

# Diencephalon

*Diencephalon* also called **midbrain** consists of 5 functionally and morphologically distinct parts. Dorsoventrally they are: *epithalamus*, *thalamus*, *metathalamus*, *subthalamus* and *hypothalamus*.

## Anatomy

The midbrain connects to the upper end of the brain stem. It is located **between the hemispheres of the terminal brain**, thus it is not well visible. The only visible structure lies on the ventral surface of the brain, and that is the hypothalamus. The posterior border is formed by the upper end of the interpeduncular fossa, or two bumps, the corpora mamillaria. It ends in the area of the optic chiasm.

The *diencephalon* is formed by further brain development of the **anterior cerebral sac** (*prosencephalon*), in which the **original division to allar a basal discs** is evident. The *thalamus* (**sensitive structure**) and basal *hypothalamus* (**visceromotor structure**) develop from the alar plates.

## Description

The most conspicuous part of the midbrain are the two arches, which are the *thalami* that form the lateral wall of the "IIIrd ventricle". Furthermore the choroidal fibrous bodies of the IIIrd ventricle form the ceiling of the 3rd ventricle. The place of attachment of the choroidal body is called *taenia thalami*.

The diencephalon contains the **3rd cerebral ventricle**, which is the continuations of the ***aquaeductus mesencephali***, coming from the **IV.th cerberal ventricle**. It then flows into the *intraventricular foramina*, through which it enters the lateral ventricles (between the hemispheres of the terminal brain).

The medial wall of the diencephalon (side walls of the III. ventricle) is divided by a paired groove - *sulcus hypothalamicus* (corresponds to *sulcus limitans* of the neural tube). This structure divides the diencephalon into **dorsal** and **ventral parts**. The dorsal part includes the *thalamus*, *metathalamus* and *epithalamus*, which are mainly sensitive (sensory). The ventral part includes the *subthalamus* and *hypothalamus*, whose functions are mainly **motoric**.

## Epithalamus

Is the dorsocaudal part of the diencephalon, which consists of **habenular nuclei and pineal body**. **The habenular nuclei are contained in the habenular trigone, which is formed by the extension of the bundle of white matter (stria medullaris thalami)**. **Both trigones together form the habenula**, within which fibers of the of the stria medullaris thalami cross. In this area of crossing the **pineal body (epiphysis)** extends from the epithalamus.

### Nuclei

Inside the habenula there are **habenular nculei** (*nucleus habenularis medialis et lateralis*). Their activity is **somatomotor and visceromotor**, allowing reactions of olfactory and limbic arousal. Habenula is a functional part of the limbic system.

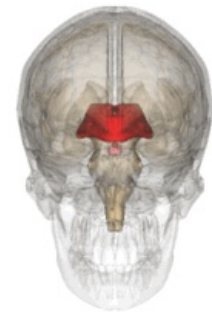
### Tracts

***Commissura posterior*** connects posterior thalamic nuclei, *colliculi superiores* and *pretectal nuclei* of both sides. It contains fibers emerging from the *ncl. interstitialis*, *ncl. Darkshevichi*, *pretectal nuclei* and a part of ***habenulotektal fibers***.

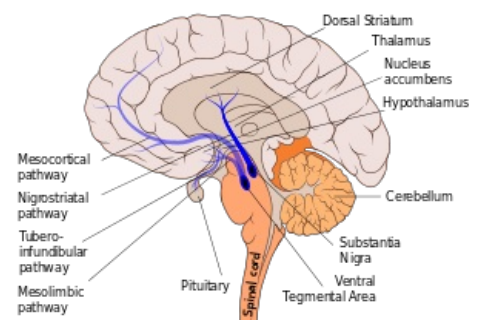
## Thalamus

Thalamus presents a paired part of the diencephalon and it is **oval in shape** The **anterior part** narrows to the *anterior tubercle* and **posterior rounded part** is referred to as the *pulvinar*. The 2 parts of the thalamus are joined to each other through the *interthalamic adhesion*.

## Metathalamus



Diencephalon



Popis mozku

The metathalamus occipitally follows the thalamus. It consists of the *lateral geniculate body*, which is located under the pulvinare and *mediale*. The metathalamus is involved in the visual pathway and auditory pathway, receiving signals from the mesencephalon.

### Nuclei

*Ncl. corporis geniculati lateralis* belongs to the **visual pathway** and *ncl. corporis geniculati medialis* belongs to the **auditory pathway**.

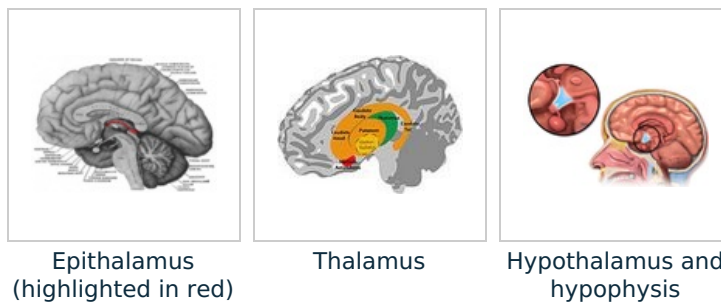
## Subthalamus

Lies ventrally from the thalamus and laterally from the hypothalamus.

## Hypothalamus

A small part of the diencephalon is found **under the thalamus**. Rostrally it reaches up to the *lamina terminalis* and caudally to the posterior margin of the *mamillary bodies*. It lies laterally to the *III. cerebral ventricle* and medially to *capsula interna*. The *infundibulum* protrudes on the base of the hypothalamus and continues as a stalk on which the **hypophysis** (*pituitary gland*) hangs.

*Hypothalamus* serves as the **highest visceromotoric center** in the human body. Further on it is the center of activities of the **autonomic nervous system**. Its functions include also **endocrine** activities.



## Links

### Related articles

- Brain
- Thalamus
- Hypothalamus
- Hypophysis
- Subthalamus
- Epiphysis

### Literature used

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- GRIM, Miloš – DRUGA, Rastislav. *4a. Centrální nervový systém*. 2. edition. Praha : Galén, 2002. ISBN 978-80-7262-938-1.