

Introduction to the study of the nervous system. Meninges, hemispheres, the lateral ventricle

Dr. Gábor GERBER

Academic Year 2018/2019 Faculty of Dentistry, 3rd Semester ED II. 1 – 4 (5)

Week	LECTURE <i>Tuesday 8.00 - 9.40 Wednesday 12.05 - 12.50</i>	DISSECTION <i>Mondays 12.00 - 13.30 Fridays 12.45 - 14.15</i>	HISTOLOGY <i>on 5 Mondays 12.00 - 13.30</i>
Week 1 Sept 10-14	<ol style="list-style-type: none"> 1. Introduction to the study of the nervous system Meninges, hemispheres, the lateral ventricles 2. Gross anatomy of the diencephalon, the III. ventricle 3. Gross anatomy of the brainstem and the cerebellum The IV. ventricle 	Divisions of the brain, meninges, arteries and veins of the brain, surface structures of the hemispheres, basis cerebri. Specimen demonstration: dura mater, sinuses	
Week 2. Sep 17-21	<ol style="list-style-type: none"> 4. Blood supply to the brain, CSF circulation 5. <i>Differentiation of the neural tube, development of the spinal cord. Neural crest</i> 6. <i>Differentiation of the brain vesicles</i> 	Lateral ventricles, third ventricle Brain stem, fourth ventricle, cerebellum	
Week 3. Sept 24-28	<ol style="list-style-type: none"> 7. Gross anatomy of the spinal cord, spinal segments, dermatomes 8. Neuronal architecture of the spinal cord: proprioceptive and nociceptive (withdrawal) reflex arcs. 9. Neuronal architecture of the spinal cord: autonomic reflex arc. Spinal pathways 	Cross sections of the brain. Specimen demonstration: spinal cord together with the membranes	
Week 4. Oct 1-5	<ol style="list-style-type: none"> 10. Introduction to cranial nerves. Classification of sensory, motor and autonomic nuclei 11. Microscopy of the brainstem: tracts and nuclei of the medulla oblongata 12. Microscopy of the brainstem: tracts and nuclei of the pons and midbrain. Reflex arc of mastication 	Fine structure of spinal cord. Revision 1st midterm test: Anatomy and development of the brain and the spinal cord	
Week 5. Oct 8-13 <i>Saturday is a workday (Monday schedule)</i>	<ol style="list-style-type: none"> 13. Cells of the CNS: neurones (axon, dendrite, synapses) and glia cells 14. Microscopy of the diencephalon 15. Microscopy of the cerebral cortex 	- Dissection of limbs. Microscopy of the CNS Extra dissection class on Saturday	Nervous system I. (on Monday)
Week 6. Oct 15-19	<ol style="list-style-type: none"> 16. Sensory systems, neuroanatomy of pain 17. Microscopy of the cerebellum, pathways 18. Structure and connections of the basal ganglia Motor pathways 	- Dissection of limbs. Microscopy of the CNS	Nervous system II.
Week 7. Oct 22-26 <i>October 22-23 are holidays</i>	<ol style="list-style-type: none"> 19. - 20. - 21. Trigeminal nerve, ophthalmic division 	No class on Monday Dissection of limbs. Microscopy of the CNS	No class on Monday
Week 8. Oct 29 – Nov 2 <i>November 1-2 are holidays</i>	<ol style="list-style-type: none"> 22. Trigeminal nerve maxillary division 23. Trigeminal nerve, mandibular division 24. Facial and glossopharyngeal nerves 	2nd midterm test: Microscopic structure of the central nervous system (written test) No dissection class on Friday	

<p>Week 9. Nov 5-10 <i>Saturday is a workday (Friday schedule)</i></p>	<p>25. Vagus, accessory and hypoglossal nerves 26. The hypothalamo-hypophysial system. The pituitary gland 27. Endocrine organs: pineal body, thyroid, parathyroid, adrenal glands</p>	<p>Dissection of limbs. Demonstration of head and neck regions. Cranial nerves Extra dissection class on Saturday</p>	
<p>Week 10. Nov 12-16</p>	<p>28. The topographical anatomy of limbs 29. Skin and appendages. Mammary gland 30. Fibrous and vascular coats of the eyeball.</p>	<p>- Dissection of limbs. Demonstration of head and neck regions. Cranial nerves. Dissection of the eye</p>	<p>Endocrine organs</p>
<p>Week 11. Nov 19-23</p>	<p>31. Lens, chambers of the eye, vitreous body, accommodation 32. Inner coat of the eyeball, retina Optic nerve, visual pathway, visual cortex 33. External muscles and movements of the eye</p>	<p>Dissection of limbs. Demonstration of head and neck regions. Cranial nerves.</p>	
<p>Week 12. Nov 26-30</p>	<p>34. Protective and lacrimal apparatus of the eye. Development of the eye 35. External ear, auditory tube, tympanic cavity, tympanic membrane, auditory ossicles 36. Bony and membranous labyrinth</p>	<p>Dissection of limbs. Demonstration of head and neck regions. Cranial nerves. 3rd midterm test: Topographical anatomy of the limbs, spinal nerves, cranial nerves</p>	
<p>Week 13. Dec 3-7</p>	<p>37. Spiral organ of Corti. Development of the auditory and vestibular systems 38. Auditory pathway, auditory cortex 39. Vestibular system</p>	<p>- Demonstration of head and neck regions. Organs of special senses</p>	<p>Organs of special senses I.</p>
<p>Week 14. Dec 10-14</p>	<p>40. Olfactory and gustatory systems 41. Limbic system 42. Parasympathetic and sympathetic nervous systems</p>	<p>- Demonstration of head and neck regions. Organs of special senses</p>	<p>Organs of special senses II. Skin and mammary gland</p>

<http://semmelweis.hu/anatomia/education/2018-2019-first-semester/>

ED II ANNOUNCEMENTS

Evaluation is made using a five-grade scale (1-5).

Signing of the lecture book: active participation in lectures, dissection room and histology lab sessions is obligatory. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester (and see below *). Absences are therefore limited in **25%**.

Midterm examinations: During the semester, both practical and theoretical knowledge will regularly be evaluated. The midterm tests may be oral or written exams and cannot be done at a different time. **Anatomy** mid-terms include both identification of several structures on the specimen and theoretical questions related to the subject. **The second midterm (Microscopy of the CNS) is obligatory.** Without a valid (i.e. passing) mark gained in this midterm the semester is not accepted*. The results of all tests will appear on the personal achievement cards.

A semester practical mark is calculated from the midterm marks together with the personal achievement mark given by the group instructor. This practical mark will be counted into the semifinal examination and will be written on the personal achievement cards.

Competition – only in the 3rd semester we offer the possibility of a competition (held during the 13th study week) **upon invitation to those students whose midterm marks are at least 4** (good). Registration for the competition is open in the 12th week. Topic: Material of the semester, written test, including slides of macroscopical and microscopical specimen together with relevant theoretical questions. Students who reach the required 80% at the competition are exempted from the semifinal examination with a mark 5 (excellent).

Semifinal examinations are composed of the following parts:

1. written pretest,
2. oral examination (practical and theoretical questions in Macroscopy together with the identification/description of two histological specimen.

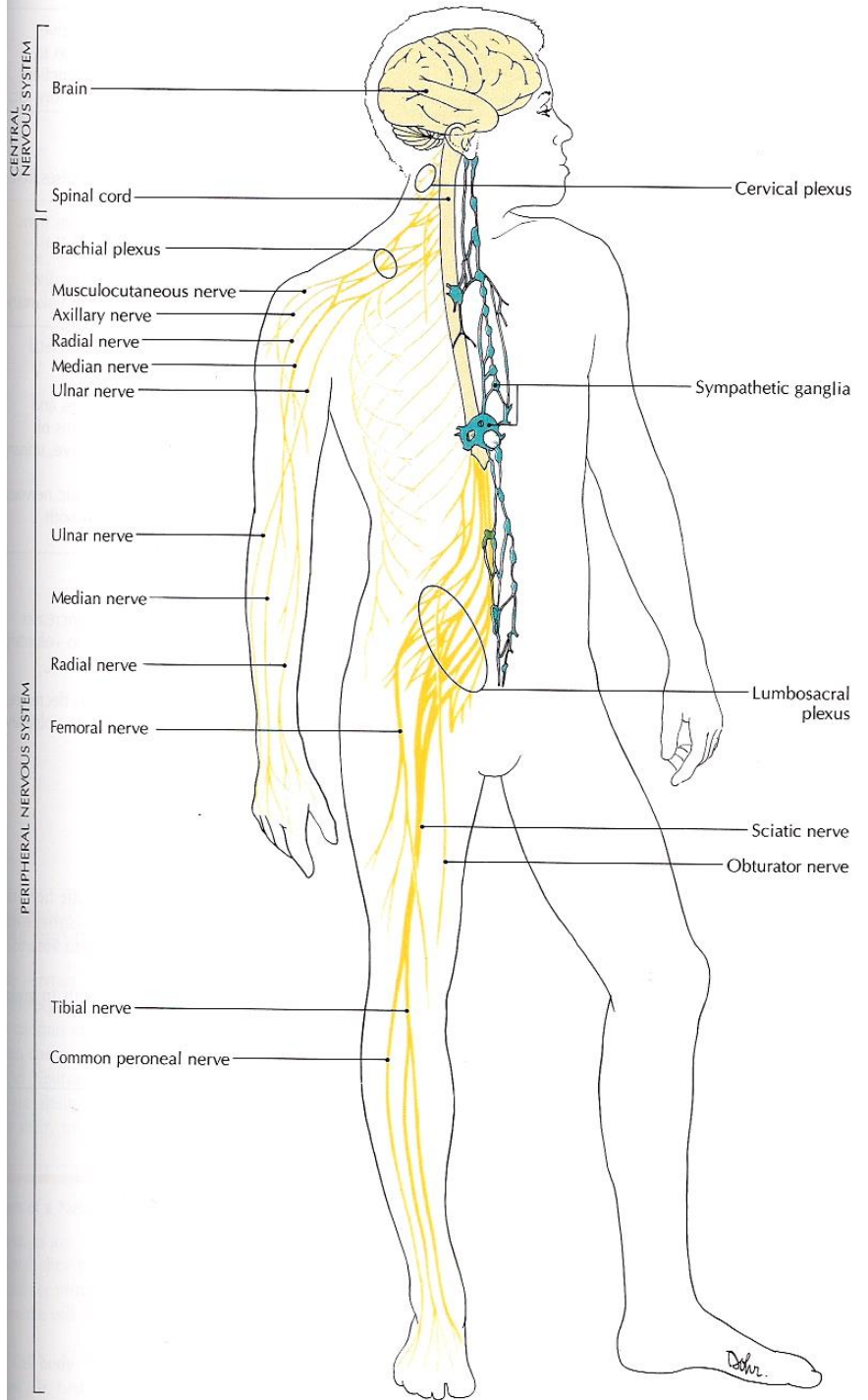
Notebooks should be used regularly in **histology lab sessions** in order to prepare schematic drawings of the histological specimens. Students will be asked to present their histology notebooks, containing the drawings, during the semifinal exams.

Obligatory dissection work – every students is required to produce a fully dissected specimen during the 2nd, 3rd or the 4th semester to be exempted from the dissection part of the final examination. The specimen will be evaluated by a departmental jury.

*N.B. – In case, neither the first nor the repeated takes of a semifinal exam have been successful and so the exam has to be postponed to the following exam period (i.e. 'CV' exam), only those students will be allowed to register for a CV ana3 exam course together with ana4 (i.e. continuing with their Anatomy studies) **whose average score of the midterm tests is equal, or higher than 2.00.** NO-SHOW at MIDTERMS is taken as ZERO for the AVERAGE*

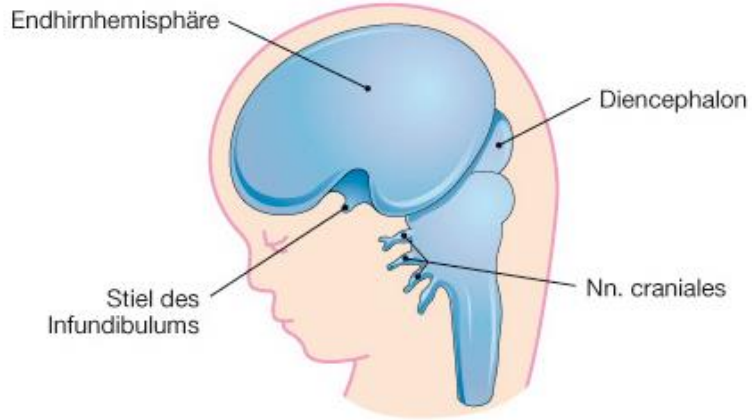


Divisions of the Nervous System

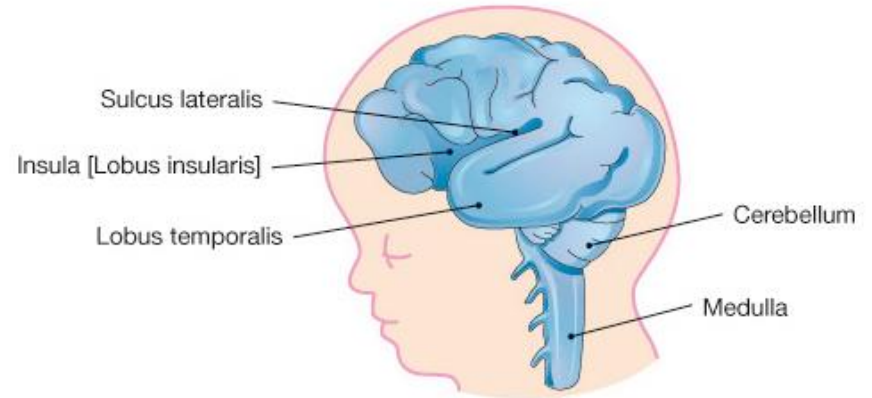


Development

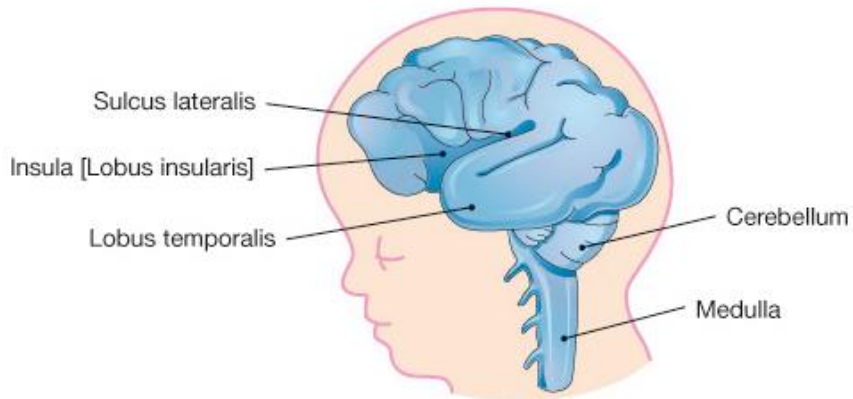
14. Woche



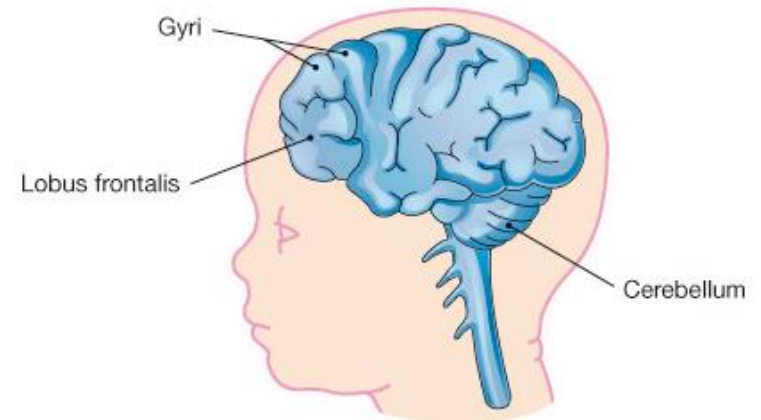
30. Woche

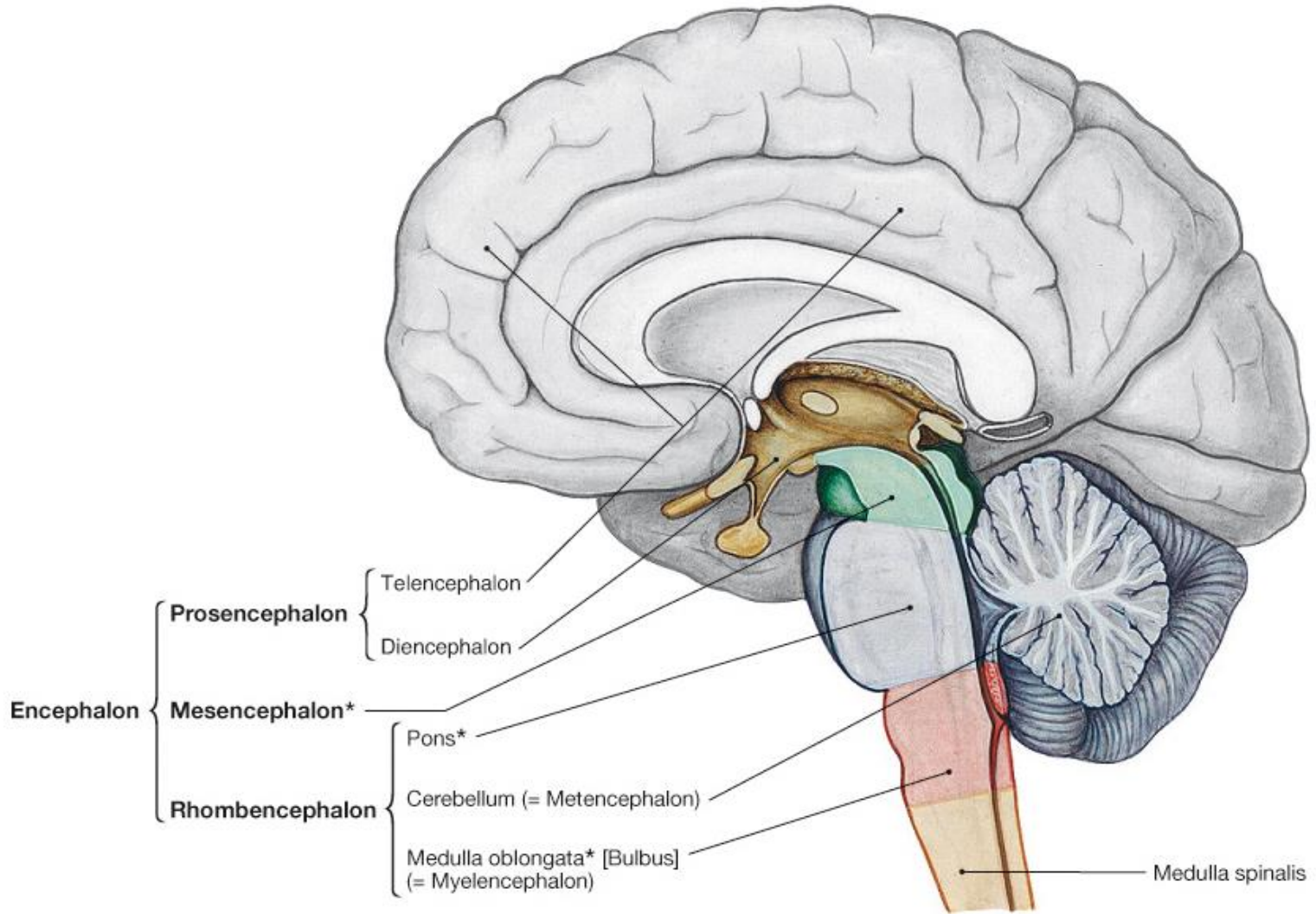


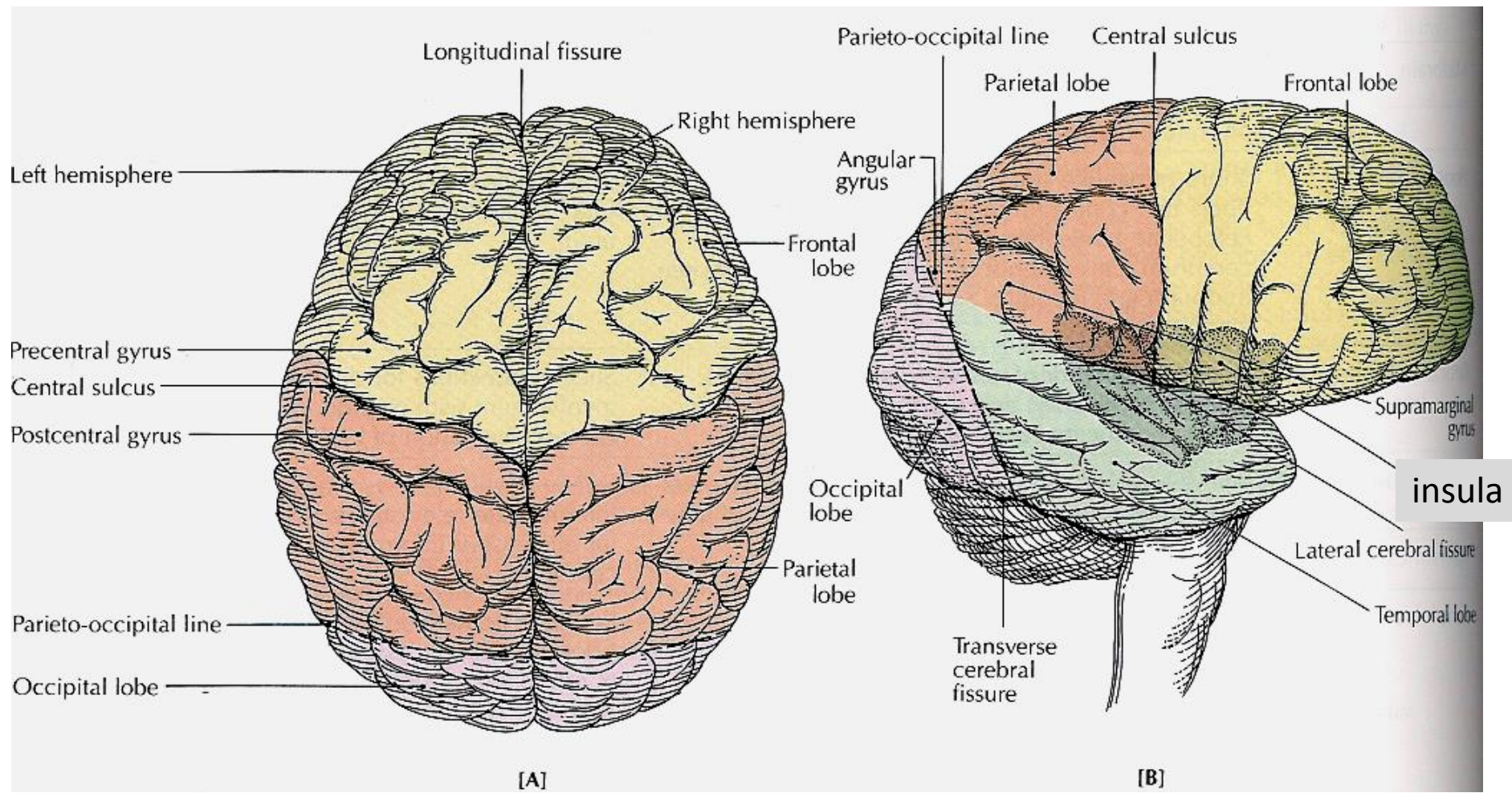
30. Woche



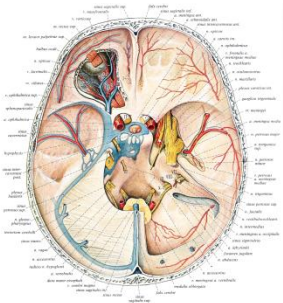
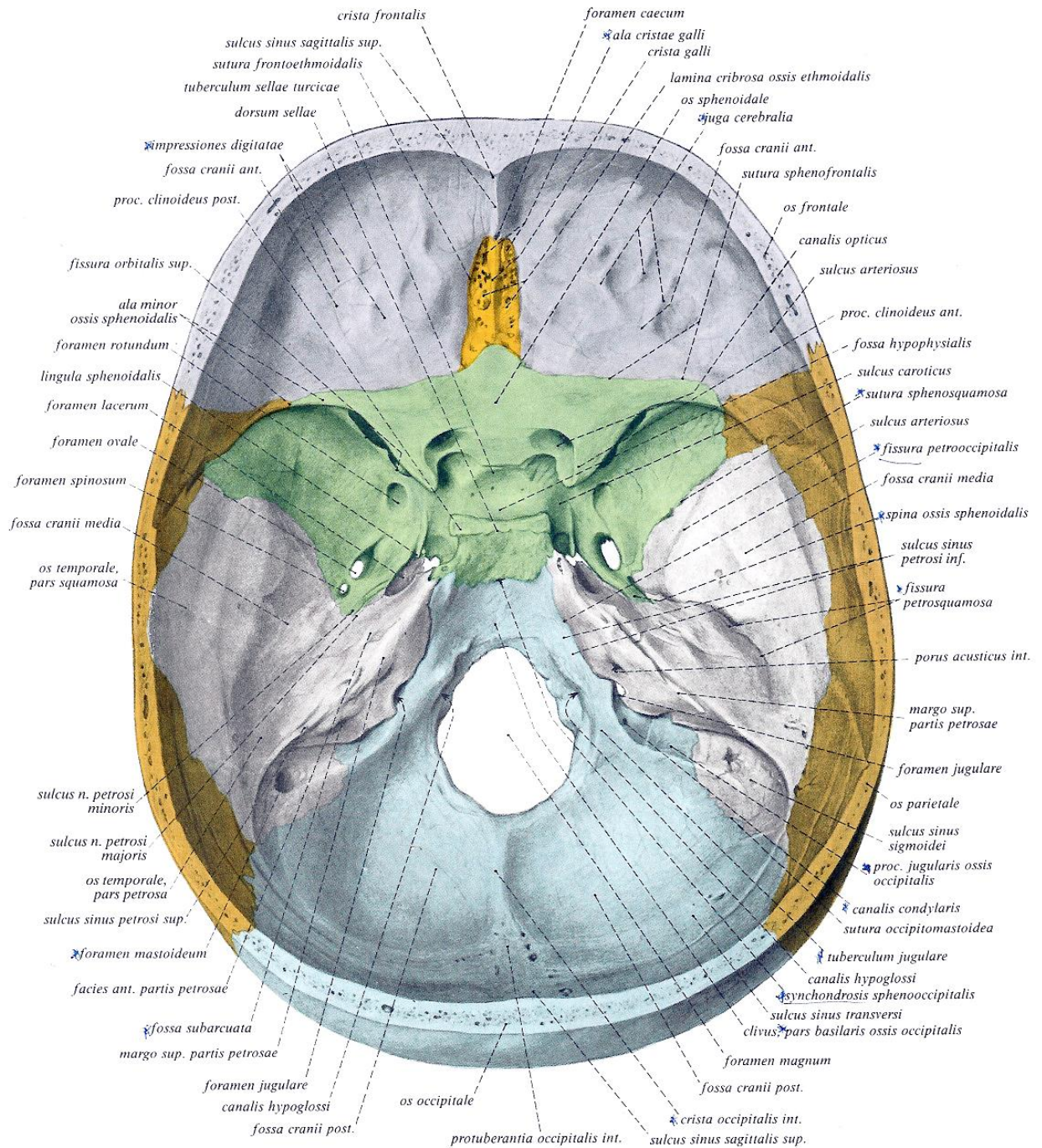
38. Woche







insula



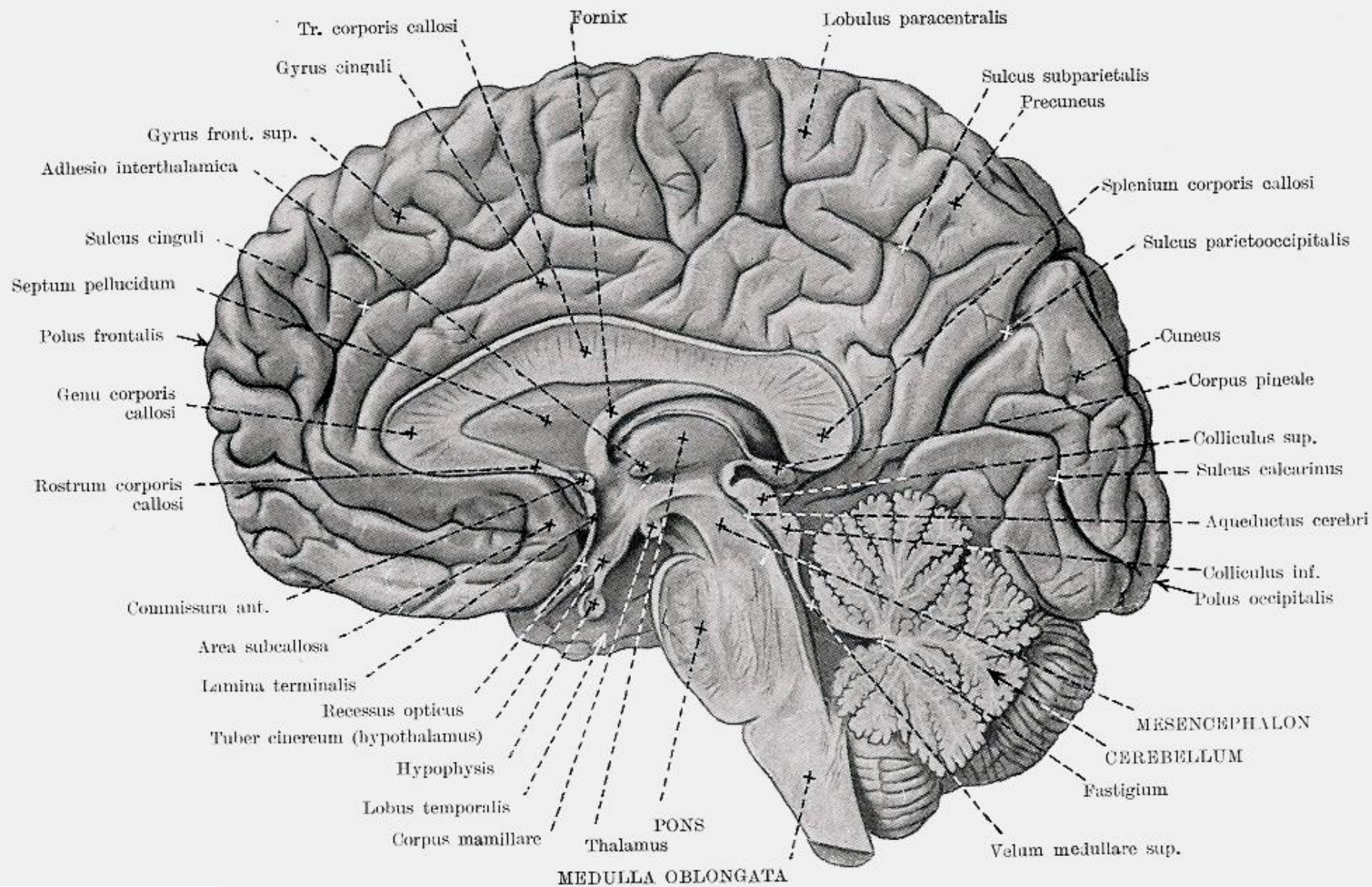
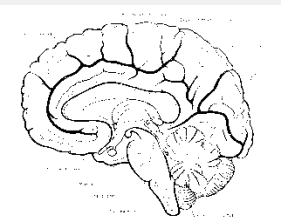


Fig. 4. ENCEPHALON II.

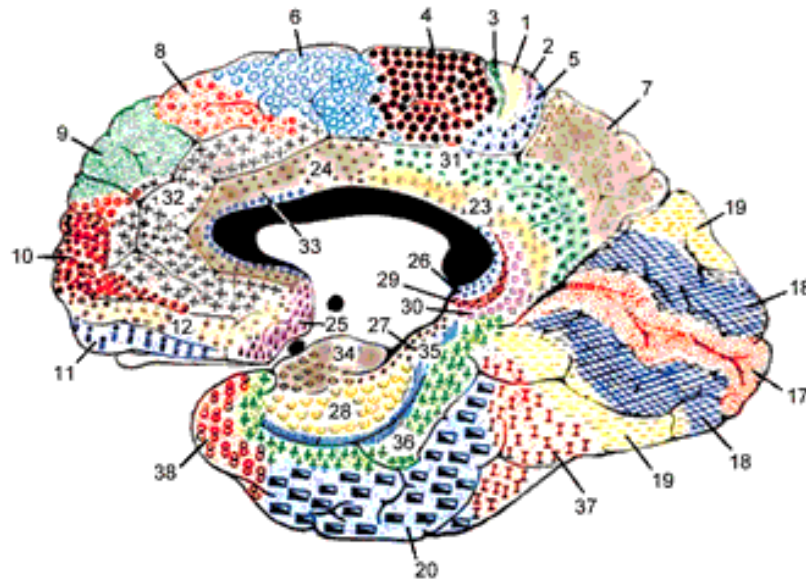
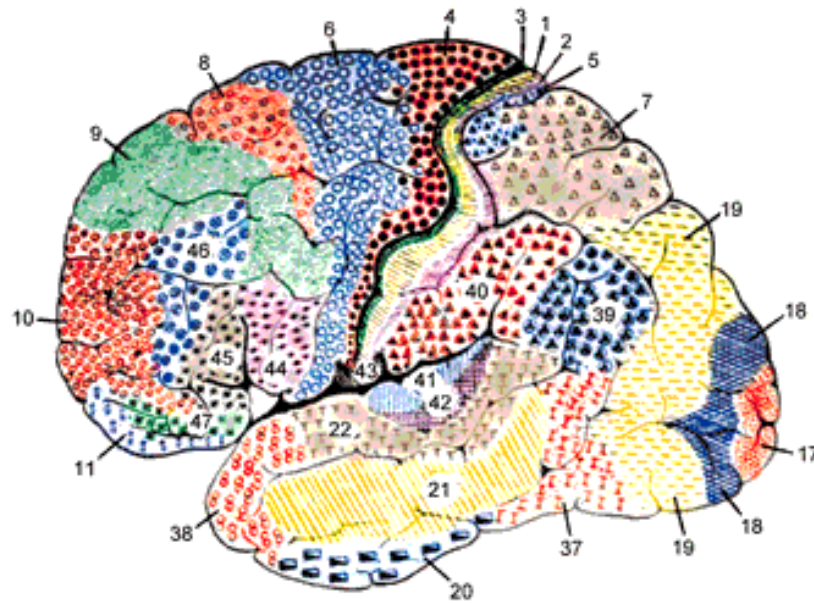
(sectio sagittalis, aspectus medialis, 1. dext.)

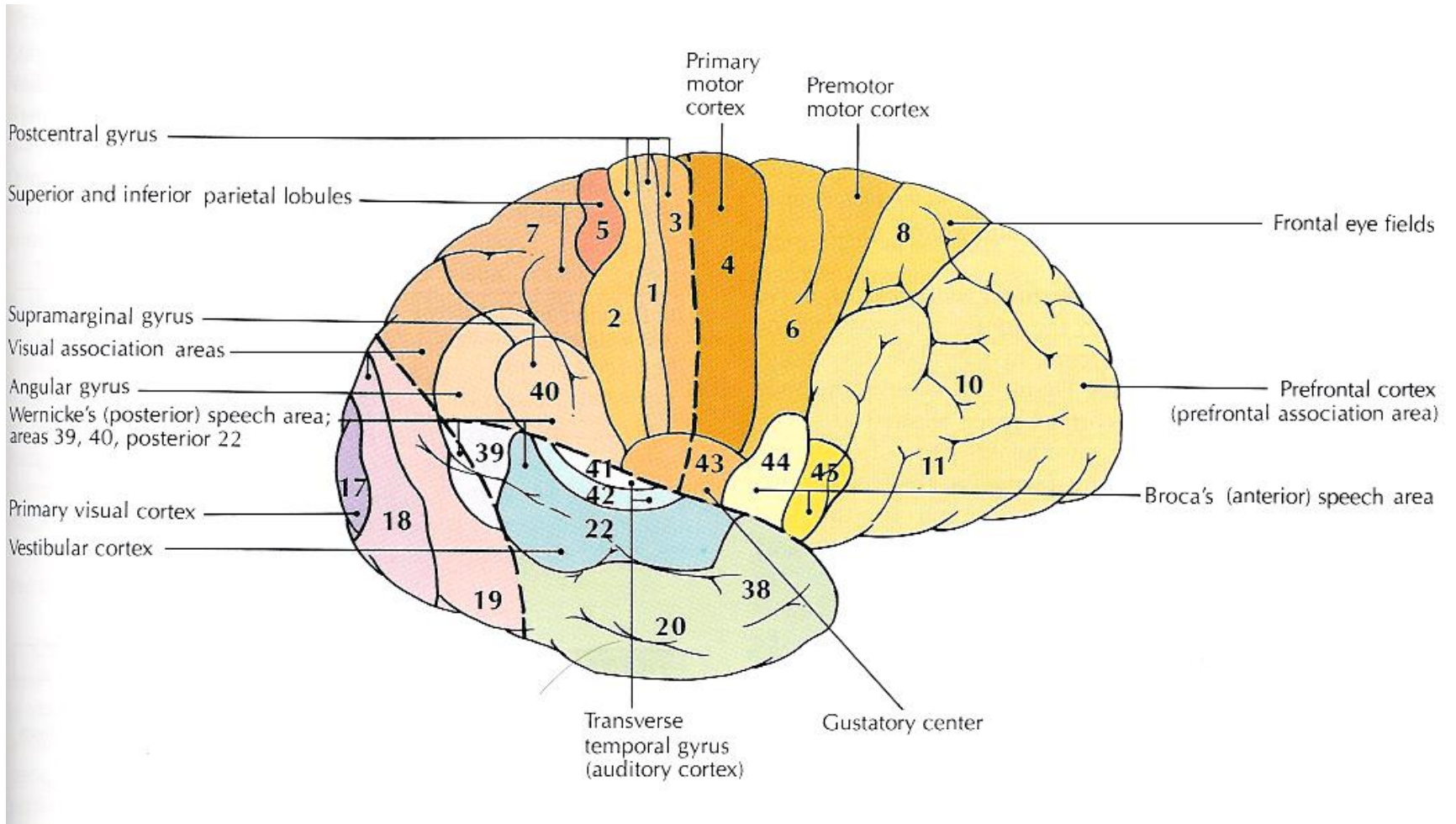


Cortex cerebri
(Bielschowsky-féle Ag-
impregnáció)
cytoarchitectura

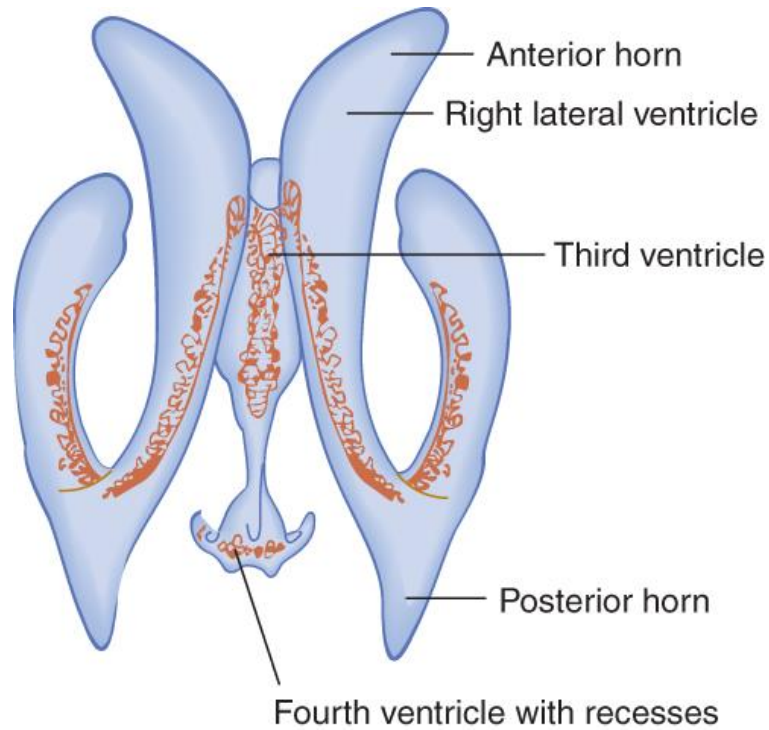
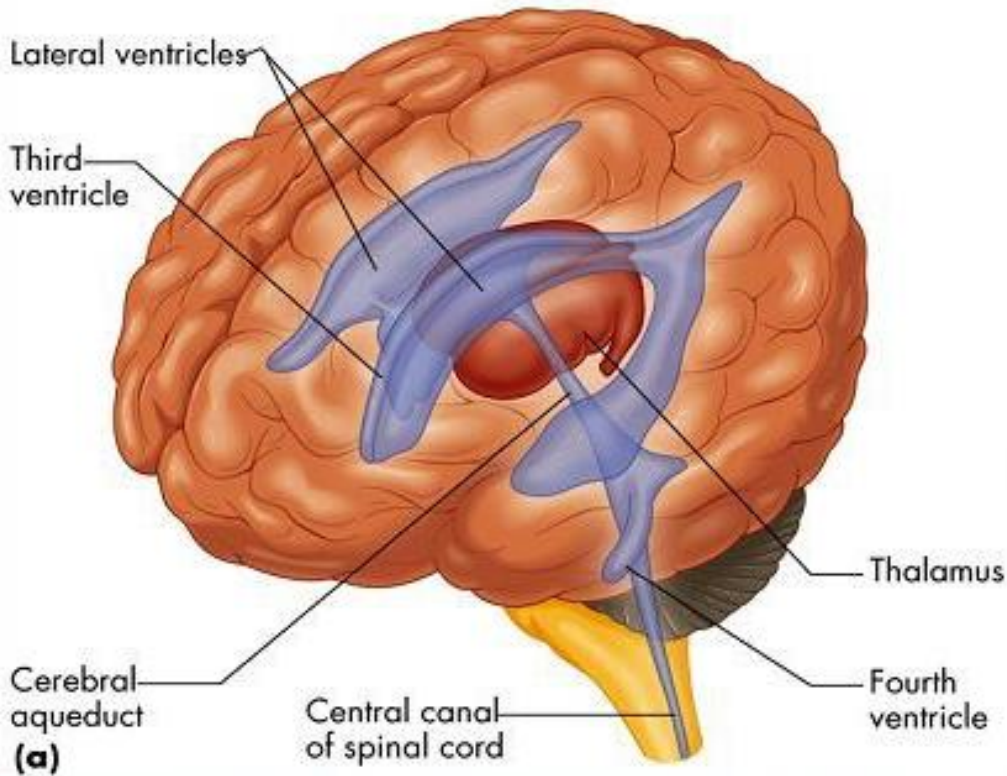


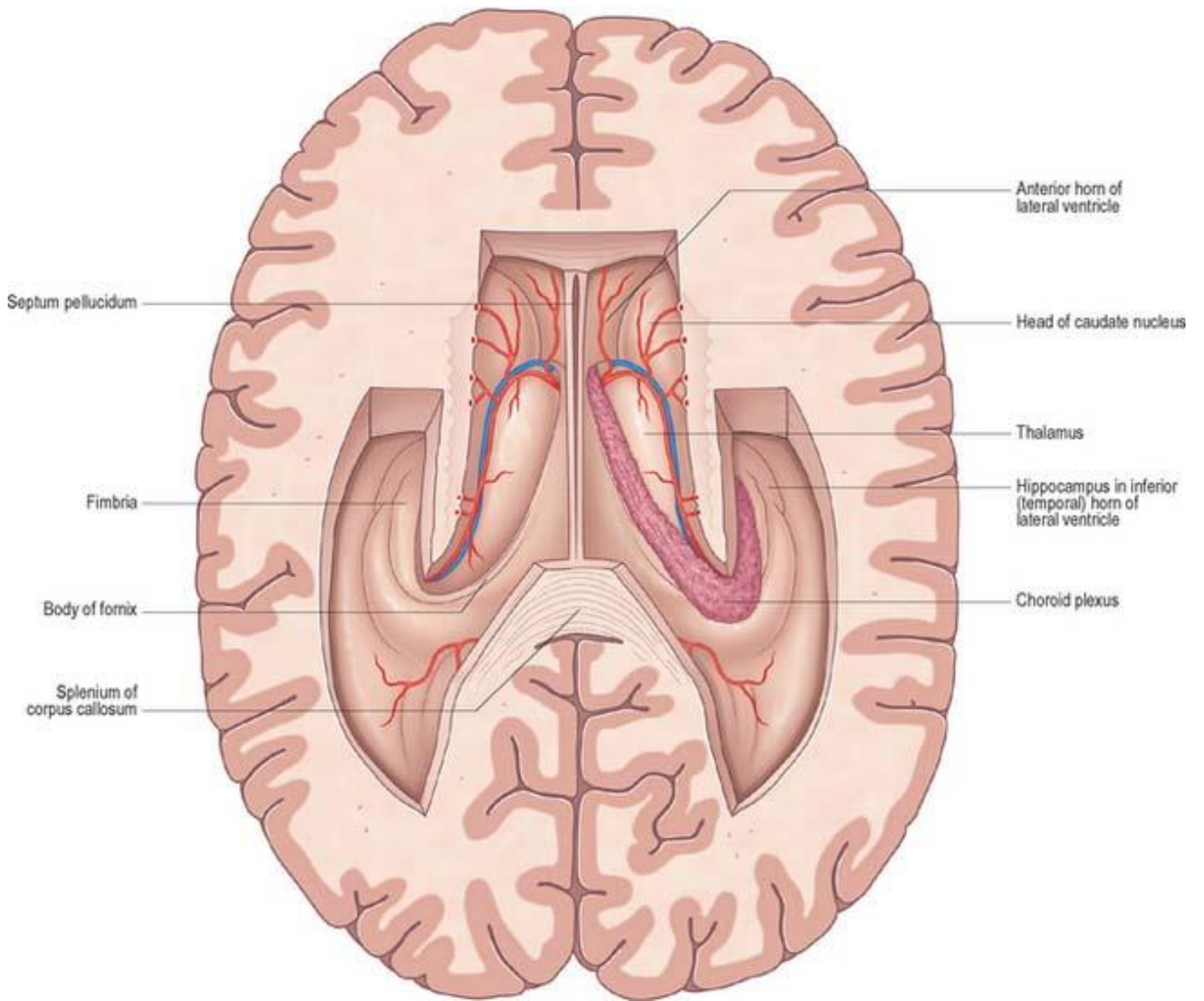
Brodmann area



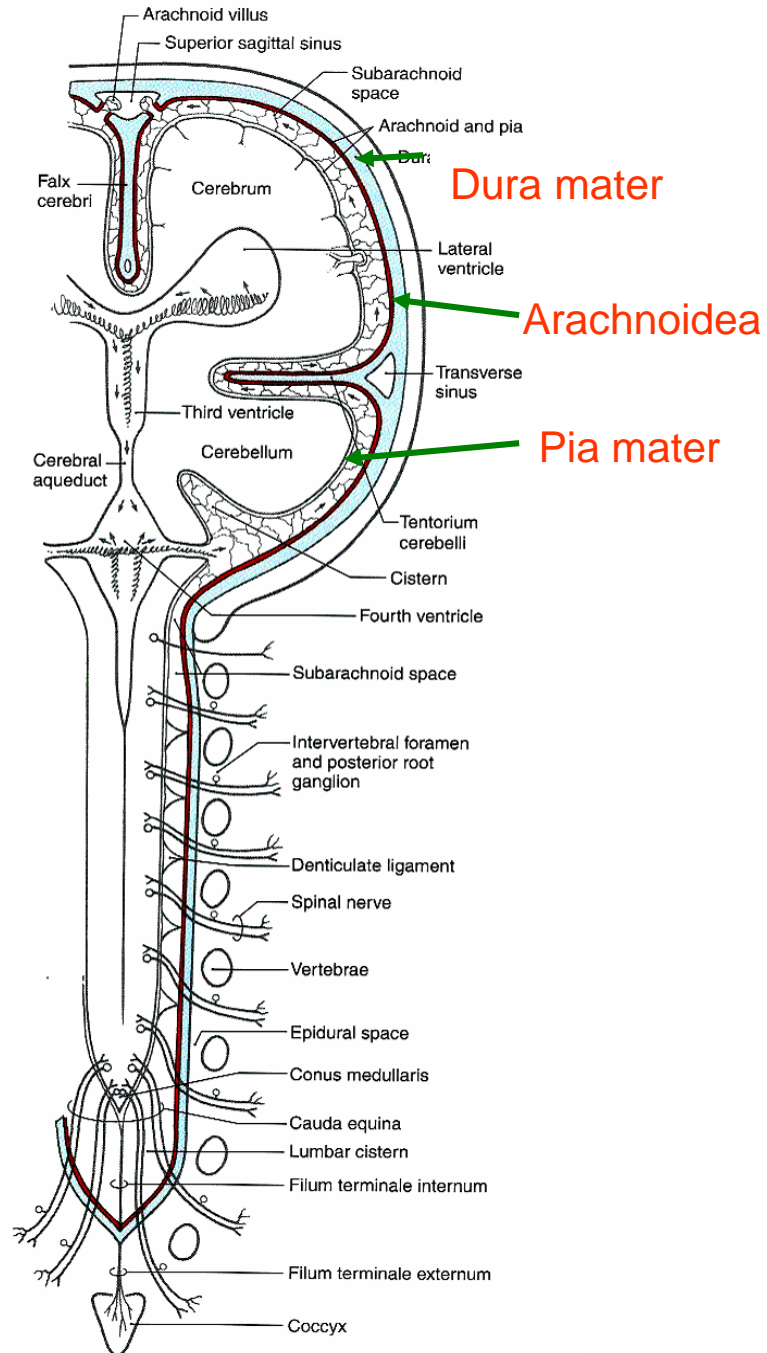


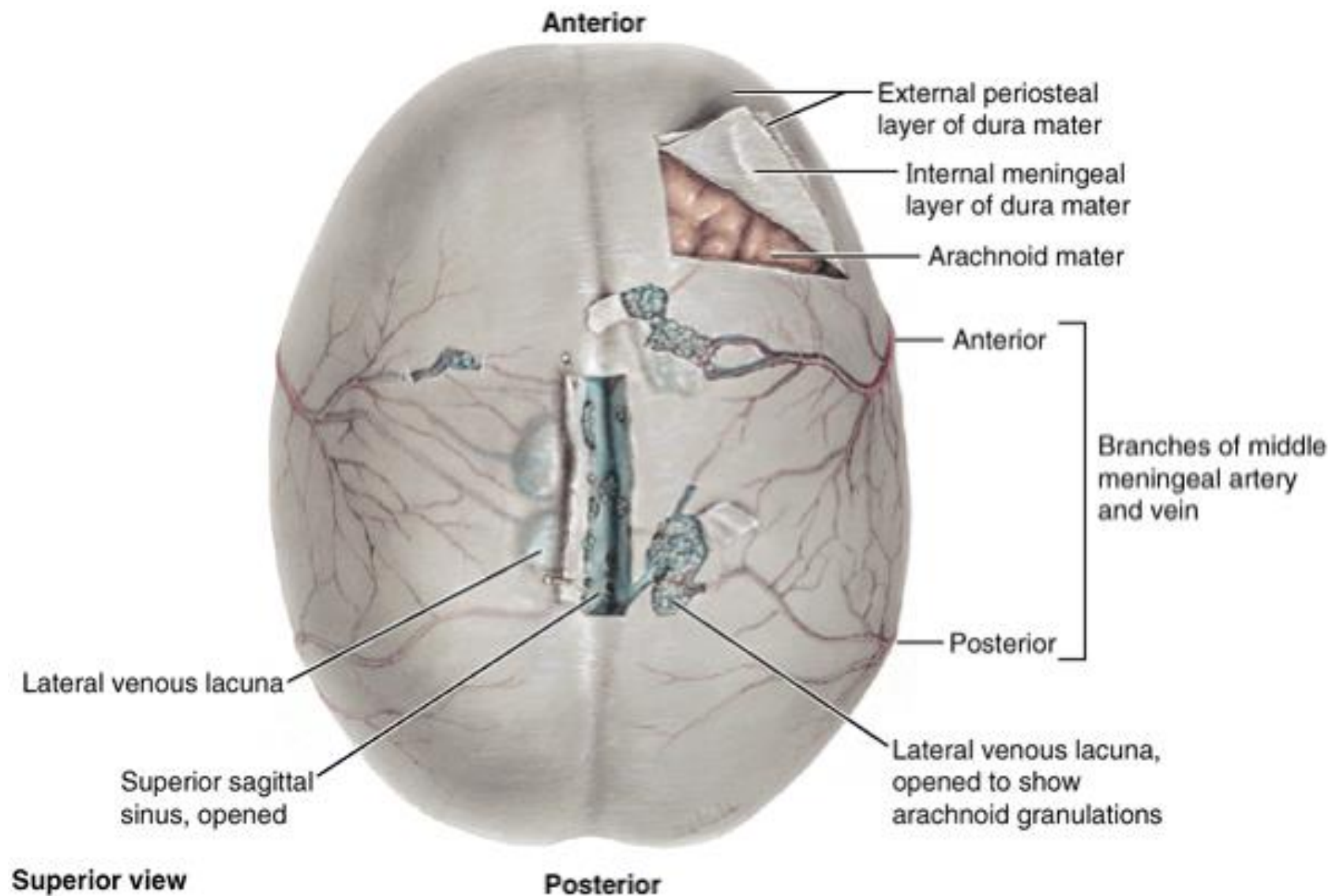
Ventricles



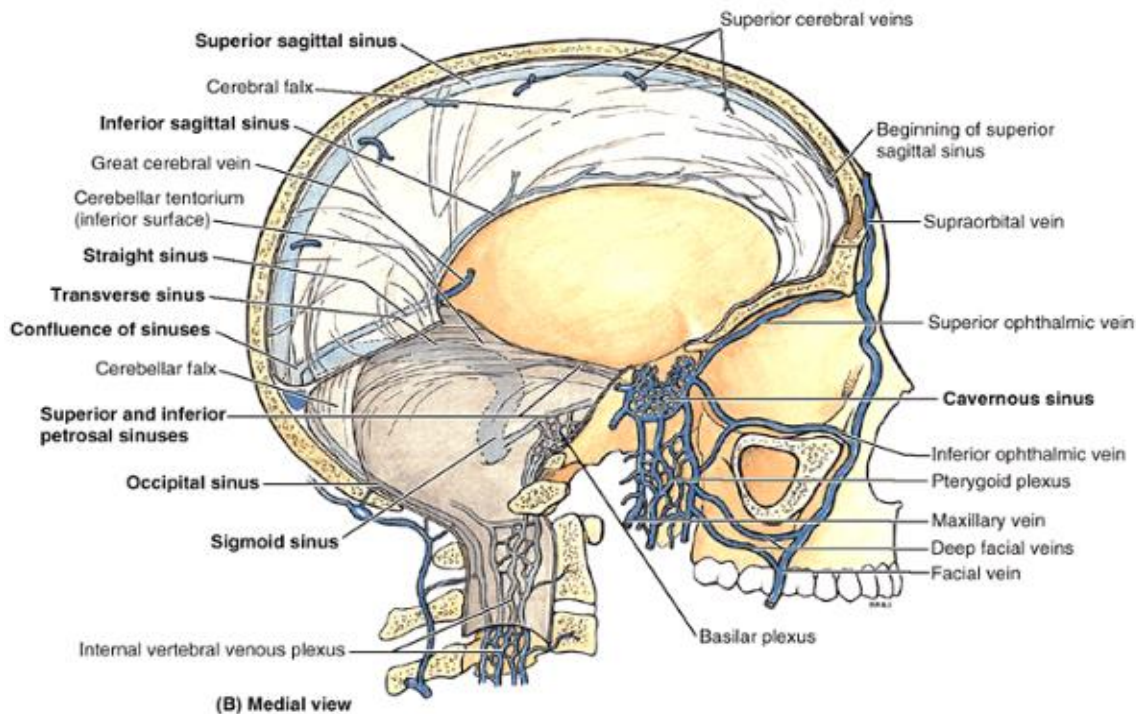
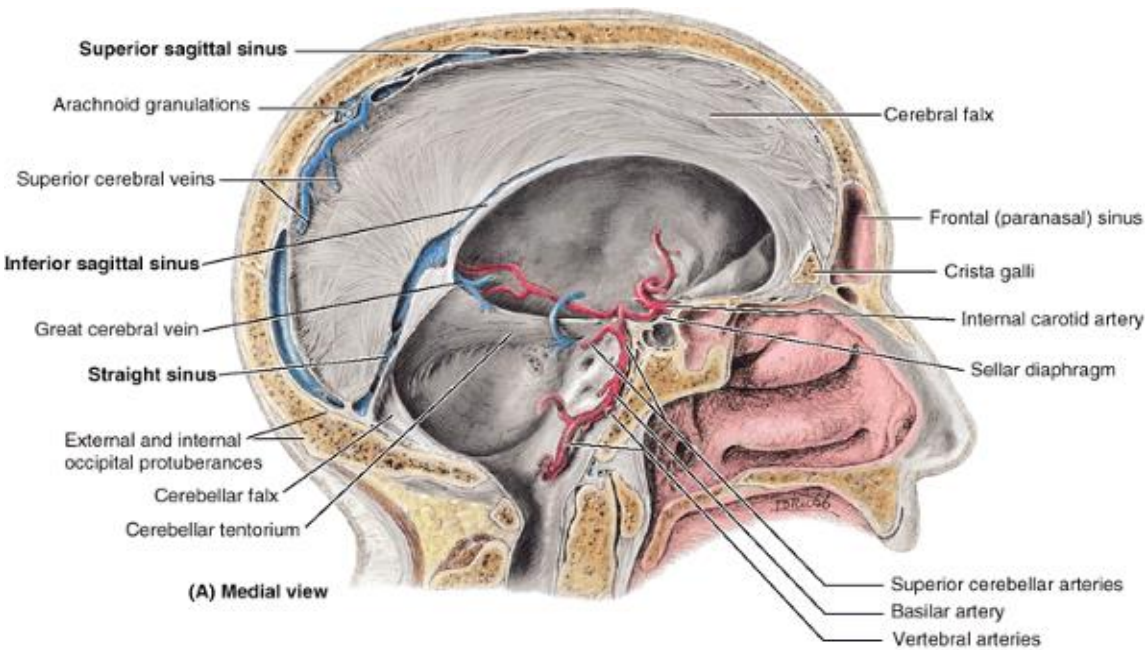


Meninges

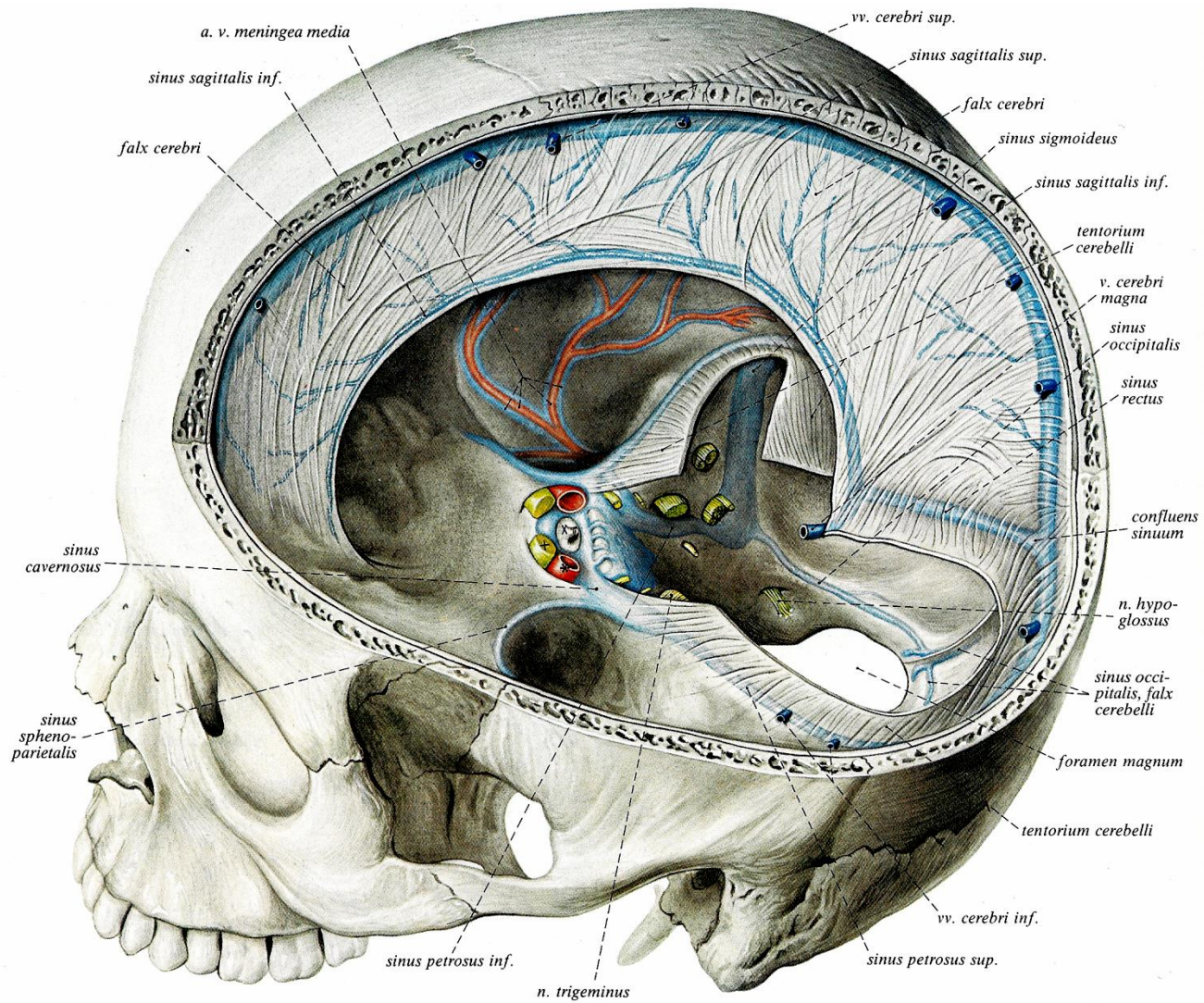




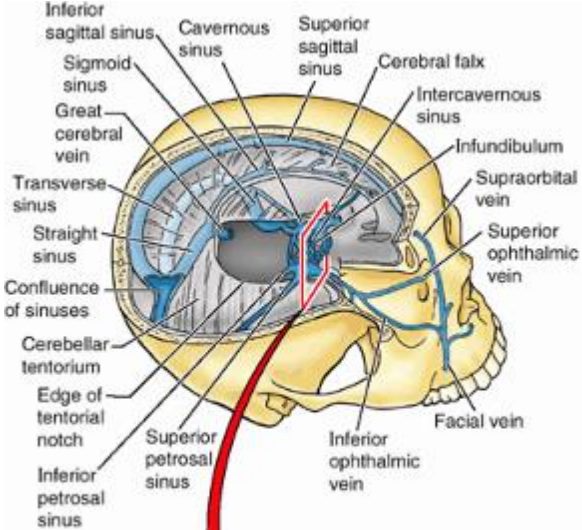
Dural infoldings and dural venous sinuses



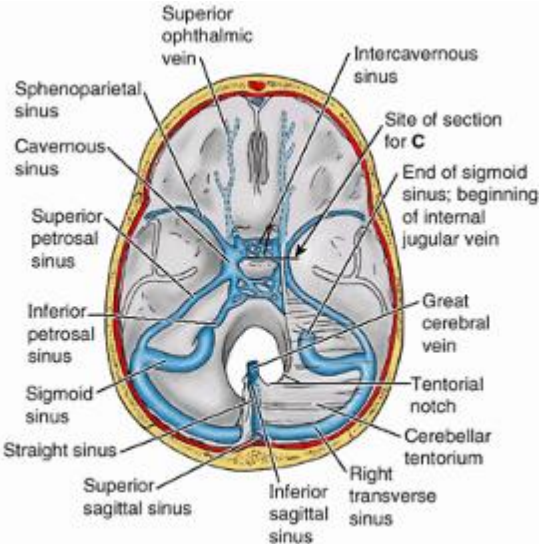
- Cerebral falx
(*L. falx cerebri*).
- Cerebellar tentorium
(*L. tentorium cerebelli*).
- Cerebellar falx
(*L. falx cerebelli*).
- Sellar diaphragm
(*L. diaphragma sellae*).



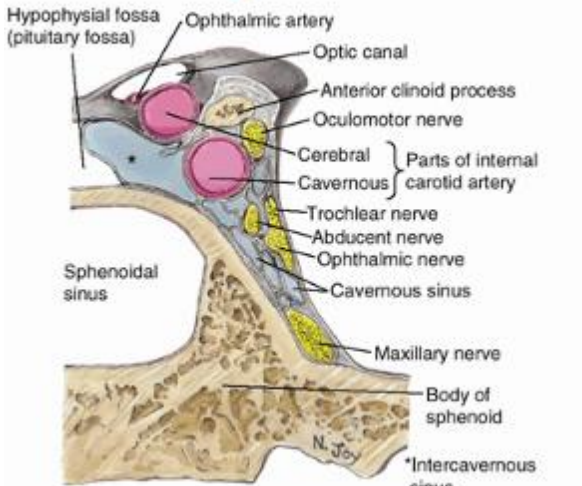
Venous sinuses of dura mater



(A) Superolateral view

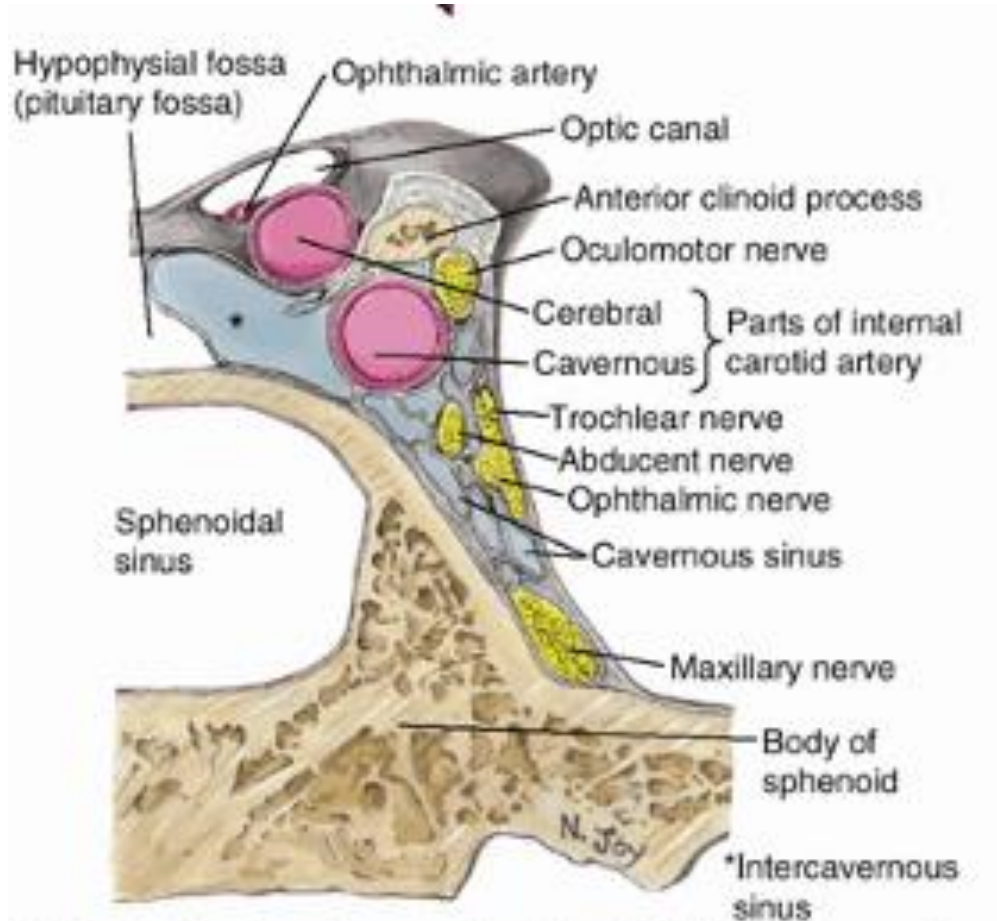


(B) Superior view

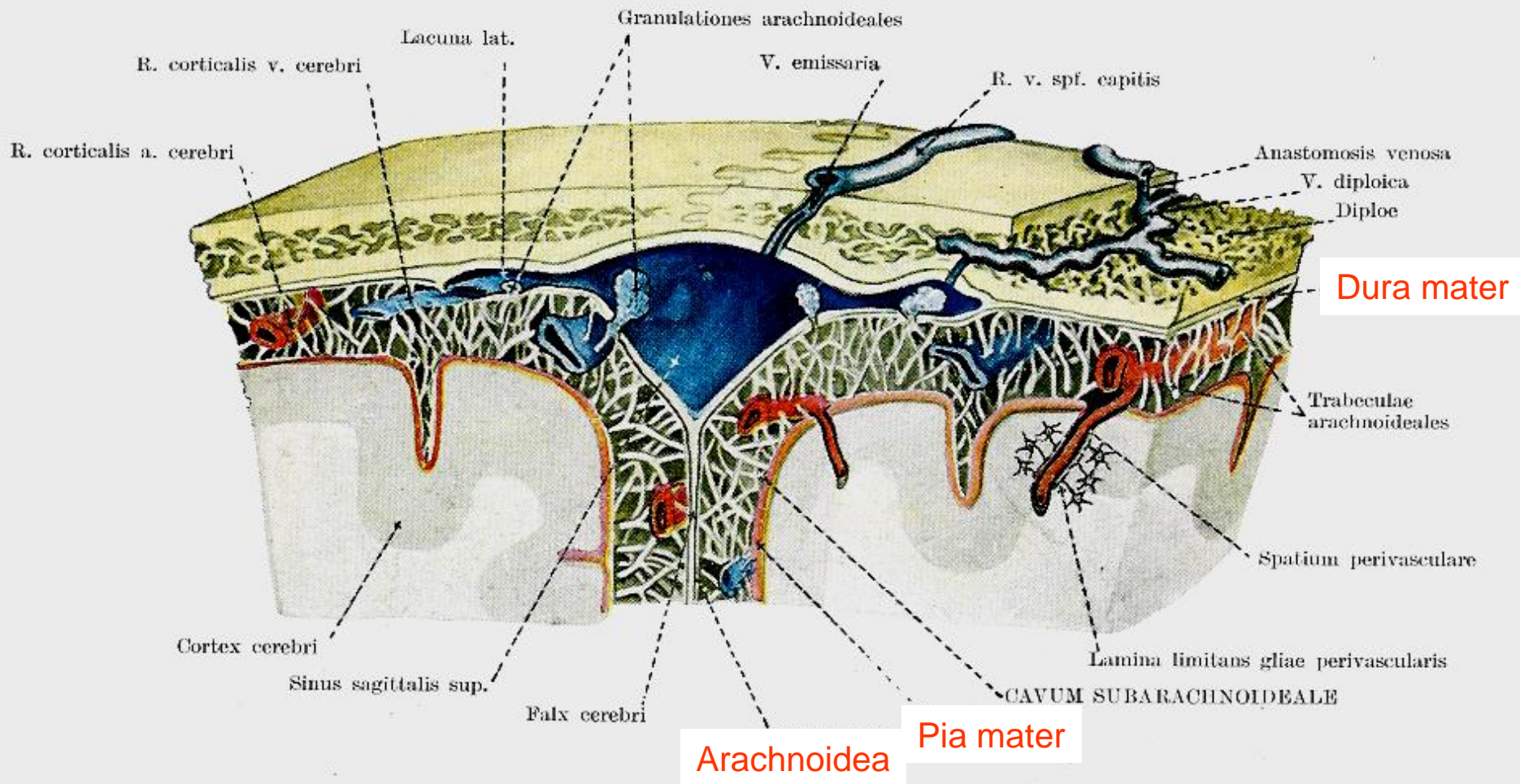


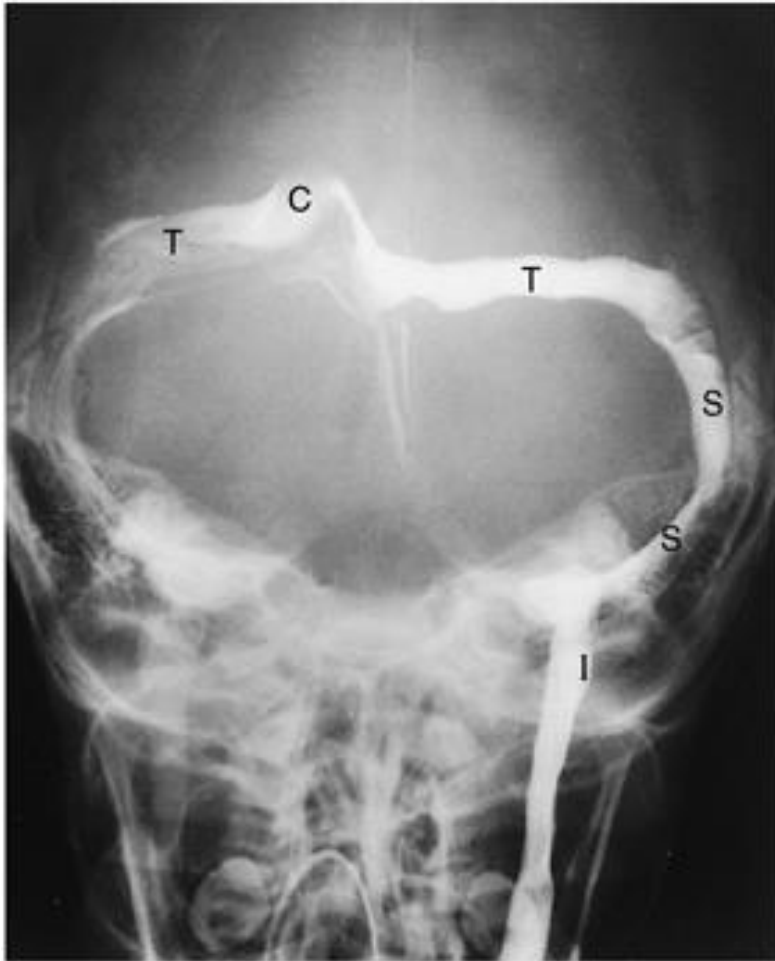
(C) Posterior view of coronal section of right cavernous sinus

Cavernous sinus

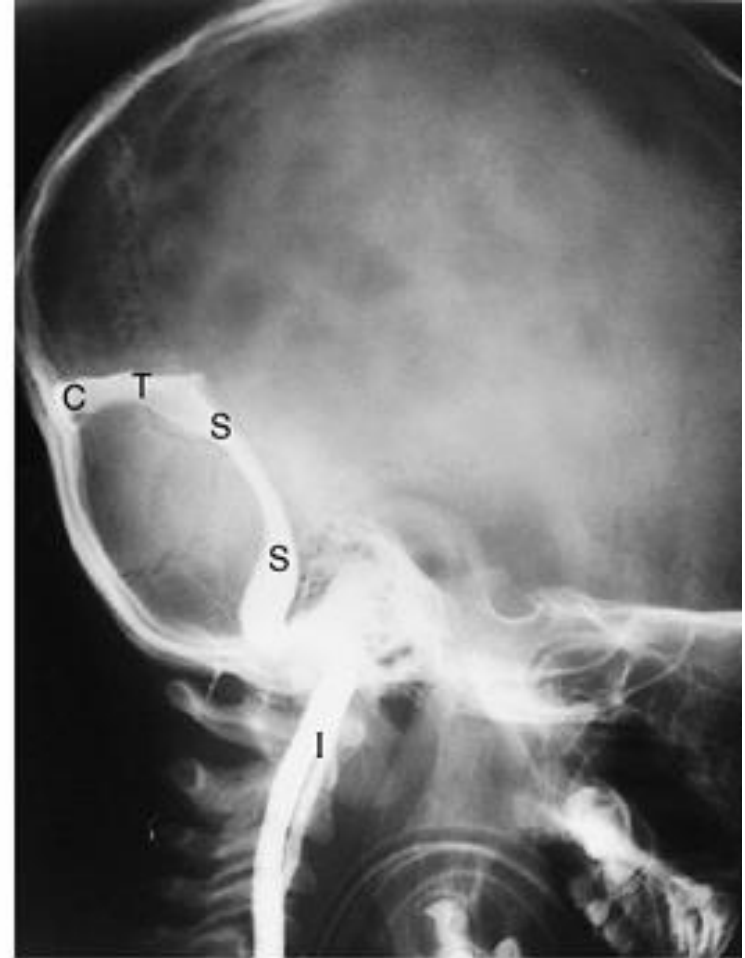


(C) Posterior view of coronal section of right cavernous sinus





(A) Anteroposterior view



(B) Lateral view

Blood supply of dura mater

anterior cranial fossa

anterior meningeal artery (branch from the **ethmoidal artery**)

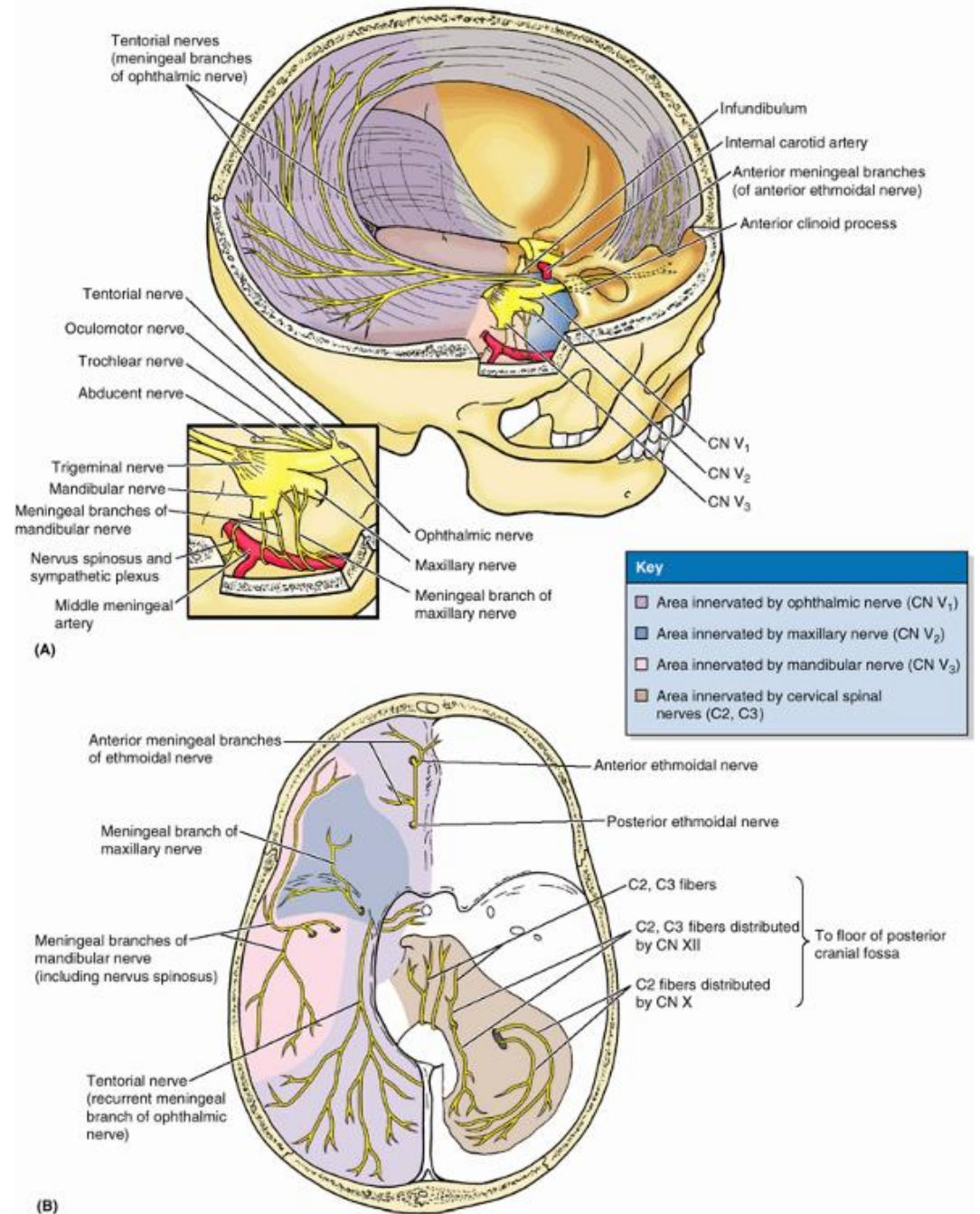
middle cranial fossa

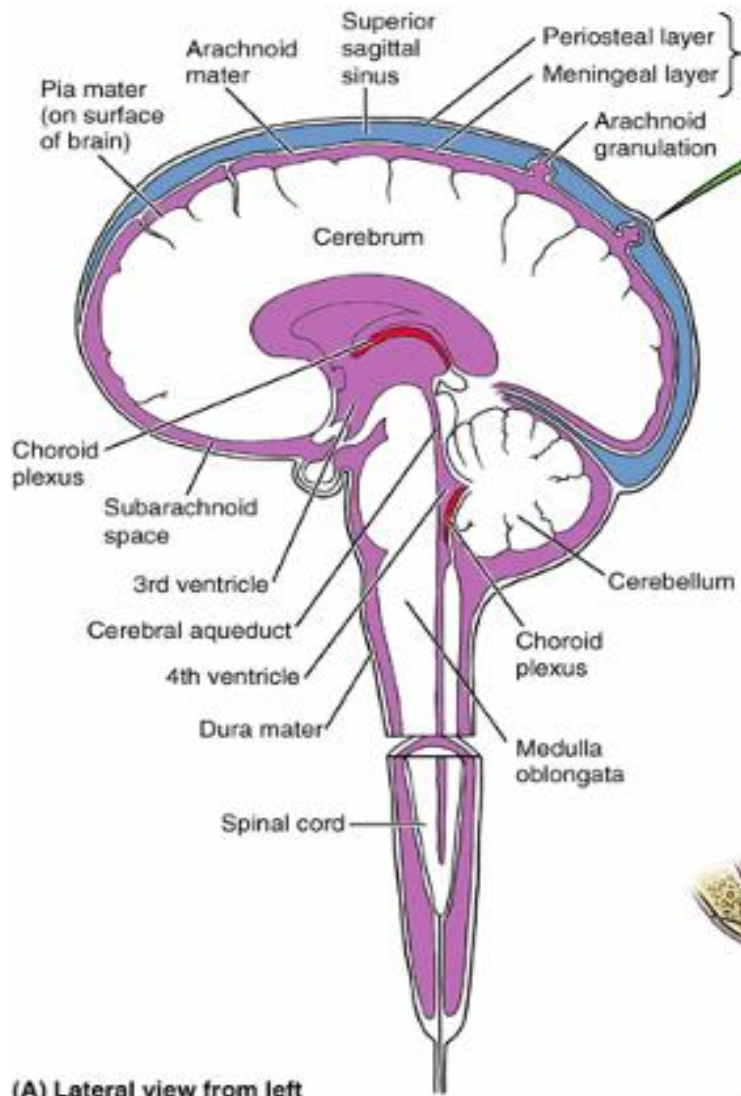
middle meningeal artery (branch from the **maxillary artery** foramen spinosum)
anterior and posterior branches, (accessory meningeal arteries through
foramen ovale)

posterior cranial fossa , numerous blood supply from different possible arteries:
posterior meningeal artery (from the **ascending pharyngeal artery** through the
jugular foramen)

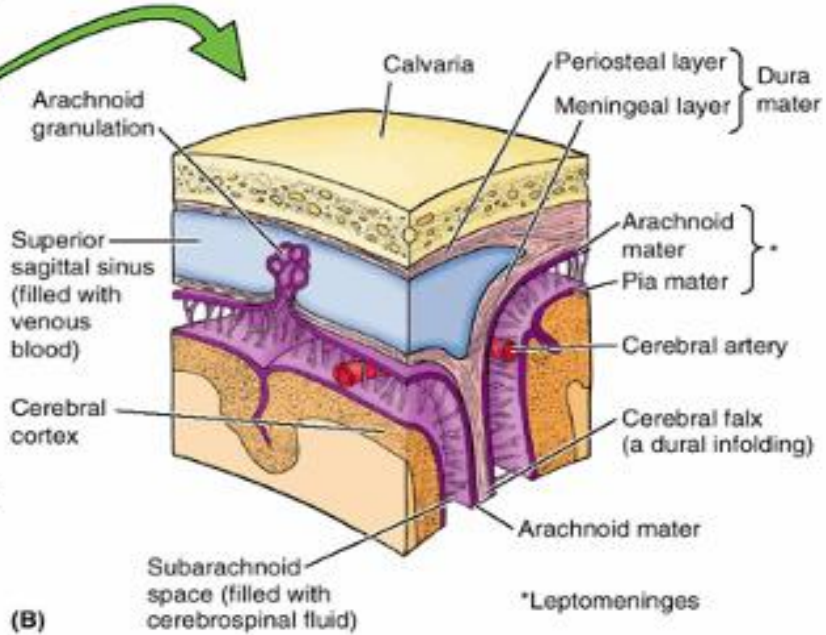
- B. meningeal arteries (from the ascending pharyngeal artery through hypoglossal canal)
- C. meningeal arteries (from occipital artery through jugular or mastoid foramen)
- D. meningeal arteries (from vertebral artery through foramen magnum)

Innervation of dura mater

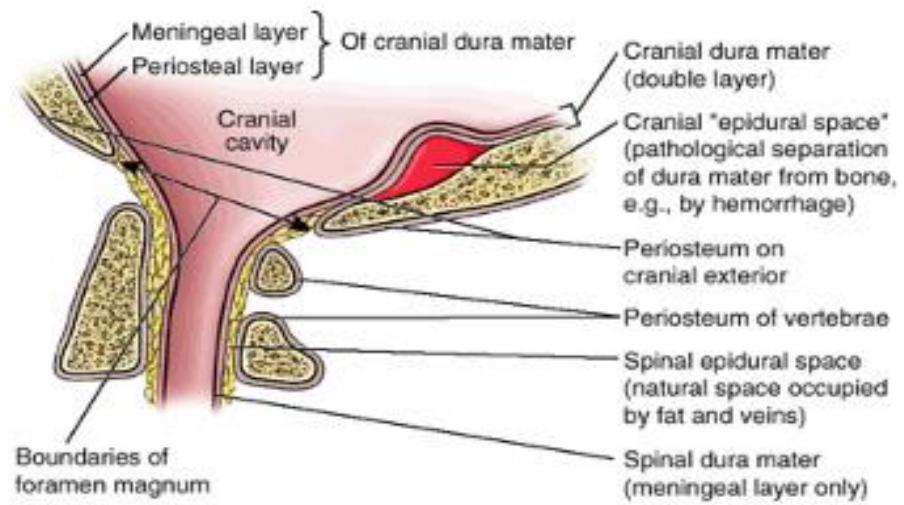




(A) Lateral view from left

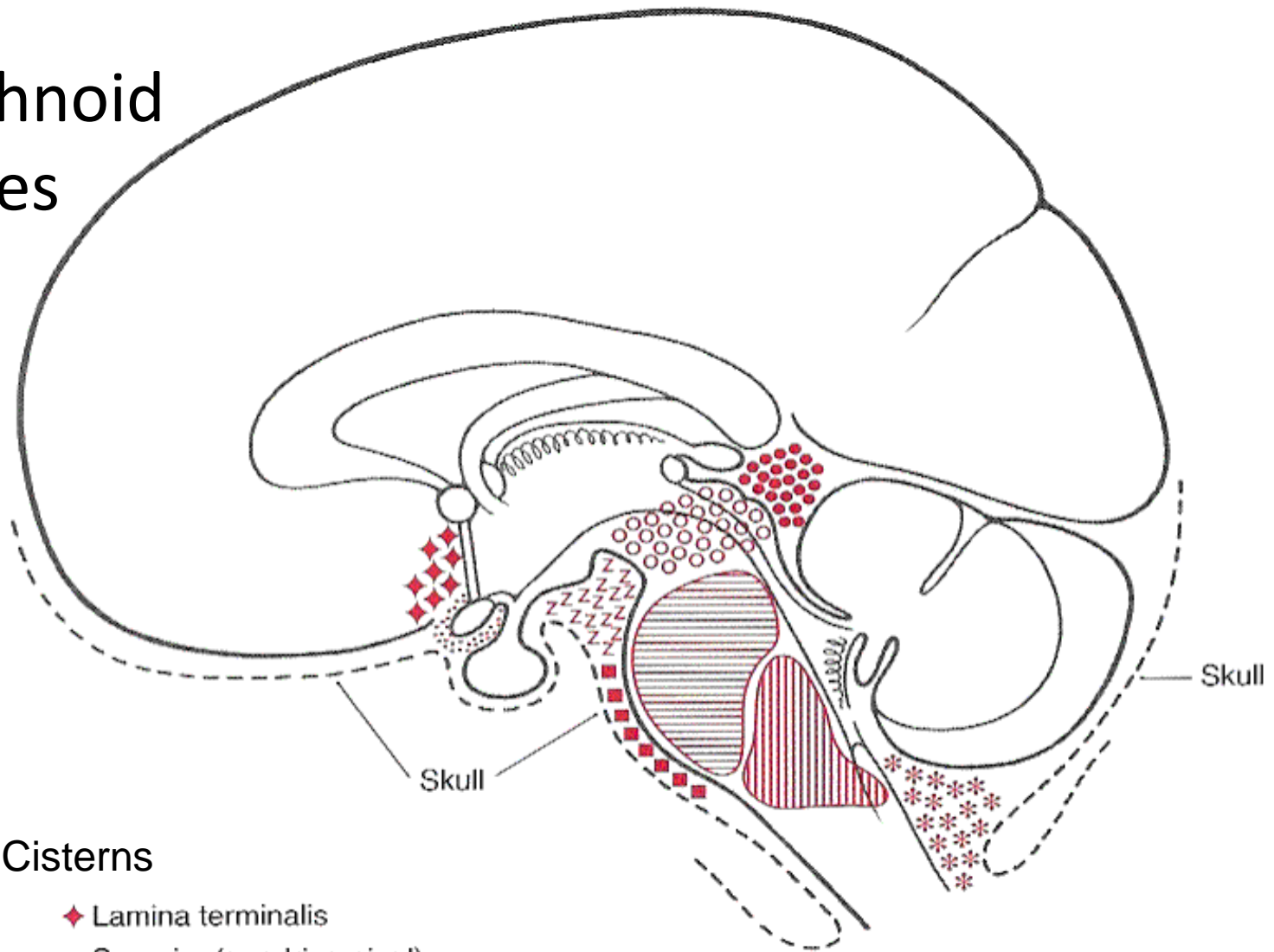


(B)



(C) Median section (from left)

Subarachnoid spaces

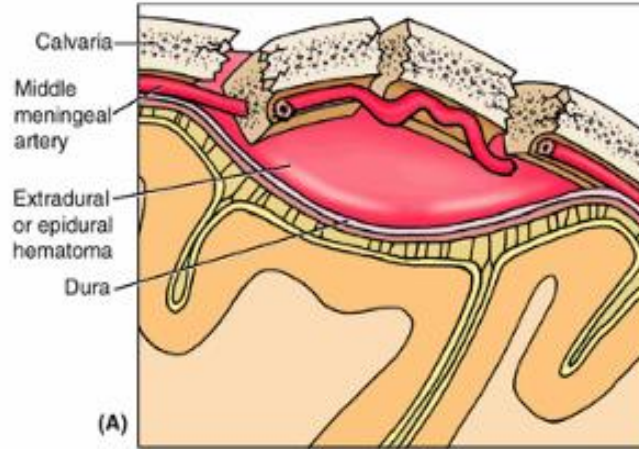


Cisterns

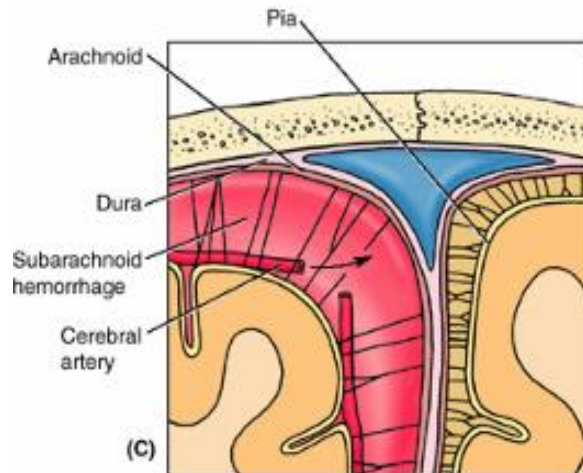
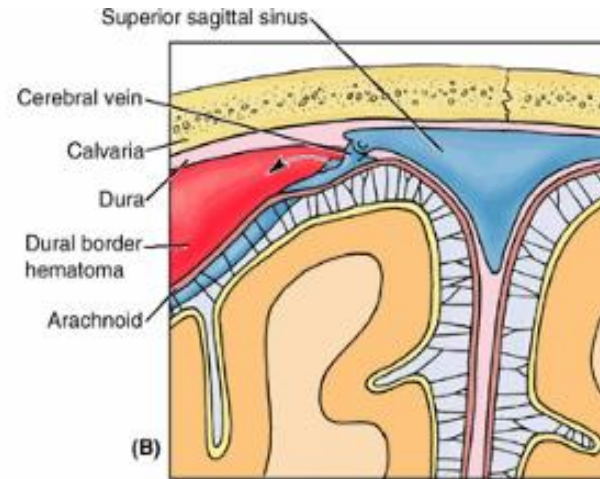
- ◆ Lamina terminalis
- Superior (quadrigenital)
- Ambient
- |||| Lateral cerebellomedullary
- * Dorsal cerebellomedullary (cisterna magna)
- ≡ Cerebellopontine
- ⋄ Chiasmatic
- z Interpeduncular
- Prepontine

Intracranial hemorrhages

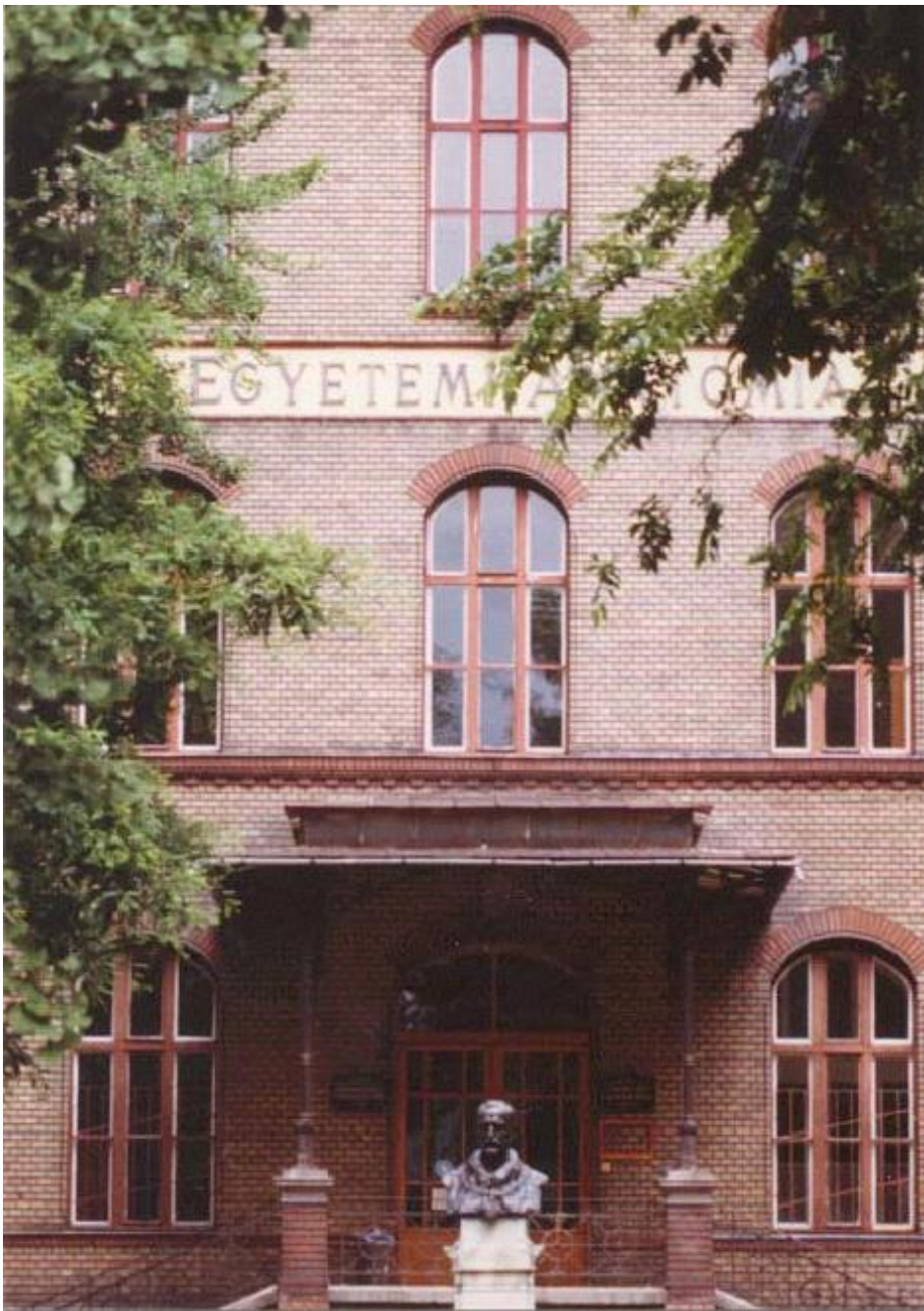
epidural hemorrhage



subdural hematoma



subarachnoid hemorrhage



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