

Peeled-back
DURA MATER

0

DURA MATER
still in place

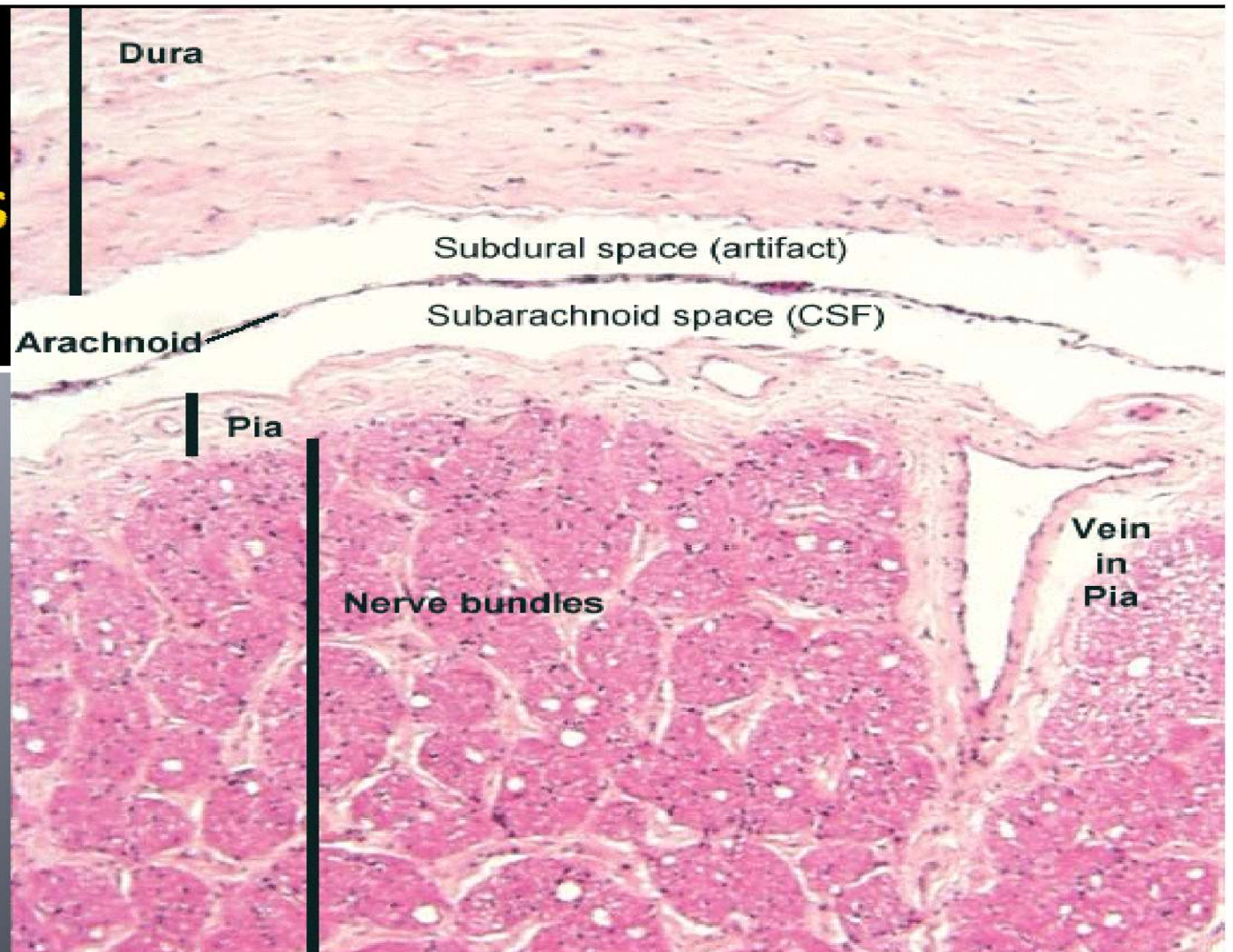
PIA MATER
covering cortical gyri

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Meninges CSF

D.Hammoudi.MD

Meninges



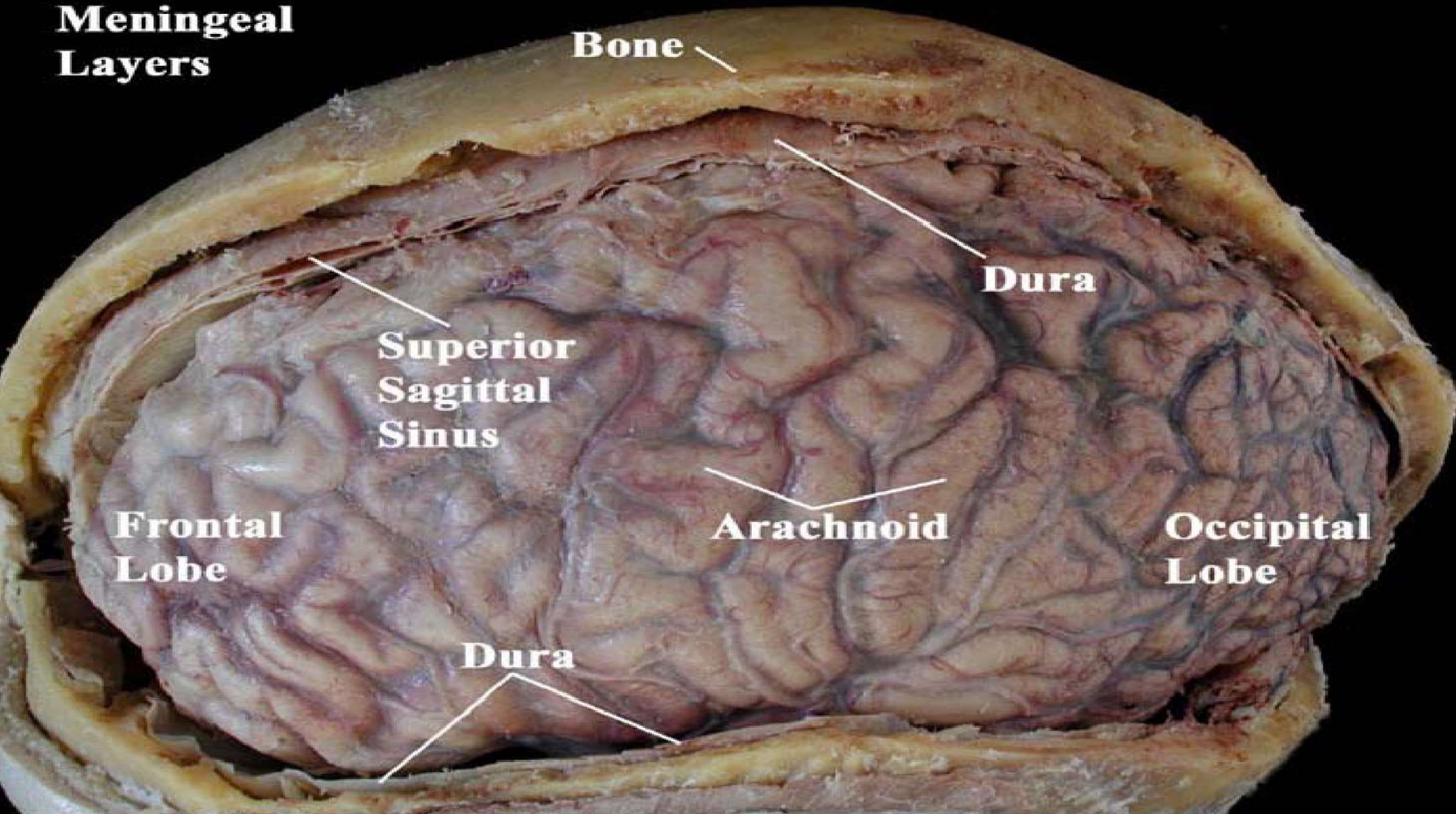
- The **cranial meninges** (singular: meninx) surround the brain and are made up of three layers (from outermost to innermost):
 - 1.dura mater
 - 2.arachnoid mater
 - 3.pia mater
- The dura mater can also be known as the **pachymeninx**.
- The arachnoid mater and pia mater are collectively known as the **leptomeninges** .
- The **spinal meninges** are similar but have some important differences.
- The meninges function to protect the brain but also provide a framework for blood vessels, nerves, lymphatics and **cerebrospinal fluid (CSF)** .

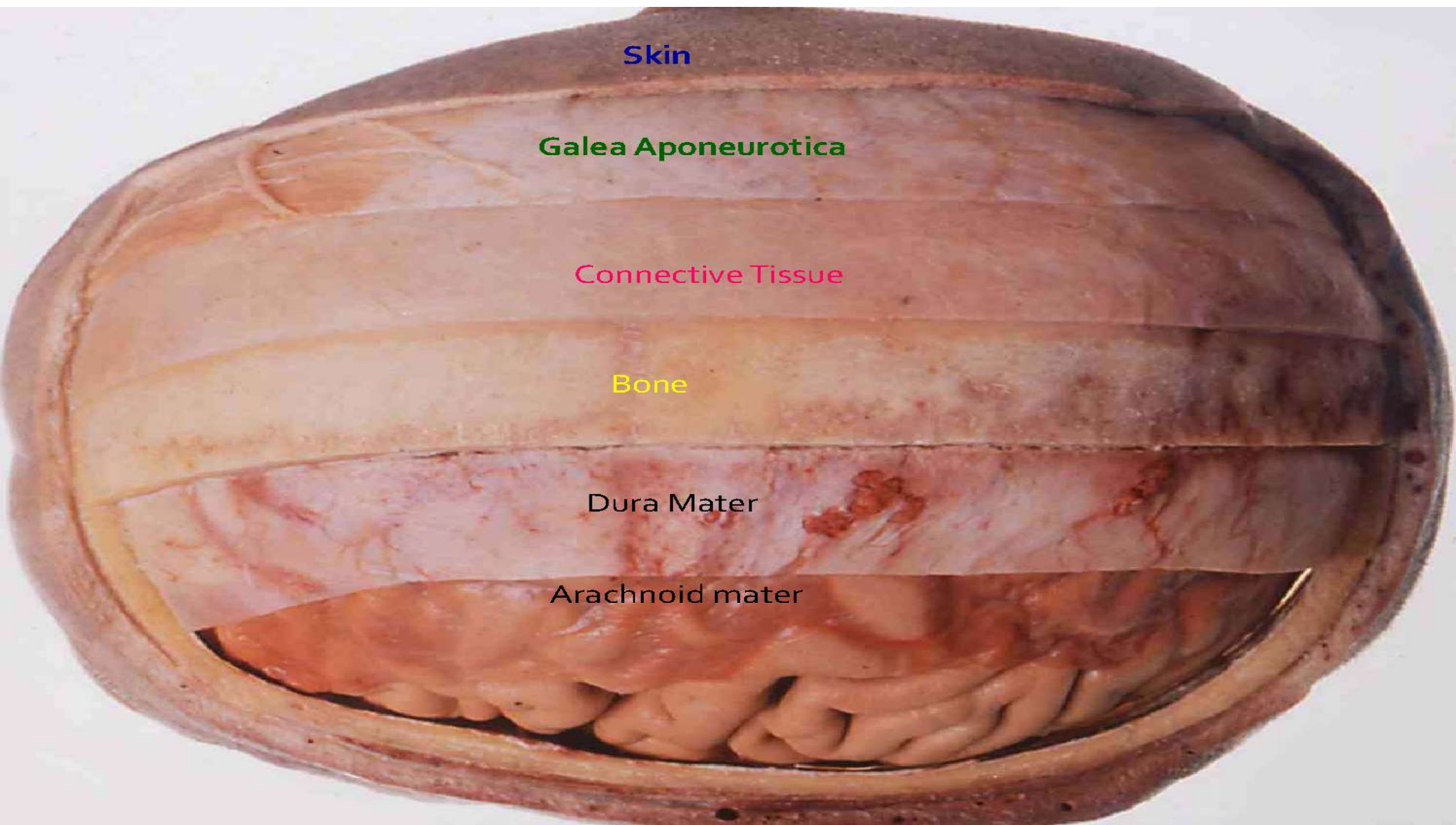
There are two potential spaces:

- epidural (extradural) space:** between the bone of the cranium and outer layer of the dura mater
- subdural space:** between the inner layer of the dura mater and the arachnoid mater

There is one CSF-containing real space, **subarachnoid space**, between the arachnoid and pia mater.

Meningeal Layers





Skin

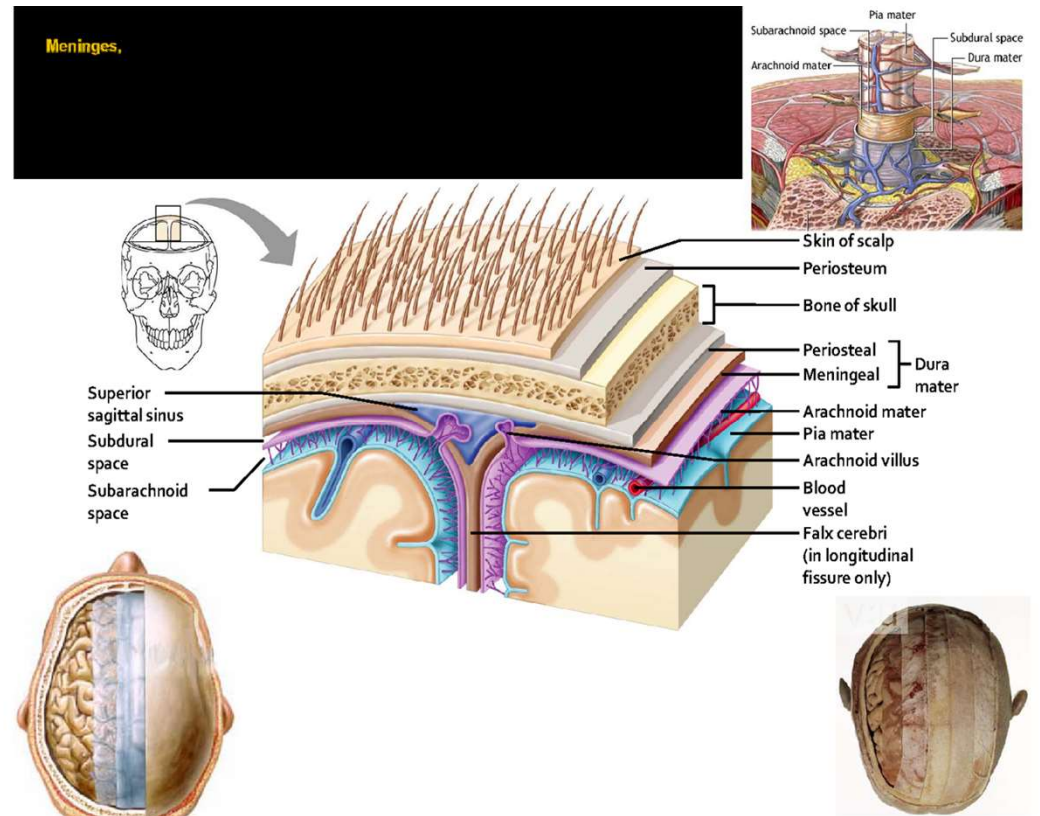
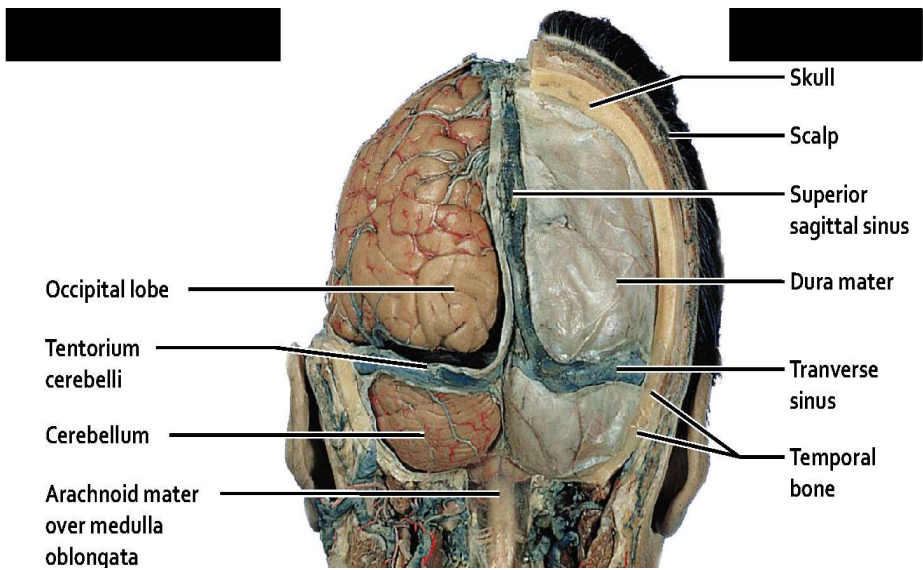
Galea Aponeurotica

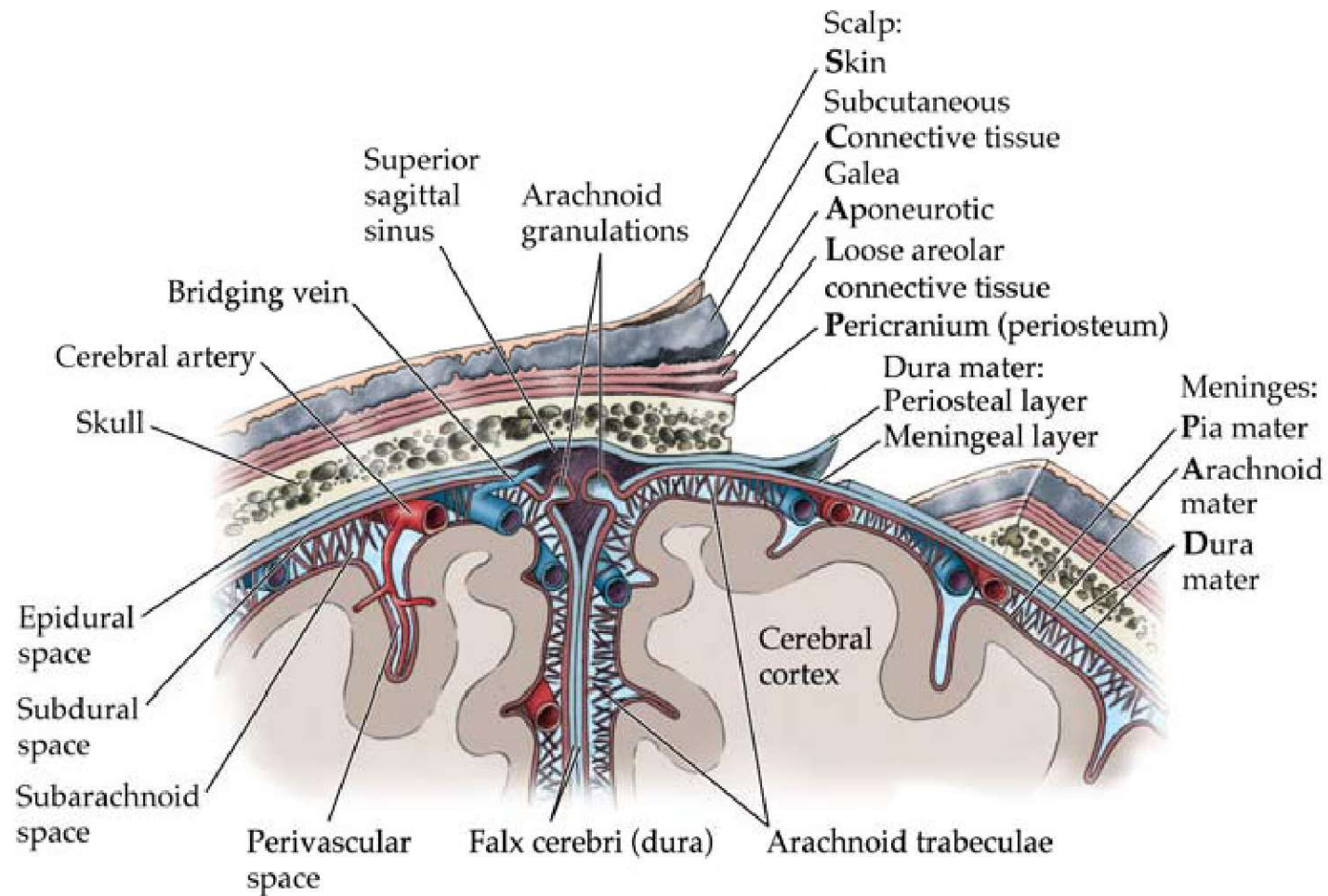
Connective Tissue

Bone

Dura Mater

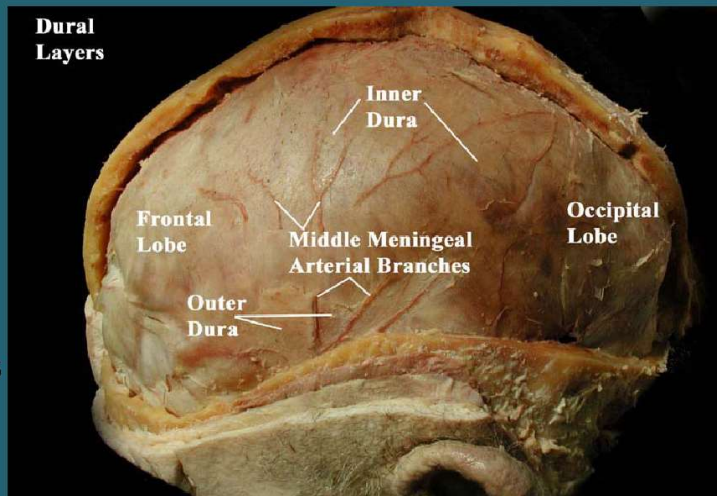
Arachnoid mater





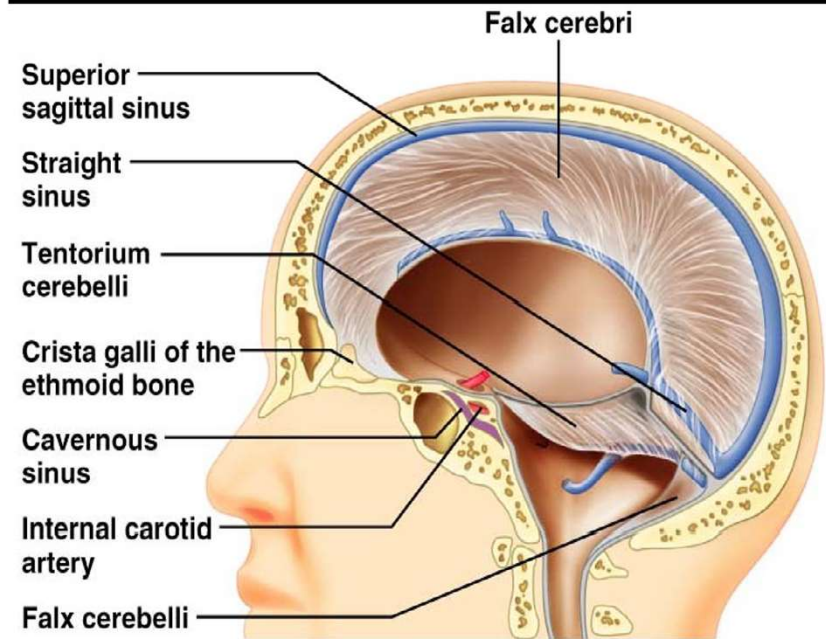
Dura Mater

- Tough and leathery.
- Most superficial.
- 2 layers:
 - **Periosteal** → attached to the skull
 - **Meningeal** → true external covering, extends downward and surrounds spinal cord



- In several locations, the inner dura mater extends in to the cranial cavity, forming a sheet that dips inward and then returns. These **dural folds** provide additional support for the brain. **Dural sinuses** may be found btwn the 2 layers of a dural fold.

Dura Mater

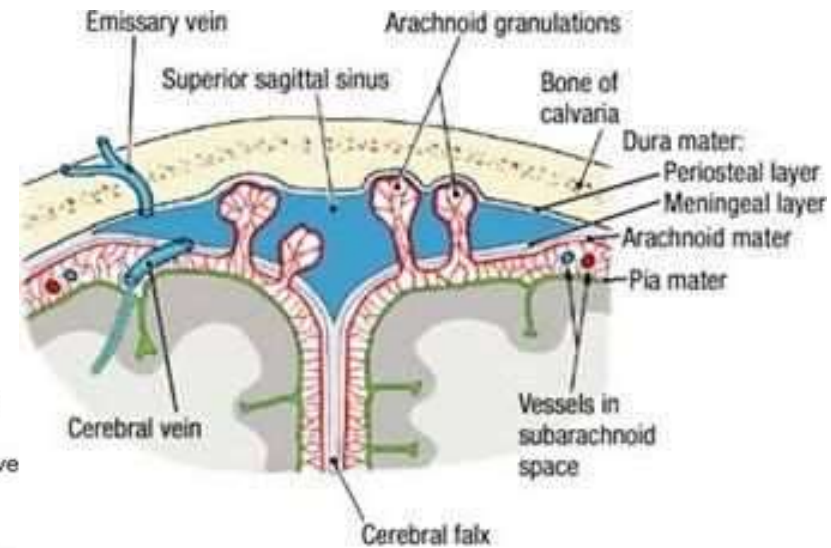
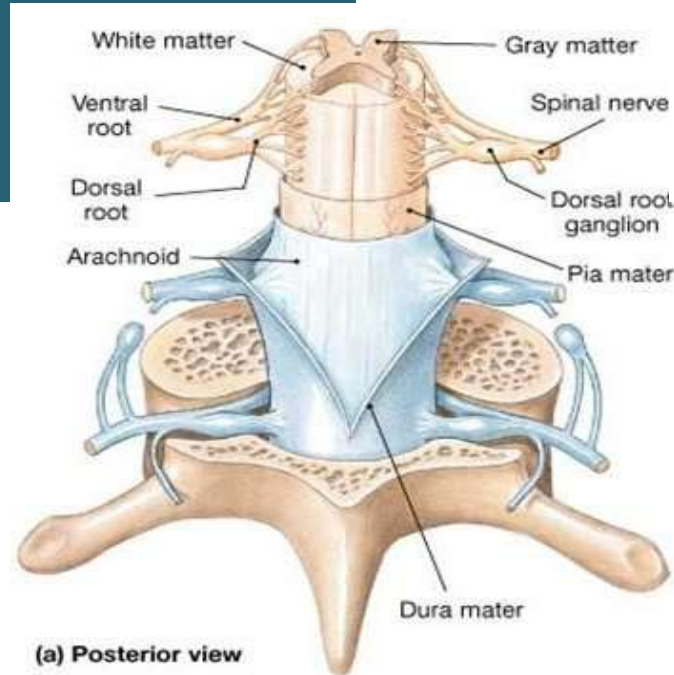
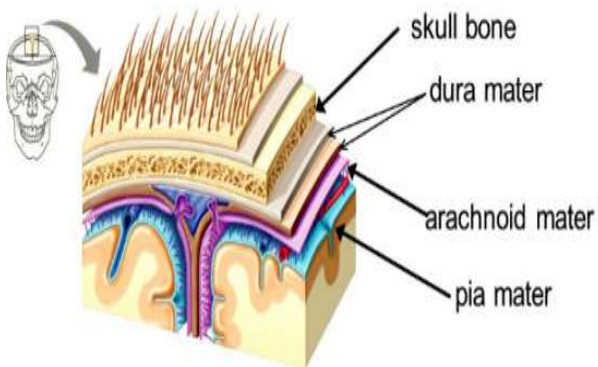


- The dura mater, also known as the pachymeninx (plural: pachymeninges), is the tough outer layer of the meninges that surrounds the central nervous system and is pierced by the cranial nerves, the internal carotid arteries and the vertebral arteries.
- Intracranially, it is formed by two layers:
 - **outer endosteal layer**, continuous via the skull sutures and foramina with the periosteum
 - **inner meningeal layer**, continuous inferiorly with the theca of the spinal cord

Arachnoid and Pia Mater

- **Arachnoid:**
 - Loose spider-web of connective tissue.
 - Beneath it is the subarachnoid space – filled with blood vessels and CSF
- **Pia**
 - Deepest and most delicate
 - Covers the brain tissue
 - Follows its every ridge and groove

➤ Three connective tissue membranes lie external to the CNS – dura mater, arachnoid mater, and pia mater



Blood-Brain Barrier

Protective mechanism that helps maintain a stable environment for the brain

Bloodborne substances are separated from neurons by:
Continuous endothelium of capillary walls

Relatively thick basal lamina

Bulbous feet of astrocytes

Blood-Brain Barrier: Functions

Selective barrier that allows nutrients to pass freely

Is ineffective against substances that can diffuse through plasma membranes

Absent in some areas (vomiting center and the hypothalamus), allowing these areas to monitor the chemical composition of the blood
Stress increases the ability of chemicals to pass through the blood-brain barrier

