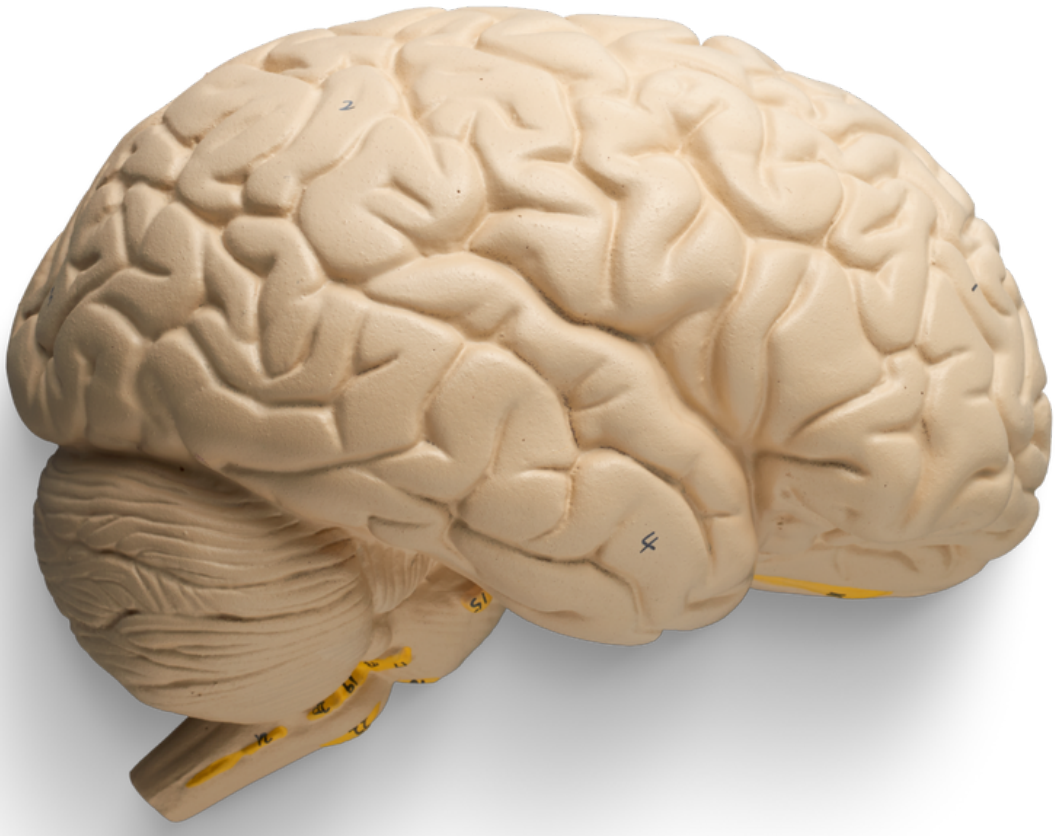
Nadine Rampf, PhD

1st Edition

Neuroanatomy Practical Manual

for Health Science and Human Anatomy Students



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Neuroanatomy Practical Manual

for Health Science and Human Anatomy Students

1st Edition

Nadine Rampf, PhD

Division of Clinical Anatomy

Faculty of Medicine and Health Sciences

Stellenbosch University

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Table of Content

Section 1

General Information and Procedures

General Information and Procedures

The purpose of this manual is to guide students through the practical dissection component of their Neuroanatomy module in a systematic fashion. The practical component of the module provides students with a "hands-on" opportunity to study the human central nervous system.

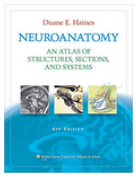
This manual will be used in conjunction with the following practical materials:

- **Articulated and disarticulated human skeletons**
  Each group will receive a bone bag containing a full disarticulated skeleton. Fully articulated skeletons will also be available in the dissection halls

- **Whole, hemisected, and sectioned human brain specimens**
  Each group will receive two brain buckets: one containing a full brain and the other a hemisected brain. In addition, students will also be provided with a series of coronal-, and horizontal brain sections.

- **Demonstration specimens and models**
  Museum and prosected brain specimens and models will be made available in the dissection halls during most practical sessions. The specimens and models on display will change between practical sessions. It is advised that students view and identify the relevant structures during the practical, as the specimens and models will be removed after the session.

Recommended Neuroanatomy Atlas



Duane E. Haines
Neuroanatomy: An Atlas of Structures, Sections, and Systems
8th Edition
Lippincott

PLEASE NOTE: It is essential that you bring a neuroanatomy atlas (print or digital format) with you to your practical session. It serves as a roadmap to your practical session – without it, you will be lost!

Online Resources

Throughout this manual, links have been provided to online resources. Use these resources as an aid to the practical session and to gain a 3D appreciation of the structures being studied.

General Information and Procedures

The online resources referenced throughout this practical manual are predominantly from the following sources:

- Functional Neuroanatomy - The University of British Columbia
- BlueLink - The University of Michigan Medical School
- Brain-Inter-Atlas - Université Catholique de Louvain (UCLouvain)
- Sketchfab

You also have access to **Anatomy.tv** through the Faculty of Medicine and Health Sciences Library. Anatomy.tv is an interactive educational resource that gives users access to interactive visuals of anatomy structures and systems that can be manipulated to be viewed in 3D. The visuals are accompanied by multimedia tutorials. Please make use of this powerful resource. Explore the 3D real-time and 3D atlas features.

Refer to the following sections for the purposes of your neuroanatomy module:

- Head and Neck
- Spine

Images from Primal Pictures, BlueLink, Brain-Inter-Atlas, and The University of British Columbia (coronal and horizontal sections) may be used in your online spot (practical) test. Please familiarize yourself with these online resources and make sure that you can identify all the structures listed in the checklist for each section.
All structures included in the checklist may be tested in your spot test.

Neuroanatomy Dissection Videos

Each section of this manual (expect section 2) has an accompanying dissection video that demonstrates the structures that you will have to identify during the particular practical session. Please watch these videos before each practical.

3D Models

Links to online 3D brain models have been provided throughout this practical manual. Please use these models in addition to the brain specimens provided in the dissection halls to identify structures that have been listed in the checklists for each section. **Still images from these models may be used in your spot test.**

General Information and Procedures

You will need to **bring the following with you to each practical session:**

- Neuroanatomy practical manual
- Neuroanatomy atlas
- Gloves and mask
- Dissection kit
- Lecture notes and writing materials
- Laptop, tablet, or smartphone (one device per group)

Before starting the practical, assign roles to each group member; these roles should alternate between sessions. You will need one person that will serve as:

- the reader
- the specimen handler/dissector
- the online resource navigator
- the note taker

Take note of the following:

- Wear a **mask**.
  Due to the close proximity to others in the dissection halls, it is mandatory to wear a mask for the duration of your practical session.

- Always use **gloves** when handling wet brain specimens.
  The brain specimens provided to you for study have been chemically "fixed". The chemicals used for the fixation process are carcinogenic, and as such, it is. advised that gloves are used at all times when handling wet brain specimens.

- **Do not dissect any part of the brain** unless specifically told to do so.

- **Do not use sharp dissection instruments** or probes when looking for or pointing out structures on the brain specimens.

- Handle the brain specimens with **care.**

- Use the **plastic trays** provided for the examination of specimens.
  Remove the brain specimens from the brain buckets and place them on the plastic trays provided for examination.

- **Wet** the brain specimens periodically.
  Remember to periodically moisten the brain specimens while you examine them.

General Information and Procedures

- Use the **biohazard bins** (i.e., the **red bins**) for disposal of any brain parts. Gloves or paper towel that has come into contact with brain material should also be disposed of in the red biohazard containers. **Please do not place any non-hazardous waste in these containers.**

- **Return** the brain specimens to the **original brain bucket** from which it was taken after examination.

- **Clean** your materials and work area at the end of the session. Clean the biohazard material out of the trays and place it in the red biohazard bins. Wash trays and dissection tools with soap and water. Dry trays with paper towels and store them in the designated area in the dissection hall.

- Make sure that the **lids** of the brain buckets are **properly closed,** and wipe down and dry each bucket.

- **Wipe** your benches and push the chairs underneath the table.

IMPORTANT: You will not be allowed to sign the attendance register if your work area is not clean as described above

Section 2

Cranial and Vertebral Osteology

Cranial and Vertebral Osteology

Outcomes

To review the osteology of the human cranium and vertebral column.

Objectives

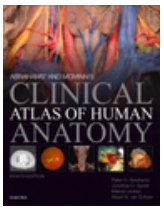
At the end of this session, you should be able to:

- Distinguish between the calvaria and the base of the skull.
- Identify the bones that form the neurocranium.
- Identify the major sutures and craniometric landmarks of the skull.
- Identify the anterior, middle, and posterior cranial fossae
- List the parts of the human brain located in each of the cranial fossae.
- Identify the cranial foramina and list the structures that traverse each.
- Identify and describe the general vertebral structure (i.e., vertebral body, vertebral arch, spinous process, lamina, pedicle, articular and transverse processes).
- Distinguish between typical and atypical vertebrae.
- Distinguish between vertebrae from different regions of the vertebral column (i.e., cervical, thoracic, and lumbar).
- Describe the regional vertebral characteristics.

Materials

- Articulated and disarticulated skeletons in dissection halls.

Resources



Abrahams' and McMinn's Clinical Atlas of Human Anatomy
Eighth Edition
Elsevier
Chapters 1 and 2
Available on ClinicalKey CLICK HERE

Online Resources

BlueLink Images

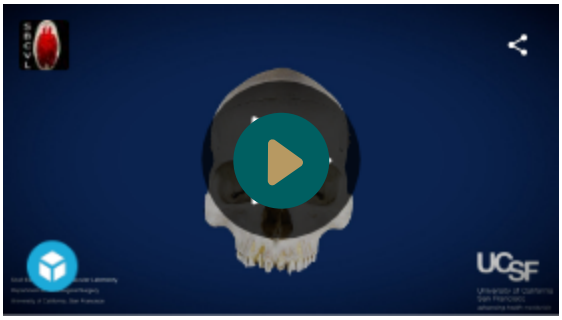
- Cranial cavity, venous sinus, and brain images (labelled)
- Deep back and spinal cord Images (Labelled)

Cranial and Vertebral Osteology

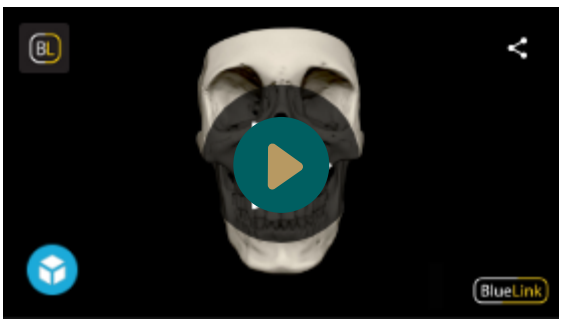
3D Models

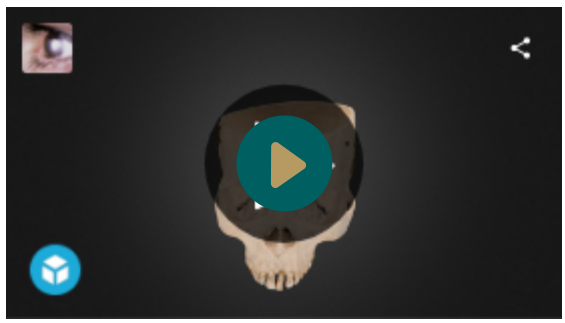
Bones of the Neurocranium

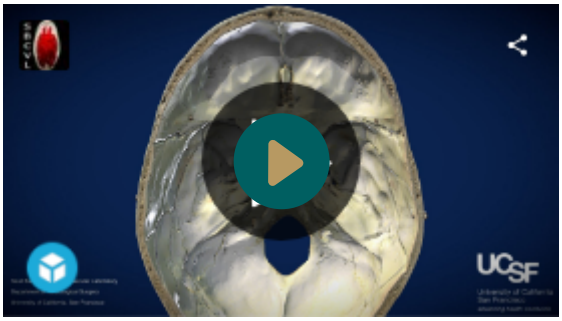
Craniometric Landmarks



Cranial Foramina and Fissures



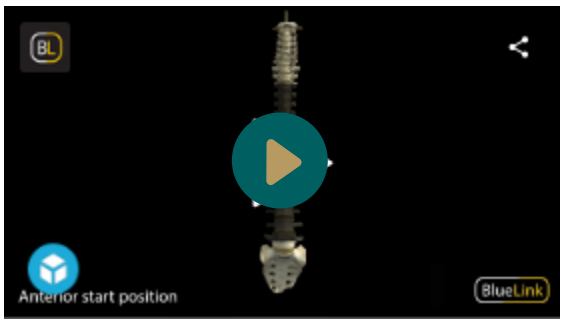




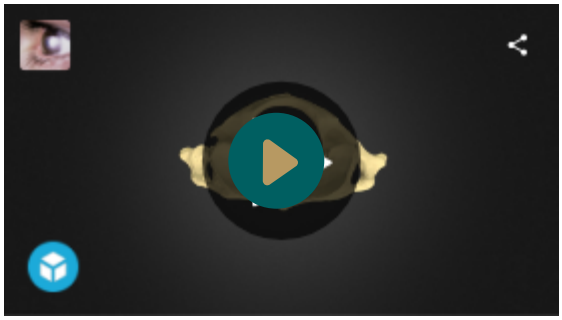
Cranial and Vertebral Osteology

3D Models

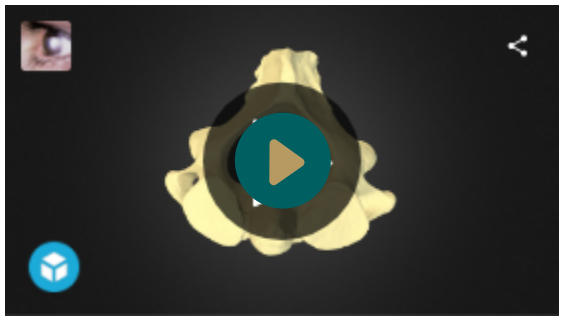
Vertebral Column



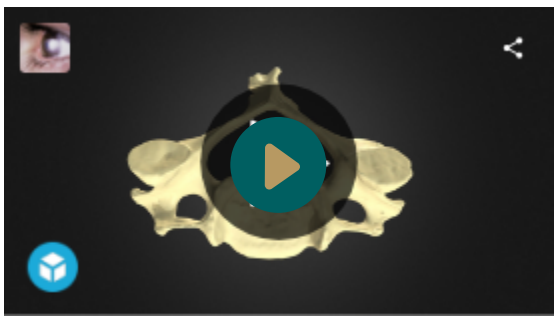
Atlas (C1)



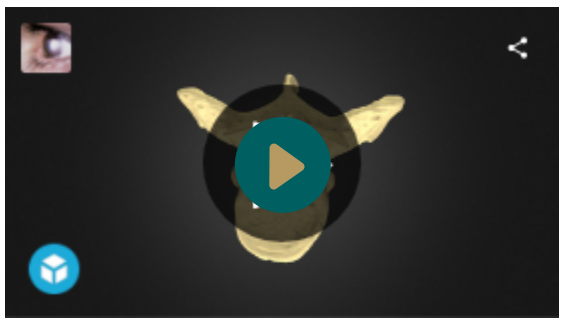
Axis (C2)



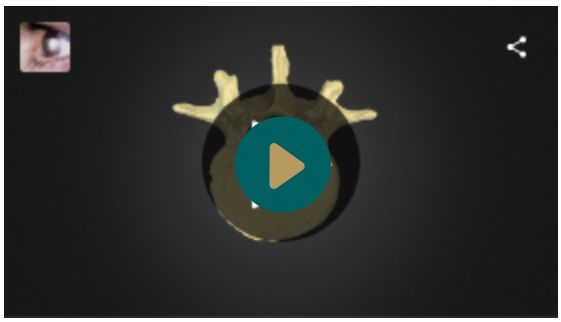
Cervical Vertebra



Thoracic Vertebra



Lumbar Vertebra



Cranial and Vertebral Osteology

List of Structures to Identify

Cranial bones

- [ ] Frontal
- [ ] Parietal (2)
- [ ] Temporal bones (2)
- [ ] Ethmoid
- [ ] Sphenoid
- [ ] Occipital

Sutures

- [ ] Coronal
- [ ] Sagittal
- [ ] Lambdoid
- [ ] Squamosal
- [ ] Parietomastoid

Landmarks

- [ ] Bregma
- [ ] Lambda
- [ ] Pterion
- [ ] Asterion
- [ ] Inion
- [ ] Basion
- [ ] Opisthion
- [ ] Glabella
- [ ] Nasion

Fossae

- [ ] Anterior cranial fossa
- [ ] Middle cranial fossa
- [ ] Posterior cranial fossa

Foramina and Fissures

- [ ] Supra-orbital foramen/notch
- [ ] Infra-orbital foramen
- [ ] Superior orbital fissure
- [ ] Inferior orbital fissure
- [ ] Cribriform plate of ethmoid bone
- [ ] Carotid canal
- [ ] Optic canal
- [ ] Foramen ovale
- [ ] Foramen rotundum
- [ ] Foramen spinosum
- [ ] Foramen lacerum
- [ ] Internal auditory meatus
- [ ] External auditory meatus
- [ ] Hypoglossal canal
- [ ] Jugular foramen
- [ ] Foramen magnum

Cranial and Vertebral Osteology

List of Structures to Identify

Vertebrae

- [ ] Atlas (C1)
- [ ] Anterior and posterior arches of C1
- [ ] Axis (C2)
- [ ] Body and dens of C2
- [ ] Cervical vertebrae (C3 - C7)
- [ ] Thoracic vertebrae (T1 - T12)
- [ ] Lumbar vertebrae (L1 - L5)
- [ ] Sacrum
- [ ] Coccyx
- [ ] Body of vertebrae and position of articular facets for heads of ribs
- [ ] Transverse process and position of articular facet for tubercle of rib
- [ ] Superior and inferior articular processes
- [ ] Laminae
- [ ] Pedicle
- [ ] Spinous process
- [ ] Foramen transversarium
- [ ] Vertebral foramen
- [ ] Intervertebral foramen

Cranial and Vertebral Osteology

Questions

Complete the table below. Provide the cranial fossa location for each of the listed foramina/fissures and the structure/s that traverse (i.e. passing through) it.

Foramen/Fissure	Cranial Fossa	Structure/s Traversing
Superior Orbital Fissure		
Inferior Orbital Fissure		
Cribriform Plate		
Carotid Canal		
Optic Canal		
Foramen Ovale		
Foramen Spinosum		
Foramen Rotundum		
Foramen Lacerum		
Internal Acoustic Meatus		
Hypoglossal Canal		
Foramen Magnum		

Section 3

Gross Anatomy of the Brain

Gross Anatomy of the Brain

Outcomes

To introduce neuroanatomical terminology and the gross external morphology of the human brain.

Objectives

At the end of this session, you should be able to:

- Describe various orientations and planes of section of the human brain (i.e., rostral, caudal, dorsal, ventral, anterior, posterior, superior, inferior, sagittal, coronal, horizontal).
- Identify the following external features of the human brain:
  - cerebrum, cerebellum, brainstem (midbrain, pons, and medulla).
  - frontal, parietal, temporal, occipital, and insular lobes.
  - median longitudinal fissure, lateral sulcus (including opercula), and central sulcus.
  - pre- and postcentral gyri.
  - olfactory tracts and bulbs.
  - optic nerve, optic chiasm, and optic tract.
  - mammillary bodies.
  - crus cerebri.
  - pyramids and olive of the medulla.
- Identify the following features of the human brain observed in a mid-sagittal section:
  - sulci and gyri.
  - frontal, parietal, occipital, temporal, and limbic lobes.
  - precuneus and cuneus.
  - uncus.
  - the corpus callosum (rostrum, genu, body, and splenium).
  - septum pellucidum.
  - parts of the ventricular system (lateral, third, and fourth ventricles, interventricular foramen, cerebral aqueduct).
  - fornix.
  - diencephalon (thalamus, hypothalamus, and epithalamus).

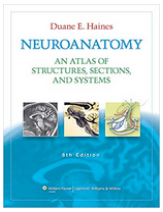
Gross Anatomy of the Brain

- interthalamic adhesion (massa intermedia).
- hypothalamic sulcus.
- anterior commissures.
- lamina terminalis.
- optic chiasm.
- pituitary stalk (infundibulum).
- mammillary body.
- habelula.
- posterior commissure.
- superior and inferior colliculi.
- brainstem (midbrain, pons, and medulla).
- tegmentum.
- cerebellum.

Materials

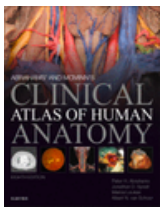
- Whole and hemisected human brains in dissection hall.

Resources



Haines DE. Neuroanatomy: An Atlas of Structures, Sections and Systems
Eight Edition
Lippincott
Chapter 2

CLICK HERE



Abrahams' and McMinn's Clinical Atlas of Human Anatomy
Eighth Edition
Elsevier
Chapters 1 and 2
Available on ClinicalKey

CLICK HERE

Gross Anatomy of the Brain

Online Resources

University of British Columbia (VR and 3D resources)

- Holobrain WebVR
- 3D Neuroanatomy Models
- 3D reconstructions

Université Catholique de Louvain (UCLouvain)

- Brain-Inter-Atlas: Interactive Brain Atlas

  Refer to the following sections:
  - Introduction
  - Telencephalon

BlueLink Practical and Images

- Cranial cavity, venous sinuses and brain LabLink
- Cranial cavity, venous sinus and brain images (labelled)

Dissection Video

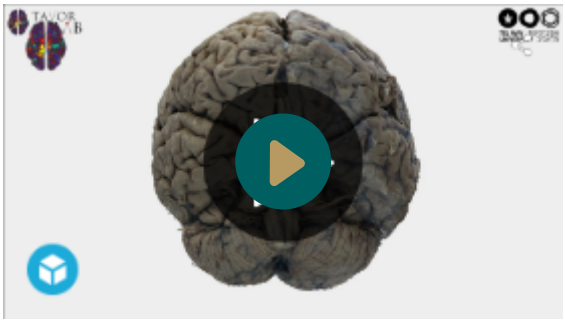
Introduction to the Human Brain (14 minutes)

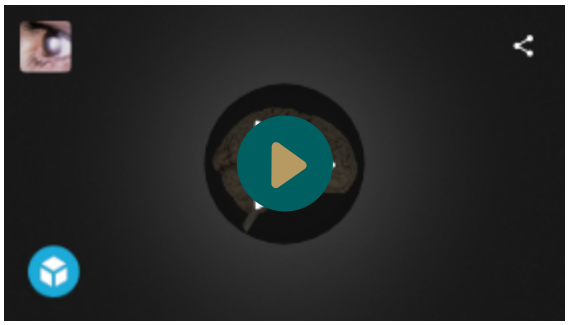
The regions and lobes of the brain are identified along with some of the nerves and vessels. The basic functions of the cortex of each lobe are introduced along with principal sulci and gyri. The importance of the left hemisphere for language and the temporal lobe in memory are mentioned along with the concept of cortical localization. A classical frontal section is used to demonstrate gray and white matter along with the primary internal structures.

Gross Anatomy of the Brain

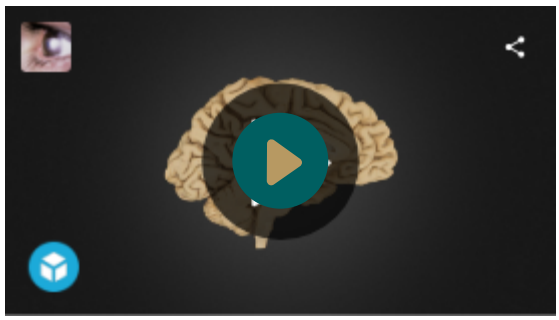
3D Models

Whole Brain

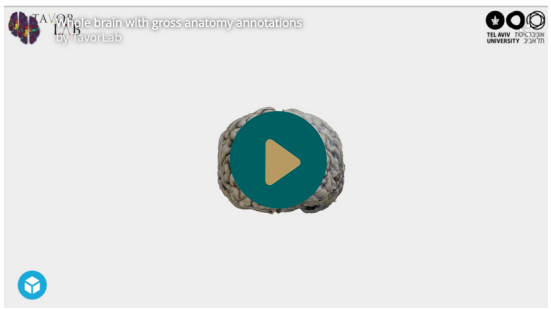


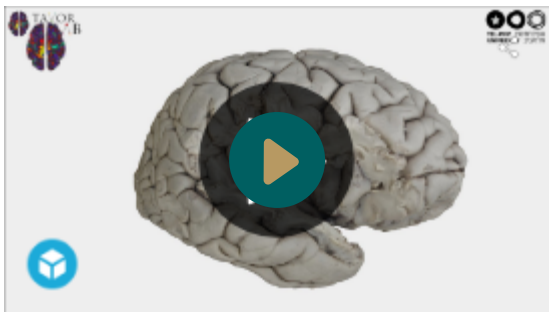


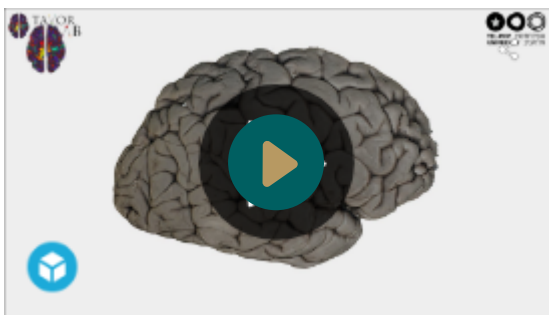
Hemisected Brain

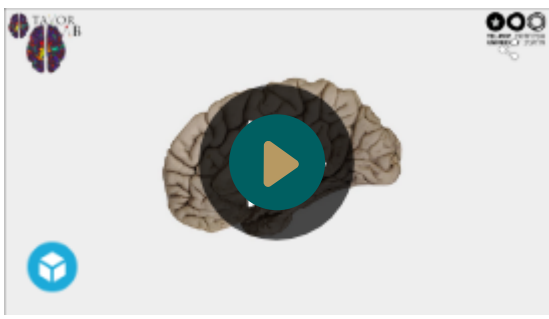


Lobes





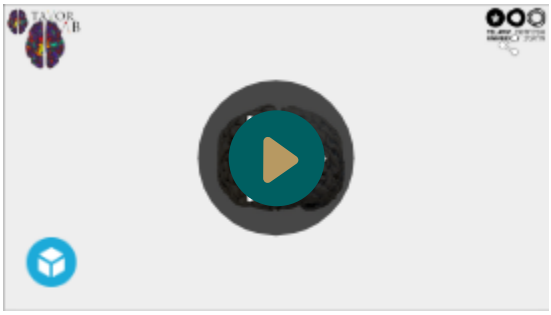


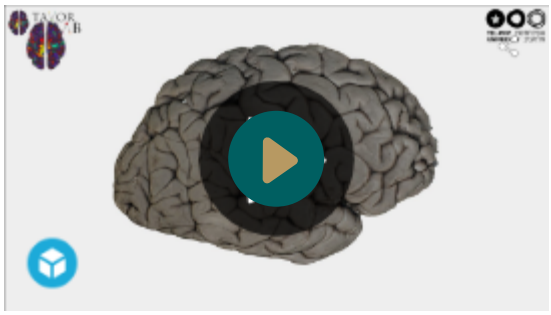


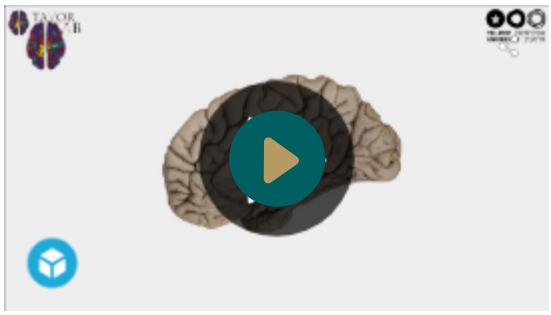
Gross Anatomy of the Brain

3D Models

Sulci and Gyri







Gross Anatomy of the Brain

Planes and Axes

Remove the whole brain specimen from the bucket and use it to familiarize yourself with the various neuroanatomical orientations, planes, and axes.

Identify each of the following surface on your whole brain specimen

- Dorsal/superior - top of the head in the human upright position
- Ventral/inferior - base of the brain or towards the neck
- Rostral/anterior - toward the front of the brain, i.e., in the direction of the forehead or nose
- Caudal/posterior - toward the buttock or the tail

Take note of the directionality of these surfaces and planes as it relates to the brainstem and spinal cord.

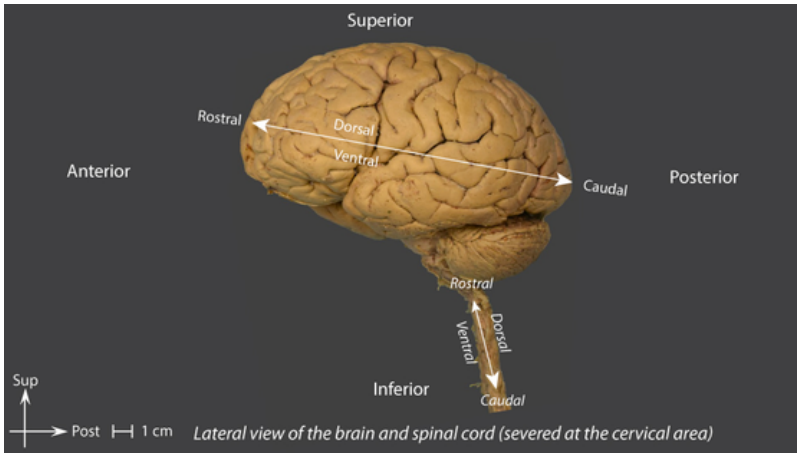


Image source: https://sites.uclouvain.be/braininteratlas/en/chapter/introduction#slideshow-4

Familiarize yourself with the following planes of section:

- Coronal
- Sigittal
- Mid-sagittal
- Horizontal/Axial

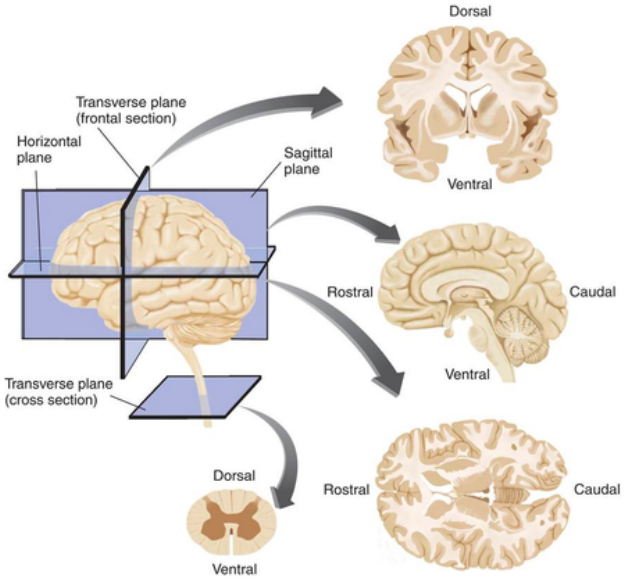


Image source: https://biology-forums.com/index.php?action=gallery;sa=view;id=21064

Gross Anatomy of the Brain

Planes and Axes Video

Orientation: The Planes of the Brain (8 minutes)

Terms such as anterior, posterior, inferior, and superior are introduced with respect to the hemispheres as well as the brain stem. Terms such as rostral and caudal or dorsal and ventral can mean different things in different areas. Sections in three planes (frontal, axial, and sagittal) are demonstrated on gross specimens along with key features, including the ventricular system.

Gross Anatomy of the Brain

List of Structures to Identify

Poles and Surfaces

- [ ] Anterior/Frontal pole
- [ ] Posterior/Occipital pole
- [ ] Temporal pole
- [ ] Dorsal/Superior surface
- [ ] Ventral/Inferior surface
- [ ] Lateral surface
- [ ] Medial surface

Lobes

- [ ] Frontal
- [ ] Parietal
- [ ] Temporal
- [ ] Occipital
- [ ] Insula*
- [ ] Limbic*

Divisions

- [ ] Cerebrum/Telencephalon
- [ ] Diencephalon
  - [ ] Thalamus
  - [ ] Hypothalamus
  - [ ] Subthalamus
  - [ ] Epithalamus
- [ ] Brainstem
  - [ ] Midbrain
  - [ ] Pons
  - [ ] Medulla
- [ ] Cerebellum

Gross Anatomy of the Brain

List of Structures to Identify

Superolateral Surface

- [ ] Longitudinal fissure
- [ ] Central sulcus
- [ ] Precentral gyrus
- [ ] Precentral sulcus
- [ ] Postecentral gyrus
- [ ] Postcentral sulcus
- [ ] Lateral/Sylvian fissure
- [ ] Preoccipital notch

Ventral Surface

- [ ] Olfactory bulb
- [ ] Olfactory tract
- [ ] Optic nerve
- [ ] Optic chiasm
- [ ] Optic tracts
- [ ] Infundibulum
- [ ] Mammillary bodies
- [ ] Crus cerebri
- [ ] Interpeduncular fossa
- [ ] Midbrain
- [ ] Uncus
- [ ] Parahippocampal gyrus
- [ ] Pons
- [ ] Medulla
- [ ] Pyramids
- [ ] Olive

Medial Surface

- [ ] Cingulate sulcus
- [ ] Cingulate gyrus
- [ ] Corpus callosum
- [ ] Septum pellucidum
- [ ] Lateral ventricle
- [ ] Interventricular foramen
- [ ] Fornix
- [ ] Diencephalon
- [ ] Thalamus
- [ ] Interthalamic adhesion
- [ ] Hypothalamus
- [ ] Mammillary body
- [ ] Anterior commissure
- [ ] Posterior commissure
- [ ] Superior colliculus
- [ ] Inferior colliculus
- [ ] Third ventricle
- [ ] Cerebral aqueduct
- [ ] Fourth ventricle
- [ ] Midbrain
- [ ] Tegmentum
- [ ] Pons
- [ ] Medulla
- [ ] Parieto-occipital sulcus
- [ ] Calcarine sulcus
- [ ] Parahippicampal gyrus
- [ ] Uncus

Gross Anatomy of the Brain

Questions

Name the lobe located anterior to the central sulcus.

Name the lobe located posterior to the central sulcus.

What divides the occipital lobe from the parietal lobe on:

a) the lateral surface of the cortex?

b) the medial surface?

Name the gyrus "capping" the caudal end of the lateral fissure.

What separates the temporal lobe from the frontal lobe?

Section 4

The Meninges

The Meninges

Outcomes

To identify and describe the meningeal coverings of the brain.

Objectives

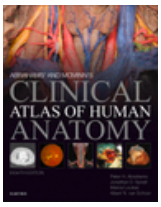
At the end of this session you should be able to:

- Identify the dura mater, pia mater, and arachnoid mater.
- Name the blood supply and innervation of the meninges.
- Identify the dural reflections (i.e., falx cerebri, tentorium cerebelli, falx cerebelli and diaphragma sellae).
- Define attachments and relationship of each of the dural reflection and the compartmentalization of the cranial cavity produced by them.
- Identify the major cisterns and list the content of each.
- Identify and describe the location of the dural venous sinuses.
- Identify the arachnoid granulations.
- Identify the major cisterns (i.e., interpeduncular, pontine, superior, and cisterna magna).

Materials

- Whole brain specimens with meninges.
- Prosected head and neck cadaveric specimens.
- Disarticulated skeletons.
- Paper, scissors and glue.

Resources



Abrahams' and McMinn's Clinical Atlas of Human Anatomy
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The Meninges

Online Resources

BlueLink Practical and Images

- Cranial cavity, venous sinuses and brain LabLink
- Cranial cavity, venous sinus and brain images (labelled)

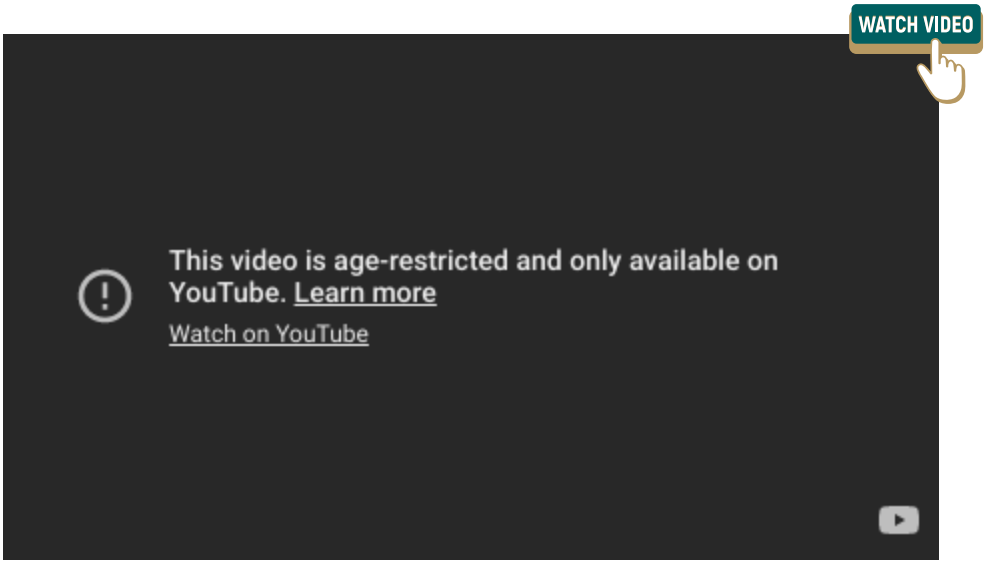
Université Catholique de Louvain (UCLouvain)

- Brain-Inter-Atlas: Interactive Brain Atlas
  Refer to the meninges section

Dissection Video

The Meninges (15 minutes)

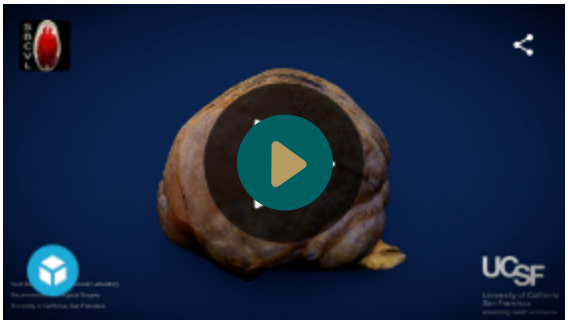
The epidural, subdural and subarachnoid spaces are demonstrated and discussed with respect to trauma and disease. The relationship of the brainstem and cerebellum to the tentorium demonstrates the vulnerability of the brain stem to increased supratentorial pressure and herniation. Arachnoid granulations and the sagittal sinus are shown. A subdural hematoma specimen as well as sections from a ruptured aneurysm complete the demonstration.

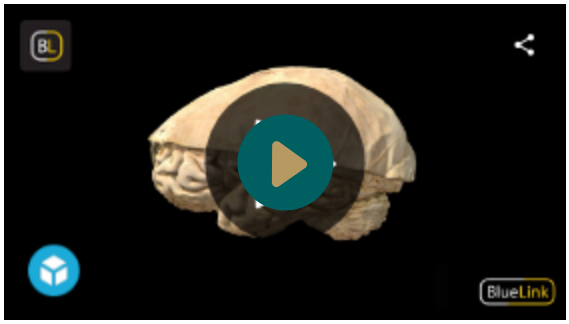


The Meninges

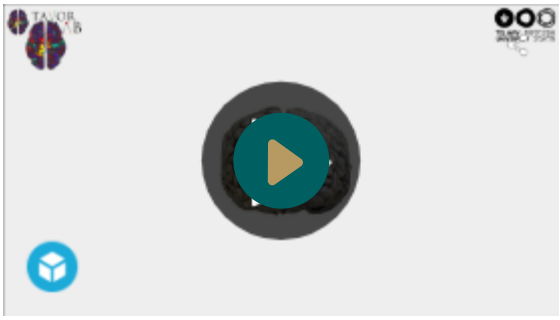
3D Models

Dura Mater





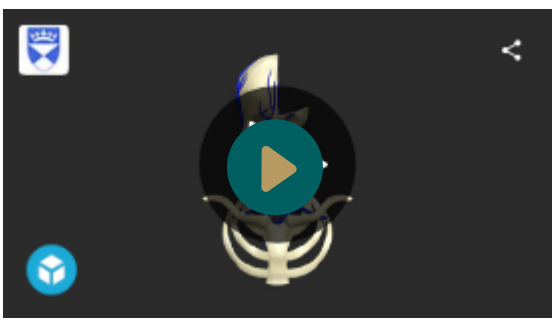
Arachnoid Mater

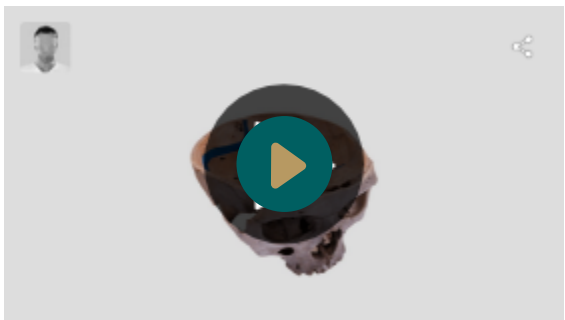


Arachnoid Granulations

Dural Reflections/Septae

Dural Venous Sinuses





The Meninges

List of Structures to Identify

Meninges

- [ ] Dura mater
- [ ] Arachnoid mater
- [ ] Pia mater

Spaces

- [ ] Subdural (potential space)
- [ ] Subarachnoid (real space)
- [ ] Subdural (potential space)

Dural Reflections

- [ ] Falx cerebri
- [ ] Tentorium cerebelli
- [ ] Falx cerebelli
- [ ] Diaphragma sellae

Sinuses

- [ ] Superior sagittal
- [ ] Inferior sagittal
- [ ] Straight
- [ ] Confluence of sinuses
- [ ] Occipital
- [ ] Transverse
- [ ] Sigmoid
- [ ] Superior petrosal
- [ ] Inferior petrosal
- [ ] Cavernous

Cisterns

- [ ] Interpeduncular
- [ ] Pontine
- [ ] Superior
- [ ] Cisterna magna

The Meninges

Questions

What is an epidural hematoma? How does it occur and where it is located?

Describe the location of the superior sagittal sinus.

What is a subdural hematoma? How does it occur and where is it located?

Define subarachnoid cistern.

Where is cerebrospinal fluid located in relation to the meninges?

Where is the pia mater located?

What are arachnoid villi and where are they located?

Name the fold of dura that separates the middle cranial fossa from the posterior cranial fossa.

Give the arterial supply and innervation to the dura.

Section 5

Vasculature of the Brain

Vasculature of the Brain

Outcomes

To identify the main arteries, veins and review the dural venous sinuses that are responsible for supplying/draining blood to/from the brain.

Objectives

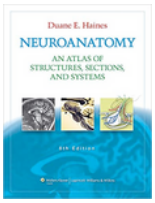
At the end of this session, you should be able to:

- identify the arteries that form part of the anterior circulatory system of the brain and list the respective areas each supply.
- identify the arteries that form part of the posterior circulatory system of the brain and list the respective areas each supply.
- identify the Circle of Willis and list arteries that give rise to it.
- describe the significance of the Circle of Willis.
- identify the main superficial veins.
- identify the dural venous sinuses and describe their location and relation.

Materials

- Whole and hemisected brain specimens.
- Prosected brain specimens.
- Head and neck prosected specimens.

Resources



Haines DE. Neuroanatomy: An Atlas of Structures, Sections and Systems
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Chapter 2

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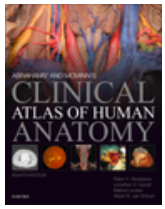

Abrahams' and McMinn's Clinical Atlas of Human Anatomy
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Vasculature of the Brain

Online Resources

University of British Columbia
- **Stroke Model**

VR and 3D resources
- **Brainstem with Circle of Willis**
- **3D printed Circle of Willis**
- **Holobrain WebVR**

Université Catholique de Louvain (UCLouvain)
- **Brain-Inter-Atlas: Interactive Brain Atlas**
  Refer to the vascularization section

BlueLink Practical and Images
- **Cranial cavity, venous sinuses and brain LabLink**
- **Cranial cavity, venous sinus and brain images (labelled)**

Dissection Video

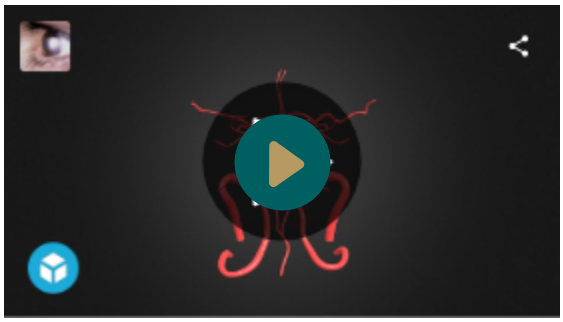
Blood Supply of the Brain (14 minutes)

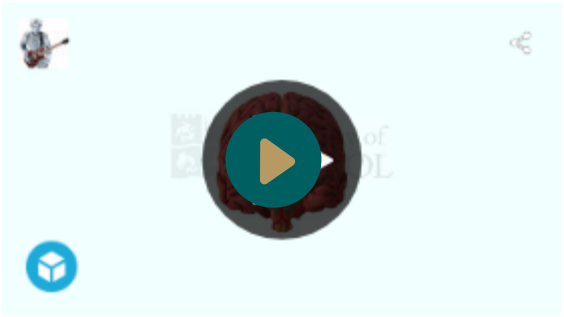
In this video the arteries of the anterior and posterior circulation of the brain is demonstrated. Vascular territories are also discussed. For the purposes of the current practical session watch from the start to minute 8:15

Vasculature of the Brain

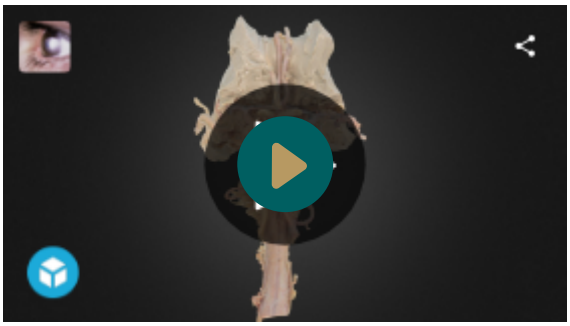
3D Models

Circle of Willis



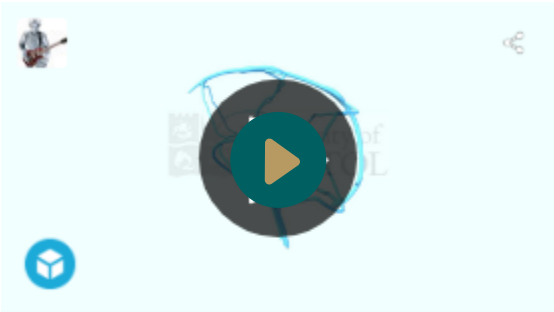


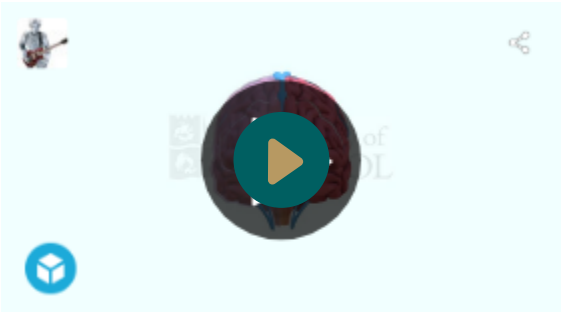
Brainstem with Circle of Willis



Whole Brain with Circle of Willis

Venous Drainage





Vasculature of the Brain

List of Structures to Identify

Arteries

- [ ] Anterior communicating
- [ ] Anterior cerebral
- [ ] Internal carotid
- [ ] Middle cerebral
- [ ] Posterior communicating
- [ ] Posterior cerebral
- [ ] Superior cerebellar
- [ ] Basilar
- [ ] Pontine
- [ ] Anterior inferior cerebellar
- [ ] Posterior inferior cerebellar
- [ ] Labyrinthine
- [ ] Vertebral
- [ ] Anterior spinal
- [ ] Posterior spinal

Veins

- [ ] Superior cerebral
- [ ] Inferior cerebral
- [ ] Temporal cerebral
- [ ] Superficial middle cerebral
- [ ] Greater anastomotic (Trolard)
- [ ] Inferior anastomotic (Labbé)
- [ ] Anterior cerebral
- [ ] Basal (of Rosenthal)
- [ ] Great cerebral vein (of Galen)

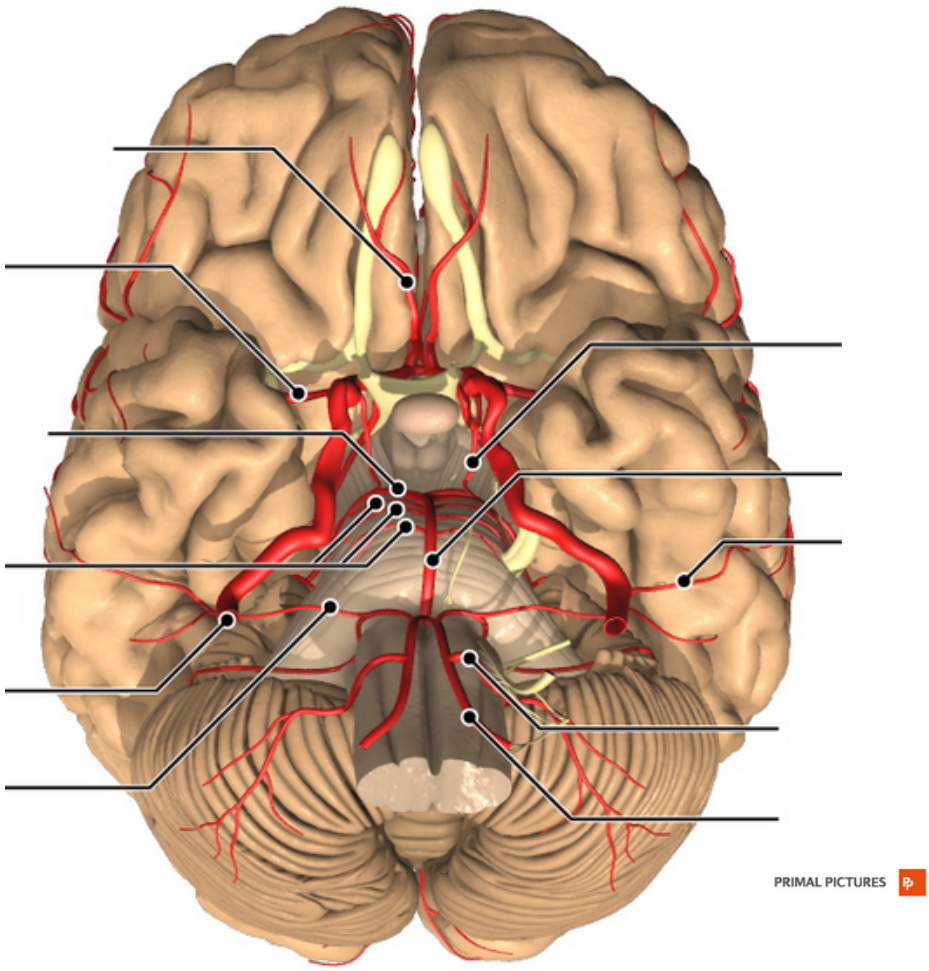
Sinuses (Review)

- [ ] Superior sagittal
- [ ] Inferior sagittal
- [ ] Straight
- [ ] Confluence of sinuses
- [ ] Occipital
- [ ] Transverse
- [ ] Sigmoid
- [ ] Superior petrosal
- [ ] Inferior petrosal
- [ ] Cavernous

Vasculature of the Brain

Questions

Label the arteries supplying the brain in the image below:



Which artery supplies blood to the medial surface of the cerebral cortex?

Which major vessels supply the small arteries penetrating the anterior perforated substance?

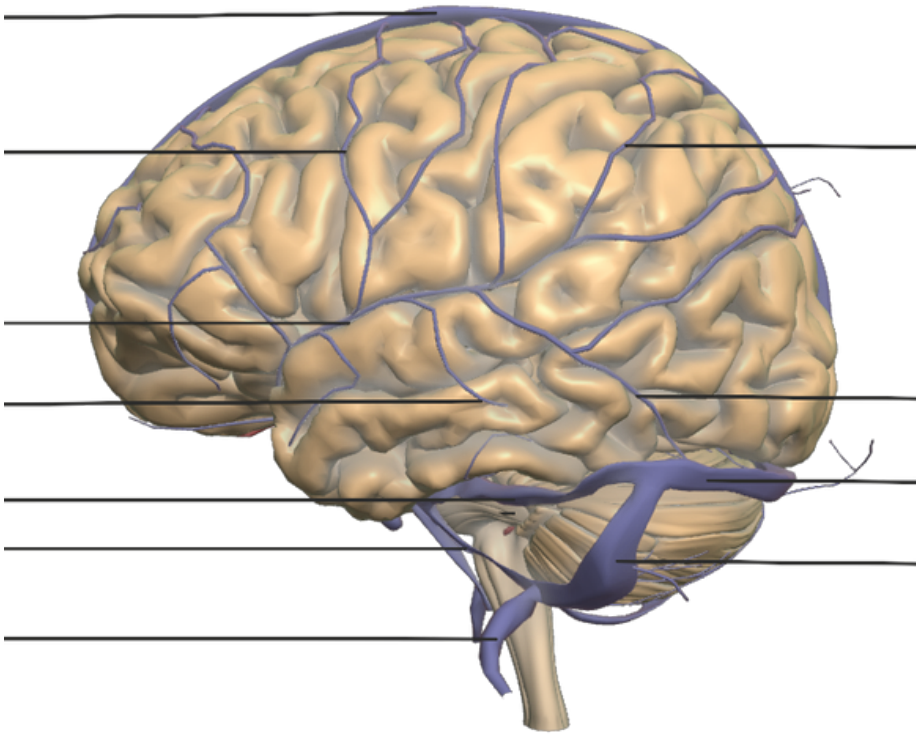
Which cerebral artery supplies blood to the posterior (occipital) part of the cerebral hemisphere?

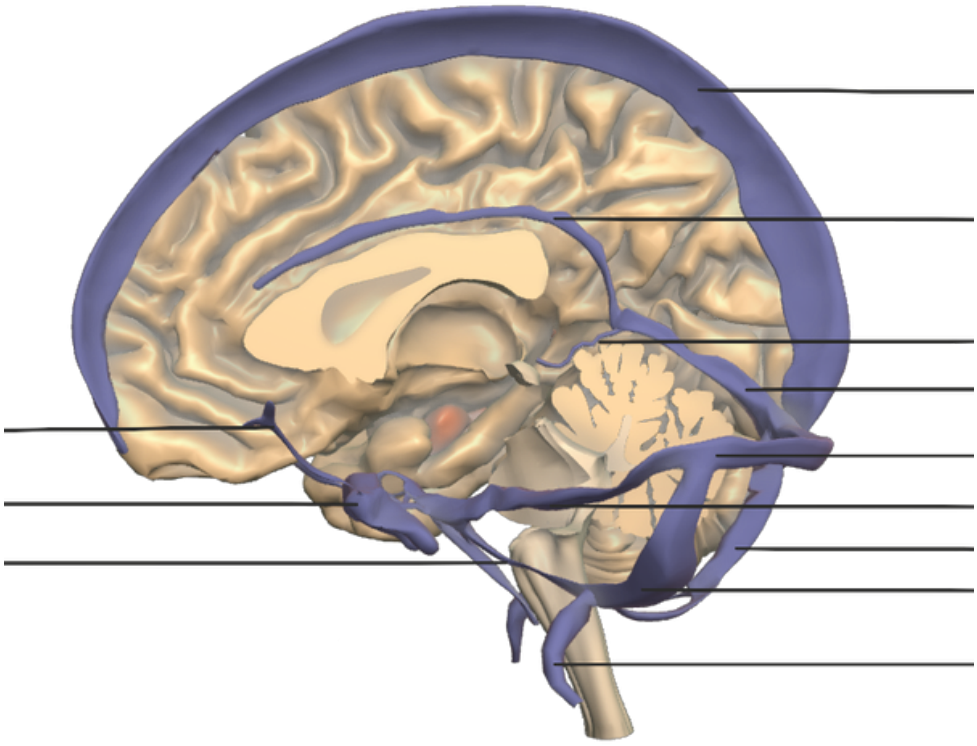
What is the main mechanism to control cerebral blood flow?

What are the “arteries of cerebral hemorrhage"?

Vasculature of the Brain

Label the venous sinuses and veins draining the brain in the images below:





PRIMAL PICTURES

Vasculature of the Brain

Which large vein drains the blood from the cranial cavity?

Name the dural sinus located at the ventral border of the falx cerebri?

What area of the brain drains venous blood into the great cerebral vein (of Galen)?

Which dural sinus receives venous blood from the superior parts of the cerebral hemisphere?

Which cranial nerves could be compromised by a tumor or carotid artery aneurism in the cavernous sinus?

Section 6

The Ventricular System

The Ventricular System

Outcomes

To identify the parts of the ventricular system and describe how cerebrospinal fluid is formed, secreted, circulated and reabsorbed.

Objectives

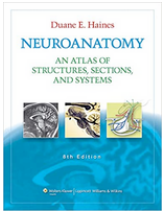
At the end of this session you should be able to:

- identify the location, parts, and relations of the lateral ventricle in mid-sagittal, coronal, and transverse sections.
- identify the location and relations of the third ventricle in mid-sagittal, coronal, and transverse sections.
- identify the location and relations of the fourth ventricle in mid-sagittal, coronal, and transverse sections.
- identify the structures located in the floor of 4th ventricle and lateral recesses.
- identify the interventricular foramen, cerebral aqueduct, and central canal
- identify the choroid plexus.
- describe how/where cerebrospinal fluid (CSF) is formed and circulated.

Materials

- Whole and hemi-sected brain specimens.
- Coronal and horizontal brain sections.
- Cast of the ventricular system.

Resources



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The Ventricular System

Online Resources

University of British Columbia
- **Stroke Model**

VR and 3D resources
- **Holobrain WebVR**
- **3D reconstructions**

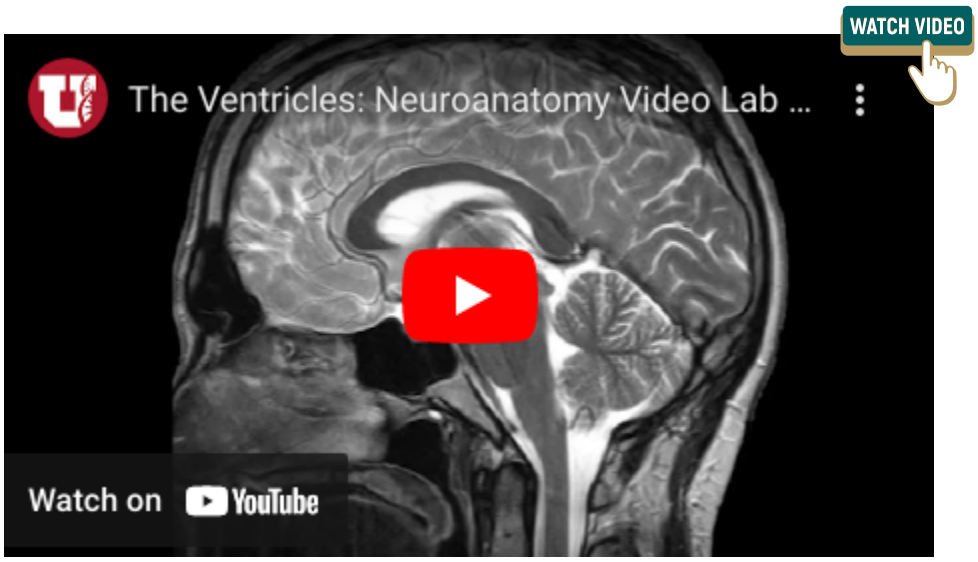
Université Catholique de Louvain (UCLouvain)
- **Brain-Inter-Atlas: Interactive Brain Atlas**
  Refer to the ventricles of the brain section

BlueLink Images
- **Cranial cavity, venous sinuses and brain LabLink**
- **Cranial cavity, venous sinus and brain images (labelled)**

Dissection Video

The Ventricles (28 minutes)

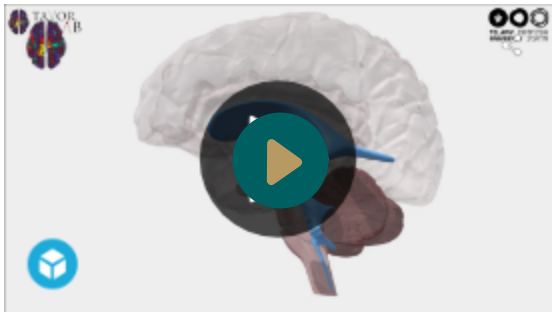
The ventricles are demonstrated and named on a model cast as well as in rotating 3D reconstructions. The production, function, circulation and removal of CSF produced by the choroid plexus is discussed using a diagram and then reviewed on frontal, axial and sagittal brain specimens and corresponding MRIs. The blood CSF and brain barriers are mentioned along with the cisterns.



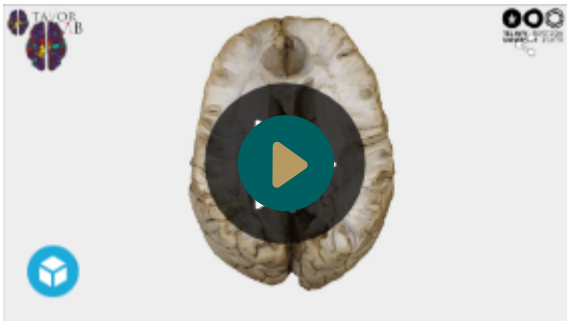
The Ventricular System

3D Models

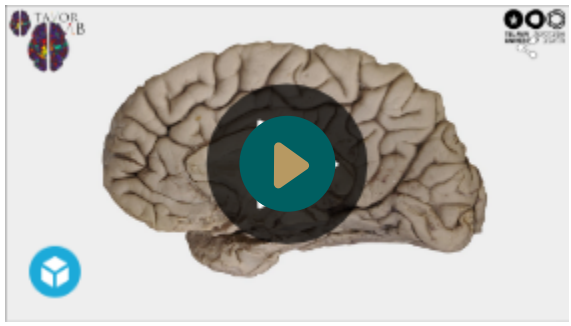
Brain Ventricles



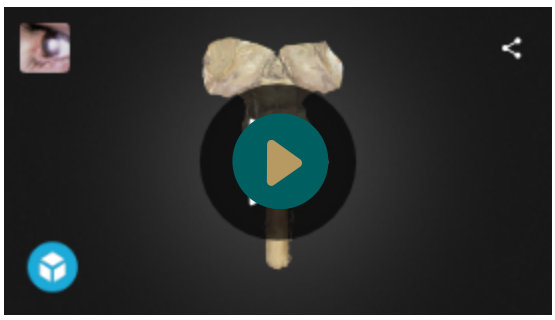
Lateral Ventricles



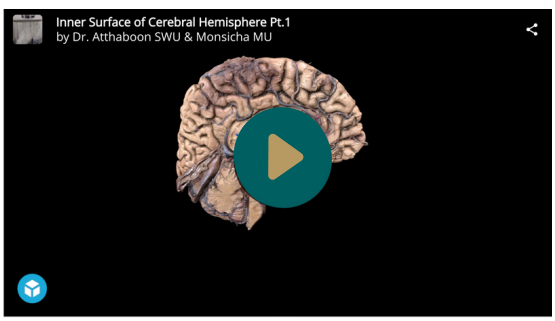
3rd Ventricle

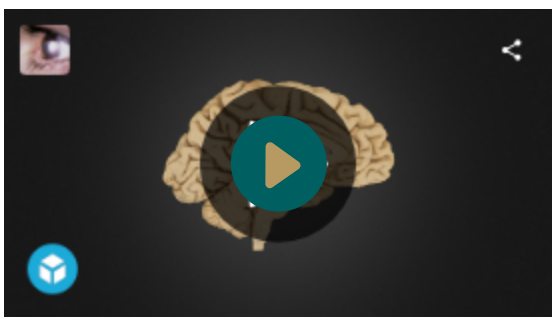


4th Ventricle



Hemisected Brain





The Ventricular System

List of Structures to Identify

Structures

- [ ] Lateral ventricle
  - [ ] Anterior horn
  - [ ] Body
  - [ ] Posterior horn
  - [ ] Inferior horn
- [ ] Third ventricle
- [ ] Fourth ventricle
- [ ] Interventricular foramen
- [ ] Foramina of Luschka
- [ ] Foramen of Magendie
- [ ] Cerebral aqueduct
- [ ] Central canal
- [ ] Choroid plexus

Floor of the Fourth Ventricle

- [ ] Area posterma
- [ ] Cuneate tubercle
- [ ] Facial colliculus
- [ ] Gracile tubercle
- [ ] Hypoglossal triangle
- [ ] Inferior cerebellar peduncle
- [ ] Locus ceruleus
- [ ] Medial eminence
- [ ] Median sulcus
- [ ] Obex
- [ ] Stria medularis
- [ ] Sulcus limitans
- [ ] Superior cerebellar peduncle
- [ ] Vagal triangle
- [ ] Vestibular area

Ventricular System

Questions

List the structures that form the following borders of the **anterior (frontal)** horn of the **lateral ventricle**:

Roof	Floor	Anterior Wall	Medial Wall	Lateral Wall

List the structures that form the following borders of the **body** of the **lateral ventricle**:

Roof	Floor	Medial Wall	Lateral Wall

Ventricular System

List the structures that form the following borders of the **inferior (temporal)** horn of the **lateral ventricle**:

Roof	Floor	Medial Wall	Lateral Wall

Name the structure that form the roof, floor and lateral borders of the **posterior (occipital)** horn of the **lateral ventricle**:

List the structures that form the following borders of the **third ventricle**:

Roof	Floor	Anterior Wall	Posterior Wall	Lateral Wall

Describe the flow of cerebrospinal fluid in the central nervous system.

Section 7

The Cerebellum

The Cerebellum

Outcomes

Identify and describe the external features and internal organization of the cerebellum.

Objectives

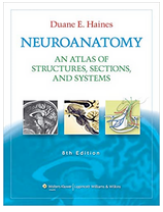
At the end of this session you should be able to:

- identify and describe the external surface features of the cerebellum, which include:
  - the hemispheres.
  - the vermis.
  - the lobes (anterior, posterior, and flocculonodular) and lobules.
  - the cortex and folia.
  - the peduncles (superior, middle, inferior).
  - the tonsils.
- identify the internal features of the cerebellum, which include:
  - the superior and inferior medullary velum.
  - the 4th ventricle.
  - the cerebellar nuclei (dentate, globose, emboliform, and fastigial).

Materials

- Whole and cross-sectioned cerebellum specimens.

Resources



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Online Resources

Université Catholique de Louvain (UCLouvain)

- **Brain-Inter-Atlas: Interactive Brain Atlas**
  Refer to the cerebellum section

The Cerebellum

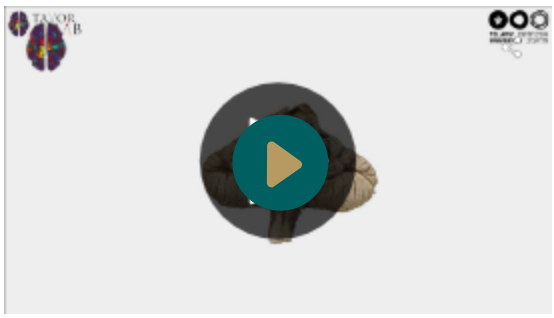
Dissection Video

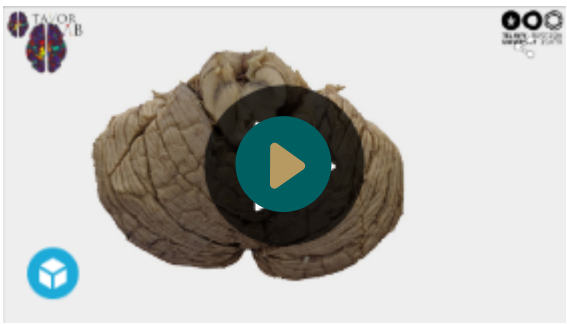
The Cerebellum (15 minutes)

In this video the external features of the cerebellum and the three cerebellar peduncles are demonstrated.

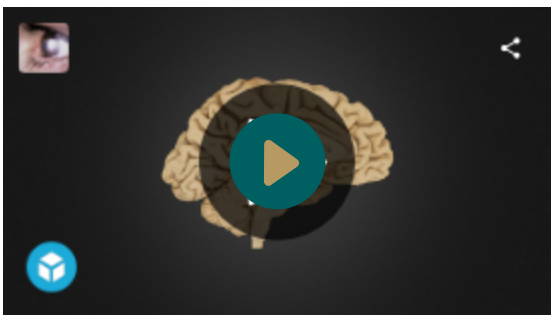
3D Models

Cerebellum





Hemisected Brain



The Cerebellum

List of Structures to Identify

Structures

- [ ] Superior cerebellar peduncle
- [ ] Middle cerebellar peduncle
- [ ] Inferior cerebellar peduncle
- [ ] Left and right hemispheres
- [ ] Vermis
- [ ] Primary fissure
- [ ] Horizontal fissure
- [ ] Posterolateral fissure
- [ ] Flocculus
- [ ] Nodulus
- [ ] Tonsil
- [ ] Floculo-nodular lobe
- [ ] Anterior lobe
- [ ] Posterior lobe
- [ ] Cortex
- [ ] Folia
- [ ] Fissures
- [ ] Gray matter
- [ ] White matter

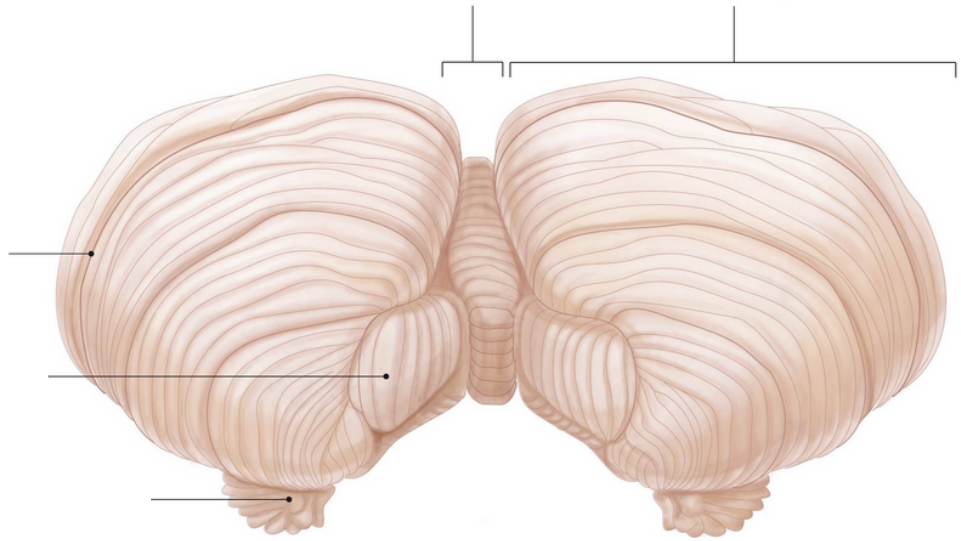
Nuclei

- [ ] Dentate
- [ ] Emboliform
- [ ] Fastigial
- [ ] Globose

The Cerebellum

Questions

Provide labels for each of the images below:



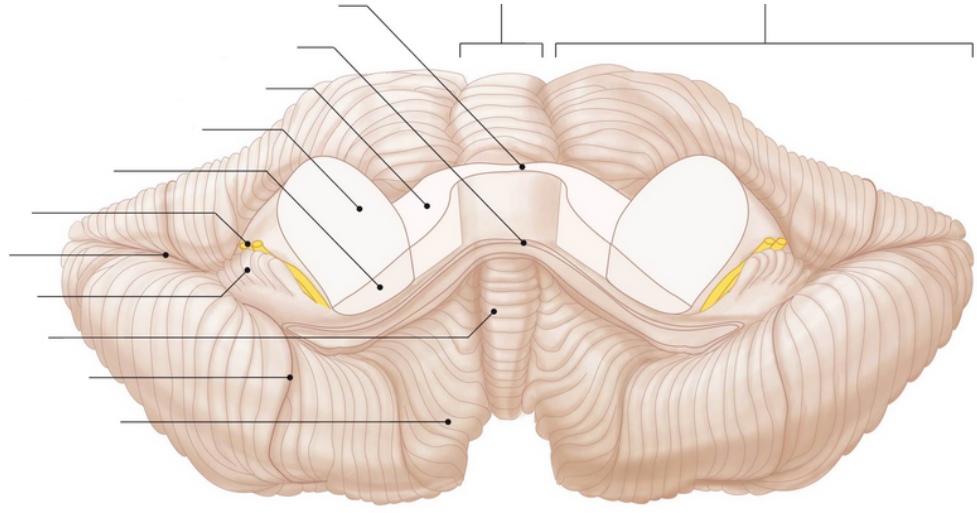


Image source: https://next.amboss.com/us/article/Lp0wJS?q=cerebellum#Z41d8fdaf426af02446dddd77a7bdb023

The Cerebellum

Provides labels for the image below:

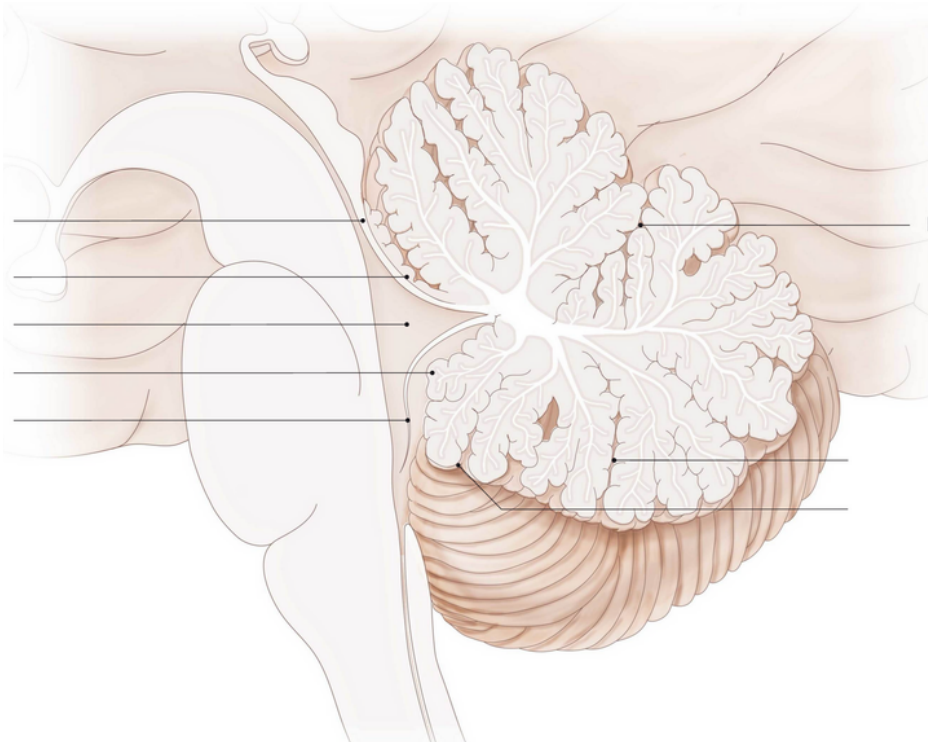


Image source: https://next.amboss.com/us/article/Lp0wJS?q=cerebellum#Z41d8fdaf426af02446dddd77a7bdb023

Section 8

The Brainstem

The Brainstem

Outcomes

To identify and describe the external features, and relations of the midbrain, pons, and medulla

Objectives

At the end of this session, you should be able to:

- Identify the individual parts of the brainstem (midbrain, pons, and medulla) in situ and the midsagittal plane.
- Identify and describe the external features of the midbrain, which include:
  - on the anterior surface, the:
    - crus cerebri (cerebral peduncles).
    - interpeduncular fossa.
    - oculomotor nerve (CN III).
    - posterior perforated substance.
  - on the posterior surface, the:
    - superior colliculus and its brachium.
    - inferior colliculus and its brachium.
    - trochlear nerve (CN IV).
- Identify and describe the external features of the pons, which include:
  - on the anterior surface, the:
    - base of the pons.
    - trigeminal nerve (CN V).
    - abducent nerve (CN VI).
    - facial nerve (CN VII).
    - vestibulocochlear nerve (VN VIII).
  - on the posterior surface (rhomboid fossa), the:
    - locus ceruleus.
    - facial colliculus.
    - sulcus limitans.
    - striae medullares.
- Identify and describe the external features of the medulla, which include:
  - on the anterior surface, the:
    - pyramid.
    - olive.
    - glossopharyngeal nerve (CN IX).
    - vagus nerve (CN X).
    - accessory nerve (CN XI).
    - hypoglossal nerve (CN XII).

The Brainstem

- on the posterior surface, the:
  - gracile tubercle.
  - cuneate tubercle.
  - rhomboid fossa and content (striae medullares, vagal trigone, hypoglossal trigone, sulcus limitans and area postrema).

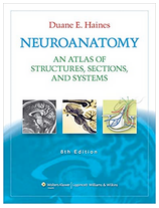
Materials

- Whole and hemisected human brains in dissection hall.

PLEASE NOTE: You may need to use the online resources and images to complete this practical (links provided in the online resources section below).

Please ensure that at least one member of your dissection group brings a laptop or tablet to the practical session.

Resources



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Lippincott
Chapter 2 and 5

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The Brainstem

Online Resources

University of British Columbia (VR and 3D resources)

- Holobrain WebVR
- 3D Neuroanatomy Models
- 3D reconstructions

Université Catholique de Louvain (UCLouvain)

- Brain-Inter-Atlas: Interactive Brain Atlas

  Refer to the following sections:
  - Midbrain
  - Pons
  - Medulla oblongata

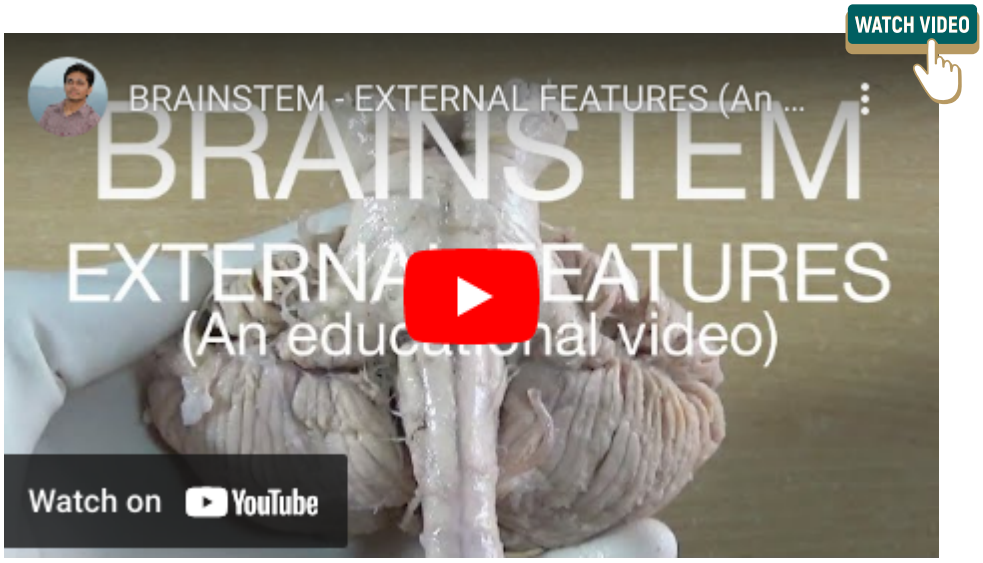
BlueLink Practical and Images

- Cranial cavity, venous sinuses and brain LabLink
- Cranial cavity, venous sinus and brain images (labelled)

Dissection Video

The Brainstem (32 minutes)

External features of brainstem and attachment of 3rd to 12th cranial nerves are described in this video.



The Brainstem

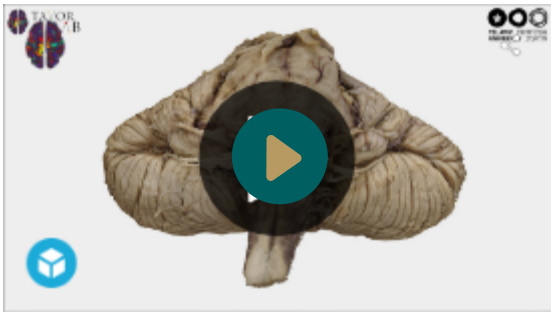
Dissection Video

The Rhomboid Fossa (9 minutes)

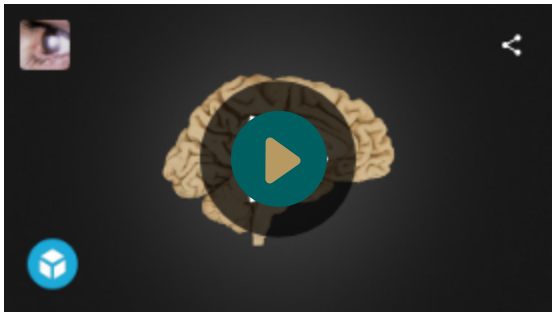
Detailed description of the structures located in the floor of the fourth ventricle.

3D Models

Brainstem



Hemisected Brain



The Brainstem

List of Structures to Identify

Midbrain

- [ ] Tegmentum
- [ ] Tectum
- [ ] Cerebral aqueduct
- [ ] Superior colliculus
- [ ] Inferior colliculus
- [ ] Red nucleus
- [ ] Substantia nigra
- [ ] Crus cerebri
- [ ] Interpeduncular fossa
- [ ] Posterior perforated substance
- [ ] Oculomotor nerve (CN III)
- [ ] Trochlear nerve (CN IV)
- [ ] Superior cerebellar peduncle

Pons

- [ ] Tegmentum
- [ ] Base of the pons
- [ ] Roof of the 4th ventricle
- [ ] Floor of the 4th ventricle
- [ ] Medial eminence
- [ ] Sulcus limitans
- [ ] Striae medullares
- [ ] Locus ceruleus
- [ ] Facial colliculus
- [ ] Trigeminal nerve (CN V)
- [ ] Abducens nerve (CN VI)
- [ ] Facial nerve (CN VII)
- [ ] Vestibulocochlear nerve (CN VIII)
- [ ] Middle cerebellar peduncle

Medulla

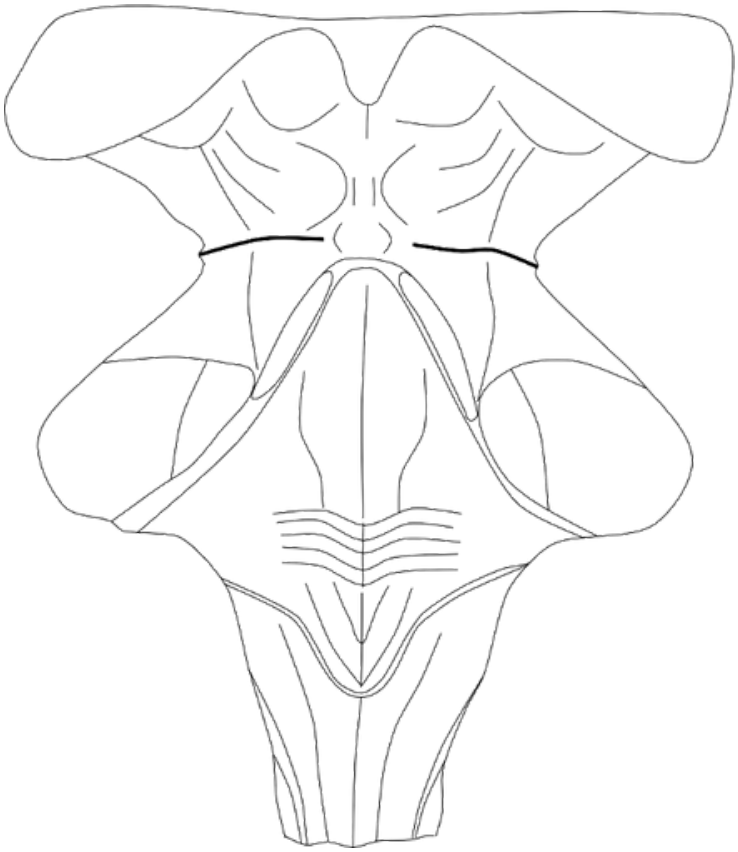
- [ ] Anterior median fissure
- [ ] Pyramids
- [ ] Olives
- [ ] Decussation of the pyramids
- [ ] Glossopharyngeal nerve (CN IX)
- [ ] Vagus nerve (CN X)
- [ ] Spinal accessory nerve (CN XI)
- [ ] Hypoglossal nerve (CN XII)
- [ ] Gracile tubercle and fasciculus
- [ ] Cuneate tubercle and fasciculus
- [ ] Rhomboid fossa
- [ ] Striae medullares
- [ ] Vagal trigone
- [ ] Hypoglossal trigone
- [ ] Sulcus limitans
- [ ] Area posterma
- [ ] Obex
- [ ] Inferior cerebellar peduncle

The Brainstem

Questions

List the major subdivisions of the brainstem.

Label as many structures listed below on the diagram of the dorsal view of the brainstem:



- Anterior medullary velum
- Superior cerebellar peduncle
- Middle cerebellar peduncle
- Inferior cerebellar peduncle
- Cerebral peduncle
- Superior and inferior colliculi
- Facial colliculus
- Fourth ventricle - lateral recesses
- Fasciculus and tuberculum gracilis
- Fasciculus and tuberculum cuneatus
- Hypoglossal triangle
- Lateral geniculate body
- Medial geniculate body
- Median eminence
- Obex
- Pineal gland
- Posteromedian and postero-intermediate sulci
- Striae medullares
- Sulcus limitans
- Thalamus (pulvinar)
- Trochlear nerve (IV)
- Vagal triangle
- Vestibular area

Section 9

Cranial Nerves

Cranial Nerves

Outcomes

Identify the 12 cranial nerves and describe at what level they emergence from the brainstem (CN III – XII)

Objectives

At the end of this session, you should be able to:

- Name and identify the 12 cranial nerves on whole brain specimens.
- Describe the level at which each cranial nerve emerges from the brainstem (CN III - XII).
- List the cranial foramina/fissures through which each cranial nerve enters/exits the skull.

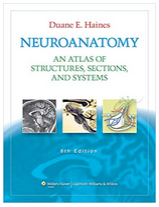
Materials

- Whole and hemisected human brains in dissection hall.

PLEASE NOTE: You may need to use the online resources and images to complete this practical (links provided in the online resources section below).

Please ensure that at least one member of your dissection group brings a laptop or tablet to the practical session.

Resources



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Lippincott
Chapter 2 and 3

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Cranial Nerves

Online Resources

University of British Columbia (VR and 3D resources)

- Holobrain WebVR
- 3D Neuroanatomy Models
- 3D reconstructions

Université Catholique de Louvain (UCLouvain)

- Brain-Inter-Atlas: Interactive Brain Atlas

  Refer to the following sections:
  - Midbrain
  - Pons
  - Medulla oblongata

BlueLink Practical and Images

- Cranial cavity, venous sinuses and brain LabLink
- Cranial cavity, venous sinus and brain images (labelled)

Dissection Video

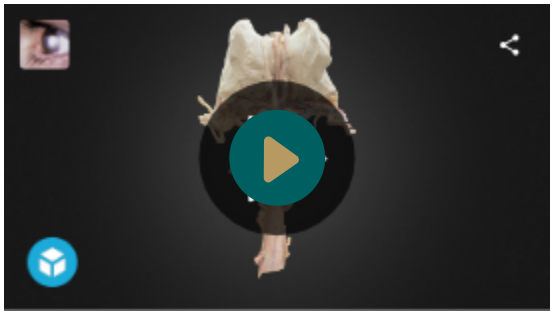
Cranial Nerves (5 minutes)

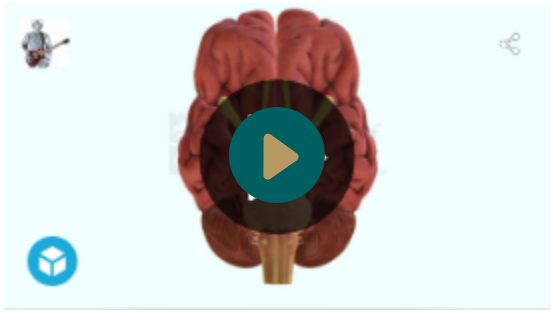
Demonstration of the cranial nerve attachments and the cranial foramina each traverse.

Cranial Nerves

3D Models

Brainstem and Cranial Nerves





Cranial Nerves

List of Structures to Identify

Cranial Nerves

- [ ] Optic nerve (CN I)
- [ ] Olfactory nerve (CN II)
- [ ] Oculomotor nerve (CN III)
- [ ] Trochlear nerve (CN IV)
- [ ] Trigeminal nerve (CN V)
- [ ] Abducens nerve (CN VI)
- [ ] Facial nerve (CN VII)
- [ ] Vestibulocochlear nerve (CN VIII)
- [ ] Glossopharyngeal nerve (CN IX)
- [ ] Vagus nerve (CN X)
- [ ] Accessory nerve (CN XI)
- [ ] Hypoglossal nerve (CN XII)

Cranial Nerves

Atlas

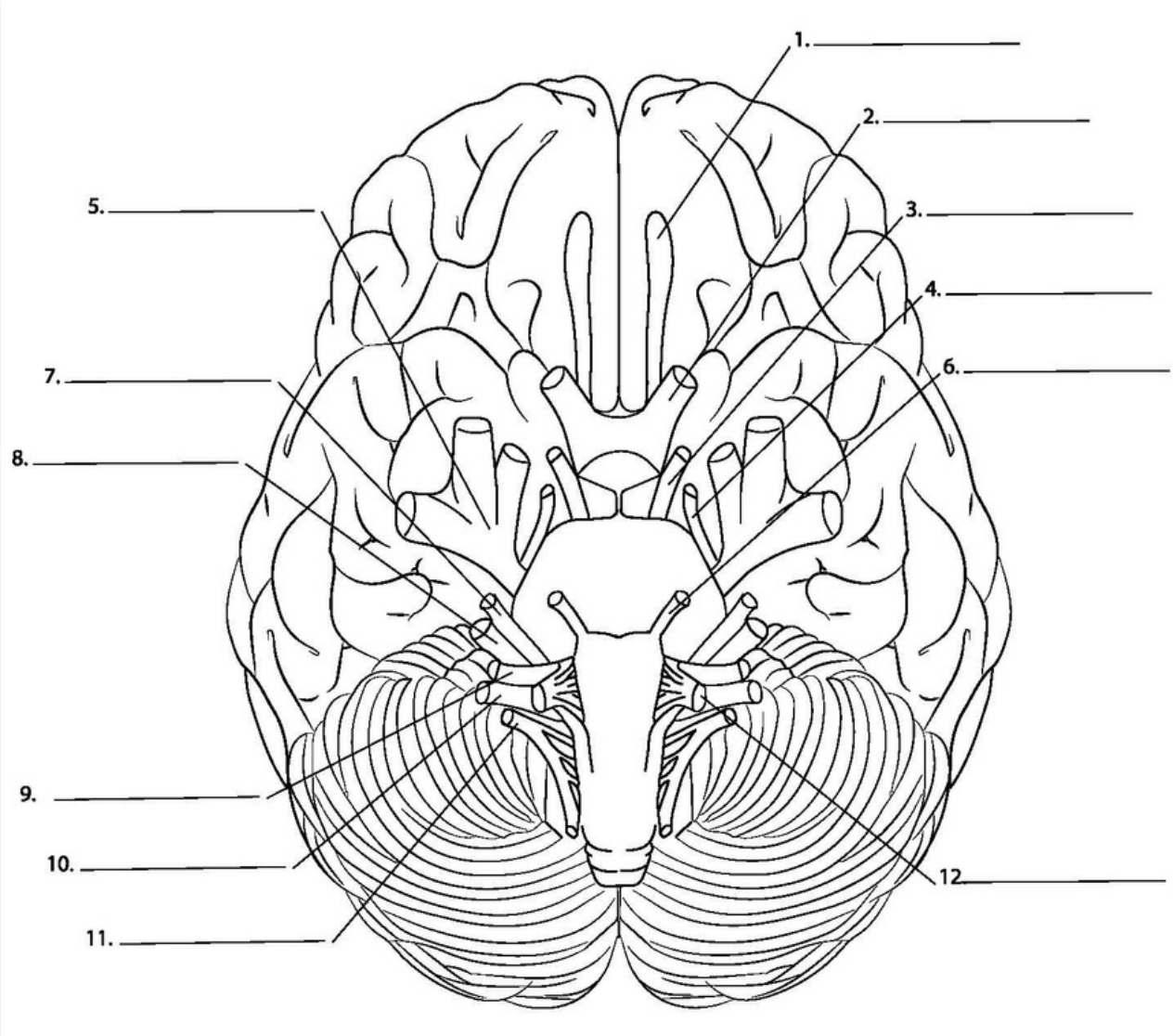
Ventral View of the Brain

"Cranial Nerves - ventral view," Digital Collections - University at Buffalo Libraries, accessed April 21, 2022, https://digital.lib.buffalo.edu/items/show/16984.

Cranial Nerves

Questions

Colour and label each of the cranial nerves in the image below:



Cranial Nerves

Questions

Complete the table below:

Cranial Nerve	Cranial Foramina	Location of Nucleus	Emergence from brain	Main function
Optic				
Olfactory				
Oculomotor				
Trochlear				
Trigeminal				
Abduncens				
Facial				
Vestibulocochlear				
Glossopharyngeal				
Vagus				
Accessory				
Hypopglossal				

Section 10

The Diencephalon

The Diencephalon

Outcomes

Identify the diencephalon and associated structures in midsagittal, coronal and transverse sections of the brain

Objectives

At the end of this session, you should be able to:

- Identify the epithalamus and associated structures in a midsagittal section:
  - pineal body.
  - habenula.
  - medullary stria of the thalamus.
  - posterior commissure.
  - tela choroidea and choroid plexus of the third ventricle.
- Identify the (dorsal) thalamus and associated structures in midsagittal, coronal, and transverse sections:
  - pulvinar.
  - medial geniculate body.
  - lateral geniculate body.
  - interthalamic adhesion (massa intermedia)
- Identify the hypothalamus and associated structures in midsagittal and coronal sections:
  - optic chiasm.
  - mammillary bodies.
  - infundibulum.
- Identify the subthalamus (ventral thalamus) and associated structures in midsagittal and coronal sections
  - identify the subthalamic nucleus (coronal sections).

Materials

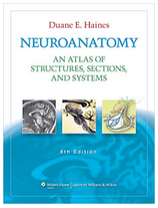
- Whole, hemisected, and serial sectioned human brains in dissection hall.

PLEASE NOTE: You may need to use the online resources and images to complete this practical (links provided in the online resources section below).

Please ensure that at least one member of your dissection group brings a laptop or tablet to the practical session.

The Diencephalon

Resources



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Online Resources

University of British Columbia (VR and 3D resources)

- Holobrain WebVR
- 3D Neuroanatomy Models
- 3D reconstructions

Université Catholique de Louvain (UCLouvain)

- Brain-Inter-Atlas: Interactive Brain Atlas
  Refer to the following sections:
  - Diencephalon

BlueLink Practical and Images

- Cranial cavity, venous sinuses and brain LabLink
- Cranial cavity, venous sinus and brain images (labelled)

The Diencephalon

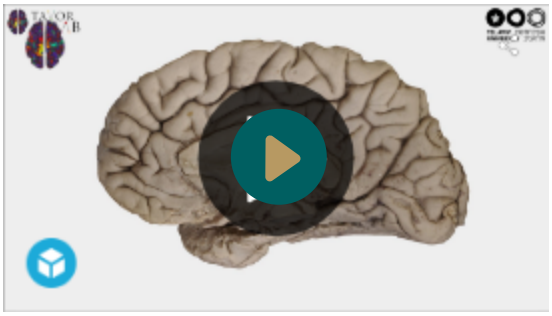
Dissection Video

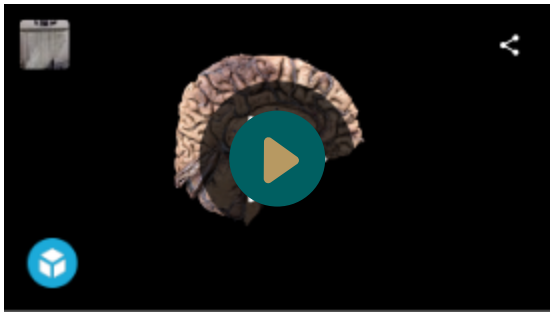
Third Ventricle (22 minutes)

In this video the structures of the diencephalon are demonstrated as they related to the third ventricle.

3D Models

Hemisected Brain





The Diencepalon

List of Structures to Identify

Structures

- [ ] 3rd ventricle
- [ ] Tela choroidea of 3rd ventricle
- [ ] Thalamus
- [ ] Interthalamic adhesion
- [ ] Hypothalamic sulcus
- [ ] Hypothalamus
- [ ] Anterior commissure
- [ ] Lamina terminalis
- [ ] Optic recess
- [ ] Infundibular recess
- [ ] Tuber cinereum
- [ ] Pituitary stalk
- [ ] Optic chiasm
- [ ] Mammillary body
- [ ] Superior colliculus
- [ ] Inferior colliculus
- [ ] Habenula
- [ ] Habenular commissure
- [ ] Posterior commissure
- [ ] Pineal gland
- [ ] Stria medullaris
- [ ] Pulvinar
- [ ] Medial geniculate body
- [ ] Lateral geniculate body
- [ ] Subthalamus (subthalamic nucleus)

Section 11

The Cerebrum

The Cerebrum

Outcomes

- To identify the major sulci, gyri, and functional areas of the medial and lateral surfaces of the cerebral hemispheres.
- Identify and describe the organization and relations of the cerebral white matter (i.e., fiber tracts and the internal capsule) in coronal and transverse sections of the brain.
- Identify and describe the organization of the deep cerebral grey matter (i.e., basal nuclei/ganglia and thalamus) in coronal and transverse sections of the brain.

Objectives

At the end of this session, you should be able to:

- Identify the functional areas on the medial and lateral surfaces of the cerebral hemisphere:
  - prefrontal cortex.
  - premotor/motor association cortex.
  - primary motor cortex.
  - frontal eye field.
  - Broca's area.
  - Wernicke's area.
  - primary somatosensory cortex.
  - parietal association cortex.
  - primary auditory cortex.
  - auditory association cortex.
  - olfactory cortex.
  - gustatory cortex.
  - primary visual cortex.
- Identify the structures of the limbic lobe which include:
  - paraterminal gyrus and subcallosal area.
  - cingulate gyrus.
  - parahippocampal gyrus.
  - hippocampus.
  - subiculum.
  - amygdala.

The Cerebrum

- Identify the following white matter fibers in both coronal and transverse sections:
  - corpus callosum (rostrum, genu, body, and splenium).
  - fornix.
  - anterior and posterior commissure.
  - optic radiations.
  - internal capsule (anterior limb, genu, and posterior limb).
  - external capsule.
  - extreme capsule.
- Identify and describe the relations of the basal nuclei/ganglia (caudate, putamen, and globus pallidus) in coronal and transverse sections.
  - Identify the claustrum in coronal and transverse sections.

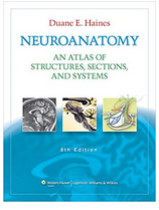
Materials

- Whole, hemisected, and serial sectioned human brains in dissection hall.

PLEASE NOTE: You may need to use the online resources and images to complete this practical (links provided in the online resources section below).

Please ensure that at least one member of your dissection group brings a laptop or tablet to the practical session.

Resources



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The Cerebrum

Online Resources

University of British Columbia (VR and 3D resources)

- **Holobrain WebVR**
- **3D Neuroanatomy Models**
- **3D reconstructions**
- **Cross-sections** (coronals, horizontals, and micrographs)

Université Catholique de Louvain (UCLouvain)

- **Brain-Inter-Atlas: Interactive Brain Atlas**
  Refer to the following sections:
  - Introduction
  - Telencephalon
  - Sectional anatomy

BlueLink Practical and Images

- **Cranial cavity, venous sinuses and brain LabLink**
- **Cranial cavity, venous sinus and brain images (labelled)**

The Cerebrum

Dissection Videos

Cerebrum - Sulci and Gyri (16 minutes)

This video demonstrates the sulci and gyri, poles, borders, surfaces and lobes of the cerebral hemispheres.

Cerebrum - Functional Areas (8 minutes)

This video demonstrates the important functional areas of the cerebral hemispheres.

The Cerebrum

Dissection Videos

Cerebrum - Coronal Sections (19 minutes)

This video demonstrates the cerebral white matter and subcortical structures as observed in coronal sections of the brain.

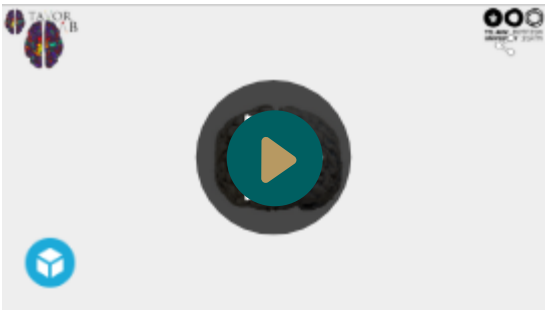
Cerebrum - Horizontal Sections (32 minutes)

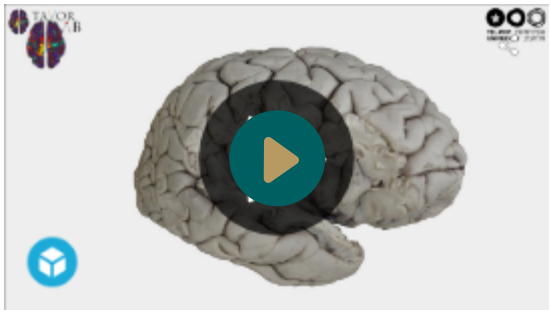
This video demonstrates the cerebral white matter and subcortical structures as observed in horizontal sections of the brain.

The Cerebrum

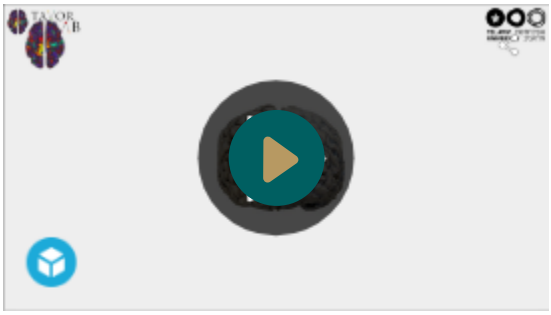
3D Models

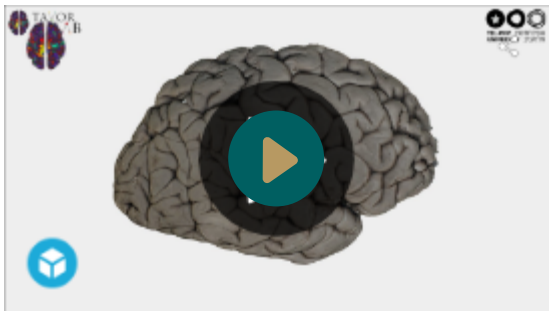
Lobes

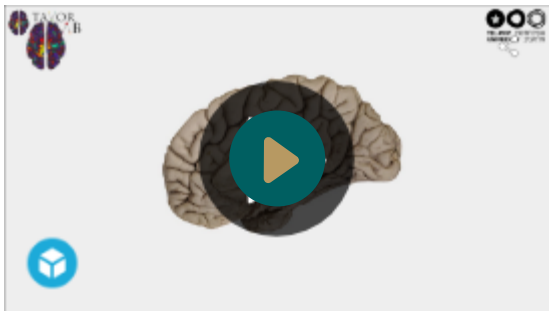




Sulci and Gyri





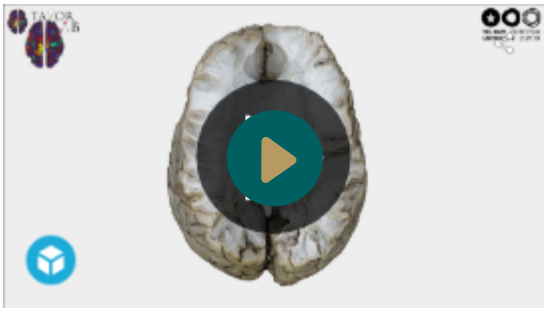


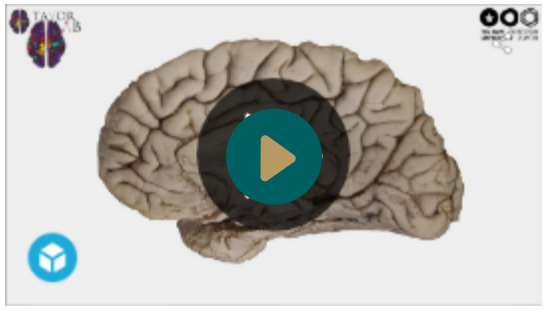
Functional Areas

The Cerebrum

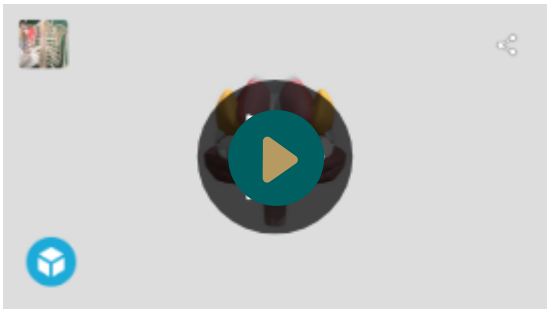
3D Models

Corpus Callosum

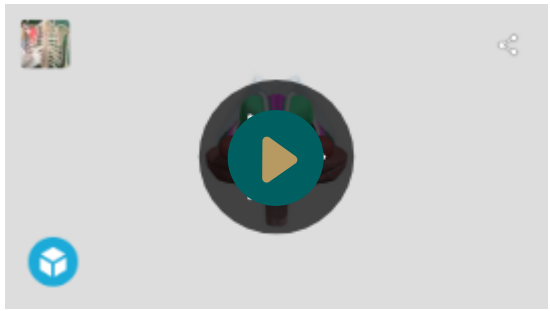




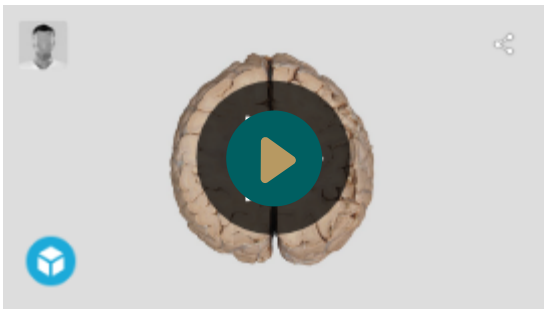
Basal Nuclei (Ganglia)

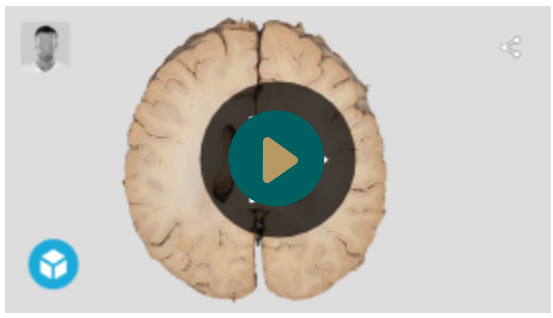


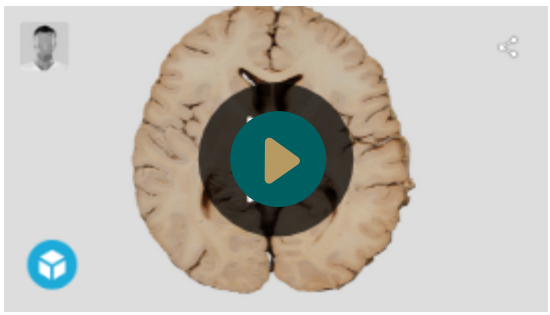
Limbic System

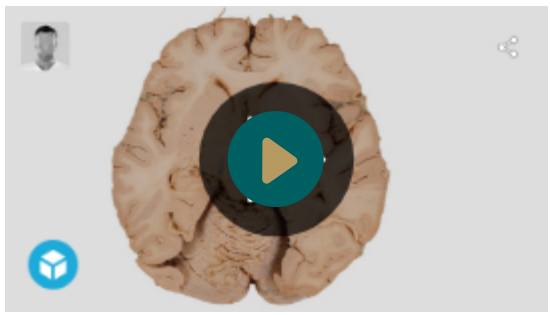


Horizontal Sections





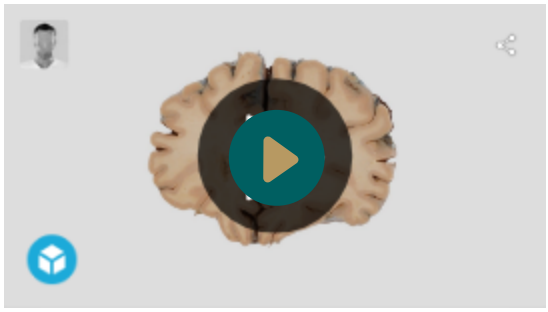


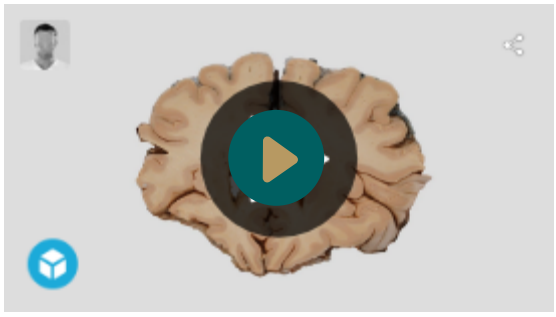


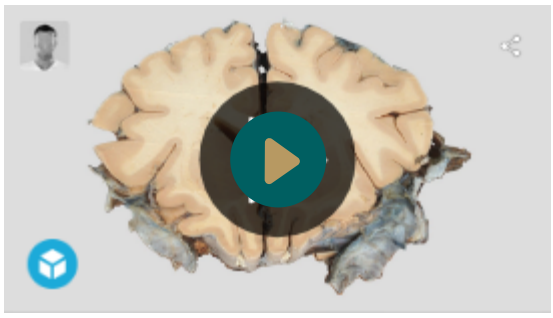
The Cerebrum

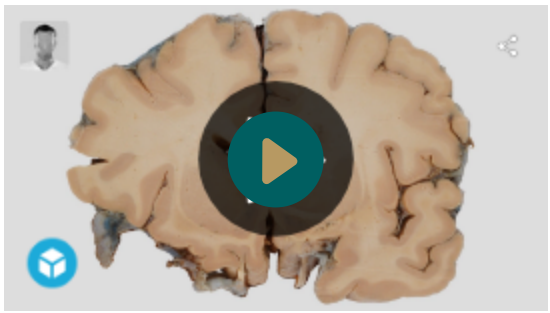
3D Models

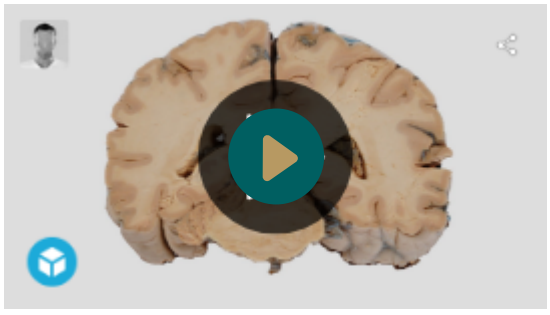
Coronal Sections











The Cerebrum

List of Structures to Identify

Lobes

- [ ] Frontal
- [ ] Parietal
- [ ] Temporal
- [ ] Occipital
- [ ] Insula
- [ ] Limbic

Functional Areas

- [ ] Wernicke's area
- [ ] Broca's area
- [ ] Primary motor area
- [ ] Motor association area
- [ ] Primary somatosensory area
- [ ] Somatosensory association area
- [ ] Frontal eye field
- [ ] Primary visual area
- [ ] Visual association area
- [ ] Primary auditory area
- [ ] Auditory association area
- [ ] Olfactory area

Sulci and Gyri

- [ ] Lateral fissure
- [ ] Central sulcus
- [ ] Precentral gyrus and sulcus
- [ ] Post central gyrus and sulcus
- [ ] Sup., middle and inf. frontal gyri
- [ ] Sup. and inf. frontal sulci

Sulci and Gyri

- [ ] Pars orbitalis
- [ ] Pars triangularis
- [ ] Pars opppercularis
- [ ] Sup., middle and inf. temporal gyri
- [ ] Sup. and inf. temporal sulci
- [ ] Sup. and inf. parietal lobules
- [ ] Supramarginal gyrus
- [ ] Angular gyrus
- [ ] Intraparietal sulcus
- [ ] Parieto-occipital sulcus
- [ ] Occipital gyri and sulci
- [ ] Orbital gyri and sulci
- [ ] Olfactory sulcus
- [ ] Gyrus rectus
- [ ] Med. and lat. occipitotemporal gyri
- [ ] Collateral sulcus
- [ ] Parahippocampal gyrus
- [ ] Uncus
- [ ] Rhinal sulcus
- [ ] Sup. frontal gyrus
- [ ] Cingulate gyrus and sulcus
- [ ] Callosal sulcus
- [ ] Paracentral lobule
- [ ] Precuneus and cuneus
- [ ] Calcarine sulcus
- [ ] Lingual gyrus

The Cerebrum

List of Structures to Identify

Transverse/Axial Sections

- [ ] Corpus callosum
- [ ] Fornix
- [ ] Forceps major
- [ ] Forceps minor
- [ ] Optic radiation
- [ ] Thalamus
- [ ] Medial geniculate nucleus
- [ ] Lateral geniculate nucleus
- [ ] Head of caudate nucleus
- [ ] Body of caudate nucleus
- [ ] Internal capsule - ant. limb
- [ ] Internal capsule - genu
- [ ] Internal capsule - post. limb
- [ ] Putamen
- [ ] Globus pallidus
- [ ] External capsule
- [ ] Claustrum
- [ ] Extreme capsule
- [ ] Insula cortex
- [ ] 3rd ventricle
- [ ] Lateral ventricle - body
- [ ] Lateral ventricle - ant. horn
- [ ] Lateral ventricle - inf. horn
- [ ] Lateral ventricle - post. horn
- [ ] Septum pellucidum
- [ ] Choroid plexus

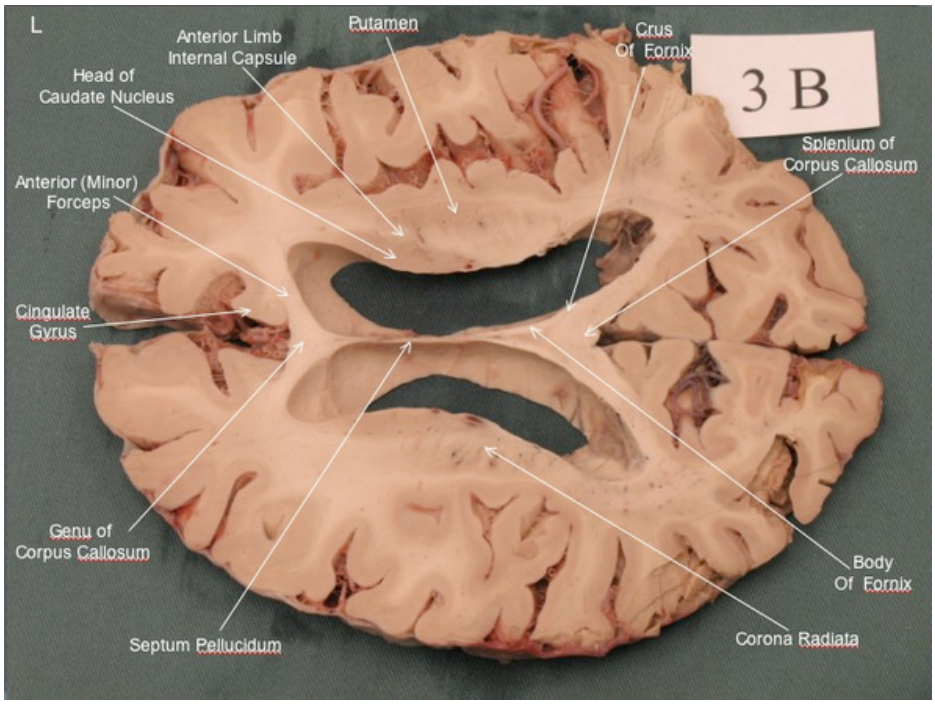
Coronal Sections

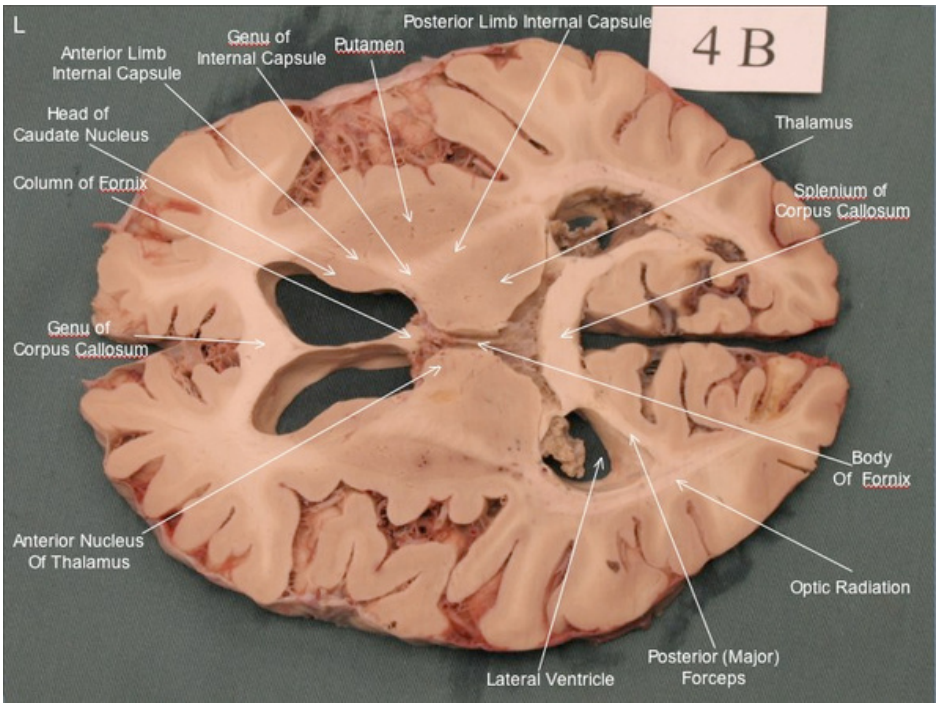
- [ ] Corpus callosum
- [ ] Fornix
- [ ] Head of caudate nucleus
- [ ] Thalamus
- [ ] Hypothalamus
- [ ] Subthalamus
- [ ] Internal capsule - ant. limb
- [ ] Internal capsule - genu
- [ ] Internal capsule - post. limb
- [ ] Putamen
- [ ] Globus pallidus
- [ ] External capsule
- [ ] Claustrum
- [ ] Extreme capsule
- [ ] Insula cortex
- [ ] 3rd ventricle
- [ ] Septum pellucidum
- [ ] Lateral ventricle - body
- [ ] Lateral ventricle - ant. horn
- [ ] Lateral ventricle - post. horn
- [ ] Lateral ventricle - inf. horn
- [ ] Mammillary body
- [ ] Amygdala
- [ ] Hippocampus
- [ ] Choroid plexus

The Cerebrum

Atlas

Transverse Sections

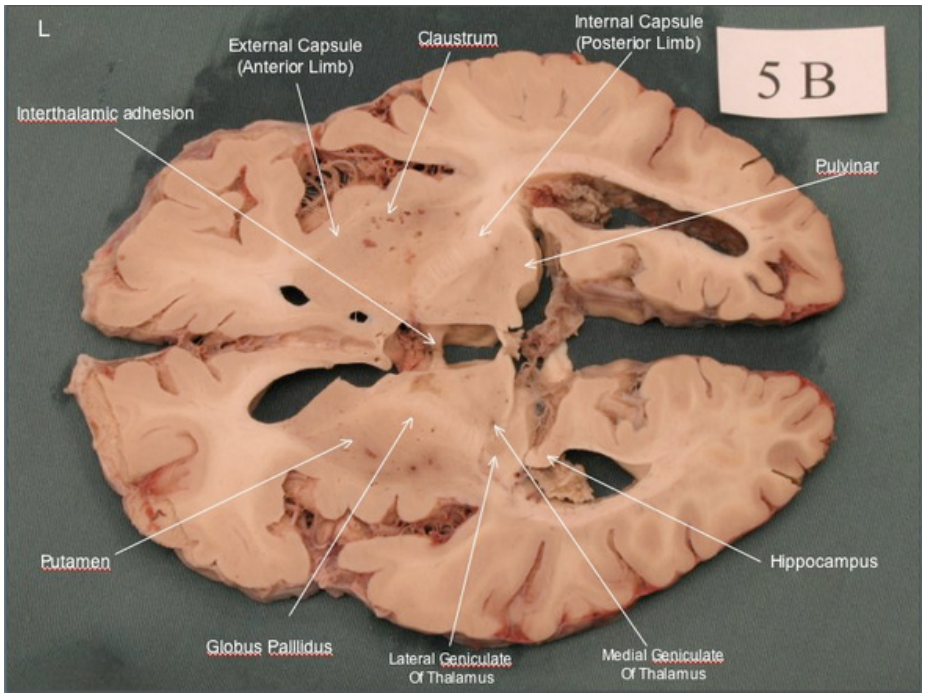


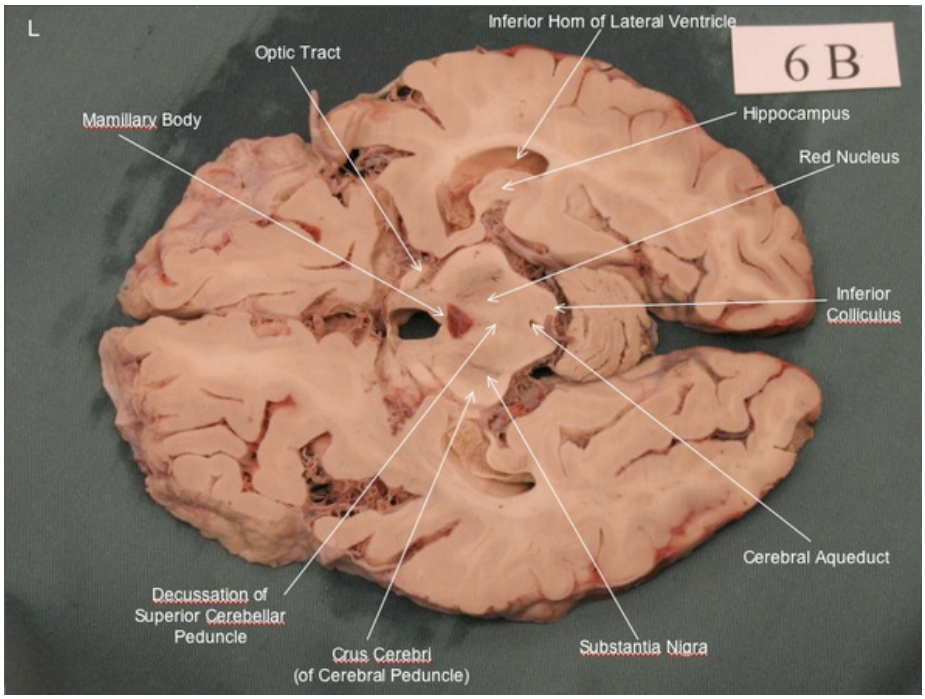


The Cerebrum

Atlas

Transverse Sections

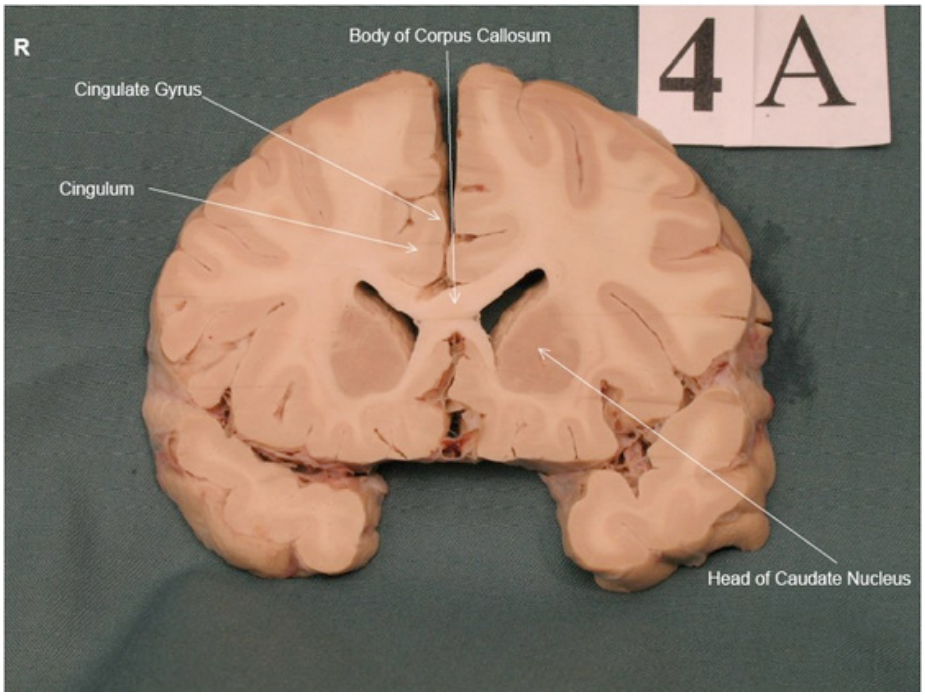


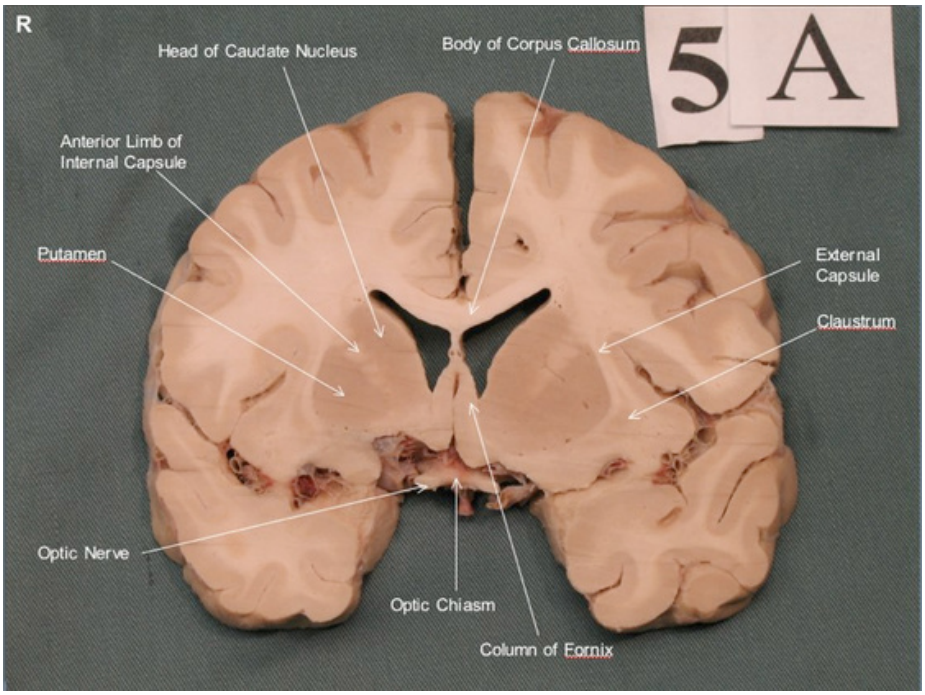


The Cerebrum

Atlas

Coronal Sections

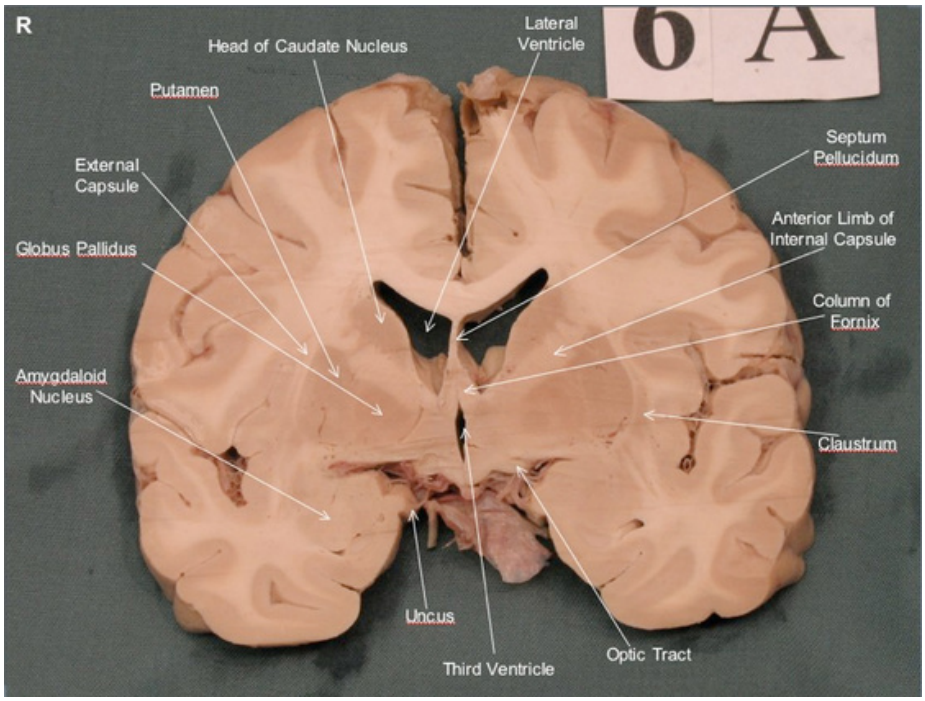


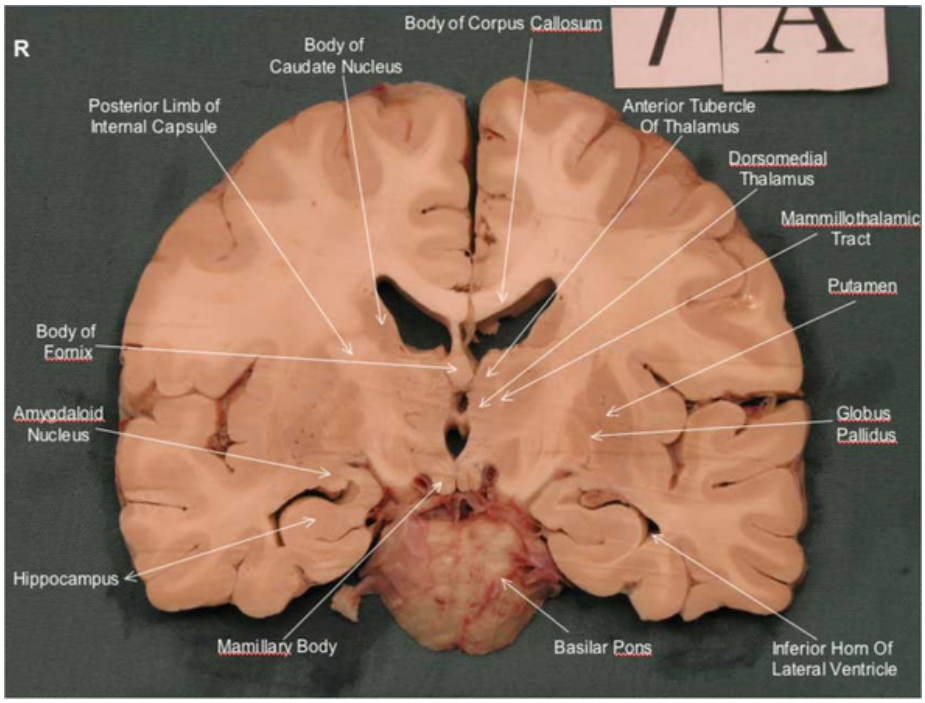


The Cerebrum

Atlas

Coronal Sections

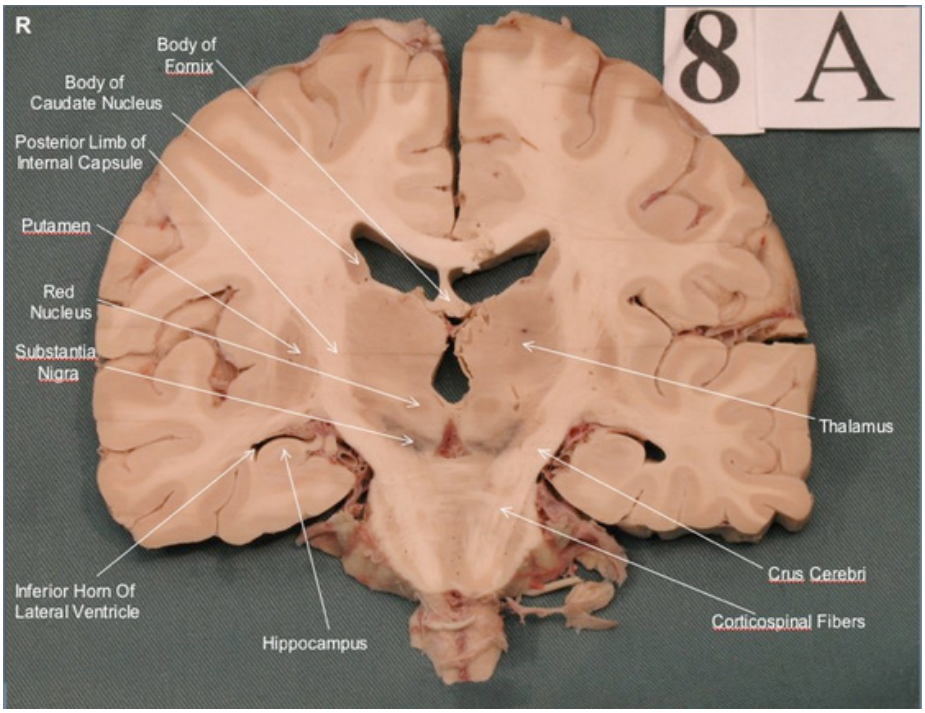


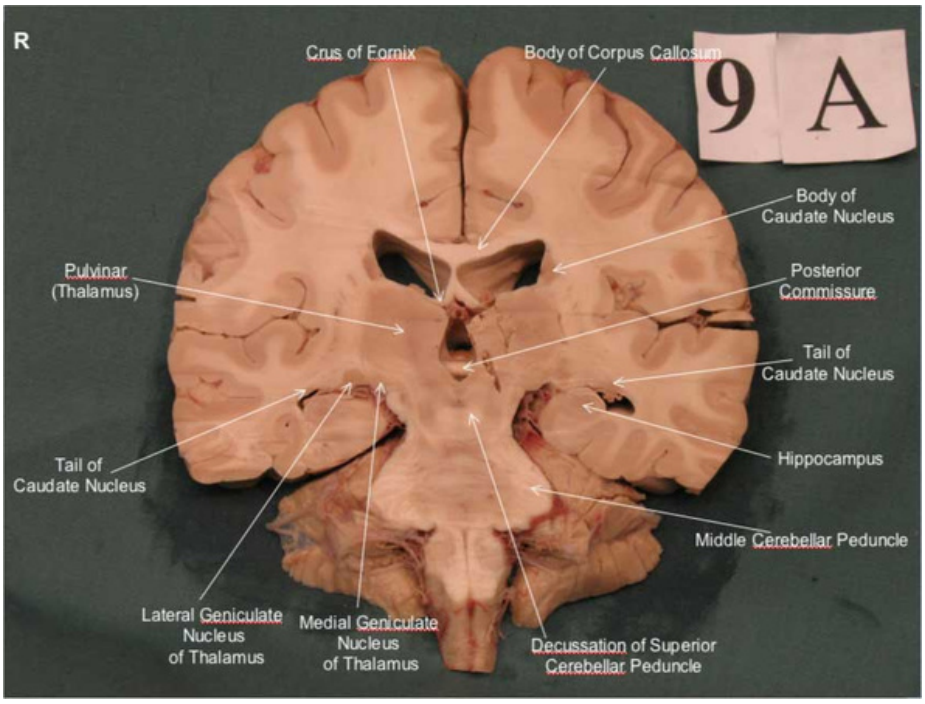


The Cerebrum

Atlas

Coronal Sections

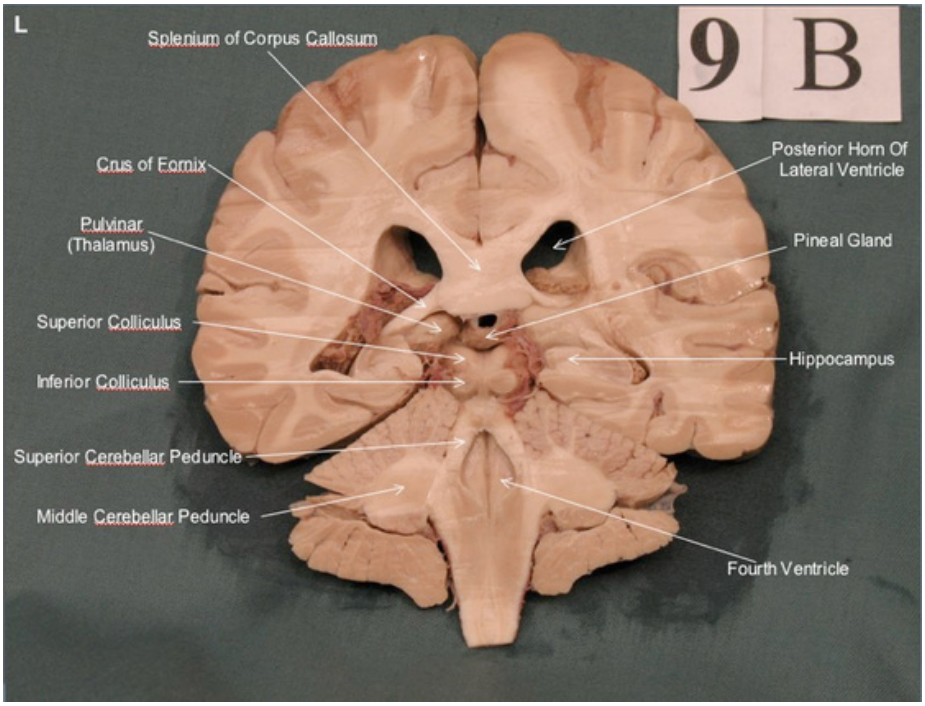


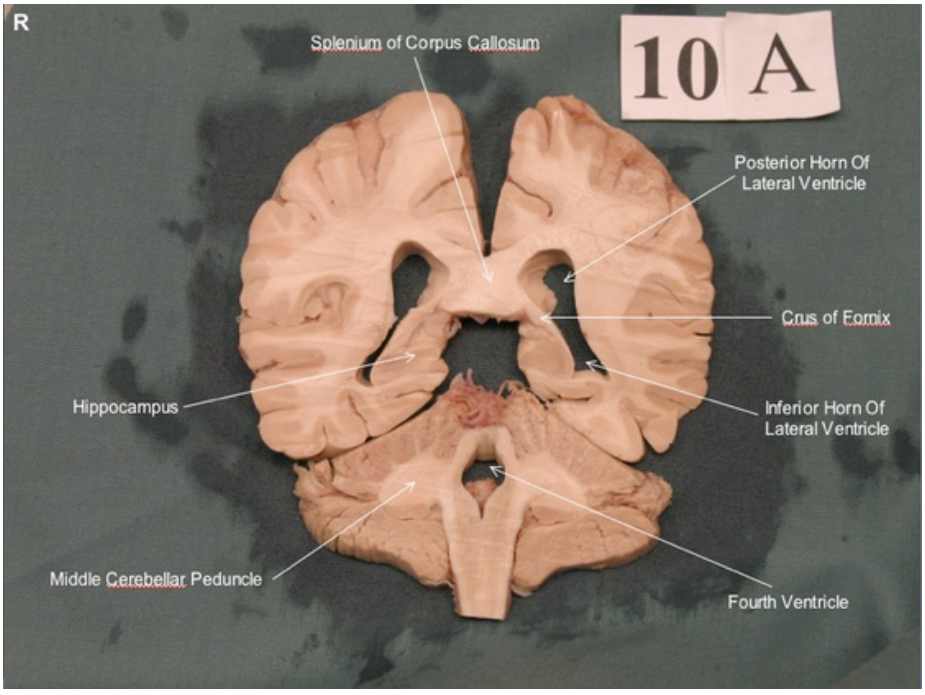


The Cerebrum

Atlas

Coronal Sections

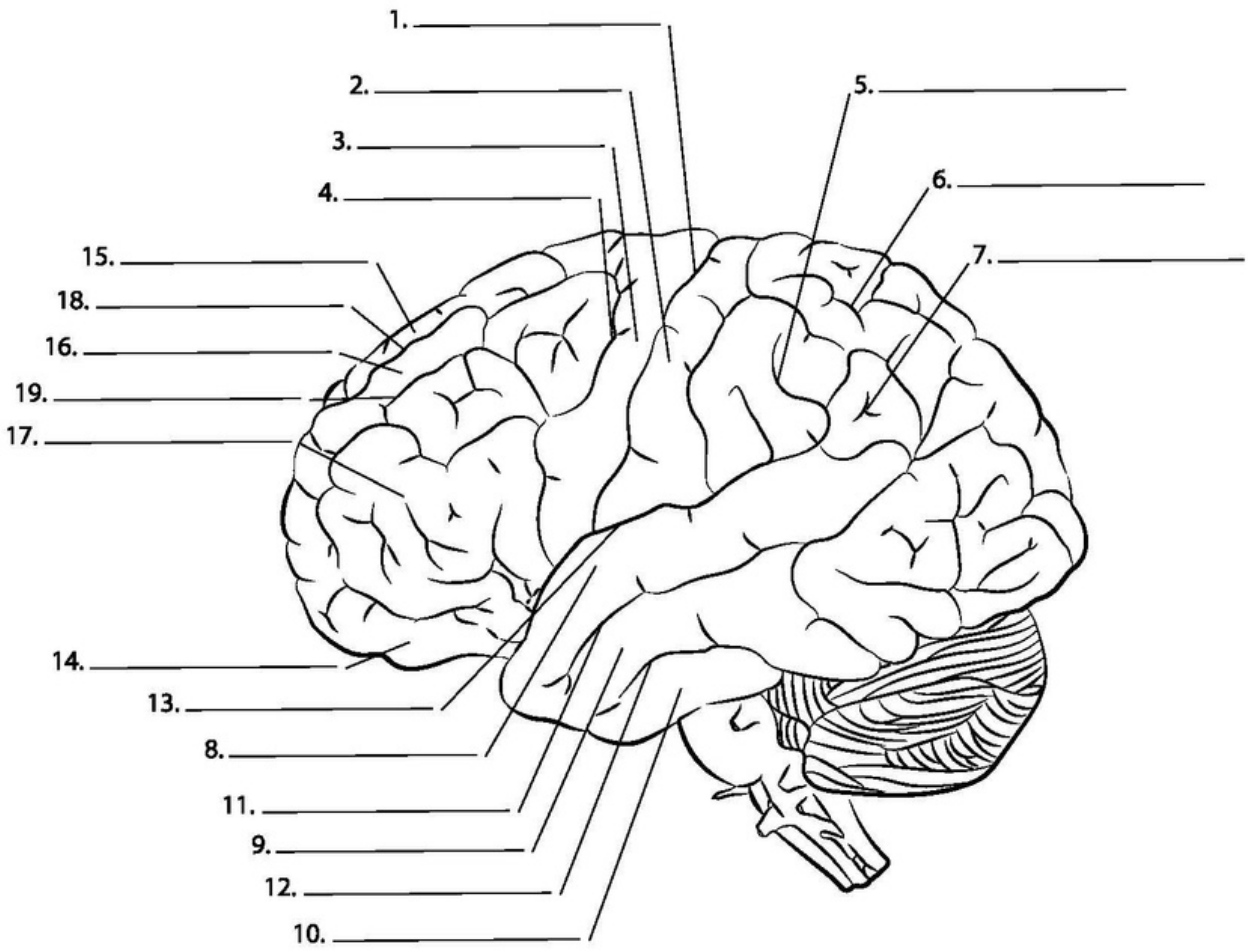




The Cerebrum

Questions

Colour and label each of the sulci and gyri on the superolateral surface of the cerebral hemisphere in the image below:



The Cerebrum

Questions

Colour and label each of the structures visible in the coronal section of the brain below