



Brain and Cranial Nerves

- Did you submit the pre-lab on Canvas?
- Complete the lab activities and get an exit ticket for today
- Don't forget to take the terminology quiz and submit the post-lab before lab next week

Brain and Cranial Nerves

- Case Study: “Stumbling Stan” (in pairs)
- Activity 1: The Structure and Function of the Brain (as a table)
- Activity 2: The Meninges and Flow of Cerebrospinal Fluid (in pairs)
- Activity 3: Dissection of a Sheep Brain (as a table)
- Activity 4: Identification of the Cranial Nerves (as a table)
- Activity 5: Evaluation of Cranial Nerve Function (in pairs)
- Putting it all Together

Reminder – the first page of the instruction book contains the terminology list for each each lab. These terms are the structures you need to be able to identify

“Stumbling Stan”

Have you read the instruction book? You need to read the Case Study and answers the questions.

Case Study: “Stumbling Stan”

It's a busy night in the city's emergency department (ER). Paramedics bring in a 63-year-old man named Stan by ambulance. He is writhing in pain due to a terrible headache, can't answer questions properly (he doesn't know today's date), doesn't understand where he is, and is experiencing sudden loss of vision. As they move him into a hospital bed, he reels and vomits. He is conscious but confused. The physician orders an MRI of his head to evaluate the brain and surrounding structures.

Please briefly describe the patient's visible symptoms; make an educated guess as to Stan's diagnosis, and list other tests might you wish for Stan to undergo in the **question** of your workbook.

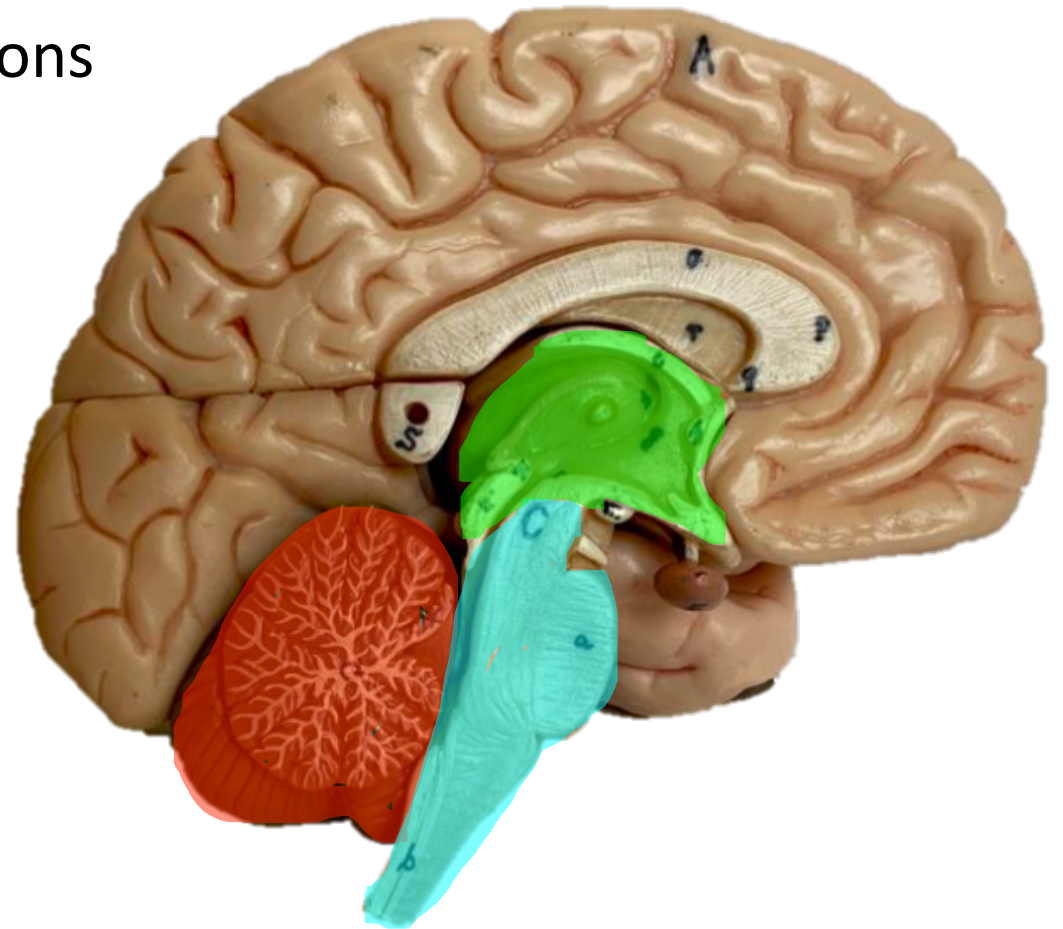
Answer the questions in
your workbook!

Case Study: “Stumbling Stan”

1. Read the Case Study in the Instruction Manual. Describe the symptoms of the patient and make an educated guess as to Stan's diagnosis.
2. What tests might you wish for Stan to undergo?

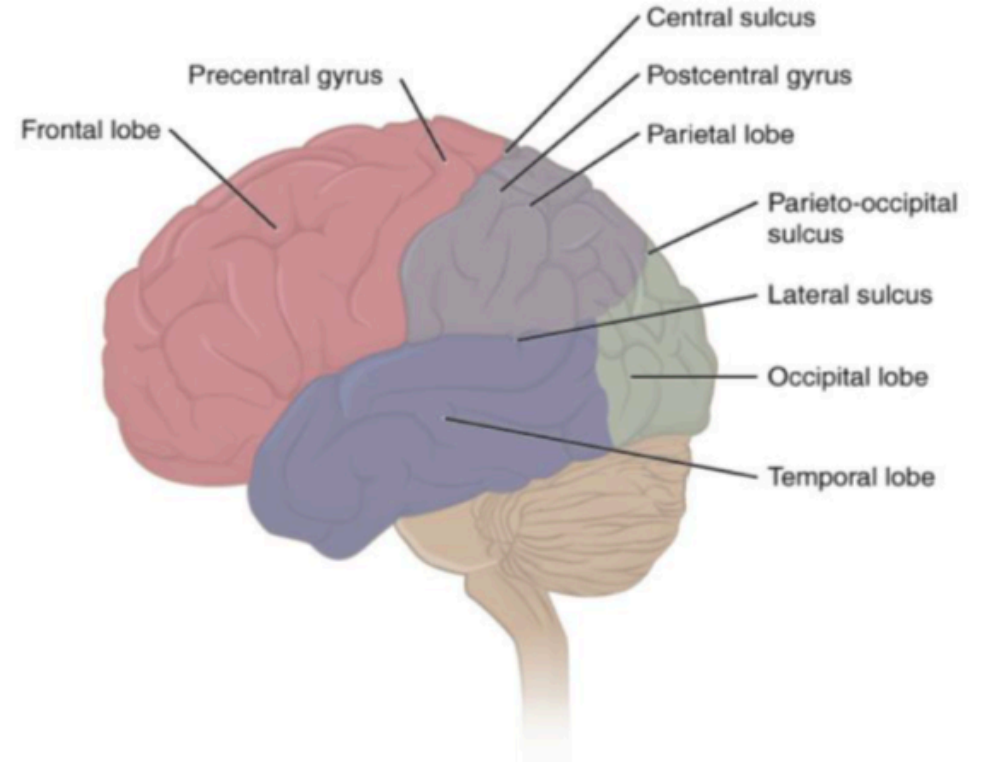
Parts of the Brain

- The brain is made of three major regions
 - Cerebrum
 - Diencephalon
 - Brain stem
 - Cerebellum



Cerebrum – Largest Part of the Forebrain

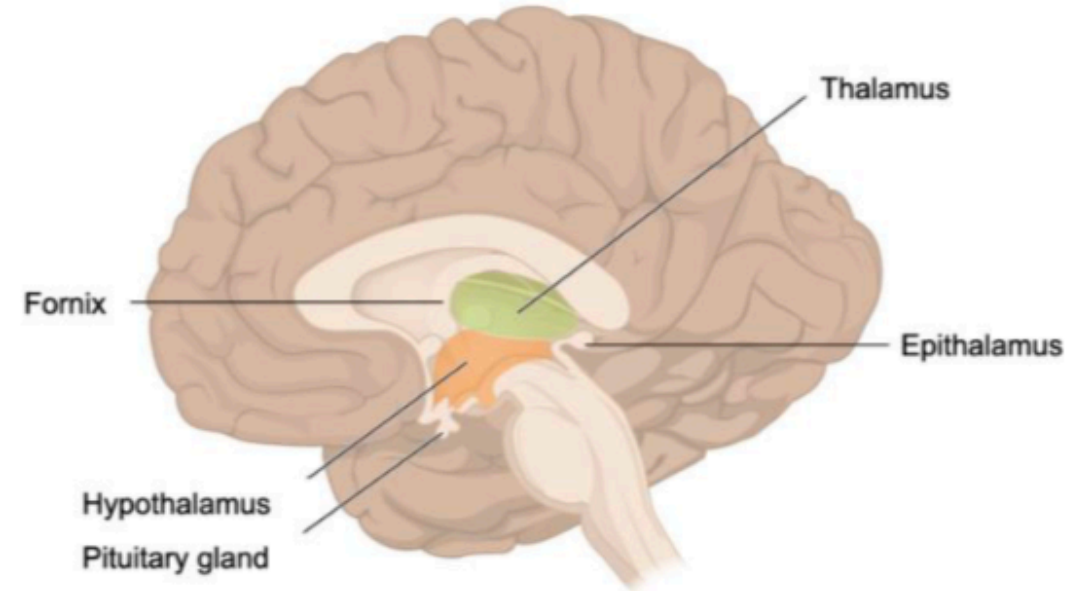
- Gyri – these are the bumps
- Sulci – these are the indentations (depressions)
- Lobes – anatomical regions
- Functional regions



Diencephalon – looks like the sagittal view of a bird's head

Diencephalon

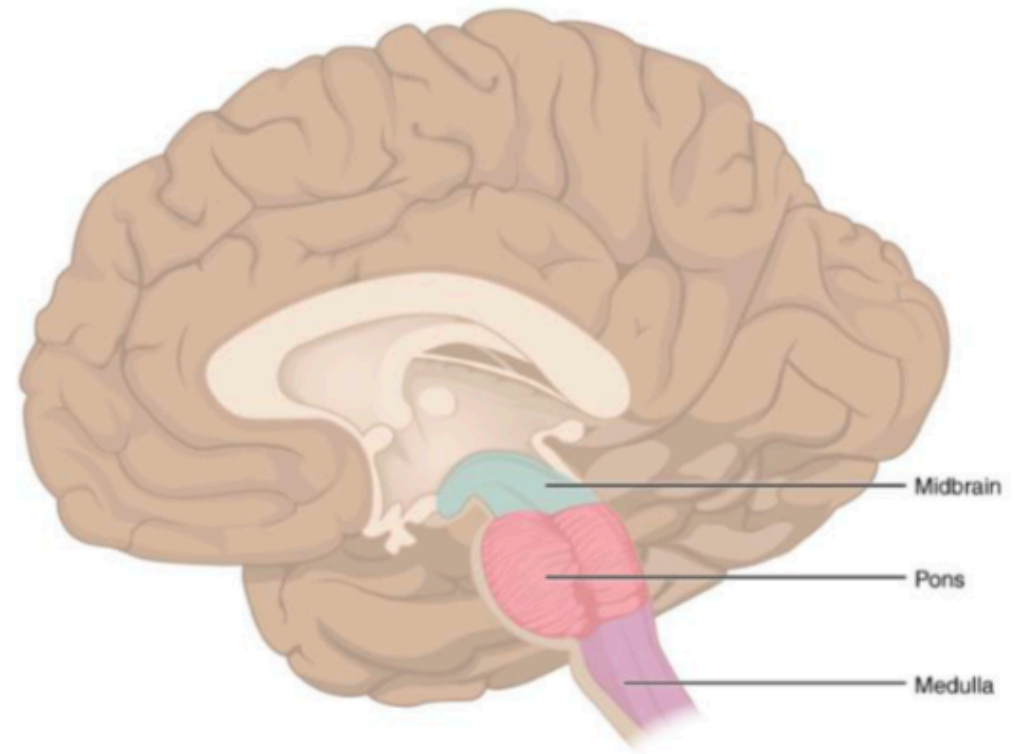
- **Thalamus** – relays signals to the cerebrum
- Epithalamus – contains pineal gland
- **Hypothalamus** – maintains homeostasis



The Brainstem connects the diencephalon to the spinal cord

Brainstem

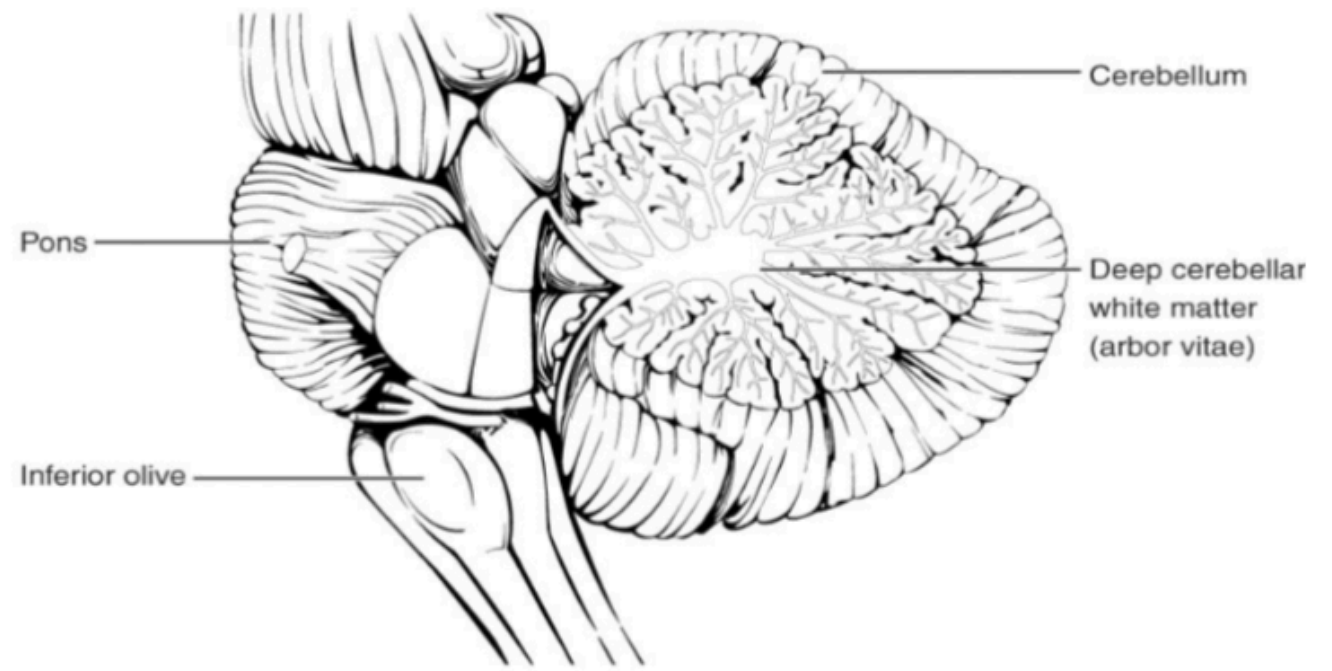
- **Midbrain** – visual and auditory reflexes
- **Pons** – connects cerebellum and cerebrum, breathing
- **Medulla** – breathing and heart rate



The Cerebellum helps to coordinate movement and maintain balance

Cerebellum

- Arbor vitae – tracts
- Folia – grey matter



Structure and Function of the Brain

You will now label the parts of the brain on the model. Please label them in chunks (or the labels will fall off). Once you are done, you will get a brain card notecard to complete the spot-check quiz. You must get your instructor's initials for this activity.

4. QUIZ TIME! Take 10-15 minutes and study the structures of the brain and then return all of the labels back to the terminology sheet.
5. Your instructor will now give each of you a brain structure notecard for a spot-check quiz.



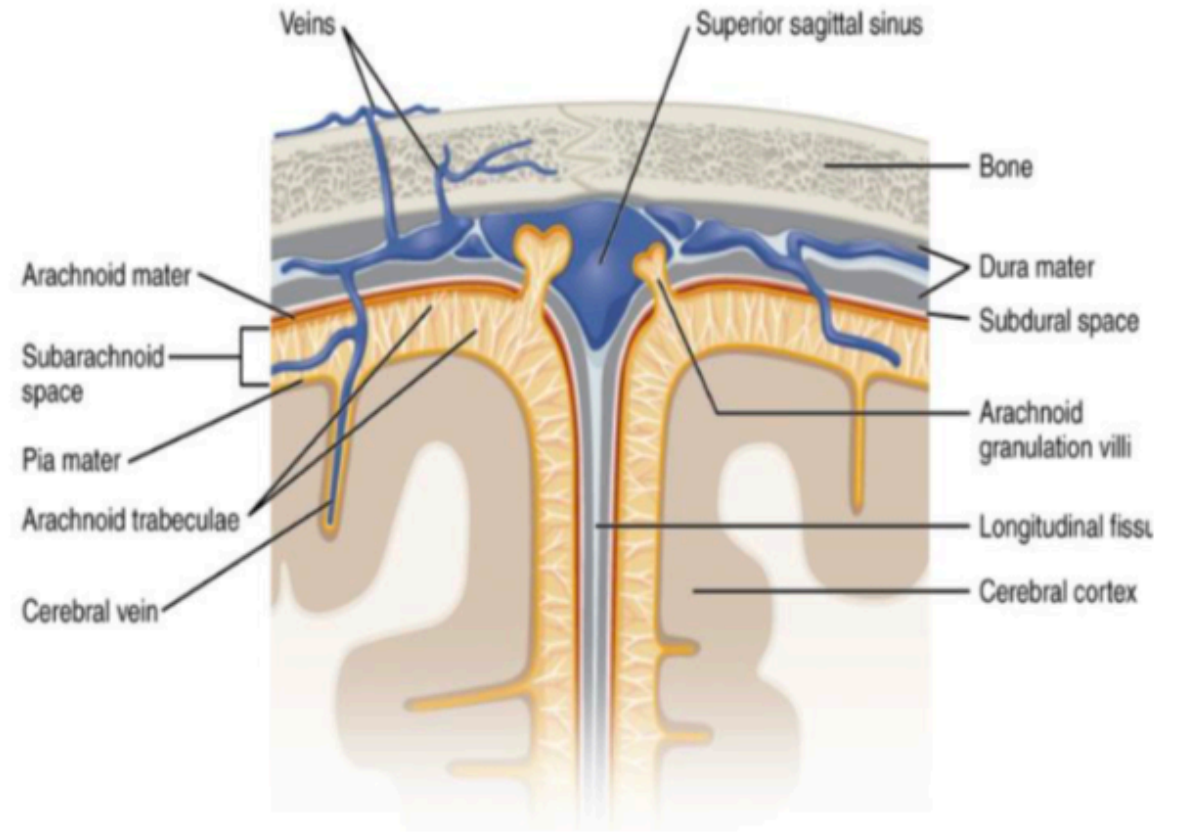
6. Use the labels to mark just those 5 structures or write answers here
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

Instructor initials after the spot-check quiz: _____.

Meninges of the Brain

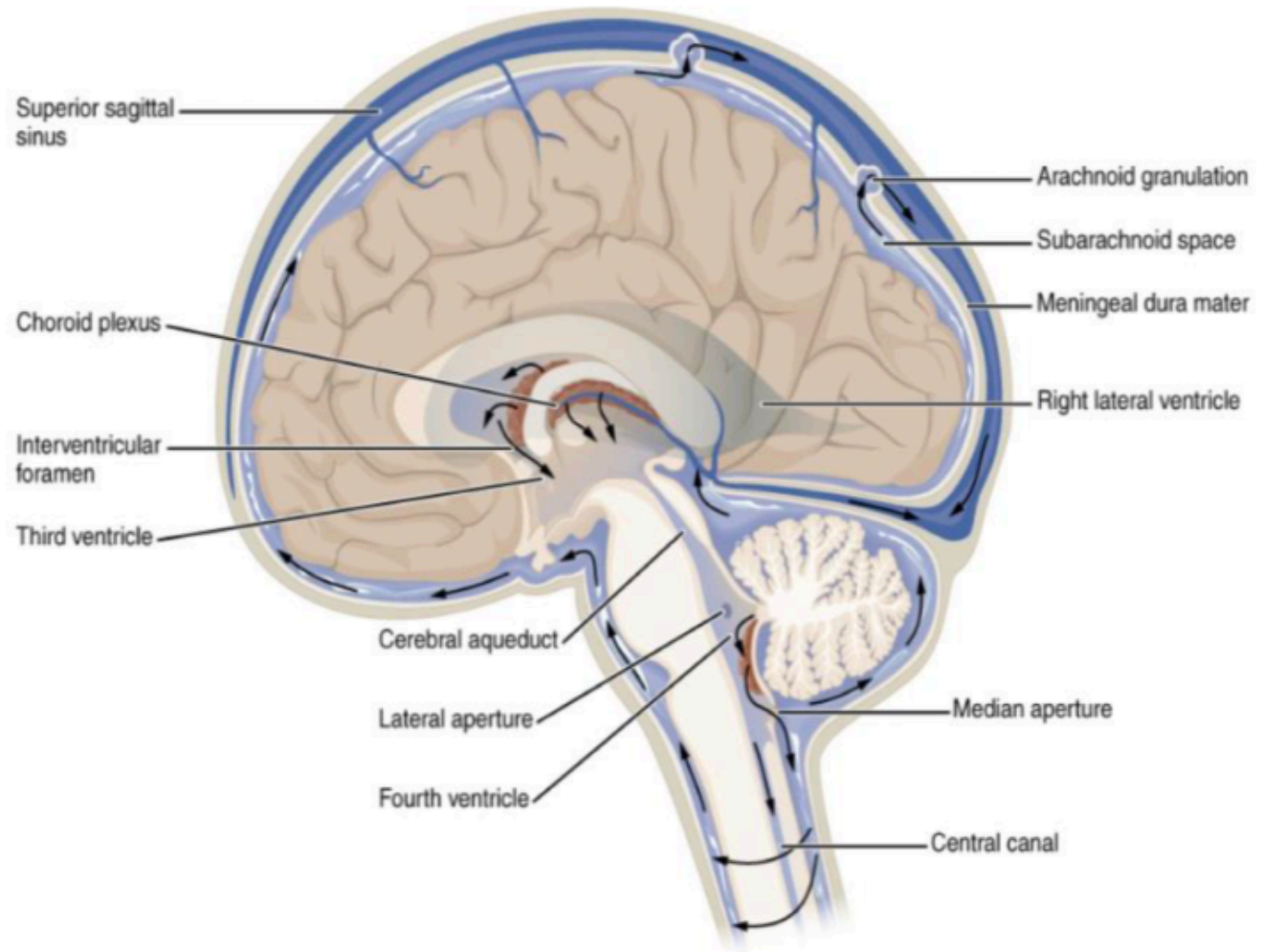
The brain is protected by skin, bone and 3 meningeal layers (dura mater, arachnoid mater, pia mater).

Make sure you know the location of each layer, relative to the others!



Ventricles of the Brain

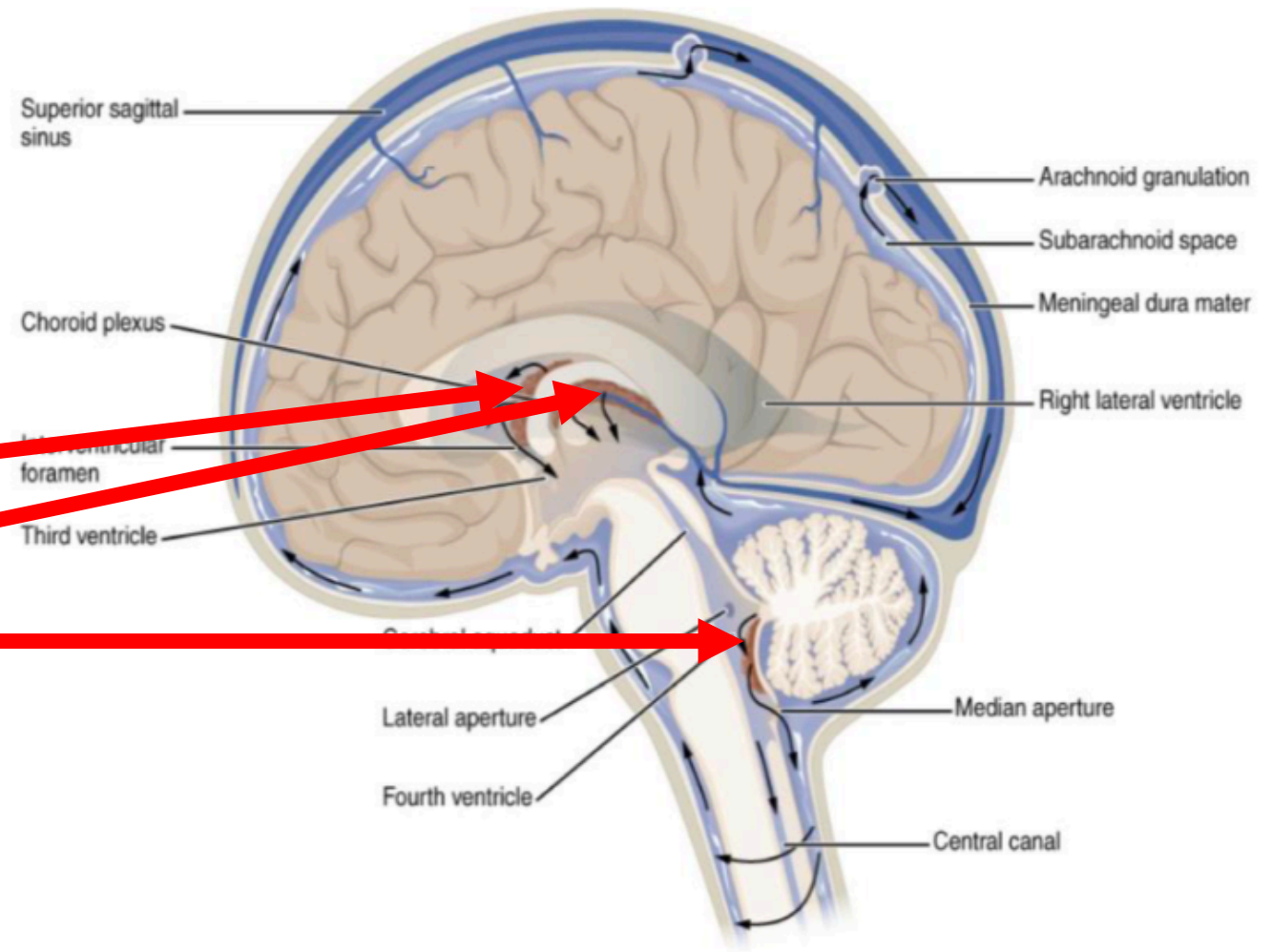
Ventricles are compartments in the brain that help to form, hold and circulate CSF to the brain cells.



Flow of CSF

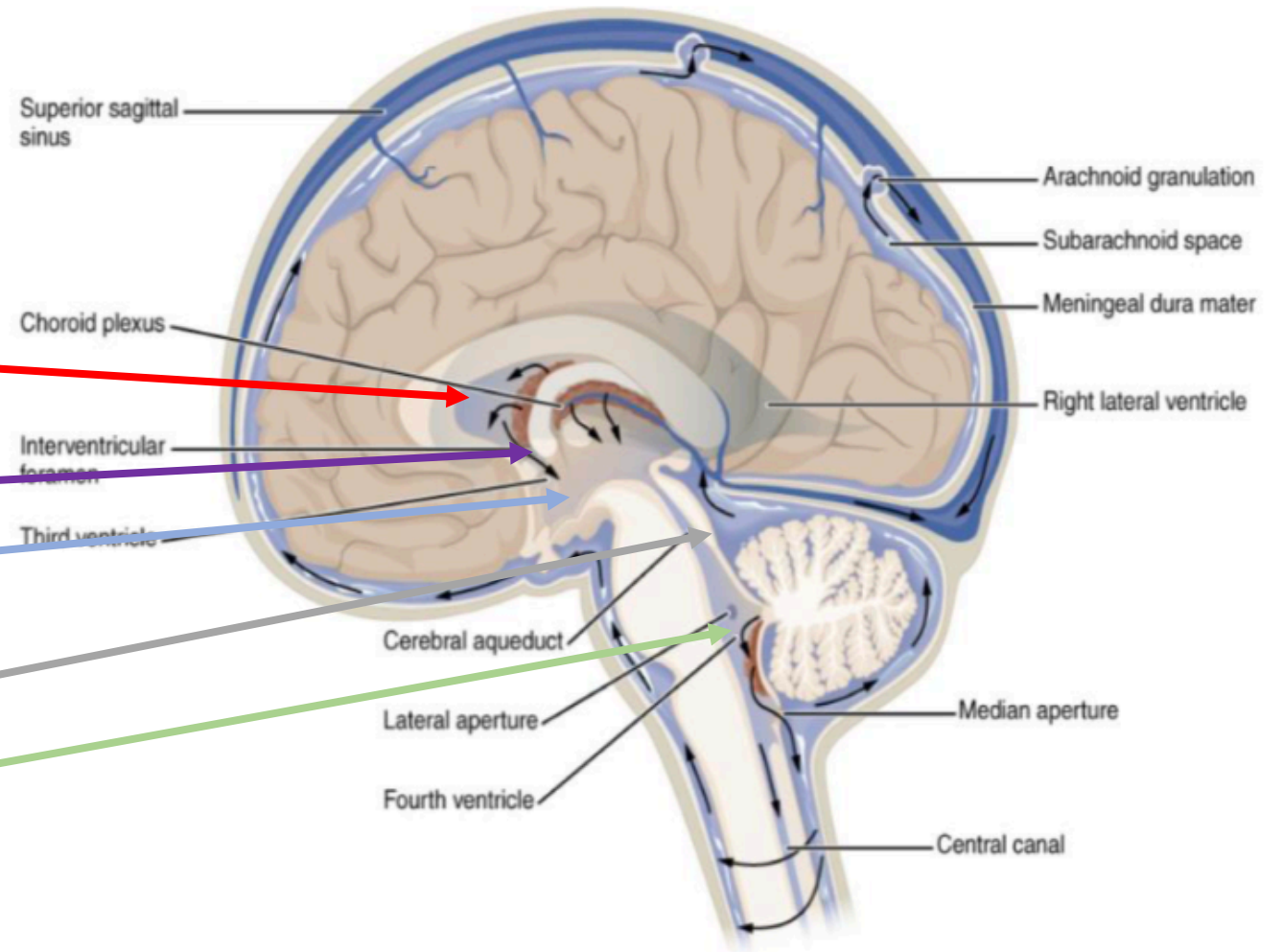
CSF is formed at the **choroid plexus** (mass of blood capillaries) in the wall of the

- Lateral ventricles
- Third ventricle
- Fourth ventricle



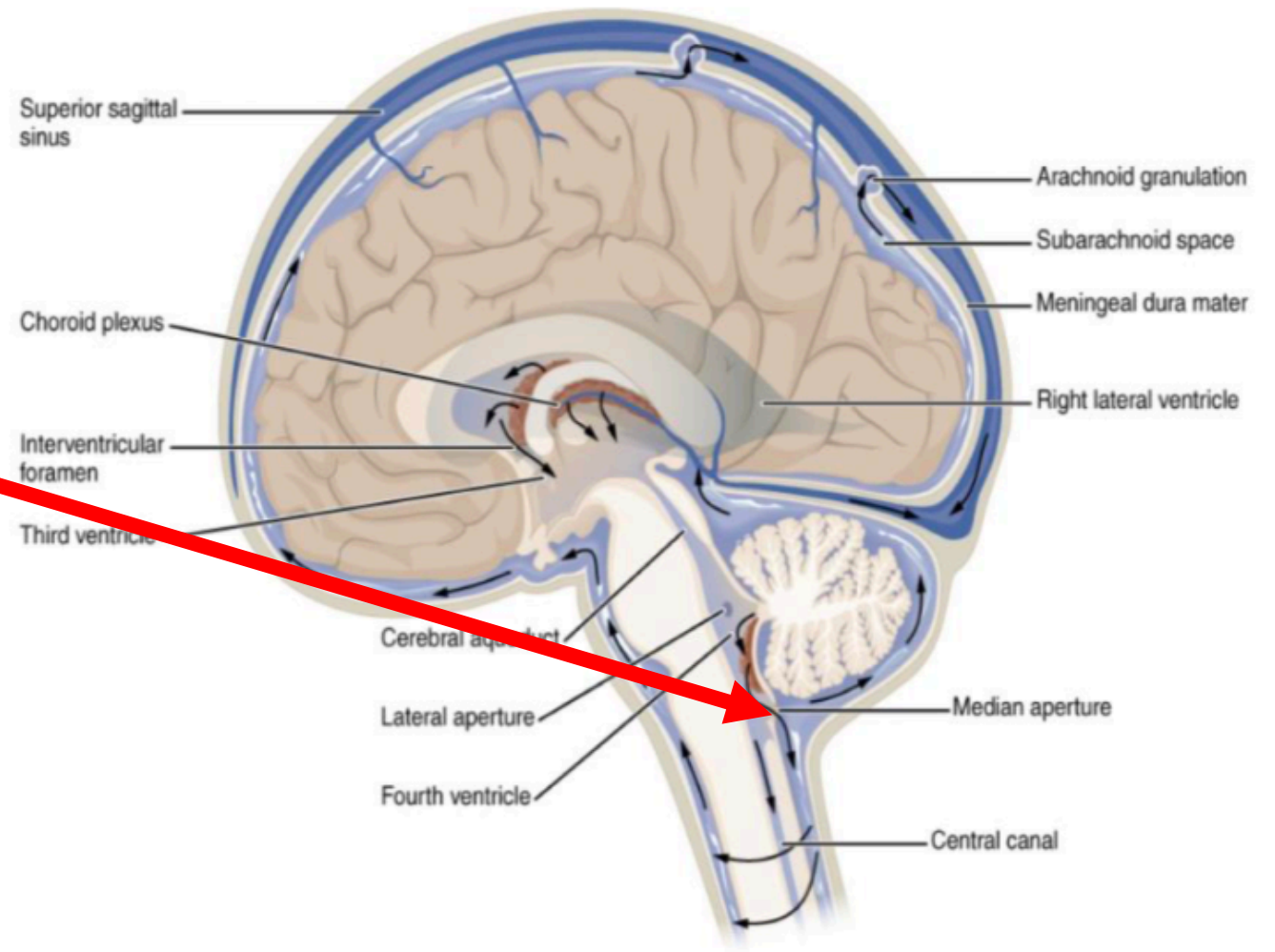
Flow of CSF

It flows through the **lateral ventricle**, through the **interventricular foramen**, to the **third ventricle**, and then through the **cerebral aqueduct** to the **fourth ventricle**



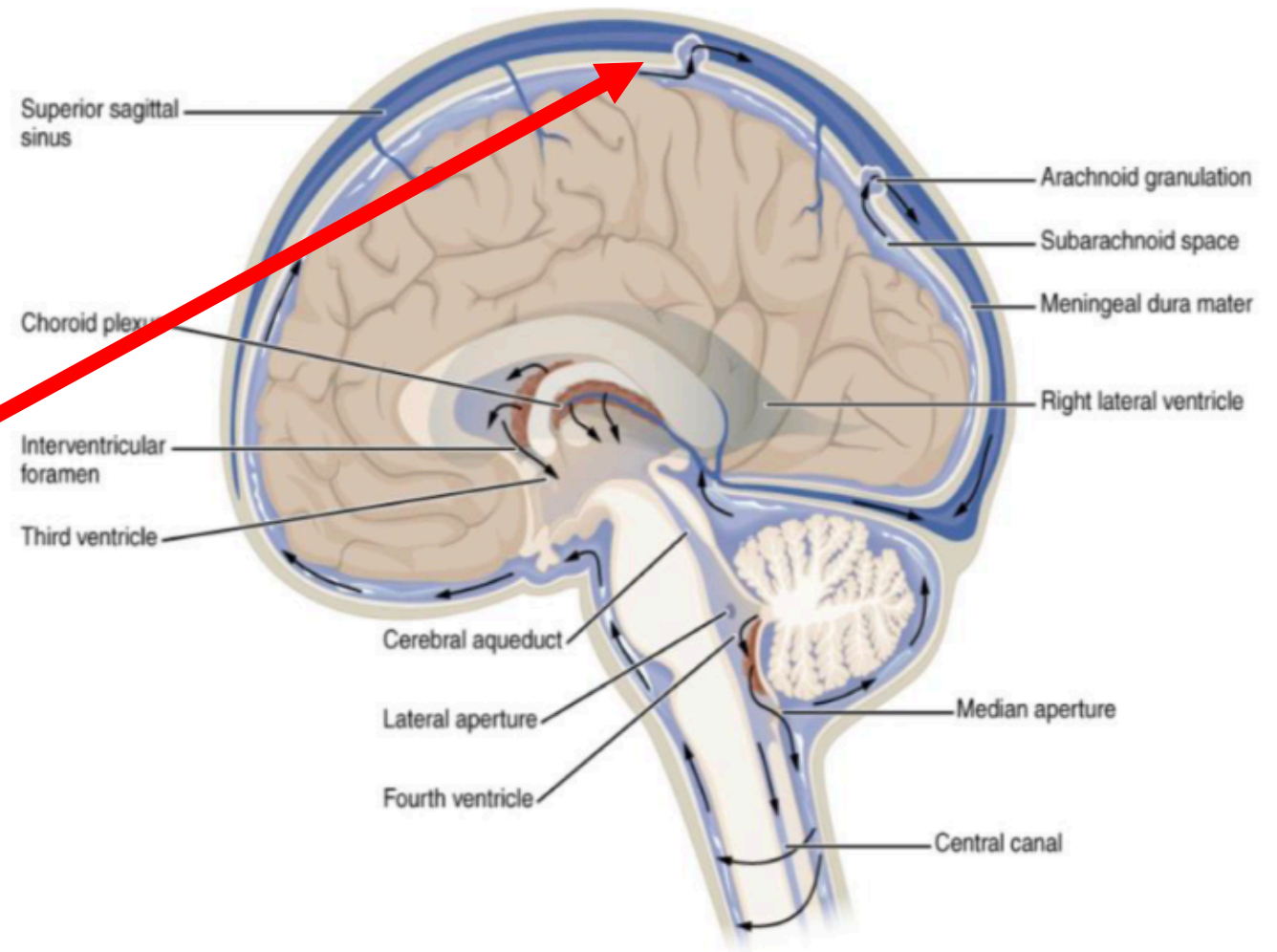
Flow of CSF

It flows through **apertures** (holes) into the **subarachnoid space** (surrounding the outer surface of the brain), and to the **central canal of the spinal cord**.



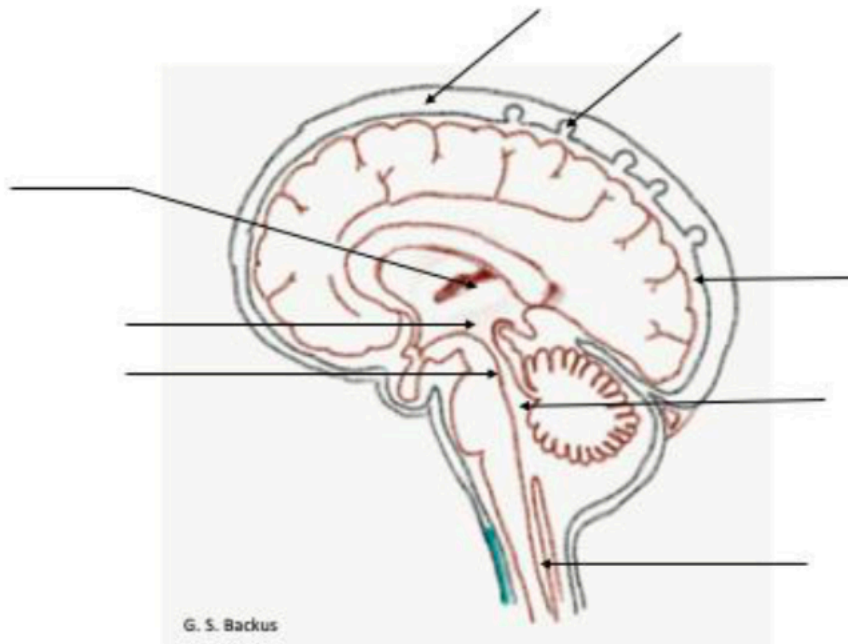
Flow of CSF

Due to hydrostatic pressure CSF is pushed out through the meningeal layer and into the **sagittal sinus at the arachnoid villi**, which reclaims the CSF into the bloodstream



Trace the Path of CSF

You will now trace the path of CSF through the brain and spinal cord.

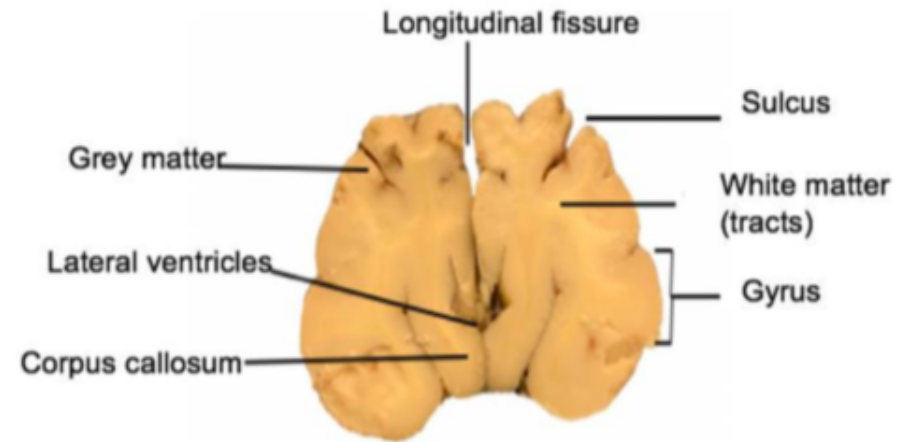
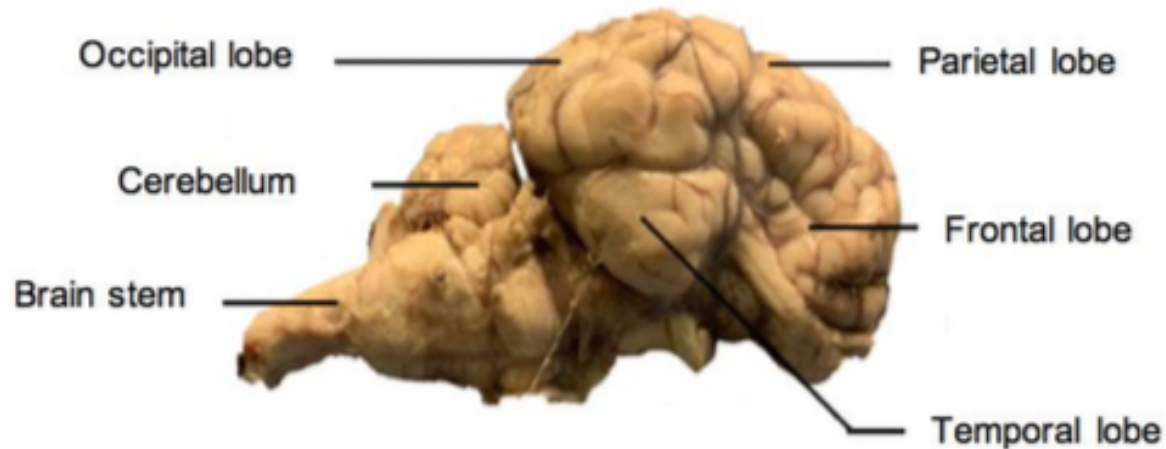


- ➔ 11. Trace the path of cerebrospinal fluid from its formation to its return to the venous circulation by completing this fill-in-the blank series. The Instruction manual will give you the appropriate background.

The choroid plexus is lined with _____ cells. The function of these cells is to _____. The third ventricle runs through the _____. The third and fourth ventricle are connected by a structure called the _____. CSF reaches the subarachnoid space by 1. _____ 2. _____ 3. _____. In order to recycle the CSF, it is pushed through the _____ into the subdural sinus.

Activity 3: Dissection of the Sheep Brain

Please wear an apron, collect the dissections tray and tools, and where lab gloves!



Activity 4: Identify the Cranial Nerves

There are a total of 12 cranial nerves that all attach to the brain. For each nerve we are going to learn:

- Name
- Location
- Type
- Function

**Don't worry there are some fun tricks to learning these.

Below is a song to help you learn.

<https://www.youtube.com/watch?v=PcQyJR4dGxc>

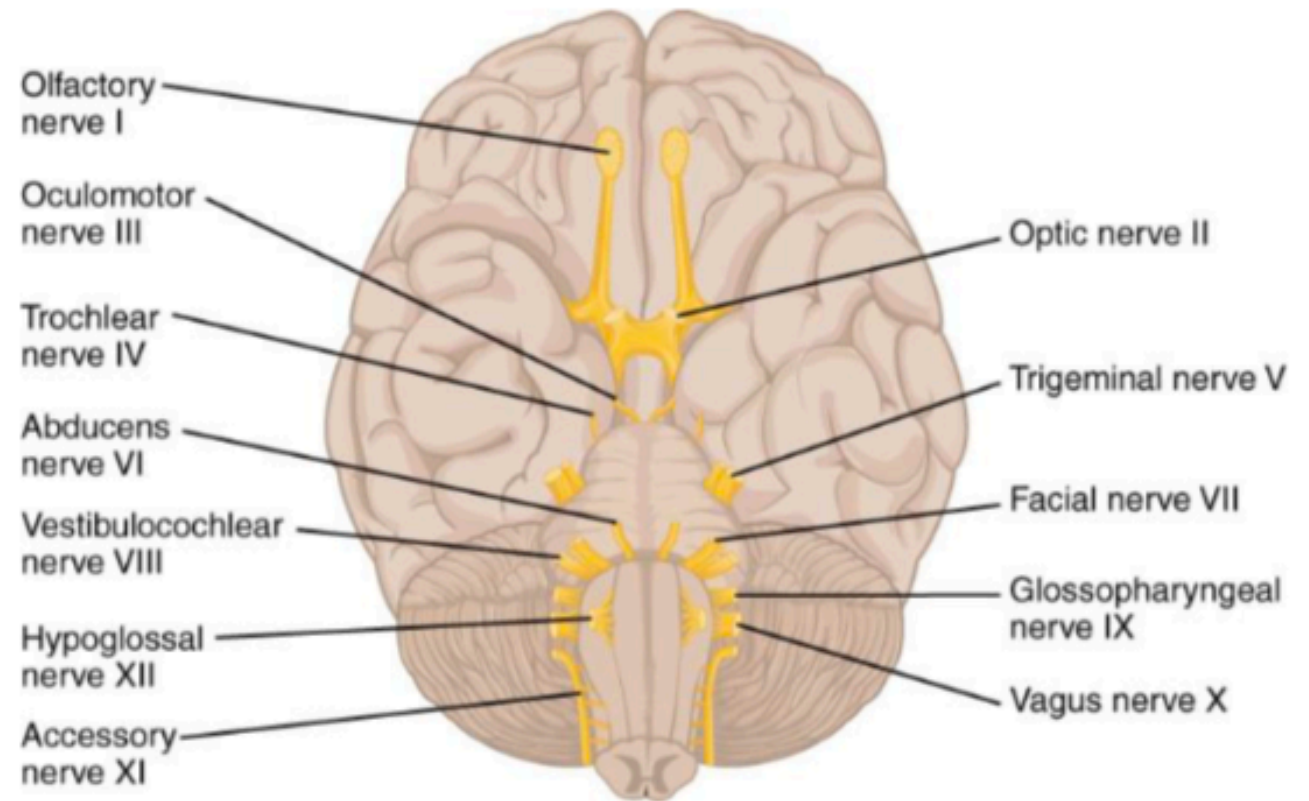


Figure 1: Cranial nerves on the inferior view of the brain.

Activity 4: Identify the Cranial Nerves

You will identify 5 of these nerves using the sticky labels in the binder on the model in the binder on the model

- Olfactory
- Optic
- Trigeminal
- Accessory
- Hypoglossal

The rest you will identify on the image in your workbook/manual.

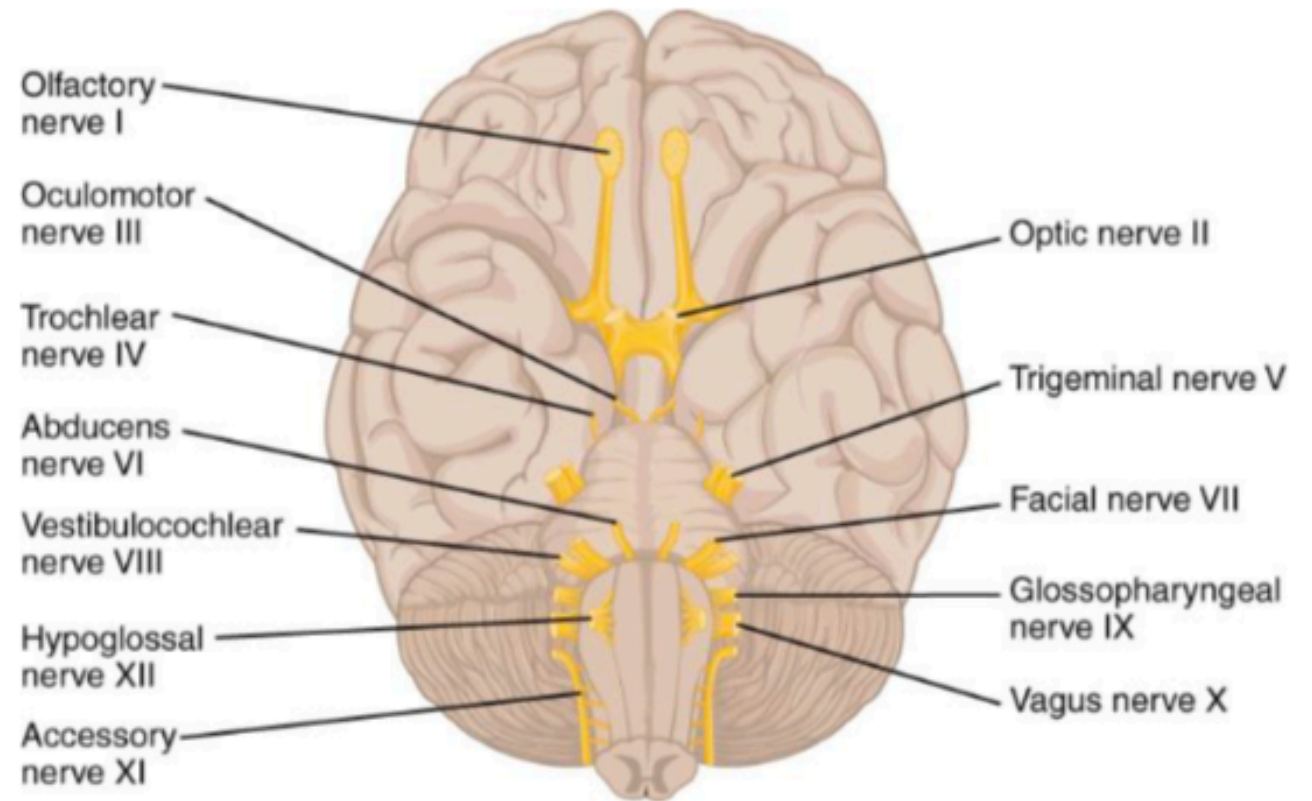
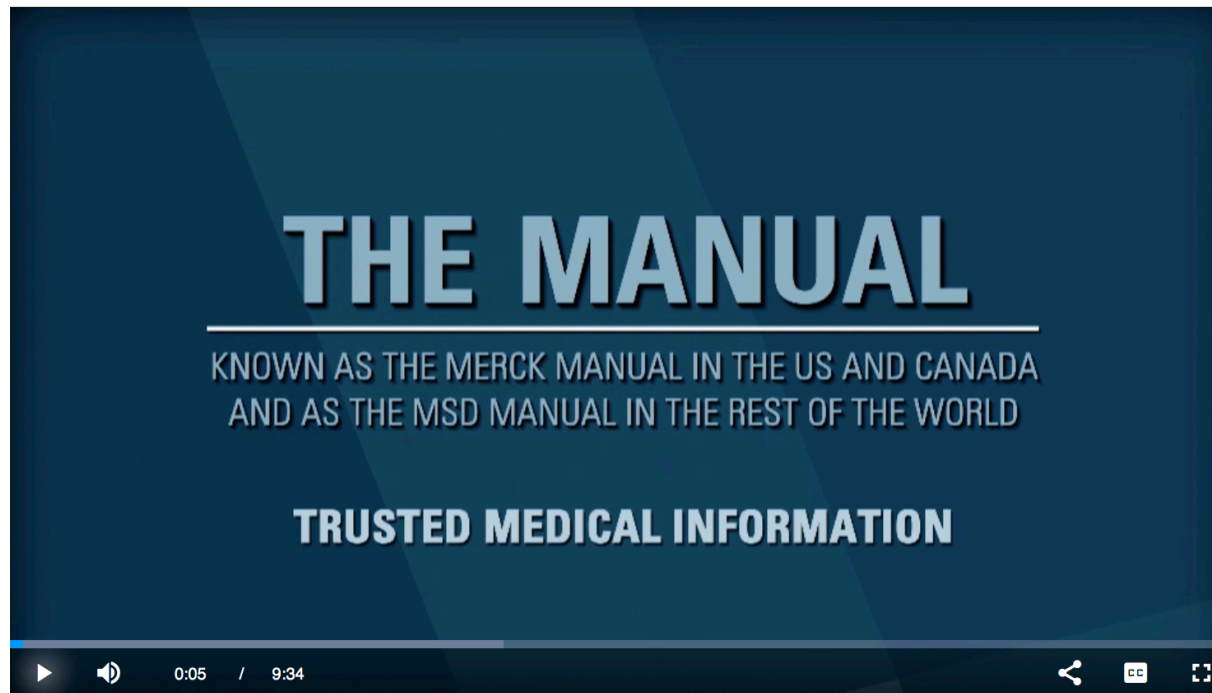


Figure 1: Cranial nerves on the inferior view of the brain.

Activity 5: Evaluating Cranial Nerve Function

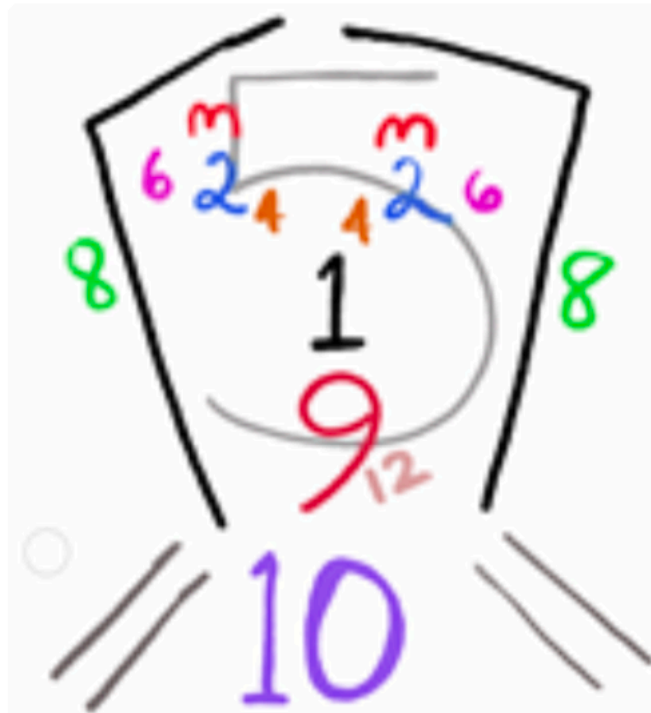
Cranial nerve tests are used to assess presence and location of neurological damage. You will follow the procedure in your manual to conduct a cranial nerve test. You will then interpret the data from your patient.



<https://www.merckmanuals.com/professional/neurologic-disorders/neurologic-examination/how-to-assess-the-cranial->

Activity 5: Evaluating Cranial Nerve Function

Cranial nerve tests are used to assess presence and location of neurological damage. You will follow the procedure in your manual to conduct a cranial nerve test. You will then interpret the data from your patient.



Putting it all together

Table 5: Results of the cranial nerve function test. Patient: 20-year old male, healthy.

Olfactory	Can detect odors out of both nostrils	Vestibulocochlear	Hearing normal, slight tilt to the right during walk
Optic	Can detect images on Snellen chart	Glossopharyngeal	Swallowing and taste is intact
Oculomotor, Trochlear, Abducens	Can track finger movements	Vagus	Normal
Trigeminal	Weakness in masseter muscle on right side	Accessory	Slight weakness on right rotation of head
Facial	Facial muscle movements limited on right side	Hypoglossal	Tongue drifts to right

Lab Clean-Up: Before you leave be sure to...

- Please use warm soapy water to clean all of your dissection tools.
- Dry them with a paper towel and put them away.
- Remove the blue insert from the tray, and clean both with soapy water.
- Leave the blue insert to dry on the dry rack and wipe the tray dry with a paper towel.
- Be sure to spray down and wipe your lab bench!