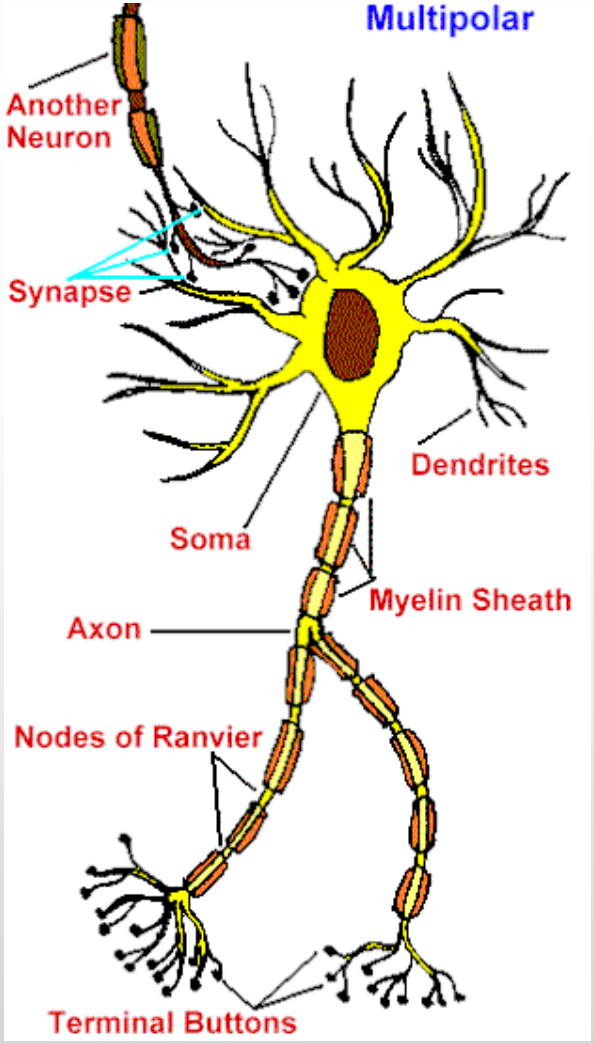
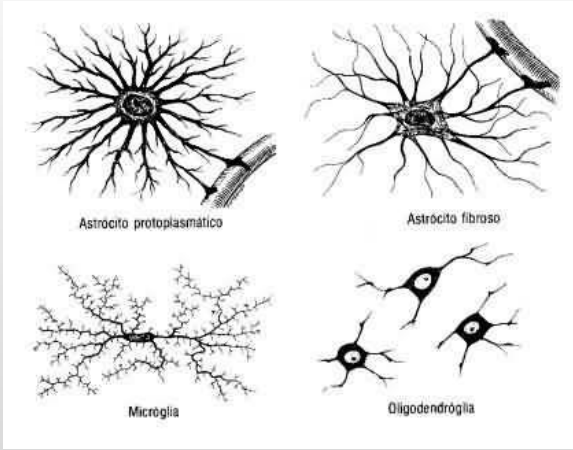
Nervový systém

Nervová tkáň

- **neurony**

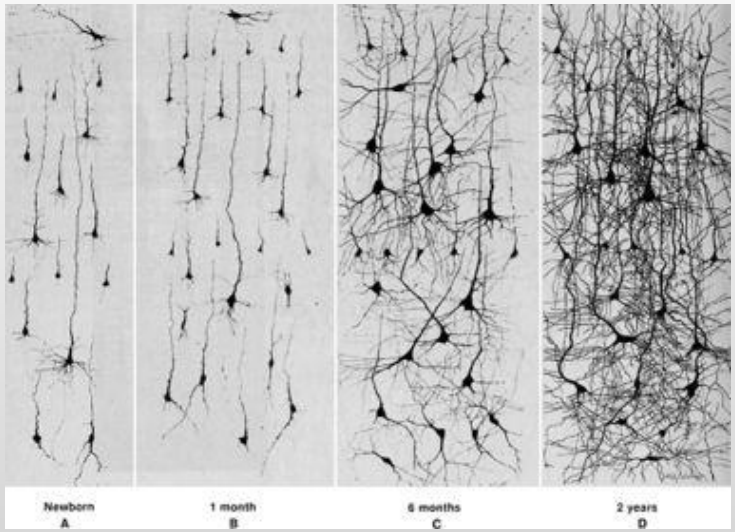


- **neuroglie**
  - centrální
    - astrocyty
    - oligodendrocyty
    - mikroglie
    - ependym
  - periferní
    - Schwannovy buňky
    - satelitní buňky

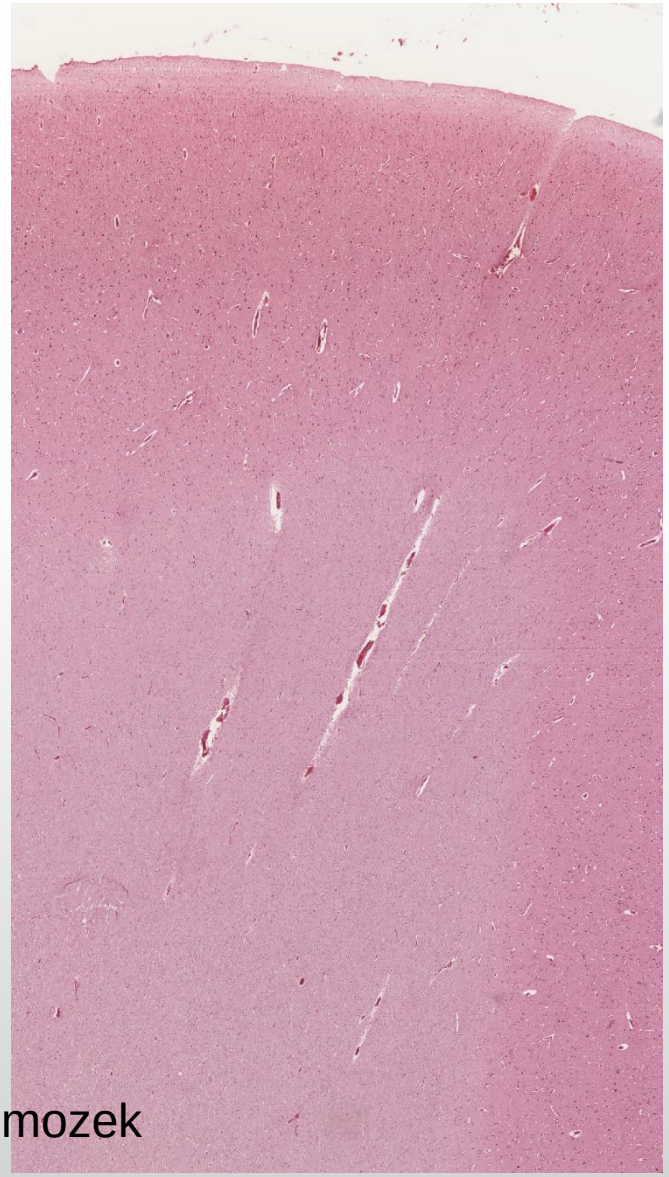


Nervový systém - CNS a PNS

CNS – mozek, mozkový kmen, mozeček, mícha
PNS – hlavové a míšní nervy, ganglia

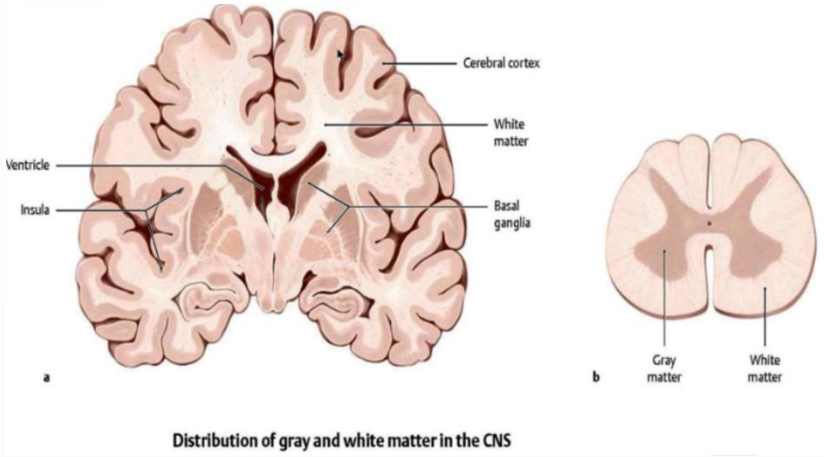


HE



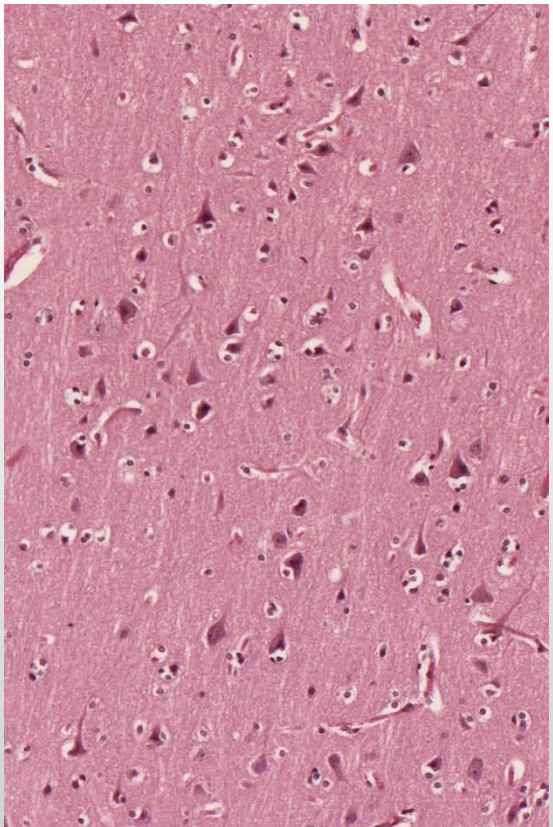
mozek

CNS – mozek a mícha



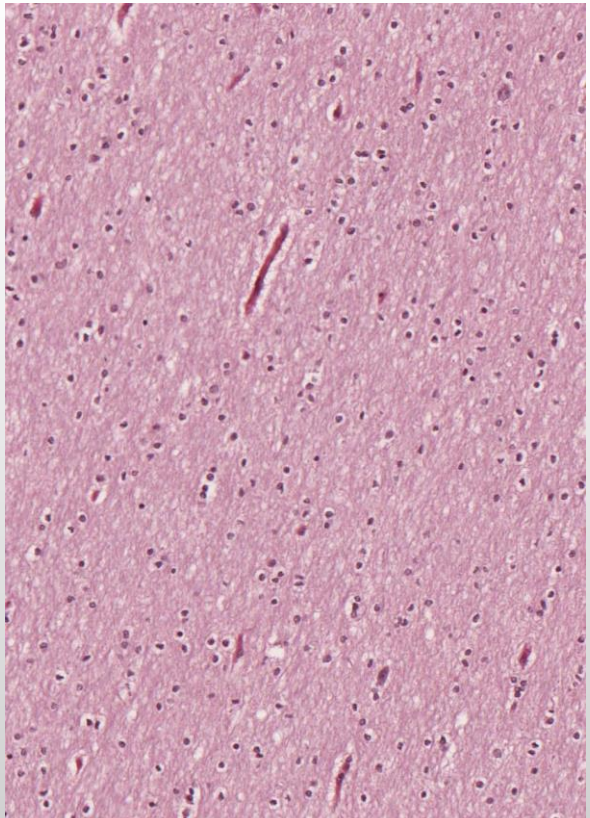
Distribution of gray and white matter in the CNS

- šedá hmota

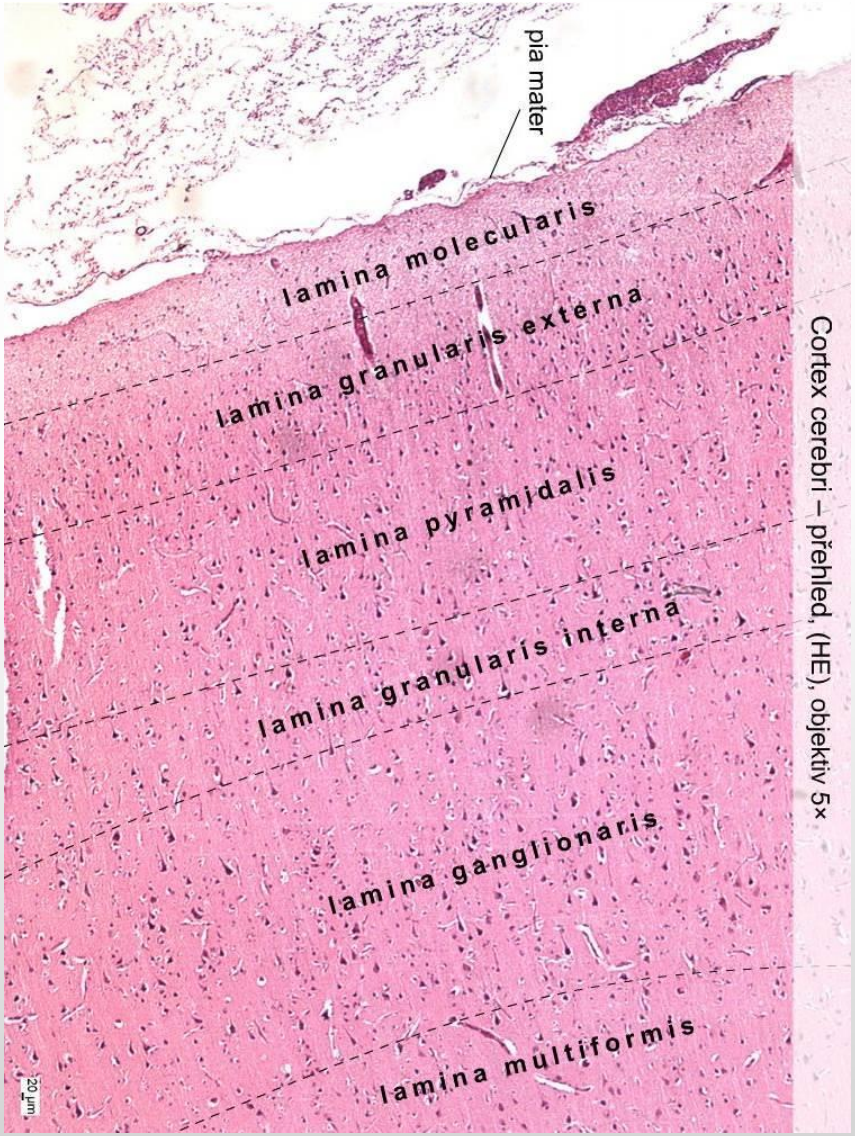


HE

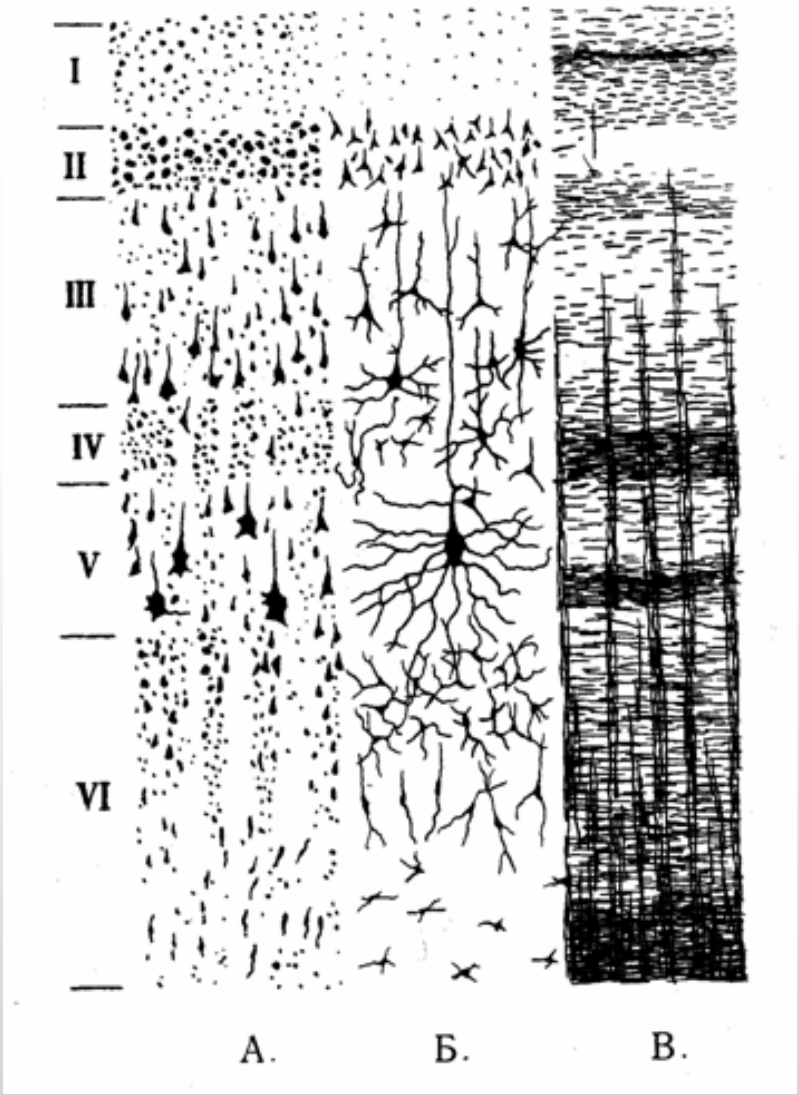
- bílá hmota



CNS - cortex cerebri

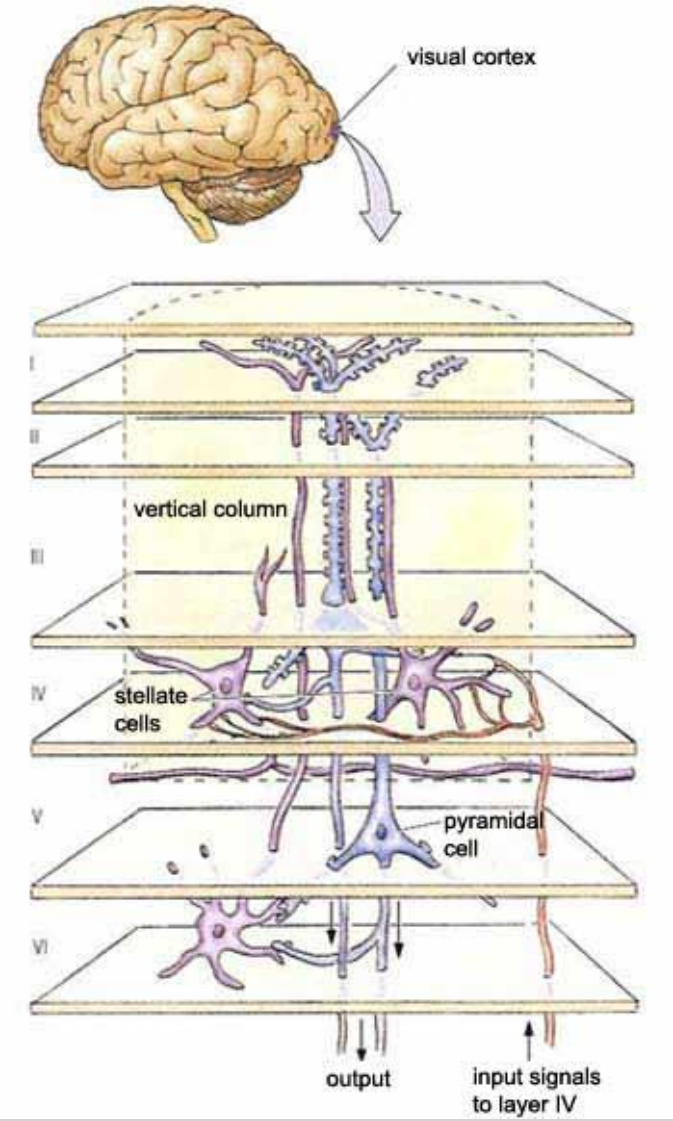


Cortex cerebri – přehled, (HE), objektiv 5×

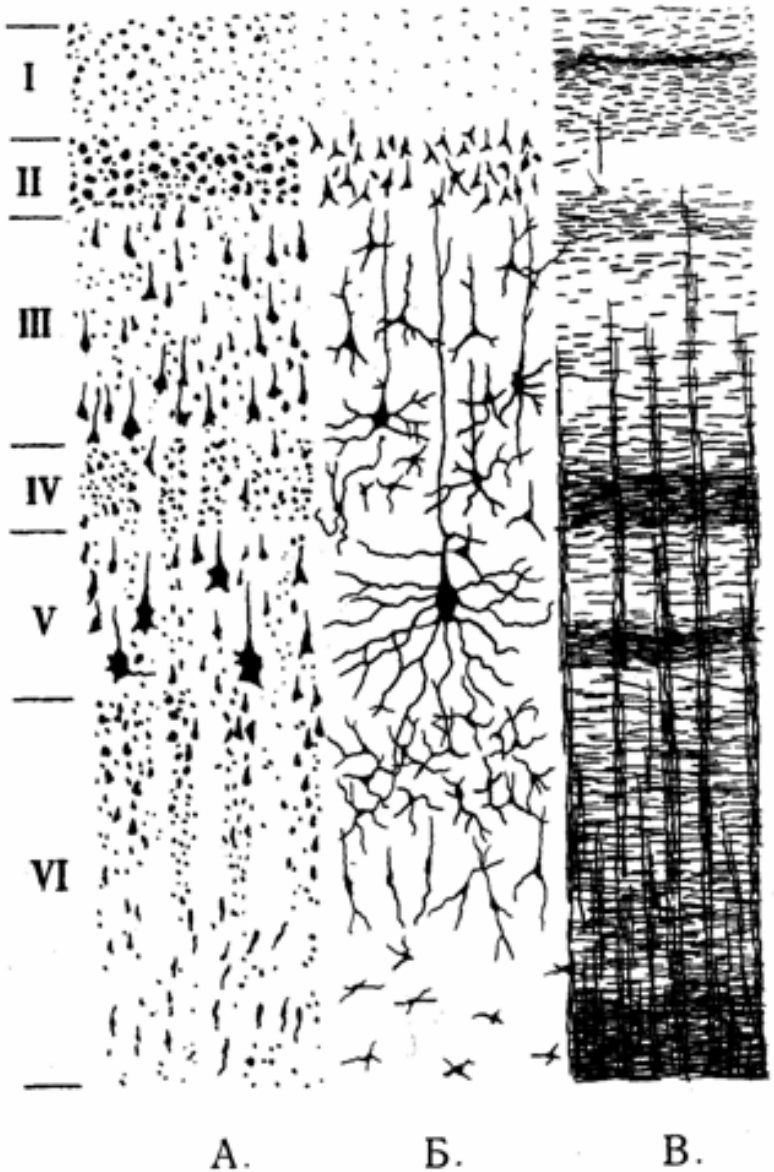


CNS - cortex cerebri - isocortex

sensorická

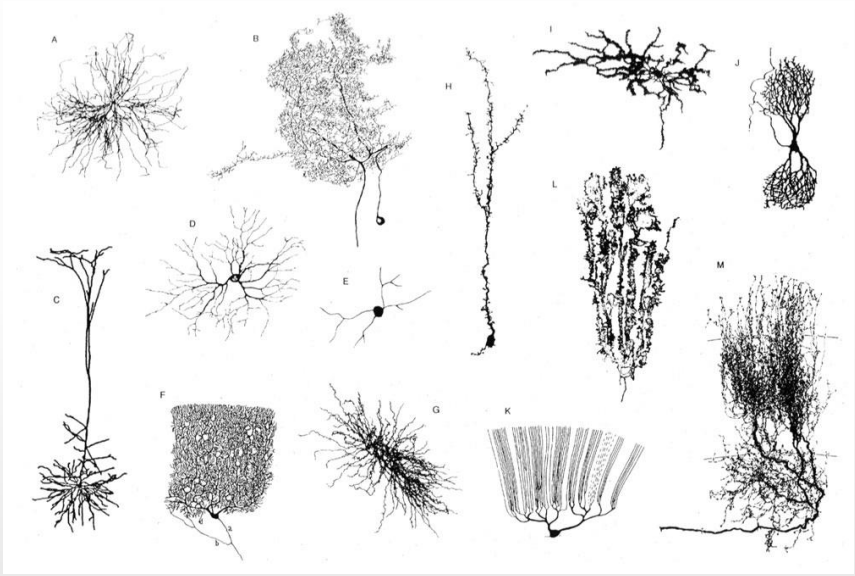


motorická

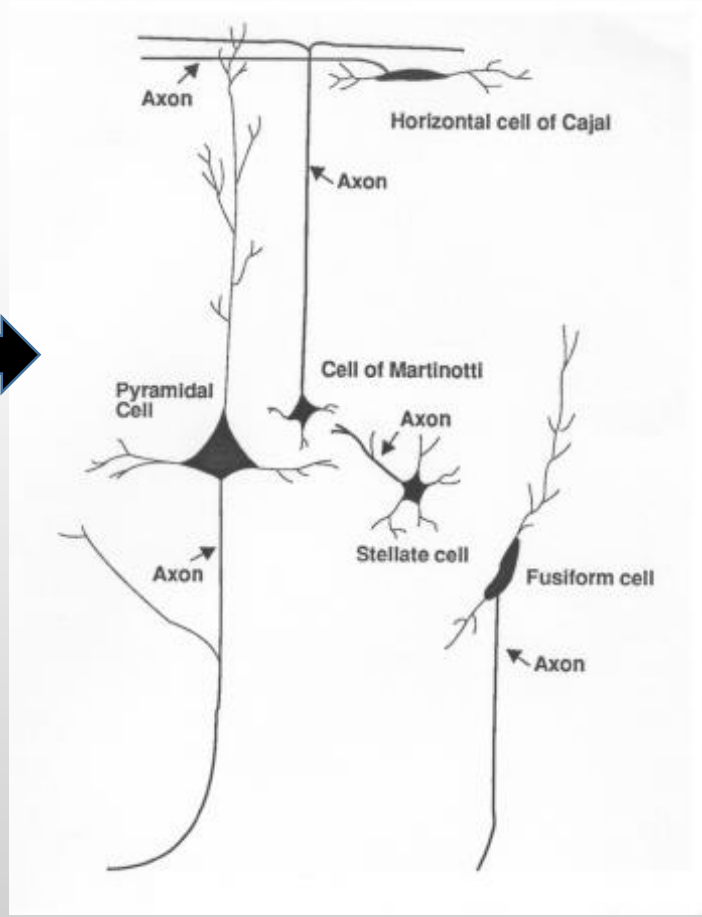


CNS - cortex cerebri – typy neuronů

- pyramidové buňky
- zrnité (granulární) buňky
- vřetenovité buňky
- horizontální (Cajal) buňky
- vertikální (Martinotti) buňky

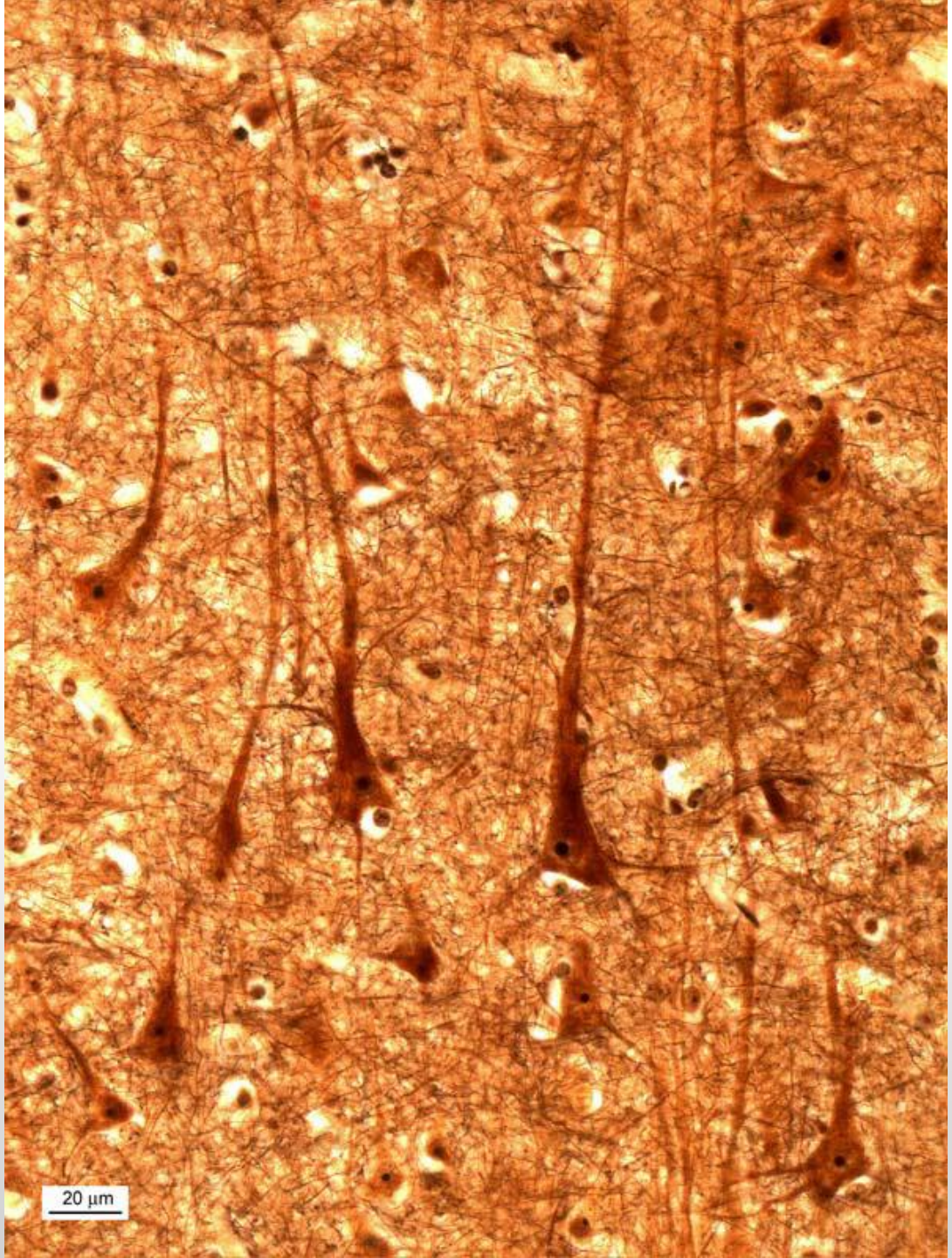


https://www.janelia.org/lab/spruston-lab/research/cellular-diversity-hippocampus

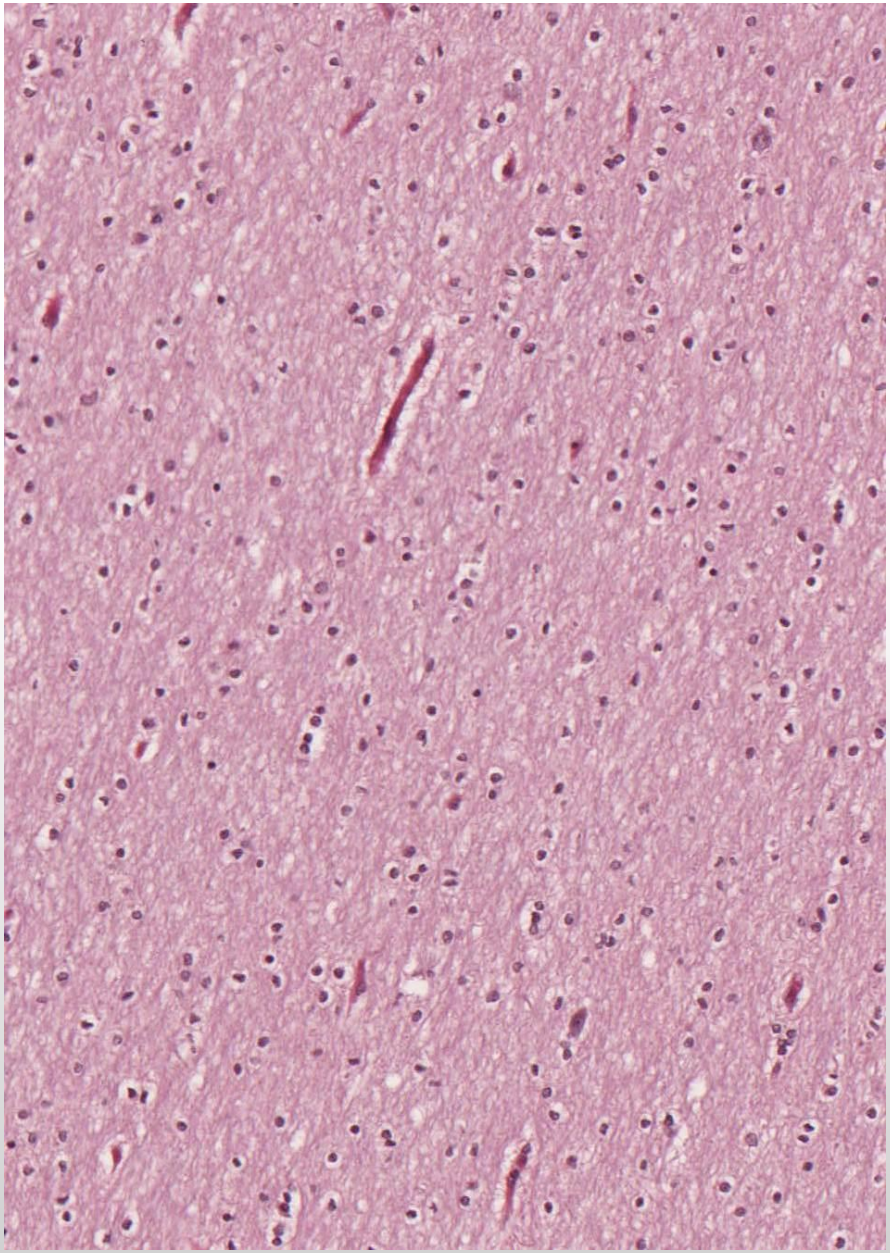


CNS - cortex cerebri

pyramidové buňky
- motorické

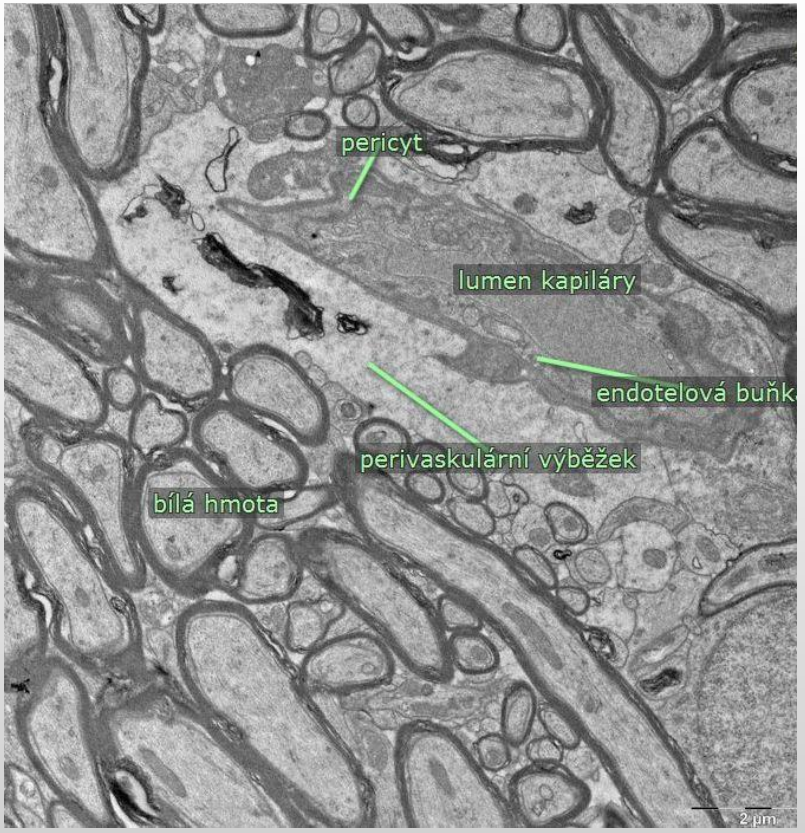


CNS – bílá hmota



výběžky neuronů, neuroglie, cévy

HEB v šedé i v bílé hmotě centrálního nervového systému



CNS - mozeček (cerebellum)

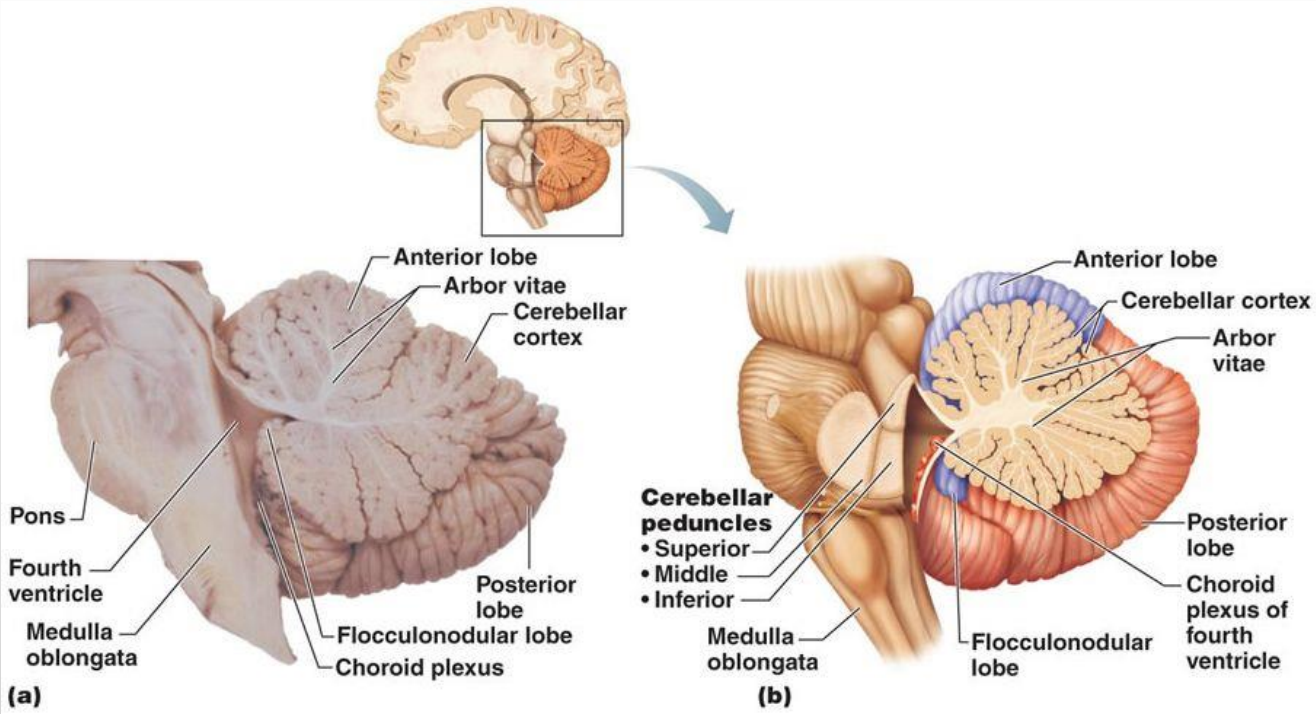
Kůra mozečku (cortex cerebelli)

Stratum moleculare - košíčkové a hvězdicovité buňky
Stratum gangliosum - Purkyňovy buňky
Stratum granulosum - malé a větší zrnité multipolární neurony

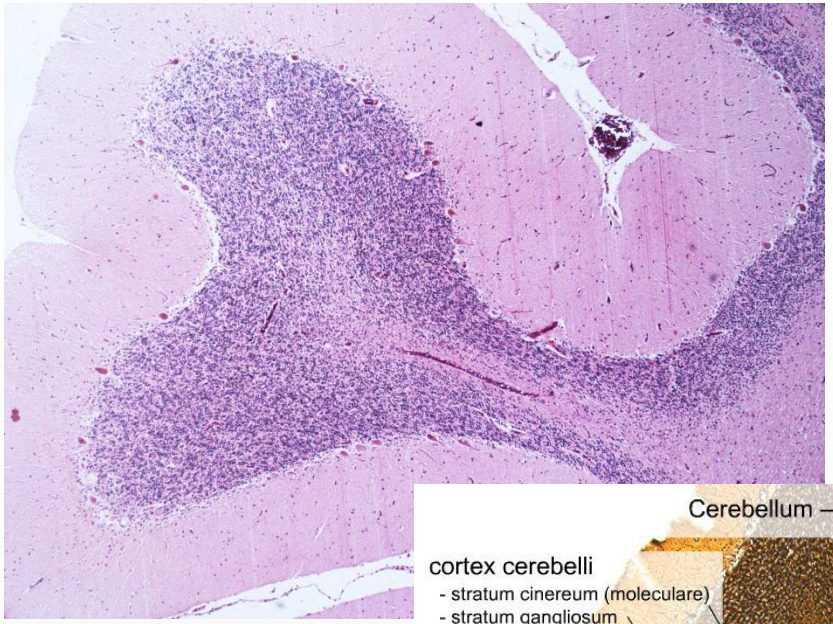
Bílá hmota mozečku

Eferentní vlákna – neurity Purkyňových buněk
Aferentní - mechová (synapse: glomeruli cerebellares)
- šplhavá

Jádra mozečku



Cerebellum



HE

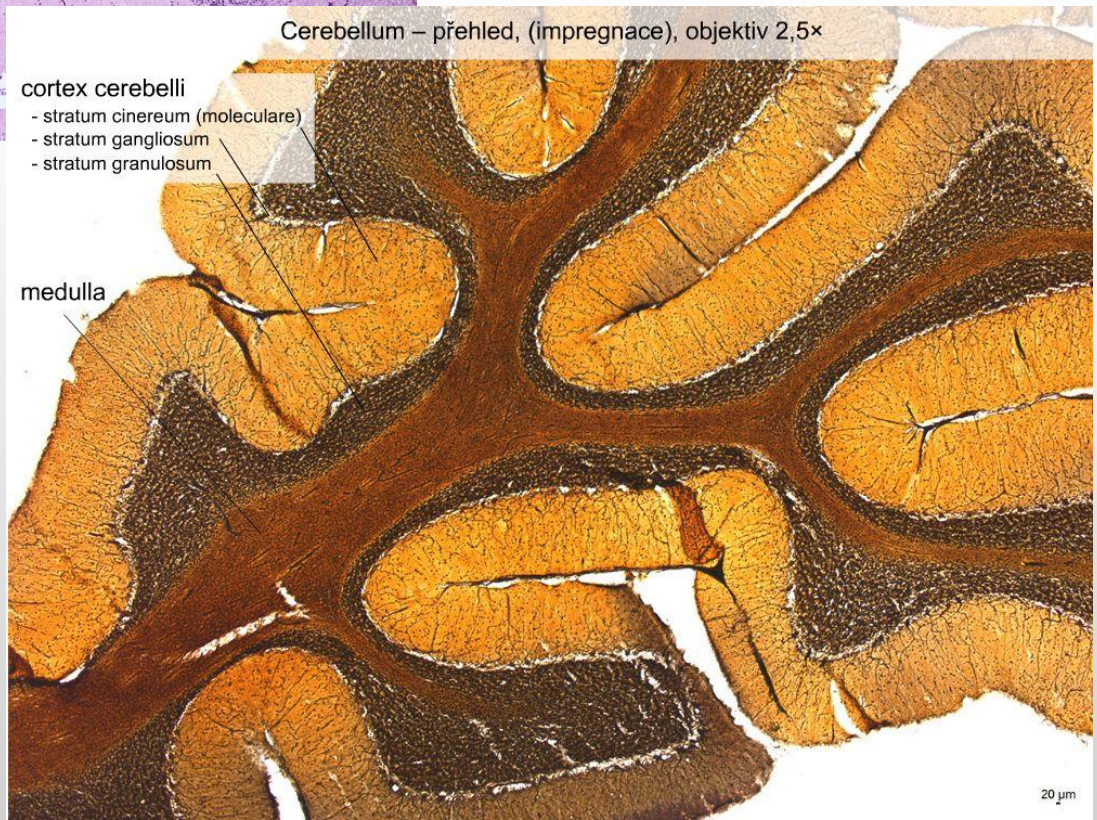
Kůra mozečku (cortex cerebelli)

- Stratum moleculare - košíčkové a hvězdicovité buňky
- Stratum gangliosum - Purkyňovy buňky
- Stratum granulosum - malé a větší zrnité multipolární neurony

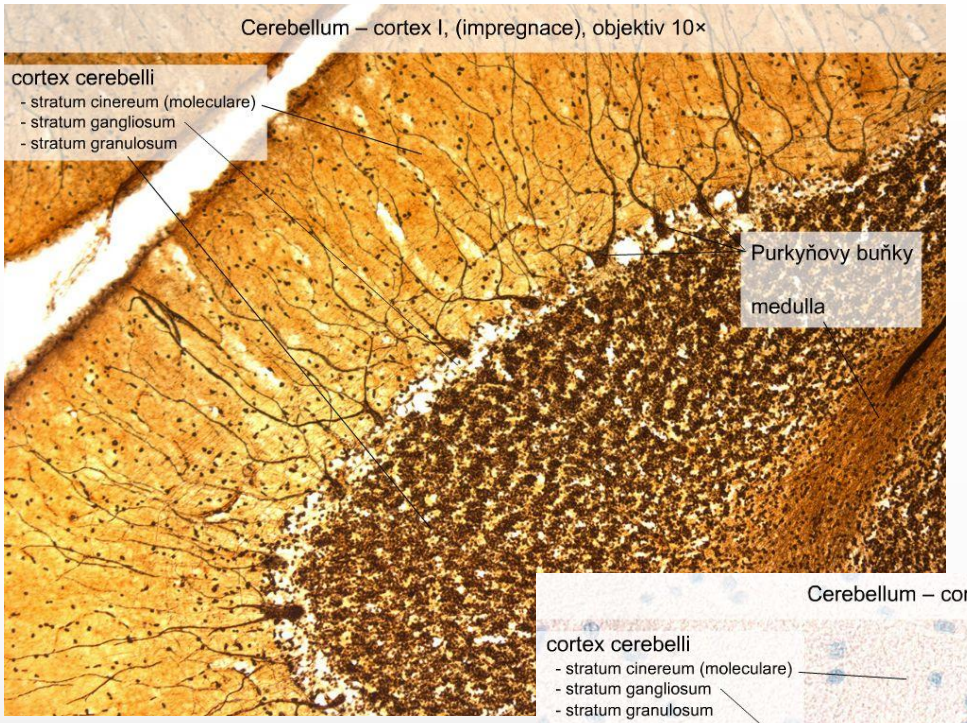
Bílá hmota mozečku

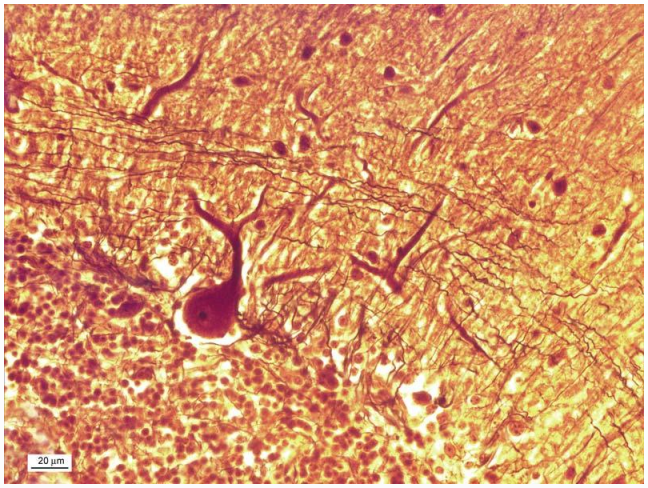
- Eferentní vlákna – neurity Purkyňových buněk
- Aferentní - mechová (synapse: glomeruli cerebellares) a šplhavá

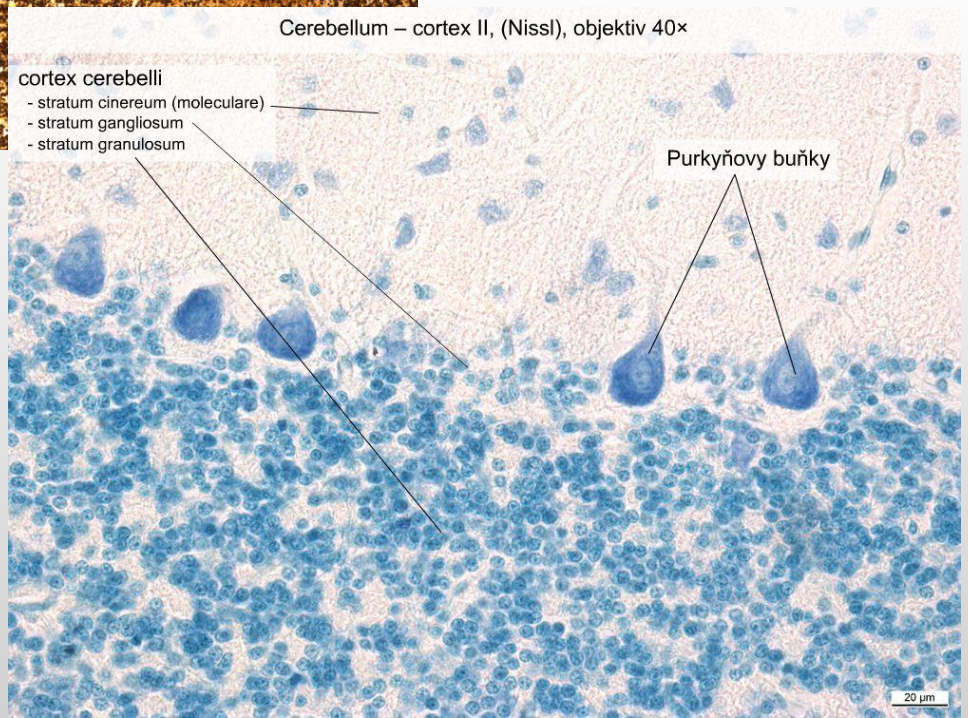
Jádra mozečku



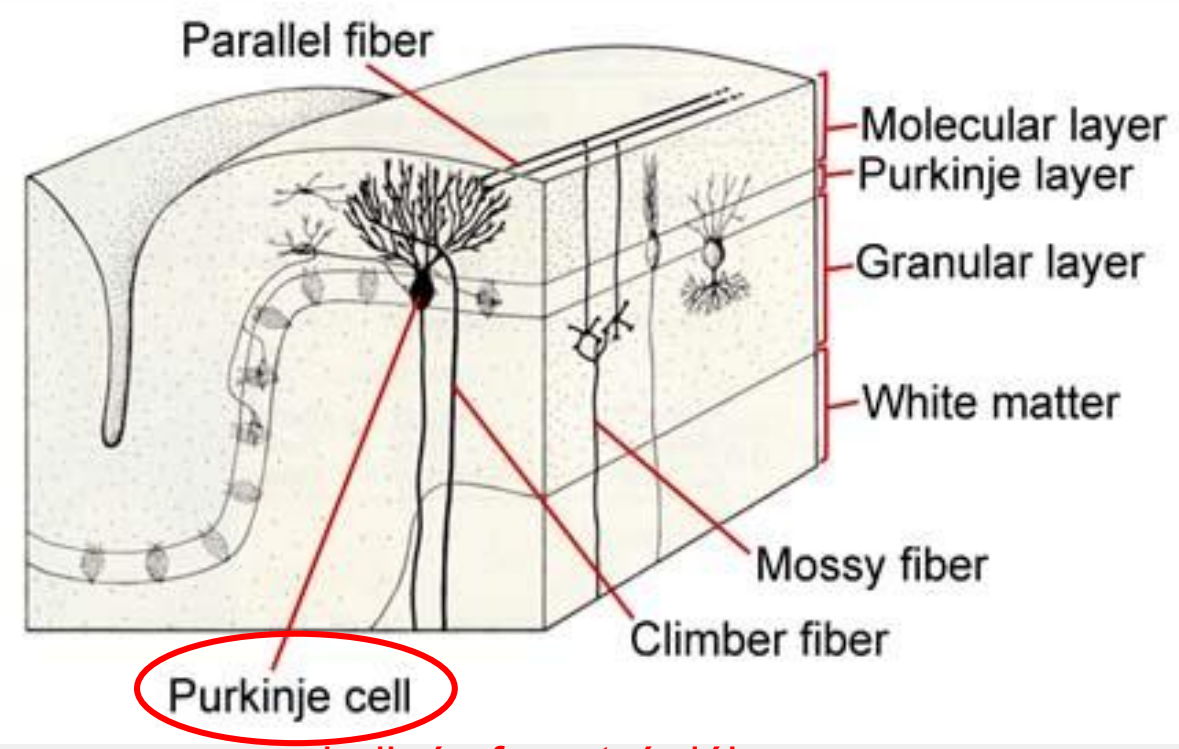
Cerebellum


Cerebellum – cortex I, (impregnace), objektiv 10×
cortex cerebelli
- stratum cinereum (moleculare)
- stratum gangliosum
- stratum granulosum
Purkyňovy buňky
medulla


20 µm


Cerebellum – cortex II, (Nissl), objektiv 40×
cortex cerebelli
- stratum cinereum (moleculare)
- stratum gangliosum
- stratum granulosum
Purkyňovy buňky
20 µm

Cerebellum (*zapojení neuronů)*

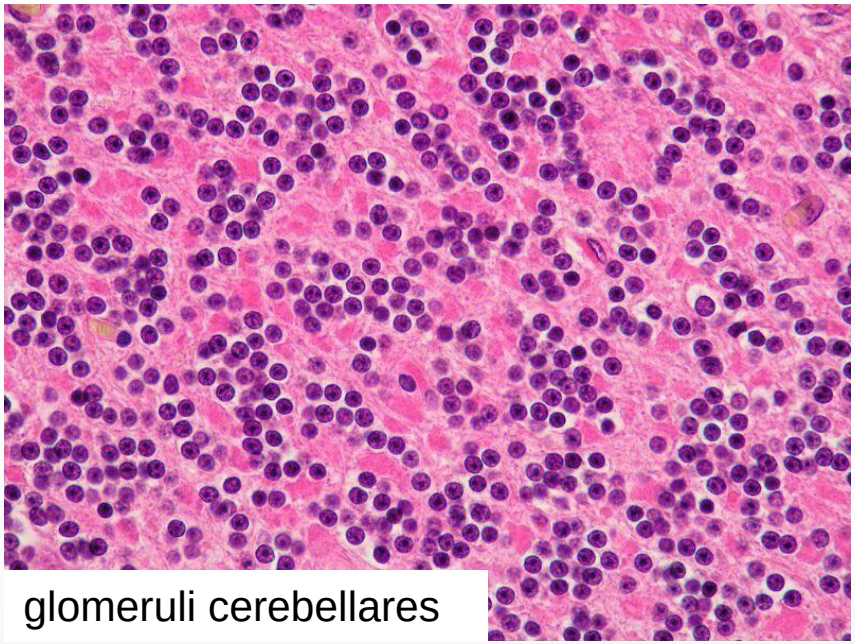


- jediná eferentní vlákna

košíčkové buňky malé zrnité (granulární) neurony	interneurony

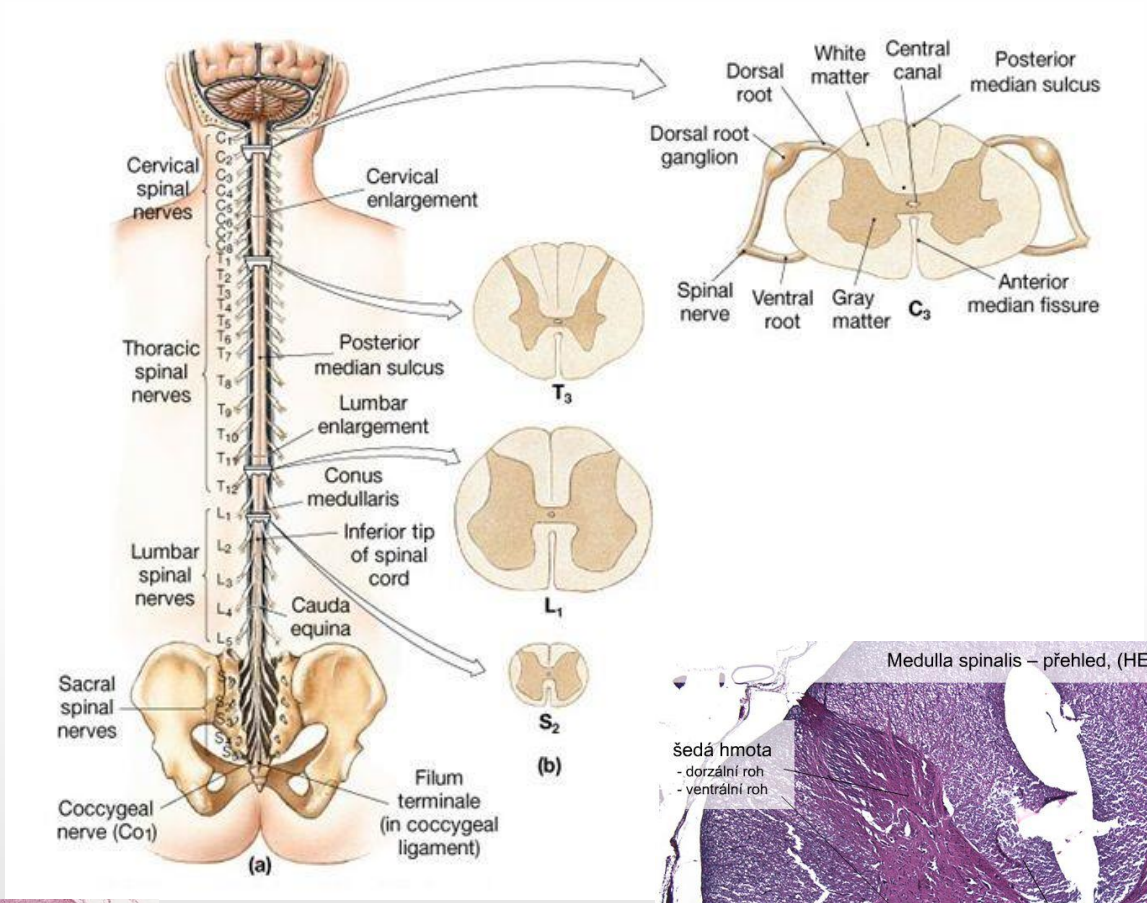
➡ kooperace Purkyňových buněk

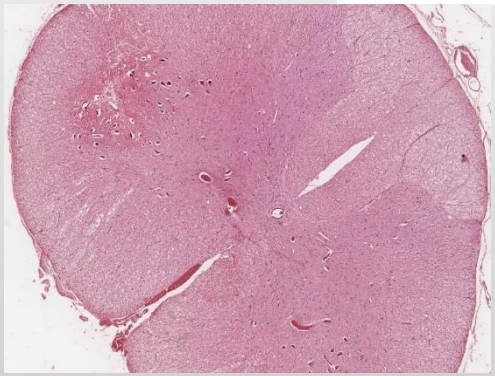
Cerebellum



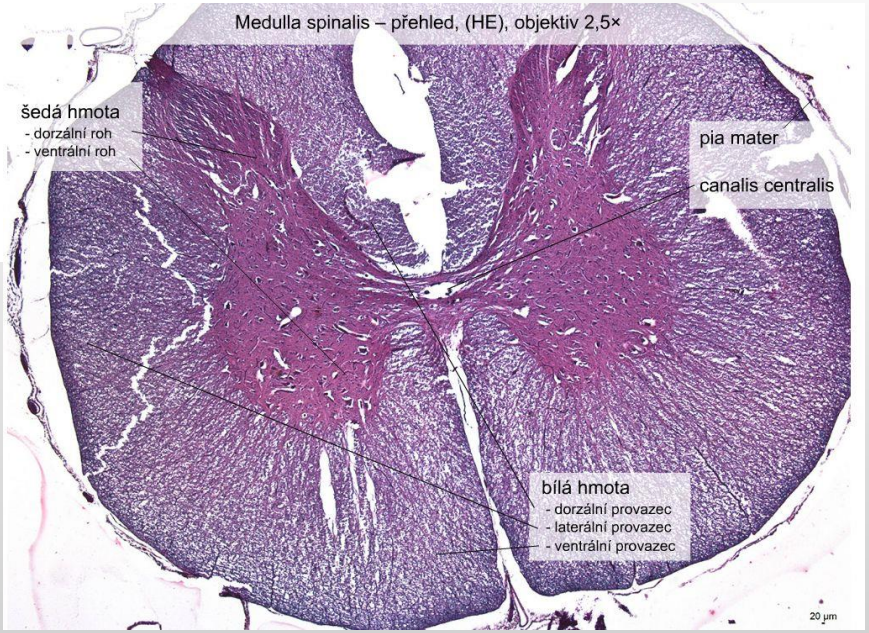
glomeruli cerebellares

CNS – mícha (medulla spinalis)





HE

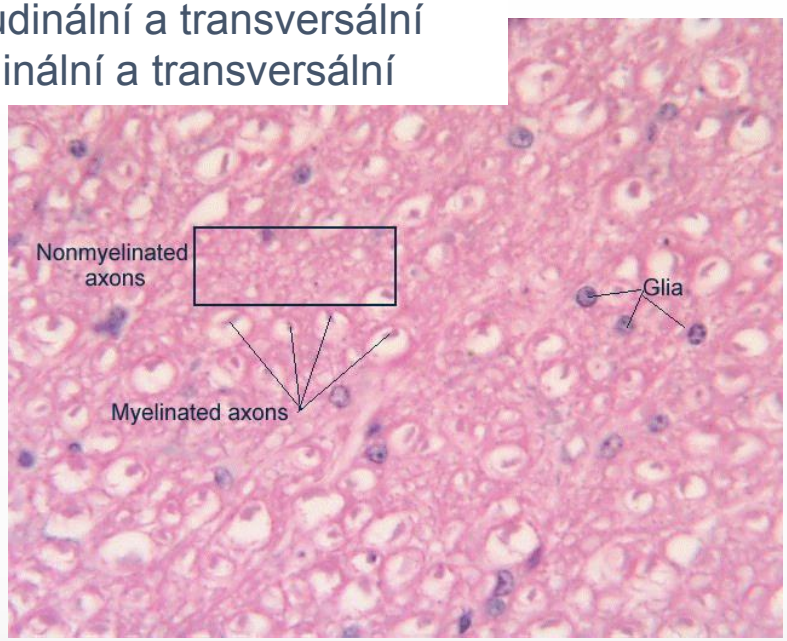


Medulla spinalis

- **Šedá hmota míšní**
  - ***Cellulae radiculares***
    - somatomotorické a visceromotorické
  - ***Interneurony***
    - vsunuté, komisurální, asociační
  - ***Cellulae funiculares***
    - v ncl.proprius a ncl. thoracicus

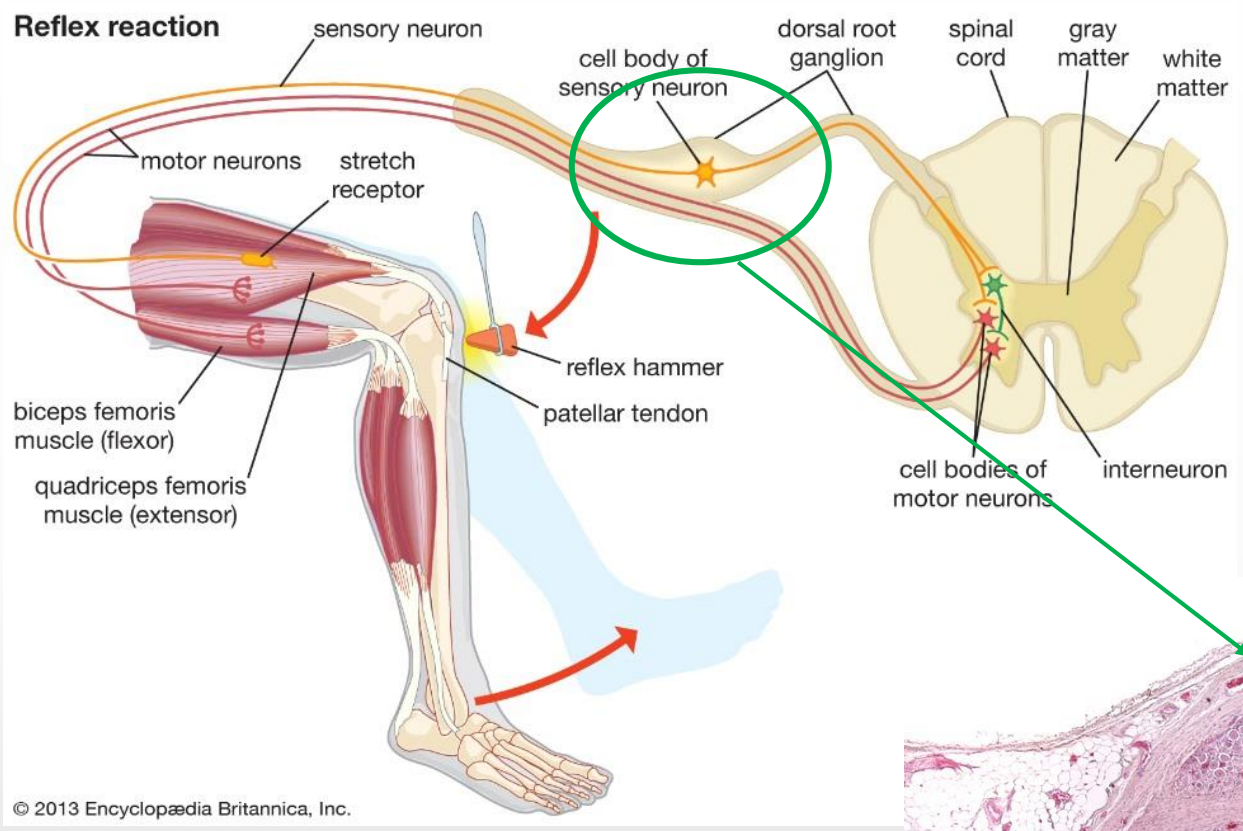
Medulla spinalis – bílá hmota

endogenní vlákna – longitudinální a transversální
exogenní vlákna – longitudinální a transversální



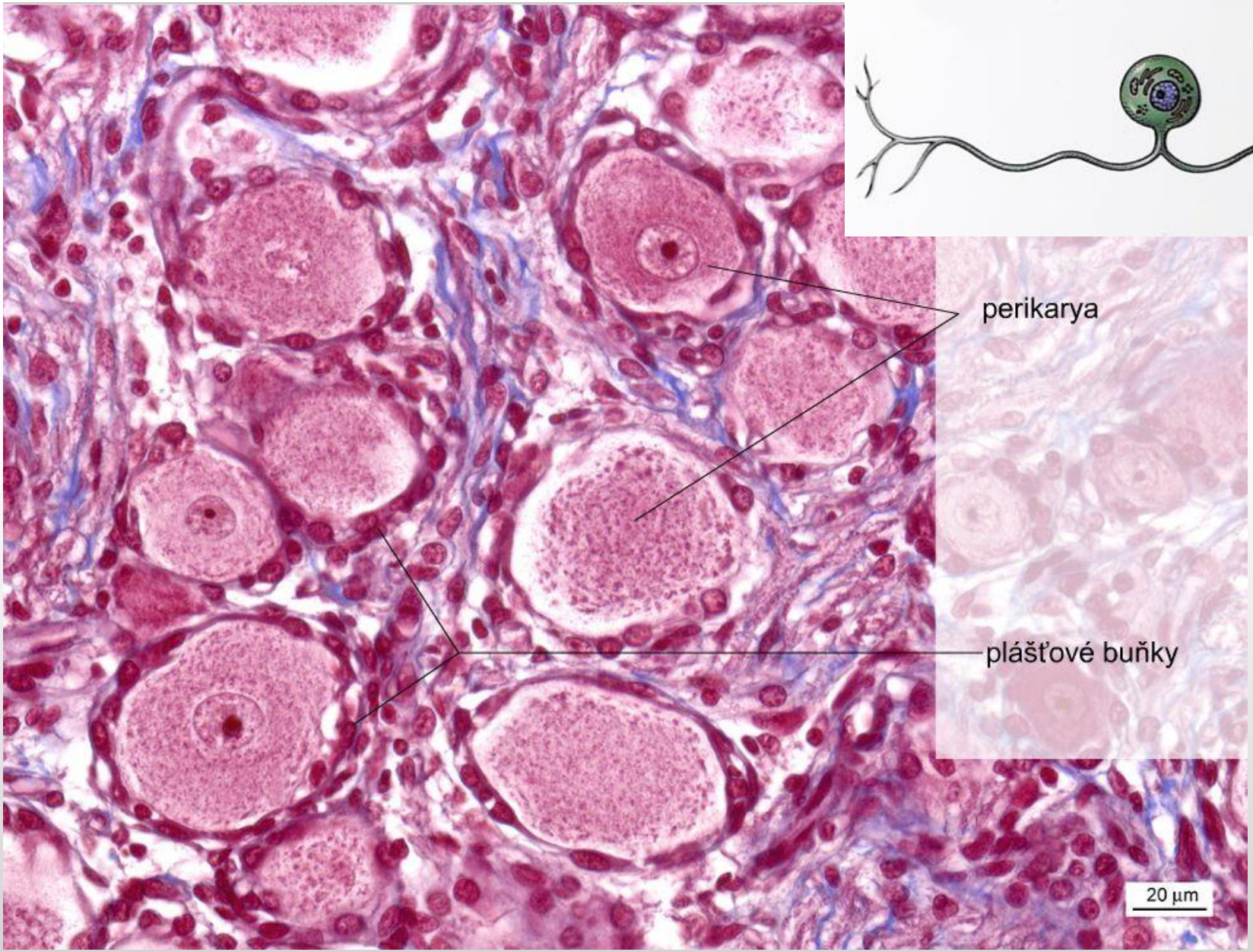
přestávka

PNS – míšní ganglion (ganglion spinale)

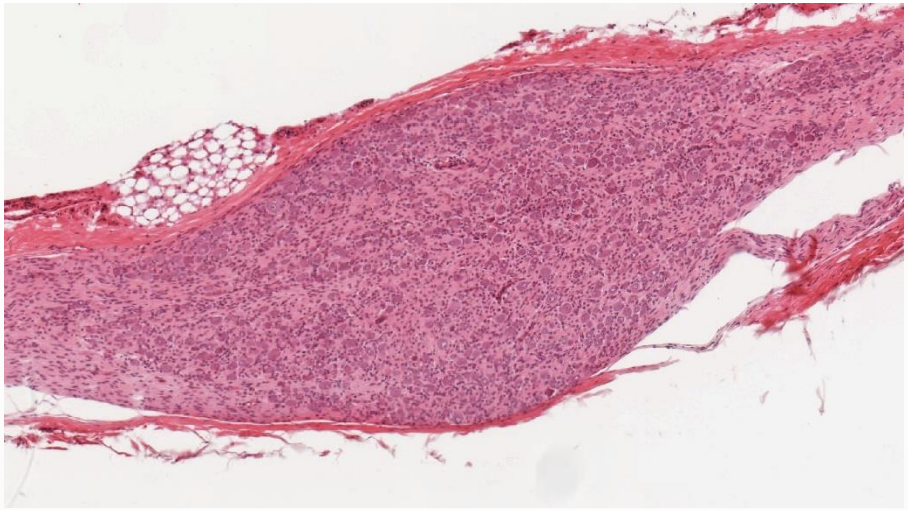


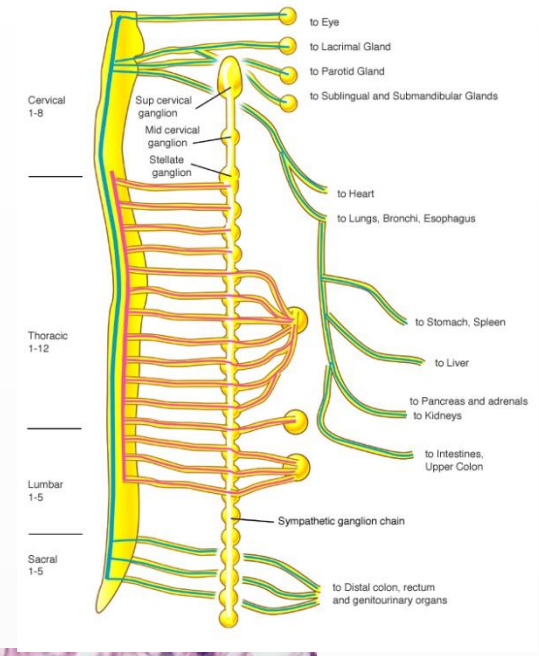
míšní ganglion

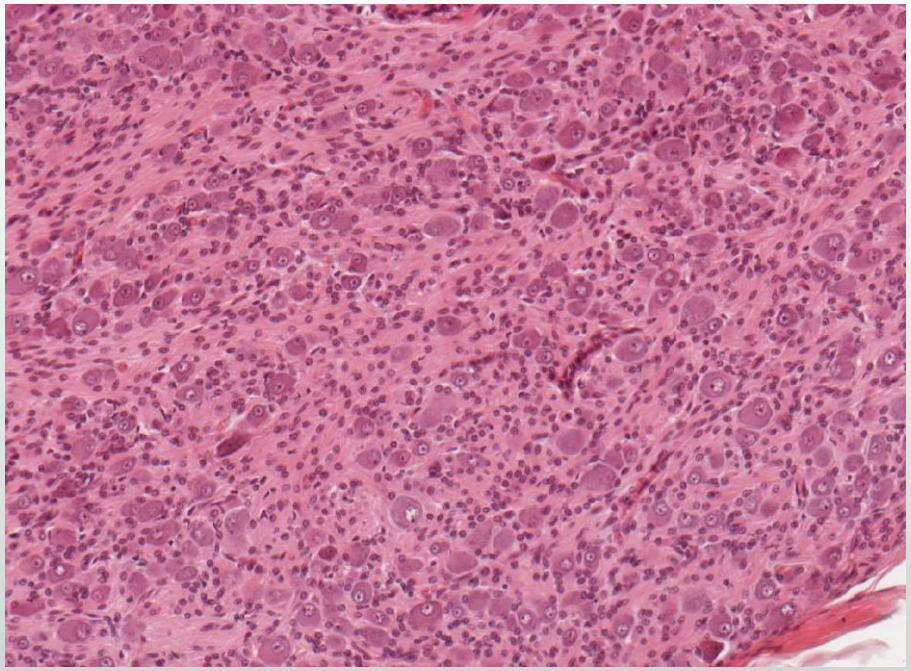
Ganglion spinale – pseudounipolární neurony a neuroglie

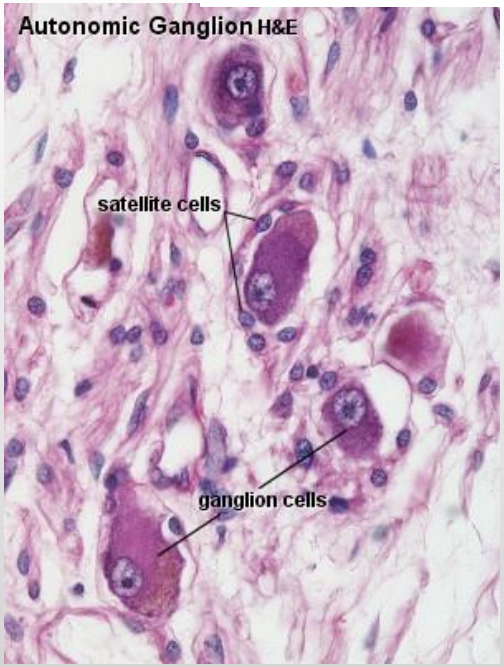


Ganglia autonomní – multipolární neurony a neuroglie

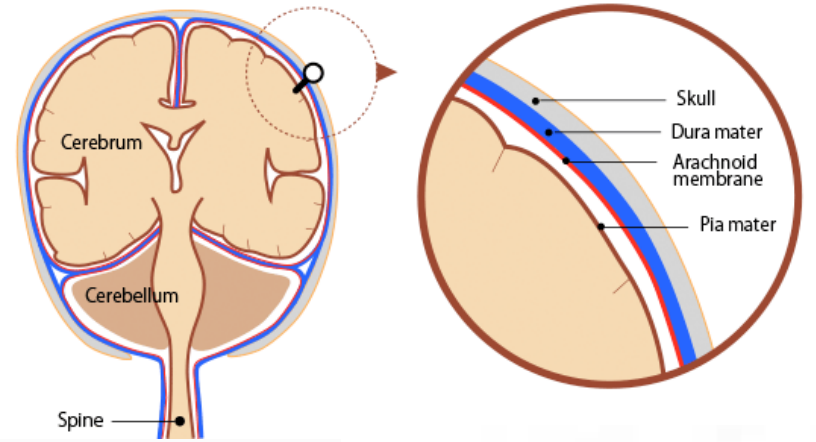


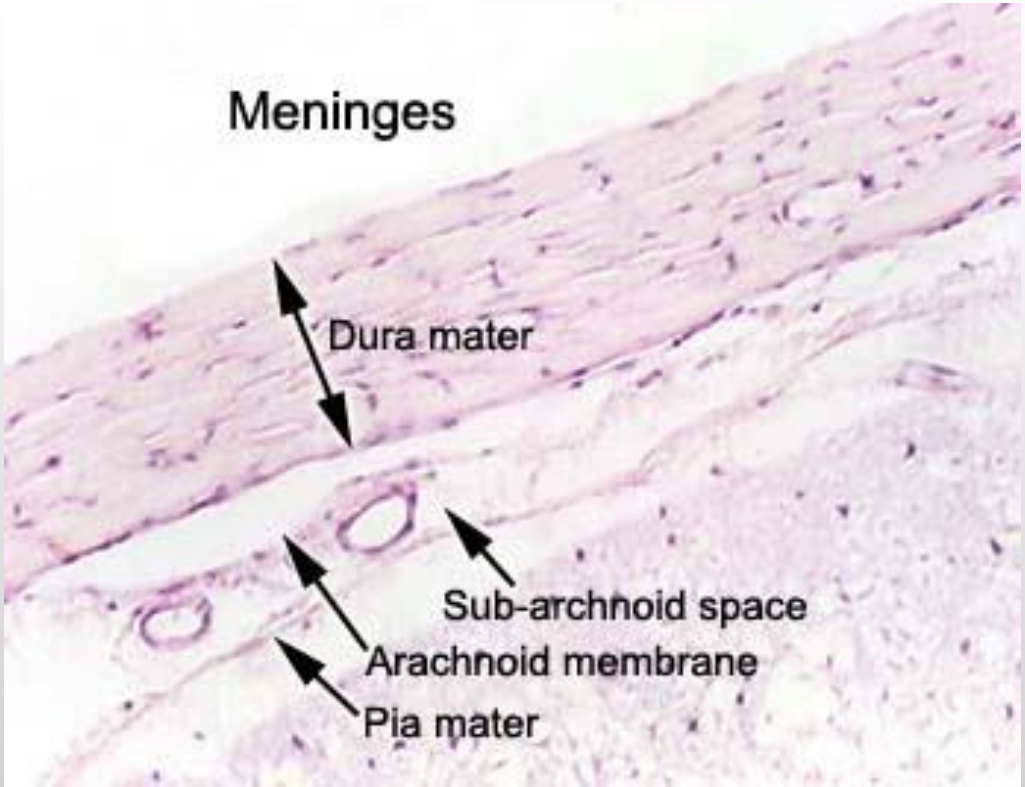




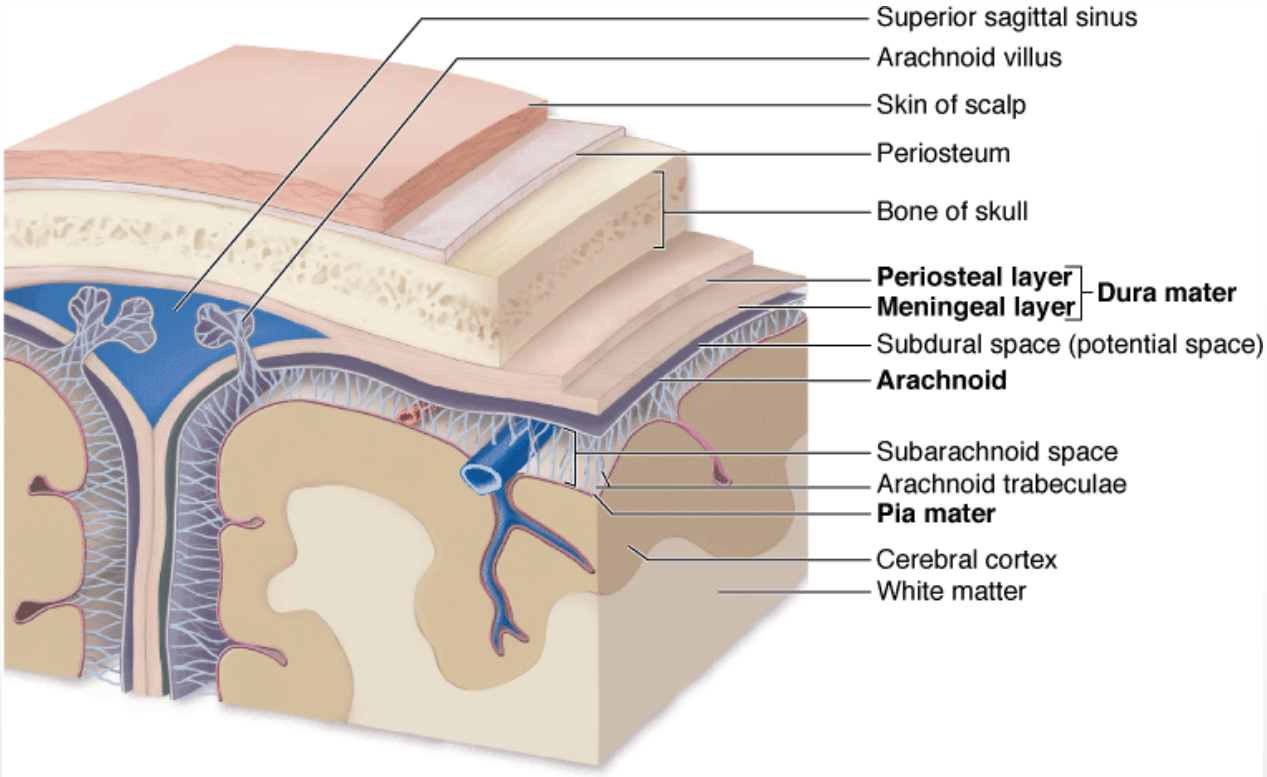


Mozkomíšní obaly - meningy





Mozkomíšní obaly - meningy

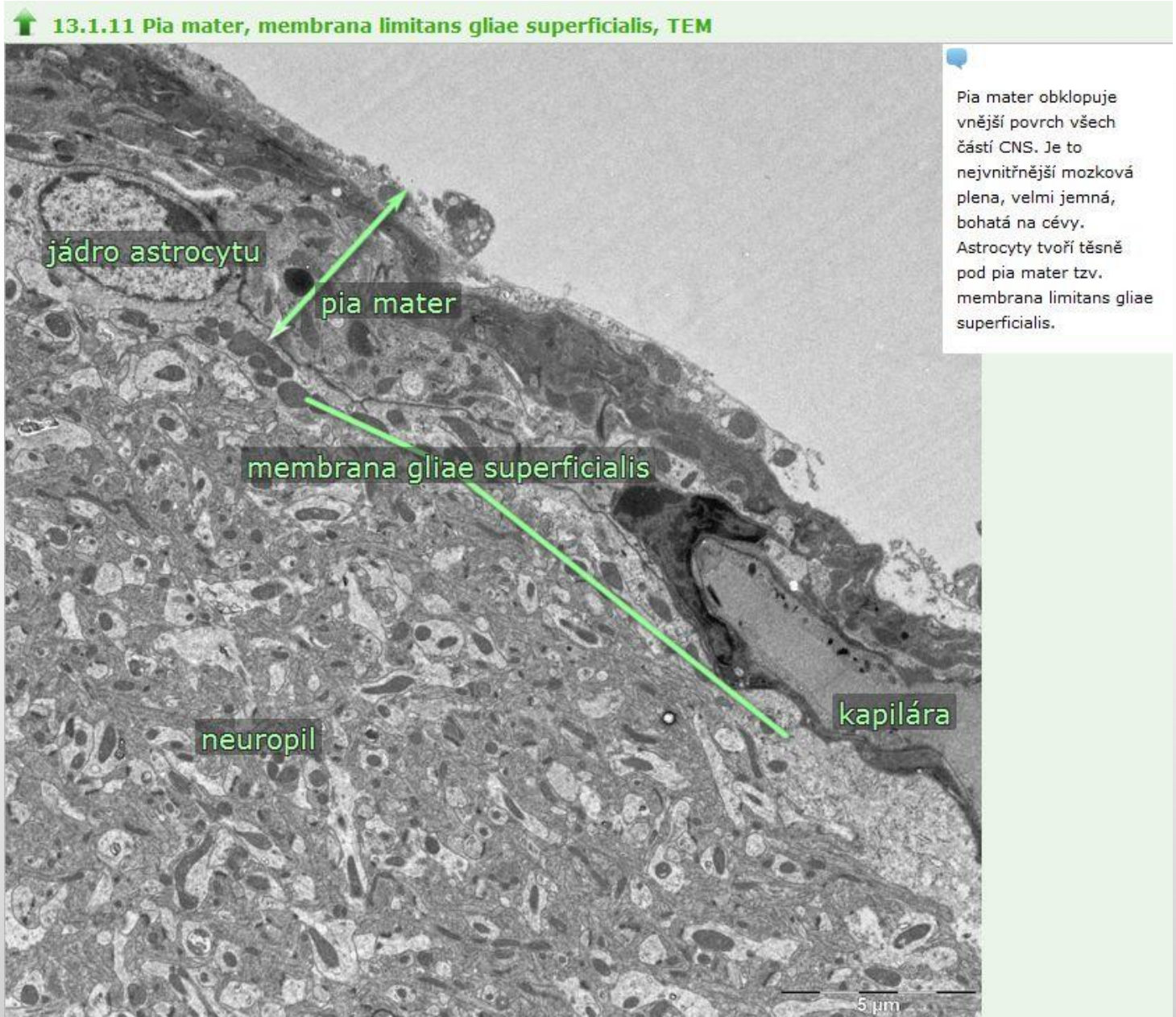


- **Dura mater**
  - endosteální vrstva (periostální)
  - meningeální vrstva

  v určitých místech obě vrstvy odděleny – venózní sinusy
- **Arachnoidea** – jemná, bez cév
  - vazivo
  - síť jemných trabekul

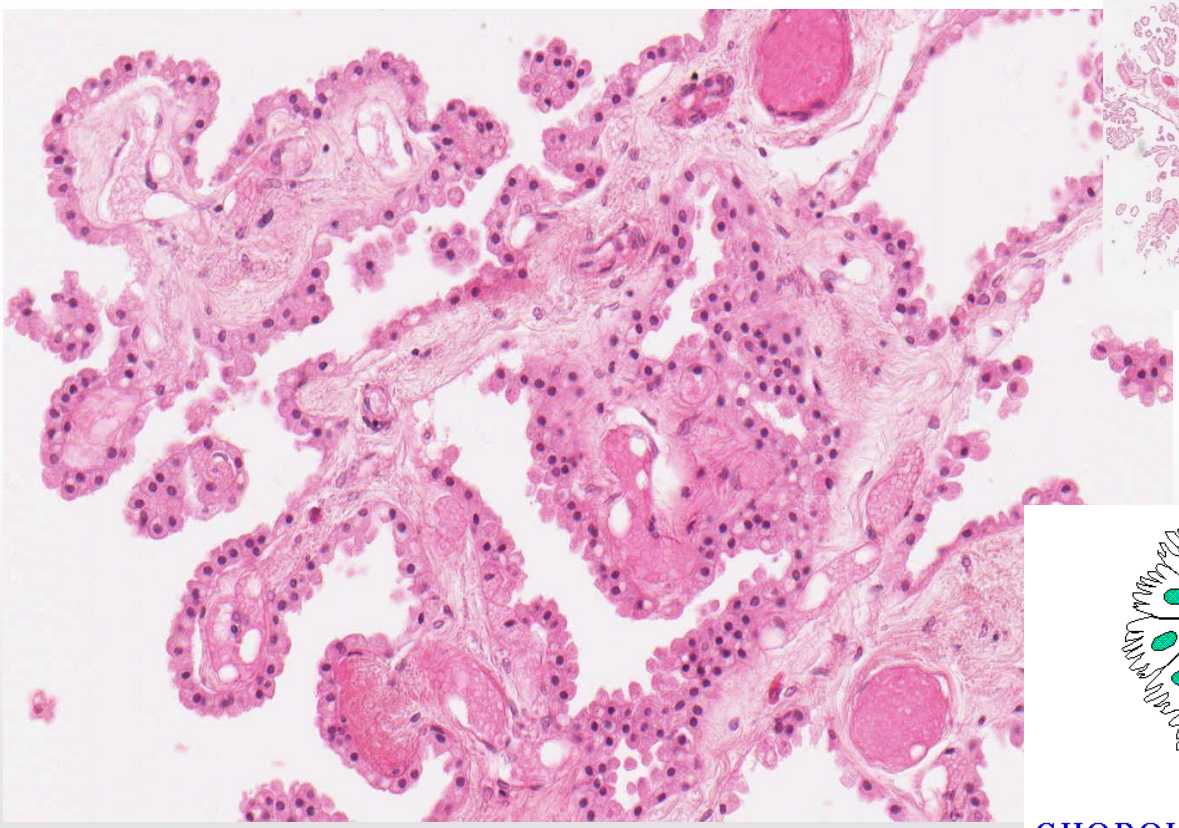
  v subarachnoidálním prostoru jsou četné cévy, prostor je vyplněn mozkomíšním mokem
- **Pia mater** – velmi vaskularizovaná jemná blána

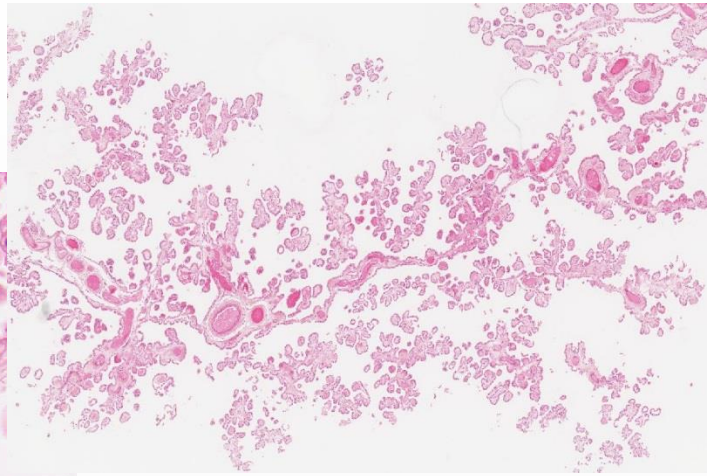
Mozkomíšní obaly - meningy



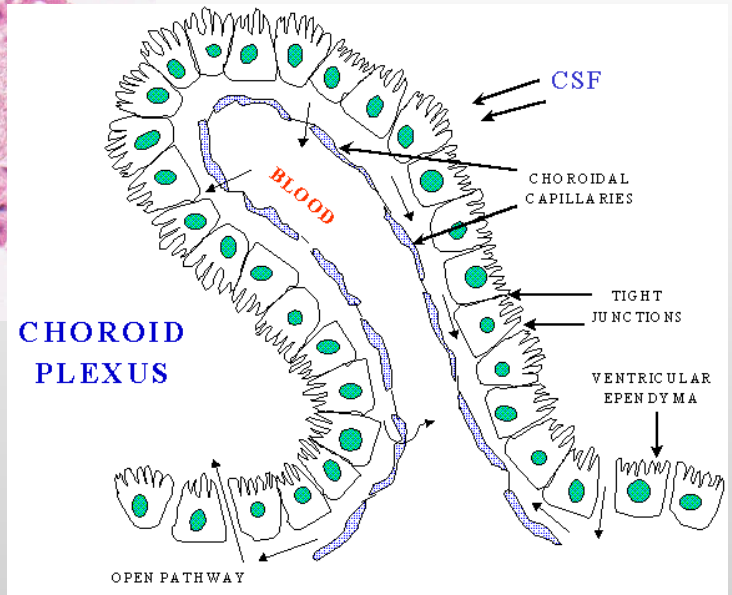
Plexus choroideus (v mozkových komorách)

produkce mozkomíšního moku





vaskularizovaná pia mater + ependym



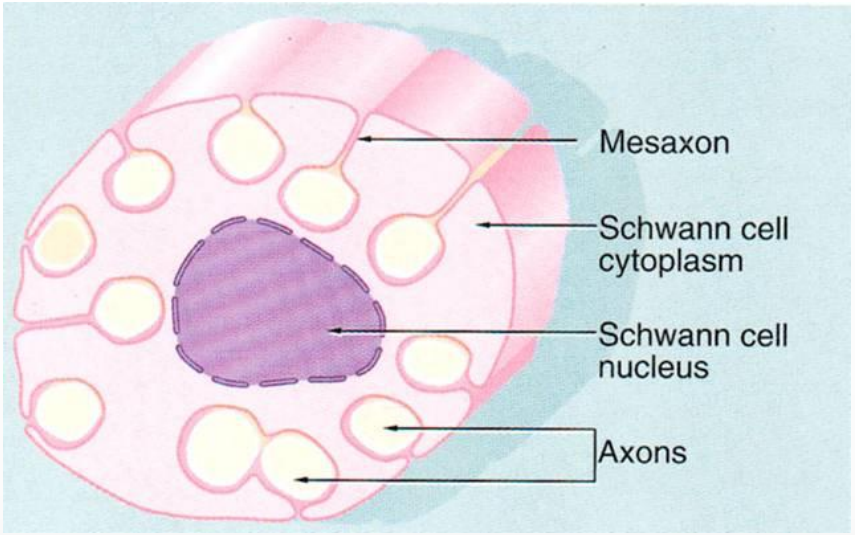
PNS - nervová vlákna

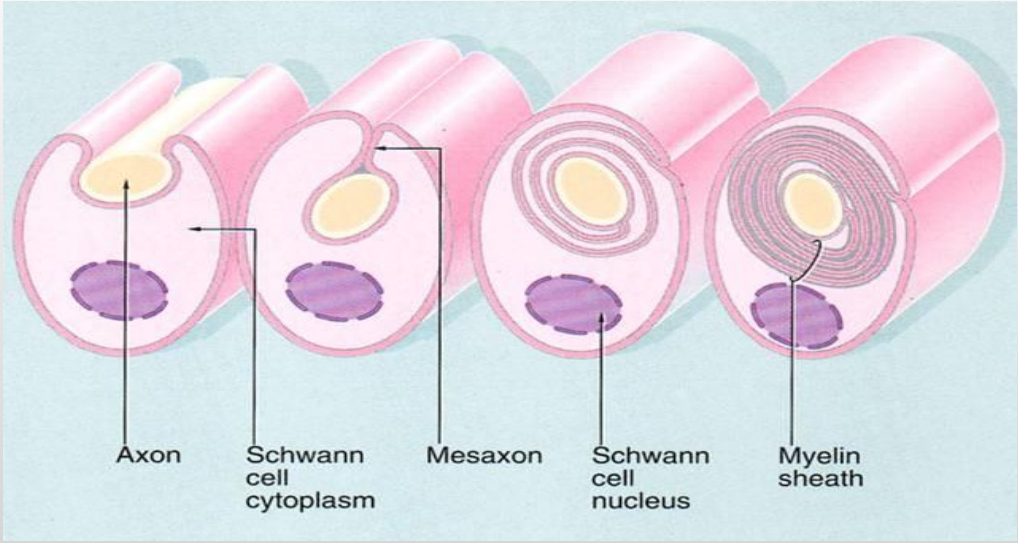
- nervové vlákno = axon + obal
- 2 typy nervových vláken
  - ***nemyelinizovaná***

    jen *neurilema* (autonomní nervy - šedá vlákna Remakova)

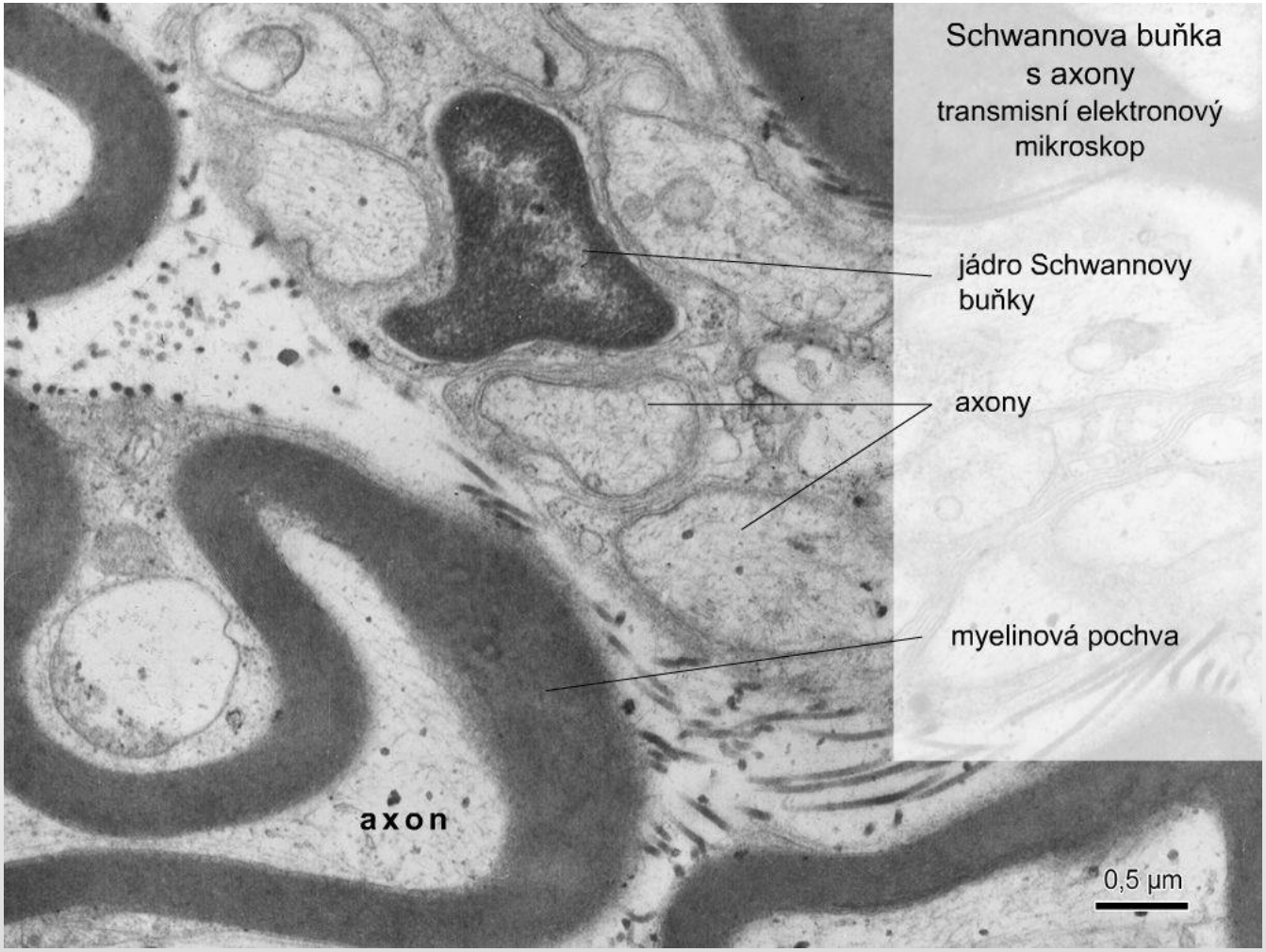
  - ***myelinizovaná***

    Schwannova pochva */neurilema/* + myelinová pochva (cerebrospinální nervy - bílá vlákna)

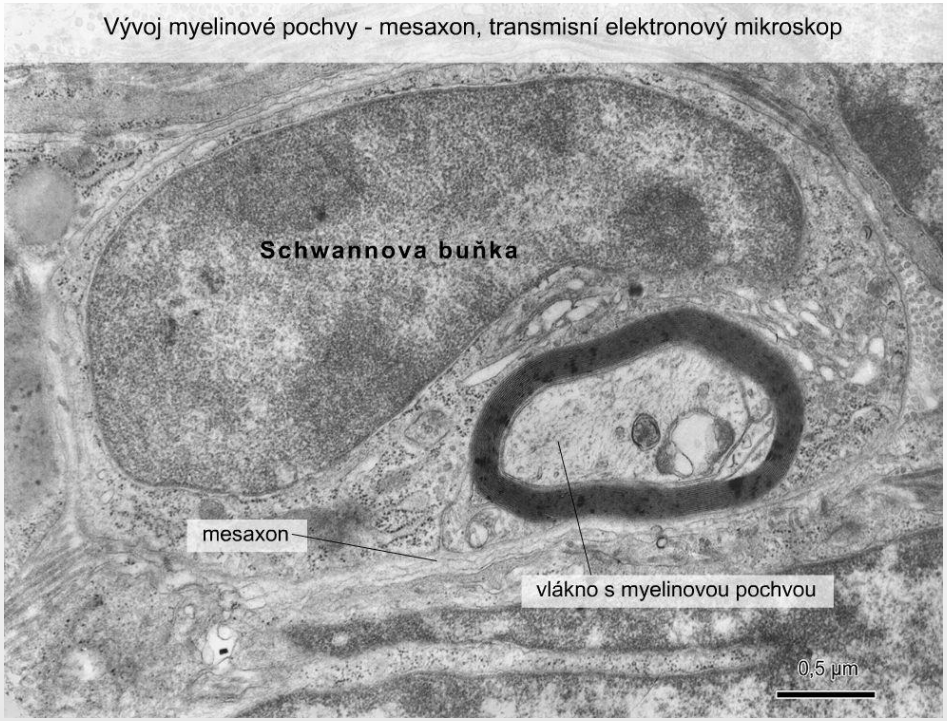


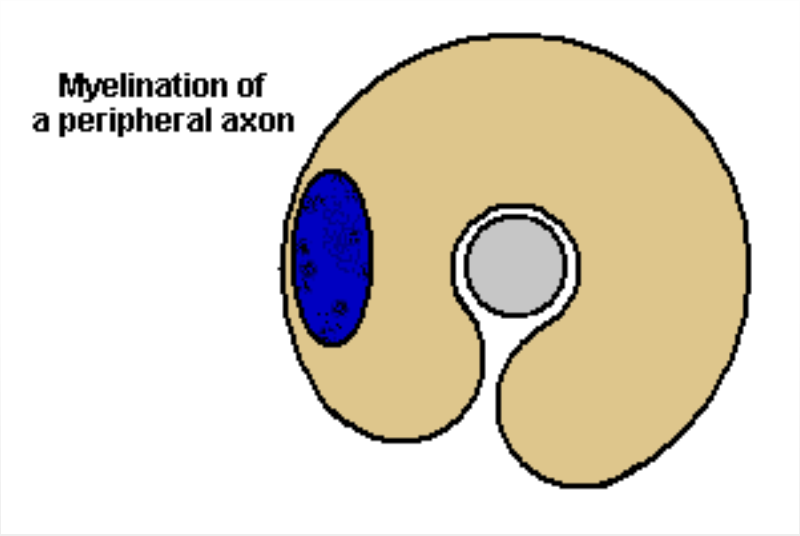


PNS - nervová vlákna

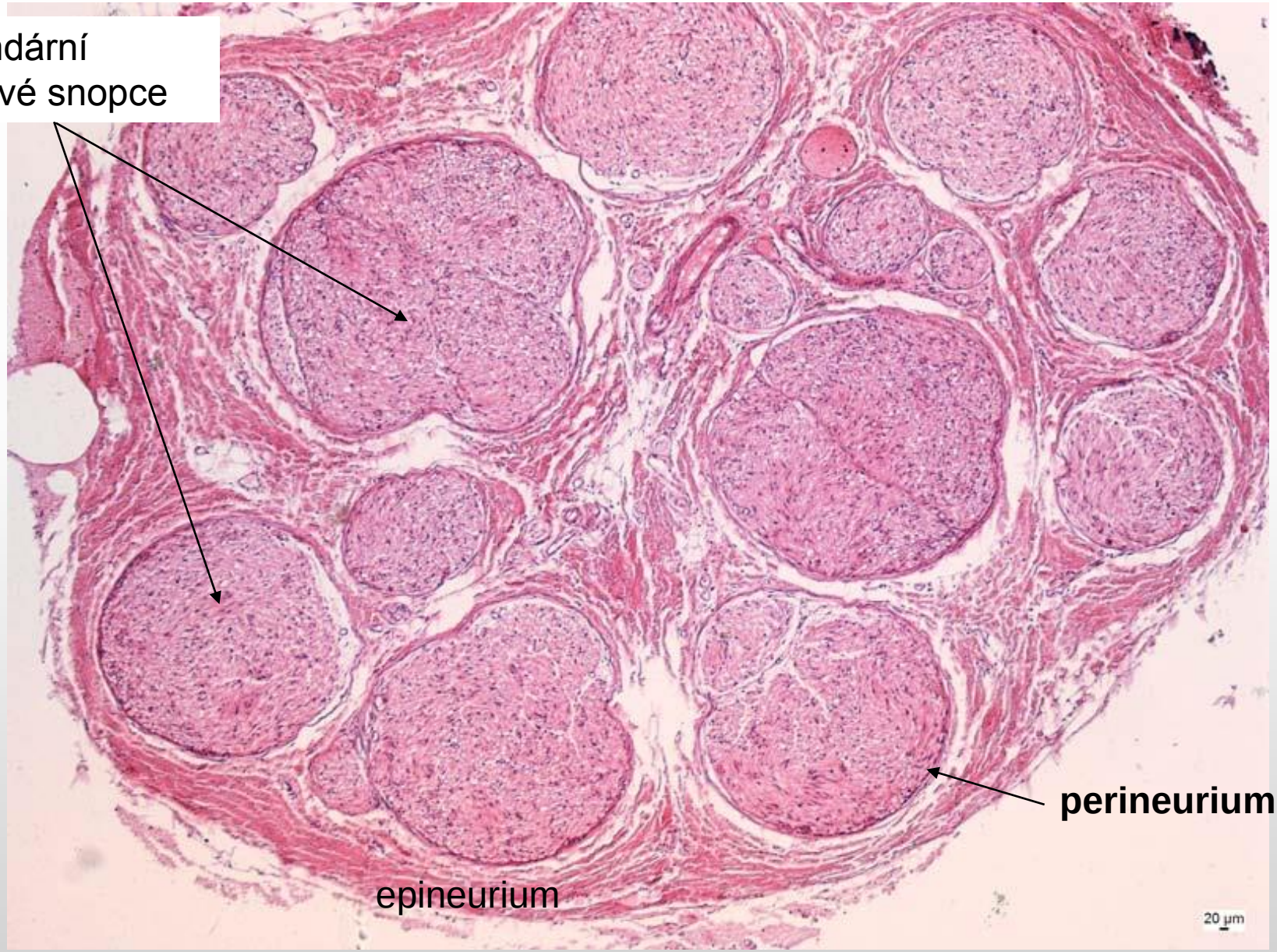


PNS - nervová vlákna – tvorba myelinu

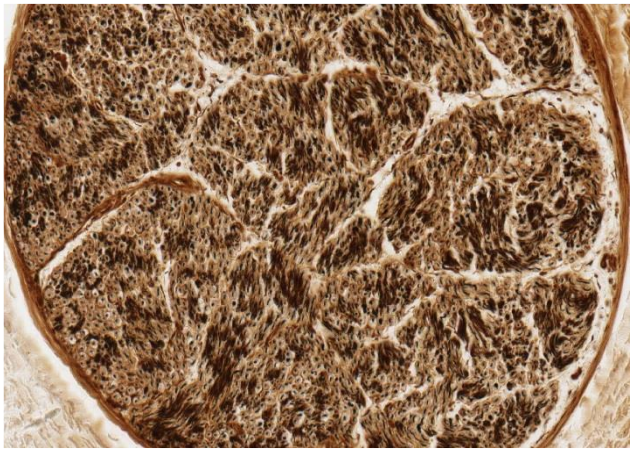




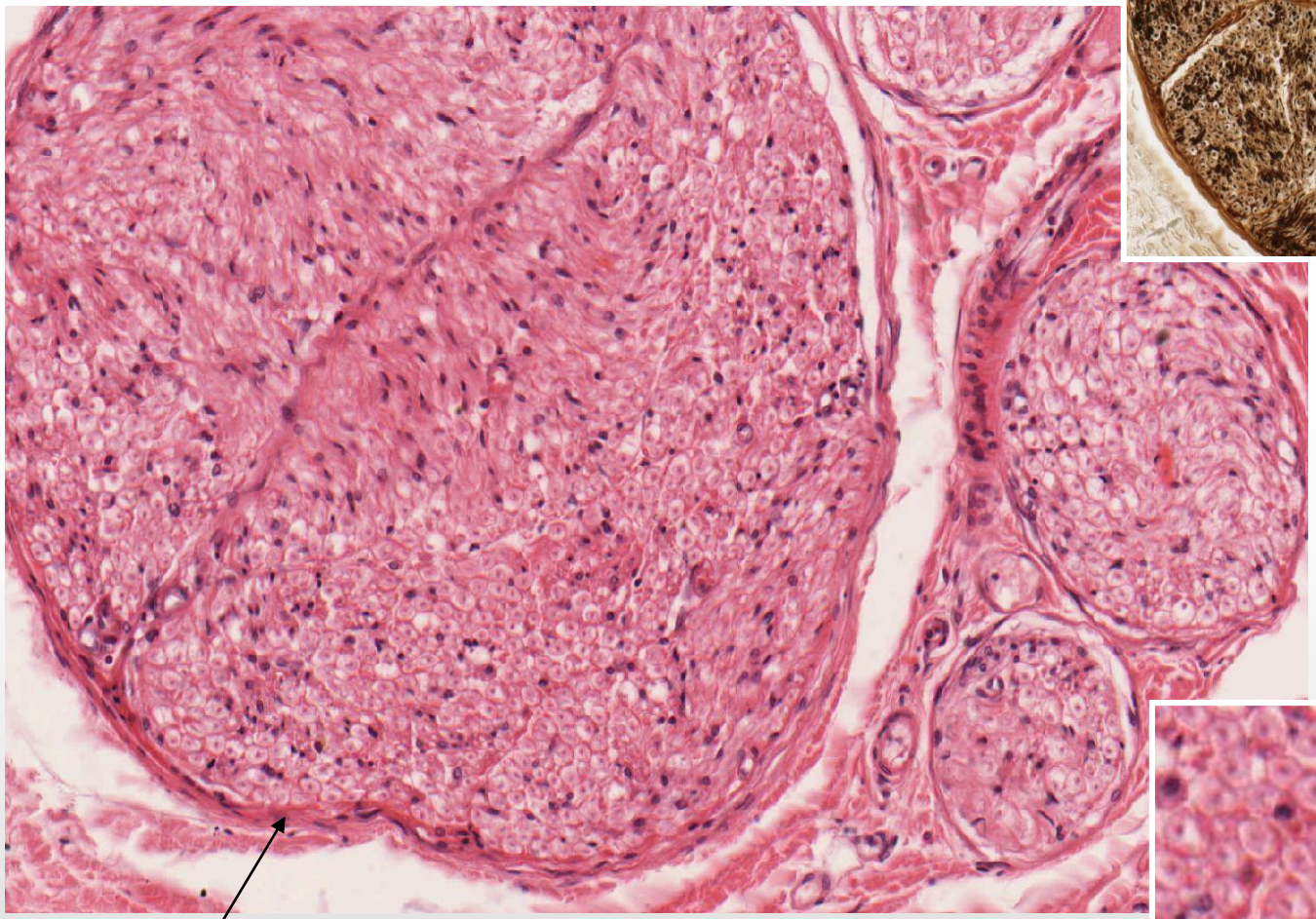
Periferní nerv



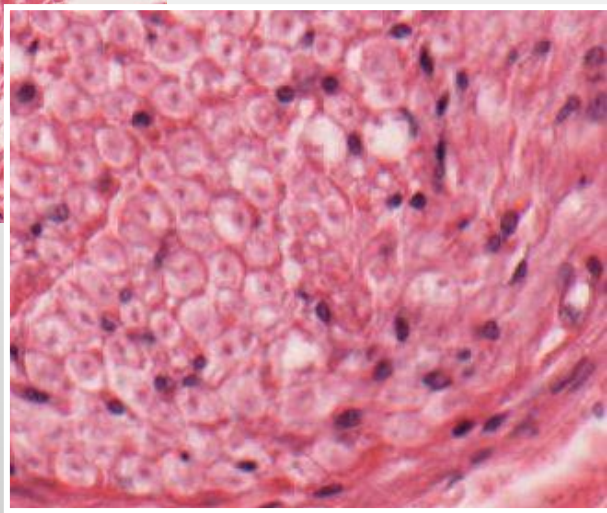
Periferní nerv



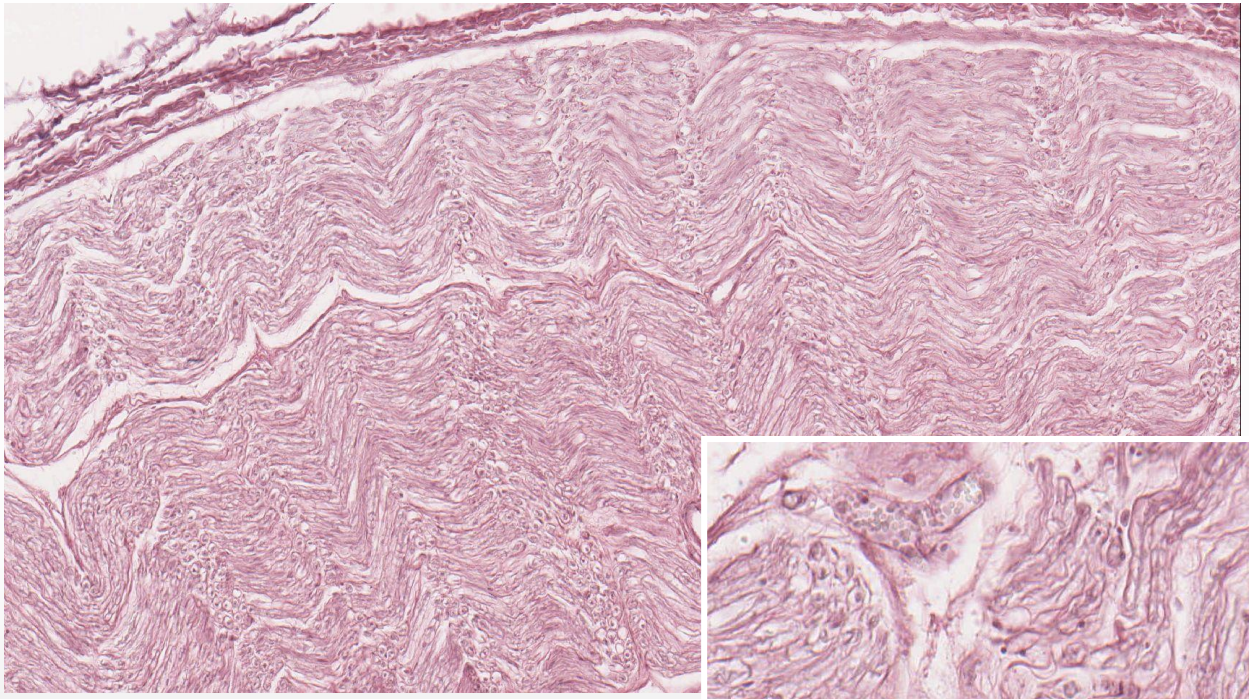
impregnace

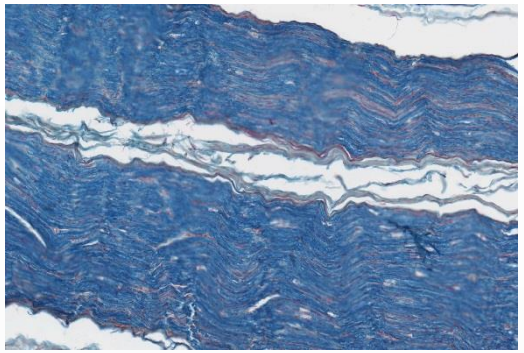


perineurium

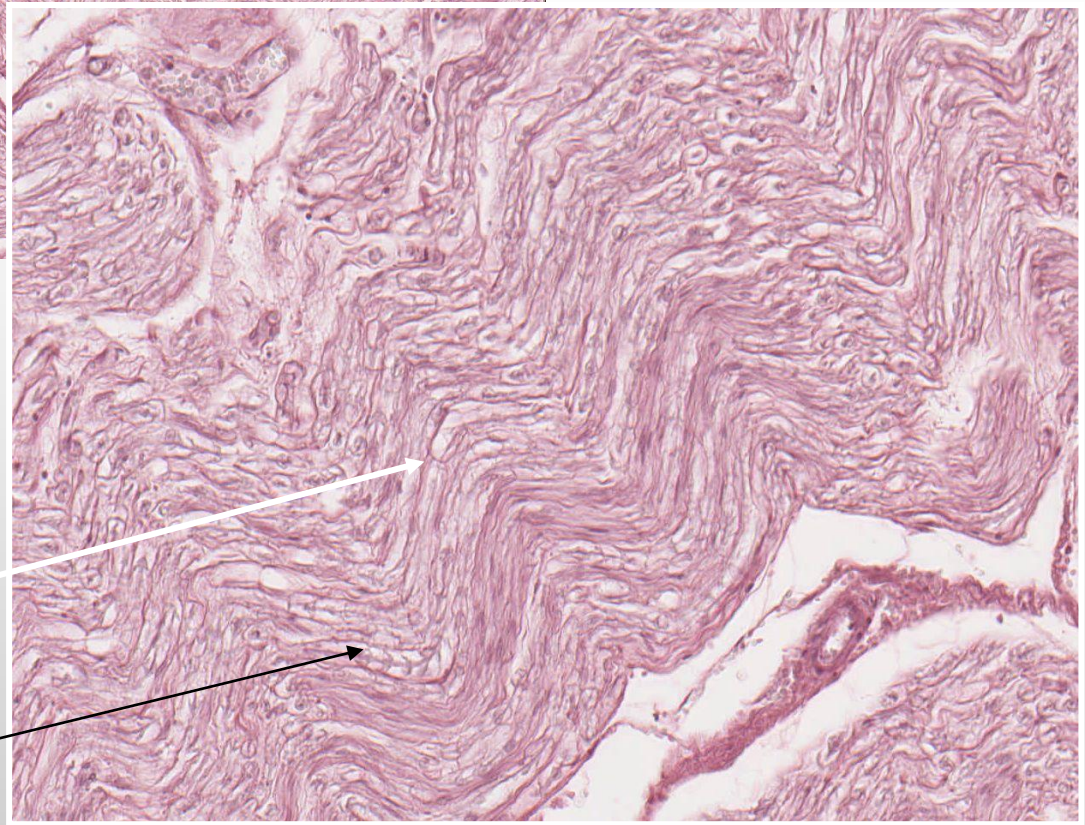


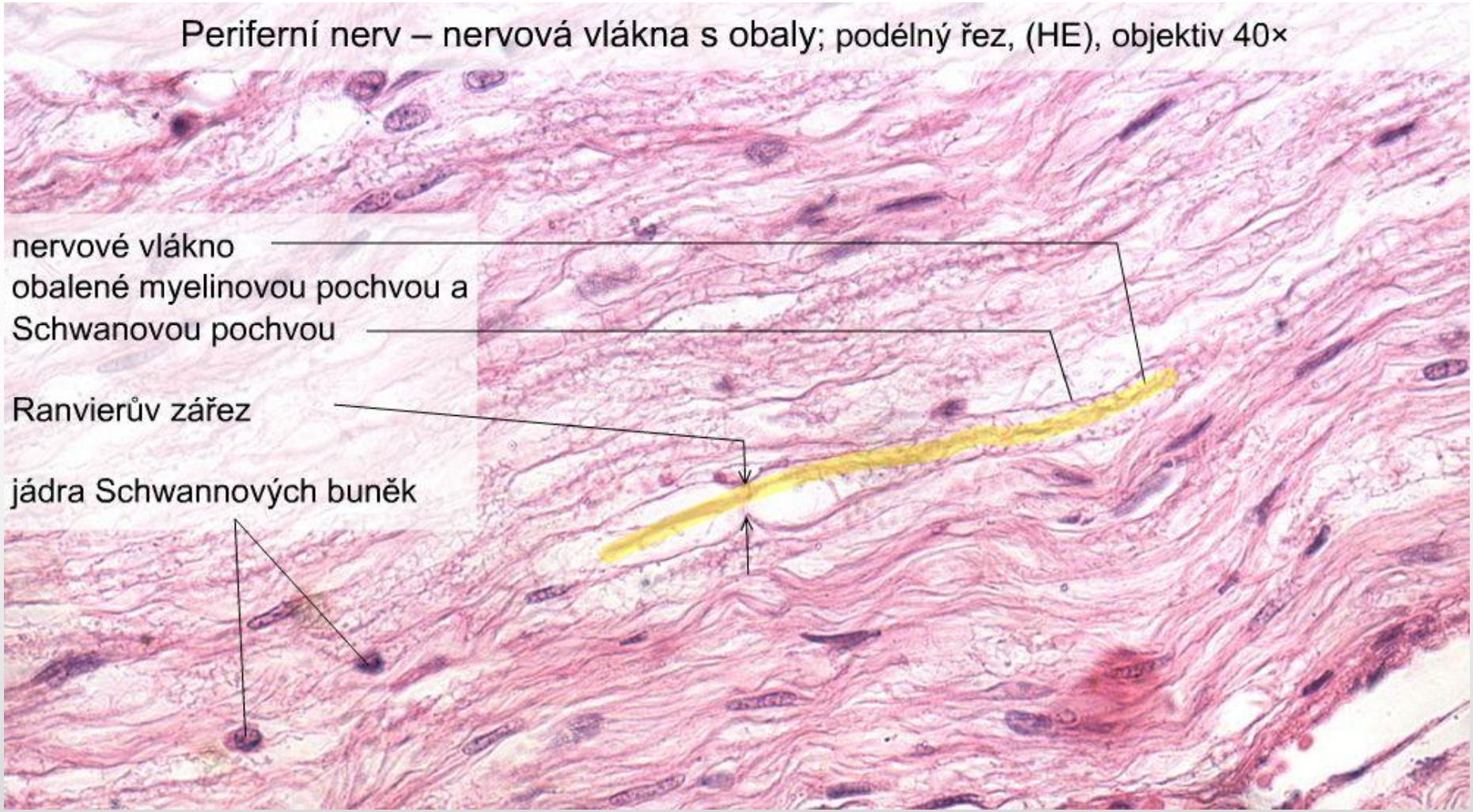
Periferní nerv



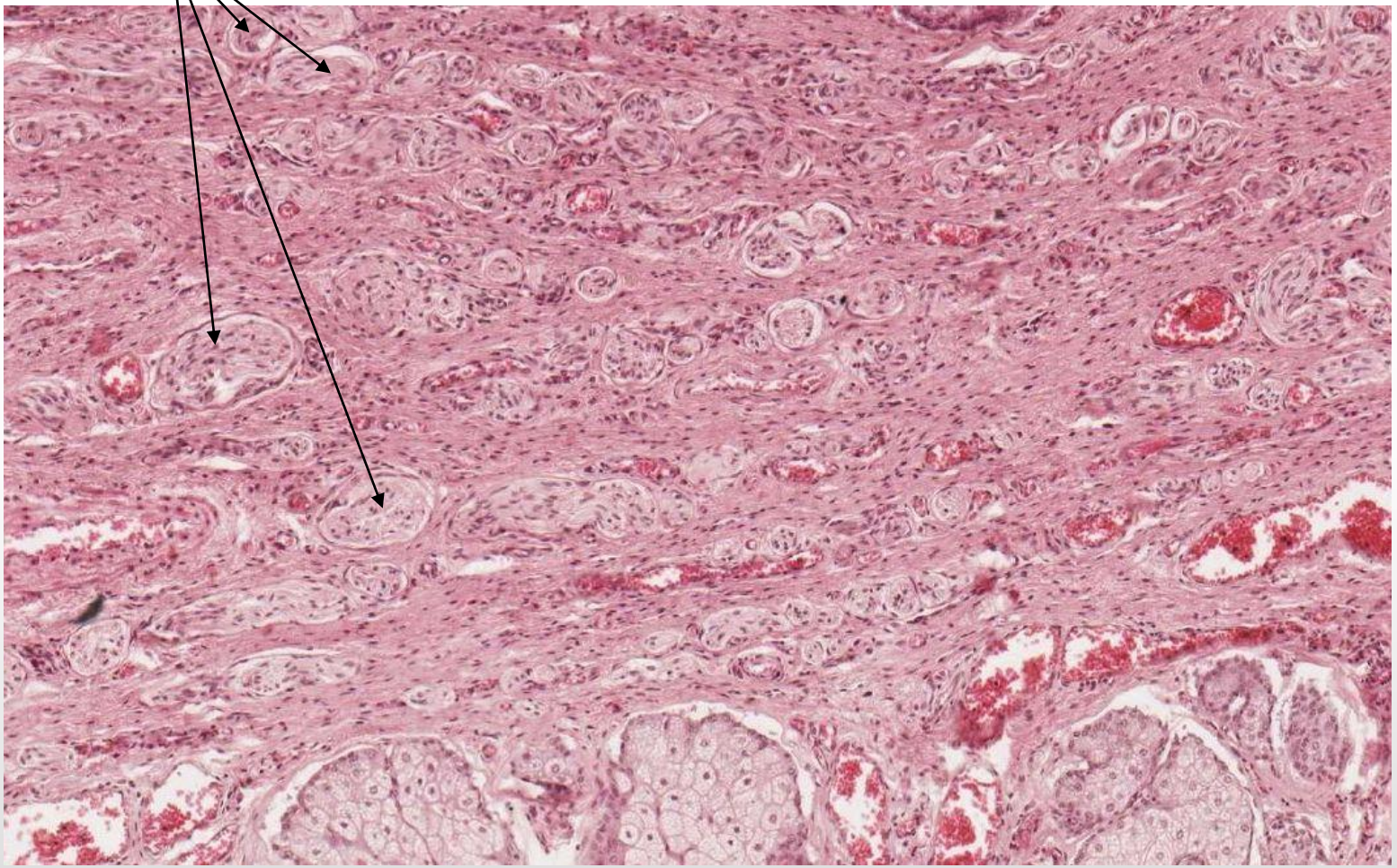


barvení na myelin - luxolová modř



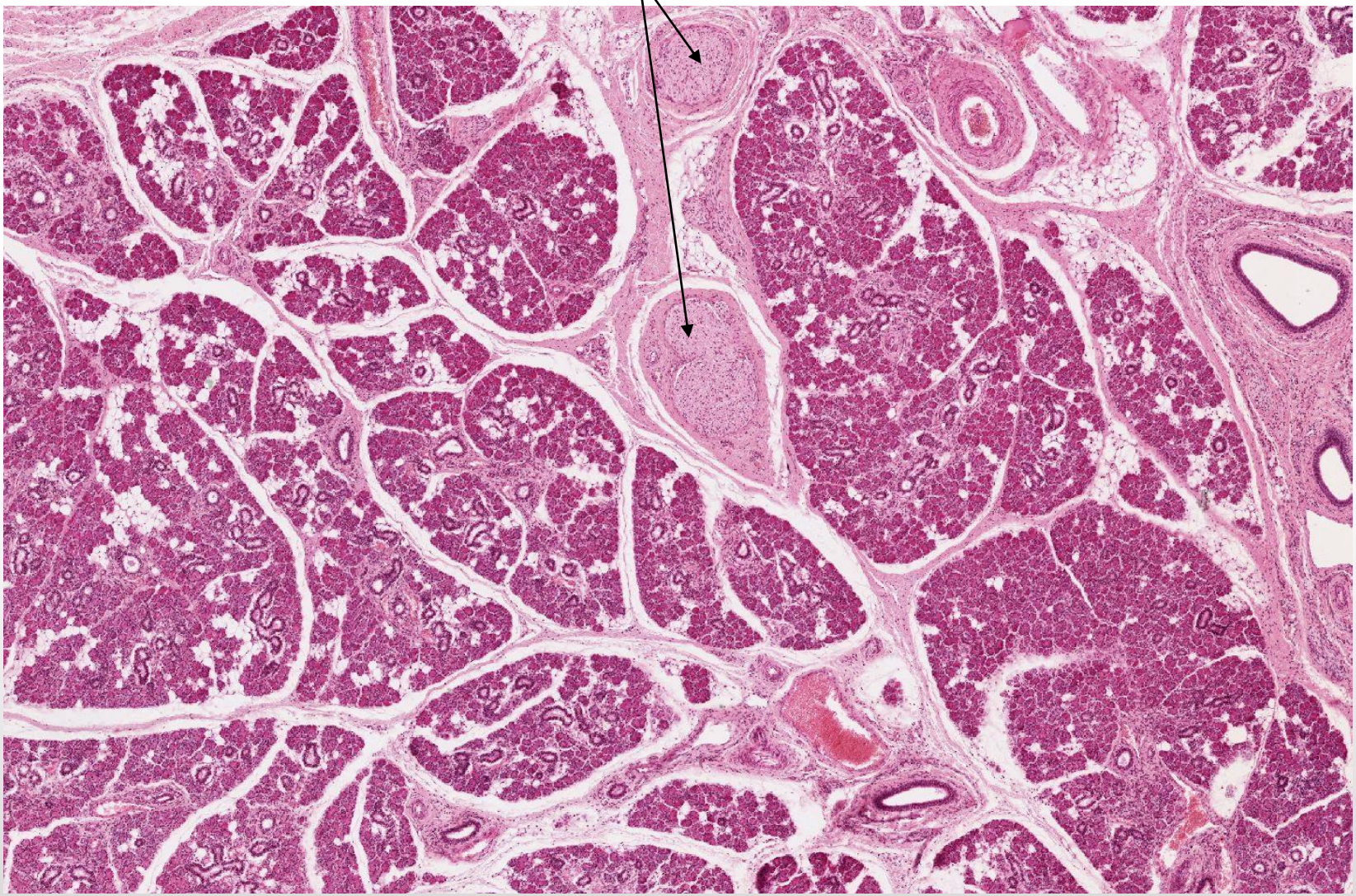

Periferní nerv – nervová vlákna s obaly; podélný řez, (HE), objektiv 40×
nervové vlákno
obalené myelinovou pochvou a
Schwanovou pochvou
Ranvierův zářez
jádra Schwannových buněk

Periferní nerv – ve tkáních



labium minus

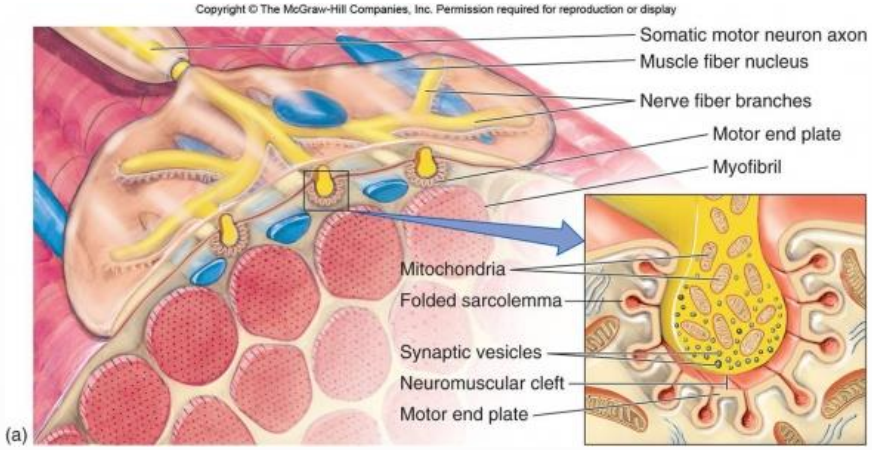
Periferní nerv – ve tkáních

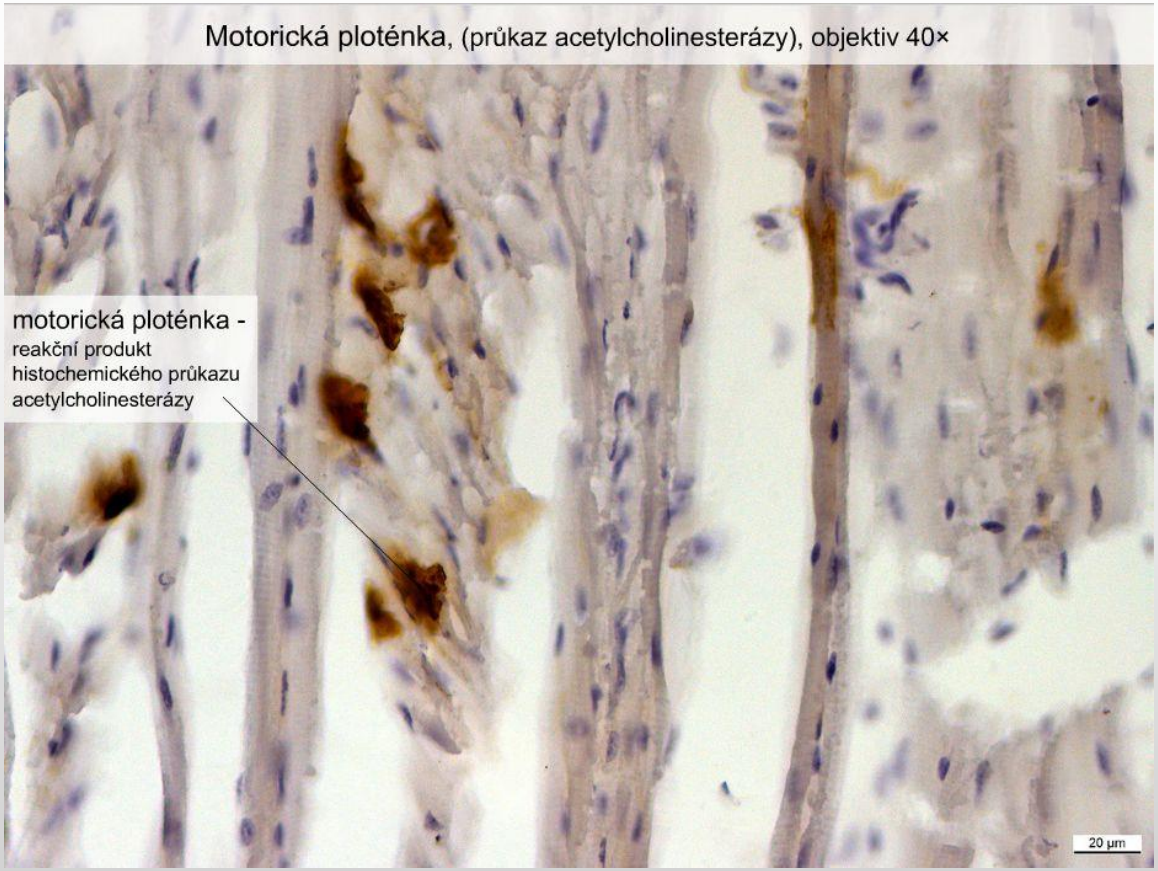


glandula parotis

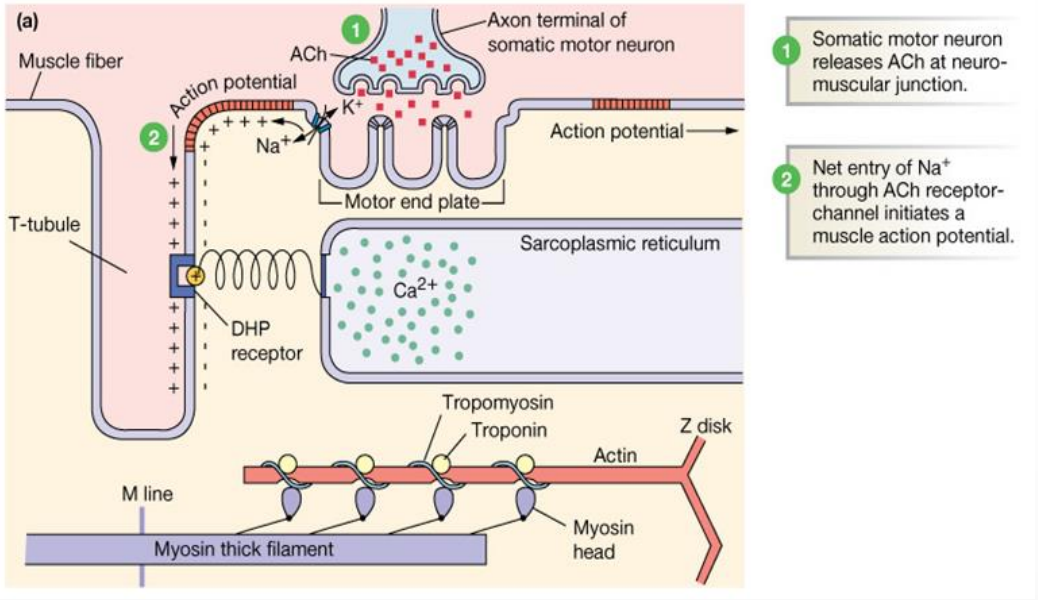
Motorická ploténka

speciální velkoplošná synapse





Motorická ploténka - funkce

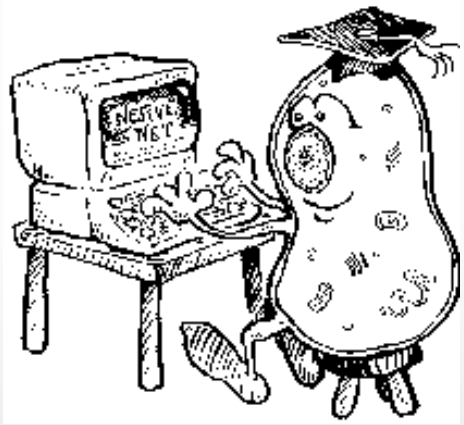


Motorická jednotka – soubor všech svalových vláken, která inervačně náleží k jednomu motoneuronu,
např. okohybné svaly – 3-5 svalových vláken na 1 motoneuron,
mm. glutei – 100-200 svalových vláken na 1 motoneuron

$AuCl_2$

Nervový systém

- 75. Cortex cerebri
- 76. Cortex cerebri /impregnace/
- 77. Cerebellum /impregnace/
- 78. Cerebellum /Nisslova substance/
- 79. Medulla spinalis
- 80. Plexus choroideus
- 81. Ganglion spinale
- 82. Ganglion spinale /impregnace/
- 83. Ganglion vegetativní
- 84. Periferní nerv – příčně
- 85. Periferní nerv – příčně /myelin/
- 86. Periferní nerv – podél
- 87. Periferní nerv – podél /myelin/



Děkuji Vám za pozornost.

Jana Dumková

otázky a komentáře na:
jdumkova&med.muni.cz