

The **medulla oblongata** is the lower portion of the brainstem.

Contents

- 1 Location
- 2 Anatomy
 - ◆ 2.1 Two parts: open and closed
 - ◆ 2.2 Landmark fissures and sulci
 - ◆ 2.3 Between the anterior median sulcus and the anterolateral sulcus
 - ◆ 2.4 Between the anterolateral and posterolateral sulci
 - ◆ 2.5 Between the posterior median sulcus and the posterolateral sulcus
 - ◆ 2.6 Lower part
 - ◆ 2.7 Base
- 3 Functions
- 4 Blood supply

Location

By anatomical terms of location, it is rostral to the spinal cord and caudal to the pons, which is in turn ventral to the cerebellum.

For a human or other bipedal species, this means it is above the spinal cord, below the pons, and anterior to the cerebellum.

Anatomy

Two parts: open and closed

The medulla is often thought of as being in two parts,

- an *open part* (close to the pons)
- a *closed part* (further down towards the spinal cord)

The 'opening' referred to is on the dorsal side of the medulla, and forms part of the fourth ventricle of the brain.

Landmark fissures and sulci

The medulla has an anterior median fissure and a posterior median sulcus corresponding to the structures seen in the spinal cord.

On each side the anterolateral sulcus lies in line with the ventral roots of the spinal nerves. The rootlets of cranial nerve XII (the hypoglossal nerve) emerge from this sulcus.

The posterolateral sulcus lies in line with the dorsal roots of the spinal nerves. It gives attachment to the rootlets of the glossopharyngeal, vagus and the accessory nerve or the IX, X, and the XI cranial nerves from above downwards in order.

Between the anterior median sulcus and the anterolateral sulcus

The region between the anterior median sulcus and the anterolateral sulcus is occupied by an elevation on either side called as the pyramid of medulla oblongata. This elevation is caused by the corticospinal tract.

In the lower part of the medulla some of these fibers cross each other thus obliterating the anterior median fissure. This is known as the decussation of the pyramids.

Some other fibres which originate from the anterior median fissure above the decussation of the pyramids and run laterally across the surface of the medulla are known as the external arcuate fibers.

Between the anterolateral and posterolateral sulci

The region between the anterolateral and posterolateral sulci in the upper part of the medulla is marked by a swelling known as the olive.

It is caused by a large mass of gray matter known as the inferior olivary nucleus.

Between the posterior median sulcus and the posterolateral sulcus

The posterior part of the medulla between the posterior median sulcus and the posterolateral sulcus contain tracts that enter it from the posterior funiculus of the spinal cord. These are the fasciculus gracilis lying medially next to the midline, and the fasciculus cuneatus lying laterally.

These fasciculi end in rounded elevations known as the gracile and the cuneate tubercles. They are caused by masses of gray matter known as the nucleus gracilis and the nucleus cuneatus.

Just above the tubercles the posterior aspect of the medulla is occupied by a triangular fossa which forms the lower part of the floor of the fourth ventricle. The fossa is bounded on either side by the inferior cerebellar peduncle which connects the medulla to the cerebellum.

Lower part

The lower part of the medulla, immediately lateral to the fasciculus cuneatus is marked by another longitudinal elevation known as the tuberculum cinereum.

It is caused by an underlying collection of gray matter known as the spinal nucleus of the trigeminal nerve.

The gray matter of this nucleus is covered by a layer of nerve fibers that form the spinal tract of the trigeminal nerve.

Base

The base of the medulla is defined by the commissural fibres, crossing over from the ipsilateral side in the spinal cord to the contralateral side in the brain stem - below this is the spinal cord.

Functions

It controls autonomic functions and relays nerve signals between the brain and spinal cord.

The medulla oblongata is responsible for controlling several major autonomic functions of the body:

- respiration (via dorsal respiratory group and ventral respiratory group)
- blood pressure
- heart rate
- reflex arcs
- vomiting

Blood supply

Blood to the medulla is supplied by a number of arteries.

- Anterior spinal artery: The anterior spinal artery supplies the whole medial part of the medulla oblongata. A blockage (such as in a stroke) will injure the pyramidal tract, medial lemniscus and the hypoglossal nucleus. This causes a syndrome called medial medullary syndrome.
- Posterior inferior cerebellar artery (PICA): The posterior inferior cerebellar artery, a major branch of the vertebral artery, supplies the posterolateral part of the medulla, where the main sensory tracts run and synapse. (As the name implies, it also supplies some of the cerebellum.)
- Direct branches of the vertebral artery: The vertebral artery supplies an area between the other two main arteries, including the nucleus solitarius and other sensory nuclei and fibres. Lateral medullary syndrome can be caused by occlusion of either the PICA or the vertebral arteries.