

## **Laboratory Activity No. 8**

### **THE NERVOUS SYSTEM**

#### **Scope of the Laboratory Activity**

This laboratory activity consists of:

- 8.1. The Human Brain
- 8.2. The Cranial Nerves
- 8.3. The Human Reflex Arc

#### **Overview**

In this laboratory activity, we will examine further the structures of the human brain and their functions. We will also familiarize ourselves with the different cranial nerves and their respective functions. The last activity on eliciting reflexes will help you appreciate the different reflexes and their functions.

#### **Objectives**

At the end of this laboratory activity, you will be able to:

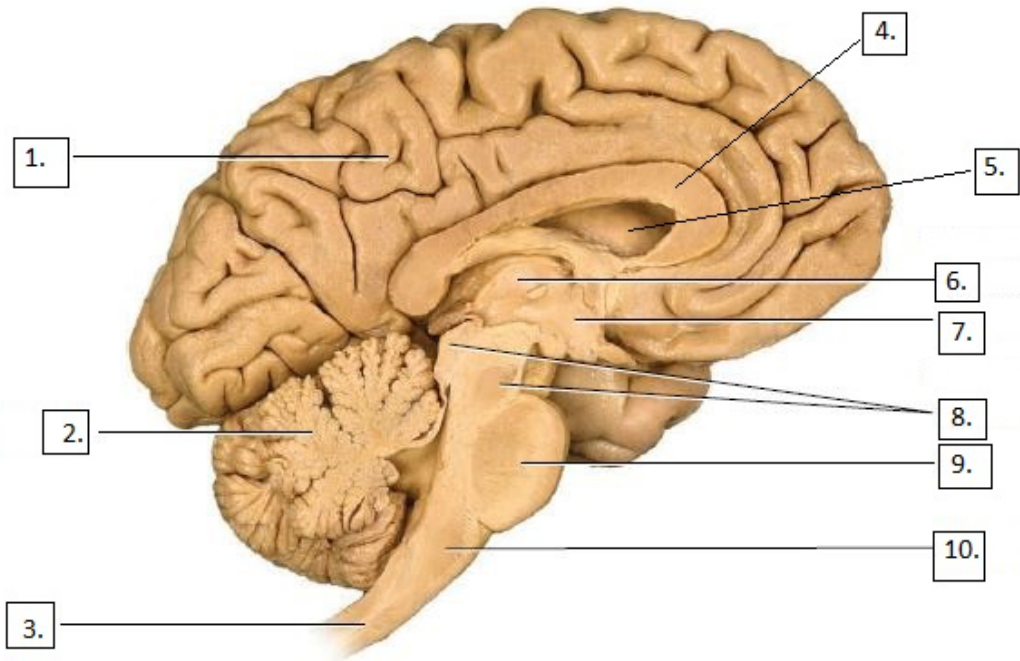
1. Recognize structural characteristics of the human brain
2. Locate well-recognized functional areas of the human cerebral hemisphere
3. Identify the location and functions of the cranial nerves
4. Appreciate the different reflexes in human
5. Identify the organ(s), receptors involved, and the action elicited by selected reflexes

#### **Laboratory Activity 8.1. The Human Brain**

Materials needed:

Model of the human brain (or a virtual illustration of the human brain)  
Anatomic charts (or virtual anatomic chart)

1. Study the model of the human brain provided (or the virtual illustration of the human brain).
2. With reference text on hand, take note of the external and internal parts of the brain, taking note of their respective size, shape, position, and function.
3. Label the figure below. Write the name of the part at the space provided corresponding to the number being pointed in the figure.

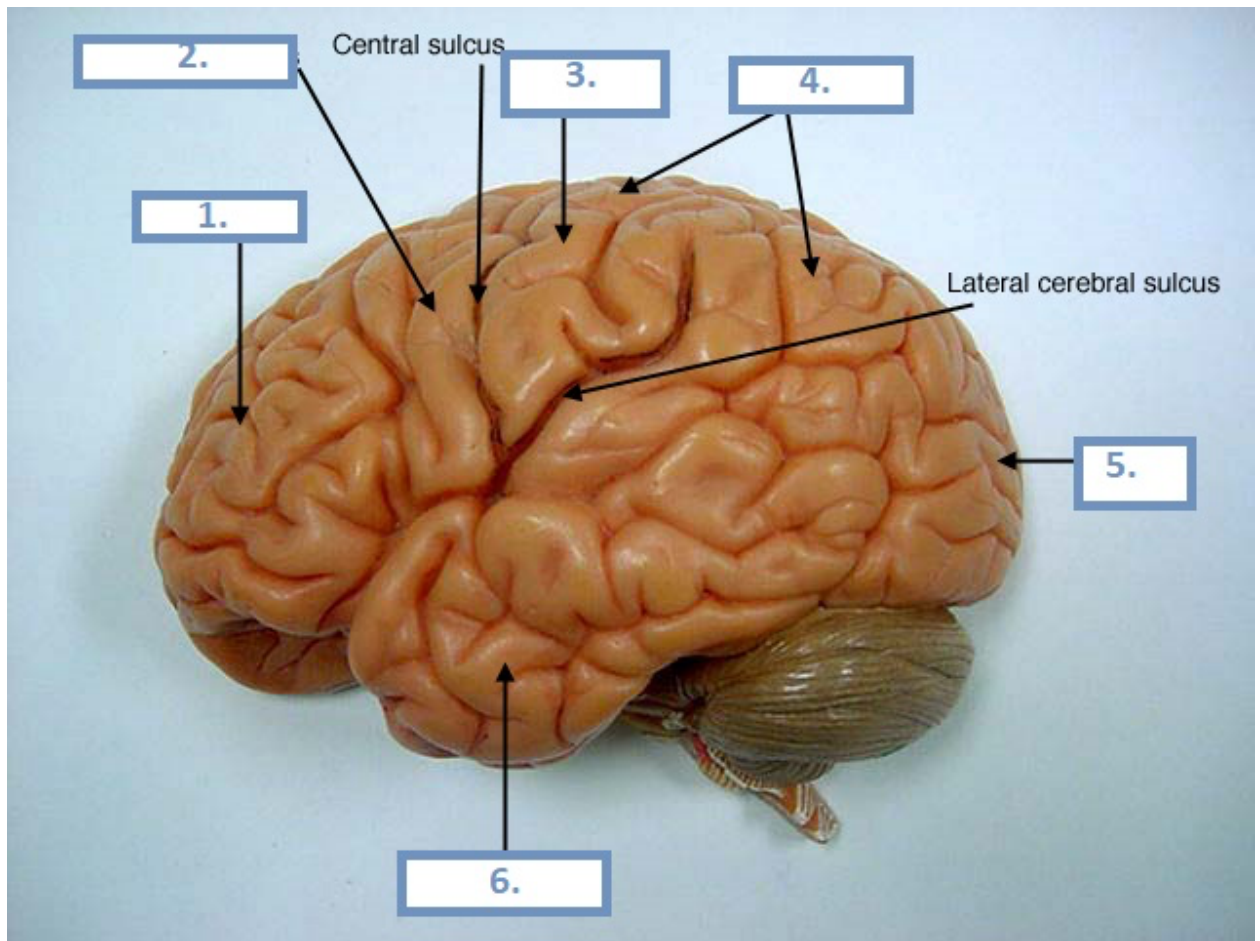


Write your answers below:

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

4. Label the figure below taking note of the different lobes of the cerebral hemisphere. Write the space provided the name of the part being pointed to and identify the functional area that is associated in the part.

Name of the Part	Functional Area
1.	
2.	
3.	
4.	
5.	
6.	



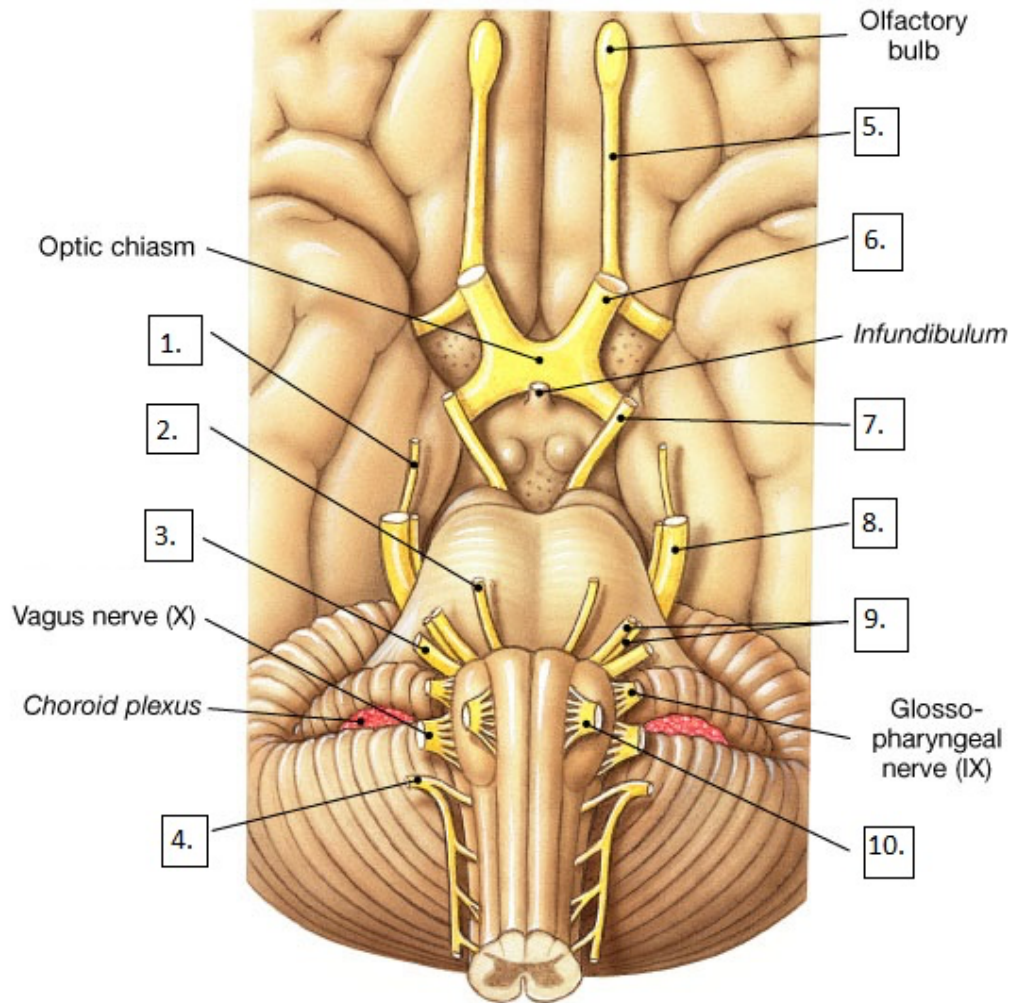
## Laboratory Activity 8.2. Cranial Nerves

Materials Needed:

Model of the human brain (or virtual illustration)

Reference text

1. With the human brain model or the virtual illustration, familiarize yourselves with the points from which the cranial nerves arise from the base of the head.
2. Label the figure below by writing the name of the cranial nerves at the space provided.



(b)

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

### Laboratory Exercise 8.3. The Human Reflex Arc

Materials Needed:

Cotton Balls	Tongue Depressor
Reflex Hammer	Penlight

Alternative to the above materials:

- If you do not have a tongue depressor, you may use your toothbrush (or the toothbrush of your partner).
- If you do not have a reflex hammer, you may make an alternative using two pencils, large eraser, and rubber bands. You can watch the instructions on how to make improvised reflect hammer through this video: <https://www.youtube.com/watch?v=uymEIDBzDAI>
- An alternative to penlight is your cellphone flashlight.

Let us try to test some of our reflexes. Get a partner to do the activities below. Follow the directions and record your answers in the spaces provided.

1. PATELLAR (knee-jerk) REFLEX: This is an example of a stretch reflex. Have your partners sit to a lab stool (or table) with feet hanging freely. Have your partner close his/her eyes while you tap the skin over the patellar tendon (located just below the kneecap) with the reflex hammer or the improvised hammer you made. Alternatively, you can tap it using the edge of your hand. See the figure below:



Describe what you observe: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Why does your partner need to be unaware to elicit this reflect? \_\_\_\_\_

\_\_\_\_\_

2. Repeat this for the ACHILLES REFLEX. Have your partner kneel on a bench or chair. Using the reflex hammer, tap the Achilles tendon at the level of the ankle. See figure below.



What did you observe? \_\_\_\_\_

\_\_\_\_\_

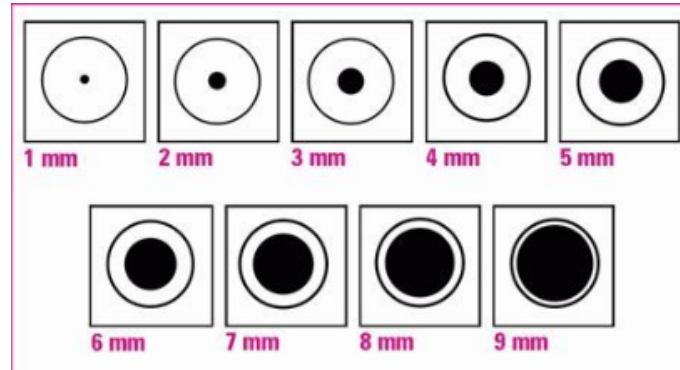
3. CORNEAL REFLEX. This is commonly used to determine how deep under anesthesia a patient may be. It produces a response when something touches the cornea. Have your partner look away from you and then lightly touch the cornea with a small piece of cotton swab. Remember to wash your hands properly before doing this activity.

What occurred? \_\_\_\_\_

What specific cranial nerves might be responsible for the motor response?

\_\_\_\_\_

4. PUPILLARY REFLEX. Light is admitted into the eye through an adjustable aperture (the pupil) surrounded by the iris. To elicit this reflex, go to a darkened room with your partner, letting the eyes to adjust to the dim light. After 2 minutes, measure pupil size in mm using a ruler or the guide below. Shine a narrow beam of light (using the penlight) from your right side into your partner's left eye. Observe what happens.



Describe what you observed in your partner's eye: \_\_\_\_\_

\_\_\_\_\_

Note the pupil size in the darkened room: \_\_\_\_\_ mm

Note the pupil size in bright area: \_\_\_\_\_ mm

What nerves of the autonomic nervous system are involved in:

- Stimulating radial muscles to dilate the pupil: \_\_\_\_\_
- Stimulating circular muscles to constrict the pupil: \_\_\_\_\_

5. GAG REFLEX. Have your partner open his mouth. Gently insert the tongue depressor into the mouth, hold the tongue down, and touch the back of the pharynx with the tongue depressor.

Describe your partner's response: \_\_\_\_\_

\_\_\_\_\_

6. Several types of reflex activity were not investigated in this laboratory activity. The most important of these are the autonomic reflexes which are difficult and impractical to do in a laboratory setting. Complete the chart below, using references, as necessary.

<i>Reflex</i>	<i>Organ Involved</i>	<i>Receptors Involved</i>	<i>Action</i>
Micturition			
Defecation			
Carotid sinus			

**References:**

1. Betts JG, Desaix Peter, Johnson E et al (2017). Chapter 1 An Introduction to the Human Body. *Anatomy and Physiology*. OpenStax Rice University. Pp 7-40.
2. Biology 160: Human Anatomy and Physiology. Available at: <http://faculty.sdmiramar.edu/faculty/sdccd/kpetti/bio160/documents%20biol160.htm>. Accessed 27 September 2020.
3. Tortora GJ & Derrickson B. (2014). Chapter 1 An Introduction to the Human Body. *Principles of Anatomy and Physiology*. John Wiley & Sons, Inc. 14 edition. Pp 1-26.