

Záněty mozku  
novorozenců a kojenců.  
Degenerativní choroby  
CNS.

Nádory CNS.

Různé

Leoš Křen

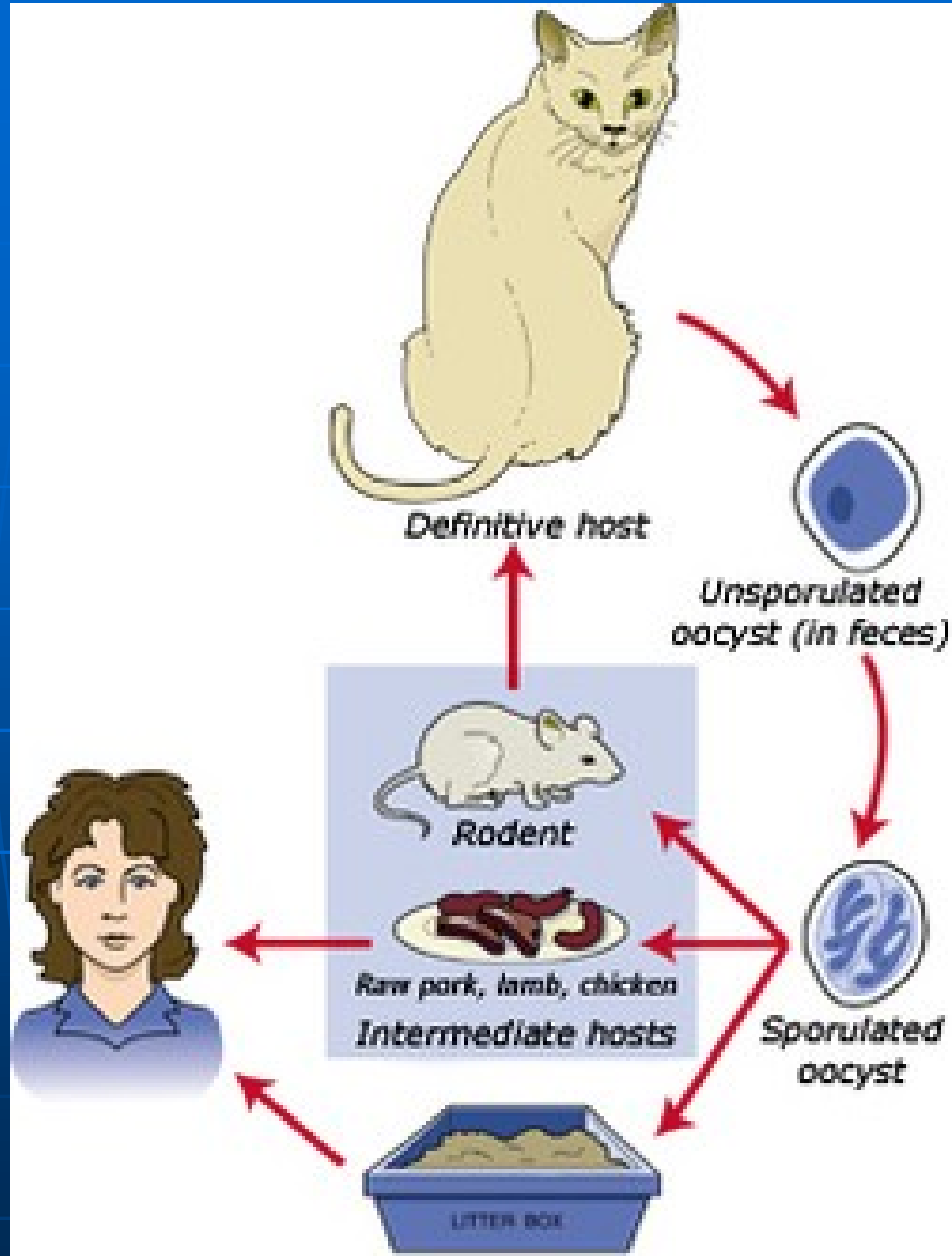


# Záněty mozku novorozenců a kojenců

- Transplacentárně
  - Při porodu
  - Po porodu
- Embryonální, časně fetální – teratogen
  - Později-zánět

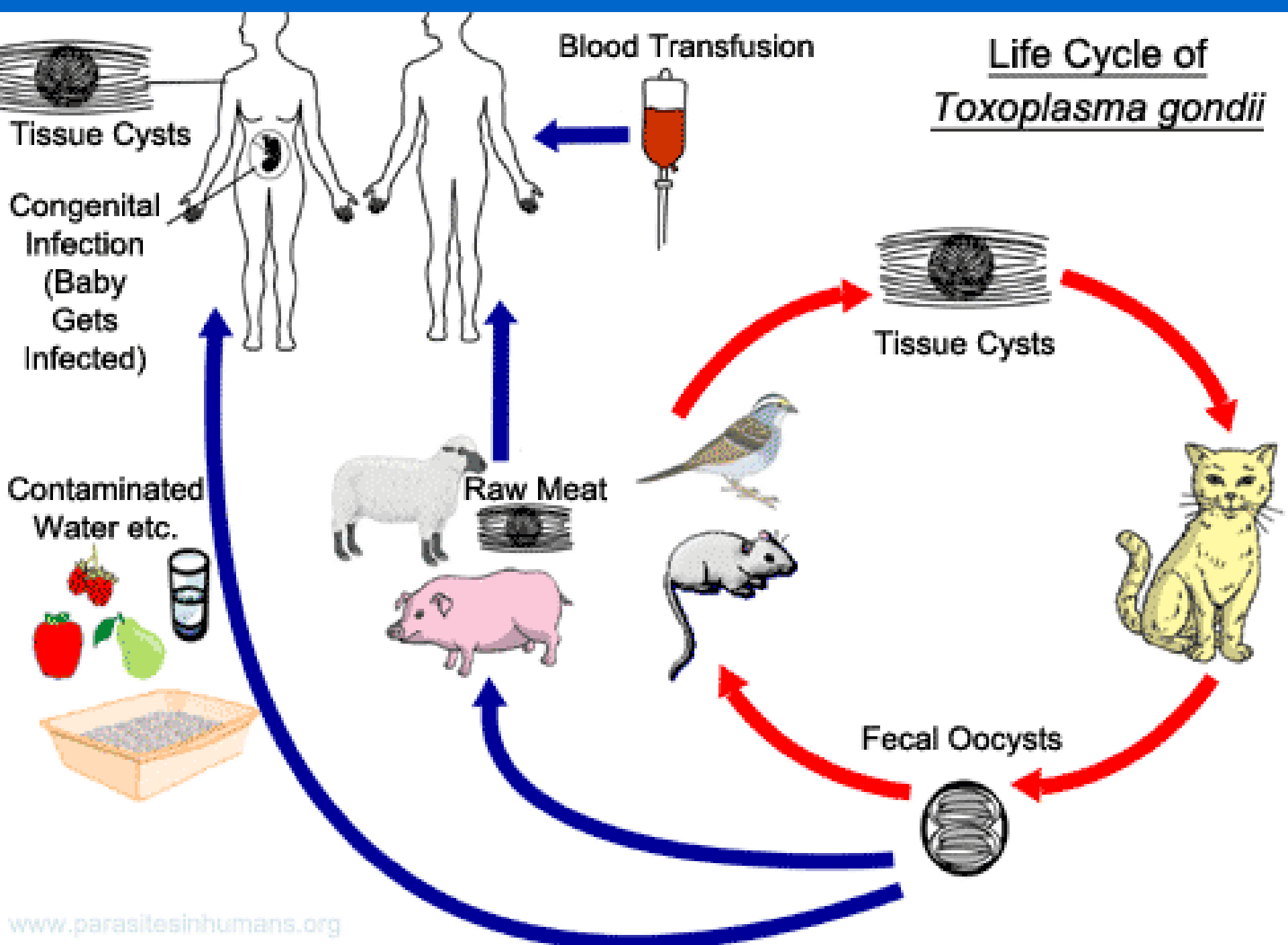
## ■ **Toxoplazmóza**

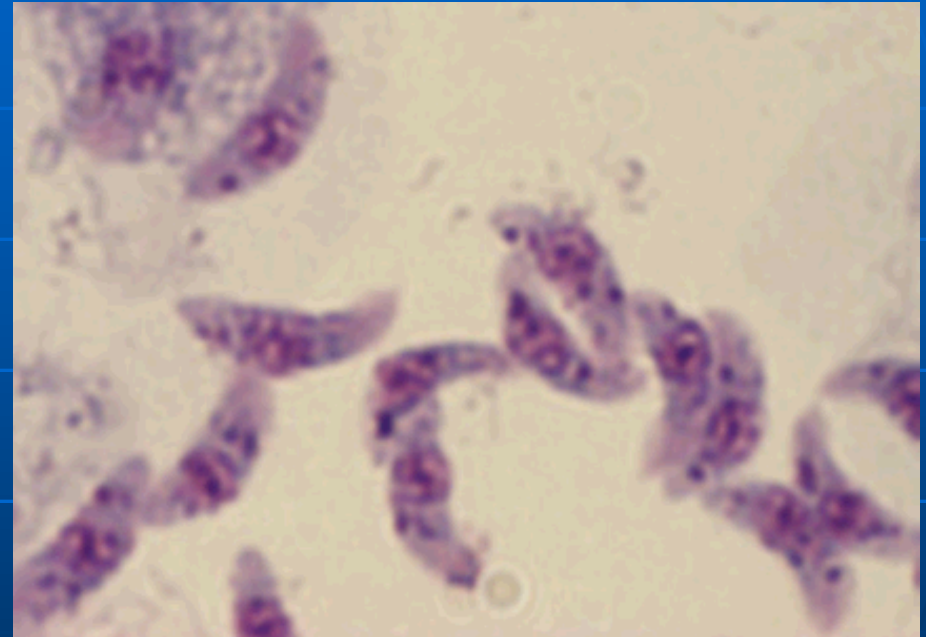
- primoinfekce matky bez kliniky 3 měs.,
- toxoplazmové pseudocysty (trofozoidy) v mozku, prasknutí, těžká meningoencefalitida  
lymfoplazmocyární, nekrózy v okolí komor



LIFE CYCE OF TOXOPLASMOSIS

# Life Cycle of *Toxoplasma gondii*





# Herpes simplex

- Infekce II typu
- Teratogenně (**mikrocefalie, mikroftalmie**)
- Při/po porodu:
- Puchýře
- Generalizovaná infekce
- Lokalizovaná encefalitida



- **Rubeola (zarděnky)**
- Těžce teratogenní
- Mikrocefalie, mikroftalmus, katarakta, hluchota, srdeční vady
  
- **CMV infekce**
- fetálně generalizovaná cytomegalová infekce (mozek-kalcifikace, parenchymové orgány)

# Degenerativní onemocnění CNS

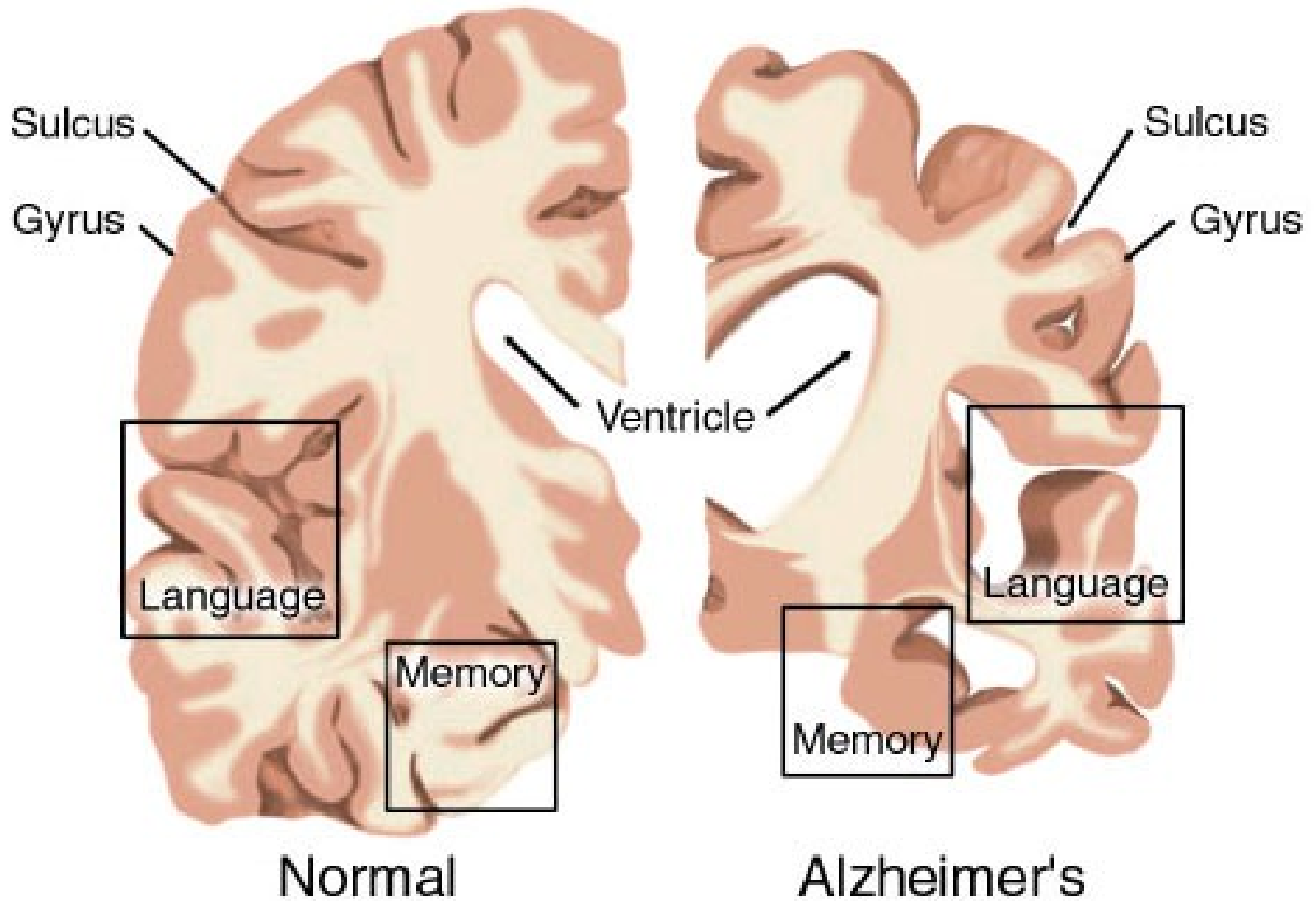
- Dle etáže:
- Mozková kůra
- Extrapyramidový systém
- Mícha

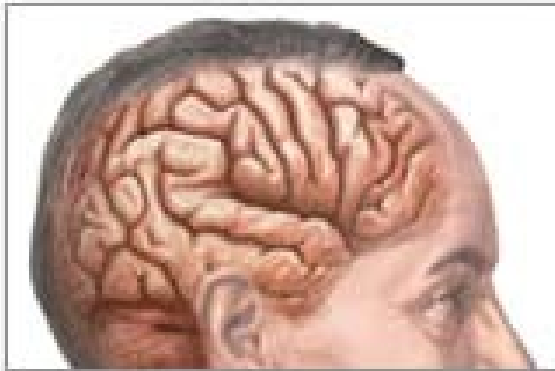
# *Mozková kůra*

- **Alzheimerova nemoc** (presenilní demence)
- F-T-P lalok
- **Senilní drůzy**  
(neuritické/amyloidové plaky)
- **Alzheimerovy změny neurofibril**
- Granulovakuolární tělíska, Hiraniho tělíska
- **Amyloidová angiopatie**

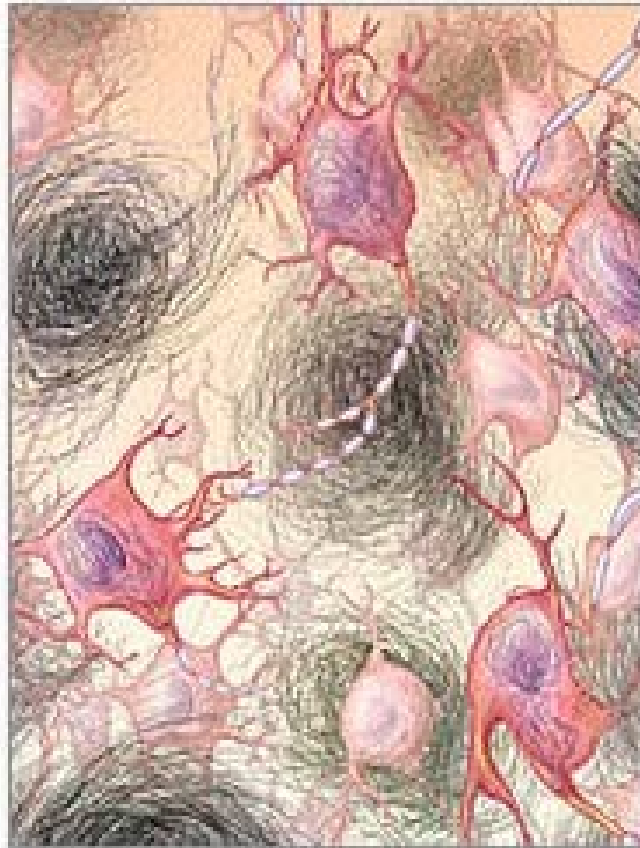




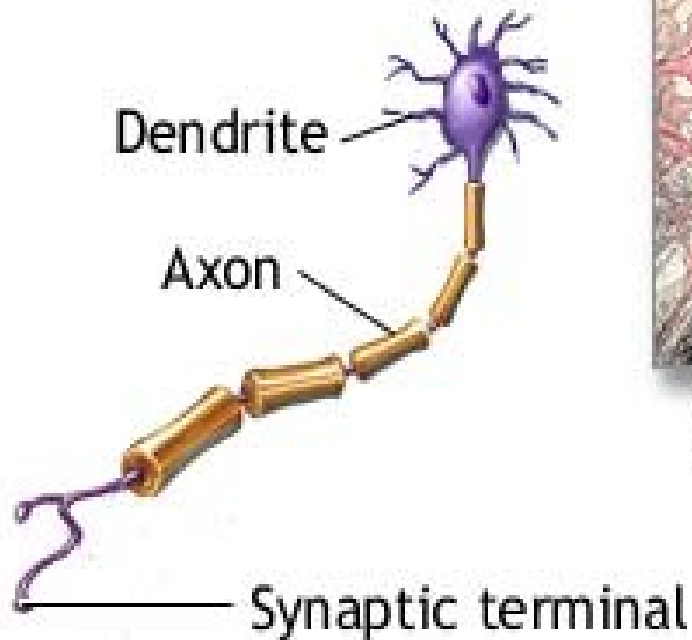




Aging brain



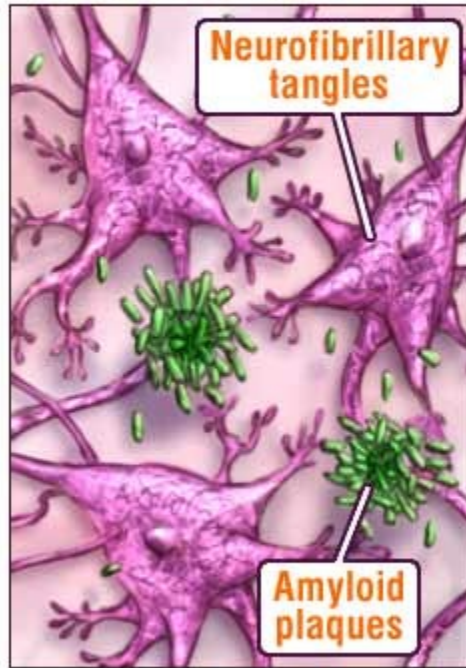
Neurons in aging brain



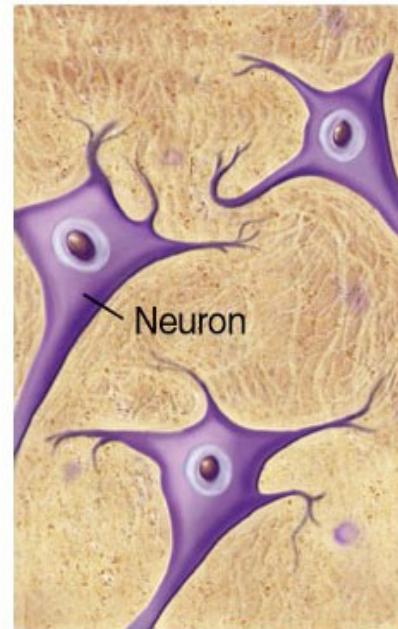
## Normal



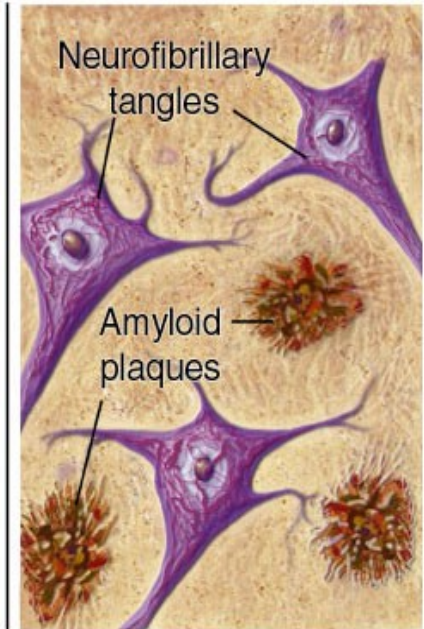
## Alzheimer's



## Normal



## Alzheimer's

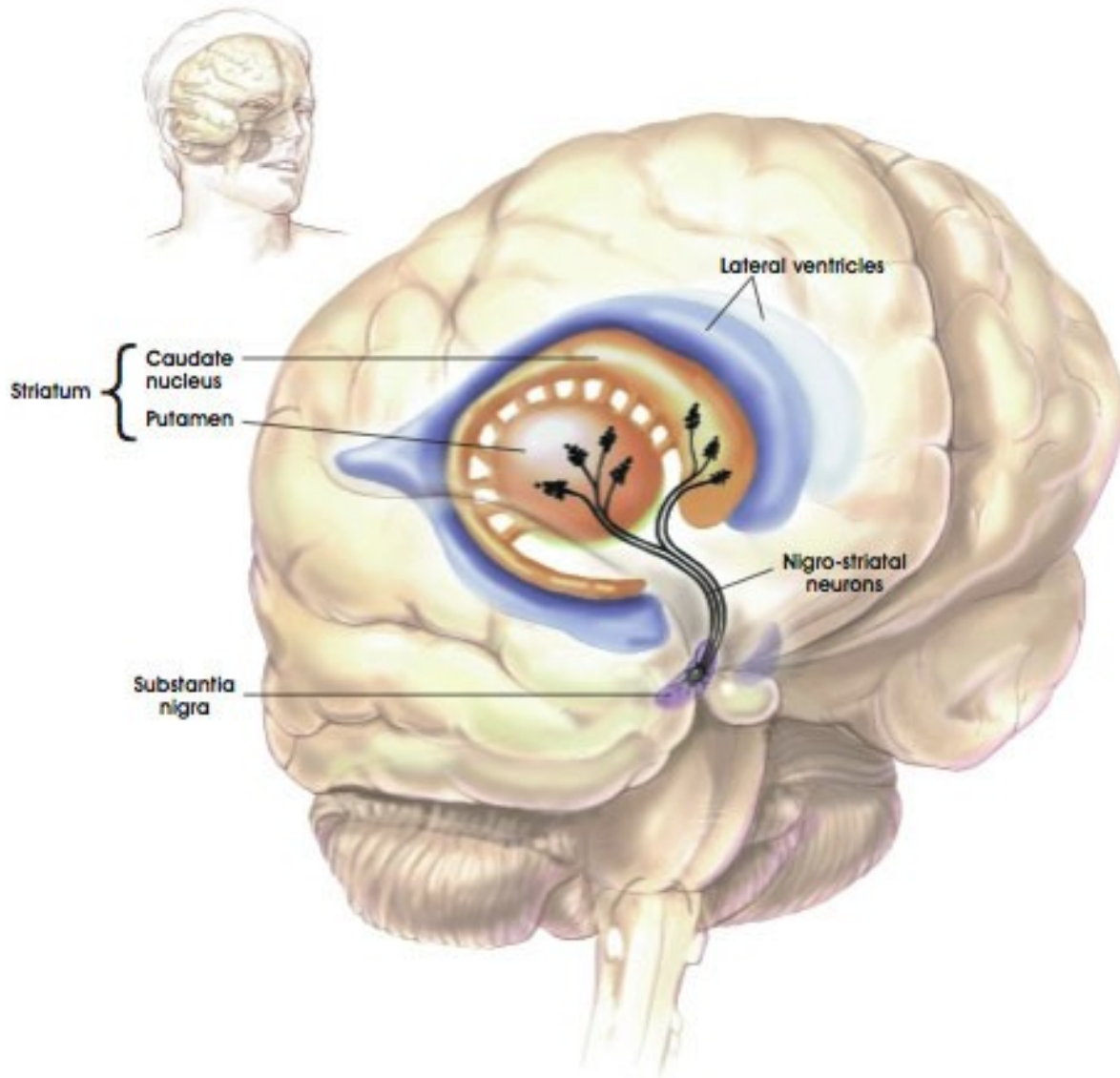


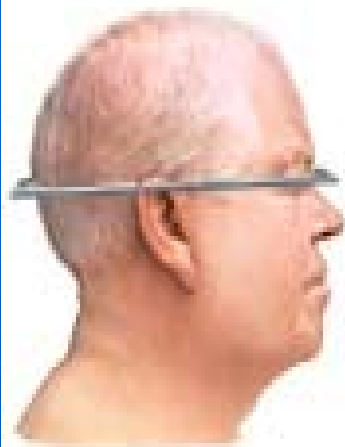


- **Pickova nemoc** (atrophia cerebri circumscripta progressiva)
- F-T lalok
- Pickova tělíska

# *Extrapyramidový systém*

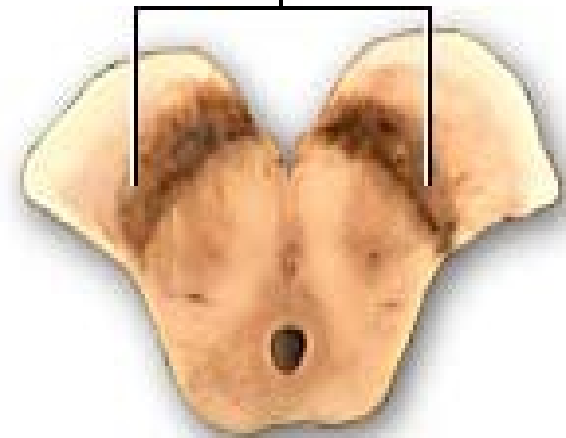
- **Parkinsonova choroba**
- s. nigra, locus coeruleus zánik neuronů
- Lewyho tělíska
- **Hungtingtonova nemoc**
- n. caudatus, putamen úbytek neuronu
- autosomálně dominantní



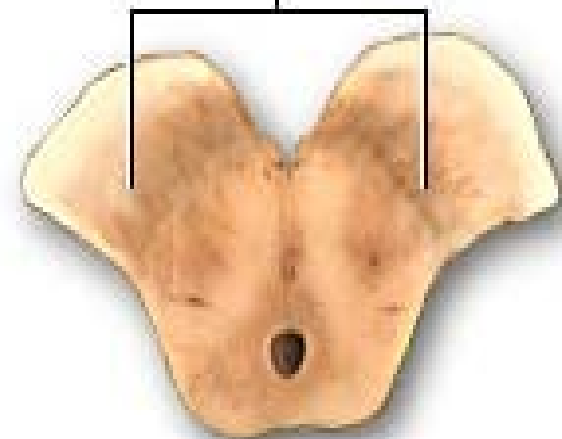
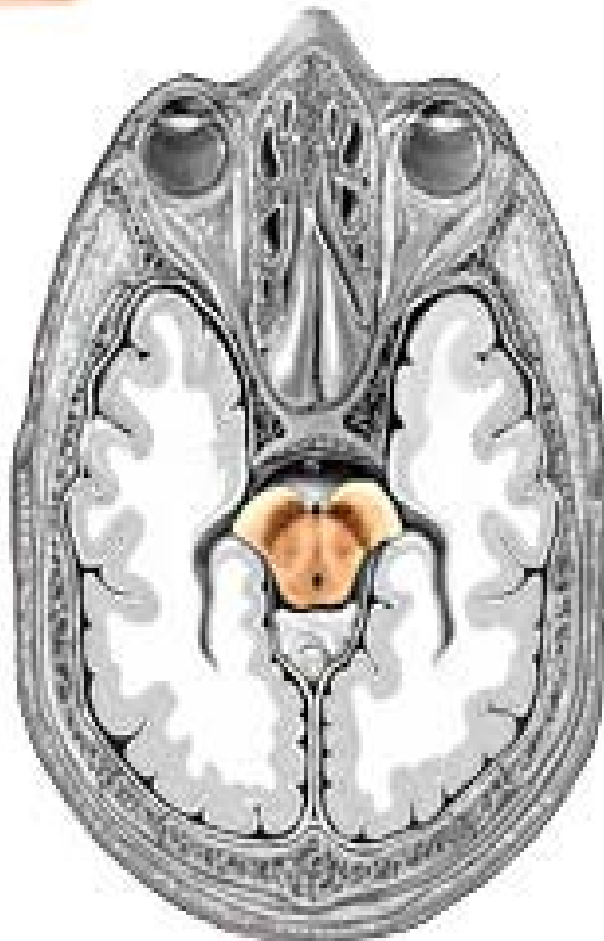


Cut section  
of the midbrain  
where a portion  
of the substantia  
nigra is visible

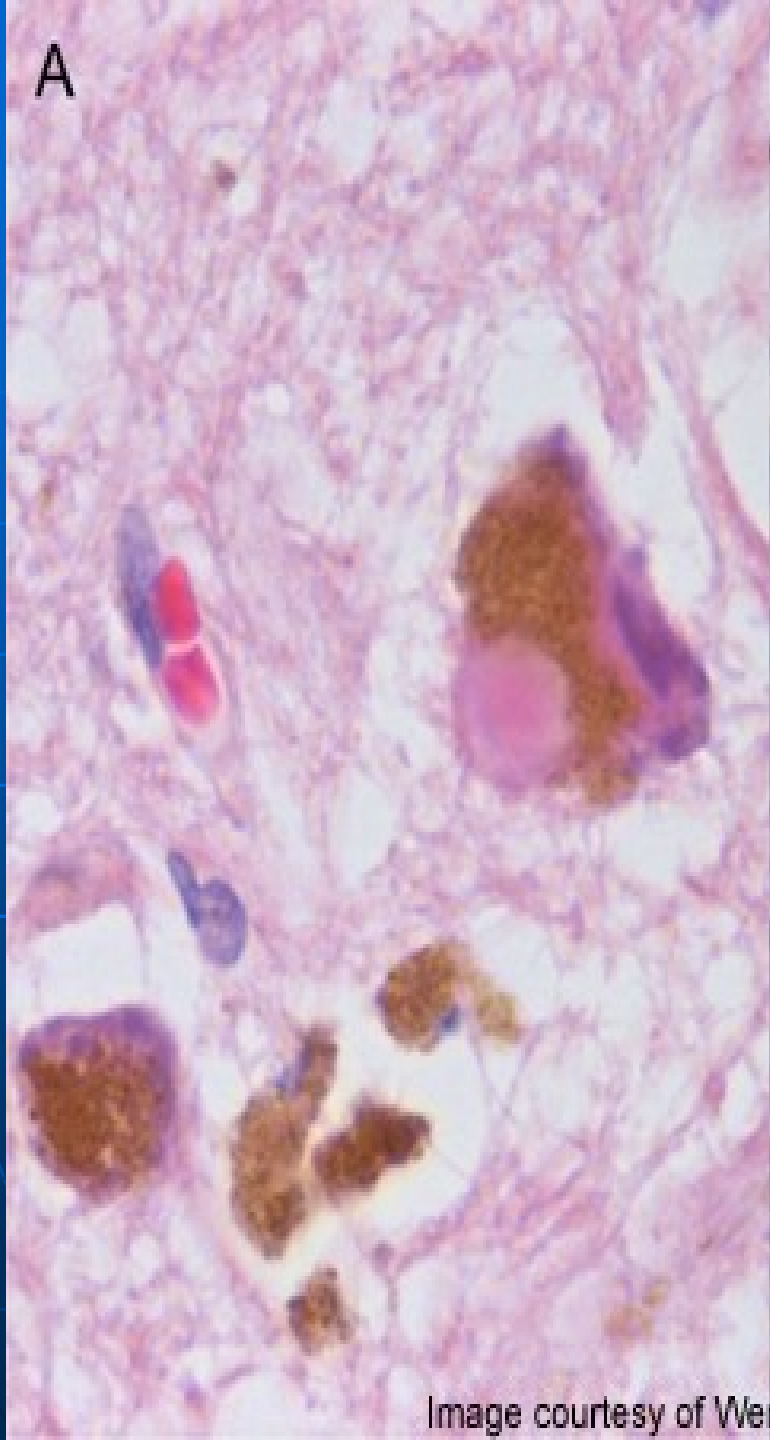
Substantia nigra



Diminished substantia  
nigra as seen in  
Parkinson's disease



A



B

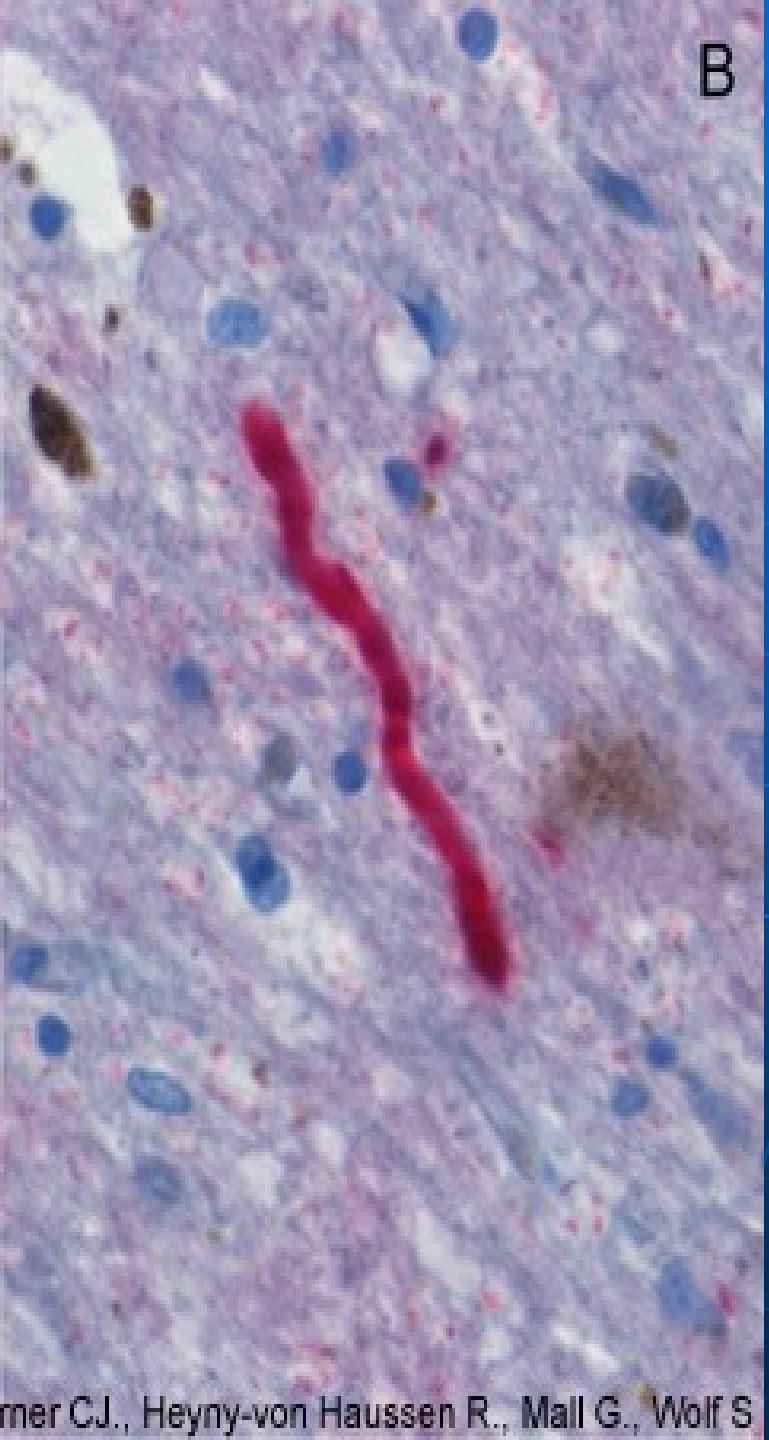


Image courtesy of Werner C.J., Heyny-von Haussen R., Mall G., Wolf S

# *Mícha*

- **Amyotrofická laterální skleróza**
- gyrus precentralis regresivní změny
- zánik a demyelinizace neuronů v předních a postranních rozích míšních

# *Nádory CNS*

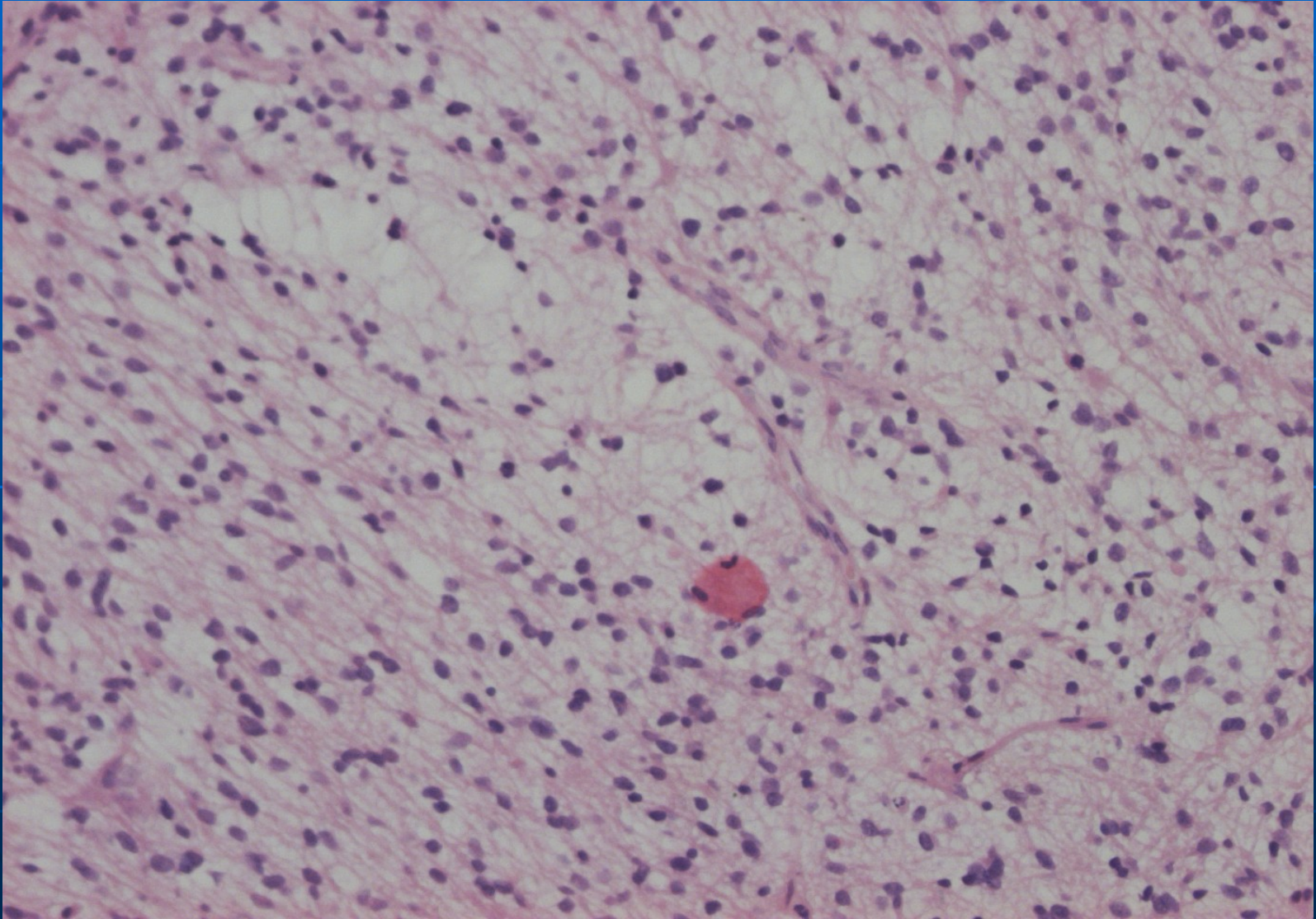
- Gliomy
- Neuronální tumory
- Nízce diferencované tumory
- Meningomy
- Vzácnější nádory

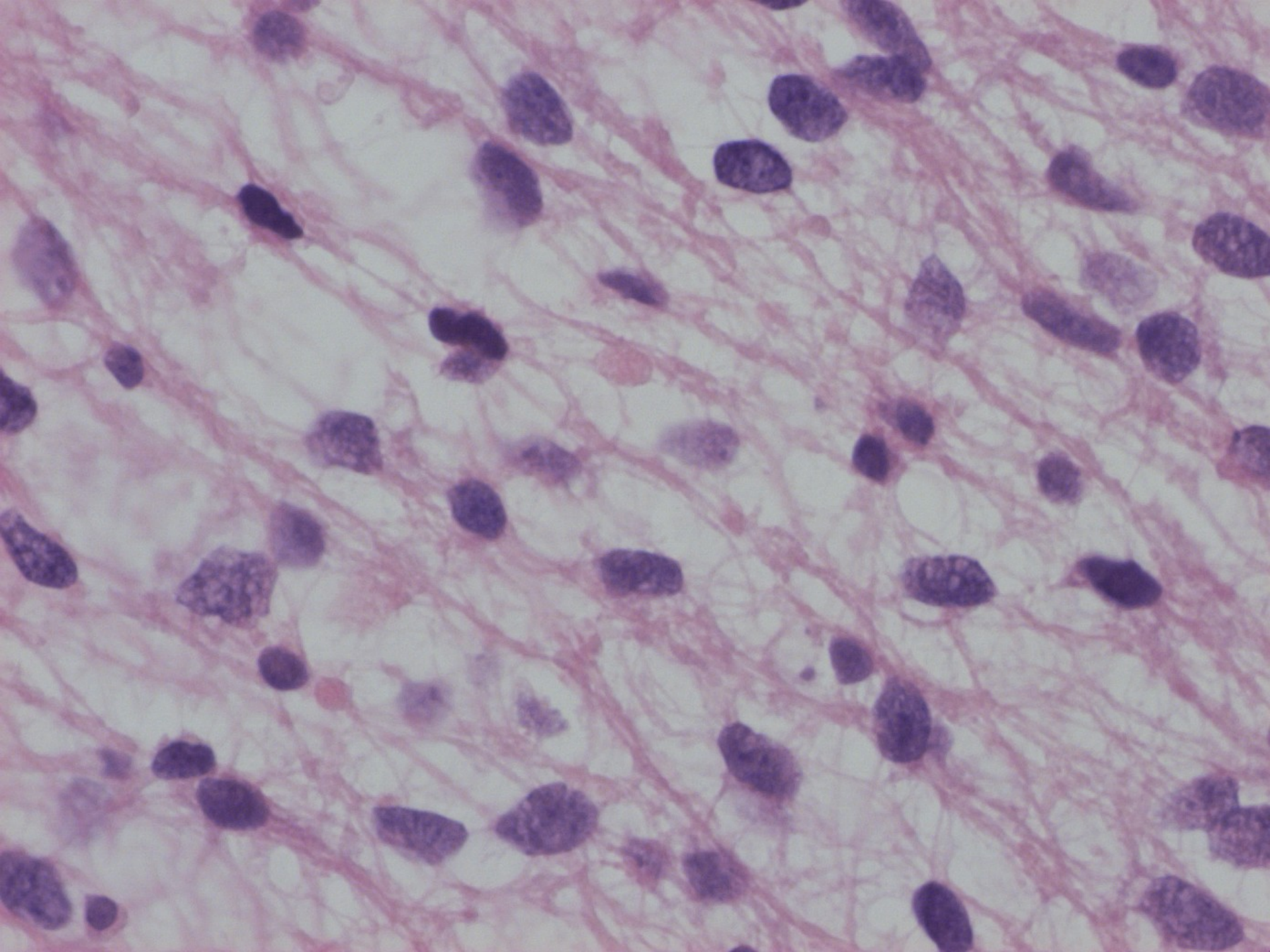
# *Gliomy*

- **Astrocytomy**
- **difúzní (Gr. II)**
- gemistocytární...už ne
- protoplasmický...už ne
- **anaplastický (Gr. III)**
- **multiformní glioblastom** (podtyp obrovskobuněčný glioblastom a gliosarkom) **(Gr. IV)**

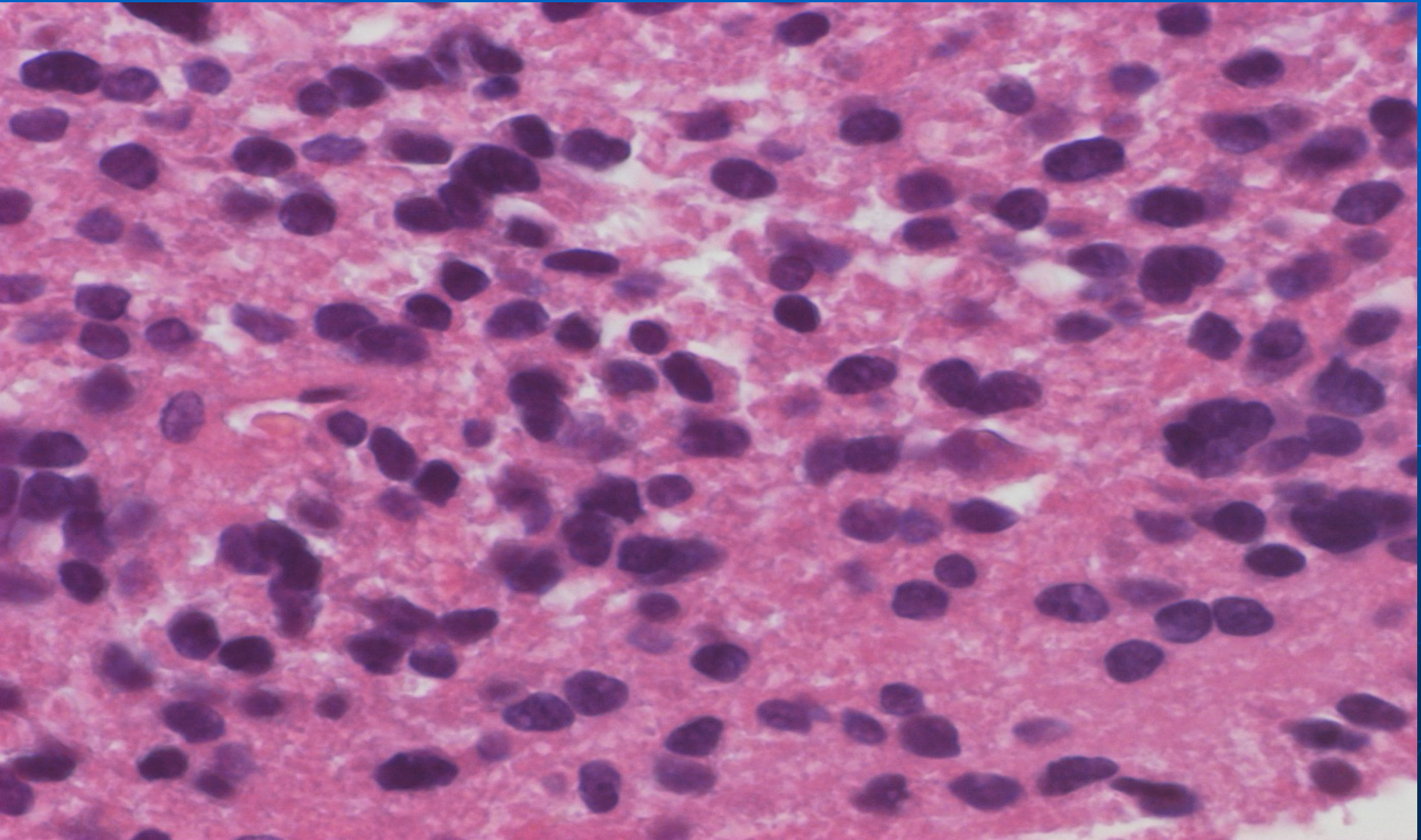


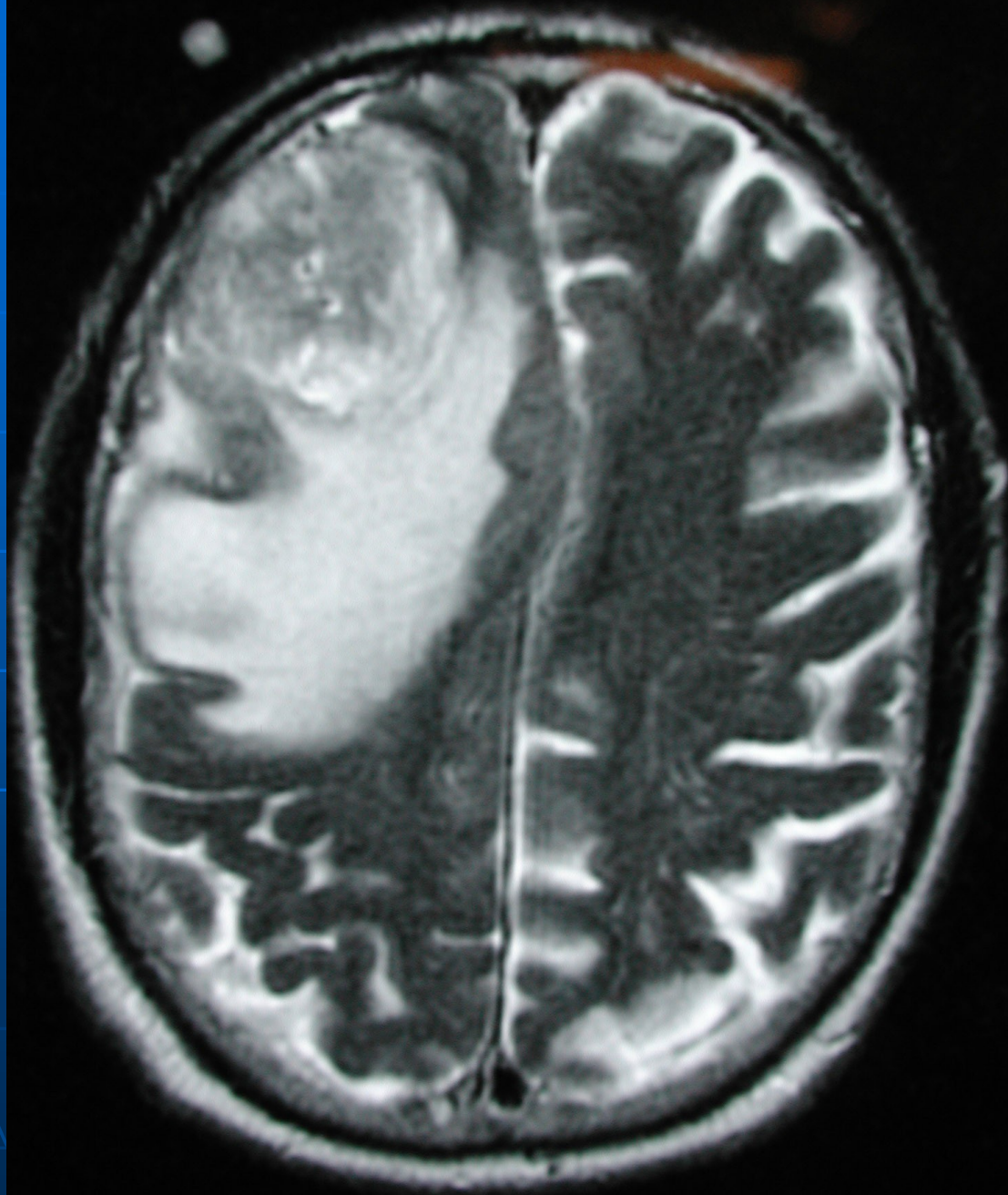
# Difúzní astrocytom

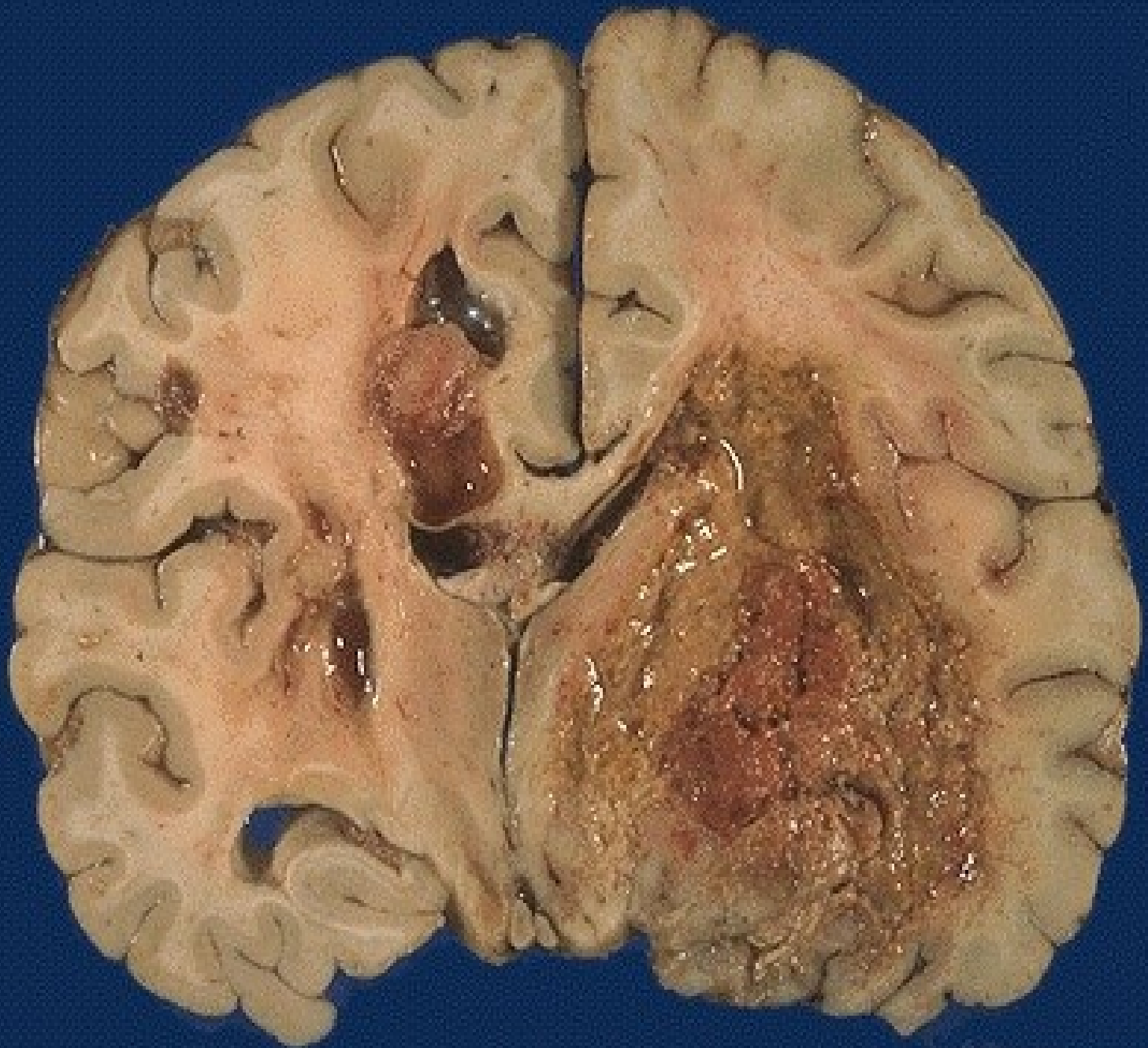


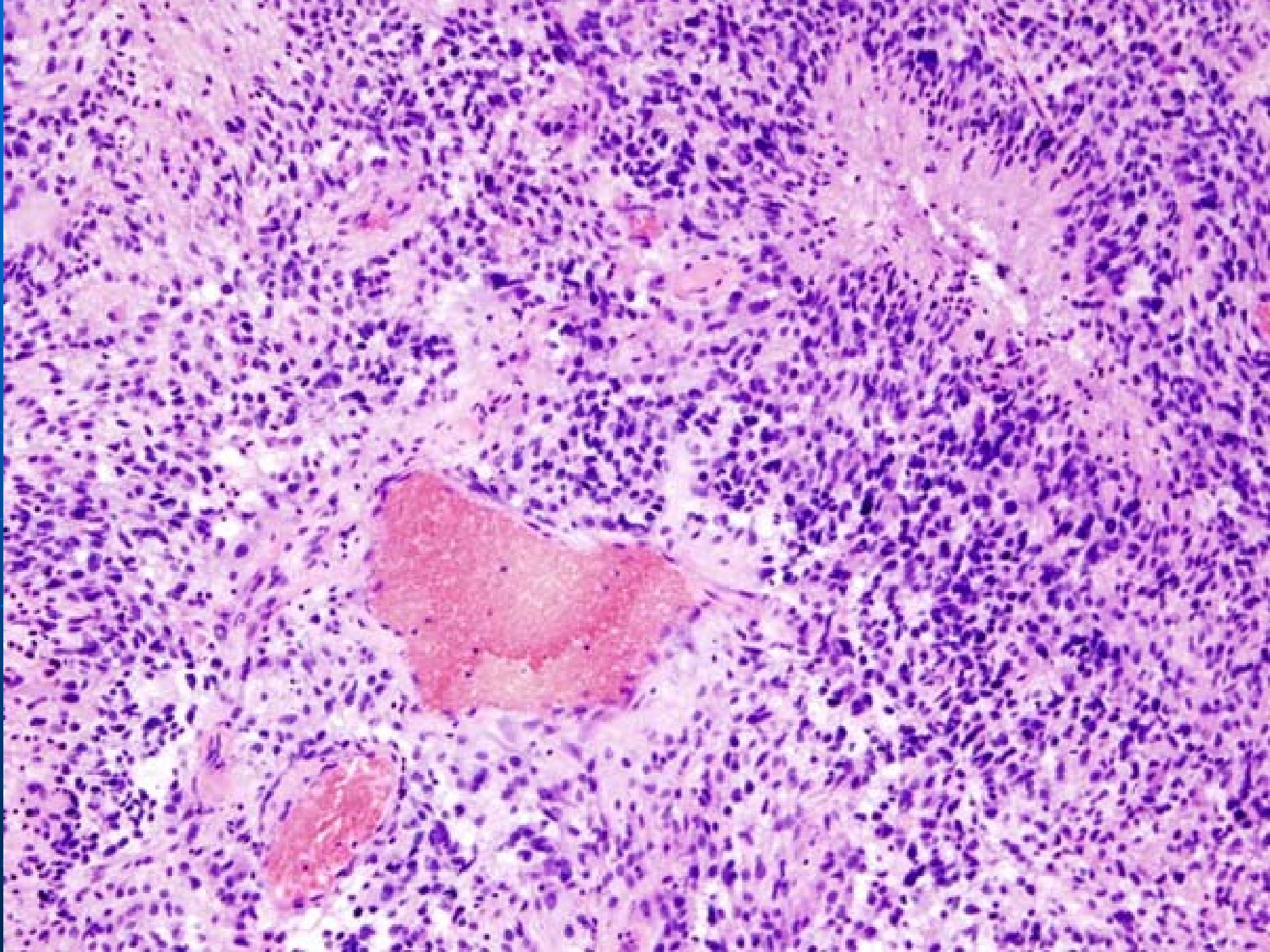


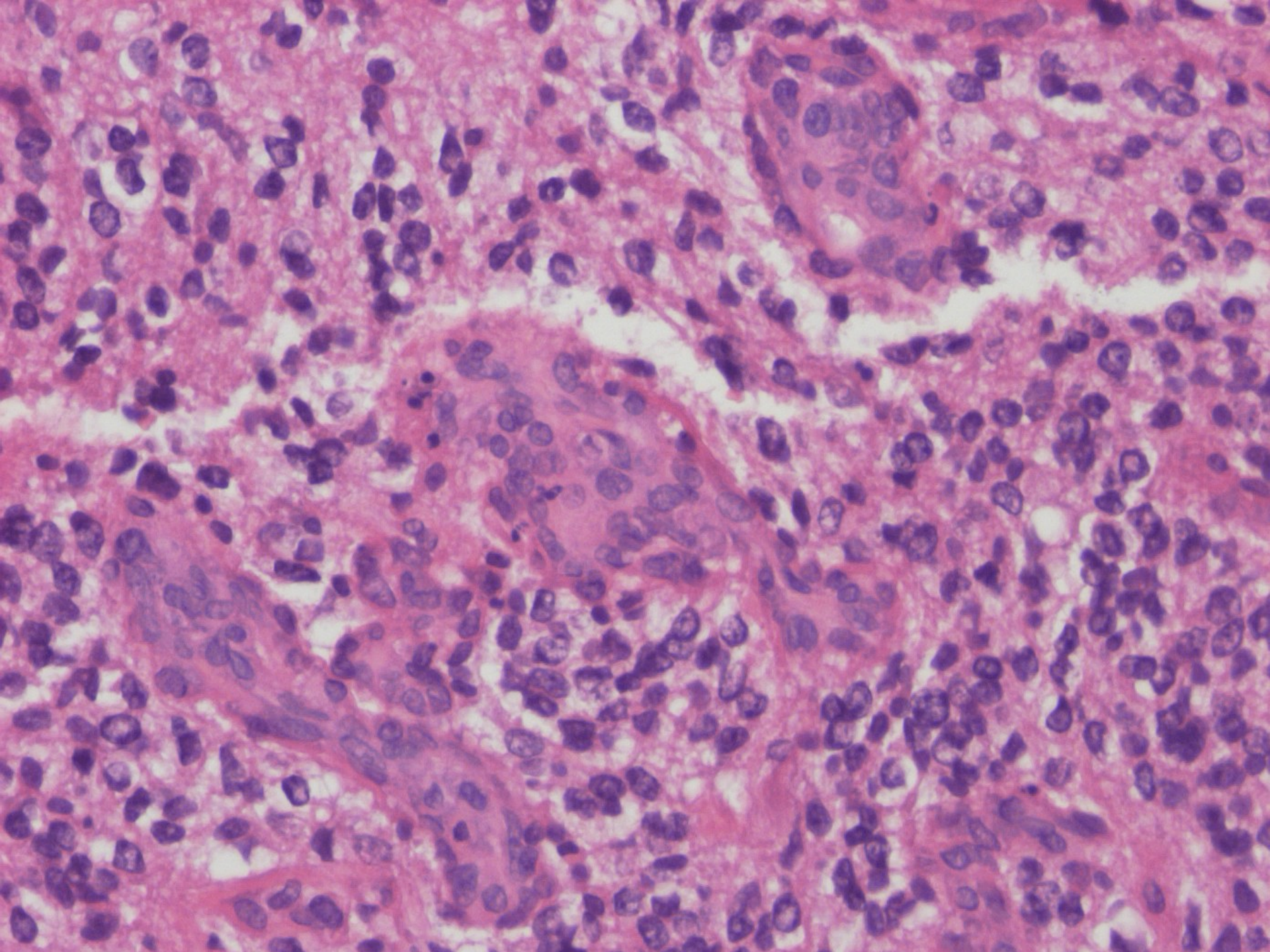
# Anaplastický astrocytom



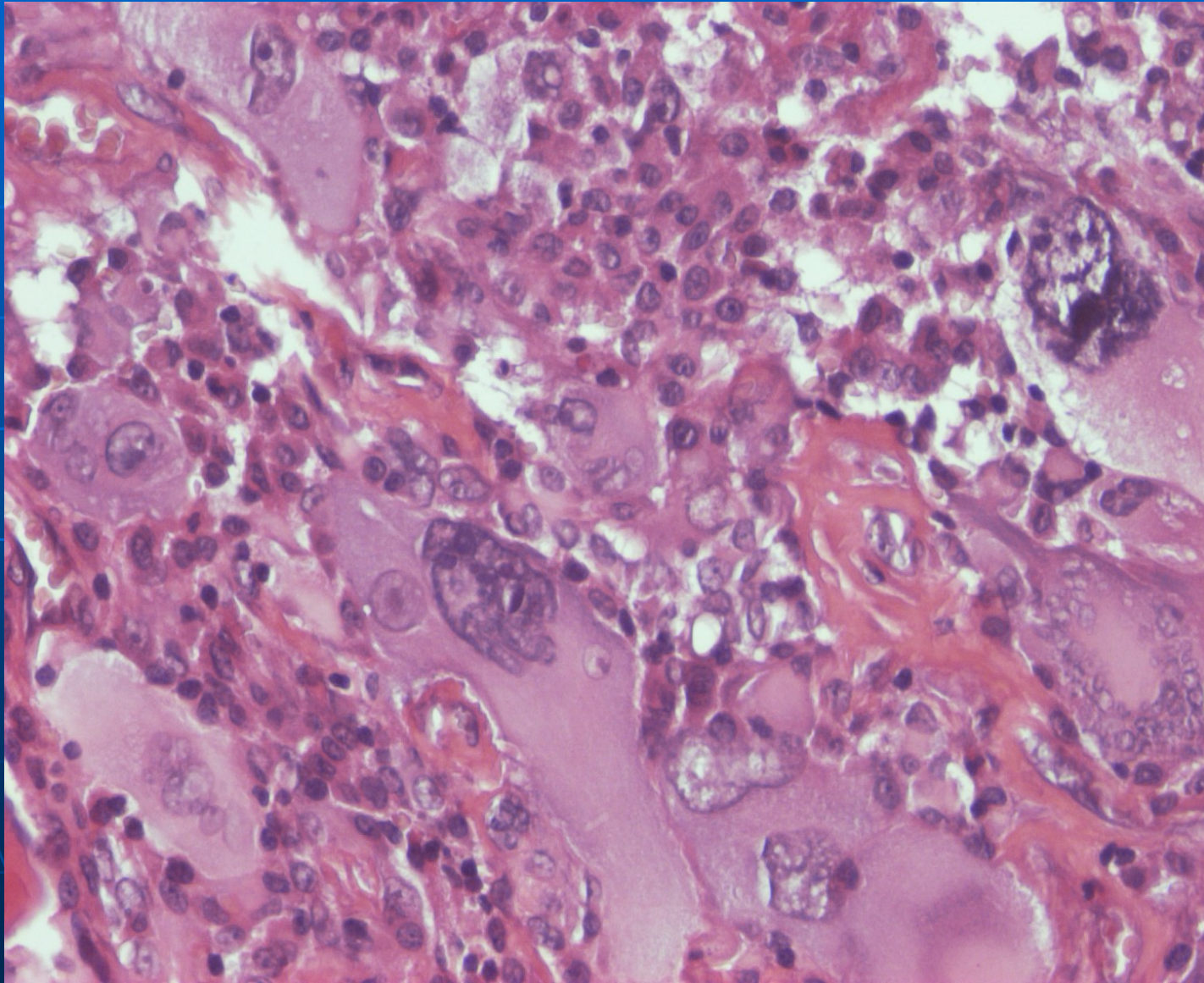






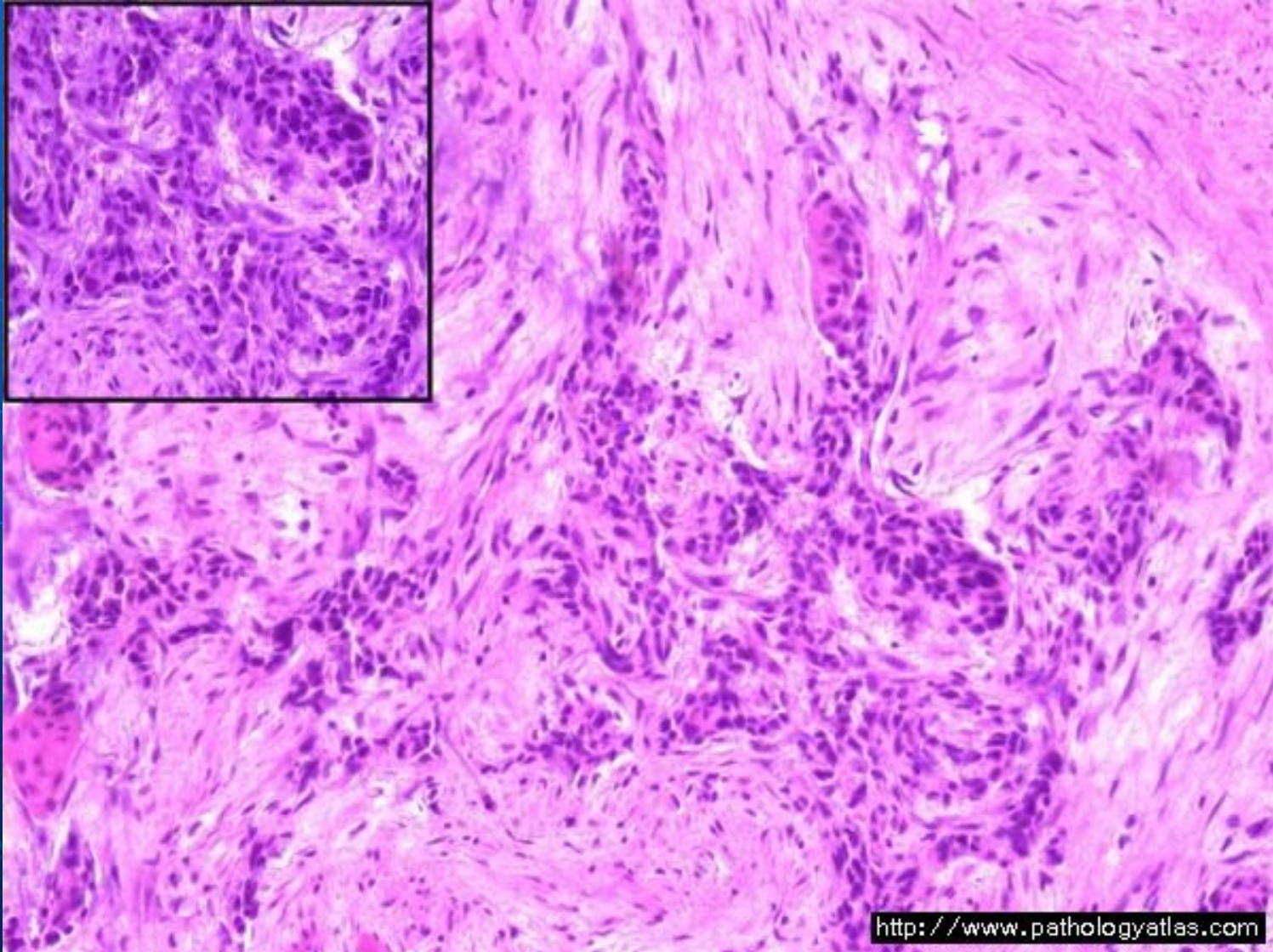


# Obrovskobuněčný glioblastom



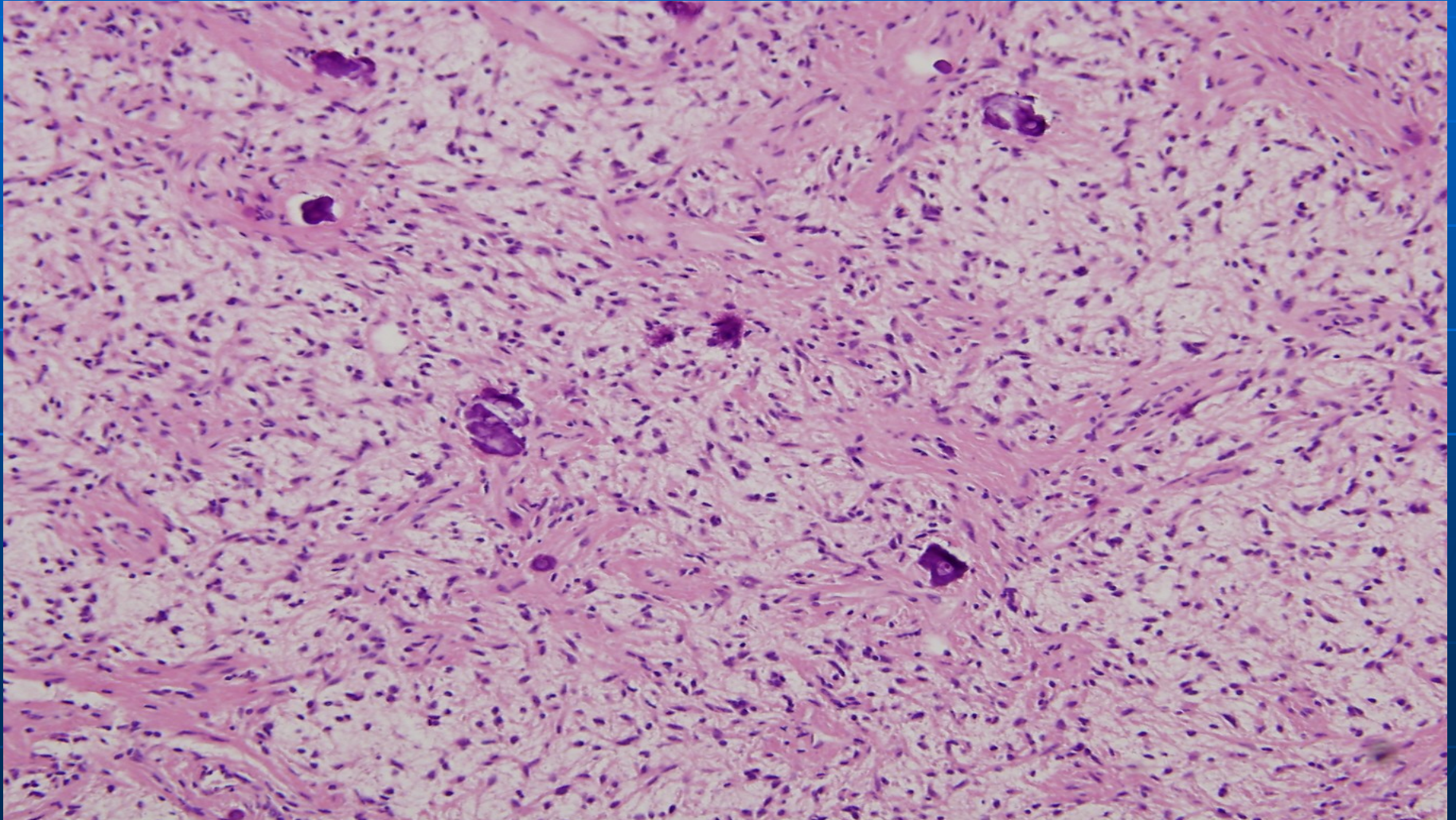


# Gliosarkom



- Zvláštní varianty astrocytomů:
- Pilocytický astrocytom (mozeček) (Gr. I) děti-nádory dětského věku
- Pleomorfní xantoastrocytom (temporální lalok) (Gr. II)
- Gliomatosis cerebri...už ne

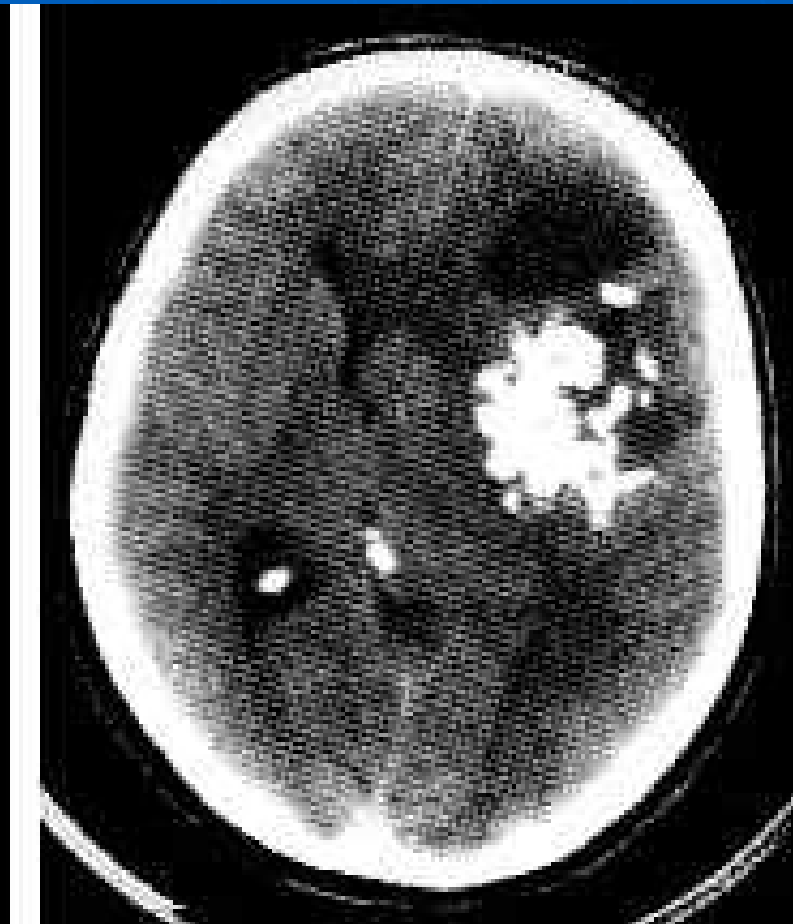
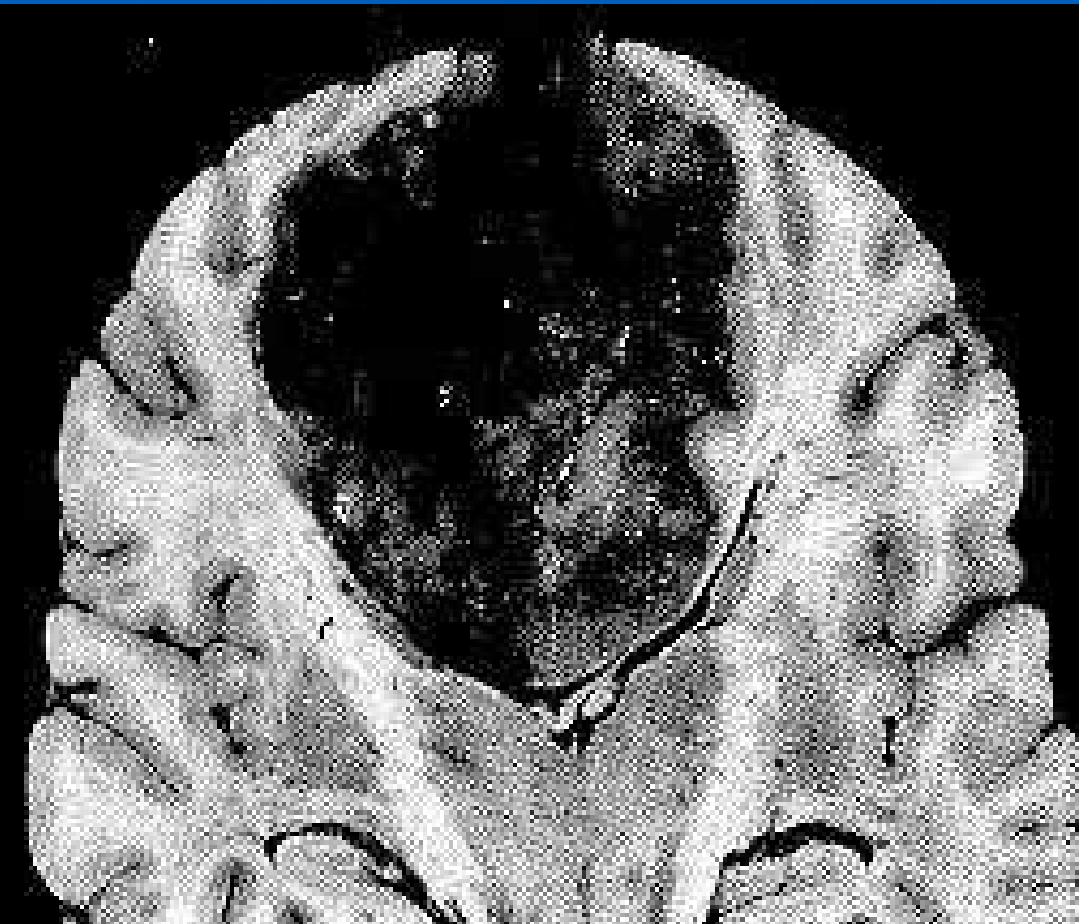
# Pilocytický astrocytom

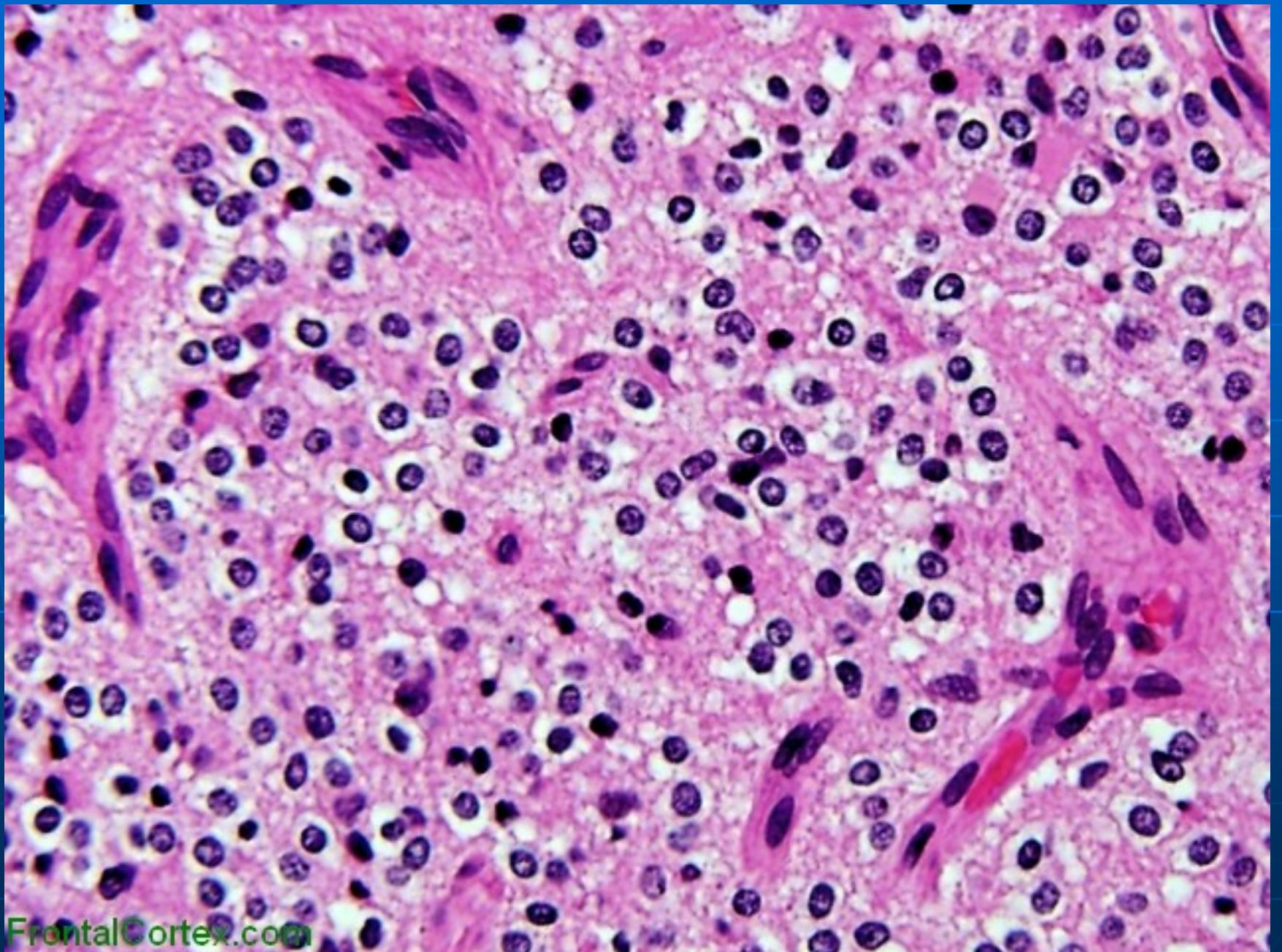


# Oligodendrogliom

- Oligodendrogliom (Gr. II),  
anaplastický oligod. )(r. III)
- sázená vejce
- „chicken wire“ kapiláry
- kalcifikace

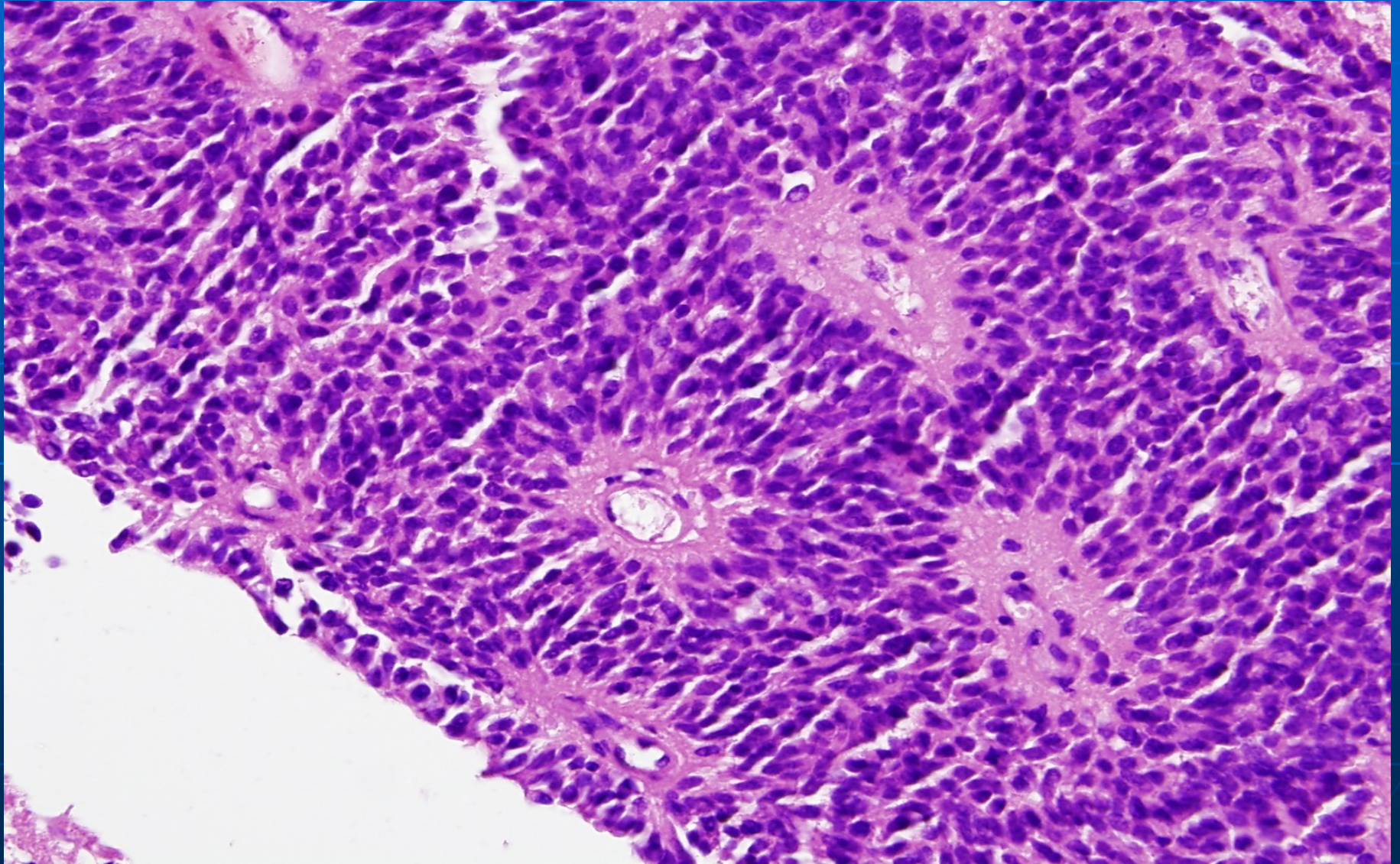
# Oligodendrogliom - kalcifikace





- Ependymom, anaplastický ependymom
  - u dětí v okolí čtvrté komory
  - u dospělých v okolí míšního kanálu
- Varianty myxopapilární ependymom subependymom

# Ependymom





# WHO revize 2016

- Koncept tzv. „**integrované diagnózy**“
- Hodnotí mutace **IDH** (izocitrát dehydrogenázy) 1,2 jak u astrocytomů tak oligodendrogliomů
- **ATRX** (ataxia telangiectasia retardation X-linked) u astrocytomů
- Hodnotí kódelece 1p19q u oligodendrogliomů

- Výsledná dg. je souhrnem („integrací“) mol. genet. aberací a histopatologického vzhledu (při diskordanci se stanoví dg. dle mol. genet. aberací).

# *Neuronální nádory*

Neuroblastom

u dětí v retroperitoneu

Ganglioneuroblastom

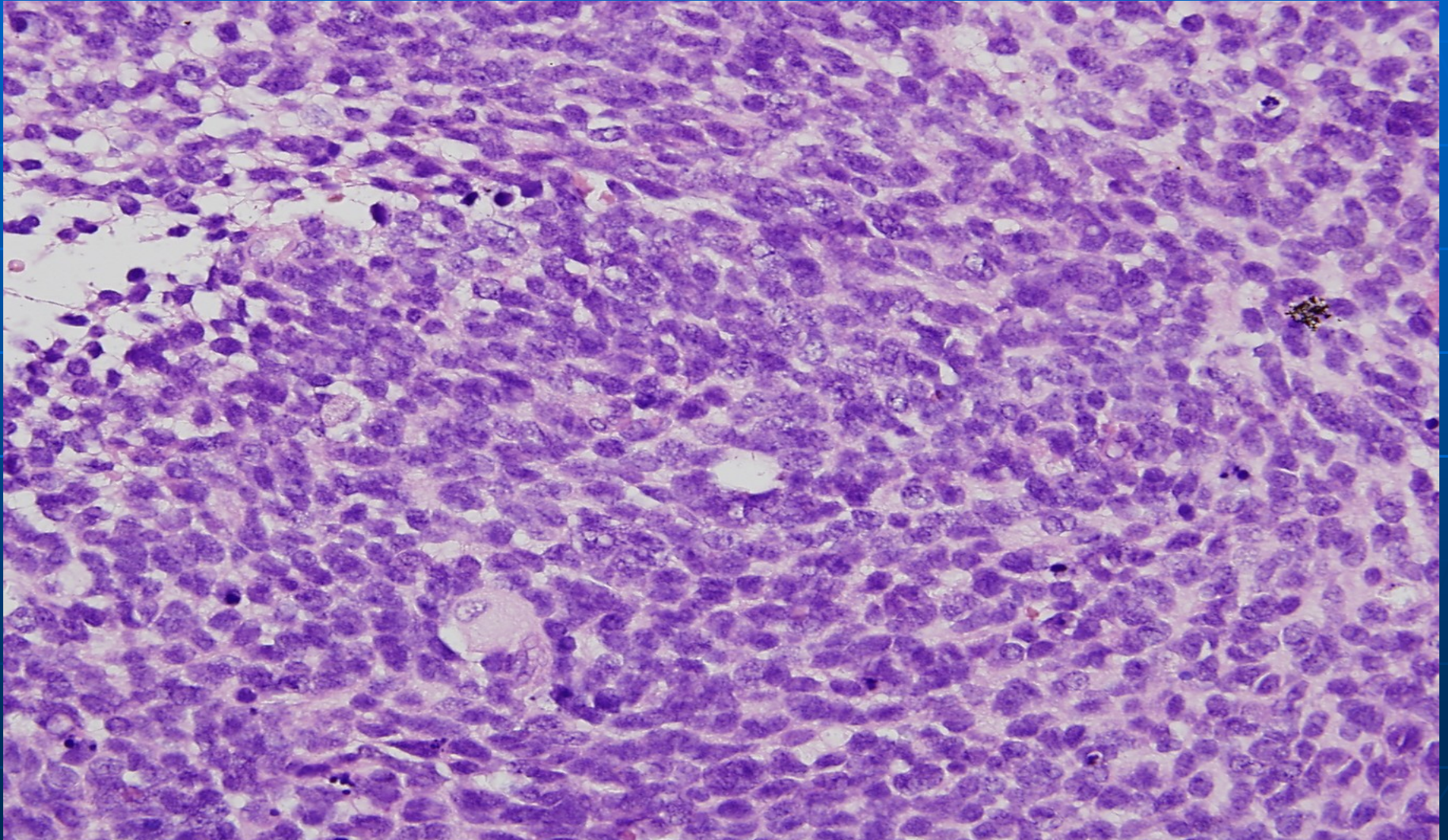
Ganglioneurom

Centrální neurocytom

# *Nízce diferencované tumory (Gr. IV)*

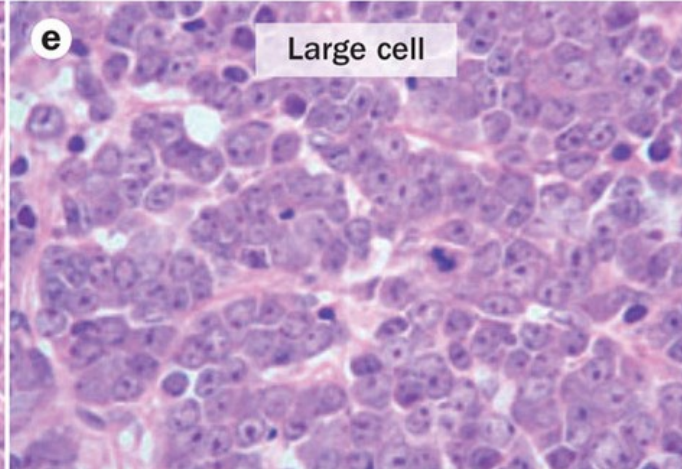
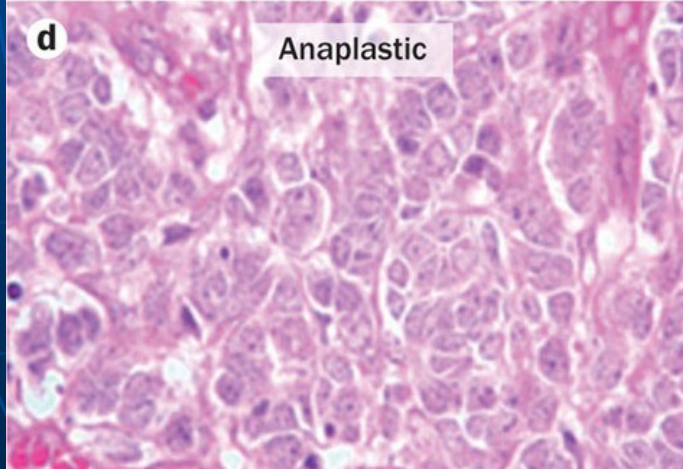
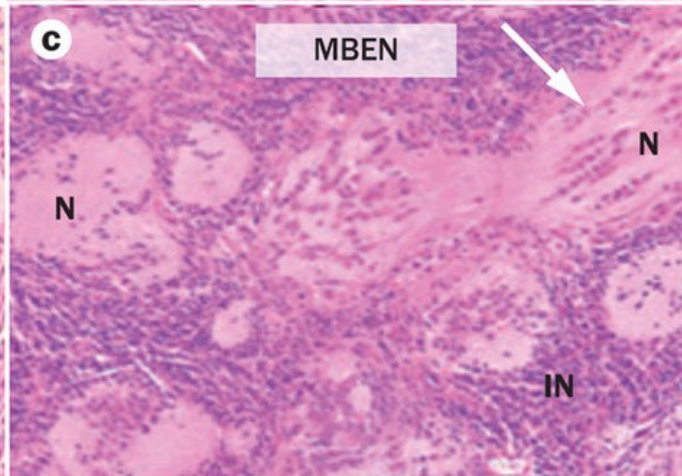
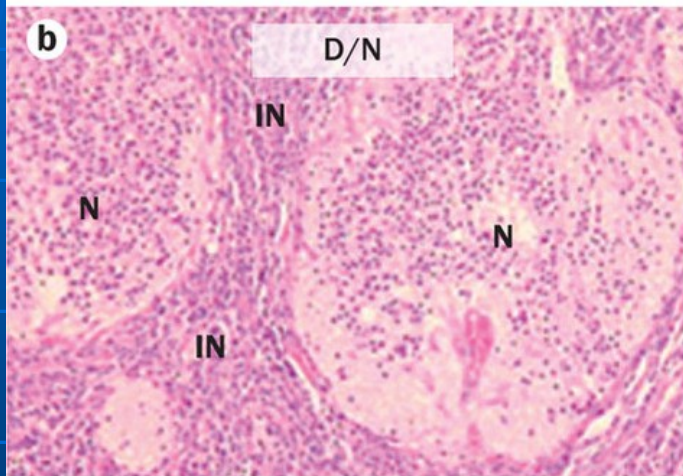
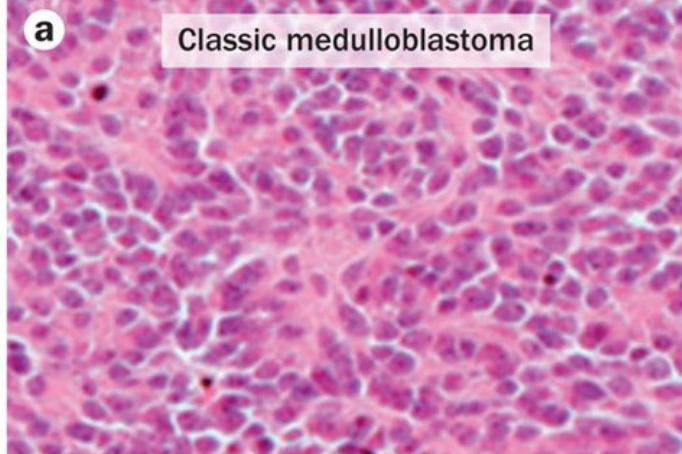
- Meduloblastom (u dětí v mozečku)
- Embryonální nádor s mnohovrstevnatými rozetami
- Meduloepiteliom
- Atypický teratoidní/rhabdoidní tumor (INI-1 negativní)

# Medulloblastom



# Meduloblastom

- Histologické varianty: klasický, desmoplastický/nodulární, s extenzívní nodularitou, velkobuněčný/anaplastický
- Genetická definice: WNT aktivované, SHH aktivované, skupina 3, skupina 4.

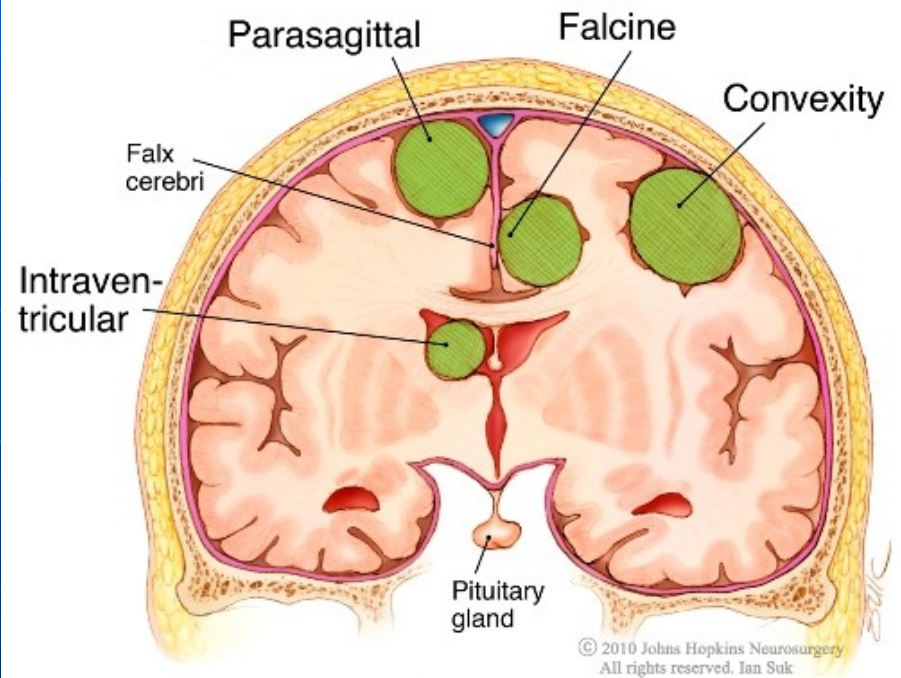
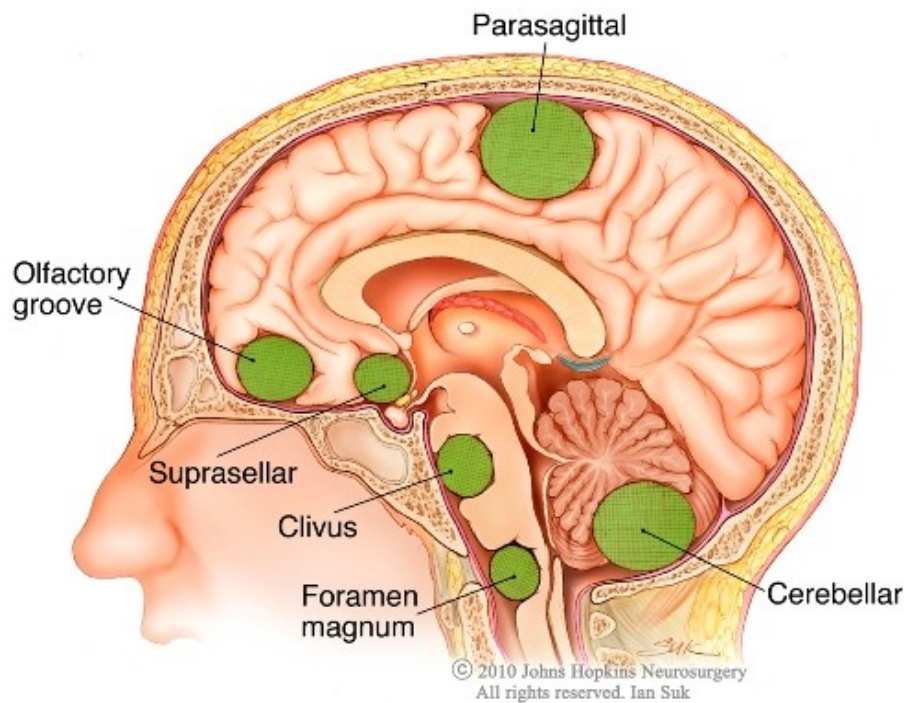


# *Meningiomy*

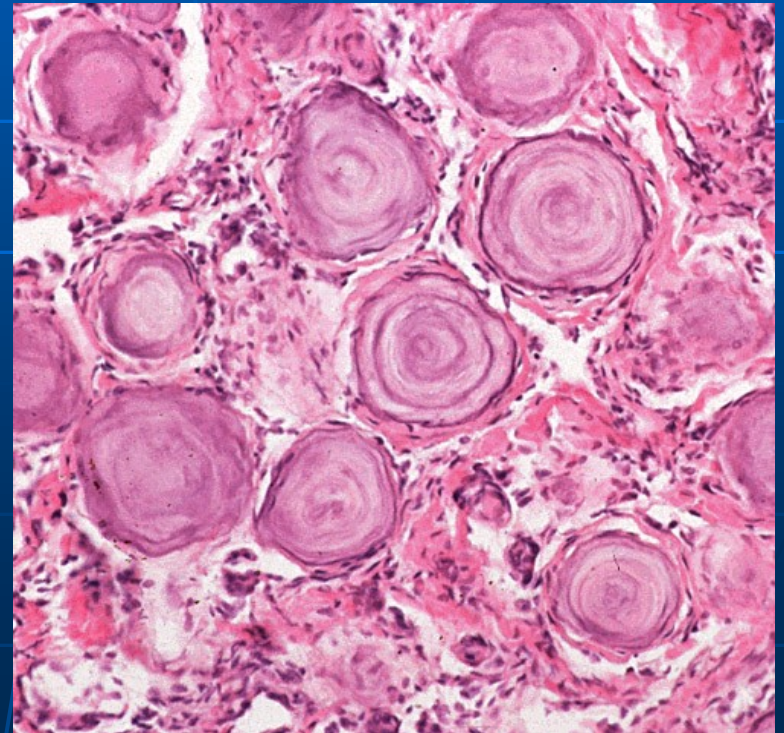
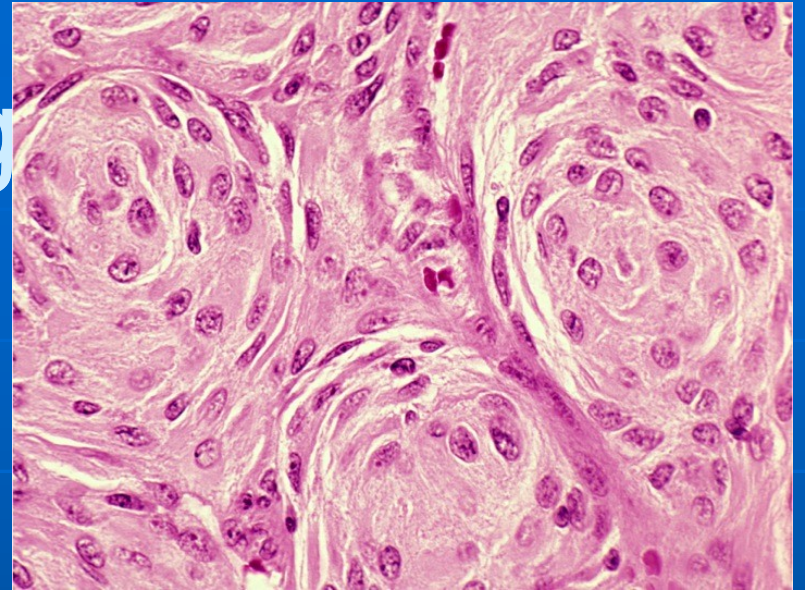
- Meningiom (Gr. I)
- meningotheiliální
- fibrózní (fibroblastický)
- tranzitorní (smíšený)
- psammomatózní
- sekreční
- světlobuněčný.....



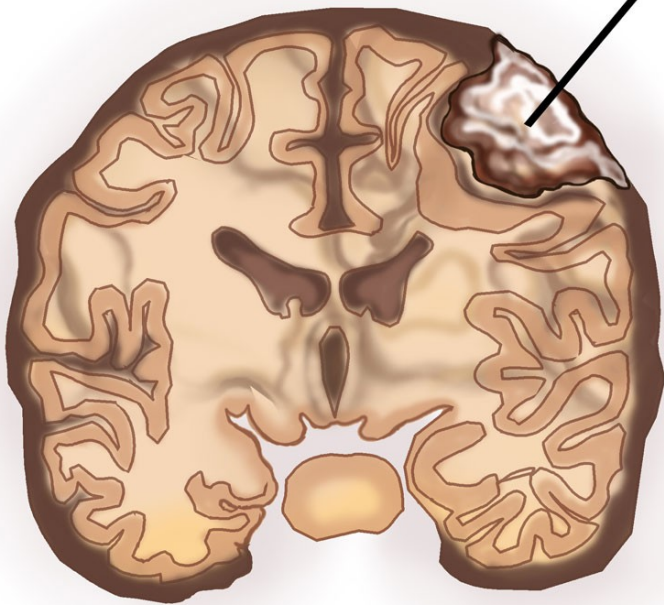
- Atypický meningiom (Gr. II),  
mitotická aktivita + další znaky
- Anaplastický (maligní) meningiom  
(Gr. III)



# Mening



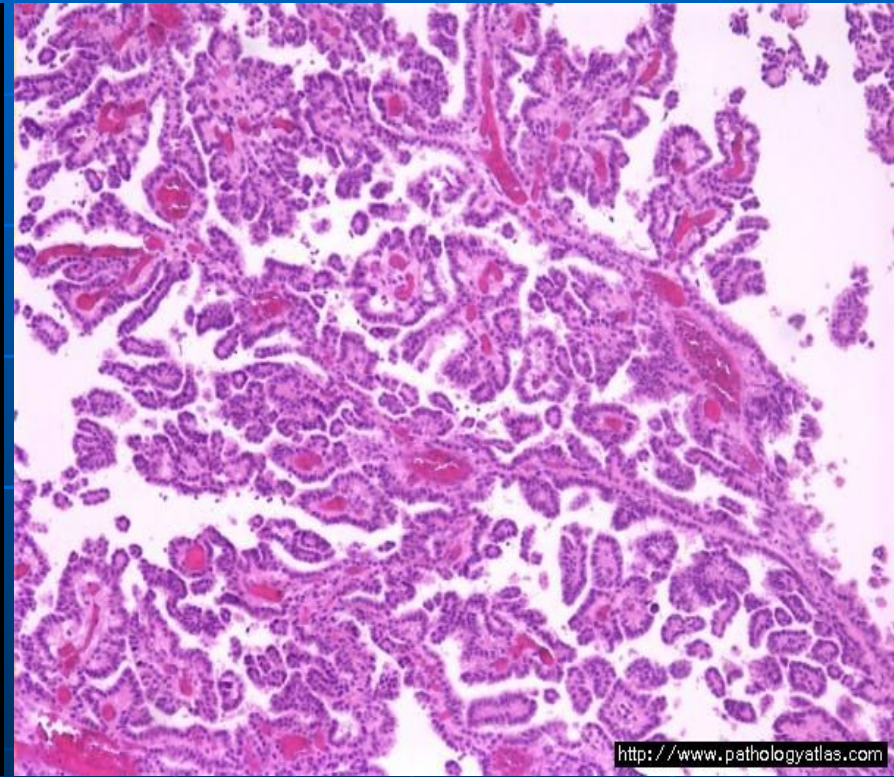
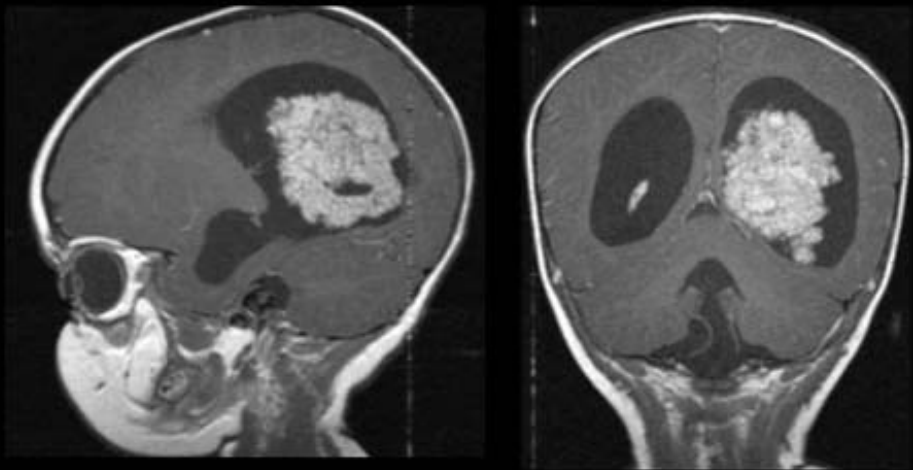
Meningioma

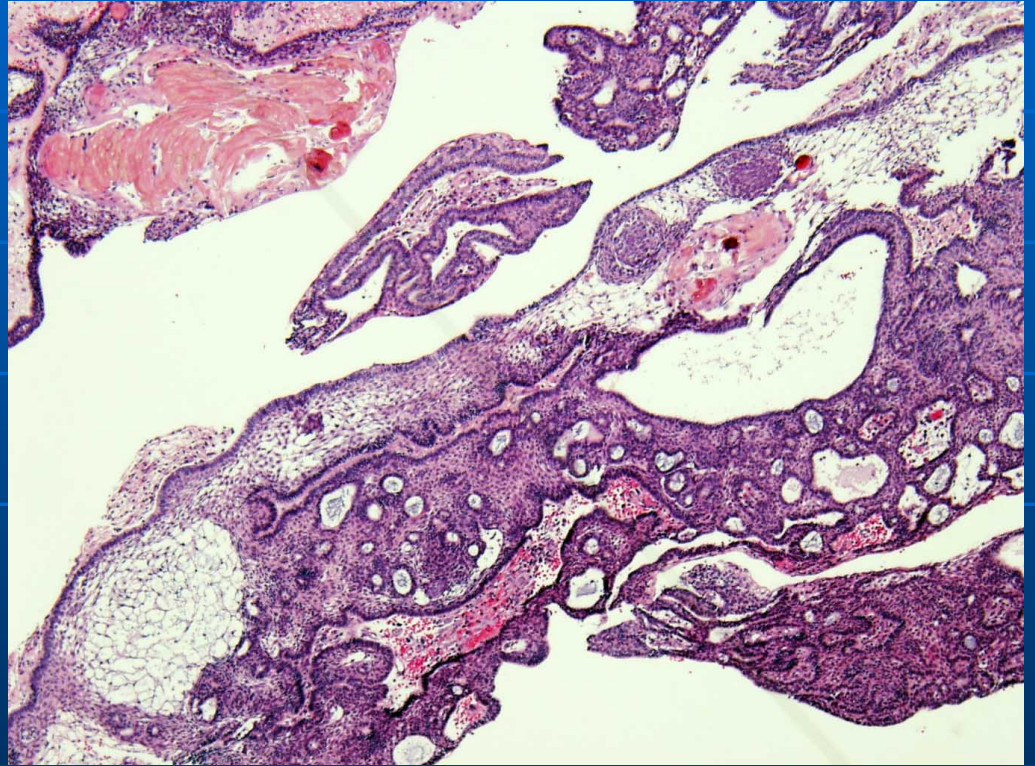


# *Další vzácnější tumory*

- Plexus chorioideus:
  - papilom
  - papilokarcinom
  
- Kraniofaryngeom
  - adamantinomatózní
  - papilární

## Choroid Plexus Papilloma





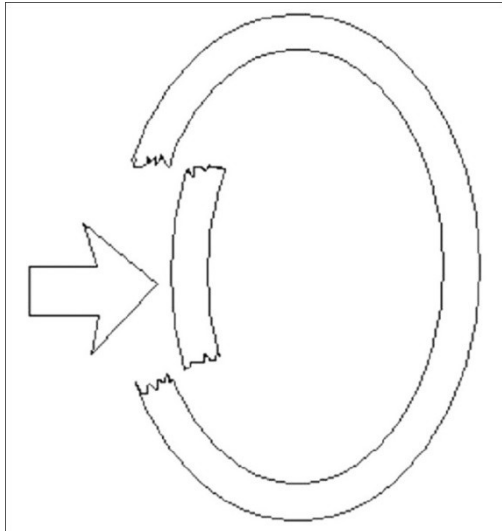
- Tumory epifýzy (šišinky)
  - pineoblastom
  - pineocytom
  
- Nádory z germinálních buněk

Různé...

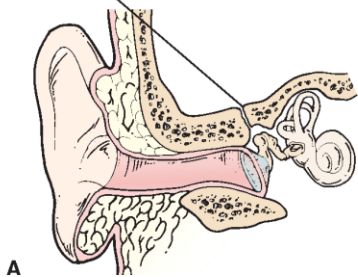
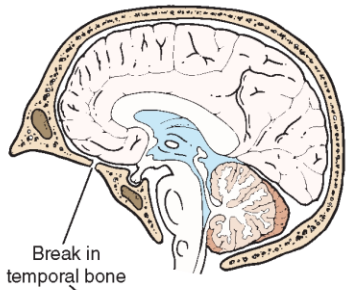
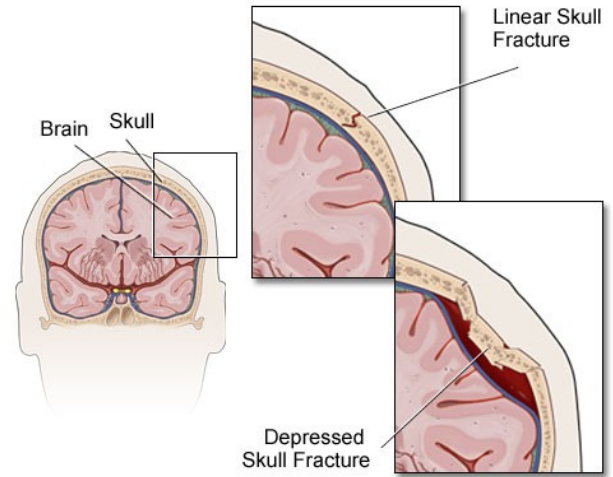


# SKULL FRACTURES

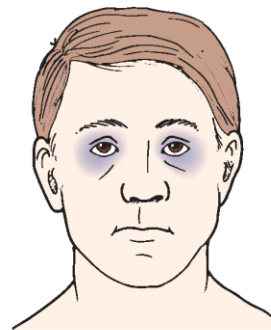
- *Linear, depressed and displaced skull fracture:* bone is displaced into the cranial cavity by a distance greater than the thickness of the bone
- Orbital or mastoid hematomas distant from the point of impact: the suspicion of a basal skull fracture
- CSF discharge from the nose or ear and infection (meningitis) may follow



## Skull Fractures



A



B Raccoon's eyes

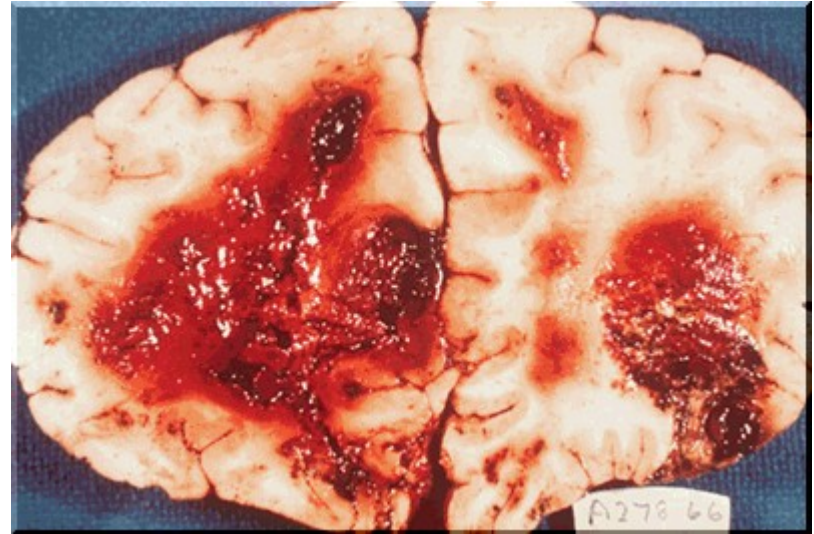


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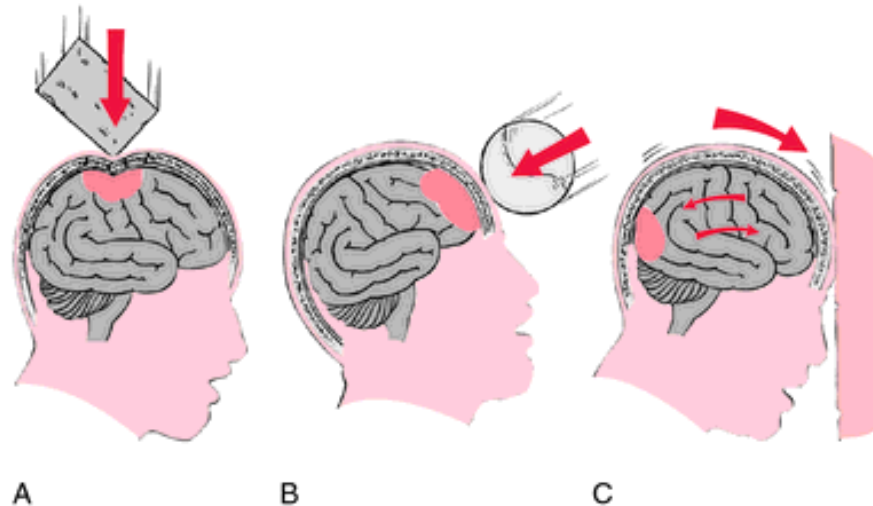


C Battle's sign



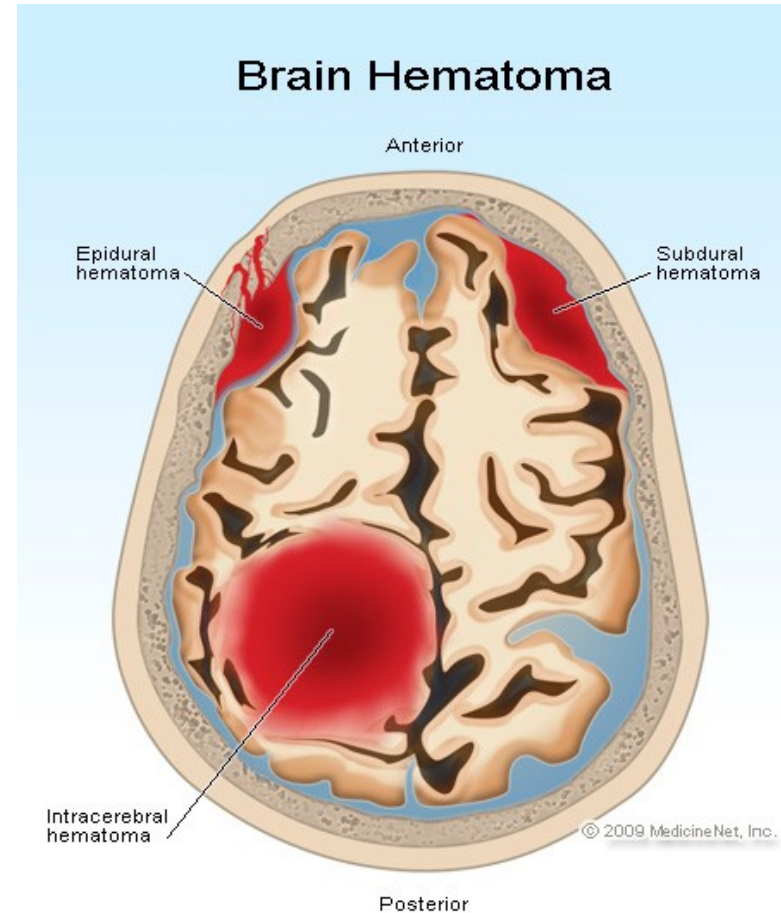


Contusion at the point of contact (a ***coup*** injury) or a contusion on the brain surface diametrically opposite to it (a ***contrecoup*** injury)

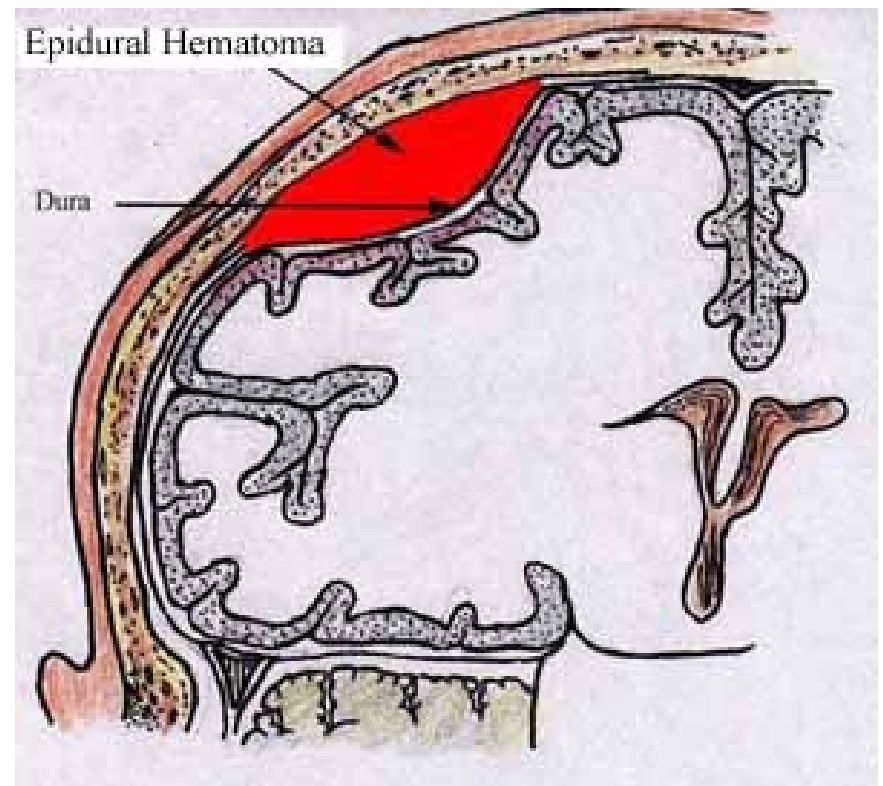
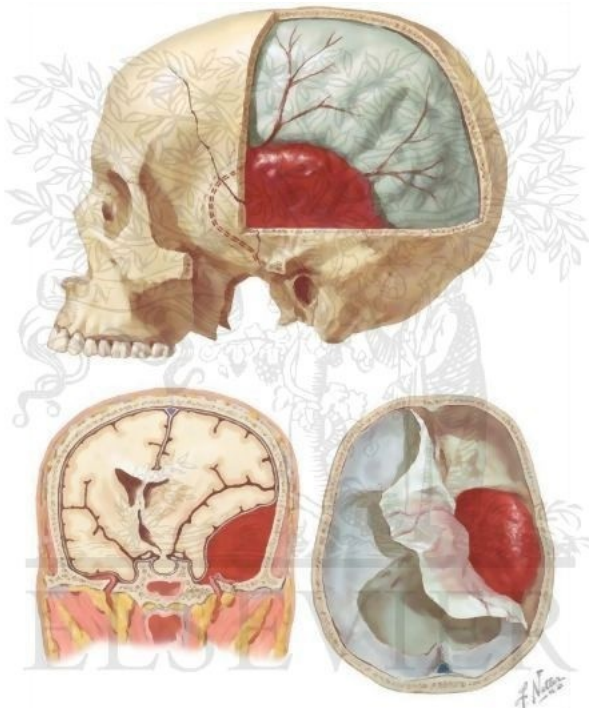


# TRAUMATIC VASCULAR INJURY

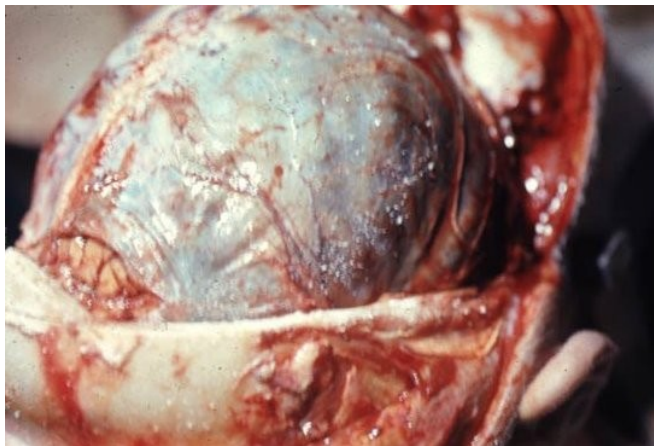
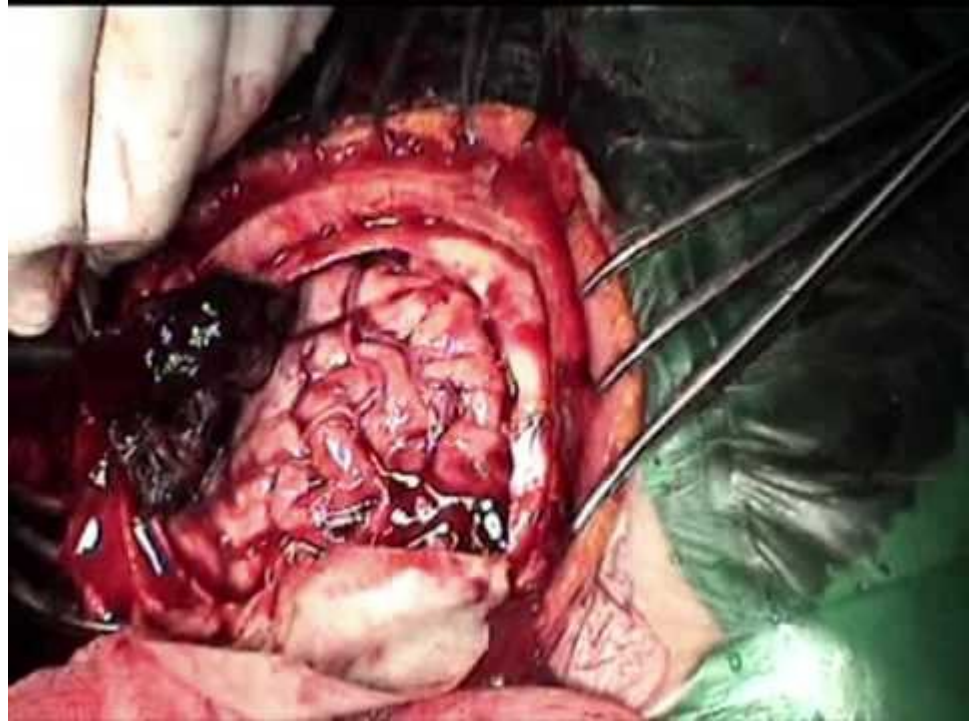
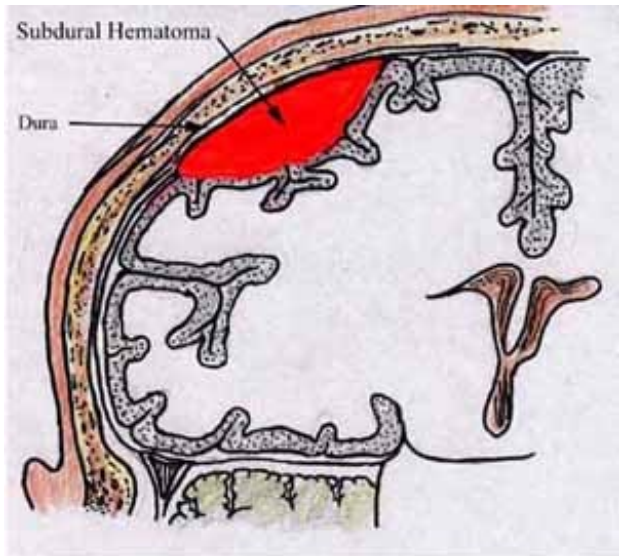
- hemorrhage may occur in:
- *epidural*
- *subdural*
- *subarachnoid*
- *intraparenchymal*



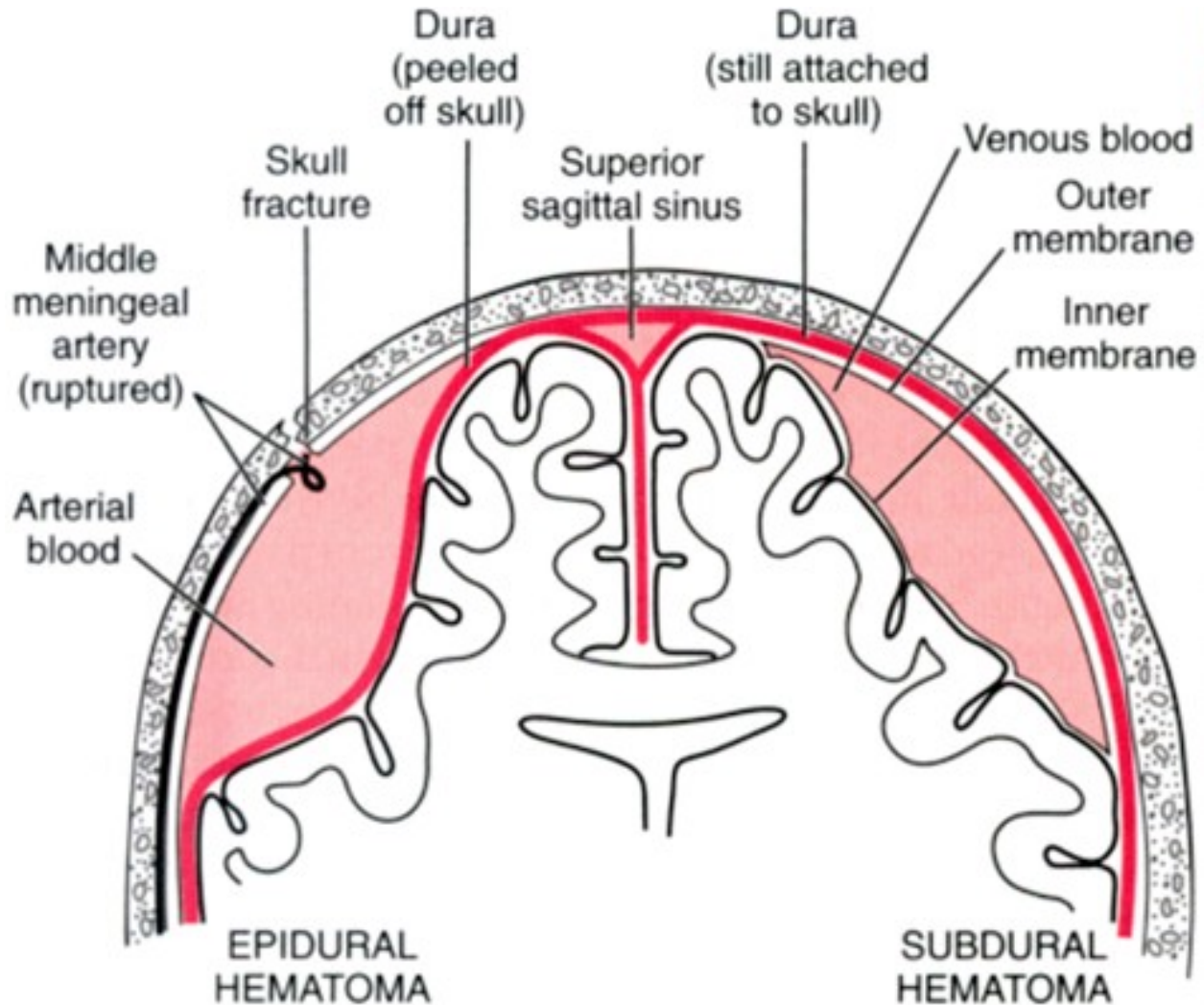
- **Epidural Hematoma:** dural arteries, most importantly *the middle meningeal artery*, are vulnerable to injury



- **Subdural Hematoma:**
- *from bridging veins*
- A collection of freshly clotted blood along the brain surface, without extension into the depths of sulci
- **The underlying brain is flattened and the subarachnoid space is often clear**

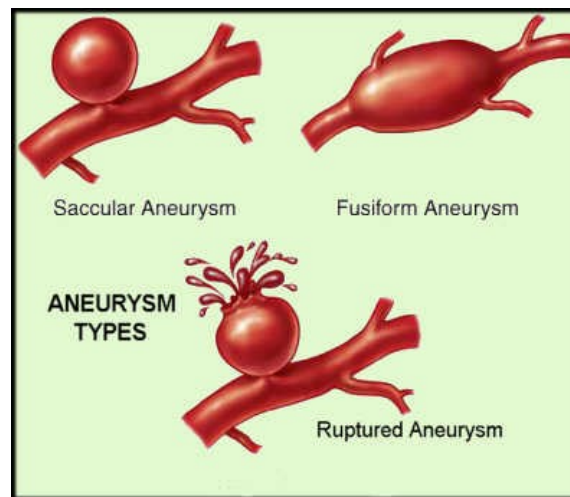


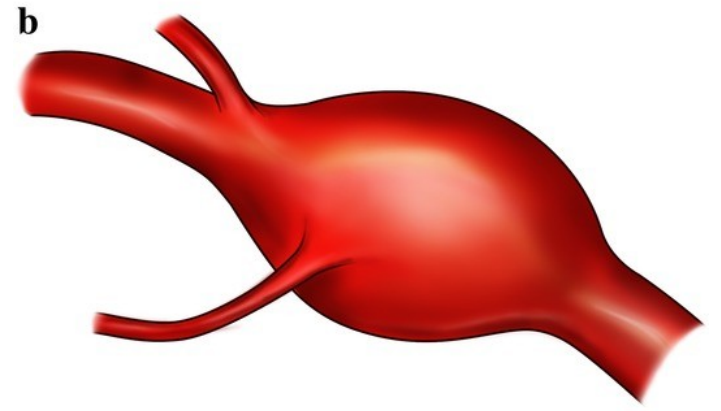
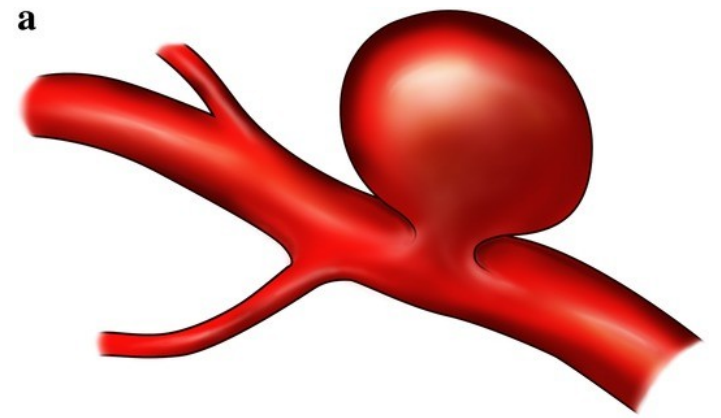
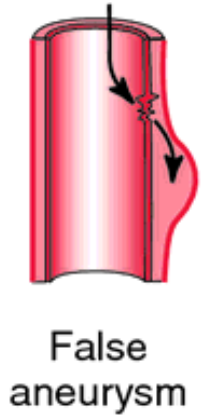
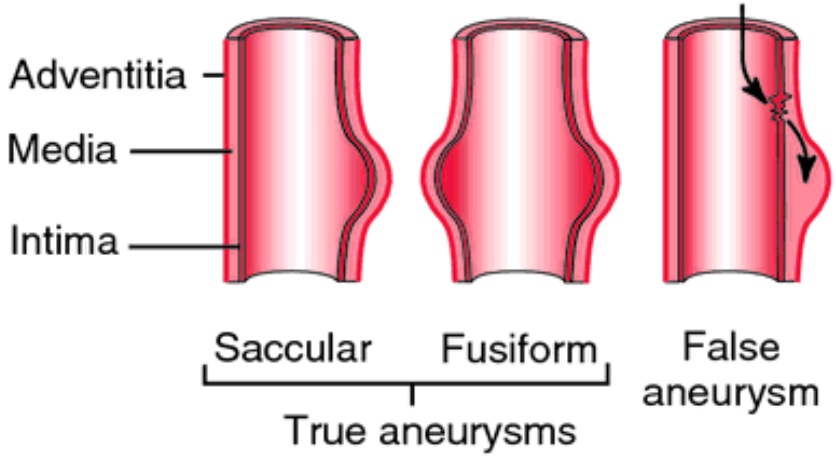
# Epidural vs. subdural





- **Subarachnoid Hemorrhage and Ruptured Saccular Aneurysms**
- The most frequent cause of clinically significant *subarachnoid hemorrhage* is rupture of a *saccular (berry) aneurysm*





Anterior communicating artery (30% to 35%)

Internal carotid artery/posterior communicating artery (30% to 35%)

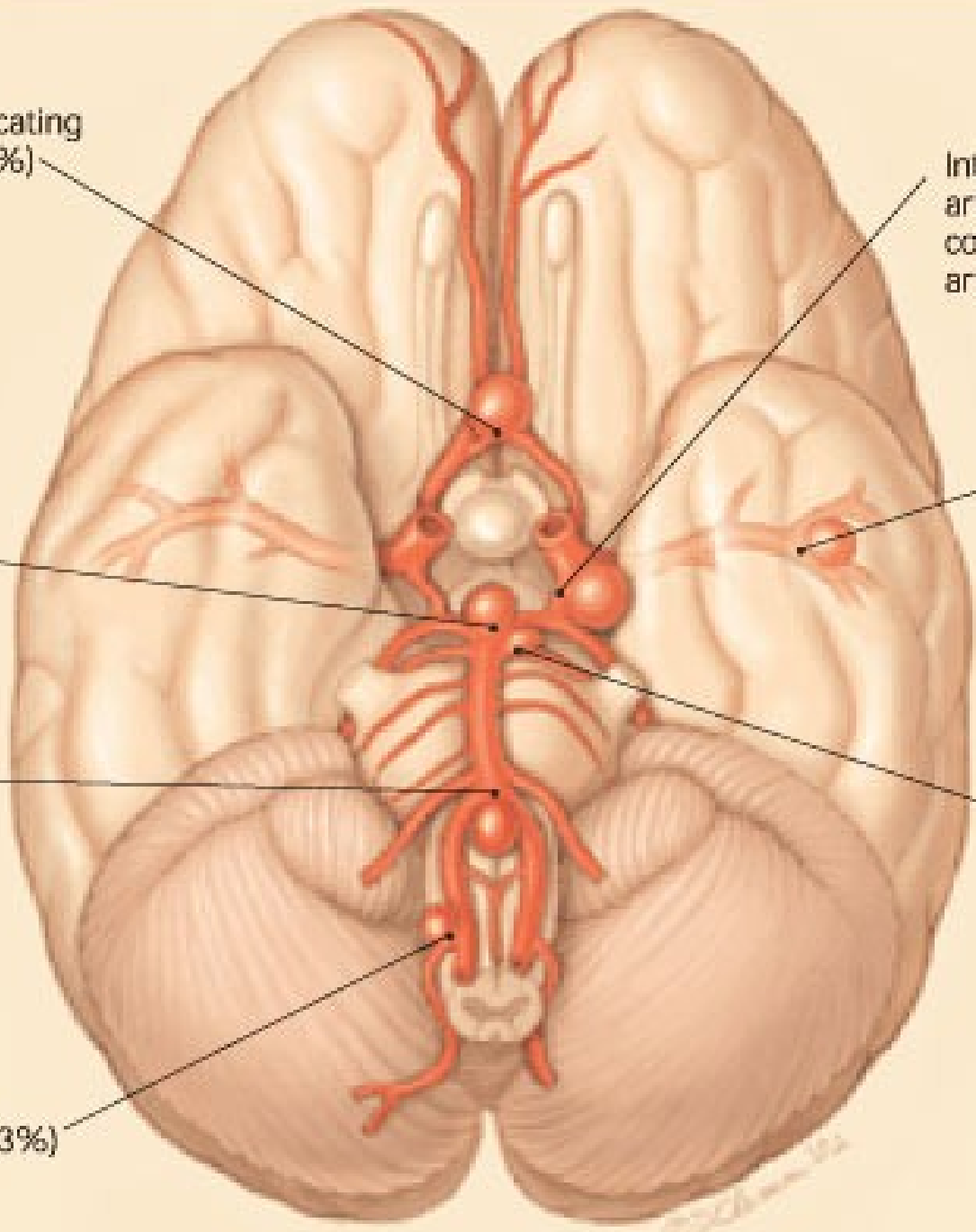
Basilar apex (5%)

Middle cerebral artery (20%)

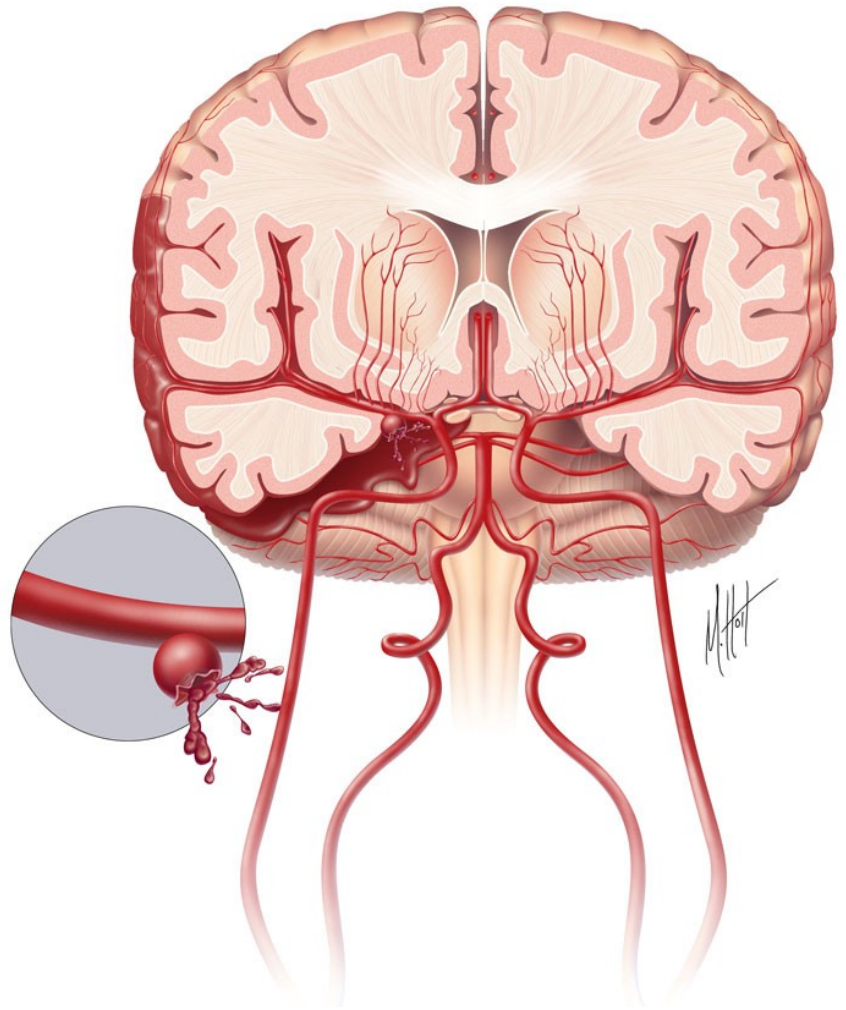
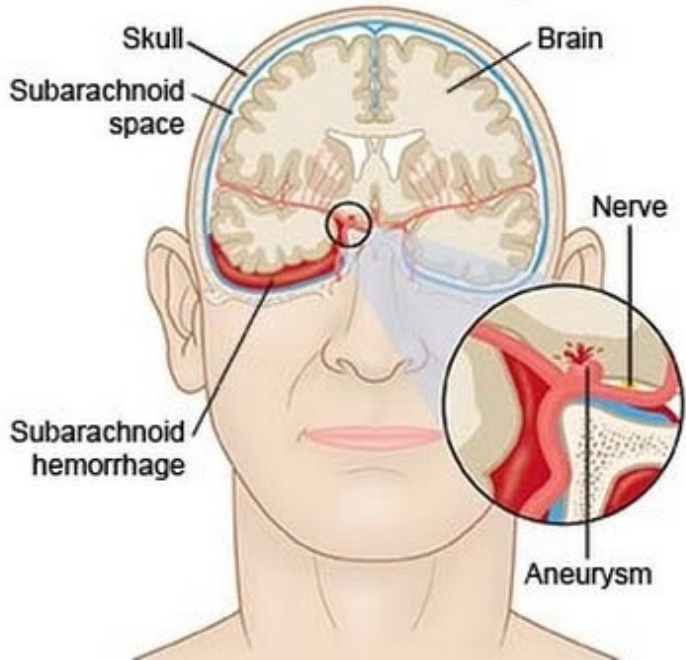
Vertebrobasilar junction (2%)

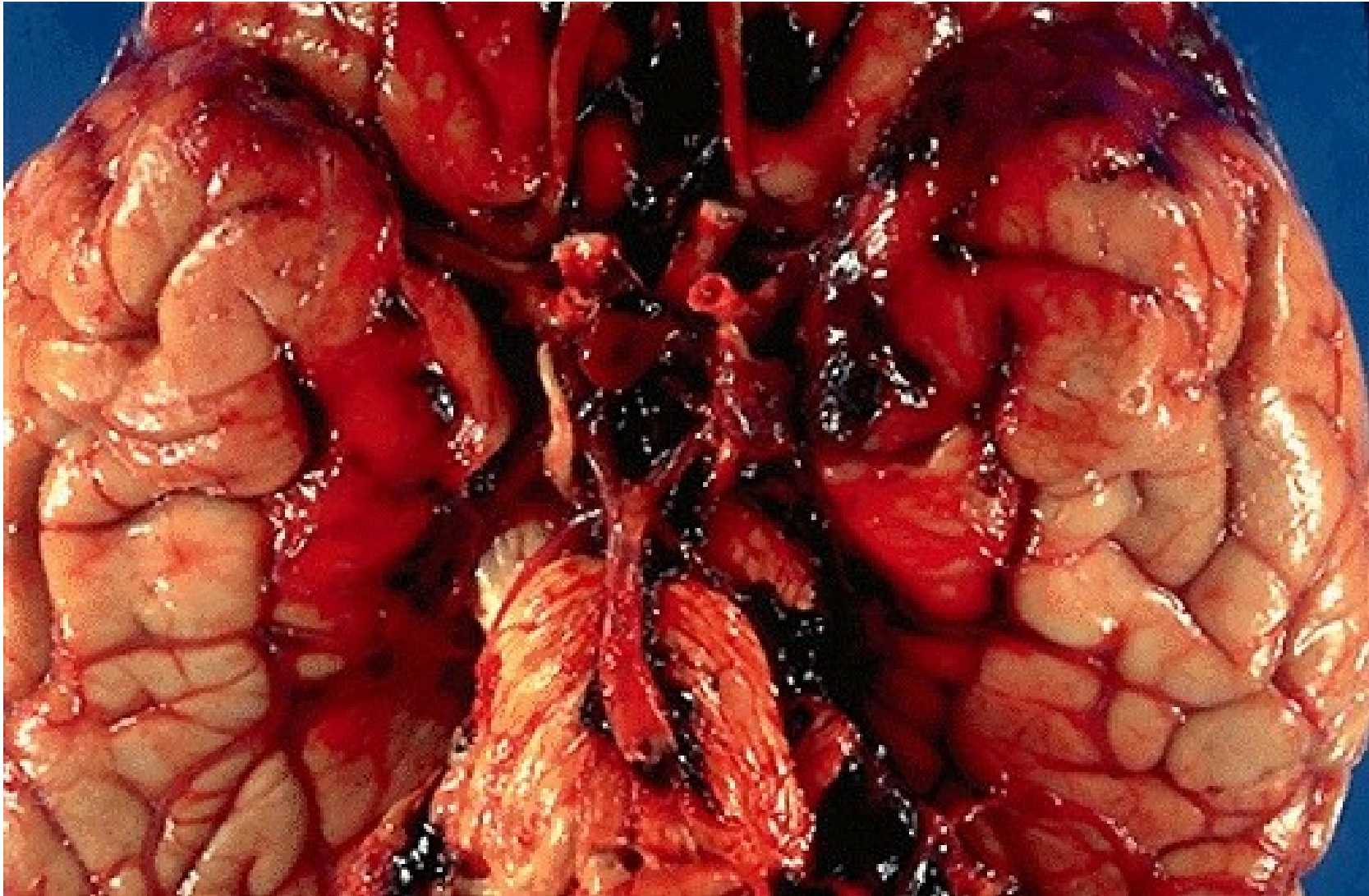
Superior cerebellar artery (3%)

Posterior inferior cerebellar artery (3%)



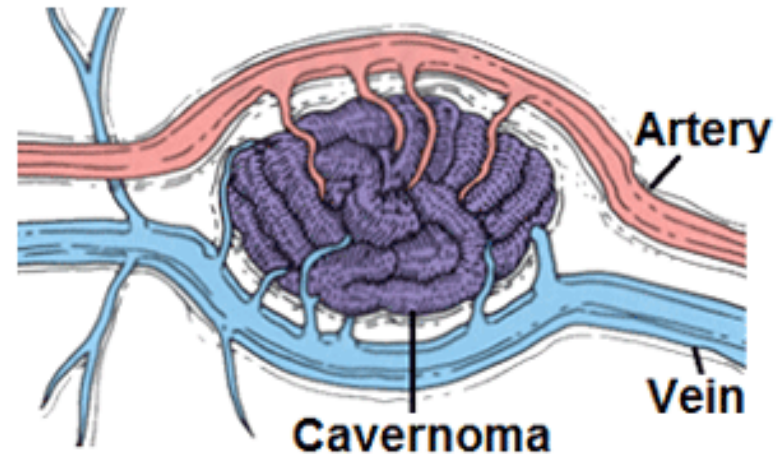
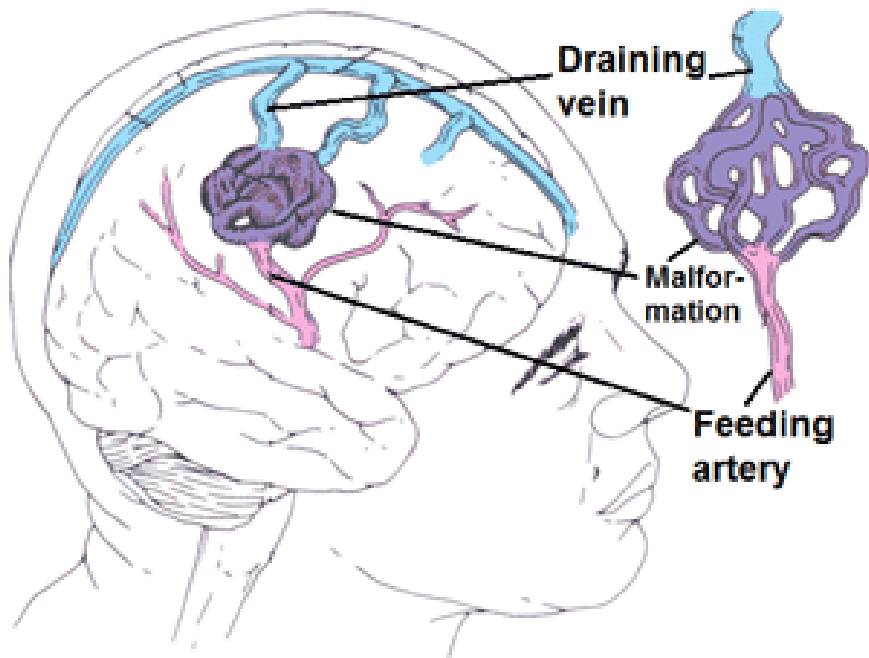
### Subarachnoid hemorrhage





# Vascular Malformations

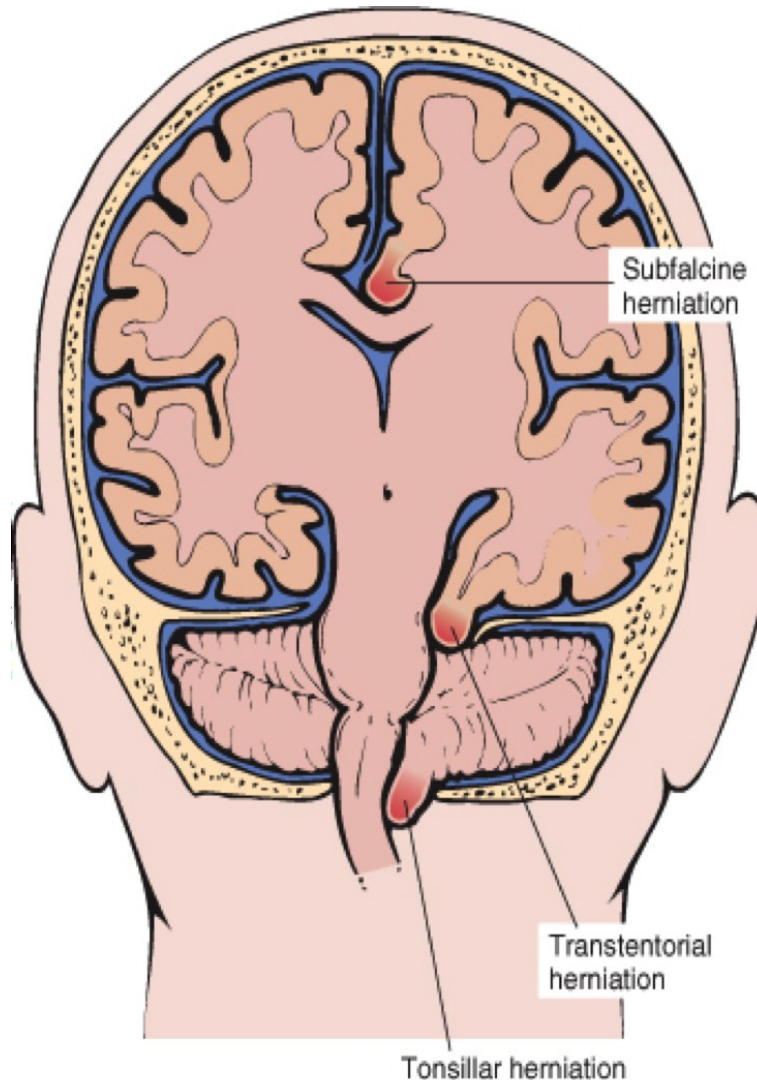
- *Four principal groups: arteriovenous malformations, cavernous malformations (no CNS tissue within), capillary telangiectasias, and venous angiomas*



- **Diffuse Axonal Injury**
- Affected may be: the deep white matter regions (the corpus callosum, paraventricular, and hippocampal areas in the supratentorial compartment), cerebral peduncles, brachium conjunctivum, superior colliculi, and deep reticular formation in the brainstem
- Widespread but often asymmetric axonal swellings
- In “shaken baby syndrome”



# RAISED INTRACRANIAL PRESSURE AND HERNIATION





# Several reasons why to become a pathologist...

- 1) You sit in a comfortable armchair and look into the microscope on beautiful colorful images...
- 2) Your working time and place are really flexible...
- 3) You can mix scientific work (physician-scientist) with routine work, during one day or lifetime
- 4) Not many graduates want to become pathologists...definitely buyers' market
- 5) There are least divorces and suicidia among pathologists (and pediatricians), compare to surgeons etc...
- 6) You can earn a decent money

