The ventricular system of the brain

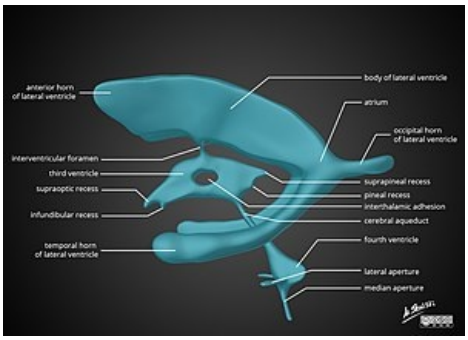
The ventricular system forms the **cavities** of the central nervous system and is filled with **cerebrospinal fluid**. It arises from the original cavity of the neural tube, which transforms into the *canalis centralis medullae spinalis* in the spinal cord and expands into the cerebral ventricles (*ventriculi cerebri*) at the base of the brain. We refer to these according to the order in the CNS in the caudocranial direction as *ventriculus quartus*, *ventriculus tertius* and *ventriculus lateralis dexter et sinister.*

Ventricular system.

Ventriculi cerebri

Ventriculus quartus (Fourth ventricle)

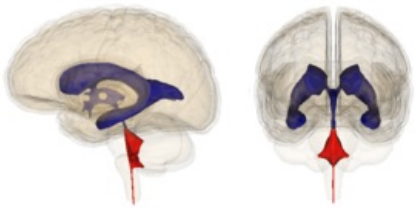
It is an unpaired cavity, the bottom of which is formed by the dorsal surface of the brainstem, the so-called *fossa rhomboidea*, the ceiling is formed by the cerebellum and other components, and laterally the ventricle extends as *recessus lateralis ventriculi quarti*. On the bottom IV. ventricles, into the *fossa rhomboidea*, the nuclei of the cranial nerves are projected. The areas of the motor and sensory nuclei are separated by the *sulcus limitans*. Two rows of **somatomotor** nuclei lie medially. A row of nuclei closer to the *median sulcus* is formed by the ncl. III., IV., VI., XII. and laterally from them are stored ncl. V., VII. and *ncl. ambiguus*, to which are attached **visceromotor** nuclei sending fibers to smooth muscle and glands. This is *ncl. oculomotorius accesorius*, *ncl. salivatorius superior et inferior* and *ncl. dorsalis n. vagi.* Lateral to the *sulcus limitans* lies the single **viscerosensitive** nucleus of the *ncl. solitarius*, completely laterally are the **somatosensitive** nuclei - *ncl. spinalis et pontinus n. V.* and **sensory** nuclei *ncll. vestibulares et cochleares*. The nuclei of the reticular formation are also arranged in the *fossa rhomboidea* in three longitudinal bands.



Anatomy of the ventricular system.

Ventriculus tertius (Third ventricle)

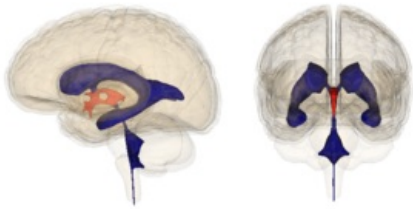
It is an unpaired cavity in the diencephalon, closed from the side by the thalamus and the right and left halves of the hypothalamus, which form its floor. The junction of the right and left thalamus, *adhaesio interthalamica*, passes through the middle of the ventricle.



Fourth ventricle (marked in red)

Ventriculi laterales (lateral cerebral ventricles)

They are **paired** horseshoe-shaped cavities located in the right and left cerebral hemispheres. We can also label them as **I. and II. cerebral ventricle.** We distinguish 4 sections in each. The *cornu frontale* arches into the frontal lobe, continues as the *pars centralis*, which runs above III. cerebral ventricle. Next is the *cornu occipitale* extending into the occipital lobe, and the last section is the *cornu temporale*, which is located in the temporal lobe and on whose basal wall lies the *hippocampus*.



Third ventricle (marked in red)

Liquor cerebrospinalis (cerebrospinal fluid)

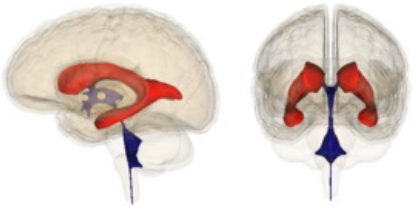
Cerebrospinal fluid is formed in all four cerebral ventricles in the ***choroid plexus***. These grape-like formations arise from the vascular plexus. The cerebrospinal fluid flows **from the lateral ventricles** through the *foramen interventriculare* **into III. ventricle** and from there through the *aquaeductus mesencephali*, the so-called Sylvian canal, **to IV. ventricle**. From the IV. ventricle is distributed through the *apertura mediana*, the so-called *foramen Magendi, et aperturae laterales ventriculi quarti (foramina Luschkae)* **into the subarachnoid space** (*spatium subarachnoideum*) of the brain and spinal cord and ***into the canalis centralis medullae spinalis.*** From the *spatium subarachnoideum*, the fluid is then **absorbed into the veins** on the surface of the CNS and through them it reaches the ***plexus venosi vertebrales interni*** in the spinal canal, the *sinus durae matris* in the skull - mostly the *sinus sagittalis superior.* Arachnoid protrusions - *granulationes arachnoideae* - participate in the absorption of cerebrospinal fluid. Decreased resorption of cerebrospinal fluid leads to increased intracranial pressure and hydrocephalus. The total amount of liquor is **150 ml**. However, approximately 500 ml of it is formed daily in the *choroid plexus*. Its main functions include **buoyancy** and **protection** of the brain – it balances pressure changes caused by arterial pulsation. It contains proteins, glucose, lymphocytes and other substances and therefore also has a **nutritional** and **immunological function.**

🔎 *For more information see Cerebrospinal Fluid.*

Links

Related articles

- Cerebrospinal fluid examination
- Cerebrospinal fluid syndromes
- Intracranial hypertension



Lateral ventricles (marked in red)

External links

- The Ventricular System, National Center for Biotechnology Information (https://www.ncbi.nlm.nih.gov/books/NBK11083/)
- Ventricles of the Brain, Maedscape (https://emedicine.medscape.com/article/1923254-overview)

Bibliography

- ČIHÁK, Radomír. *Anatomie III.* 1. edition. Grada, 1997. 672 pp. ISBN 80-7169-140-2.
- ELIŠKOVÁ, Miloslava – NAŇKA, Ondřej. *Přehled anatomie.* 2. edition. Karolinum; Galén, 2009. 416 pp. ISBN 978-80-246-1717-6.