

# Cerebellum

## Localization

Is located dorsally from the IV. ventricle (fastigium is turned up to the ventricle)  
(originates from the alar plate of brain stem)

## Surface description

- hemispheres (lobus anterior and posterior)
- fissura prima
- pars flocculonodularis
- fissura posterolateralis
- vermis cerebelli (lingula, nodulus, uvula, flocculus, and pyramis vermis)
- sulci and folia cerebelli

## Development

Pars flocculonodularis = vestibular cerebellum = archicerebellum (afferent information is transmitted from vestibular apparatus)

Lobus anterior = spinal cerebellum = palaeocerebellum (afferent information is transmitted from medulla)

Lobus posterior = neocerebellum (afferent information is transmitted from pons Varoli)

## Gray matter

Cortex cerebelli (here is transmitted information from higher and lower levels of CNS)

Nuclei cerebelli (nuclei fastigii, globosi, emboliformes and nucleus dentatus – from nuclei cerebelli is information transmitted out of cerebellum)

## White matter

- Pedunculi cerebellares inferiores (between them is located velum medullare inferius)

Afferent tractus: tractus olivocerebellaris, tractus spinocerebellaris posterior, tractus cuneocerebellaris et bulbocerebellaris, vestibulocerebellaris, reticulocerebellaris.

Efferent tractus: cerebellovestibularis from pars flocculonodularis and cerebelloreticularis.

- Pedunculi cerebellares medii

tractus pontocerebellares

- Pedunculi cerebellares superiores (between them is located velum medullare superius)

Afferent tractus: tractus spinocerebellaris anterior, rubrocerebellaris, trigeminocerebellaris

Efferent tractus: from nuclei emboliformes, globosi and dentatus

- White matter inside of the cerebellum is substantia medullaris (arbor vitae, tree of life)

## Function

Maintenance of balance (vestibula cerebellum)

Regulation of muscle tone (spinal cerebellum)

Management and coordination of movements (neocerebellum)

**Cerebellum is auxiliary motor system, but it is not a source of motor pathways**

## **Diencephalon** (covered by hemispheres of the telencephalon)

**Consists of:**

**Thalamus** and **epithalamus** (originate from **alar plate**) – located at both sides of the III. ventricle

**Hypothalamus** and **subthalamus** (originate from **basal plate**)

– border between thalamus and hypothalamus is formed by **sulcus hypothalamicus** in the floor of the III. ventricle

Caudal surface of diencephalon is formed by **corpora mammillaria, tuber cinereum, infundibulum with hypophysis**

### **Thalamus**

- **gray matter** (relay station for **sensory tracts** – „entrance to consciousness“), from here they continue **to the cortex**. Thalamus is in connection with **motor activities**, too.
- (for division of thalamic nuclei see the lectures)

**Tuberculum anterius thalami, pulvinar thalami, sulcus terminalis (with vena thalamostriata and stria terminalis), tela choroidea (tenia choroidea), lamina affixa, stria medullaris thalami (tenia thalami), adhesio interthalamica**

Dorsally (under pulvinar thalami) is located **corpus geniculatum laterale and mediale** with **brachium colliculi superioris and inferioris**  
**=metathalamus** (relay station of **optic and acoustic tracts**)

**Epithalamus** – located close to the ceiling of the III. ventricle dorsally – **epiphysis=corpus pineale** (located over **colliculi superiores of mesencephalon**), produces hormone melanin – („changes of night and day“), **concrements from calcium - acervulus**  
Relay station for tracts between olfactory centers and brainstem and epiphysis.

**Stria medullaris thalami** – connection with hypothalamus and nuclei habenulares

**Commissura posterior** – connection with colliculus superior and area pretectalis of both sides

**Trigonum habenulae** with nuclei, **commissura habenularum**

**Subthalamus** – **gray matter** located ventrally from thalamus and laterally from hypothalamus.

**Nucleus subthalamicus** and **zona incerta** – both serve for **motor activity** („motor circuits“)

**White matter** – consists of **fasciculus thalamicus, lenticularis, subthalamicus** and **ansa lenticularis** – they serve for connection with **basal ganglia** and **thalamus** or **hypothalamus**

**Hypothalamus** highest regulatory center of **autonomic=vegetative nervous system** (parasympathetic and sympathetic). It has influence to **breathing, osmotic pressure, temperature** and level of **various hormones** in the body. It has a major role in producing responses to **emotional changes**, activity of **digestive system**, and it is responsible for constant internal environment (**homeostasis**).

- **Corpora mamillaria, infundibulum, tuber cinereum and hypophysis**

**Hypothalamus** has very close relation to the **hypophysis**, which gets out from its base.

**Hypophysis cerebri** = **pituitary gland** (located in the **fossa hypophysealis** of sphenoid bone)

**Adenohypophysis (lobus anterior)** – superior position to other endocrine glands – it products for example SH, FSH, LH, ACTH....

Hormone production by the adenohypophysis is controlled by **chemical substances** produced by **hypothalamic cells** (transported by **hypophyseal portal system**).

**Pars media** – products **melanostimulating hormon**

**Neurohypophysis** is formed by **eminetia mediana, processus infundibularis and lobus posterior**.

**Neurohypophyseal hormones** are synthetized in the **hypothalamus** (in the **nucleus supraopticus** and **nucleus paraventricularis** = **hormons vasopressin** and **oxytocin**) – **tractus hypothalamo-hypophysealis**