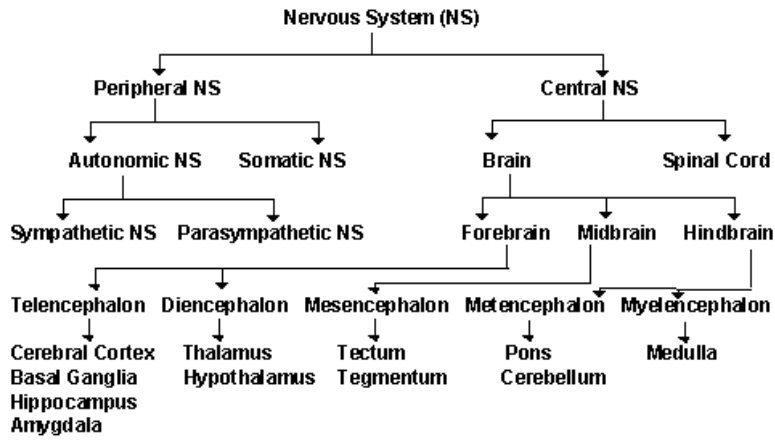
# Embryonic Development of the Brain and Spinal Cord, Secondary Structures



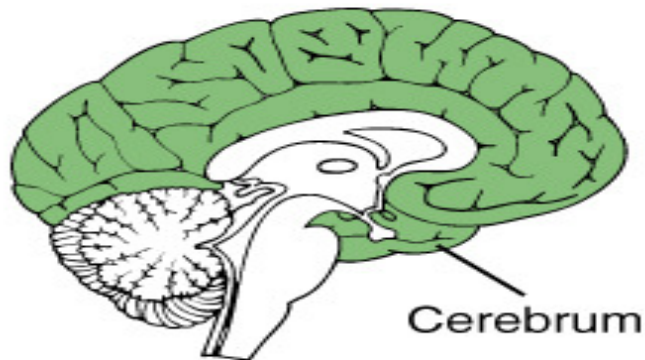
(b) 5–week embryo showing secondary brain vesicles

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## Flow Chart for the Nervous System



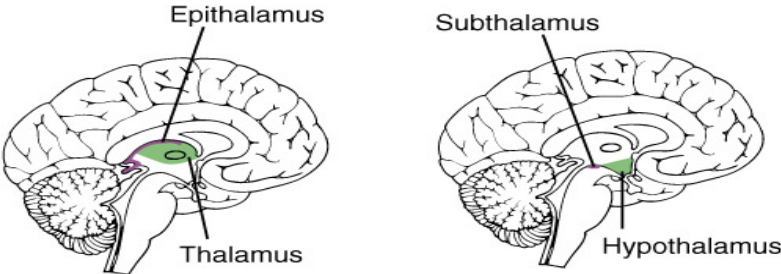
## Major Structures of the Brain



(d) Cerebrum

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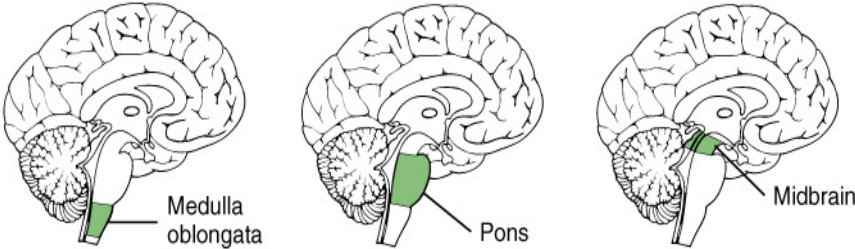
# Major Structures of the Brain



(c) Diencephalon

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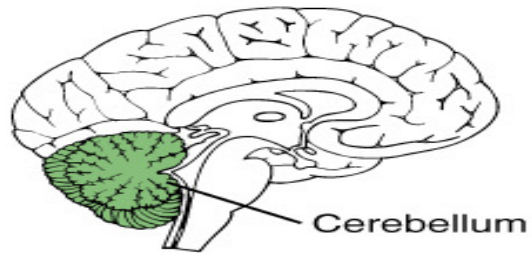
# Major Structures of the Brain



(a) Brain stem

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## Major Structures of the Brain



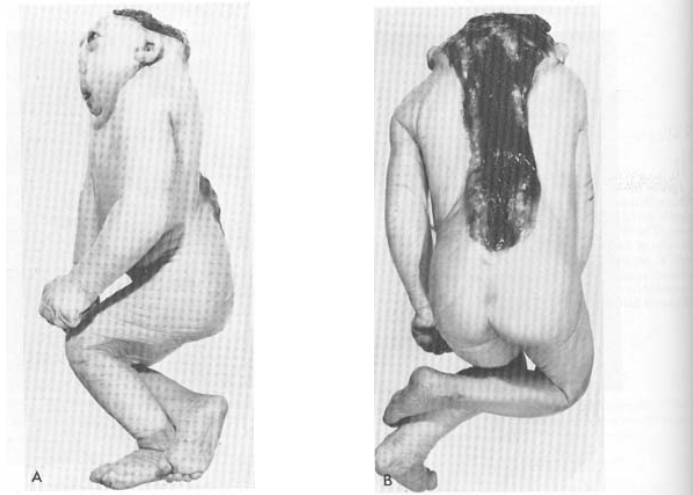
(b) Cerebellum

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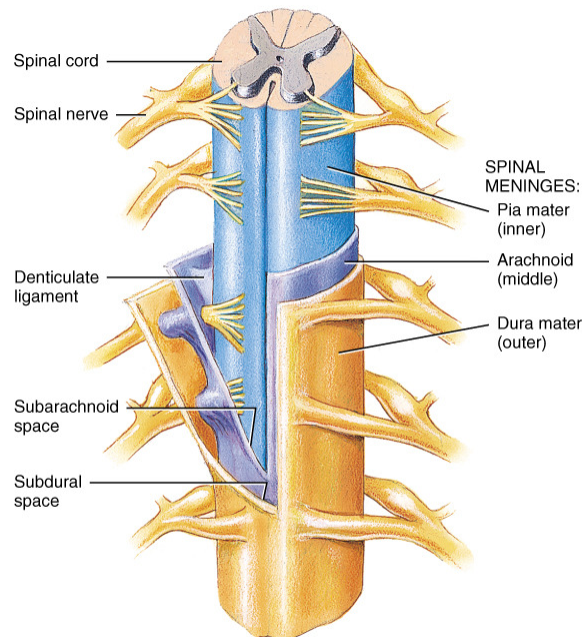
## Embryonic Development of the Brain and Spinal Cord



## Embryonic Development of the Brain and Spinal Cord



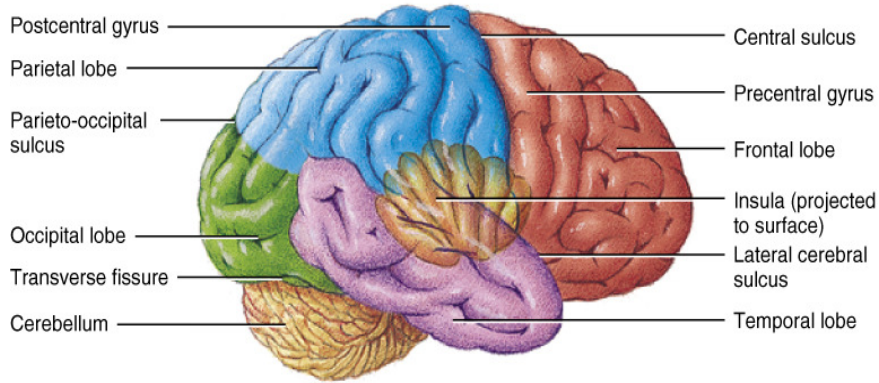
## Arrangement of the Meninges and their spaces



(a) Anterior view and transverse section through spinal cord

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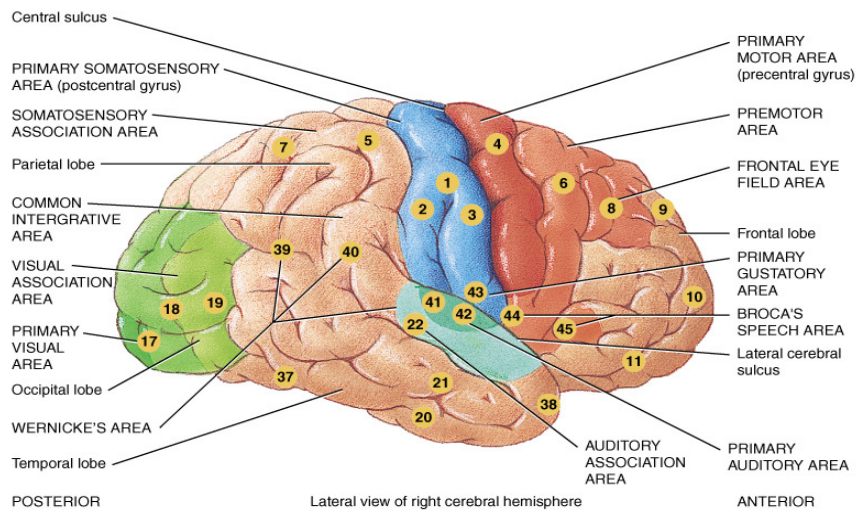
# Lobes of the Cerebral Cortex



(b) Right lateral view

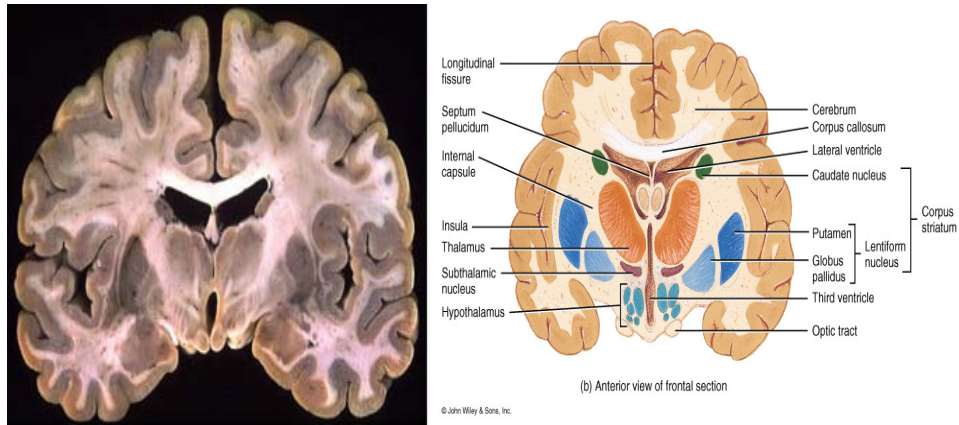
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# Functional Areas of the Cerebral Cortex

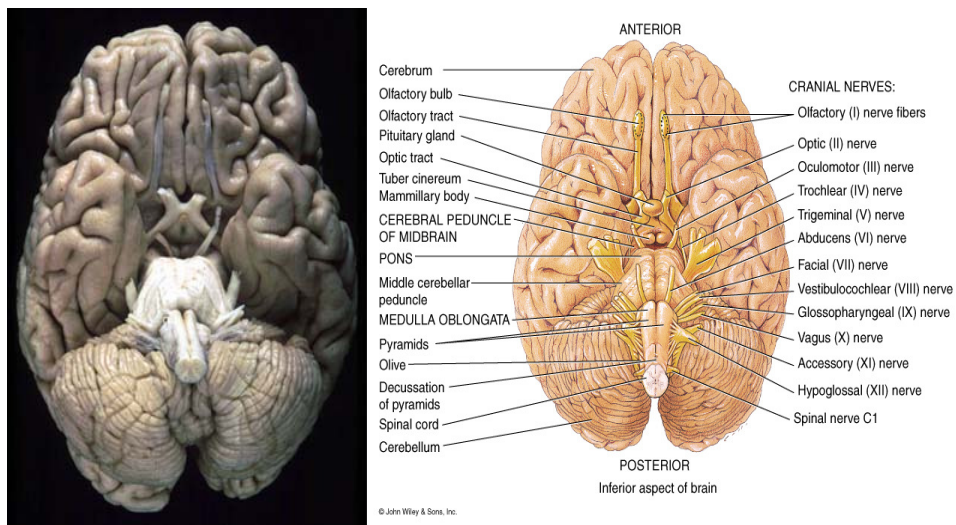


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## Major Structures of the Brain as seen in Frontal Section

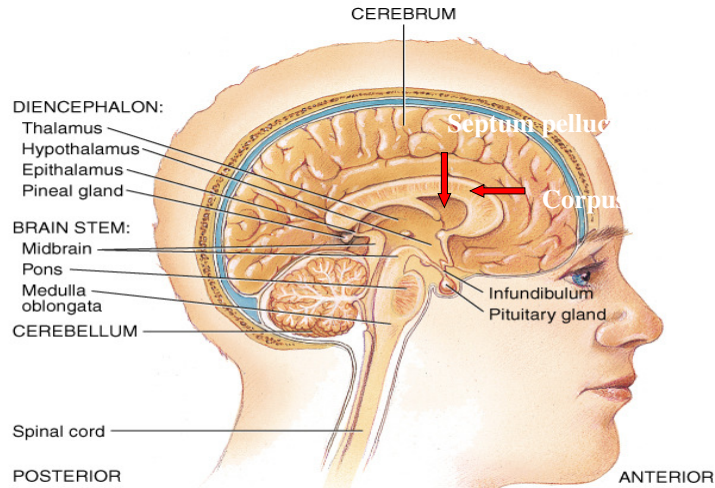


## Major Structures of the Brain as seen from an inferior view including cranial nerves





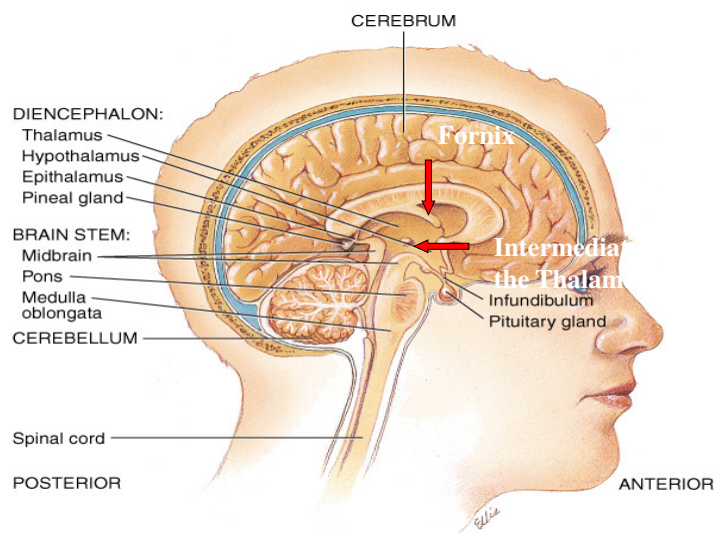
## Major Structures of the Brain as seen in midsagittal



(a) Sagittal section of brain, medial view

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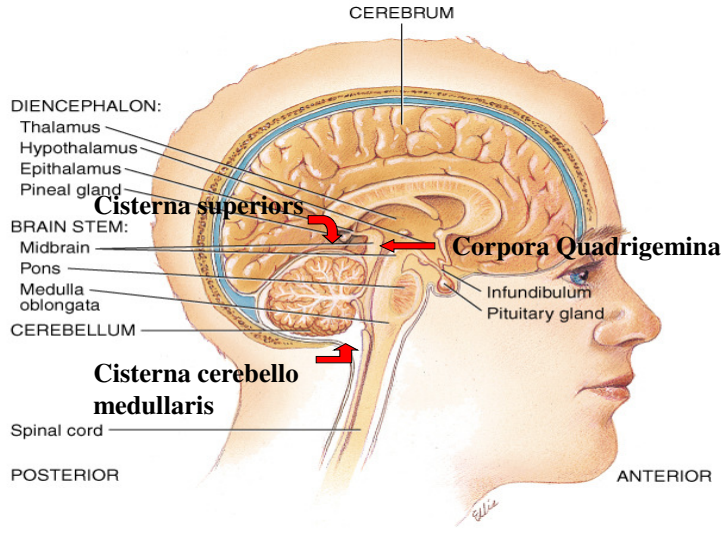
## Major Structures of the Brain



(a) Sagittal section of brain, medial view

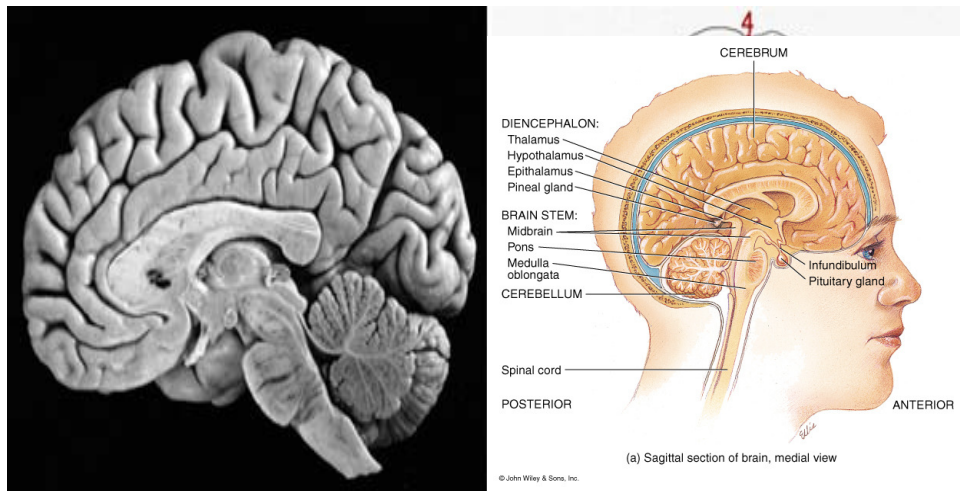
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# Major Structures of the Brain



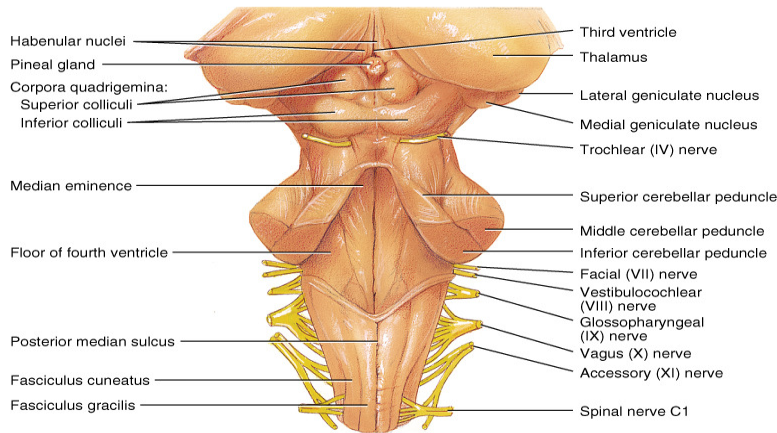
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# Major Structures of the Brain



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## Major Structures of the Brain



(a) Posterior view of midbrain in relation to brain stem

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## Cerebrospinal Fluid “CSF”

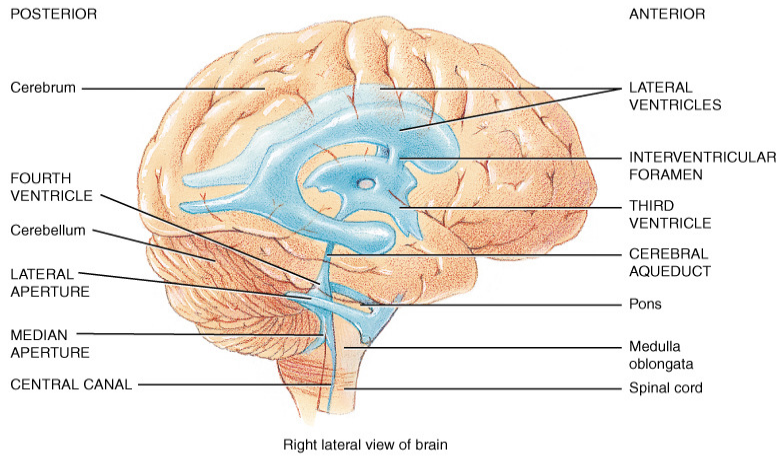
**Blood-Brain Barrier:** formed by tight junction of the endothelial cells of capillaries, tight junction between ependymal cells and astrocytes. These three tissues are involved in production of CSF.

**Total Volume:** 80-150 ml  
**Production rate:** 20ml/hr.  
**Composition:** glucose, proteins, lactic acid, urea cations (Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>) anions (Cl<sup>-</sup>, HCO<sub>3</sub><sup>-</sup>)

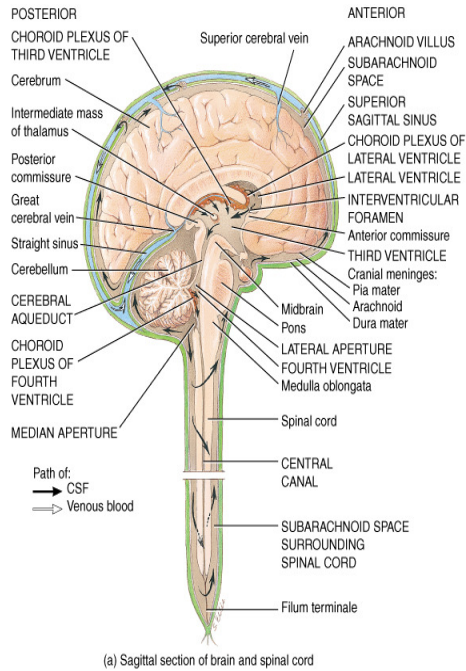
**Functions:**

1. Mechanical protection
2. Chemical protection  
hyponatremia, hypernatremia
3. Circulation

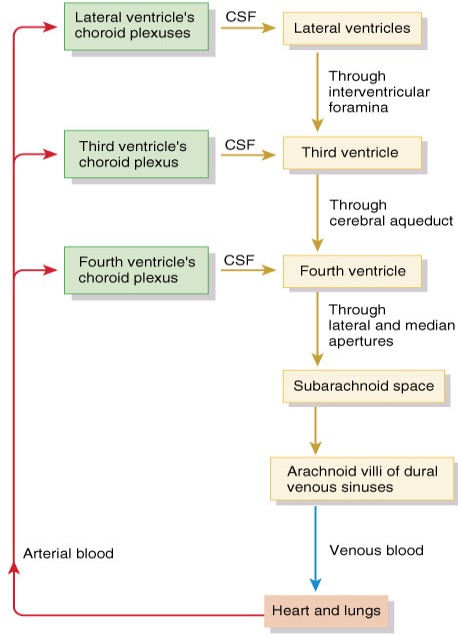
# Ventricles of the Brain



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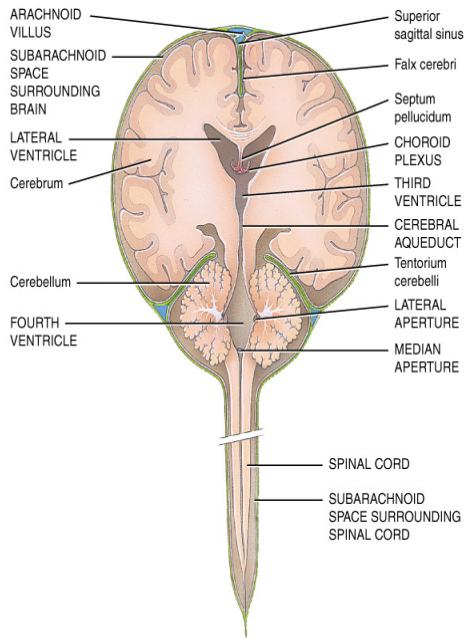


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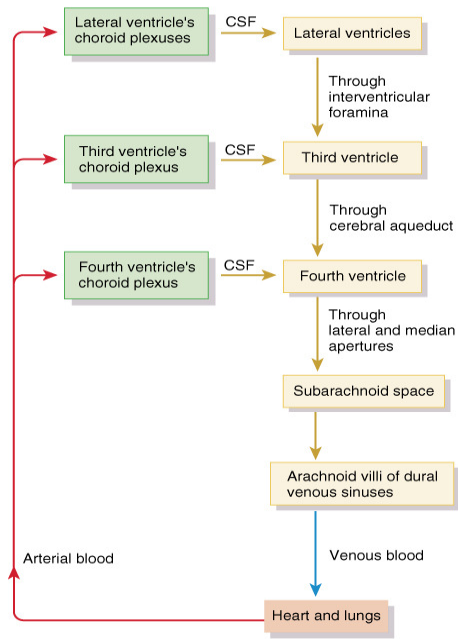
(c) Summary of the formation, circulation, and absorption of cerebrospinal fluid (CSF)

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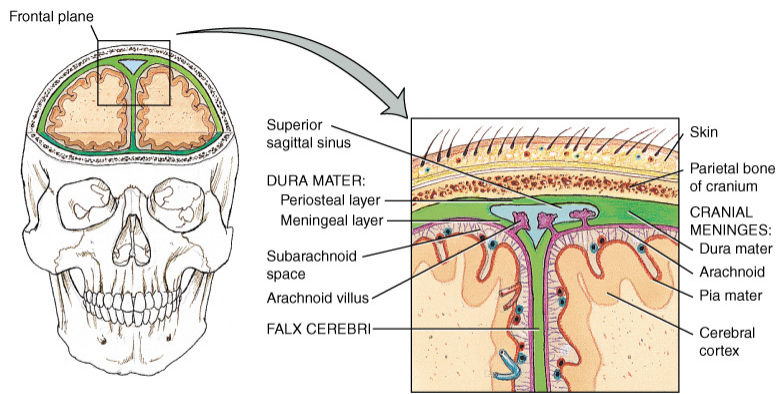
(b) Frontal section of brain and spinal cord

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(c) Summary of the formation, circulation, and absorption of cerebrospinal fluid (CSF)

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Frontal section through skull showing the cranial meninges

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