



Al-Mustaqbal University

College of Engineering & Technology

Biomedical Engineering Department

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Subject Code: [UOMU01104]

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Lecture No.: - 7-

Lecture Title: [the skull and crainal cavity]



ANATOMY II/ 2nd Stage

Head and Neck

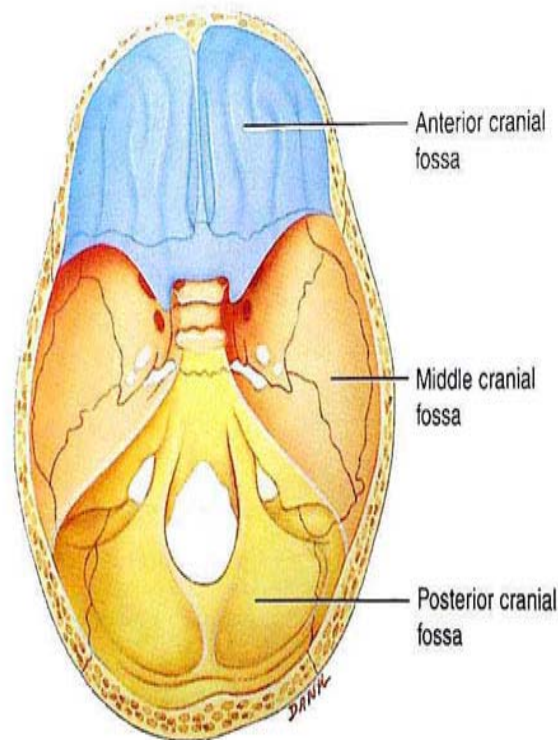
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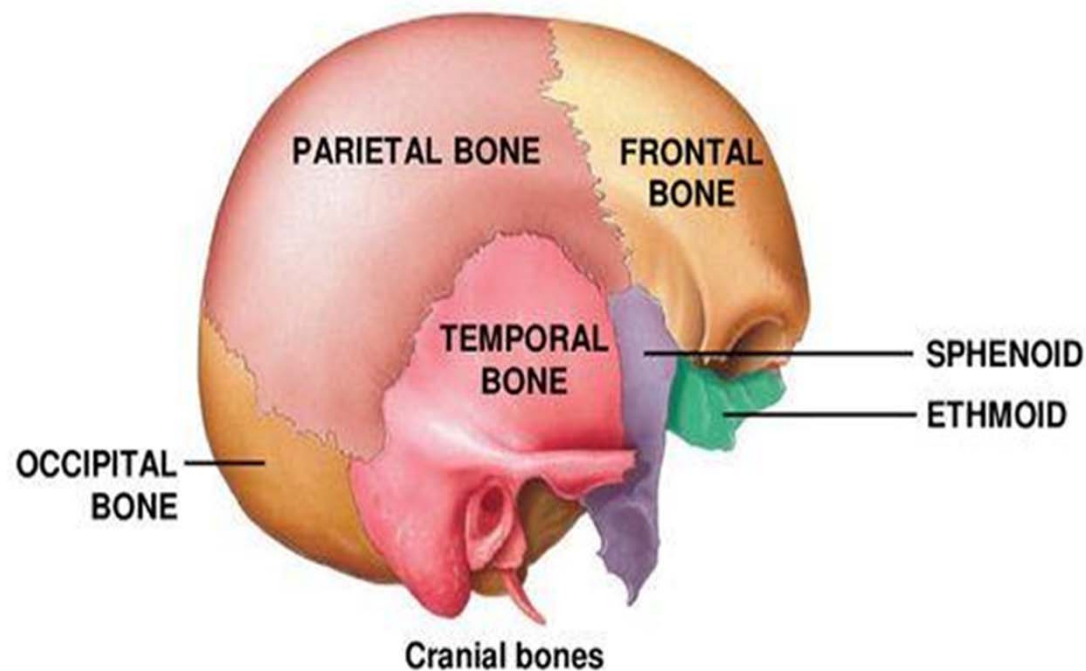
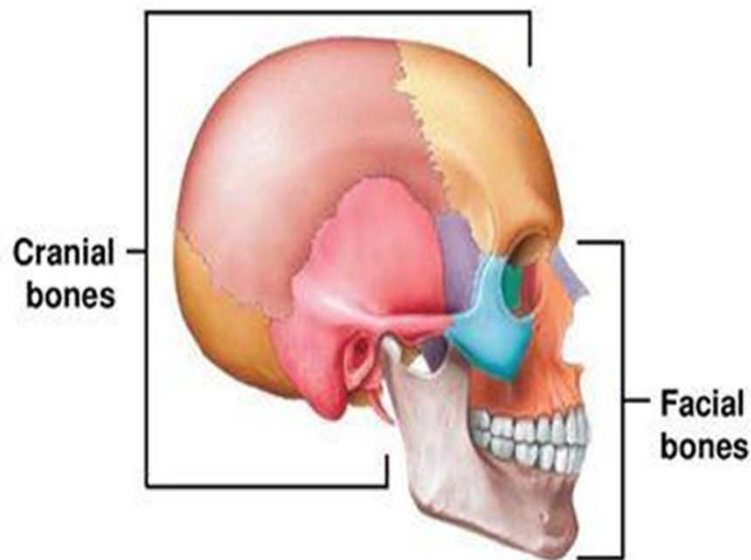
The skull and the Cranial Cavity

The bones of the head and neck include the skull, middle ear ossicles, hyoid bone and cervical vertebrae.

- The skull is composed of several separate bones united at immobile joints called **sutures** .
- The mandible is an exception to this rule, as it is united to the skull by the mobile, synovial TemporoMandibular Joints (TMJ)

- The cranial cavity is the space containing the brain. (composed from 8 bones)
- The skull vault (calvarium) is the upper part of the cranium and forms the roof and side walls of the cranial cavity.
- The base of the skull is the lowest part of the cranium and forms the floor of the cranial cavity.





SKULL

ASSOCIATED BONES 7

Auditory ossicles enclosed in temporal bones (detailed in Chapter 17)

6

Hyoid bone

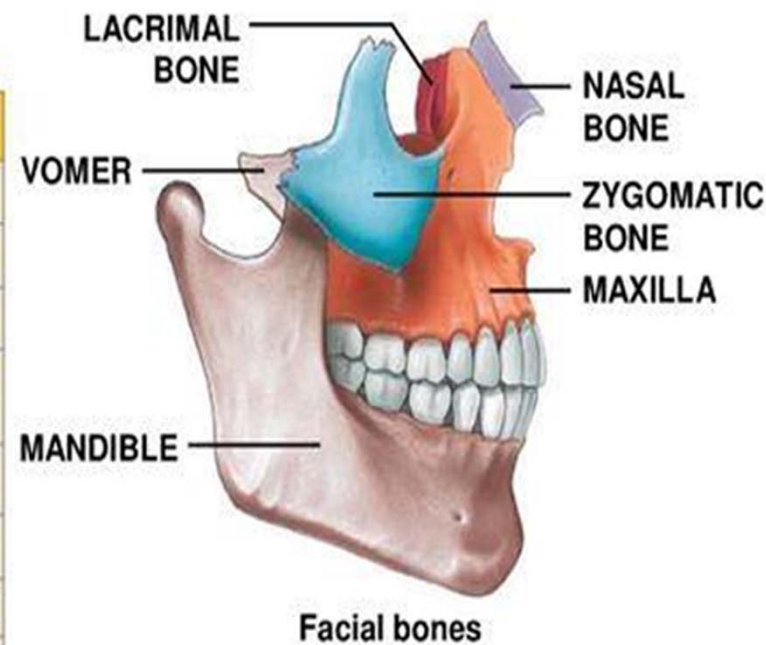
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CRANIUM 8

Occipital bone	1
Parietal bones	2
Frontal bone	1
Temporal bones	2
Sphenoid	1
Ethmoid	1

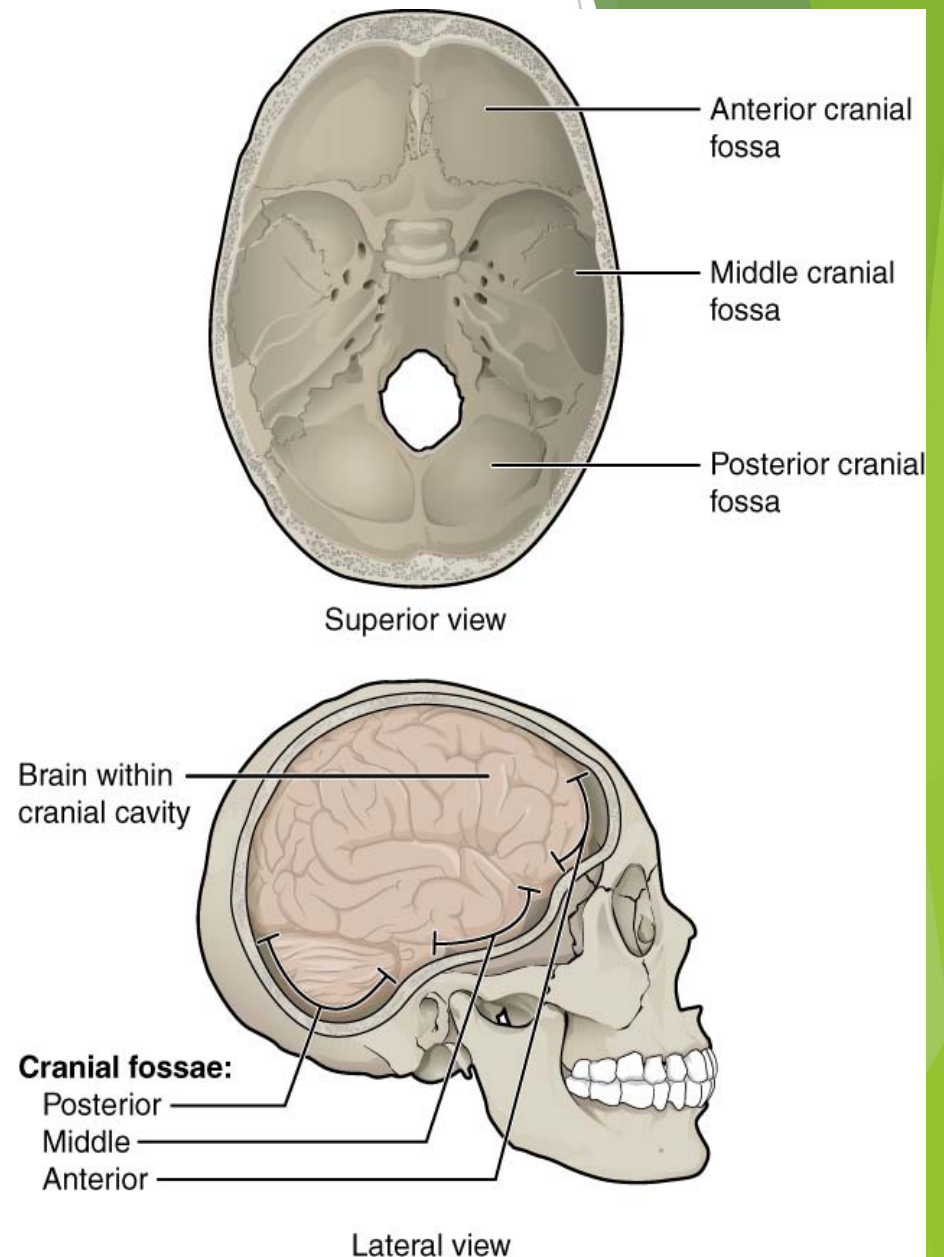
FACE 14

Maxillae	2
Palatine bones	2
Nasal bones	2
Inferior nasal conchae	2
Zygomatic bones	2
Lacrimal bones	2
Vomer	1
Mandible	1



Cranial Cavity

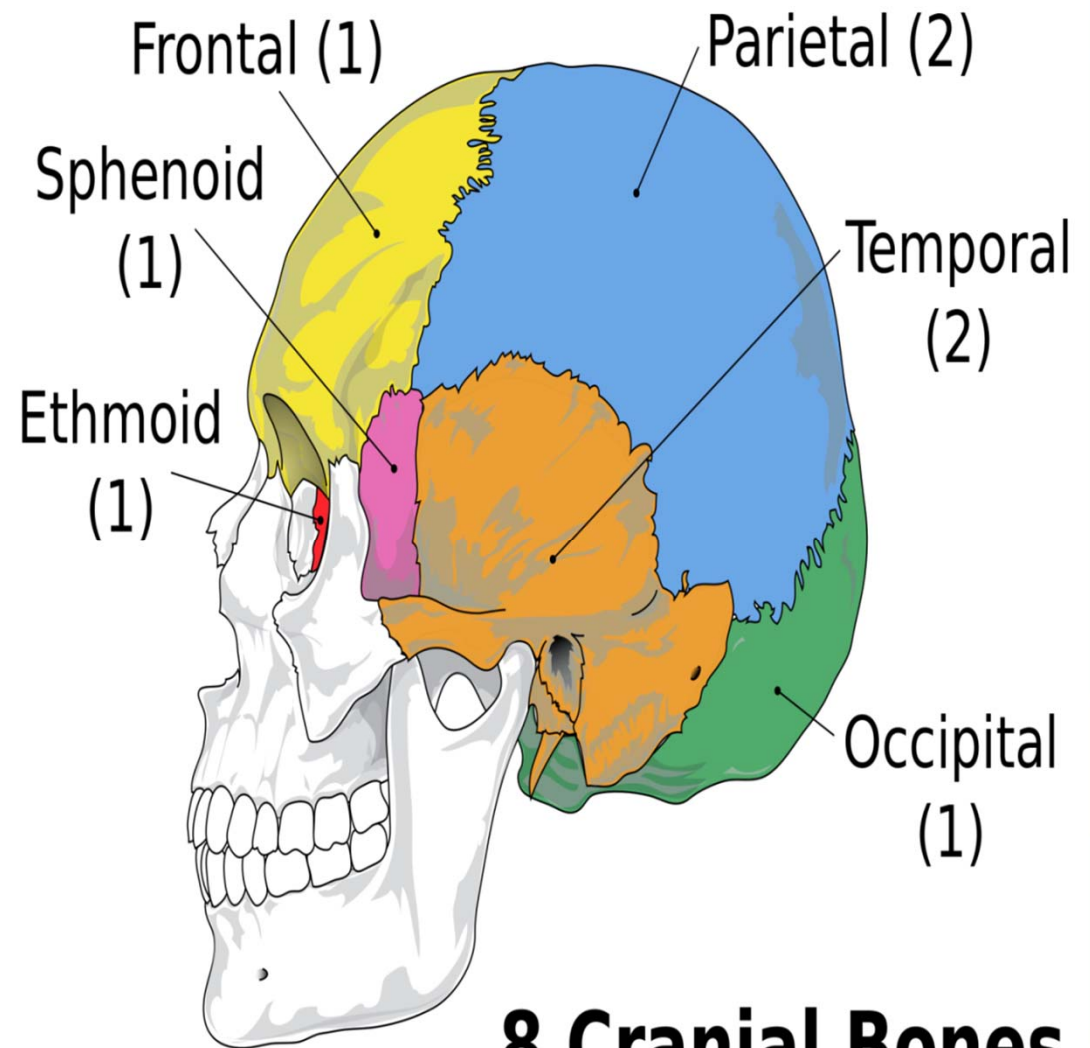
- * The inside view of cranium is known as **cranial cavity**.
- * The cranial cavity contains the brain and its surrounding meninges, portions of the cranial nerves, arteries, veins, and sinuses.



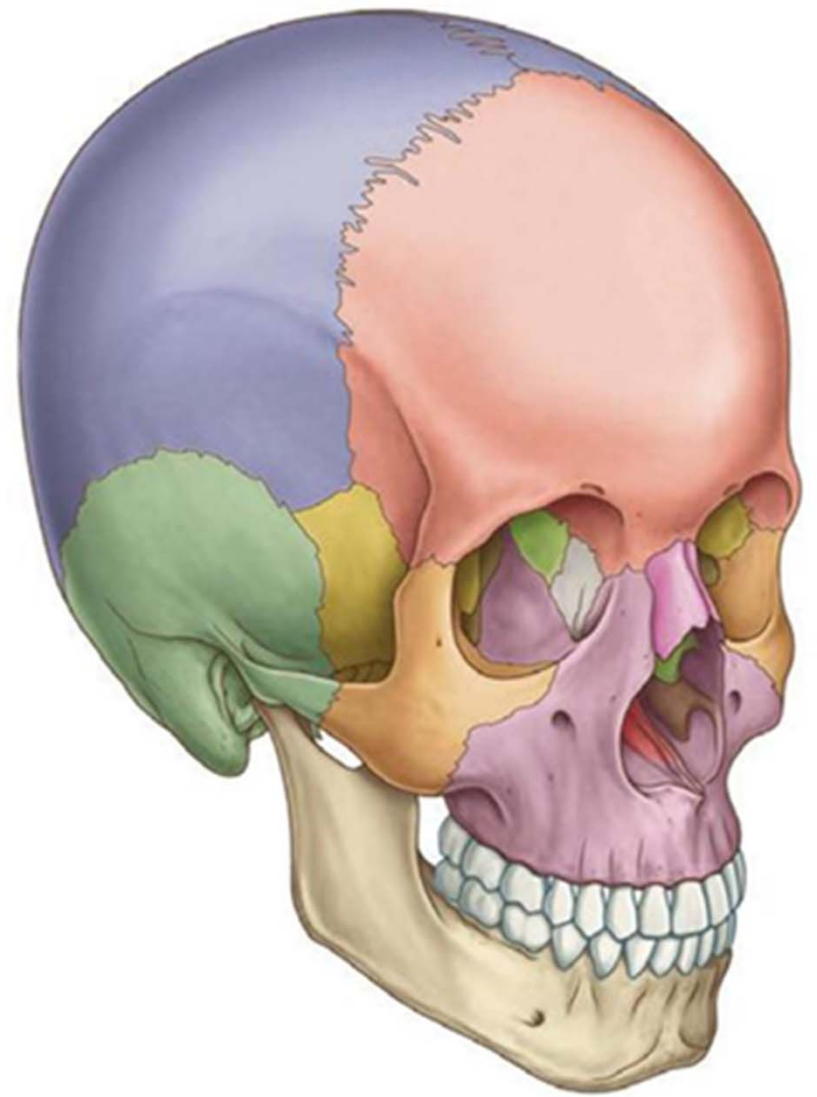
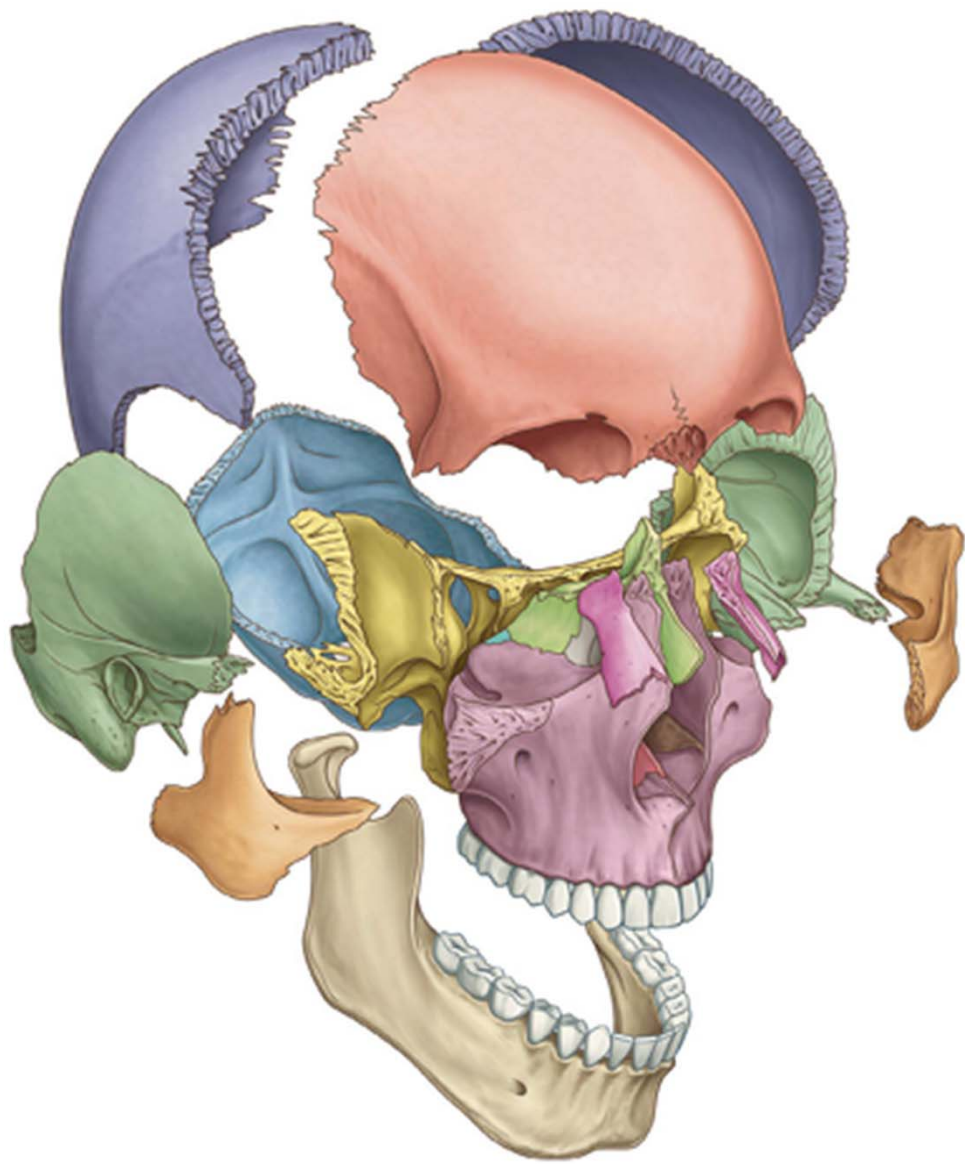
Bones that make up the cranial cavity

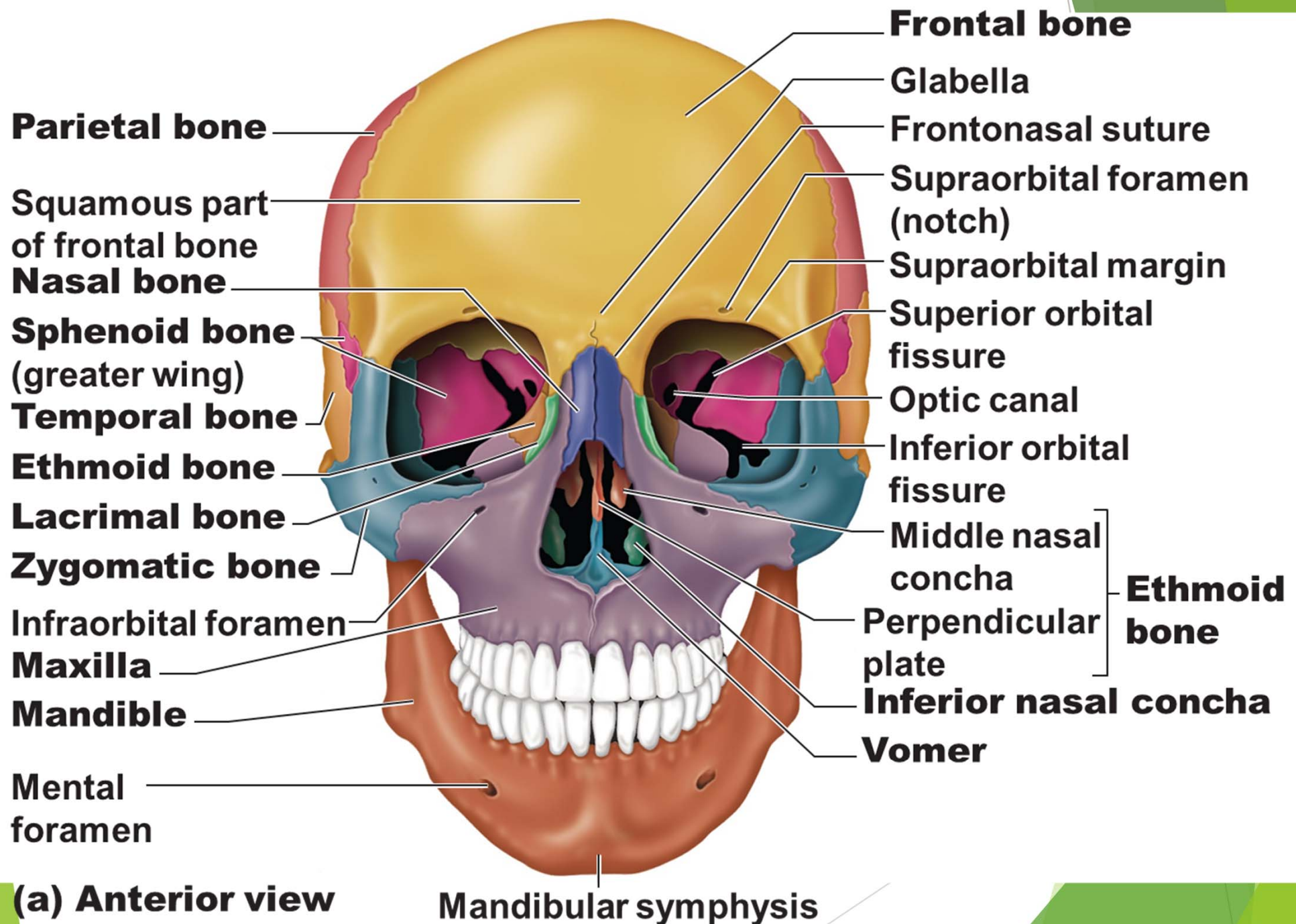
Cranial cavity is formed by 8 cranial bones:

- 1-Frontal.
- 2-Occipital.
- 3-Sphenoid.
- 4-Ethmoid.
- 5-Parietal (2 bones).
- 6-Temporal (2 bones).

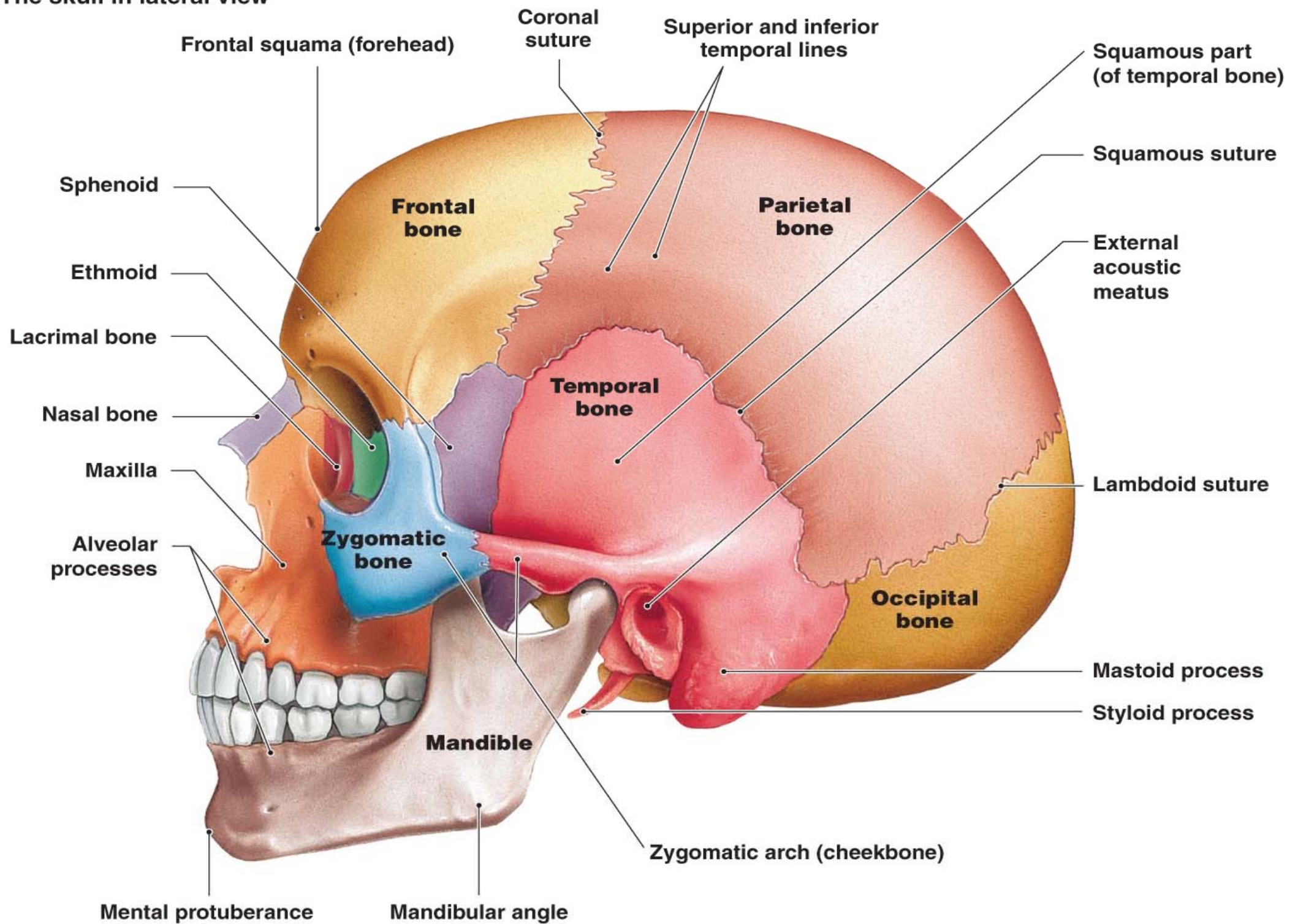


8 Cranial Bones





The skull in lateral view



The interior base of the skull

It is divided into three cranial fossae:

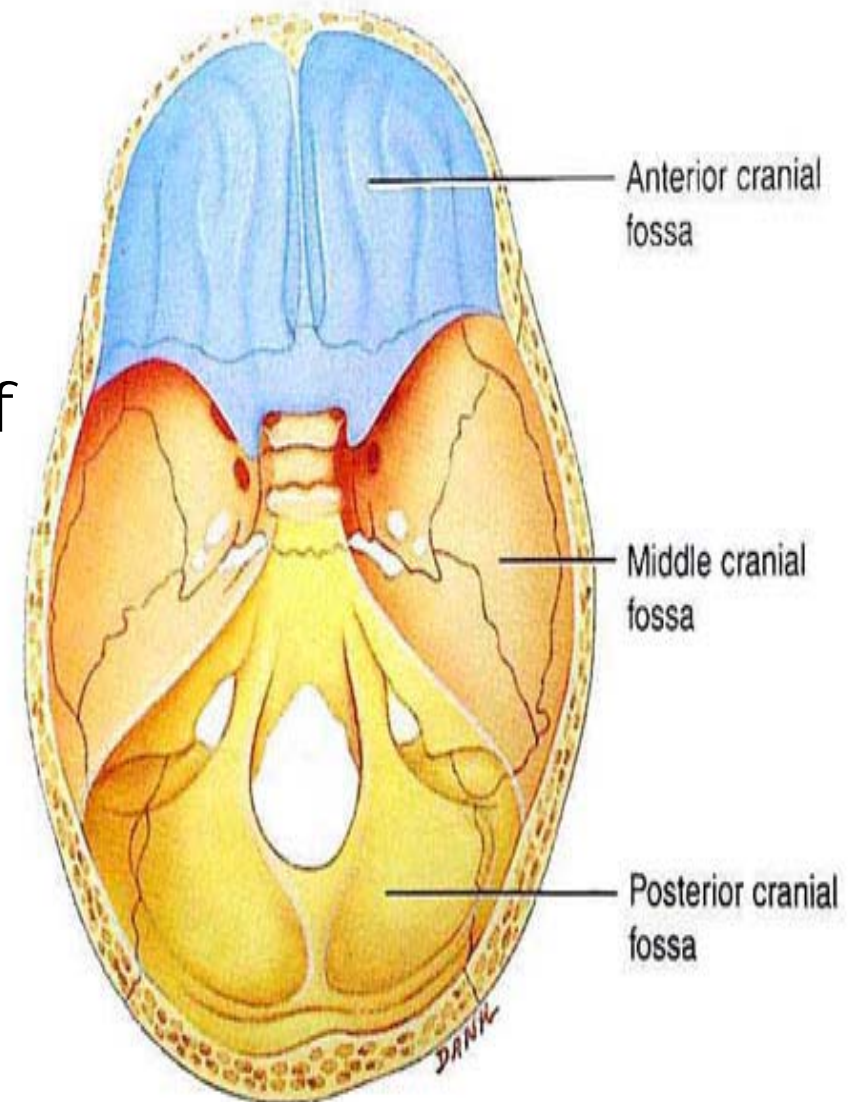
1- Anterior. 2- Middle. 3- Posterior.

The anterior cranial fossa

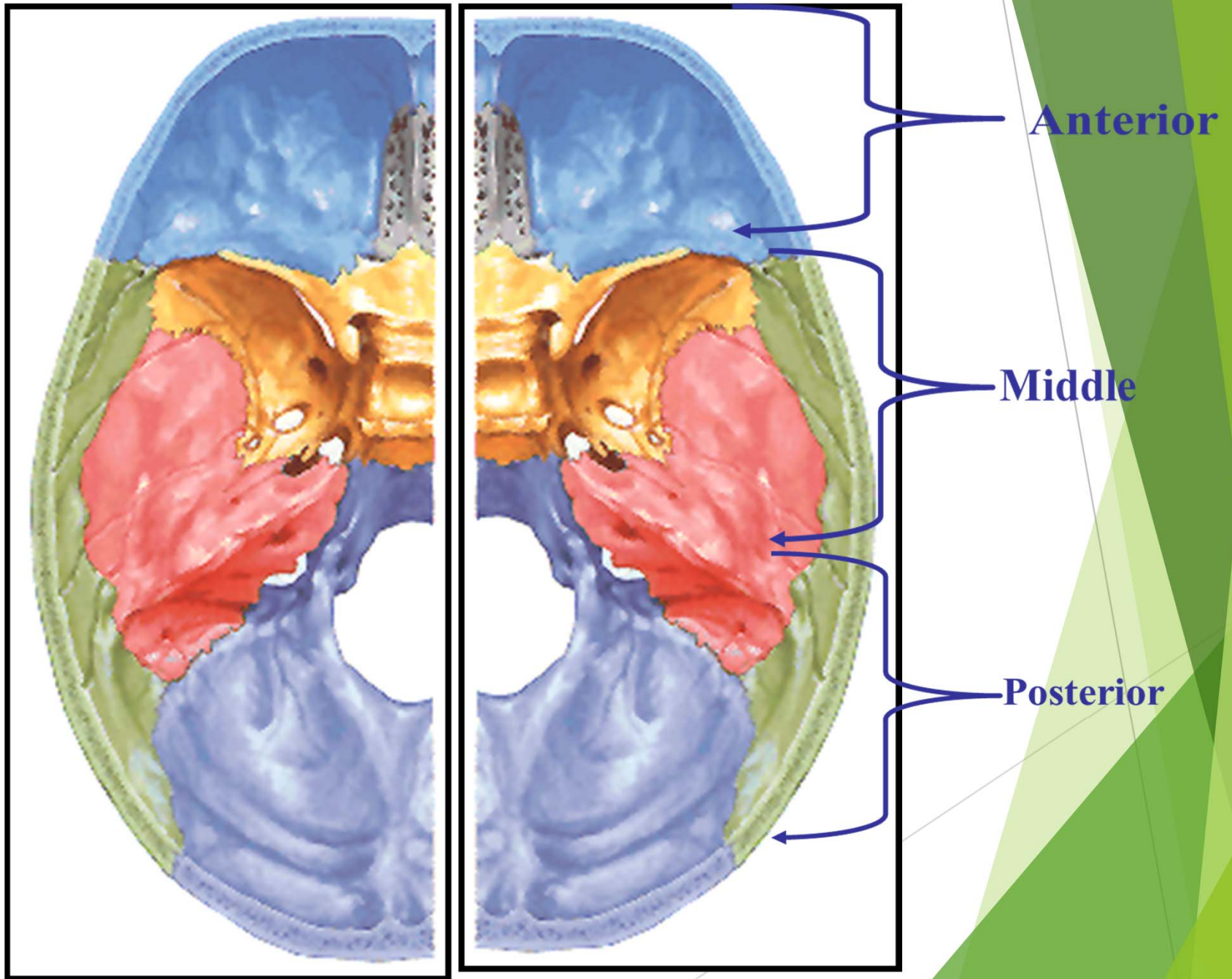
Is separated from the middle cranial fossa by the lesser wing of the sphenoid.

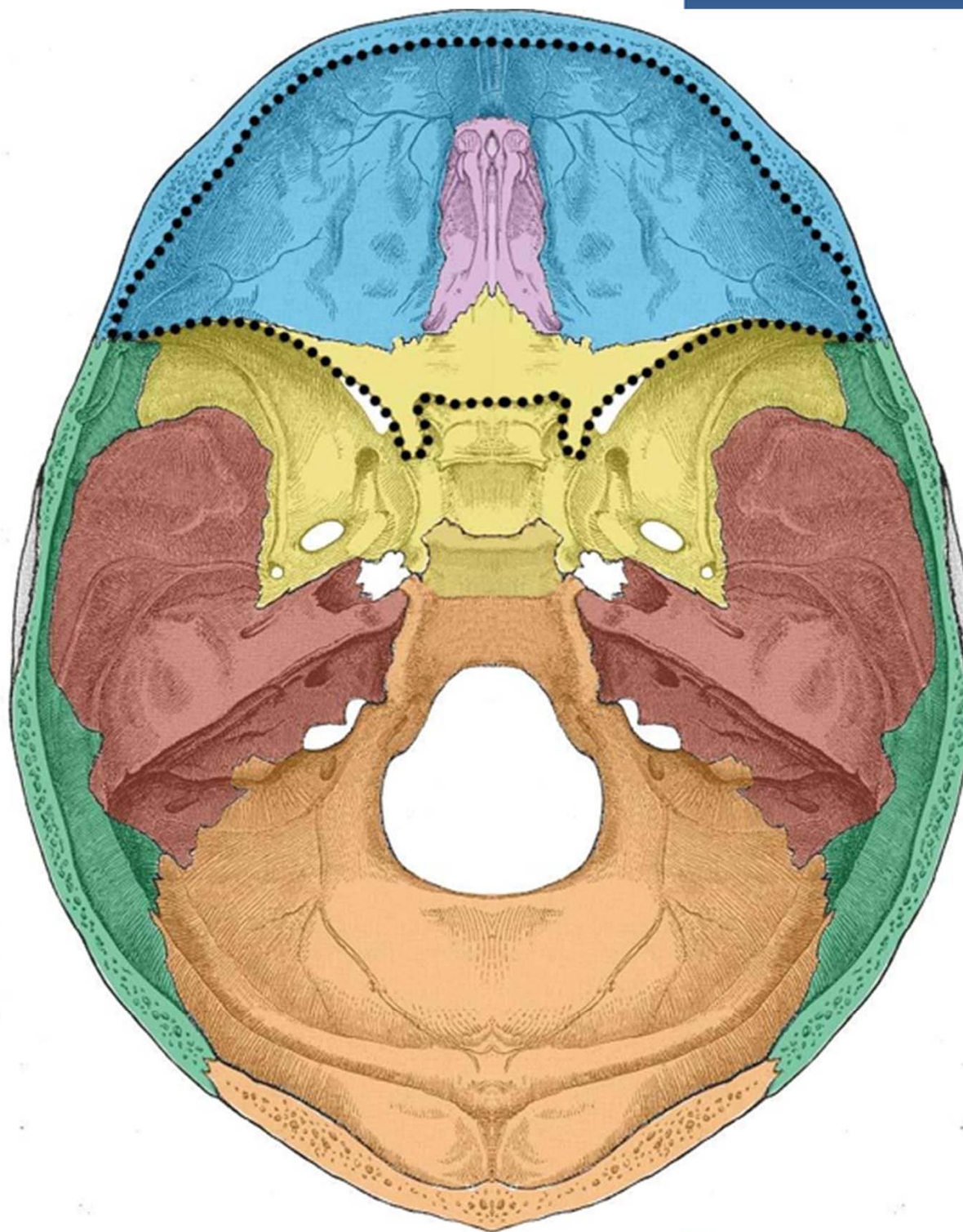
The middle cranial fossa


Is separated from the posterior cranial fossa by the petrous part of the temporal bone.



CRANIAL FOSSAE





	Frontal
	Ethmoid
	Sphenoid
	Temporal
	Parietal
	Occipital

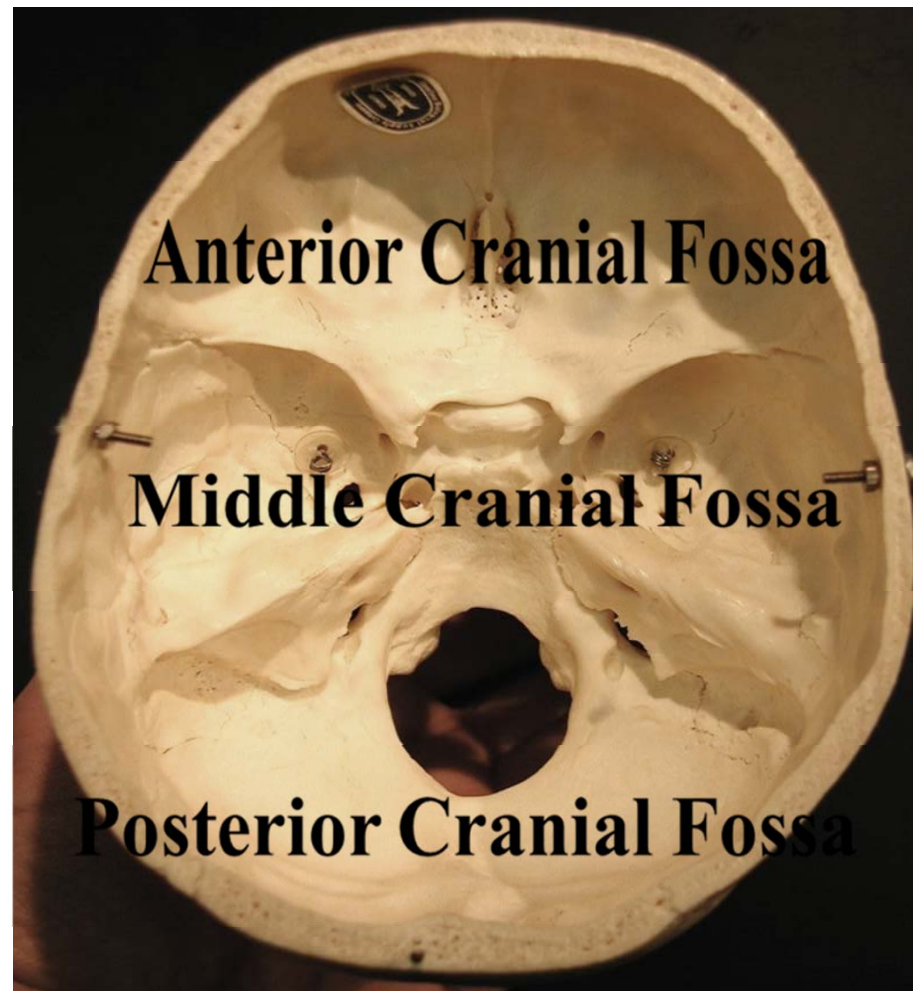
in anterior cranial
fossa

articulates with

- Ethmoid
- sphenoid bone.

Posterior cranial fossa

Is much shallower and wider than the middle cranial fossa and it accommodates the occipital lobes of the brain.

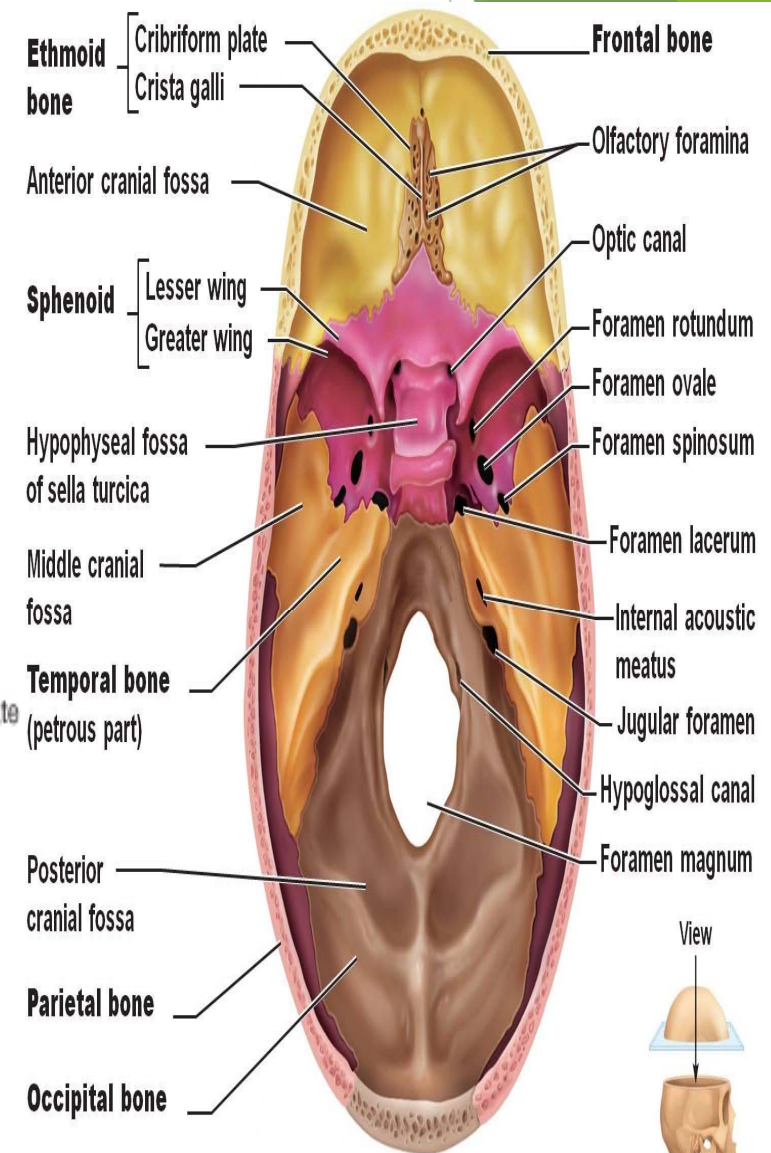
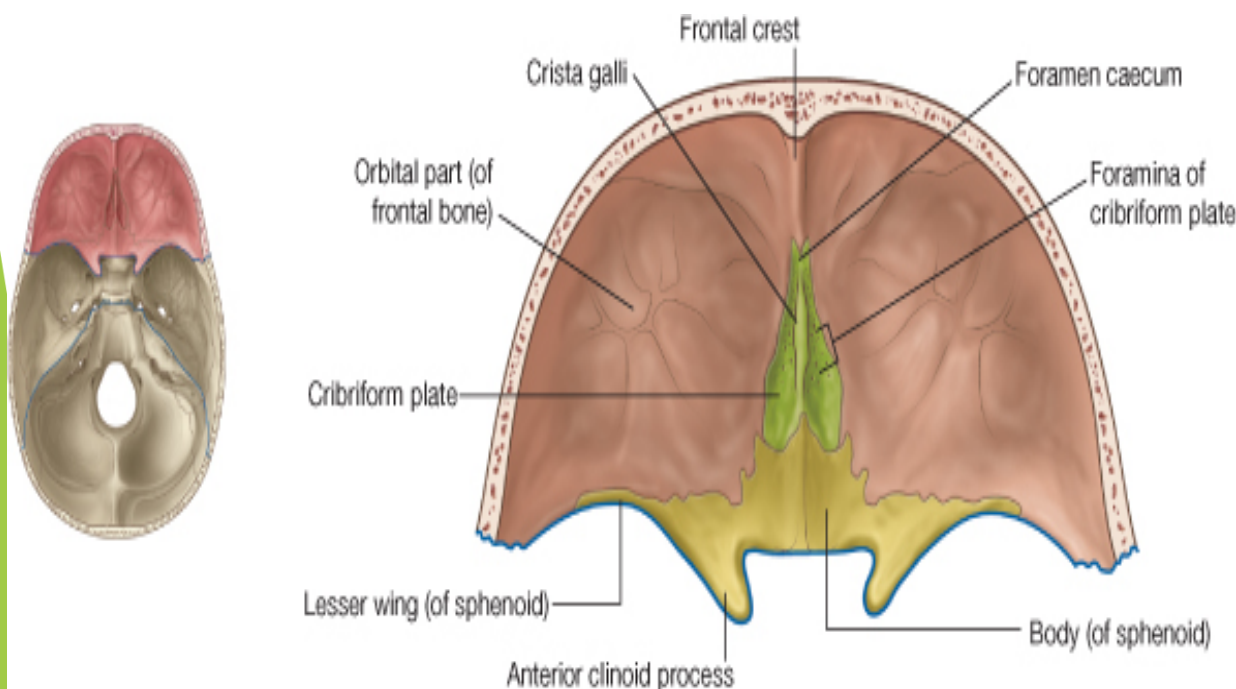


Anterior Cranial Fossa

Anterior cranial fossa which accommodates the anterior lobe of brain.

The floor of the fossa is formed by:

1. Orbital plates of the frontal bone
2. Cribriform plate of the ethmoid .



(a) Superior view of the skull, calvaria removed

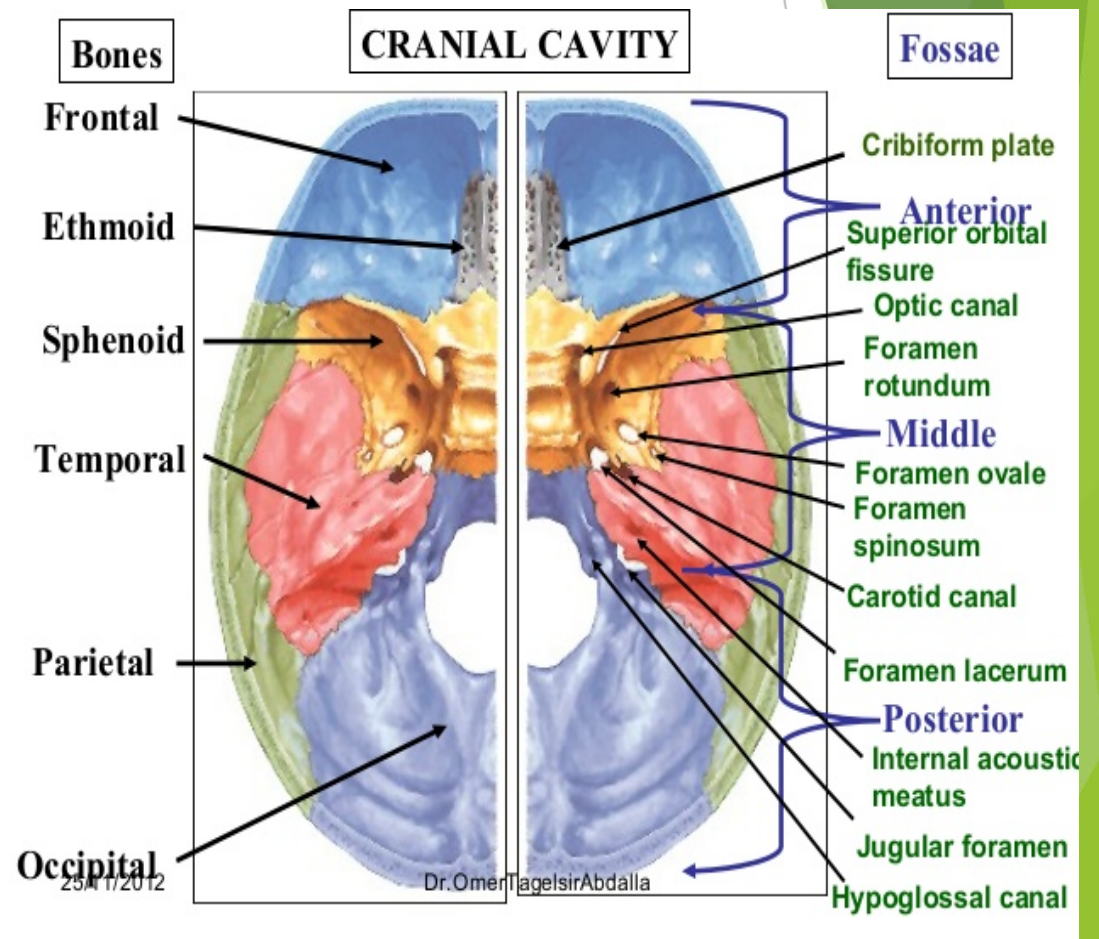
Middle Cranial Fossa

Middle cranial fossa, much wider than the anterior cranial fossa contain the 2 temporal lobes of brain.

median raised part is formed by body of the sphenoid

expanded lateral parts formed by:

- 1- Squamous parts of the temporal bones.
- 2- Greater wings of the sphenoid bone.
- 3- Parietal bones.



Foramens of middle cranial fossa

1-Optic canal Optic nerve, ophthalmic artery

2-Superior orbital fissure Lacrimal, frontal, oculomotor, trochlear, nasociliary, and abducent

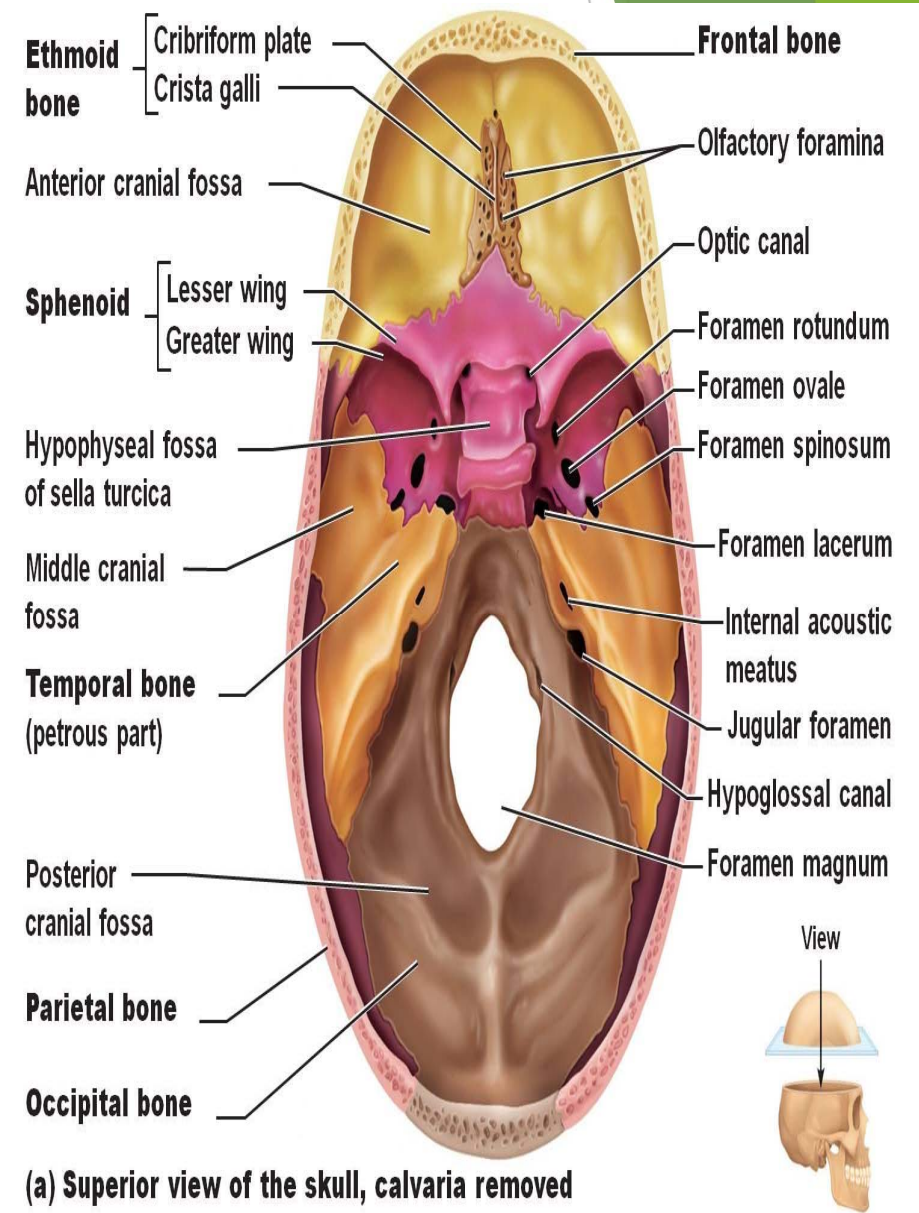
nerves; superior ophthalmic vein

3-Foramen rotundum Maxillary division of the trigeminal nerve

4-Foramen ovale Mandibular division of the trigeminal nerve, lesser petrosal nerve

5-Foramen spinosum Middle meningeal artery

6-Foramen lacerum Internal carotid artery



The Sphenoid Bone

- It articulates with all the other cranial bones, holding them together
- The shape of the sphenoid resembles a butterfly
- It consists of 4 main parts :

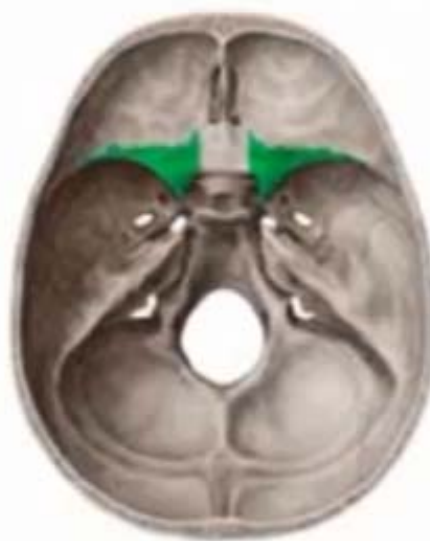
- **The Openings :**

1. Sella turcica
2. Foramen (rotundum/ovale/spinosum/lacerum)
3. Superior orbital fissure
4. Optic canal
5. Sphenoidal sinus

Body



Lesser wing



Greater wing

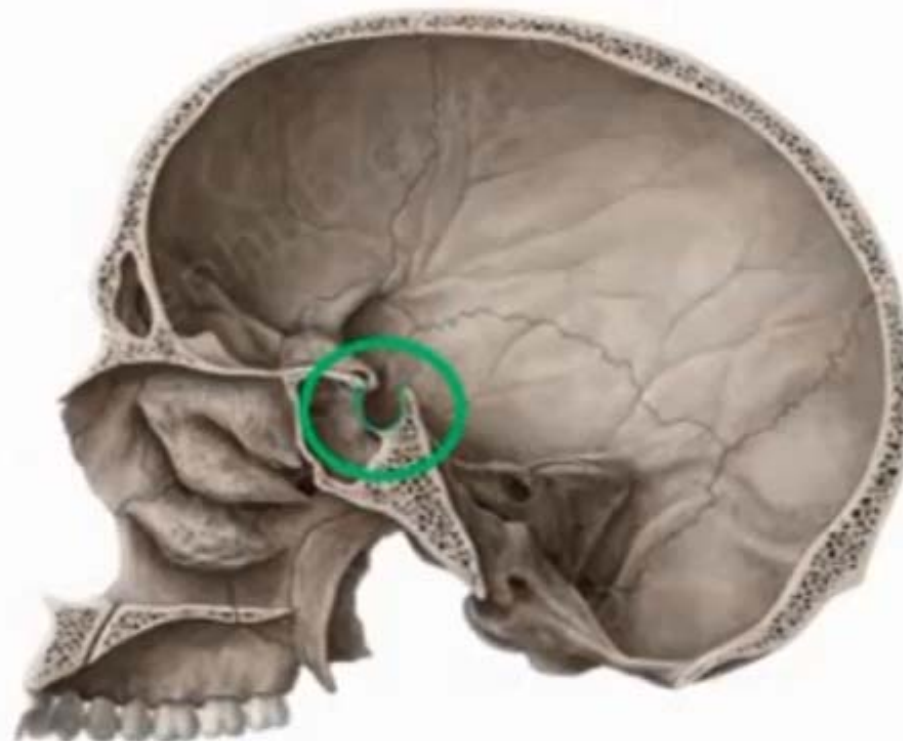


Pterygoid



1-) The Body

- It has a hollow called the Sphenoidal sinus
- It also forms “**Sella Turcica**” which has 3 parts : Tuberculum sellae, Hypophyseal fossa, and the Dorsum sellae
- The Hypophyseal fossa houses the Hypophysis “Pituitary” gland



2-)The Lesser wings

- Between the body and lesser wing is the optic canal through which the optic nerve and artery pass into the orbit



3-)The Greater wings

- Lateral to the body between the greater and lesser wings is a slit called “The superior orbital fissure”
- Blood vessels and cranial nerves pass through this fissure
- The greater wings also contains (Foramen rotundum, Foramen spinosum, Foramen ovale, Foramen lacerum)



4-)The Pterygoid processes

- Extend from the inferior part of the sphenoid bone
- Some of the muscles that move the mandible attach to the pterygoid processes



The Ethmoid Bone

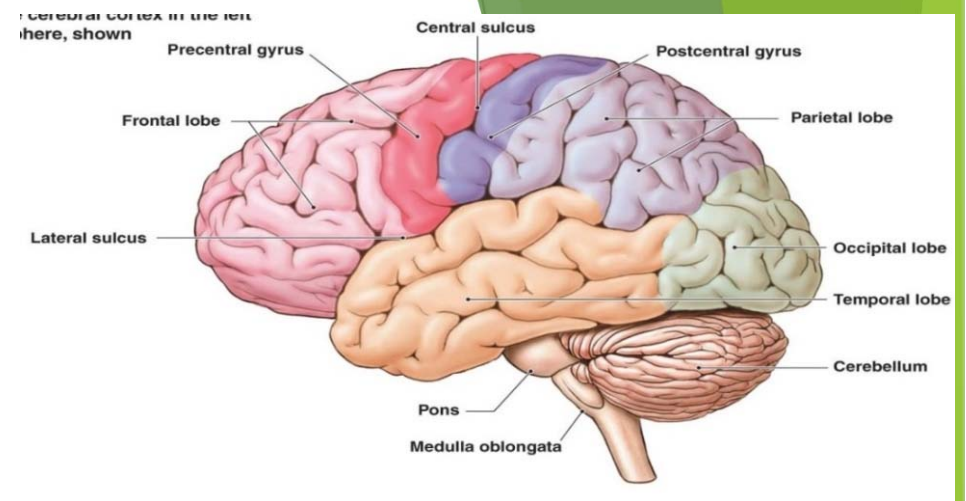
- Sponge-like in appearance
- It has ethmoidal air cells that together form the ethmoidal sinus
- It contains 2 plates : The Perpendicular plate and The Horizontal (Cribriform) plate
- The “Crista Galli” is the top point of the ethmoid bone, it serves as an attachment for the membrane that separates the two sides of the brain
- The Ethmoid bone also contains the three Nasal Conchae “ The superior, middle and inferior”
- Some scientists count the Inferior Nasal Concha as a bone by itself
- **The Openings :**
 1. Olfactory foramina
 2. Ethmoidal sinus



Posterior Cranial Fossa

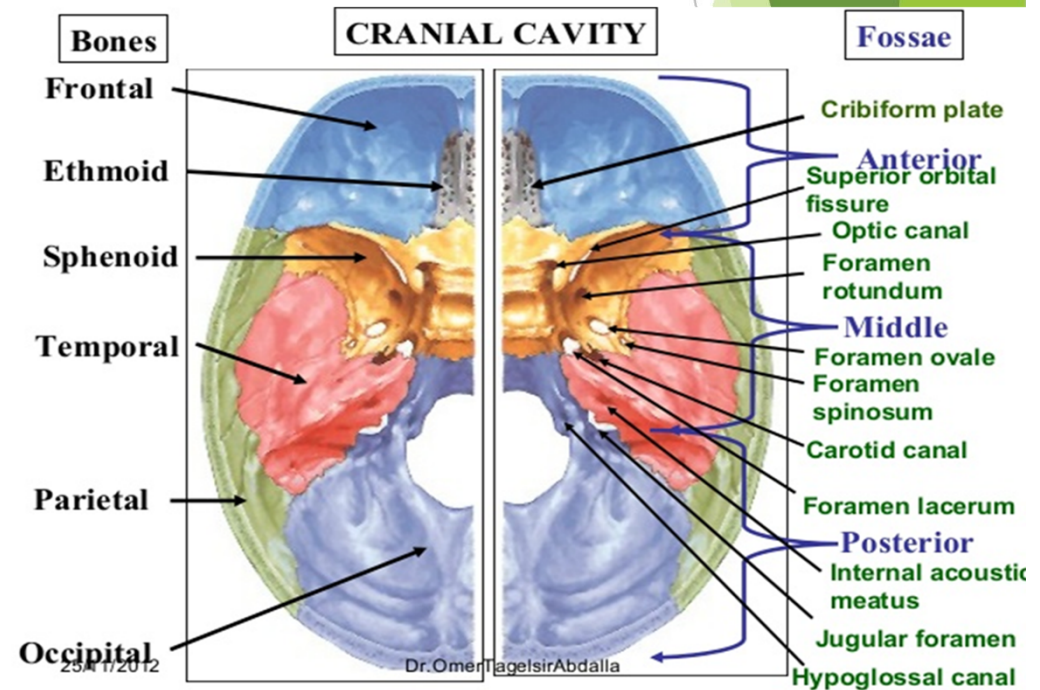
It is deep and contains the:

- 1- Cerebellum.
- 2- Pons.
- 3- Medulla oblongata.



The floor of the posterior fossa is formed by:

- 1- Occipital bone.
- 2- Mastoid part of the temporal bone.



Foramens of posterior cranial fossa

Foramen magnum

Medulla oblongata, spinal part of accessory nerve(XI), right and left vertebral arteries.

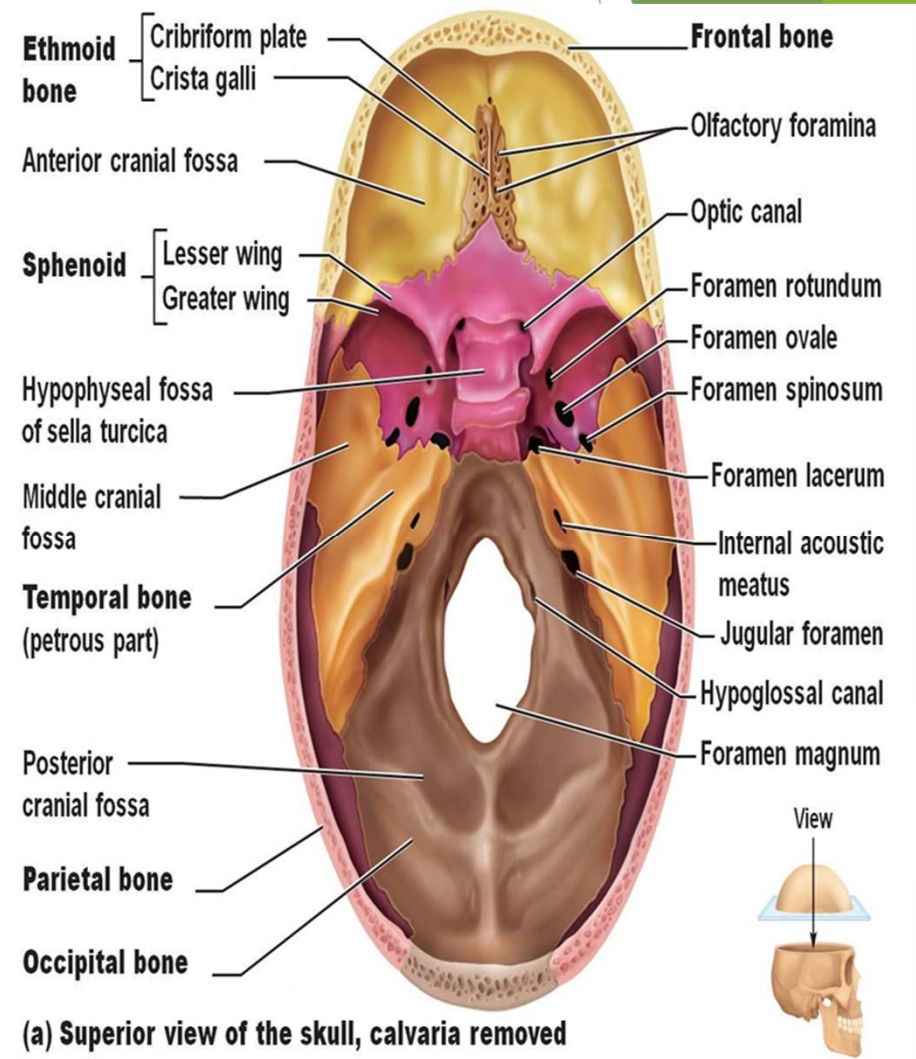
Hypoglossal canal Hypoglossal nerve(XII).

Jugular foramen

Glossopharyngeal (IX), vagus (X), and accessory nerves(XI); internal jugular vein.

Internal acoustic meatus

Vestibulocochlear (VIII) and facial (VII) nerves.



The Meninges

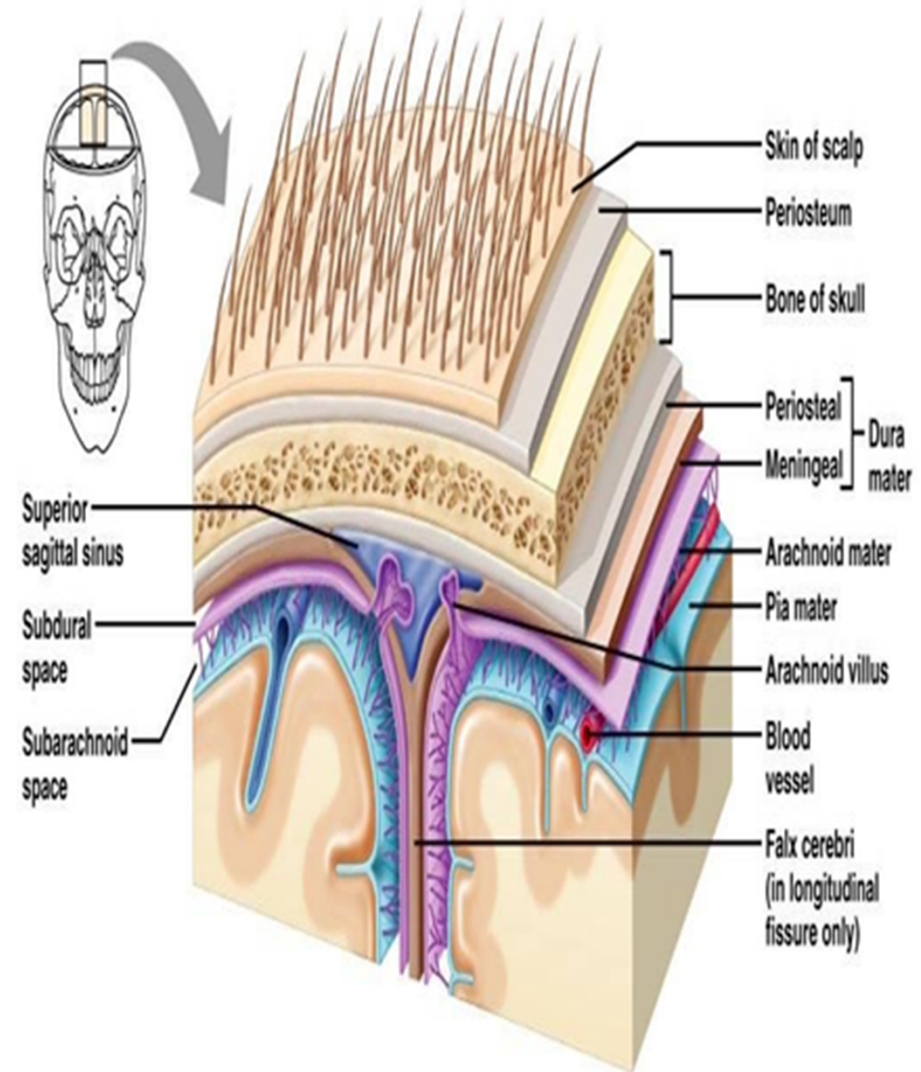
The brain is surrounded by three protective membranes, (meninges):

1- Dura mater.

2-Arachnoid mater.

3-Pia mater.

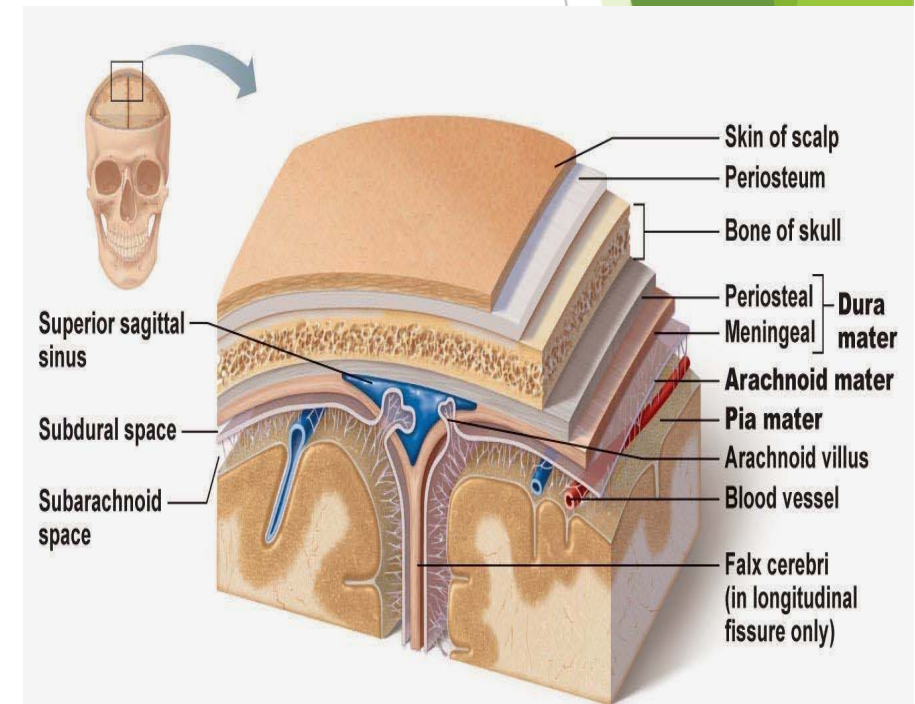
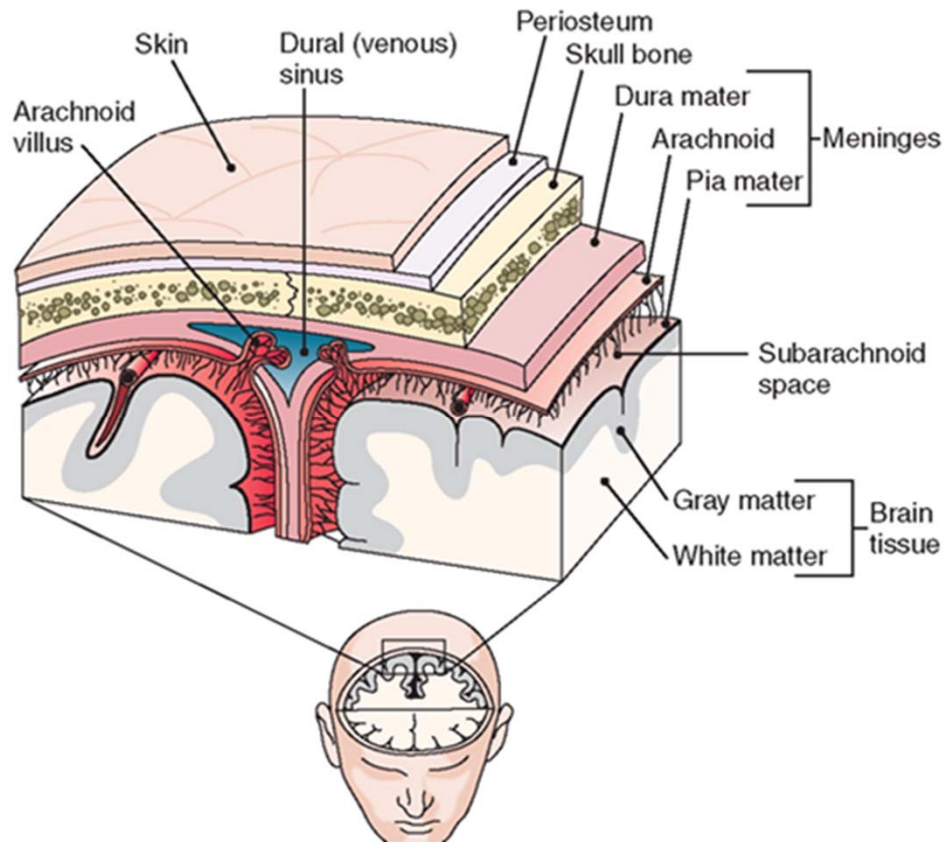
The spinal cord in the vertebral column is also surrounded by three meninges.



Dura Mater of the Brain

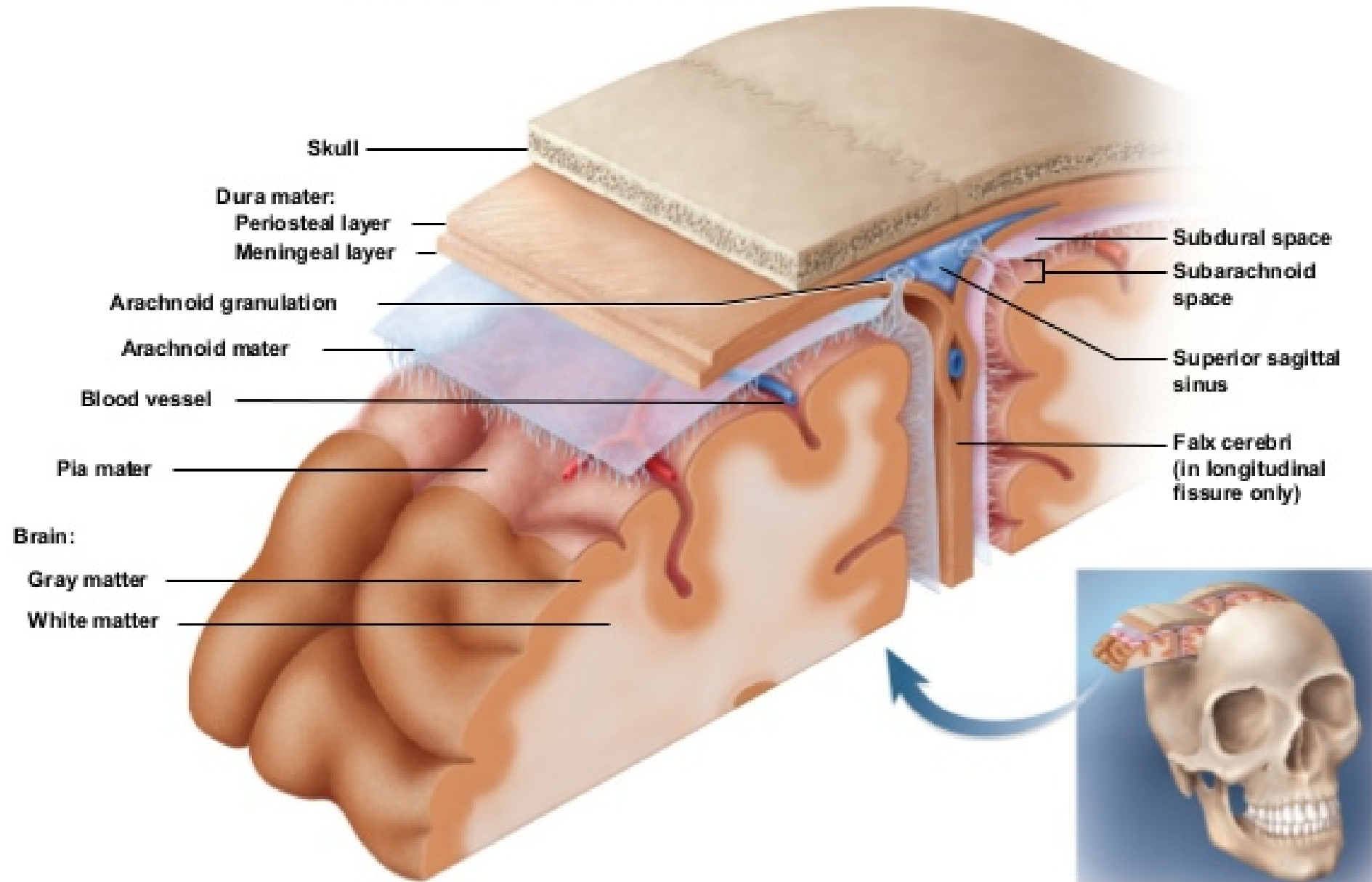
The dura mater is described as two layers:

1. Periosteal layer.
2. Meningeal layer.



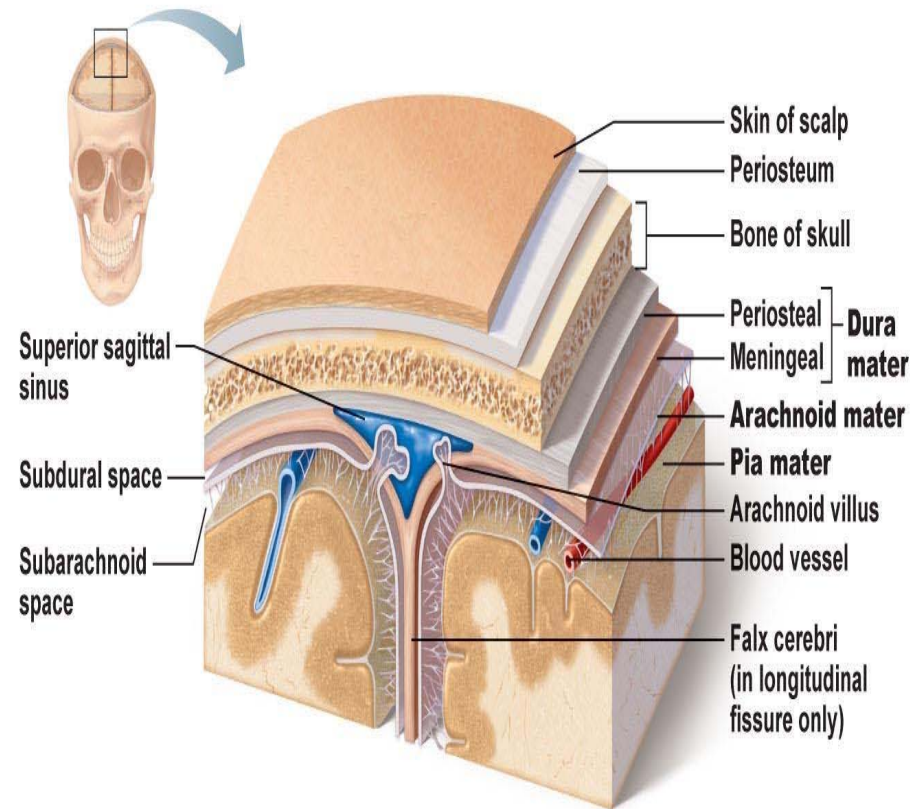
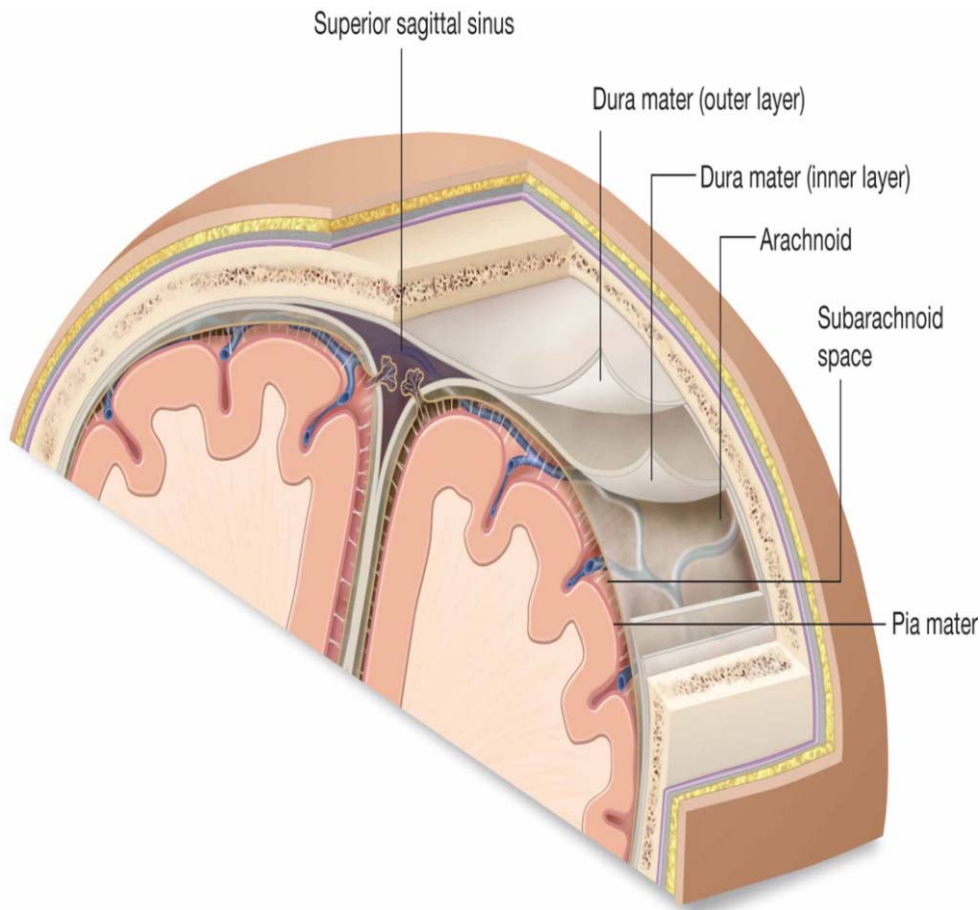
Meninges

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Arachnoid Mater of the Brain

It is separated from dura by subdural space, and from pia by subarachnoid space(filled with cerebrospinal fluid).



Pia Mater of the Brain

Is a vascular membrane that closely invests the brain.

