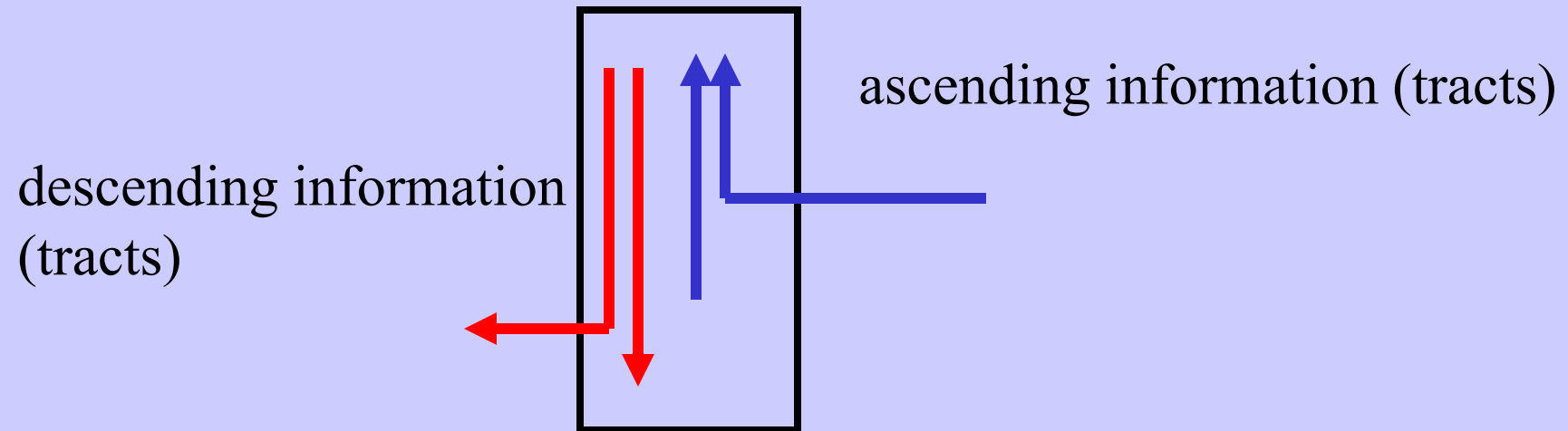
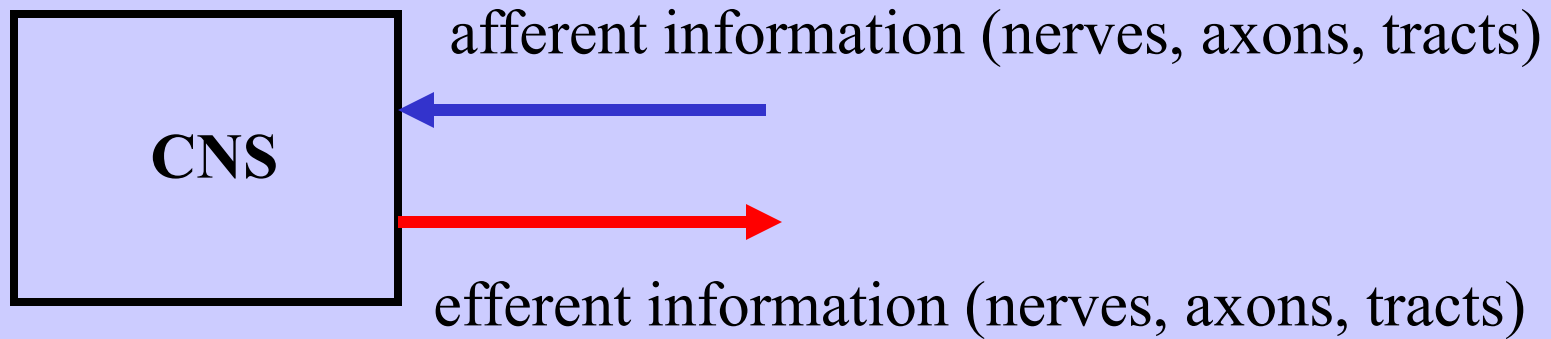


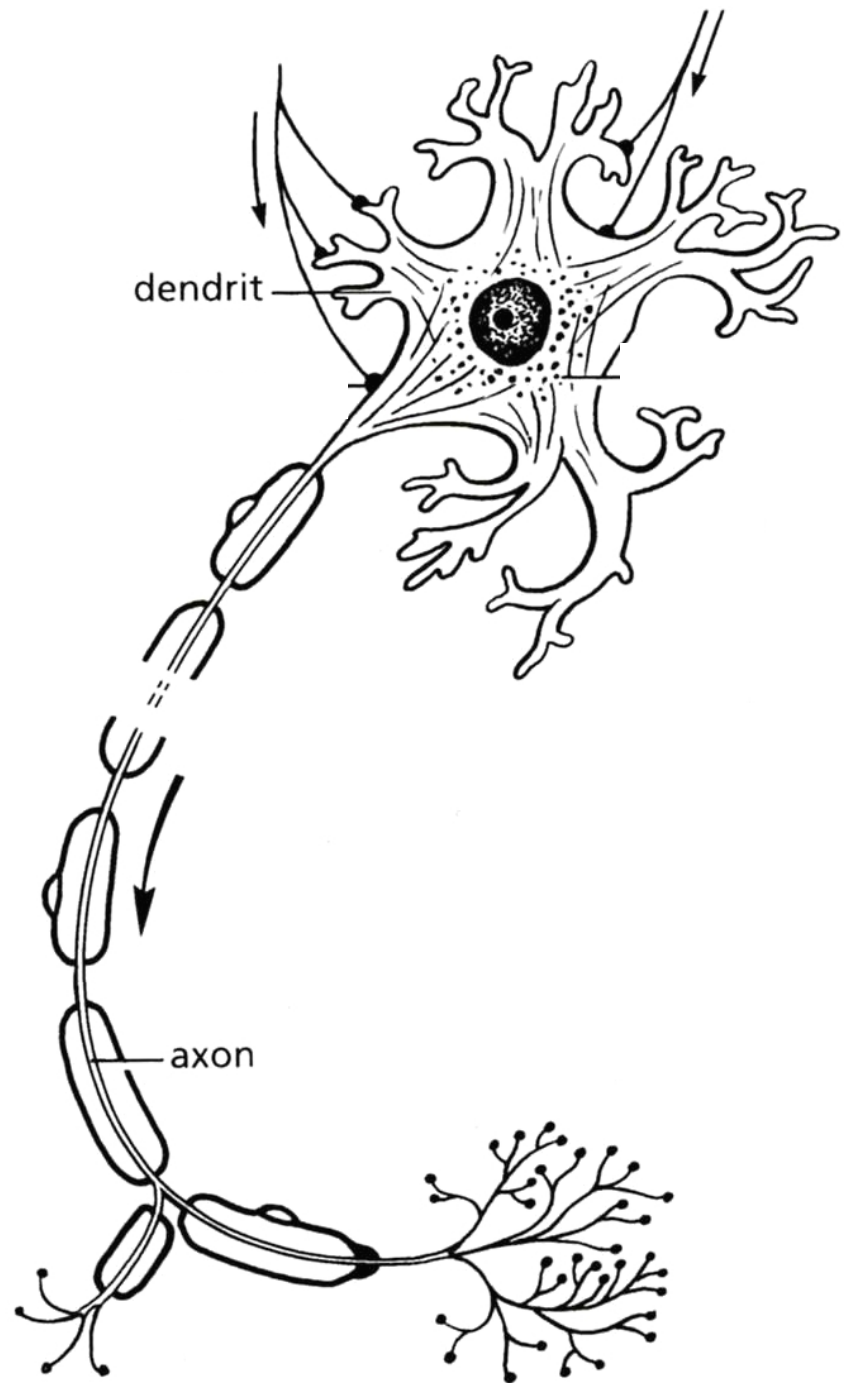
BASIC ANATOMY OF THE NERVOUS SYSTEM



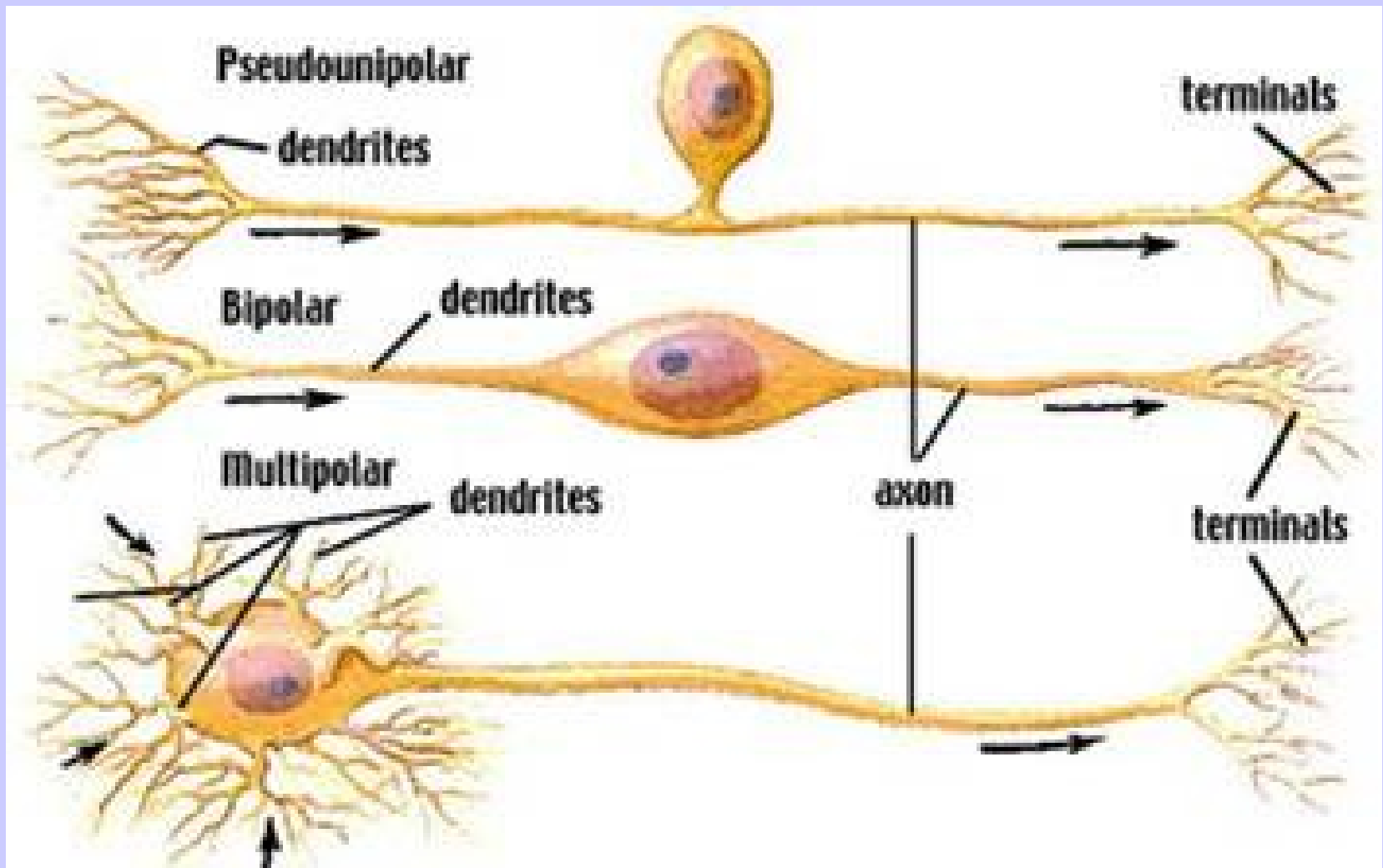
Basic conception



NERVE CELL = NEURON



TYPES OF NEURONS



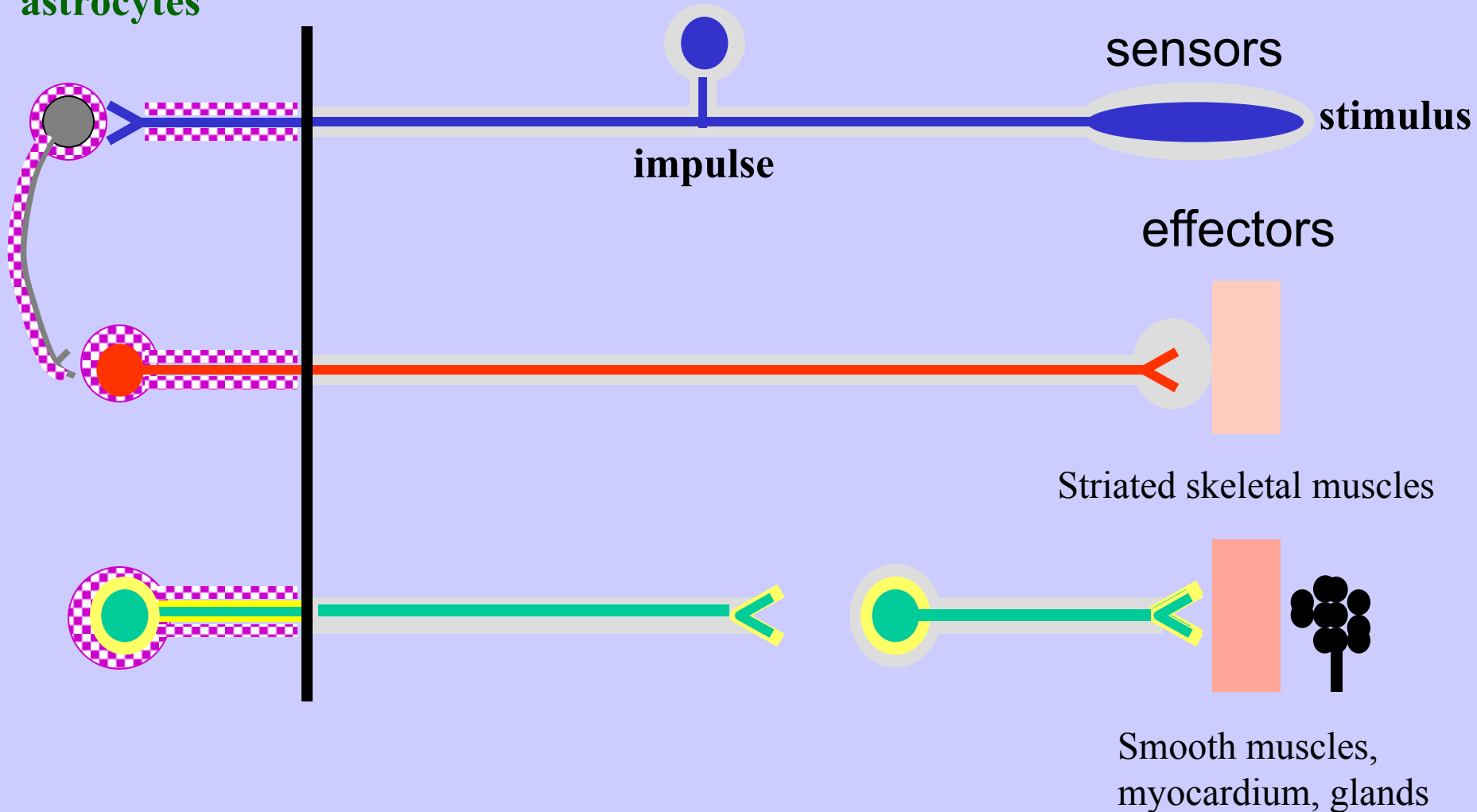
DIVISION OF THE NERVOUS SYSTEM

CNS

PNS

oligodendrocytes
astrocytes

Schwann cells and their derivatives



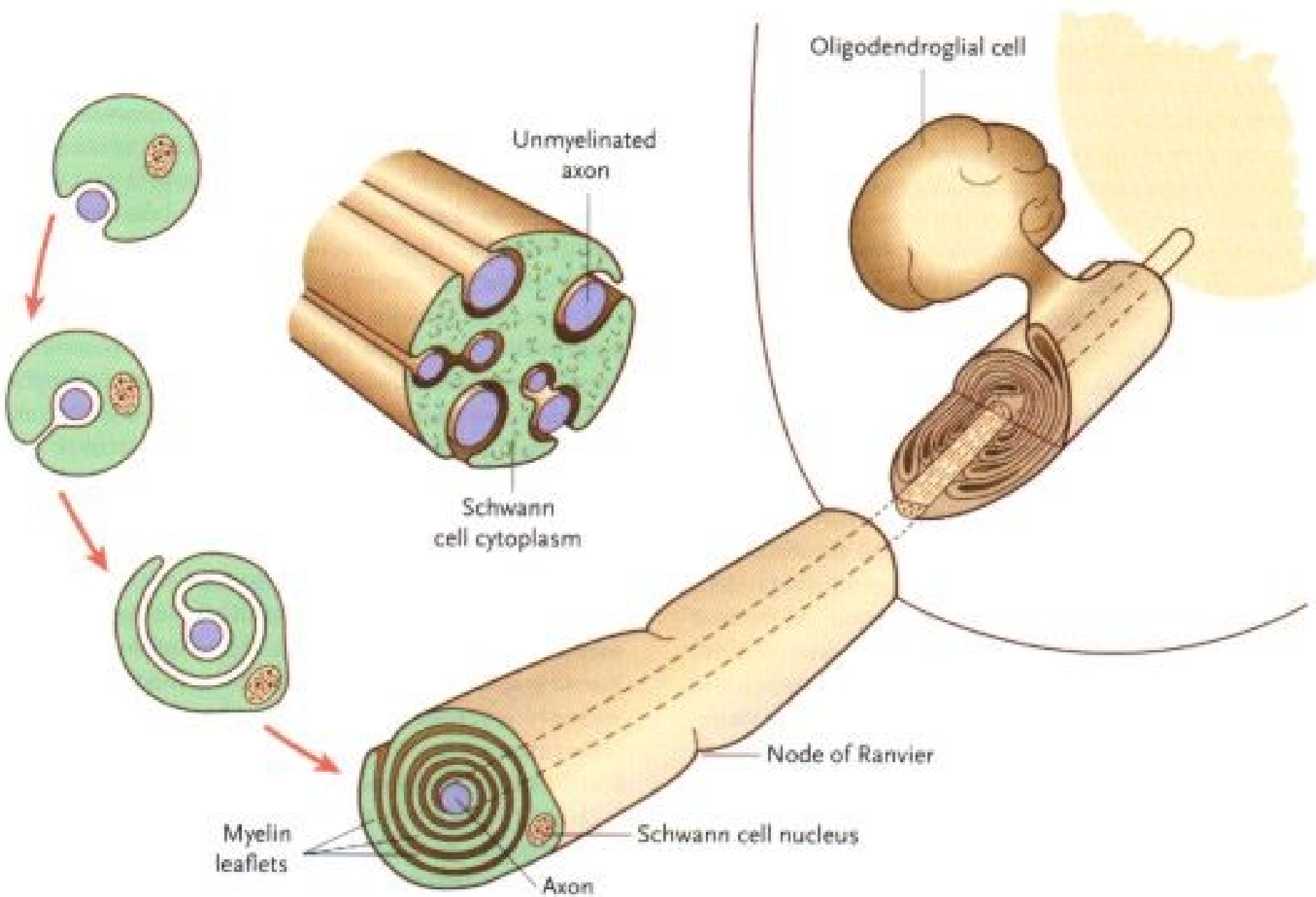
DIVISION OF THE PNS

Cranial nerves I.- XII.

- run through the skull base

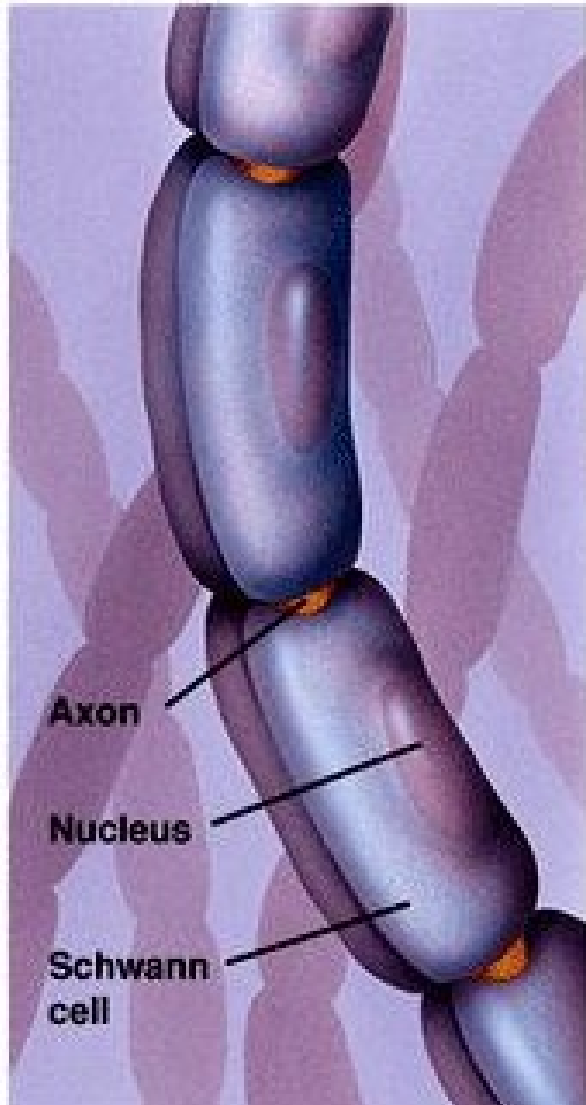
Spinal nerves – 31 pairs

- run through foramina intervertebralia

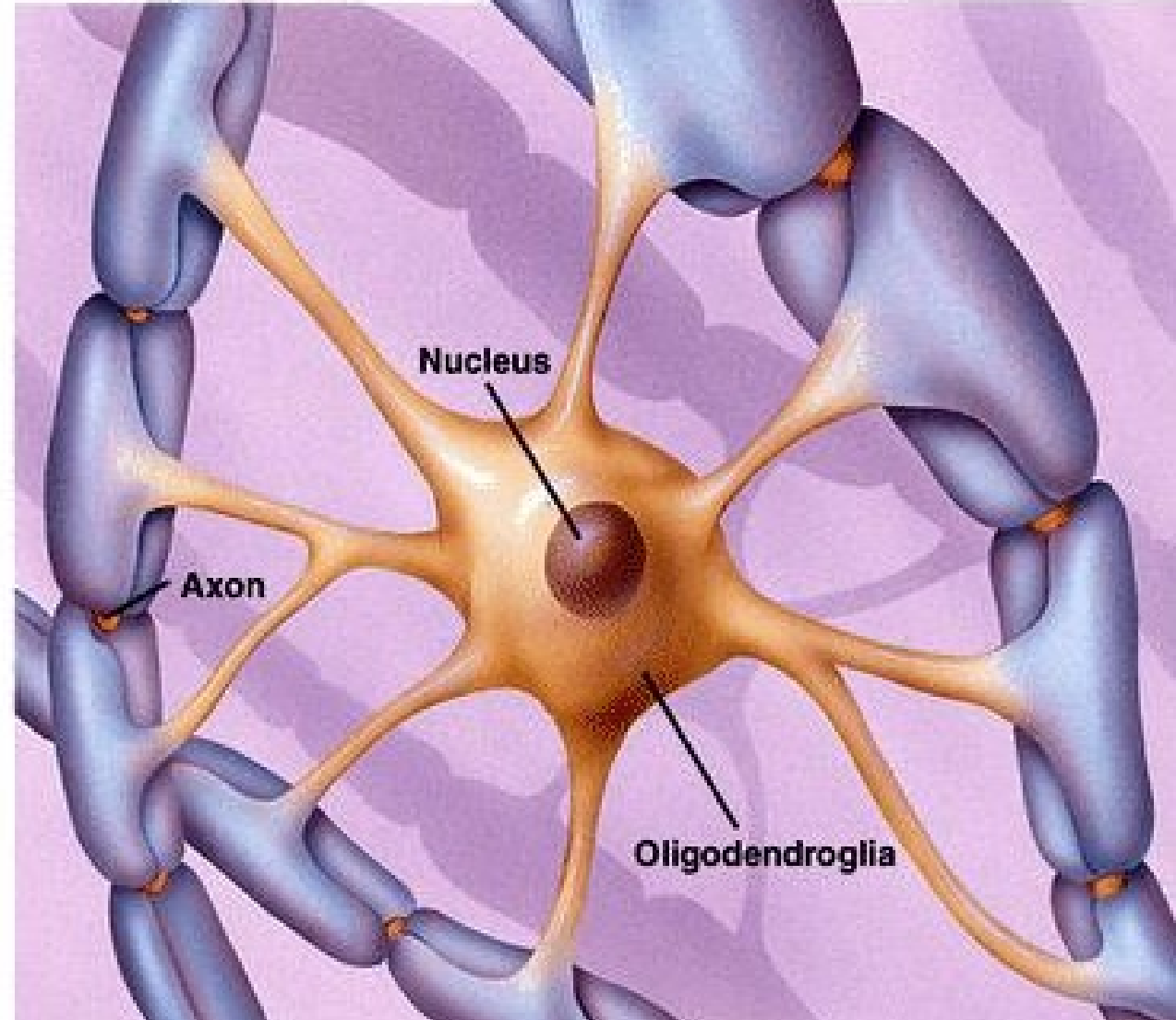


Glial cells of the CNS: astrocytes, oligodendrocytes, microglial, ependymal cells
Glial cells of the PNS: myelinating and non-myelinating Schwann cells, satellite glial cells, terminal glial cells

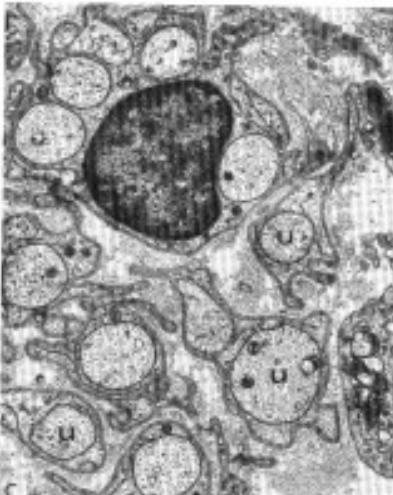
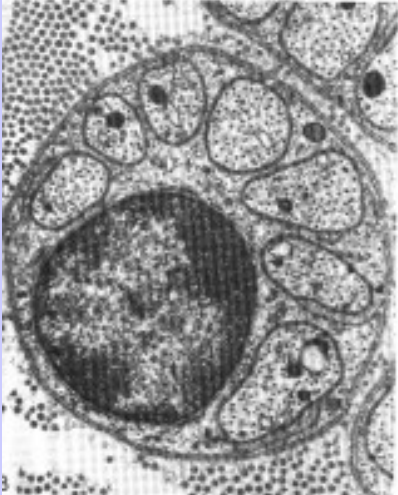
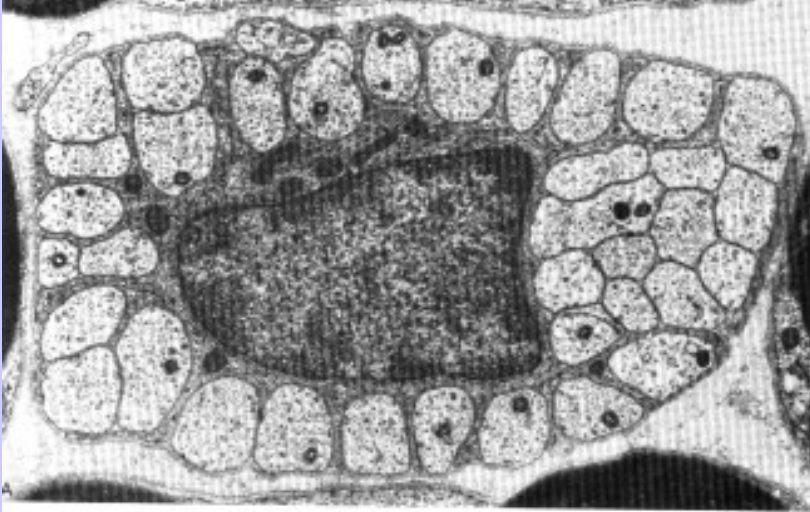
Myelination in the Peripheral Nervous System



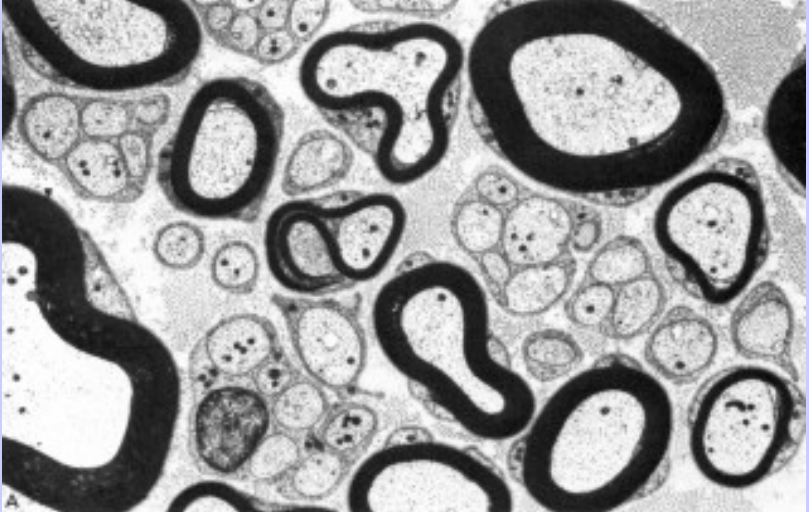
Myelination in the Central Nervous System



unmyelinated axons (< 1μm)





myelinated axons



FUNCTIONAL TYPES OF AXONS IN PNS



Afferent

somatosensory  touch, proprioception, pain

viscerosensory  mechanoception, pain



sensory  relay impulses for taste, hearing and balance

Efferent

somatomotor   **striated muscles**

branchiomotor   **striated muscles**

visceromotor   **smooth muscles**

sympathetic   **myocardium**

parasympathetic   **glands**

DIVISION OF THE CNS

Brain (Encephalon)

Spinal cord (Medulla spinalis)

Brainstem (Truncus encephali)

Medulla oblongata

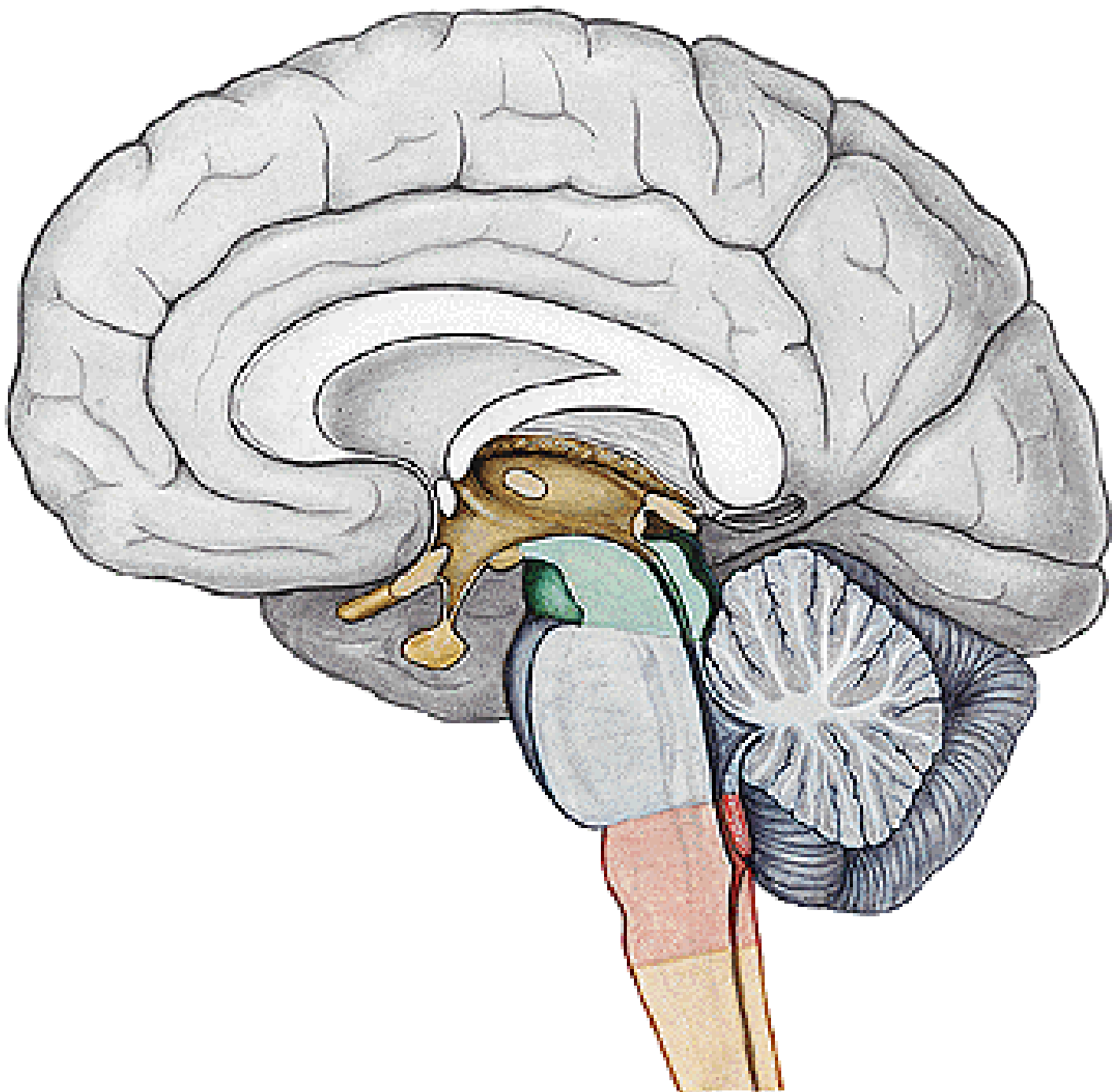
Pons

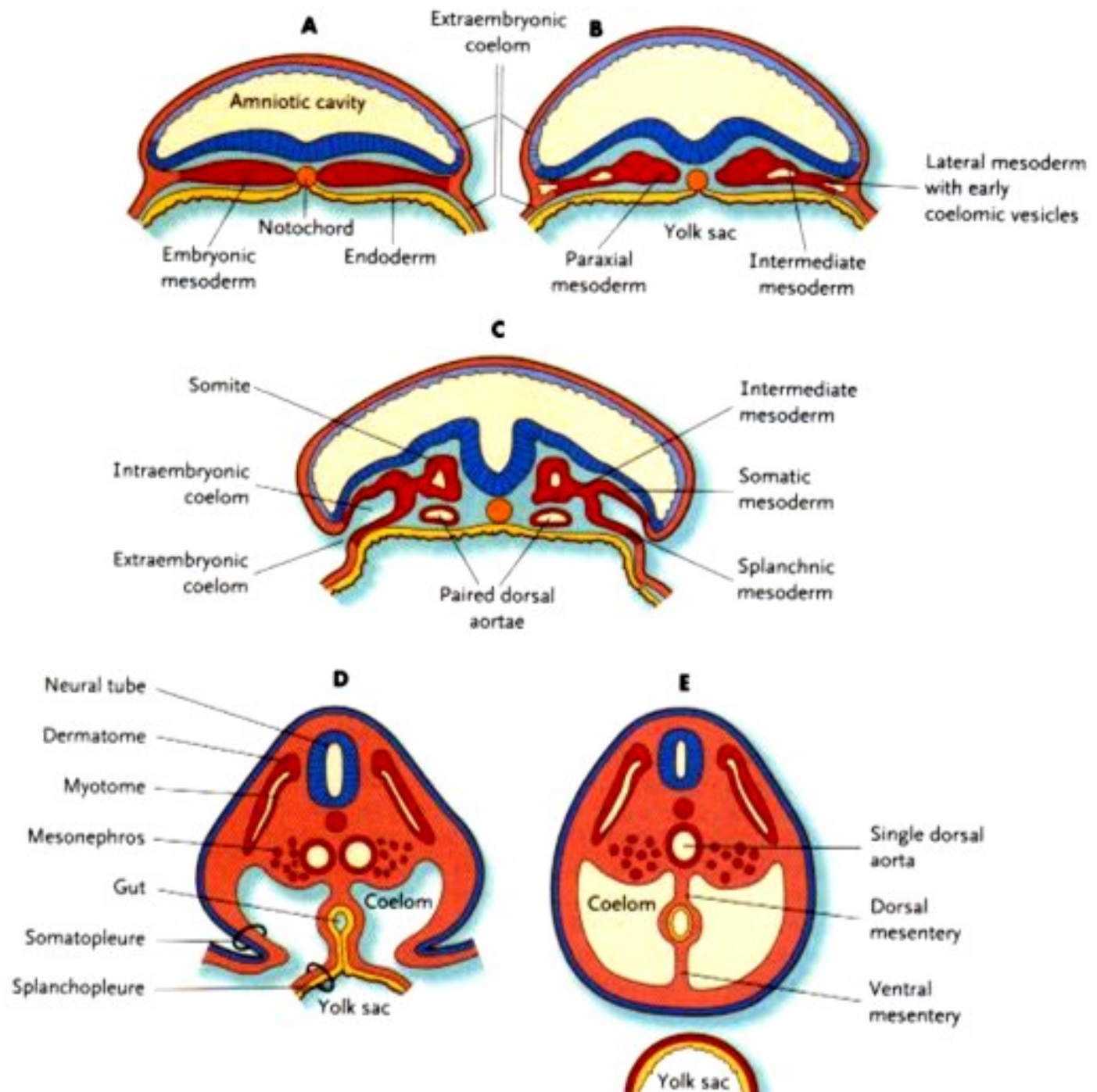
Mesencephalon

Cerebellum

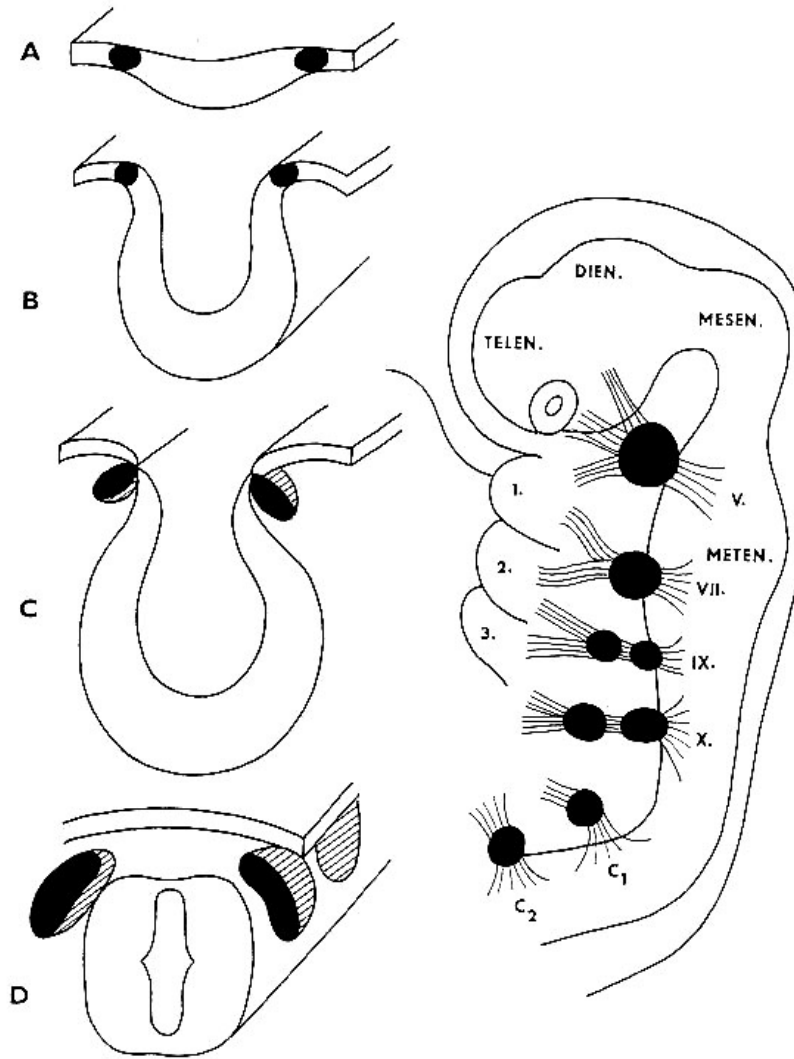
Diencephalon

Telencephalon





Neural crest

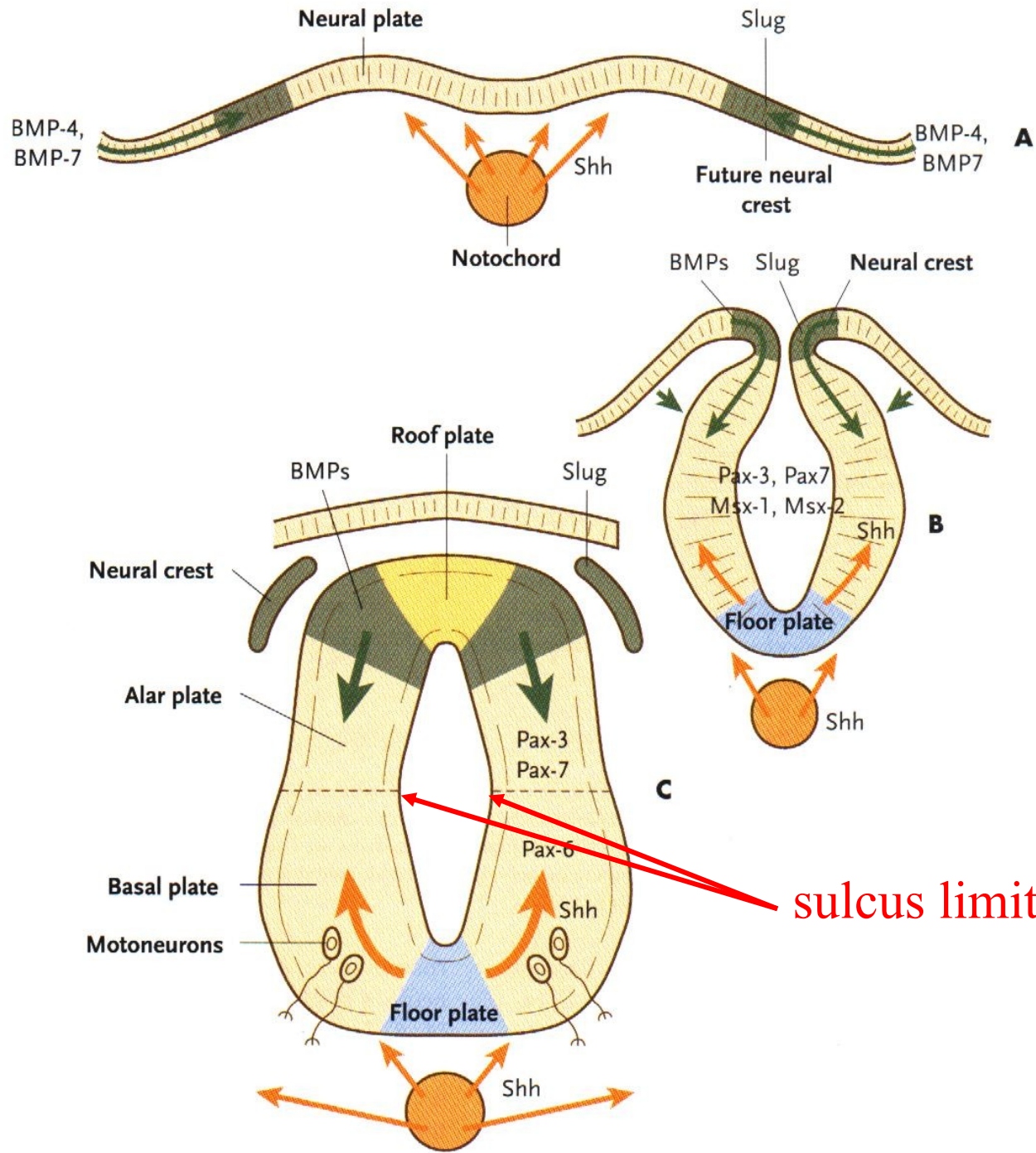


r. 1.: Schema vývoje nervové trubice a gangliové lišty v příčných řezech (vlevo) a poloha spinálních ganglií (C₁, C₂) a ganglií hlavových nervů (římské číslice (vpravo)

A - vznik medulární ploténky, B - prohloubení v medulární rýhu, C - odštěpování gangliové lišty, D - vznik nervové trubice.

DIEN. - mezimozek, MESEN. - střední mozek, METEN. - zadní mozek, TELEN. - koncový mozek, 1.-3. - žaberní oblouky.

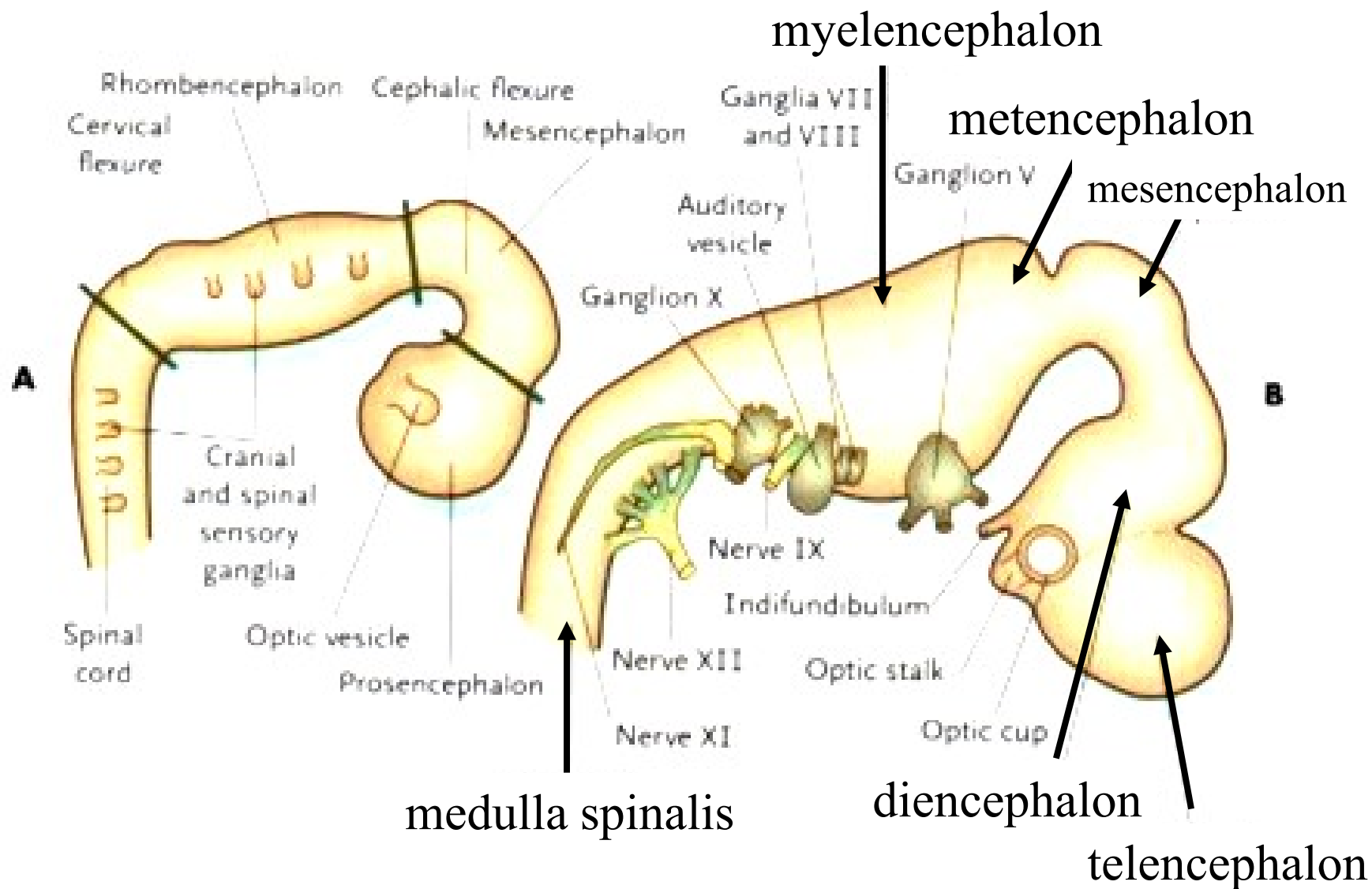
Buněčný materiál gangliové lišty i jednotlivá ganglia jsou zakresleny černě.

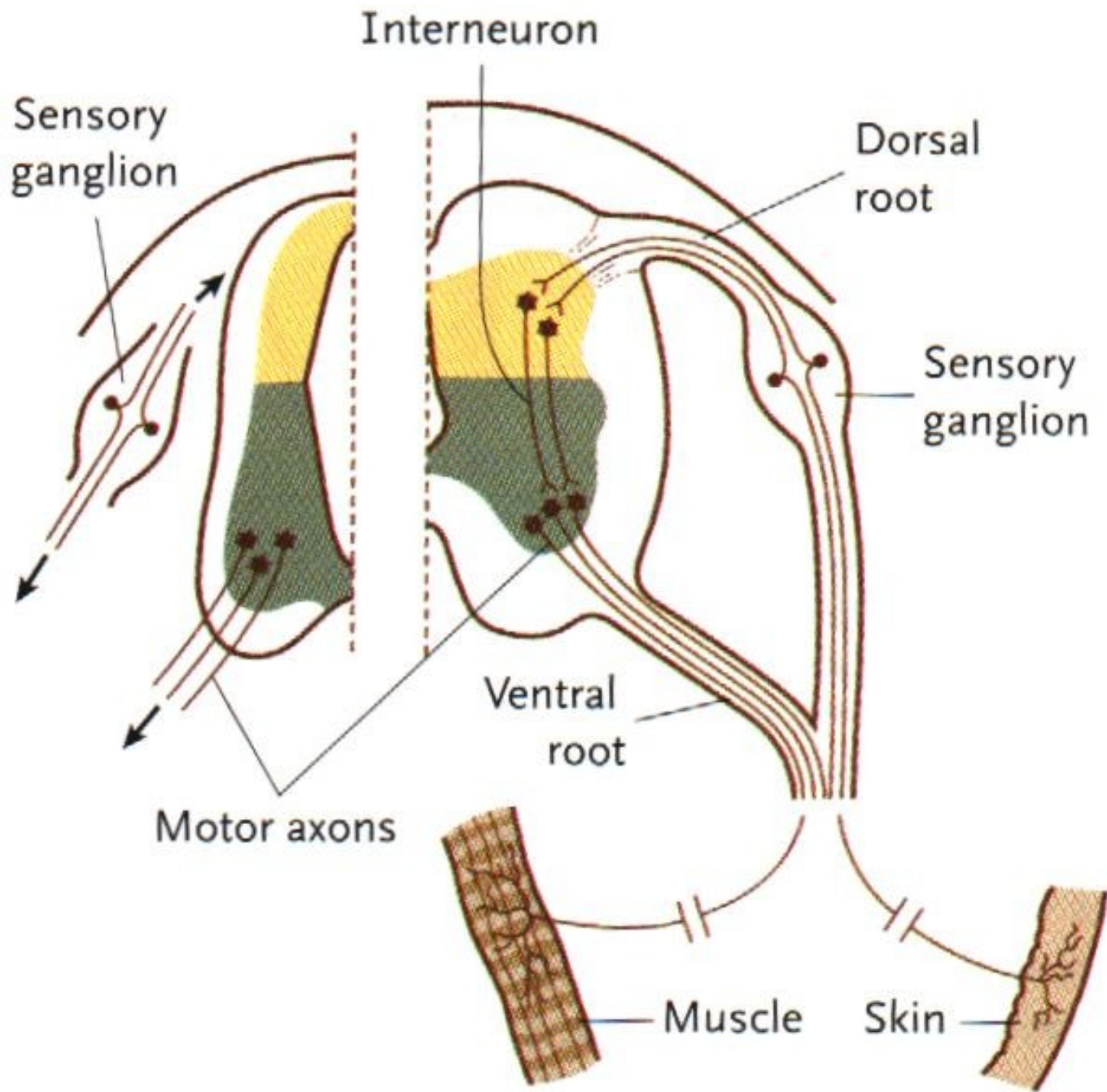


sulcus limitans

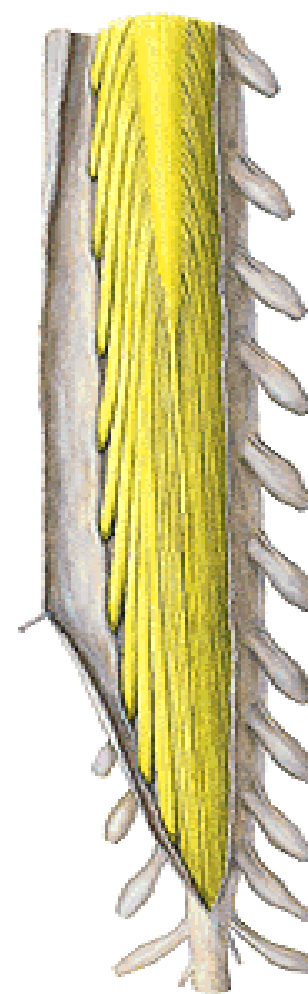
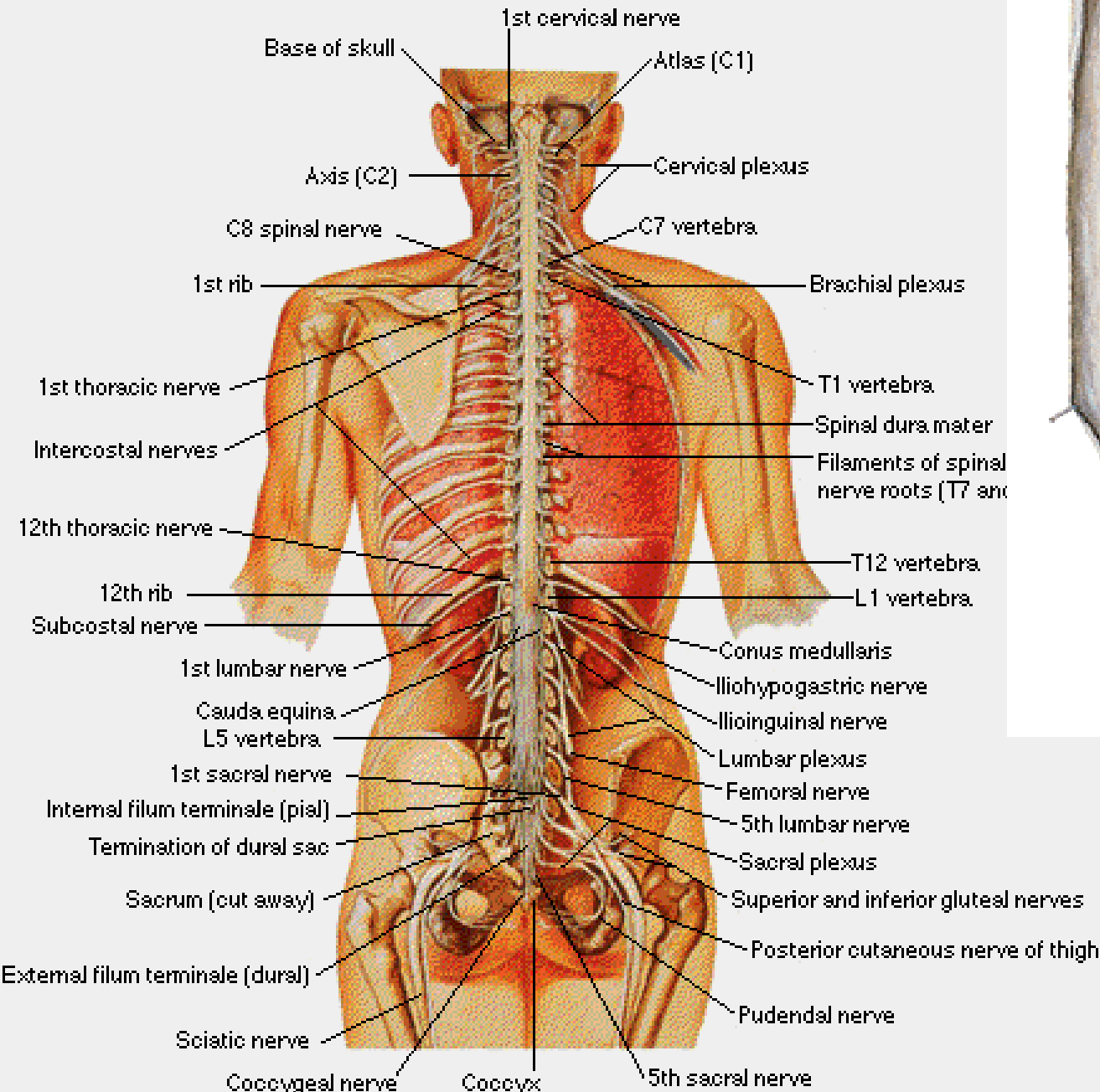
Primary subdivisions: prosencephalon, mesencephalon, rhombencephalon

Secondary subdivision: telencephalon, diencephalon, metencephalon, myelencephalon





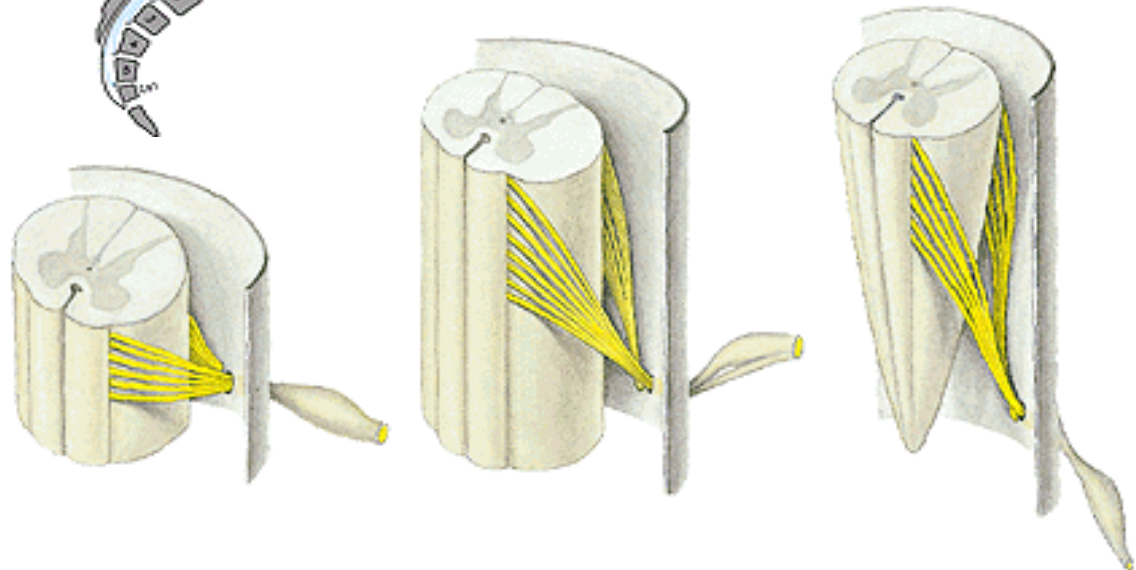
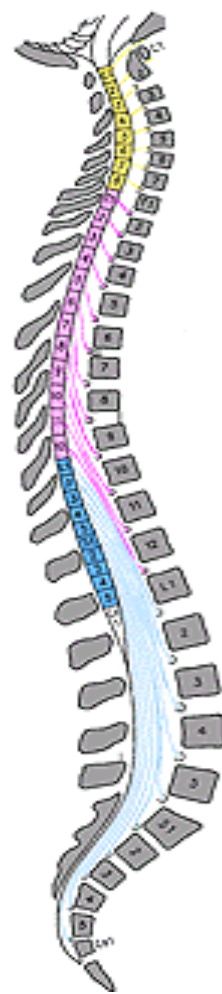
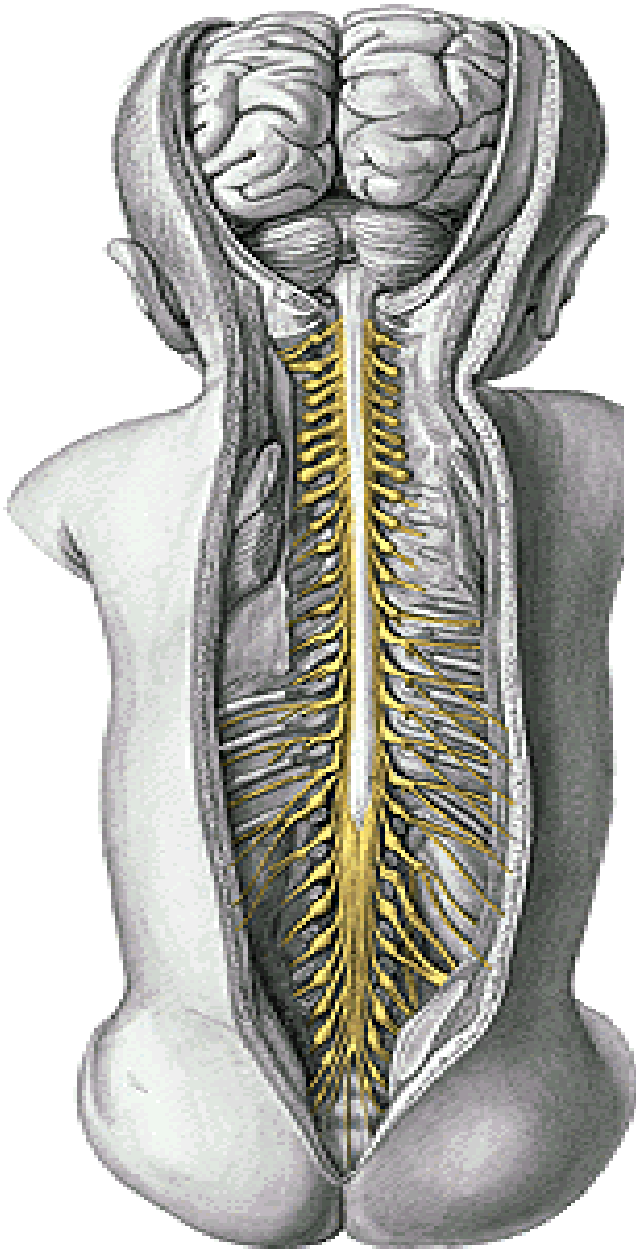
Spinal Cord in Situ

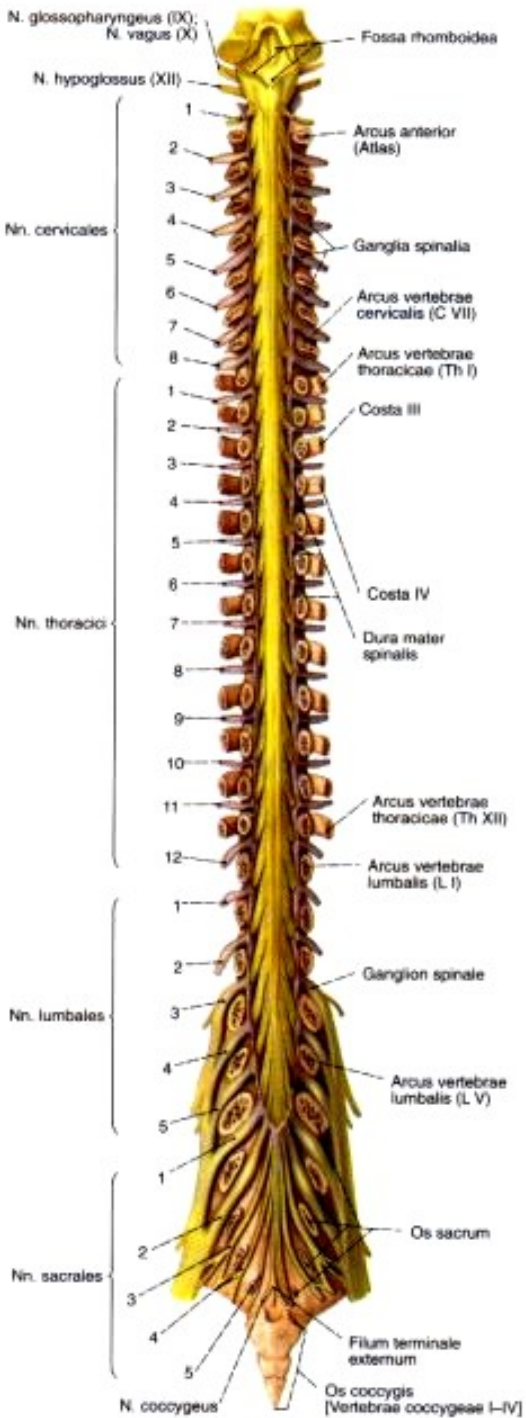


Conus medullaris
Filum terminale
Cauda equina

Spinal segment

Fila radicularia



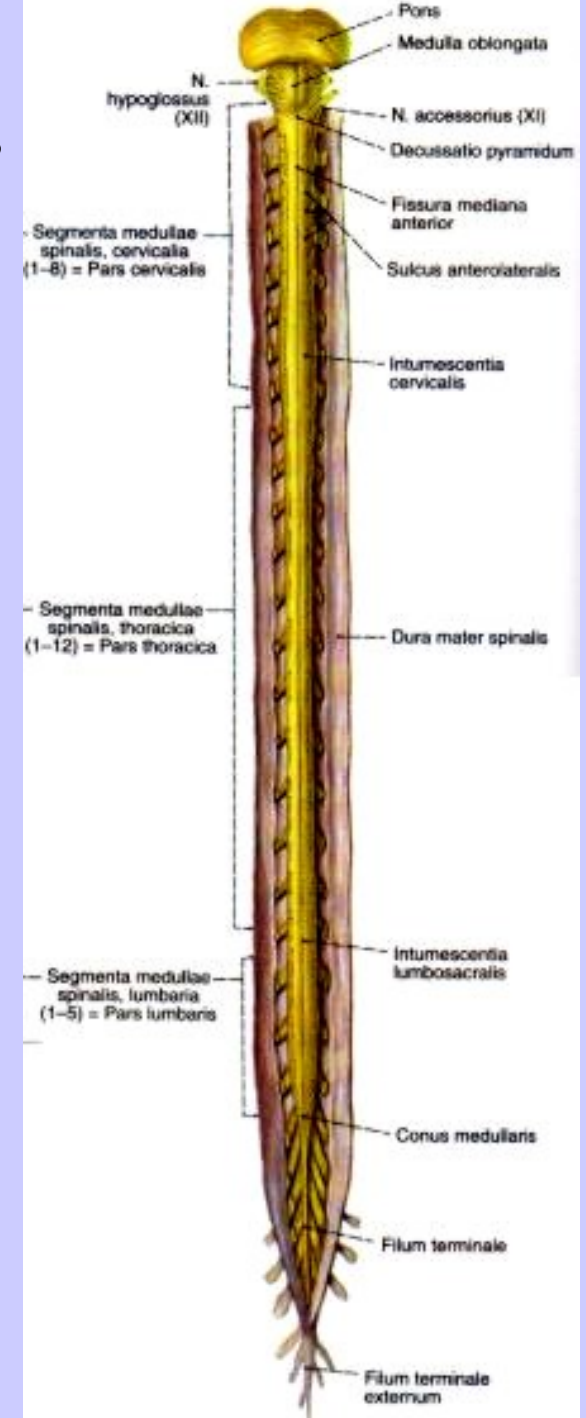


Intumescentia cervicalis

C3 – T2

Intumescentia lumbalis

T9 – T12





Segment C5



Segment C8



Segment Th2



Segment L4



Segment S4



Segment C1



Segment C5



Segment C8



Segment Th2



Segment Th10



Segment L1

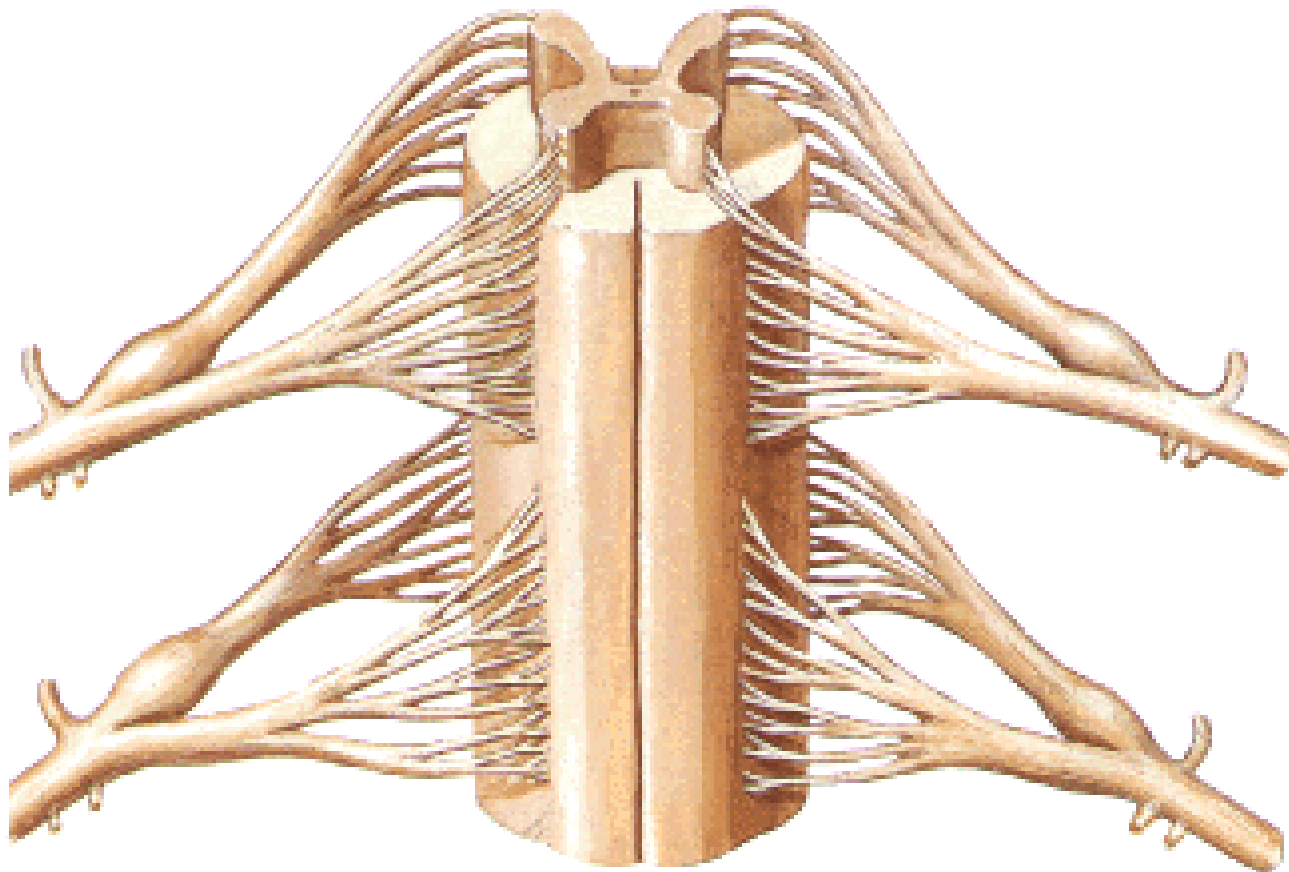


Segment L4



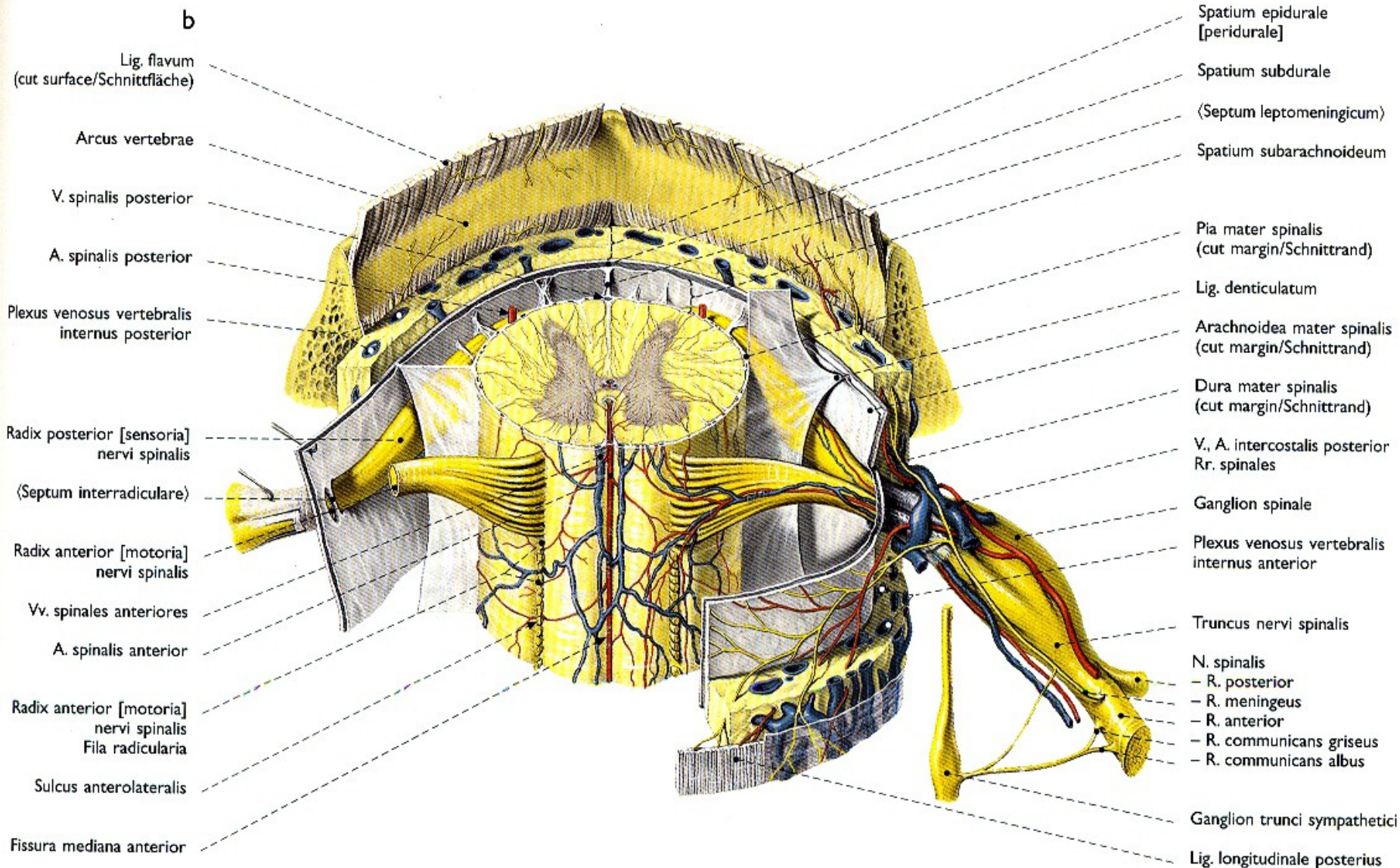
Segment S4

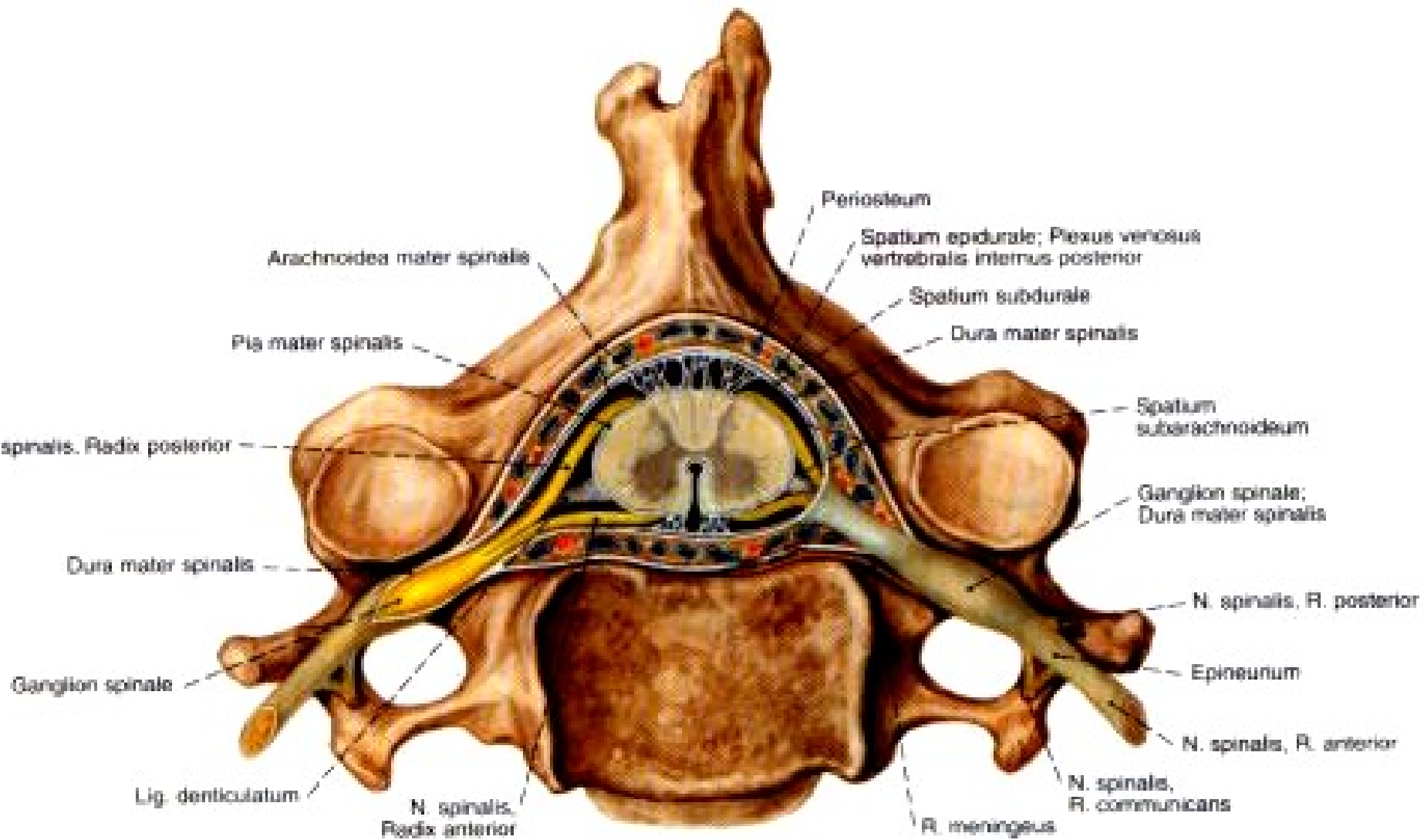
SUBSTANTIA GRISEA – cornu anterius (columna anterior), cornu posterius (columna posterior), cornu laterale (columna lateralis), substantia intermedia, canalis centralis



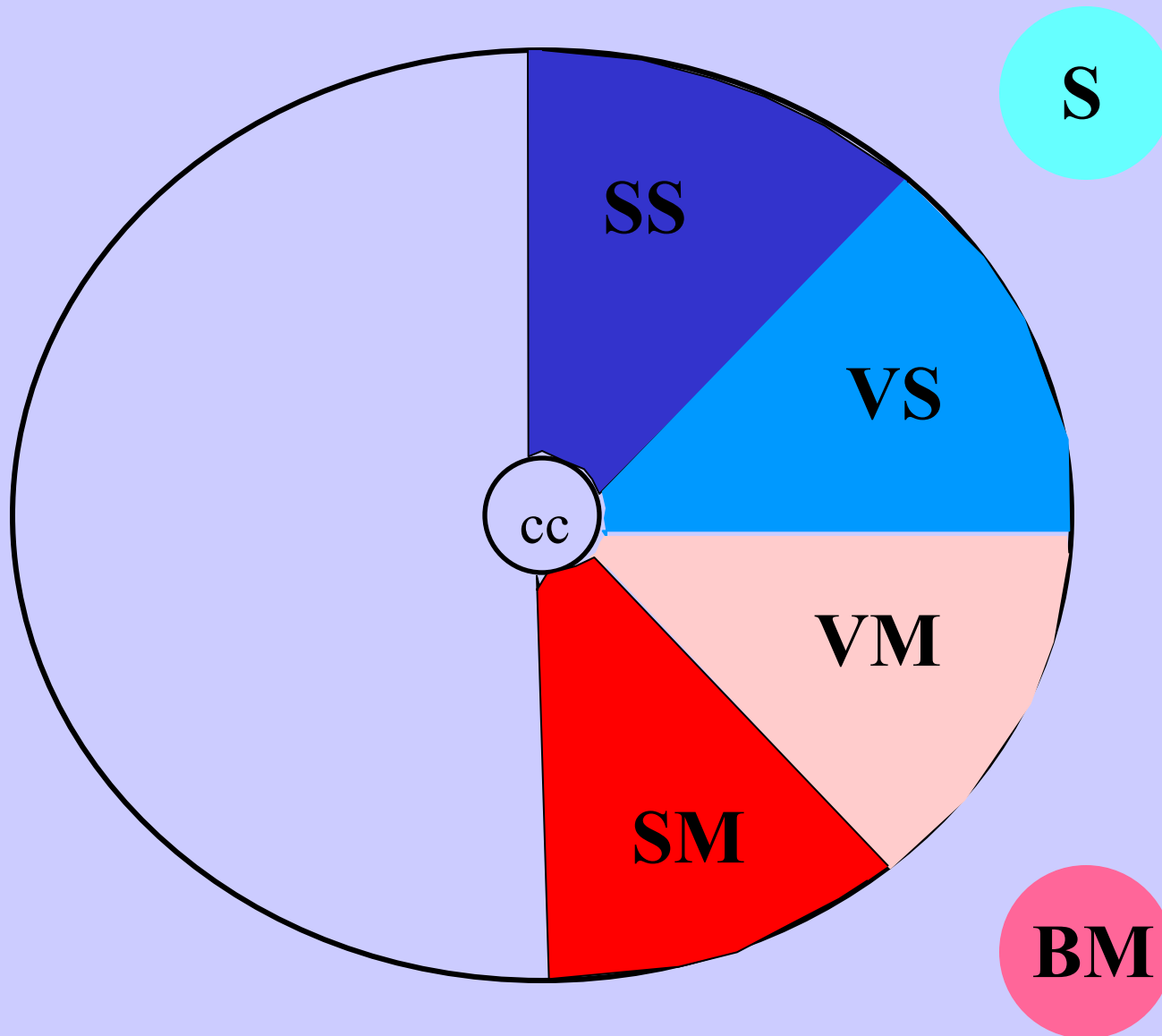
SUBSTANTIA ALBA – funiculus anterior, lateralis, posterior

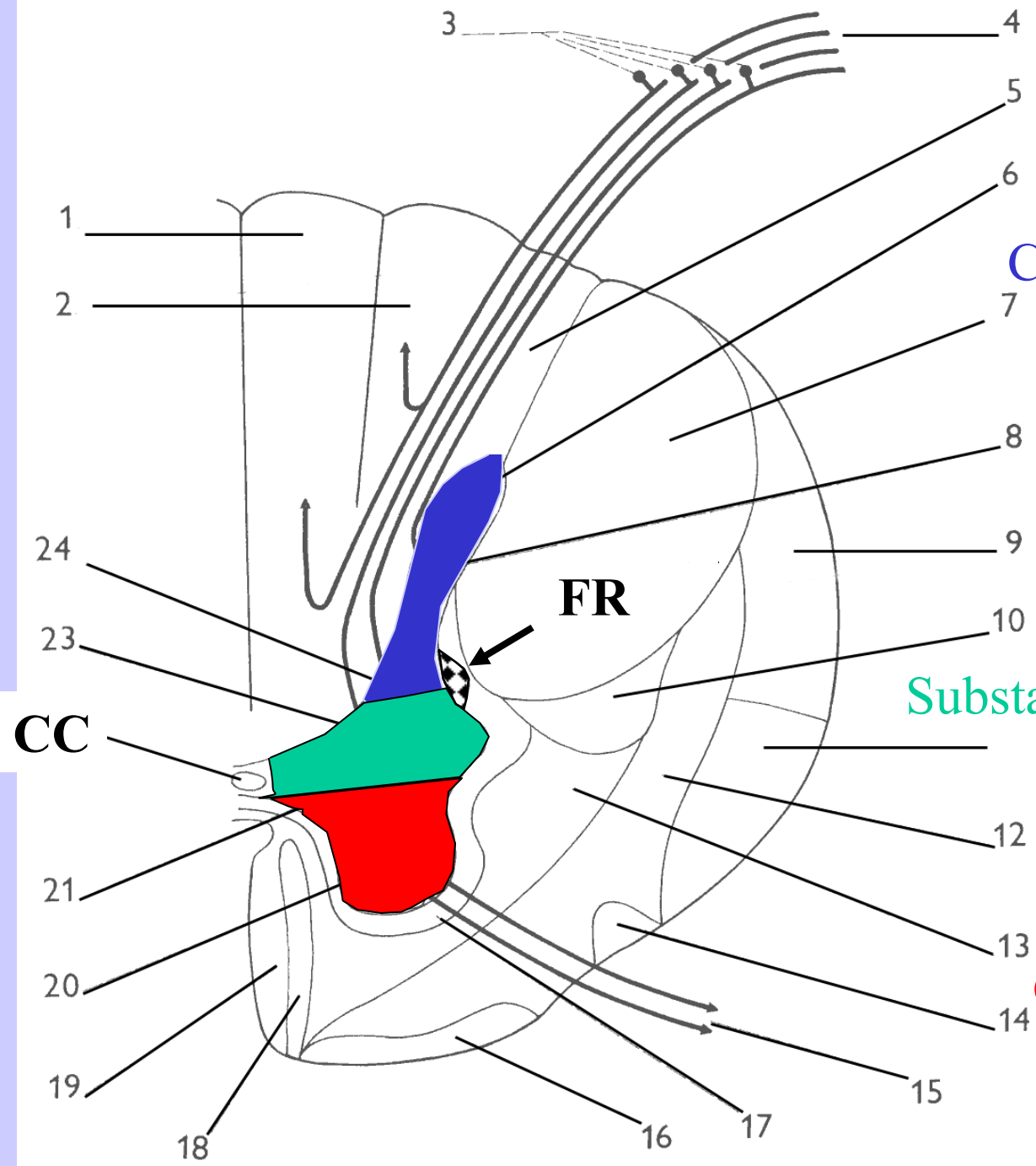
fissura mediana ant., sulcus medianus post., septum medianum posterius, sulcus anterolateralis, posterolateralis





FUNCTIONAL ZONES IN THE NEURAL TUBE





Cornu posterius

Substantia intermedia

Cornu anterius

Pseudounipol. neurons of the DRG

Radix dorsalis

Tr. spinobulbaris

Fasc. gracilis

Fasc. cuneatus

Tr. dorsolateralis Lissaueri

Ncl. posteromarginalis +
Subst. gelatinosa Rolandi

Ncl. thoracicus
(Stilling-Clark.)

Ncl. intermediomedialis

Ncl. proprius

Tr. spinocerebellaris post.

Tr. spinocerebellaris ant.

Tr. spino-thalamicus,
-reticularis, -tectalis

Tr. spino-olivaris
Tr. olivo-spinalis

22

21

20

19

18

7

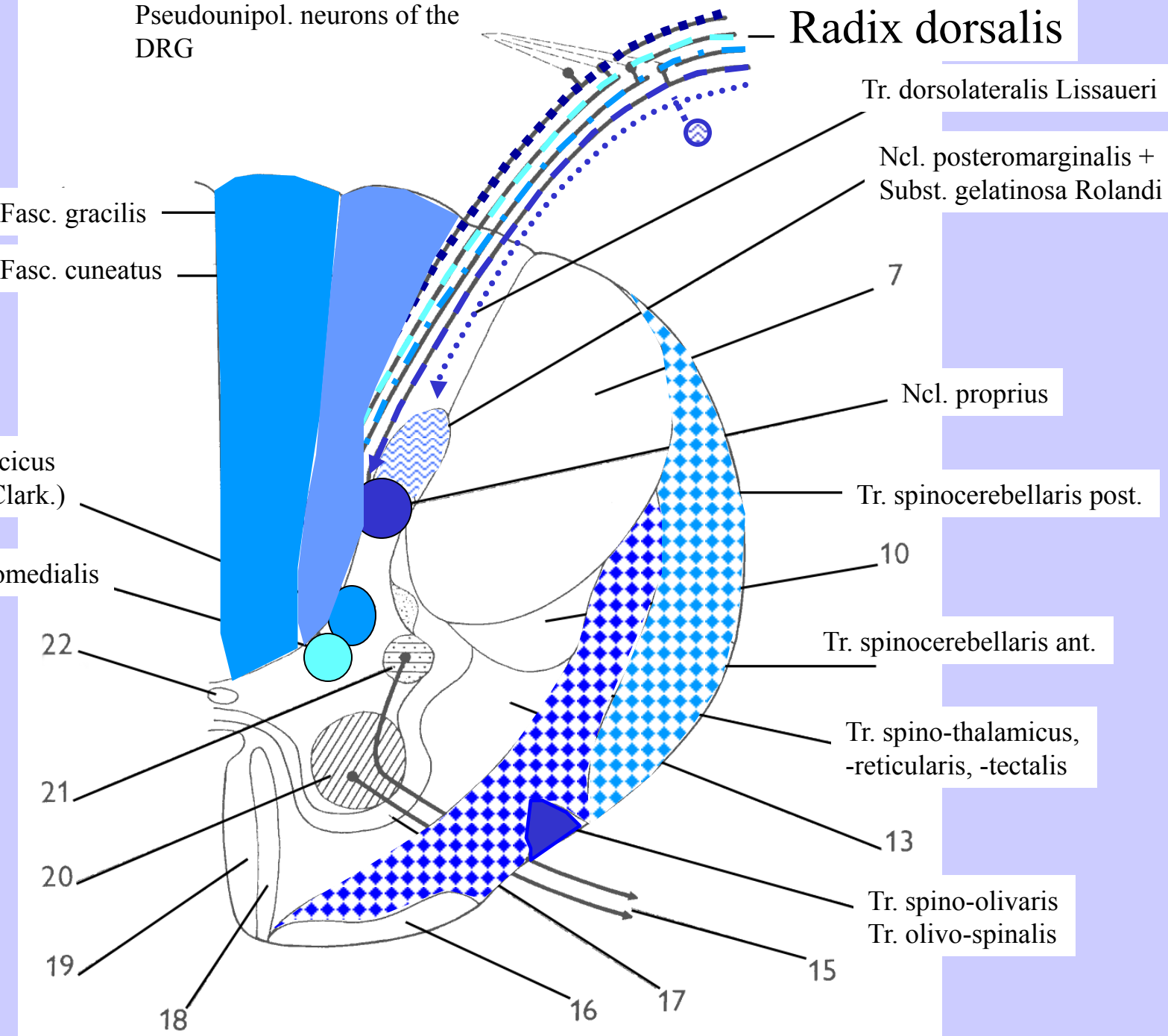
10

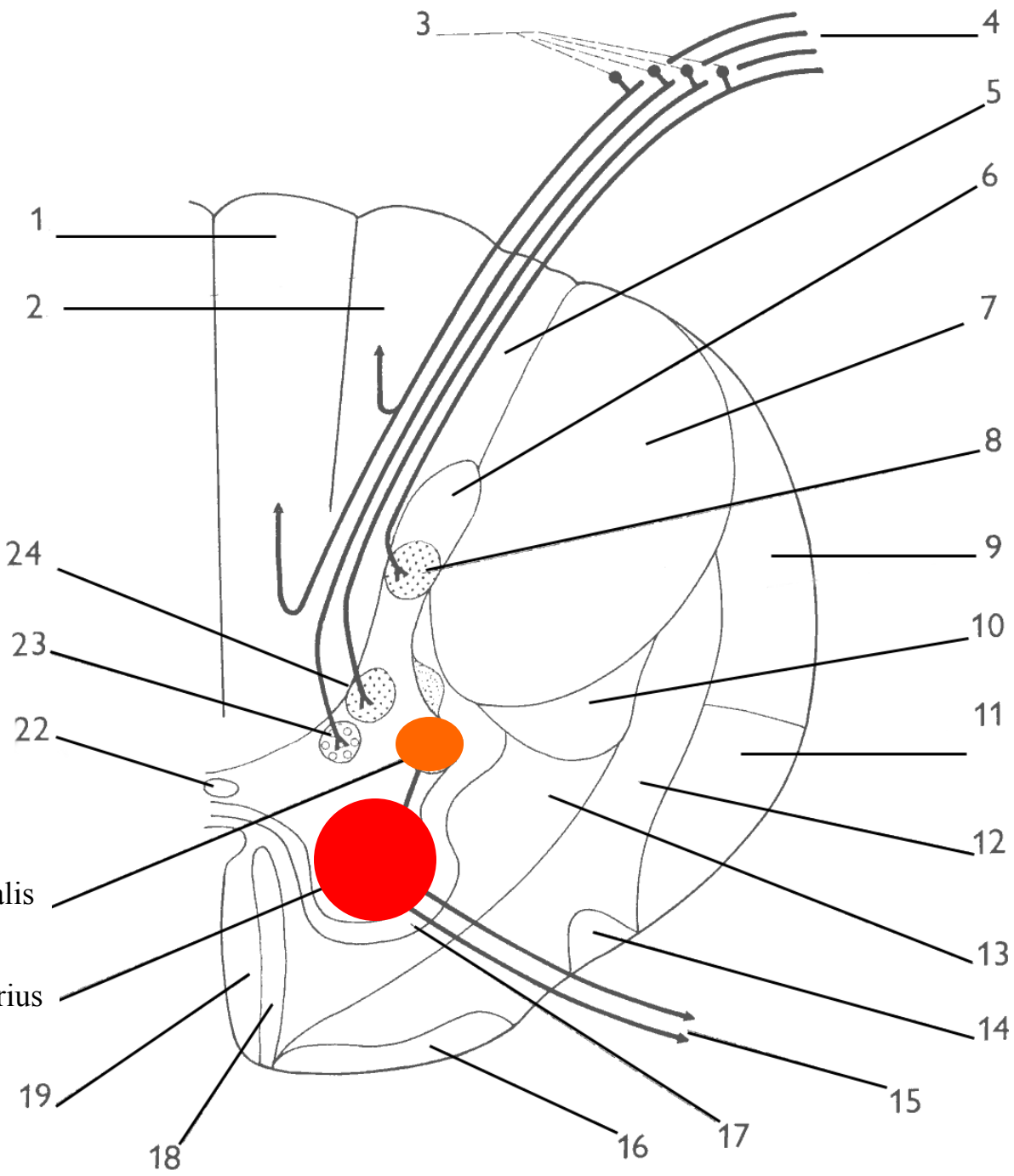
13

15

16

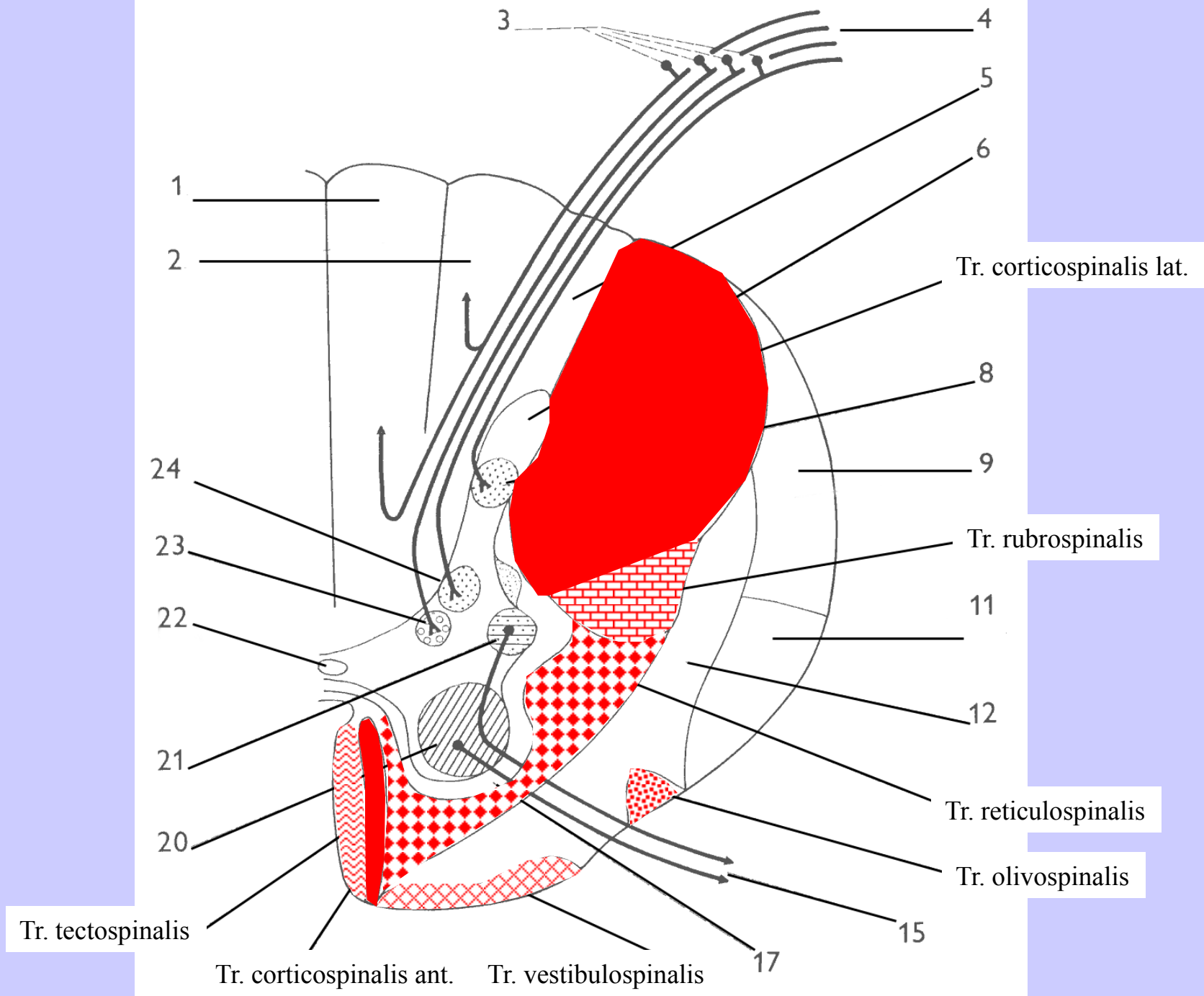
17





Ncl. intermediolateralis

Ncl. motorius



laminae (Rexed 1952)	nuclei
I	ncl. apicalis (ncl. posteromarginalis)
II + III	substantia gelatinosa Rolandi
IV + V	ncl. proprius
VI	ncl. thoracicus (Stilling - Clark) C8-L3
VII	group of interneurons in the anterior horn
VIII	medial group of motoneurons
IX	lateral group of motoneurons
X	zona centralis, gray matter around the central canal