

Hindbrain: Brainstem, Medulla, Pons, Reticular Activating System and Cerebellum

by Sophia Tutorial



WHAT'S COVERED

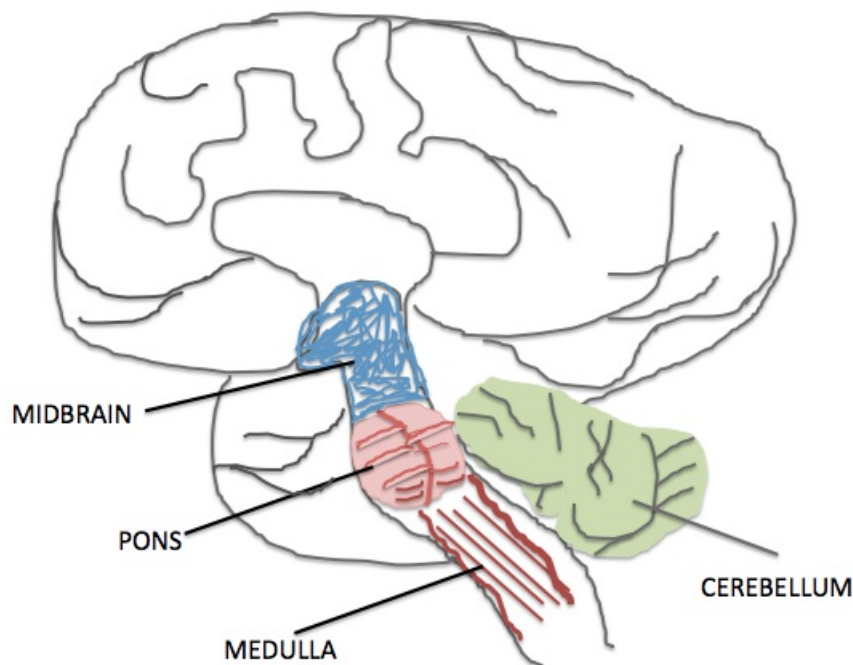
The brain is likely most recognizable by an outer layer of wrinkled material called the cerebral cortex, which is also called the forebrain. This is an area that developed much later on in the history of humans, in terms of evolution. The more basic and earlier parts of brain development, however, occurred in the hindbrain, will be the focus of this tutorial. This tutorial will cover:

1. Overview of the Hindbrain
2. Medulla Oblongata
3. Pons
4. Reticular Formation and the RAS
5. Cerebellum

1. Overview of the Hindbrain

The earlier, more basic parts of brain development occurred in the hindbrain. These are the structures of the brain that are at the center or core of the brain and are connected to the spinal cord that goes out to the rest of the body.

This is also an area known as the **brainstem**, which includes the midbrain as well as the hindbrain.



TERM TO KNOW

Brainstem

Structures of the brain at the center or core of the brain, connected directly to the spinal cord; also referred to as the hindbrain (cerebellum, pons, medulla oblongata)

2. Medulla Oblongata

The first section of the brainstem is the medulla, or the full name, **medulla oblongata**. It is connected directly to the spinal cord.

The medulla oblongata is related to involuntary body processes--those functions that are important in keeping us alive. The medulla regulates functions like breathing, heart rate, digestion, and swallowing. You may think of them as reflexes, but they are not; a lot of reflexes are controlled by the spinal cord itself.

DID YOU KNOW

The medulla even regulates sneezing!

TERM TO KNOW

Medulla Oblongata

The area directly connected to the spinal cord; related to reflexive, involuntary body processes important to living

3. Pons

The **pons** is located directly above the medulla and literally means "bridge" in Latin. You can see why, because the pons is related to transferring information from the hindbrain to the other areas of the brain.

The pons transfers information between the medulla and the brain, as well as the rest of the brain structures, particularly in relation to things like sleep and arousal. It's kind of a messenger that also helps to regulate those types of important bodily processes, and this works in conjunction with the reticular formation, covered in the next section.



TERM TO KNOW

Pons

The area just above the medulla and pons that transfers information between the medulla and brain, as well as the rest of the brain structures

4. Reticular Formation and the RAS

The **reticular formation (RF)** is a little network of neurons, located inside the medulla and up to the pons. It is associated with attention and alertness. It's also related to functions like sleep and arousal, like the pons. The **reticular activating system (RAS)**, activates other areas of the cerebral cortex, and is the system that keeps you awake or alert.



EXAMPLE The RAS ensures that you are awake during certain periods of time, like when you're trying to study for a test late at night.



DID YOU KNOW

Do you ever wonder why children have such short attention spans? Well, it's because the reticular formation isn't fully developed until adolescence.



TERMS TO KNOW

Reticular Formation (RF)

A network of neurons inside the medulla related to attention and alertness

Reticular Activating System (RAS)

A system that heightens other areas of the cerebral cortex and keeps a person awake and alert

5. Cerebellum

The **cerebellum** is a cauliflower-looking structure located at the rear of the brain, right underneath and in the back of the cerebral cortex and all the other structures.

The cerebellum controls movements and helps to regulate coordination and balance. Again, this is a very important basic area of the brain. It keeps you upright and keeps you moving. It's also related to memories of skills and habits, meaning those kinds of things that involve motor movements and basic sorts of memory, that you don't necessarily have to think too hard about.



TERM TO KNOW

Cerebellum

The structure at the back of the brain, behind the medulla and the pons, that helps to control movement and to regulate coordination and balance



SUMMARY

Today's lesson has been a brief **overview of the hindbrain** and its structures. The **medulla oblongata** is connected to the spinal cord and is related to involuntary body processes important to living. The **pons** is responsible for transferring information from the hindbrain to the other areas of the brain. The **cerebellum** helps to control movement and to regulate coordination and balance.

Good luck!

Source: This work is adapted from Sophia author Erick Taggart.



TERMS TO KNOW

Brainstem

Structures of the brain at the center or core of the brain, connected directly to the spinal cord; also referred to as the hindbrain (cerebellum, pons, medulla oblongata).

Cerebellum

The structure at the back of the brain, behind medulla and pons that helps to control movement and to regulate coordination and balance.

Medulla Oblongata

The area directly connected to the spinal cord; related to reflexive, involuntary body processes important to living.

Pons

The area just above the medulla and pons that transfers information between medulla and brain, as well as the rest of the brain structures.

Reticular Activating System (RAS)

A system that heightens other areas of the cerebral cortex and keeps a person awake and alert.

Reticular Formation (RF)

A network of neurons inside the medulla related to attention and alertness.