Interior of the Skull

* The Cranial Cavity

The cranial cavity contains the brain and it's surrounding meninges, portions of the cranial nerves, arteries, veins, and venous sinuses.

1* Internal surface of the *cranial vault* (Vault of the skull):

The internal surface of the vault shows the coronal, sagittal, & lambdoid sutures. In the midline is a shallow sagittal groove that lodges the **superior sagittal sinus**. On each side of the groove the several small pits, called **granular pits**, which lodge the **lateral lacunae** & **arachnoid granulations**.

Several narrow grooves are present for the anterior & posterior divisions of the **middle meningeal vessels** as they pass up the side of the skull to the vault.

2* Internal surface of the *cranial base* (Base of the skull):

The interior of the base of the skull is divided into three cranial fossae : anterior, middle, and posterior.

The anterior cranial fossa is separated from the middle cranial fossa by the lesser wing of the sphenoid , and the middle cranial fossa is separated from the posterior cranial fossa by the petrous part of the temporal bone.

☒ **Anterior Cranial Fossa** : it lodges the **frontal lobes** of the cerebral hemispheres. In the midline is a crest for the attachment of the **falx cerebri**. The floor of the fossa is formed by the ridged orbital plates of the frontal bone laterally & by the **cribriform plate** of the ethmoid medially. The **crista galli** is a sharp upward projection of the ethmoid bone in the midline for the attachment of falx cerebri. Between the crista galli & the crest of the frontal bone is a small aperture, the **foramen cecum,** for the transmission of a small vein from the nasal mucosa to the superior sagittal sinus. The upper surface of the cribriform plate supports the **olfactory bulbs**, & the small perforations in this plate are for the **olfactory nerves**.

☒ **Middle Cranial Fossa** : it consists of a small median part & expanded lateral parts. The median raised part is formed by the body of the sphenoid, & the expanded lateral parts form concavities on either side, which lodge the **temporal lobes** of the cerebral hemispheres.

The floor of each lateral part of the middle cranial fossa is formed by the greater wing of the sphenoid & the squamous & petrous parts of the temporal bone.

The sphenoid bone resembles a bat having a centrally placed **body** with **greater** & **lesser wings** that are outstretched on each side.

The body of the sphenoid contains the **sphenoid air sinuses**, which are lined with mucous membrane & communicate with the nasal cavity; they serve as voice resonators.

Anteriorly, the **optic canal** transmits the optic nerve & the ophthalmic artery (branch of the internal carotid artery) to the orbit. The **superior orbital fissure**, which is a slitlike opening between the lesser & greater wings of the sphenoid, transmits the lacrimal, frontal, trochlear, oculomotor, nasociliary, & abducent nerves, together with the superior ophthalmic vein.

The **foramen rotundum**, which is situated behind the superior orbital fissure, perforates the greater wing of sphenoid & transmits the maxillary nerve from the trigeminal ganglion to the pterygopalatine fossa.

The **foramen ovale** lies posterolateral to the foramen rotundum. It transmits the mandibular division of the trigeminal nerve to the infratemporal fossa; & the lesser petrosal nerve.

The small **foramen spinosum** lies posterolateral to the foramen ovale. It transmits the middle meningeal artery from the infratemporal fossa into the cranial cavity.

The large & irregularly shaped **foramen lacerum** lies between the apex of the petrous part of the temporal bone & the sphenoid bone (in life it's filled by cartilage & fibrous tissue). It transmits the internal carotid artery from the cranial cavity to the neck.

The **carotid canal** opens into the side of the foramen lacerum. The internal carotid artery enters the foramen through the carotid canal.

Lateral to the foramen lacerum is an impression for the **trigeminal ganglion**.

The median part of the middle cranial fossa is formed by the body of the sphenoid bone. In front is the **sulcus chiasmatis**, which is related to the optic chiasma & leads laterally to the **optic canal** on each side. Posterior to the sulcus is an elevation, the **tuberculum sellae**. Behind the elevation is a deep depression, the **sella turcica,** which lodges the **hypophysis cerebri** (the pituitary gland).
The sella turcica is bounded posteriorly by a square plate of bone called the **dorsum sellae**. The superior angles of the dorsum sellae have two tubercles, called the **posterior clinoid processes**, which give attachment to the fixed margin of the tentorium cerebelli.

The **cavernous sinus** is directly related to the side of the body of the sphenoid. It carries in it's lateral wall the **third** (oculomotor) & **fourth** (trochlear) cranial nerves & the ophthalmic & mxillary divisions of the **fifth (**trigeminal) cranial nerve. The internal carotid artery & the **sixth** (abducent) cranial nerve pass forward through the sinus.

☒ **Posterior Cranial Fossa** : it's deep & lodges the parts of the hindbrain, namely, the **cerebellum**, **pons**, & **medulla oblongata**.

The *floor* of the posterior fossa is formed by the parts of the occipital bone & the mastoid part of the temporal bone.

The *roof* of the fossa is formed by a fold of dura, the **tentorium cerebelli**, which intervenes between the cerebellum below & the occipital lobes of the cerebral hemispheres above.

The **foramen magnum** occupies the central area of the floor & transmits the medulla oblongata & it's surrounding meninges, the ascending spinal parts of the accessory nerves, and the two vertebral arteries.

The **hypoglossal canal** is situated above the anterolateral boundary of the foramen magnum & transmits the **hypoglossal nerve**.

The **jugular foramen** lies between the petrous part of the temporal bone & the condylar part of the occipital bone. It transmits the **inferior petrosal sinus**; the **ninth** (glossopharyngeal), **tenth** (vagus), & **eleventh** (accessory)cranial nerves; & the large sigmoid sinus, which turns down through the foramen to become the **internal jugular vein**.

The **internal acoustic meatus** pierces the petrous part of the temporal bone. It transmits the **eighth** (vestibulocochlear) & **seventh** (facial) cranial nerves.

* The Venous Blood Sinuses

The venous sinuses of the cranial cavity are blood-filled spaces situated between the layers of the dura mater, they have *no* valves. They receive tributaries from the brain, the diploe of the skull, the orbit, and the internal ear.

The superior sagittal sinus, occipital sinus, inferior sagittal sinus, straight sinus, transverse sinuses, sigmoid sinuses, cavernous sinuses, the superior & inferior petrosal sinuses are examples.

{THE MENINGES}

The brain and spinal cord are surrounded by three membranes, or meninges : the dura mater, the arachnoid mater, and the pia mater.

* Dura Mater of the Brain

It's conventionally described as two layers : the endosteal layer and the meningeal layer. These are closely united except along certain lines, where they separate to form venous sinuses.

The endosteal layer is the ordinary periosteum covering the inner surface of the skull bones. It *dose not* extend through the foramen magnum to become continuous with the dura mater of the spinal cord. It is most strongly adherent to the bones over the base of the skull.

The meningeal layer is the dura mater proper. It is a dense, strong, fibrous membrane covering the brain & is continuous through the foramen magnum with the dura mater of the spinal cord. It provides tubular sheaths for the cranial nerves as they pass through the foramina in the skull.
The meningeal layer sends inward *four septa* that divide the cranial cavity into freely communicating spaces lodging the subdivisions of the brain.
The function of these septa is to restrict the rotatory displacement of the brain.

The **falx cerebri** is a sickle-shaped fold of dura mater that lies in the midline between the two cerebral hemispheres.

The **tentorium cerebelli** is a crescent-shaped fold of dura mater that roofs over the posterior cranial fossa.

The **falx cerebelli** is a small, sickle-shaped fold of dura mater that projects forward between the two cerebellar hemispheres.

The **diaphragma sellae** is a small circular fold of dura mater that forms the roof for sella turcica.

* Arachnoid Mater of the Brain

It's a delicate, impermeable membrane covering the brain & lying between the pia mater internally & the dura mater externally. It's separated from the dura by a potential space, the **subdural space**, and from the pia by the **subarachnoid space**, which is filled with **cerebrospinal fluid (C.S.F.)**.
In certain areas the arachnoid projects into the venous sinuses to form ***arachnoid villi*** which serve as sites where the c.s.f. diffuses into the blood- stream.
Aggregations of arachnoid villi are referred to as ***arachnoid granulations*.**

* Pia Mater of the Brain

It's a vascular membrane that closely invests the brain, covering the gyri and sulci. It extends over the cranial nerves & cerebral arteries entering the brain.