The Human Skull and Its Layers

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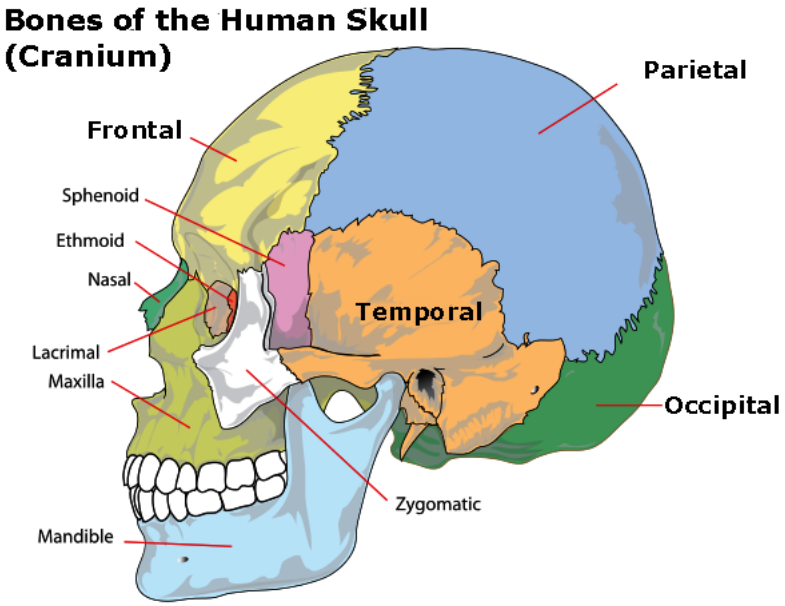
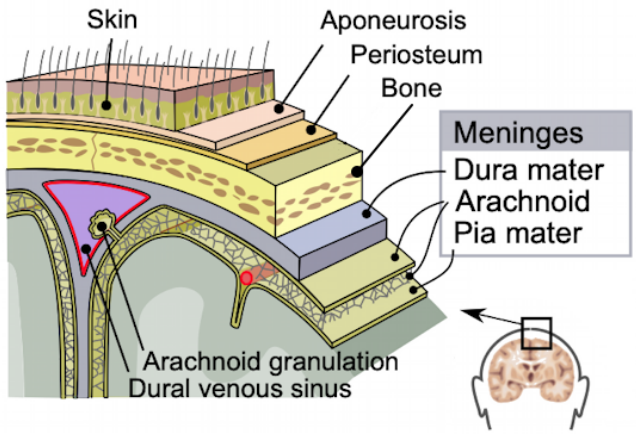
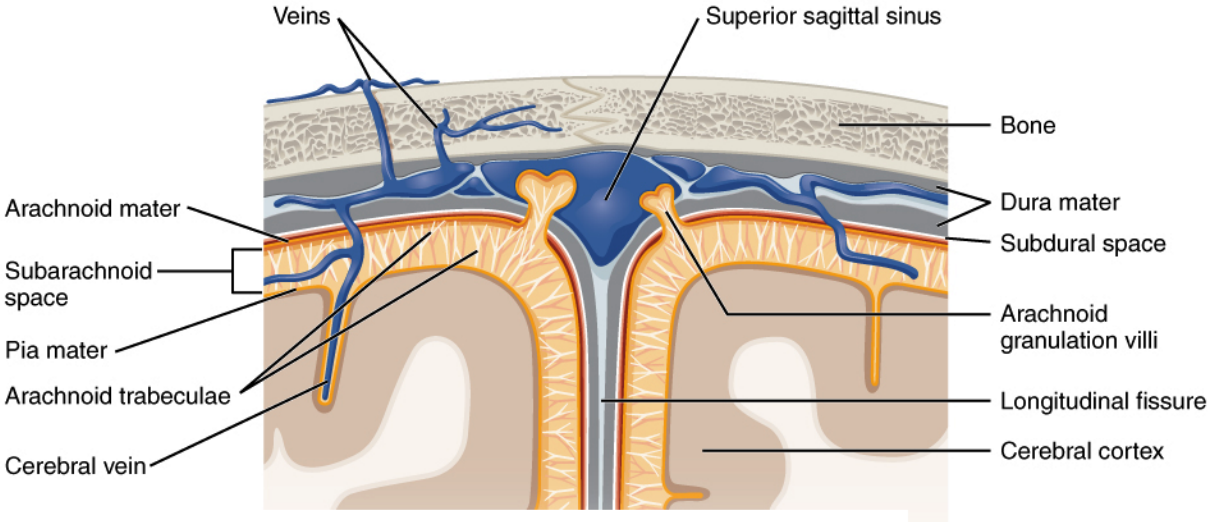


Source: https://upload.wikimedia.org/wikipedia/commons/thumb/6/6e/Human_skull_side_simplified_%28bones%29.svg/617px-Human_skull_side_simplified_%28bones%29.svg.png



Source: https://commons.wikimedia.org/wiki/File:Meninges-en.svg



Source: https://upload.wikimedia.org/wikipedia/commons/4/4c/1316_Meningeal_LayersN.jpg

Aponeurosis = "The ***epicranial aponeurosis***, or ***galea aponeurotica***, is a tough layer of dense fibrous tissue which runs from the frontalis muscle anteriorly to the occipitalis posteriorly… [The] primary function [of the aponeurosis] is to join muscles and the body parts they act upon, whether it be bone or other muscles" {Wikipedia}

Periosteum (aka **pericranium)** = "the fibrous membrane that forms the covering of bones except at their articular surfaces. It consists of a dense external layer containing numerous blood vessels and an inner layer of connective tissue cells that function as ***osteoblasts*** [= cells that form new bones] when the bone is injured and also participate in new bone formation. The ***periosteum*** serves as a supporting structure for blood vessels nourishing bone and for attachment of tendons and ligaments" (Venes, 2009, p. 1752).

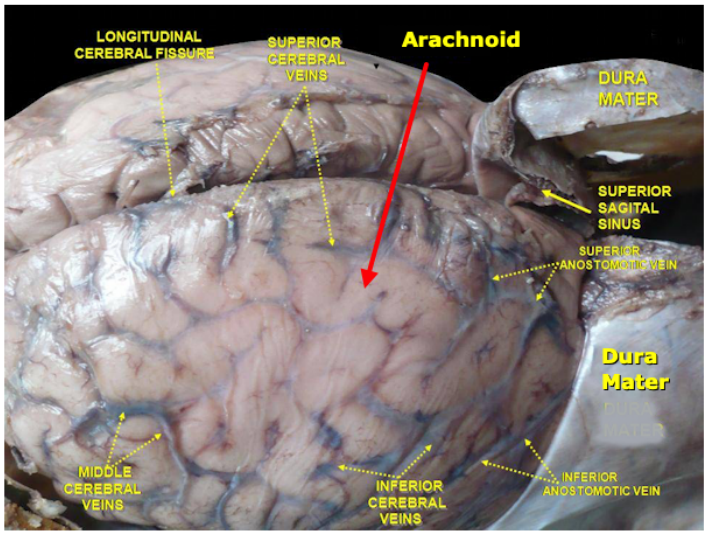
Skull Bone ([Neuro-]Cranium) = The human skull is generally considered to consist of twenty-two bones—eight cranial bones and fourteen facial skeleton bones. In the neurocranium these are the occipital bone, two temporal bones, two parietal bones, the sphenoid, ethmoid and frontal bones. {Wikipedia]. Note that the four lobes of the cerebral cortex are named after the bones which cover them. The section of the skull covering the cerebrum is also known as the ***calvarium***. [Latin: calvaria = "skull']

As with bones throughout the body, the interior of the cranial bones contains marrow. Recent research points to the cranial bone marrow as a source of cells to combat inflection or other forms of injury to the brain (Cugarra et al., 2021; Herisson et al., 2018)

Meninges = below the neurocranium (skull bones) are three layers of membranes which cover the brain.

- **Dura mater** (Latin = "hard mother"). The outermost layer of the three meninges, the ***dura mater*** is a tough & thick membrane which consists itself of two layers (the upper layer connects to the skull and the lower "meningeal layer" contains its own arteries, veins, and nerve endings). It serves to protect the brain and spinal cord, limit how much the brain can be displaced by rotation, and other functions (Woldenberg & Cohn, 2014).

  Normally there is little space between the dura mater and the arachnoid membrane. However, because of injury or damage, a space may appear, e.g., by a hemorrhage. Such injuries or damage involving such spaces are labelled ***subdural***, e.g., ***subdural hematoma***.



source: https://commons.wikimedia.org/wiki/File:Slide6Neo.JPG

- **Arachnoid mater** (Greek: *arachne* = "spider", Latin: "arachnoīdes*" = "like a cobweb or spider web"*).

  Subarachnoid space. Below the arachnoid membrane and above the pia mater is the ***subarachnoid space***. This area contains ***cerebral spinal fluid*** (CSF) as well as multiple branches of the brain's arteries and veins. Over the gyri of the cortex, this space tends to be quite thin. However, in the sulci of the cortex, the space between the arachnoid membrane and pia mater can become quite large and forms what are known as subarachnoid or basal cisterns (Latin = "boxes").

  Tumors growing in the meninges are called ***meningiomas***. They generally arise in the arachnoid and press down upon the Pia mater.

- **Pia mater** (Latin = "tender mother") The ***pia mater*** is a thin membrane which covers the entire CNS including the insides of the sulci. Functionally it appears to provide a covering of the cortical tissue that allows water and some small soluble molecules to pass through to the brain's interstitial fluid (the fluid which surrounds the neurons and glial cells of the brain.) The Pia mater and Arachnoid together are sometimes called the ***leptomeninges.***

- Note that ***meningitis*** is a usually seen as an inflammation of the ***leptomeninges*** with the ***dura mater*** less frequently involveds

References

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