

Nerve tissue

Neurons

Glial cells

CNS: oligodendrocytes, astrocytes,
ependymal cells, microglia

PNS: satellite cells, Schwann's cells

Synapse

Myelinization

Hemato-encephalic barrier

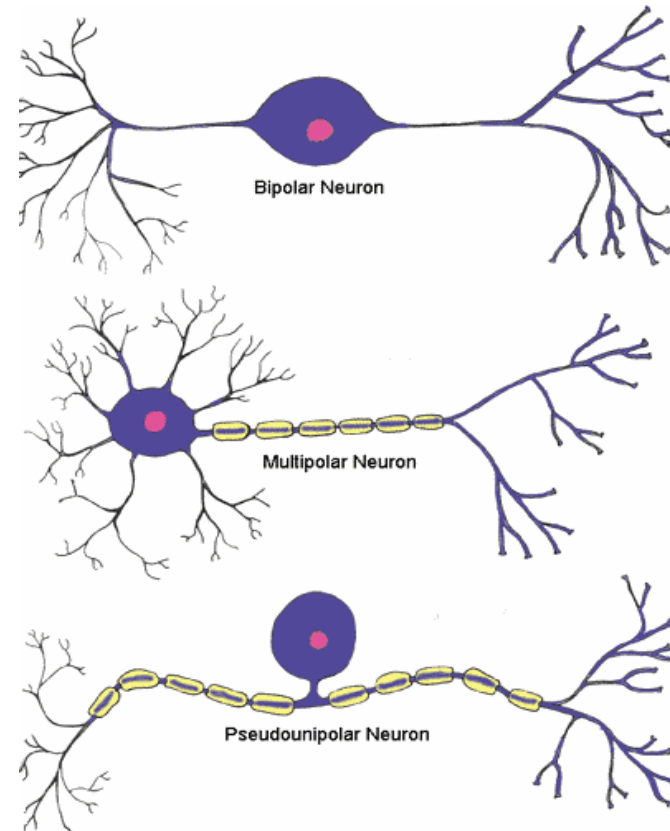
Neuron – Classification

According to the number of processes

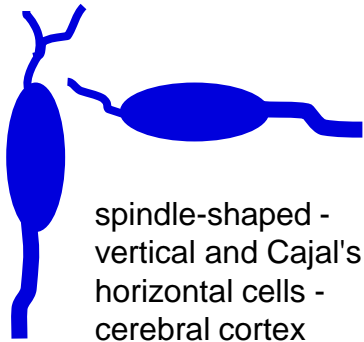
- unipolar
- pseudounipolar
- bipolar
- multipolar

According to the function

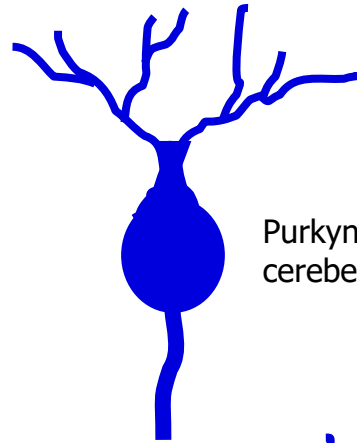
- sensitive (afferent, centripetal)
somatosensitive or viscerosensitive
- motor (efferent, centrifugal) - from
CNS to effectors (muscles, glands)
somatomotor or visceromotor
- interneurons (associative) - represent
about 97% of all neurons



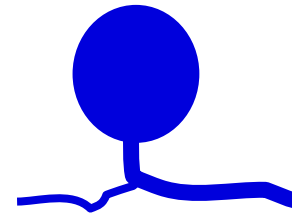
Shapes of the neuron bodies



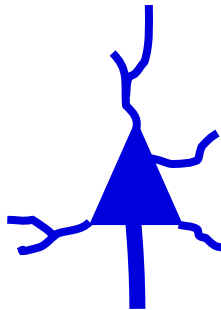
spindle-shaped -
vertical and Cajal's
horizontal cells -
cerebral cortex



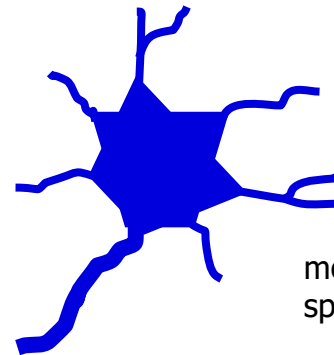
Purkinje cells
cerebellum



Neurons of
spinal ganglia

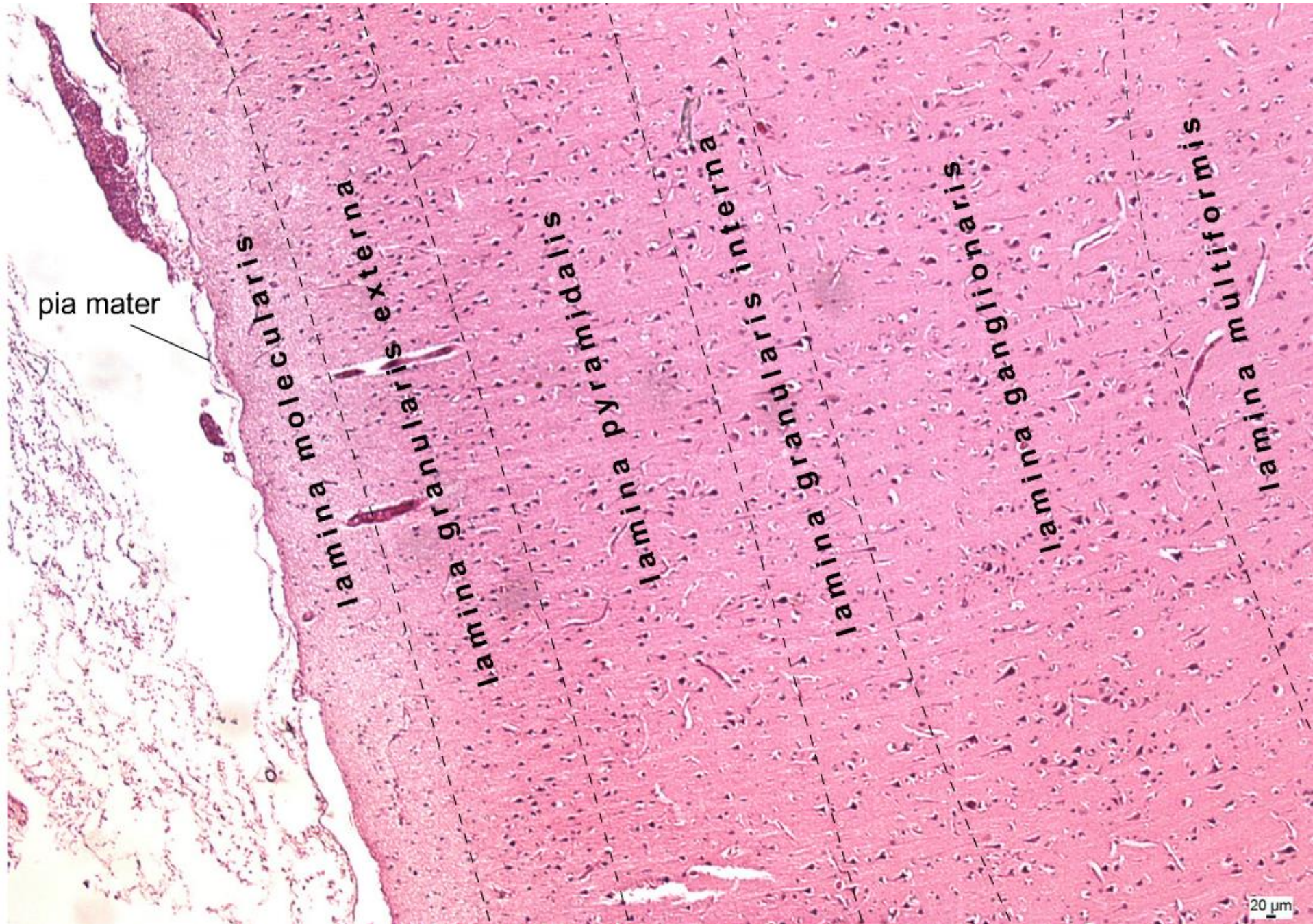


pyramidal cells
- cerebral cortex

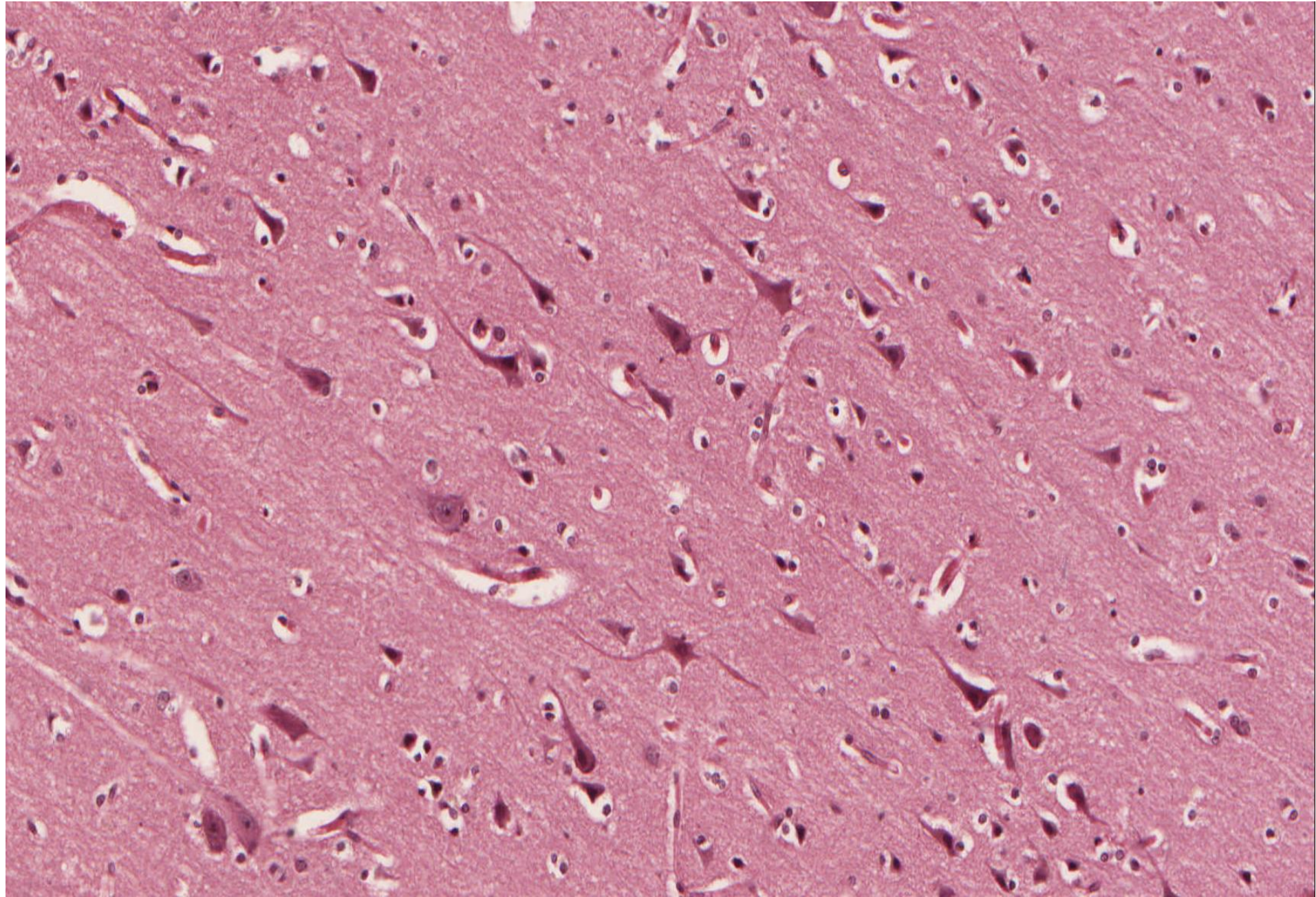


motor neurons of
spinal cord

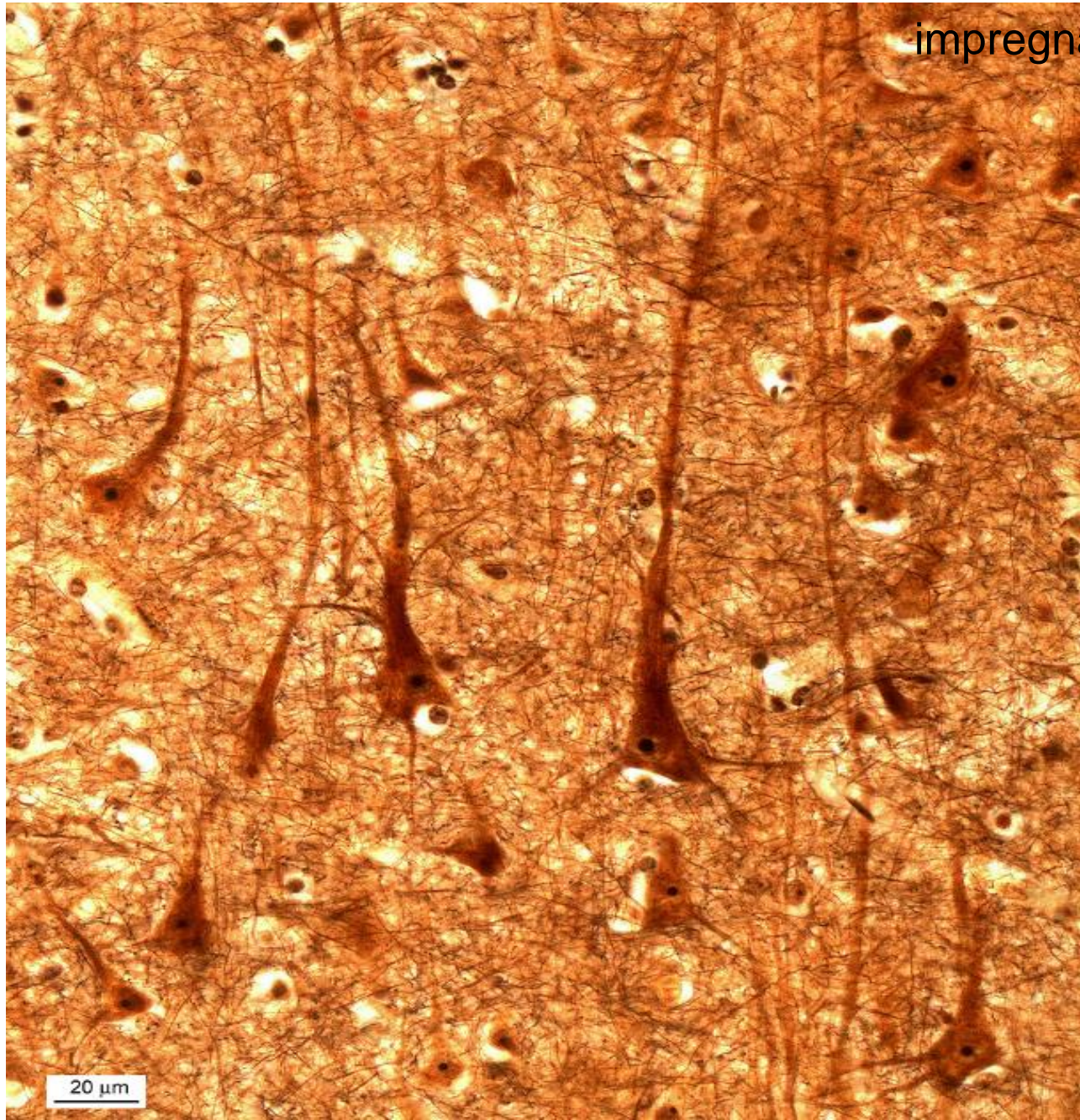
Cortex cerebri



Cortex cerebri – pyramidal cells – multipolar neurons



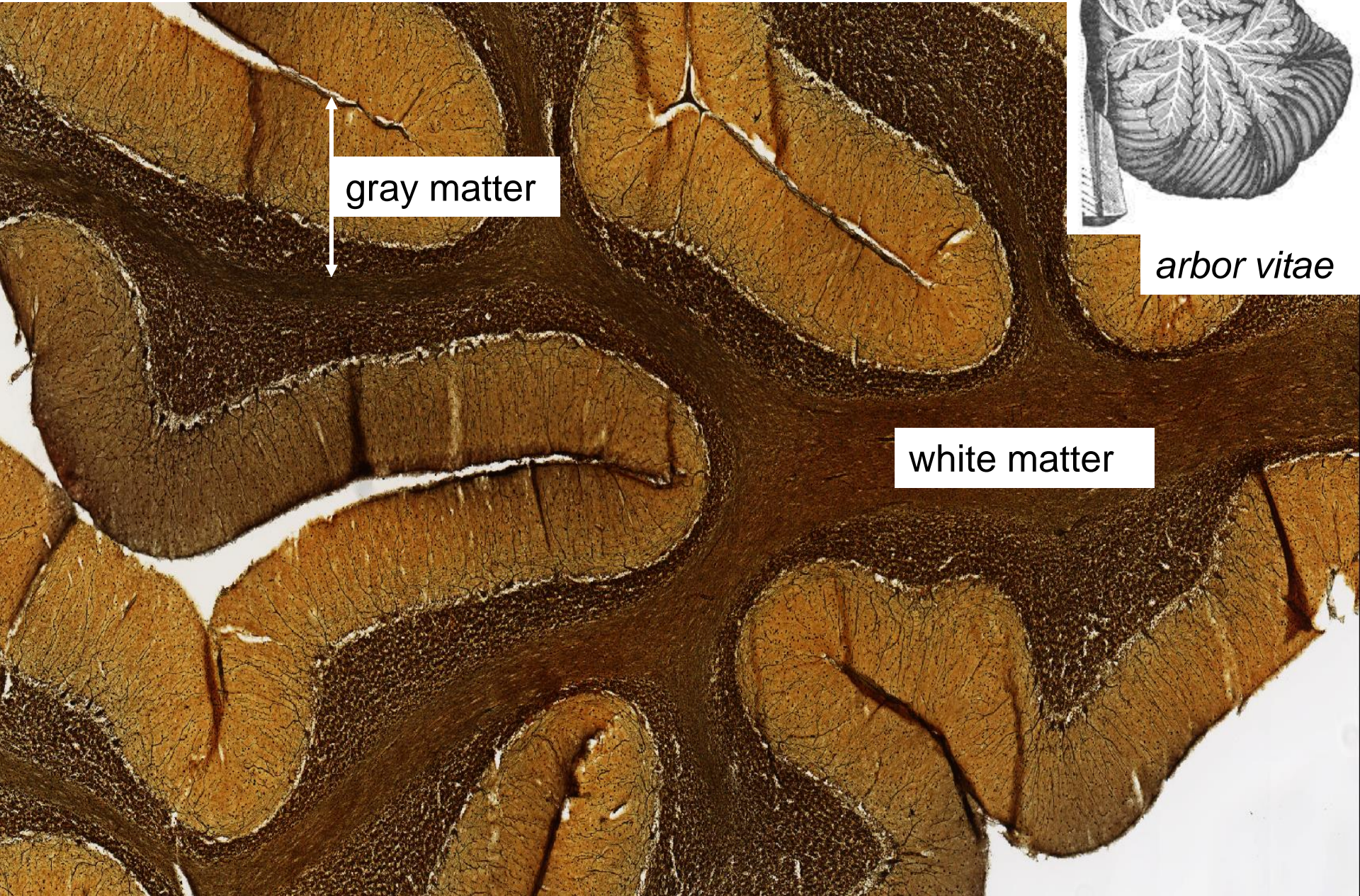
Cortex cerebri – pyramidal cells – multipolar neurons



impregnation

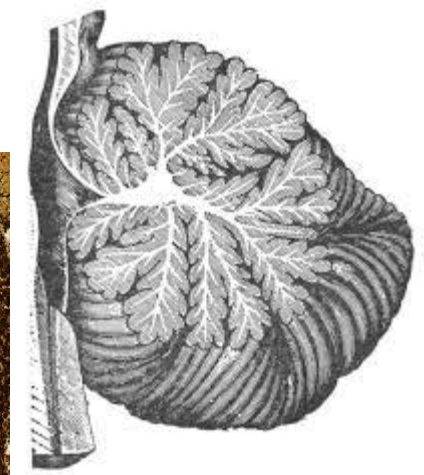
20 μ m

Cerebellum (impregnation)



gray matter

white matter



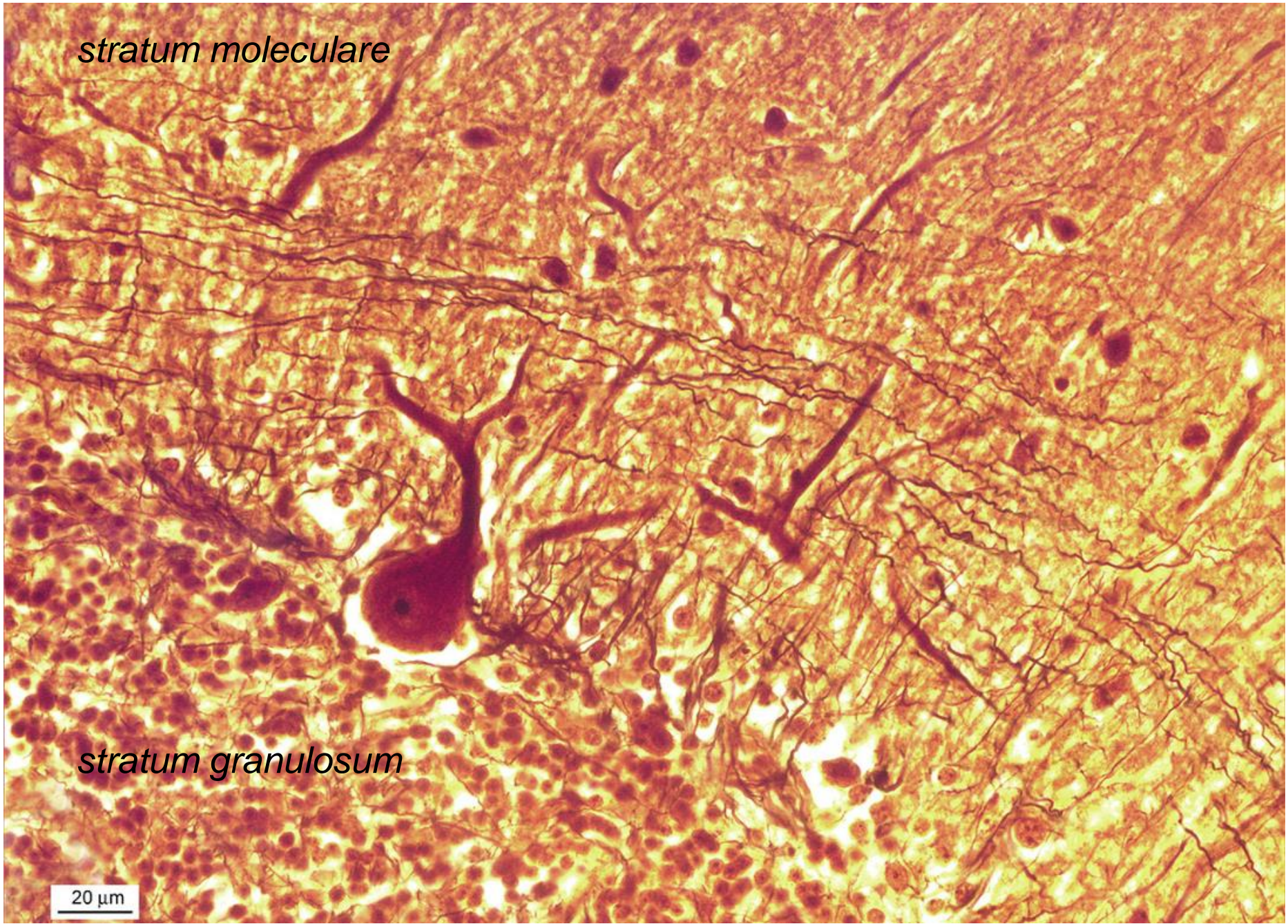
arbor vitae

Cerebellum – Purkinje cell

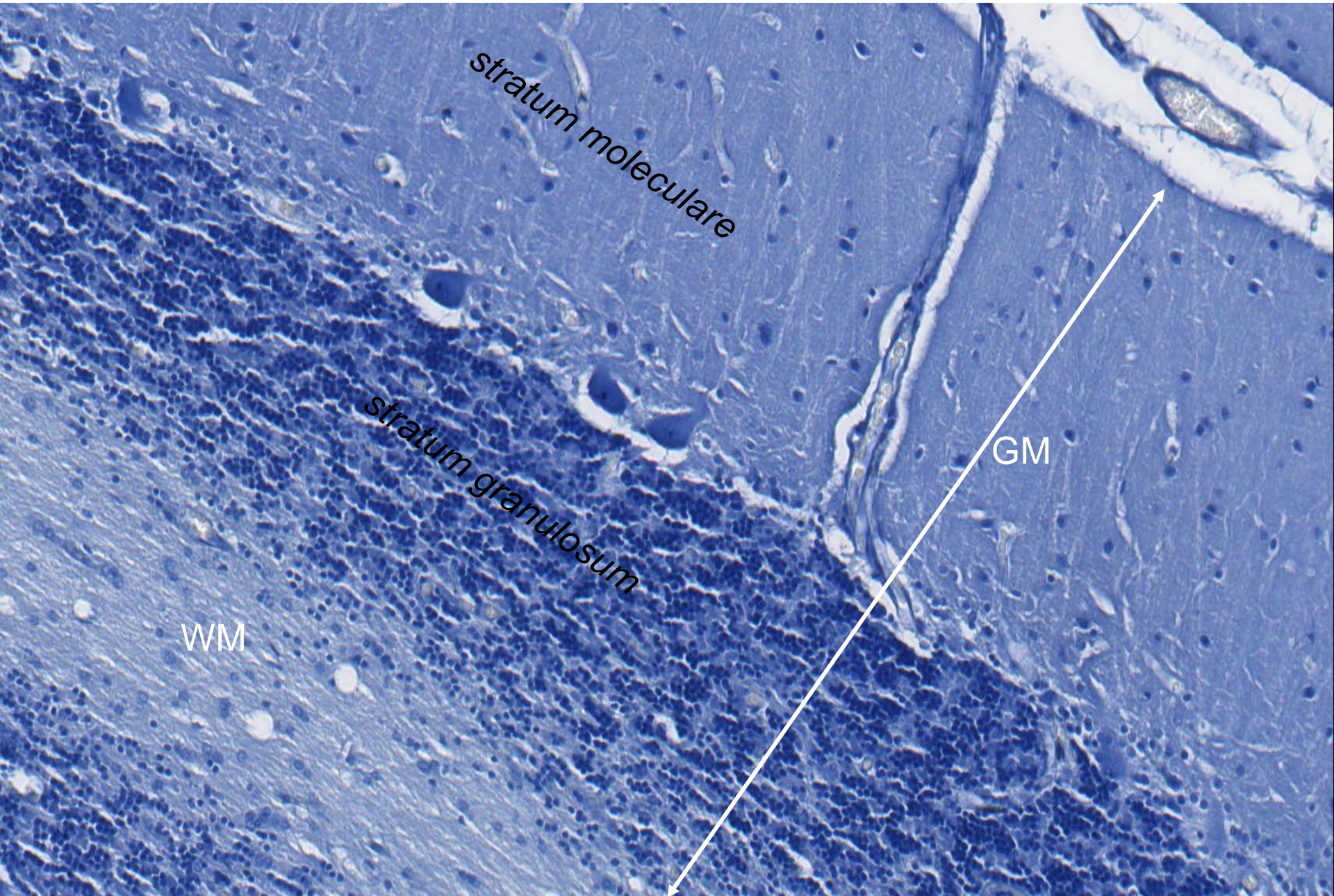
stratum moleculare

stratum granulosum

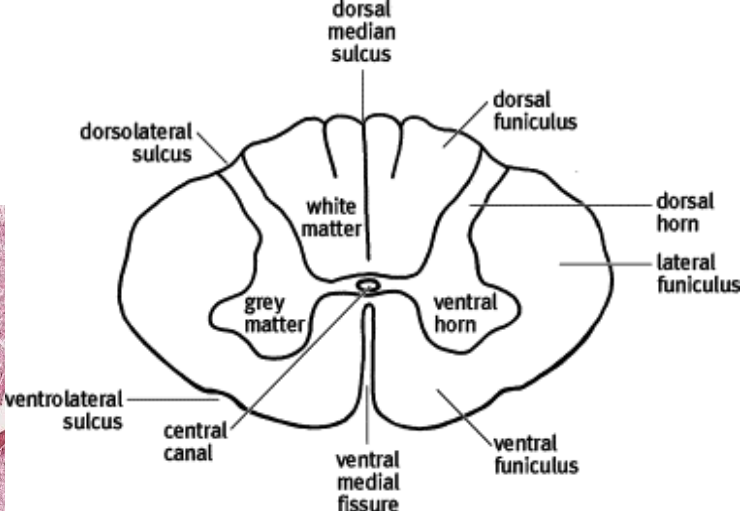
20 μ m



Cerebellum - Nissl bodies in Purkinje cells (Nissl staining)



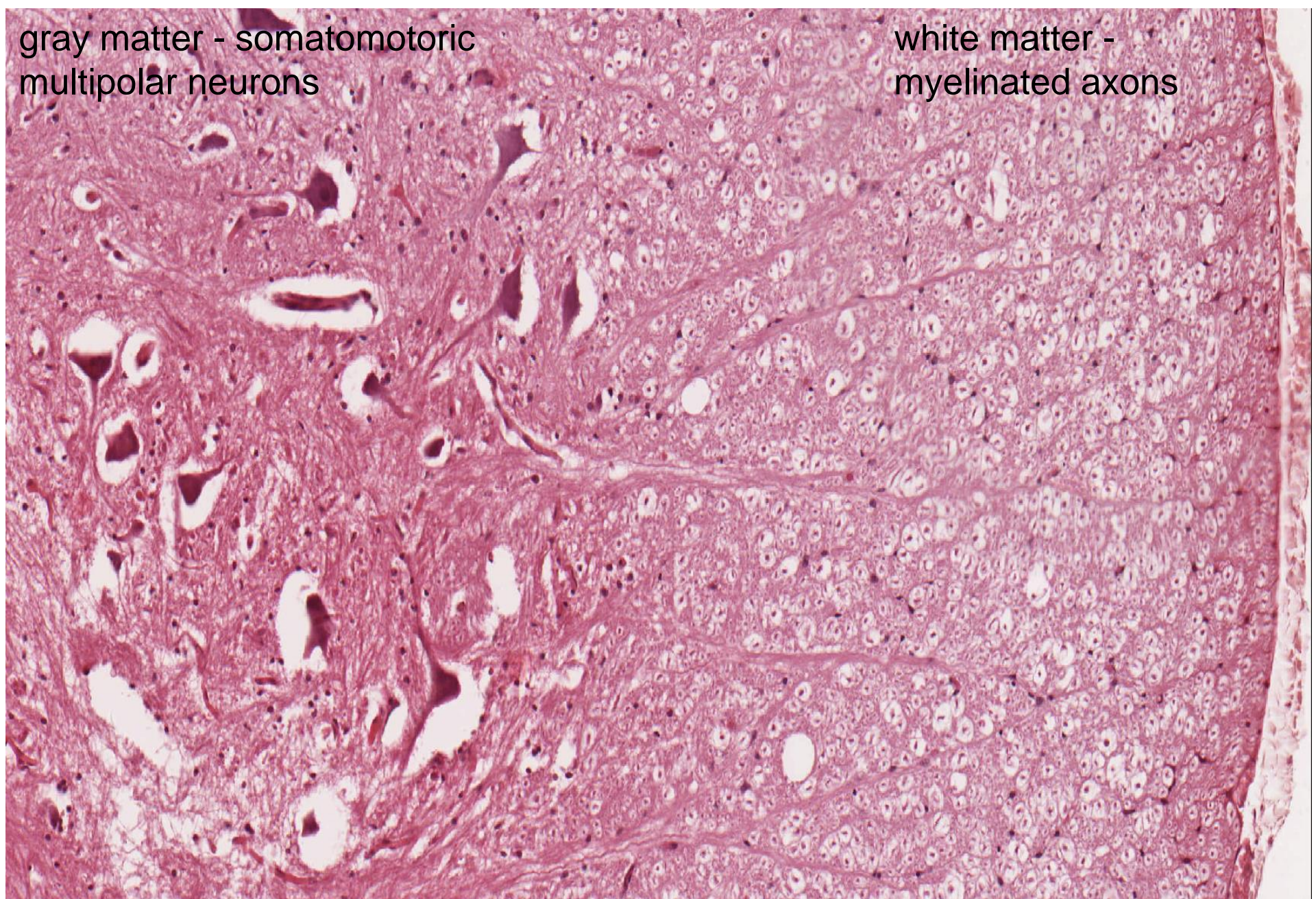
Medulla spinalis



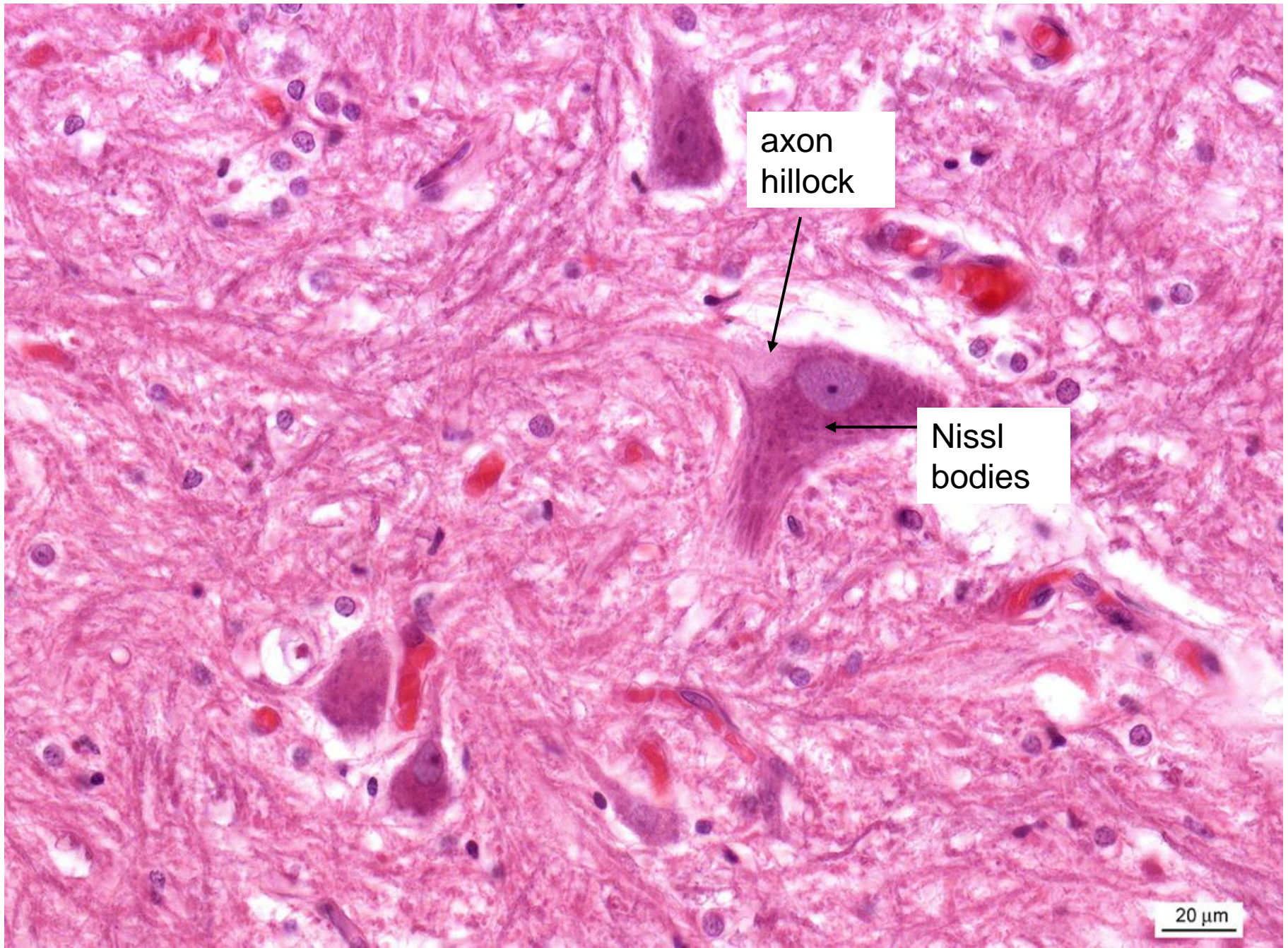
Medulla spinalis

gray matter - somatomotoric
multipolar neurons

white matter -
myelinated axons



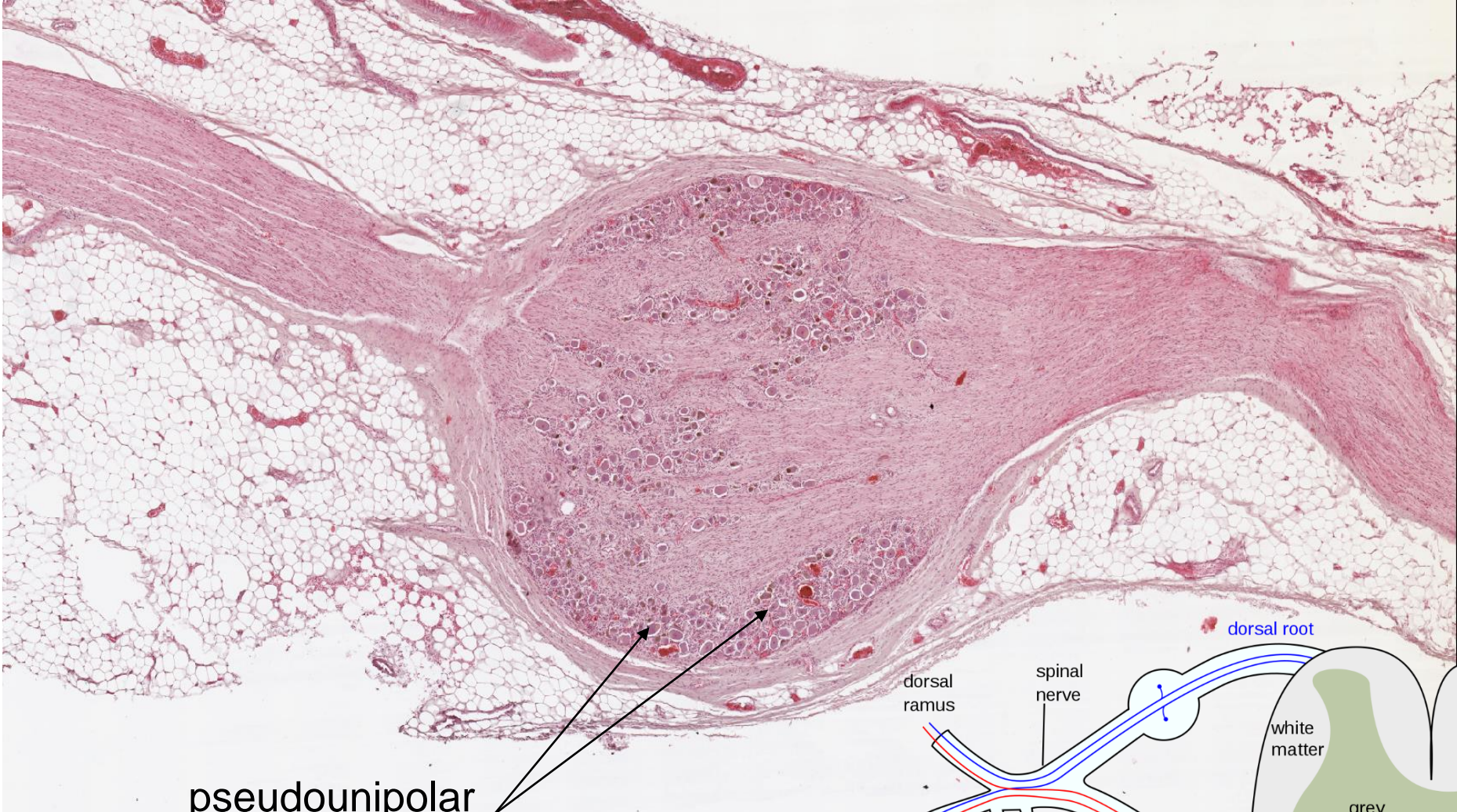
Somatomotoric multipolar neuron – *medulla spinalis*



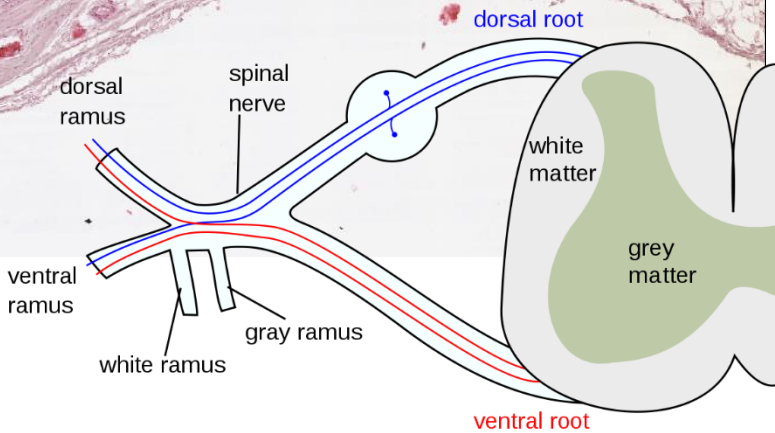
Medulla spinalis – ependymal cells



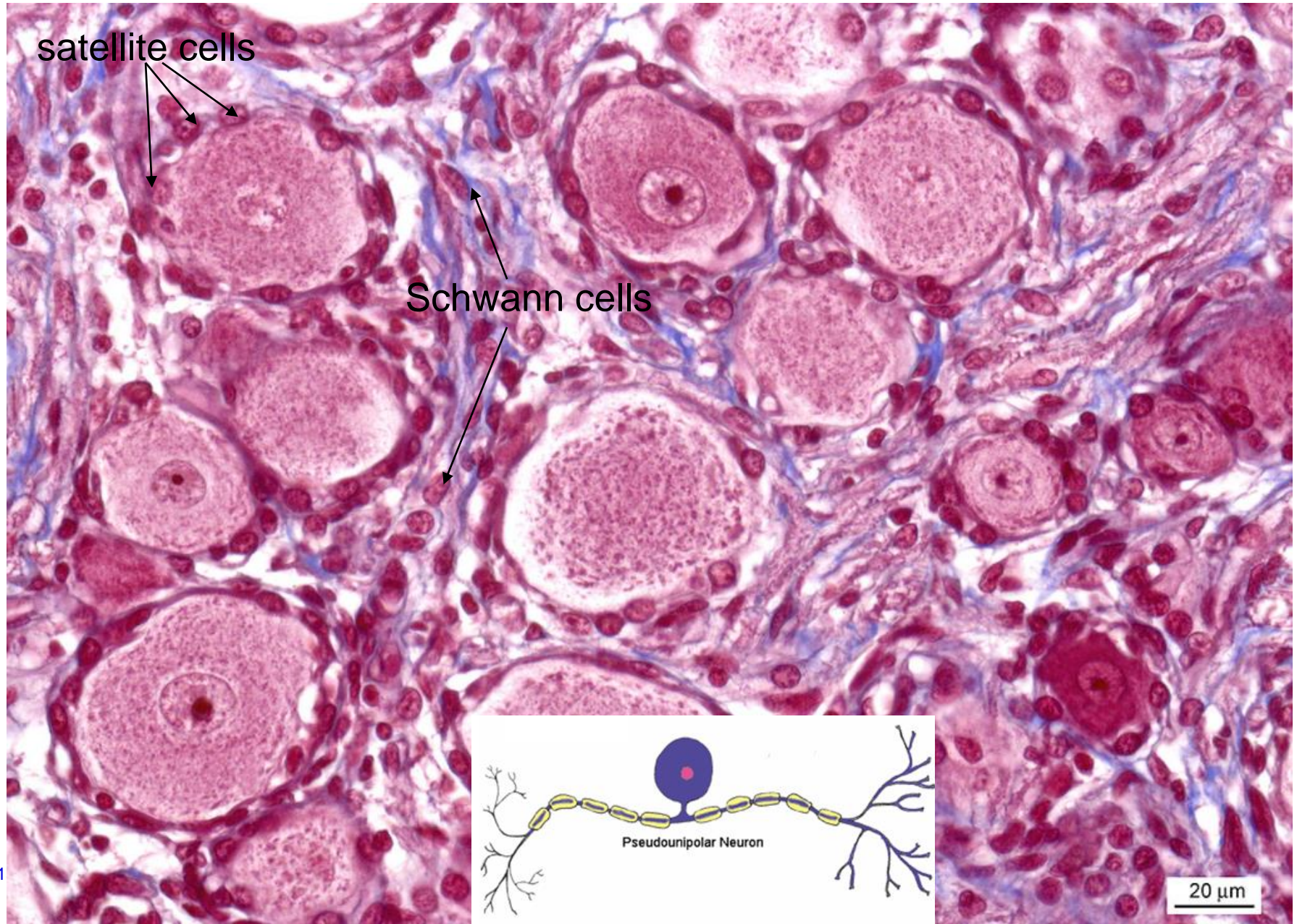
Ganglion spinale (DRG)



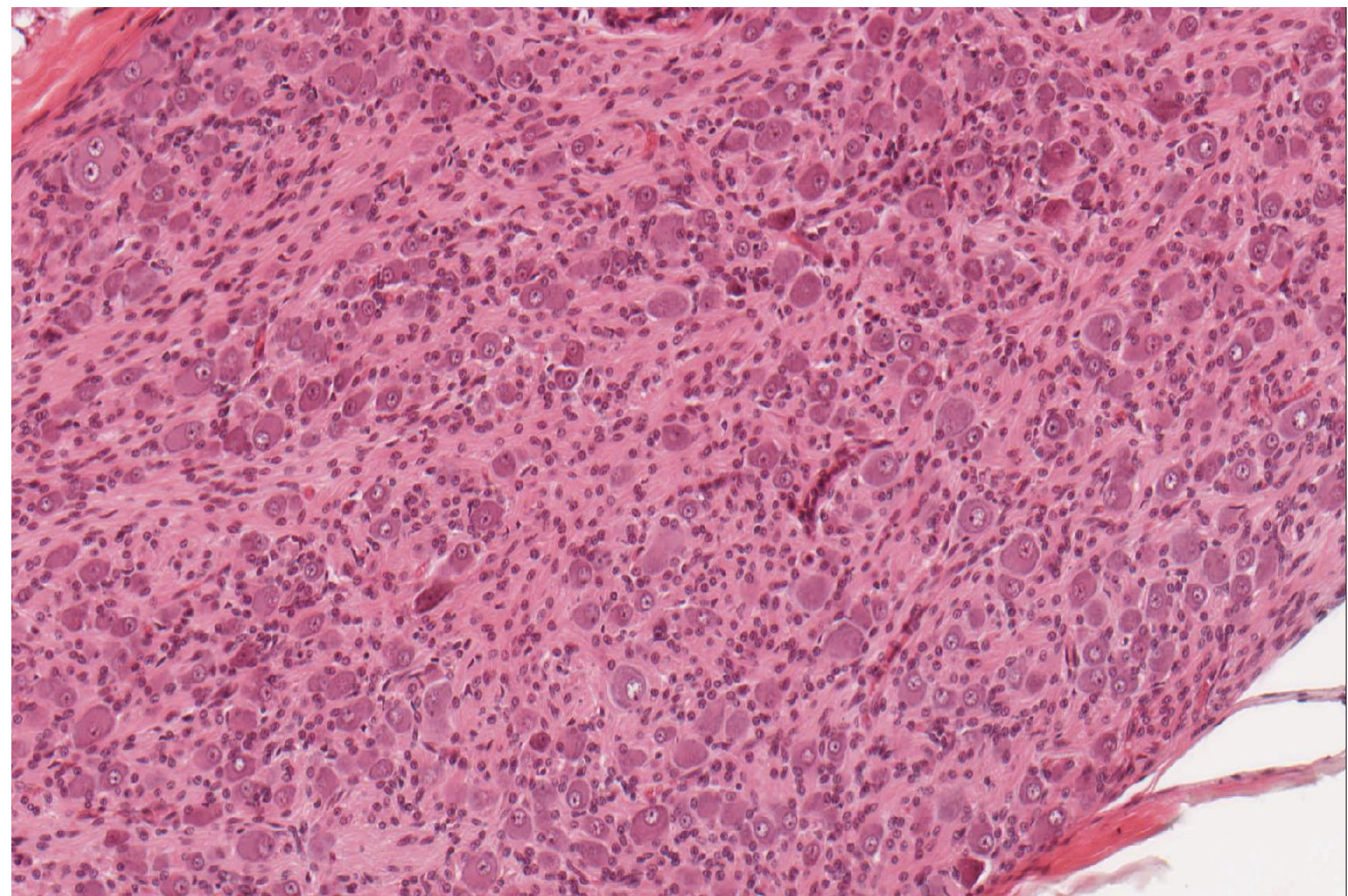
pseudounipolar
neurons

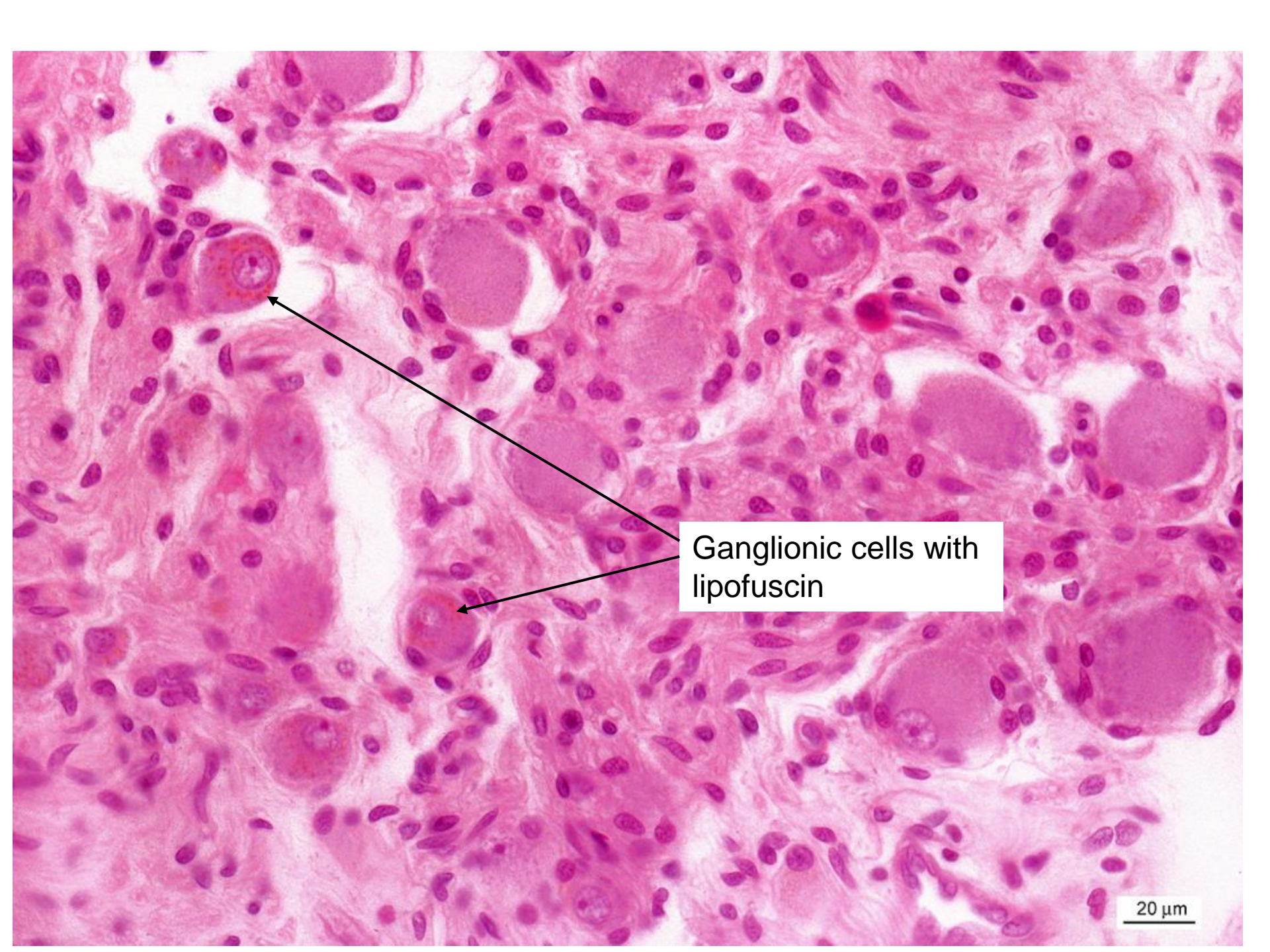


Ganglion spinale (DRG) – pseudounipolar neuron



Vegetative ganglion – ganglion cells (multipolar neurons), satellite cells





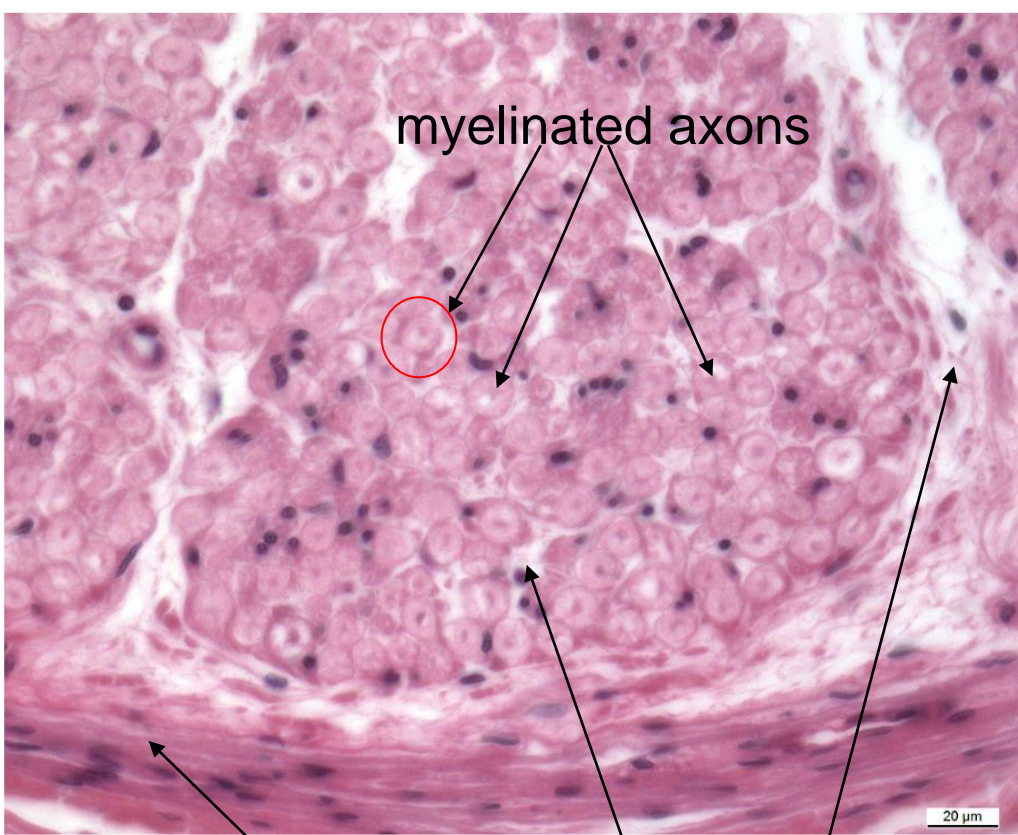
Ganglionic cells with lipofuscin

20 μ m

Peripheral nerve

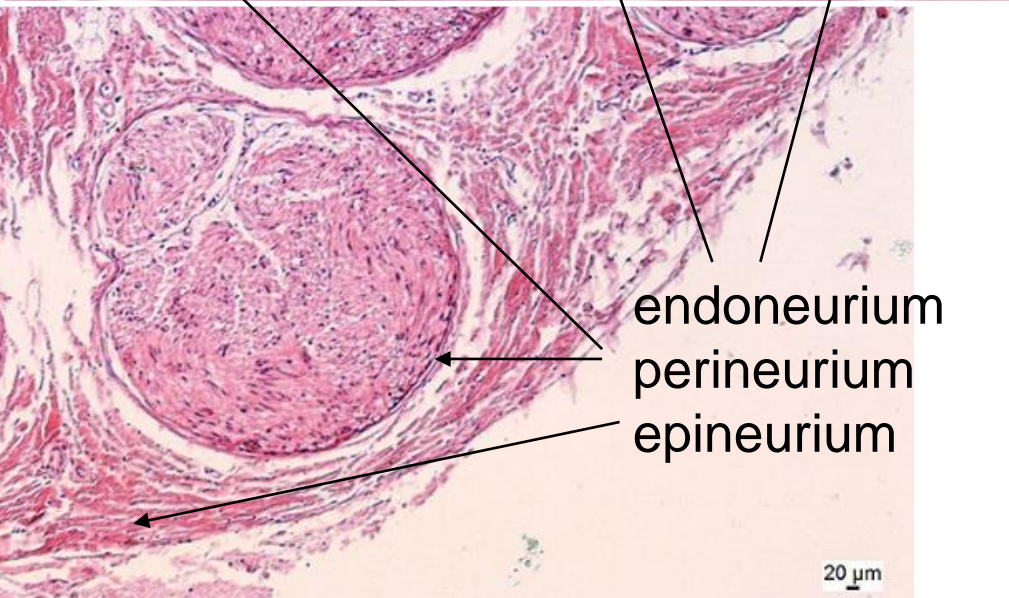


nerve bundles



myelinated axons

20 μm



endoneurium
perineurium
epineurium

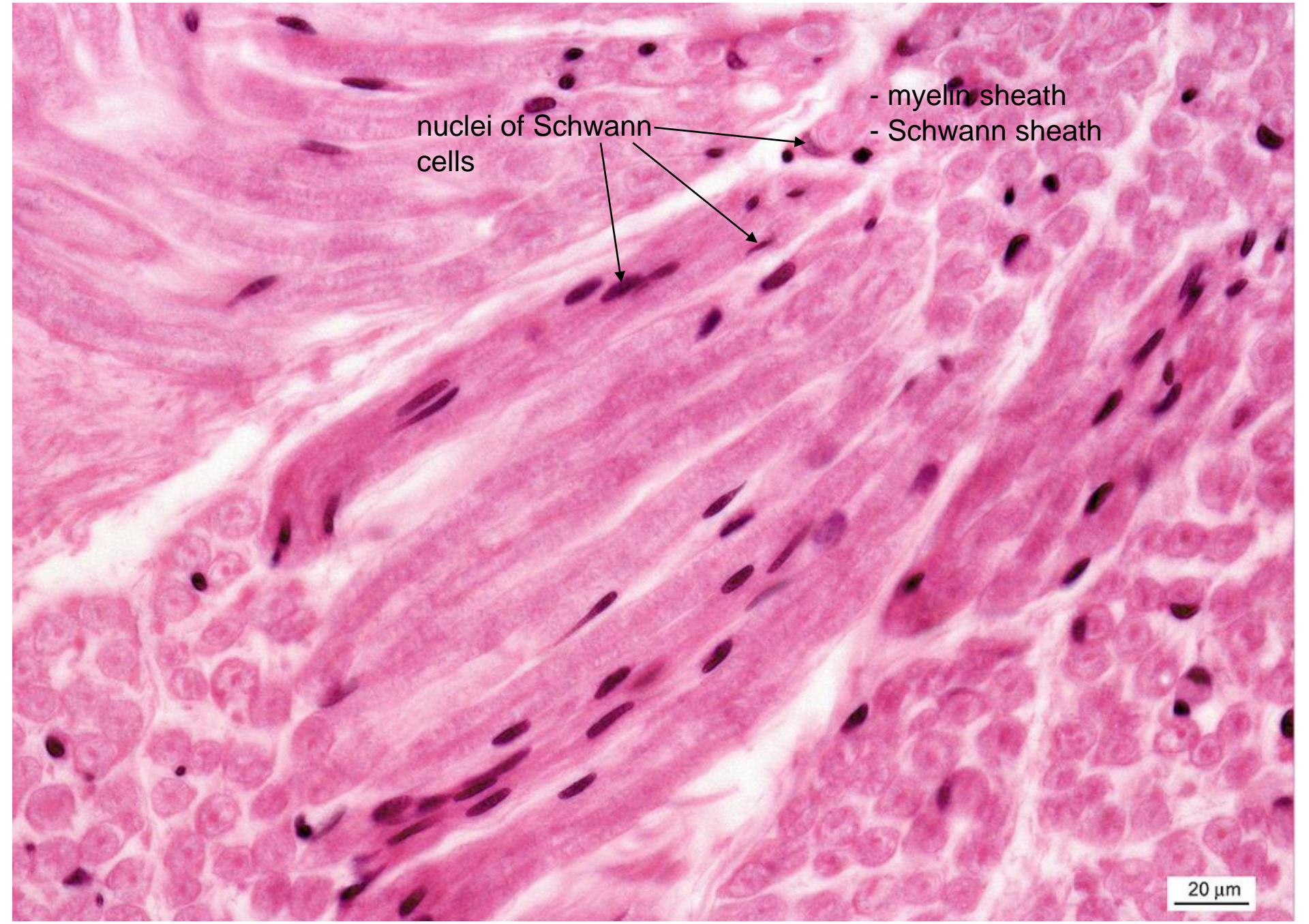
20 μm

Peripheral nerve

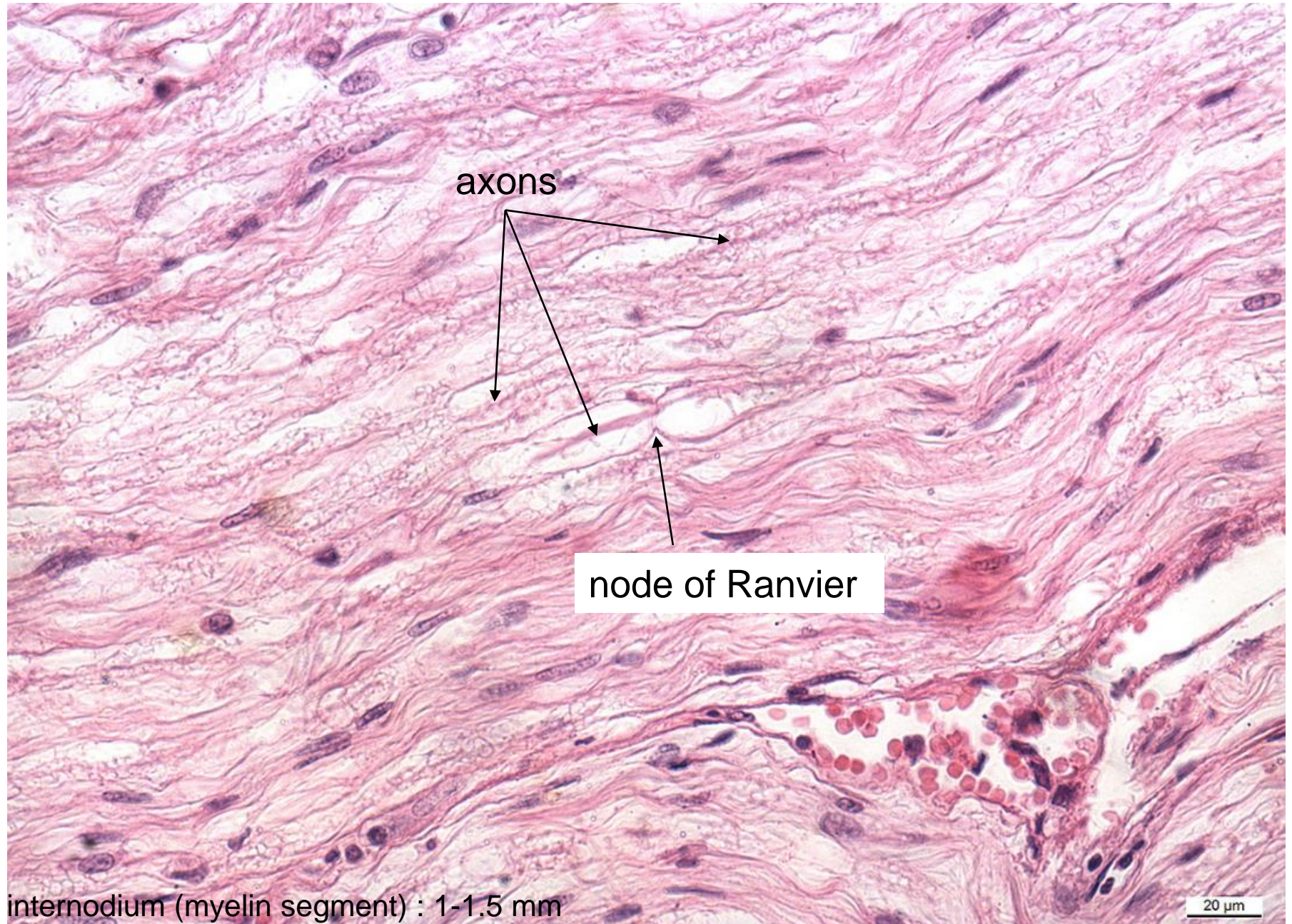
nuclei of Schwann
cells

- myelin sheath
- Schwann sheath

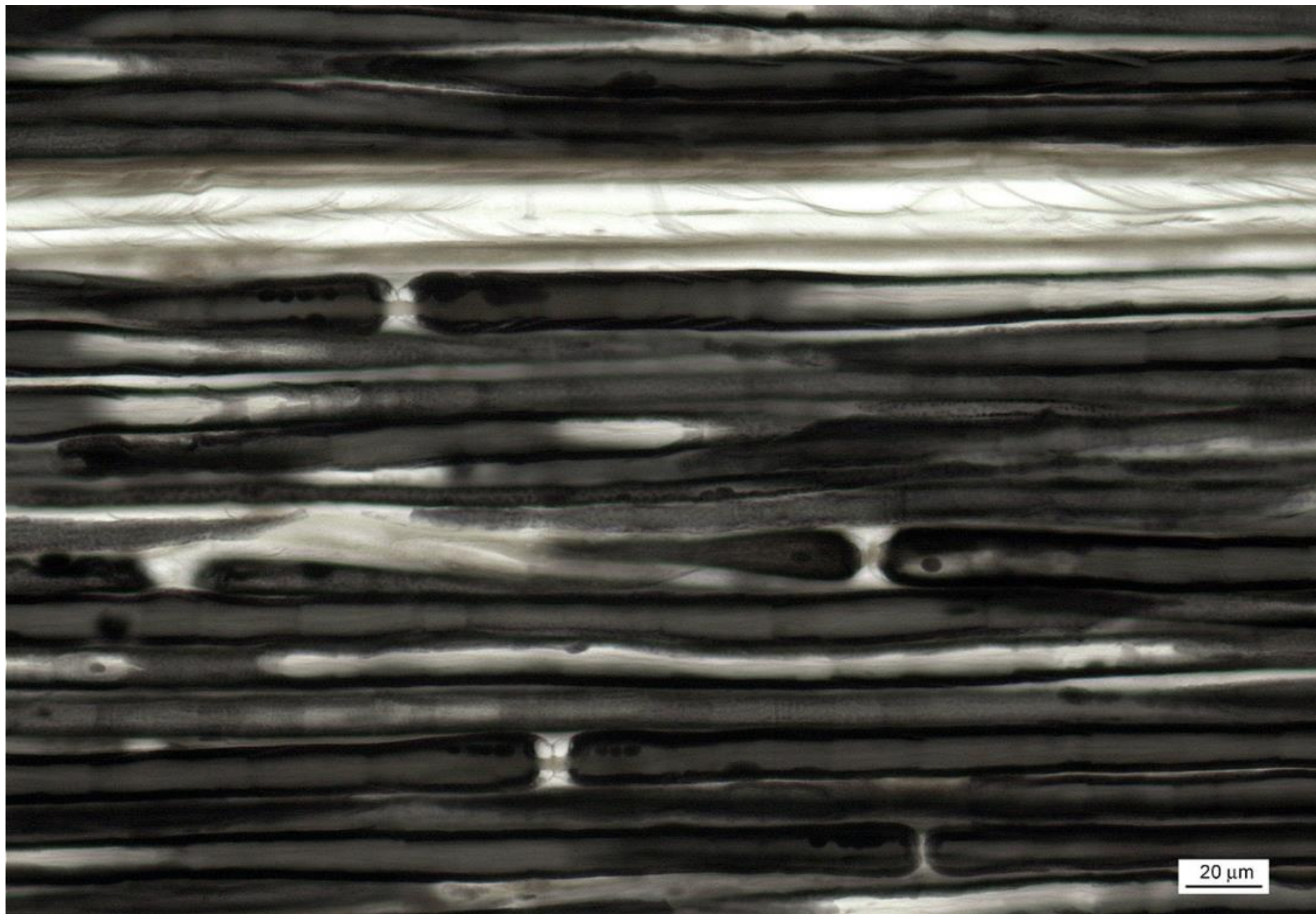
20 μ m



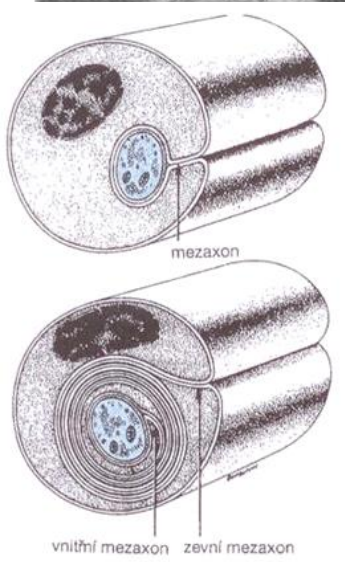
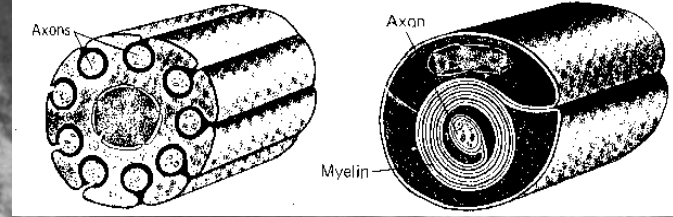
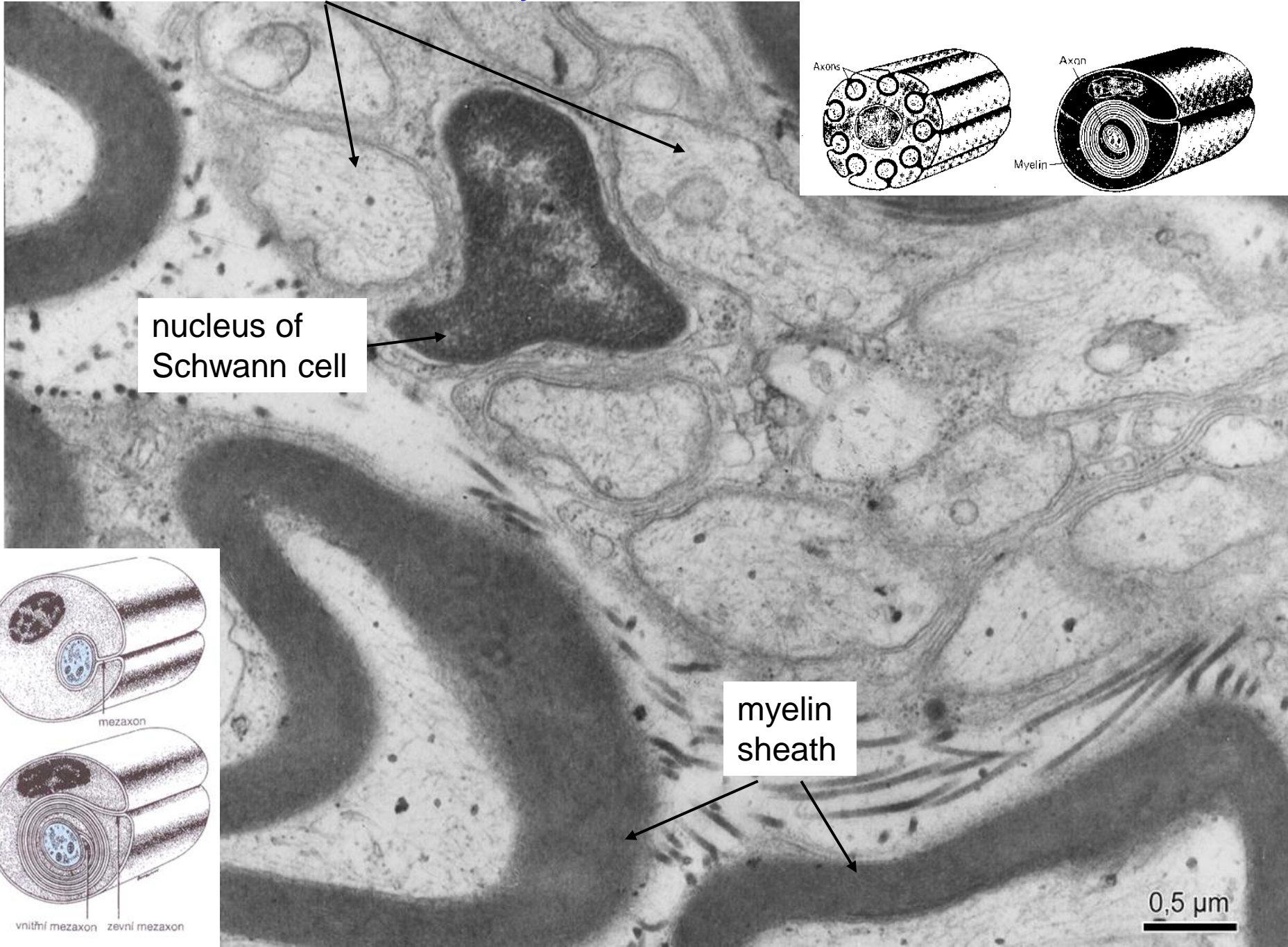
Peripheral nerve – longitudinal section



Myelin sheaths with nodes of Ranvier – peripheral nerve (OsO₄)

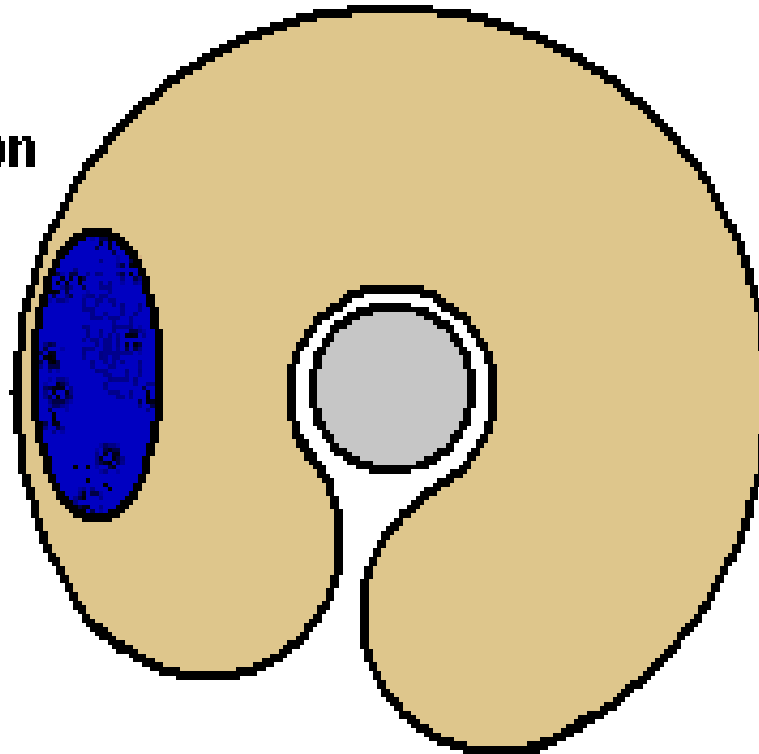


Axons with myelin and Schwann sheath

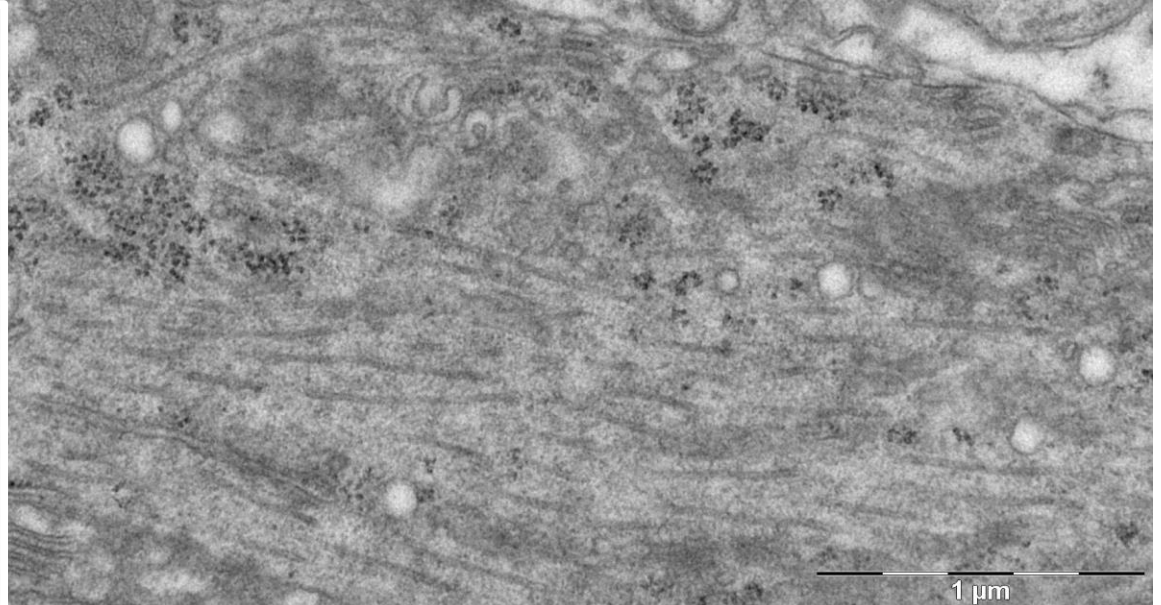
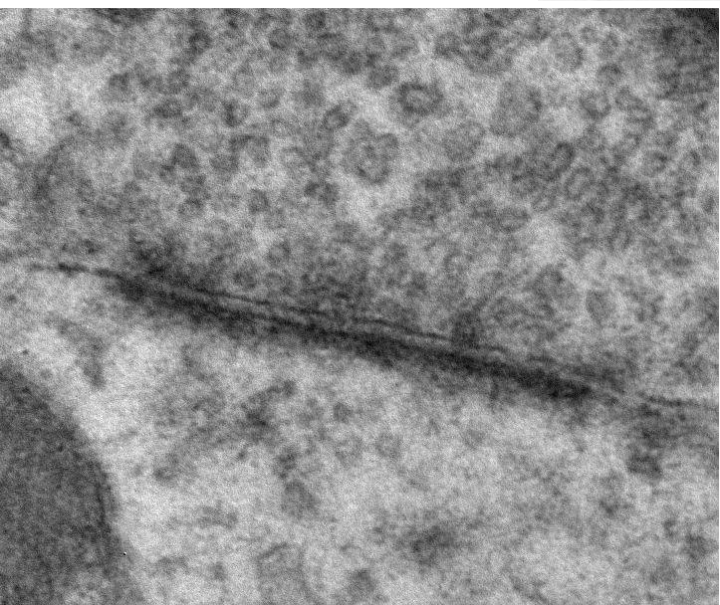
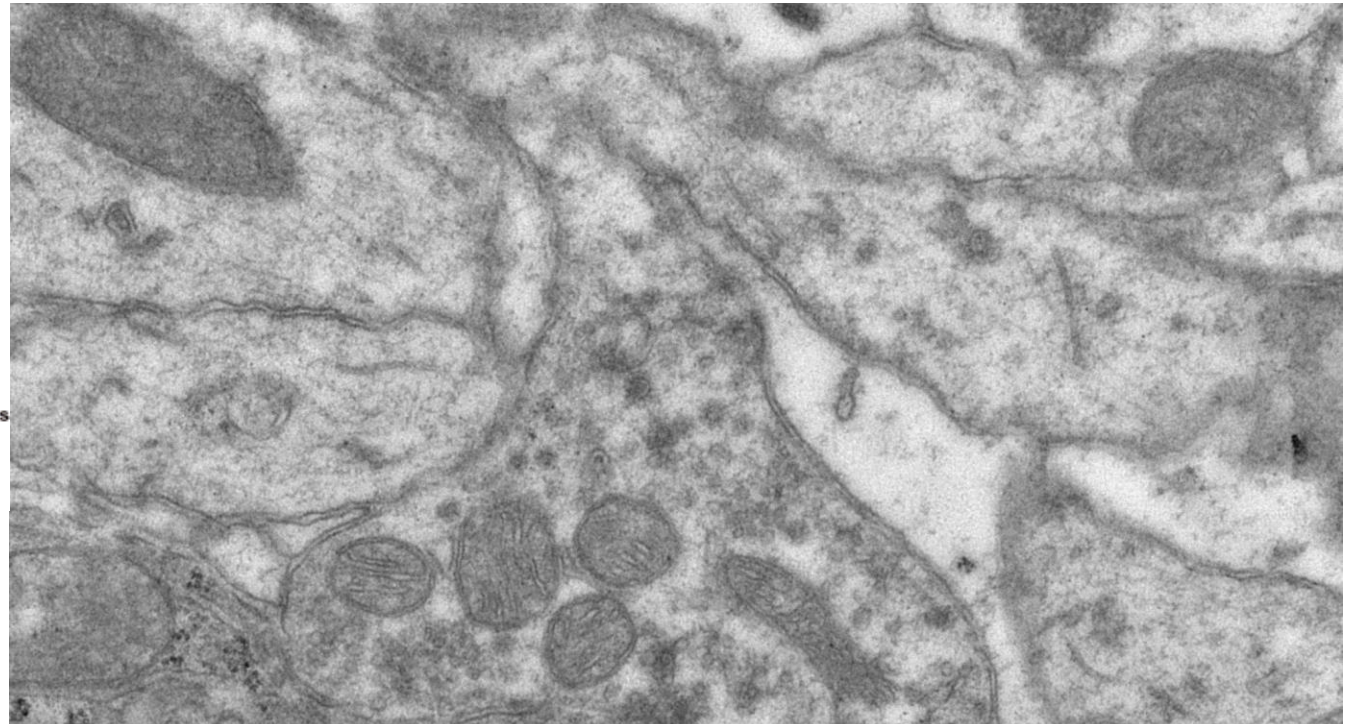
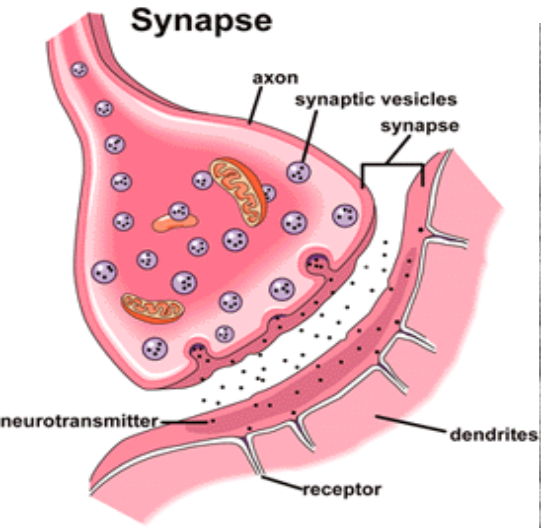


Development of myelin sheath

**Myelination of
a peripheral axon**



Synapse



NEUROTRANSMITTERS

ADRENALINE fight or flight

produced in stressful situations. Increases heart rate and blood flow, leading to physical boost and heightened awareness.

GABA calming

Calms firing nerves in the central nervous system. High levels improve focus, low levels cause anxiety. Also contributes to motor control and vision.

NORADRENALINE concentration

affects attention and responding actions in the brain. Contracts blood vessels, increasing blood flow.

ACETYLCHOLINE learning

Involved in thought, learning and memory. Activates muscle action in the body. Also associated with attention and awakening.

DOPAMINE pleasure

feelings of pleasure, also addiction, movement and motivation. People repeat behaviors that lead to dopamine release.

GLUTAMATE memory

Most common neurotransmitter. Involved in learning and memory, regulates development and creation of nerve contacts.

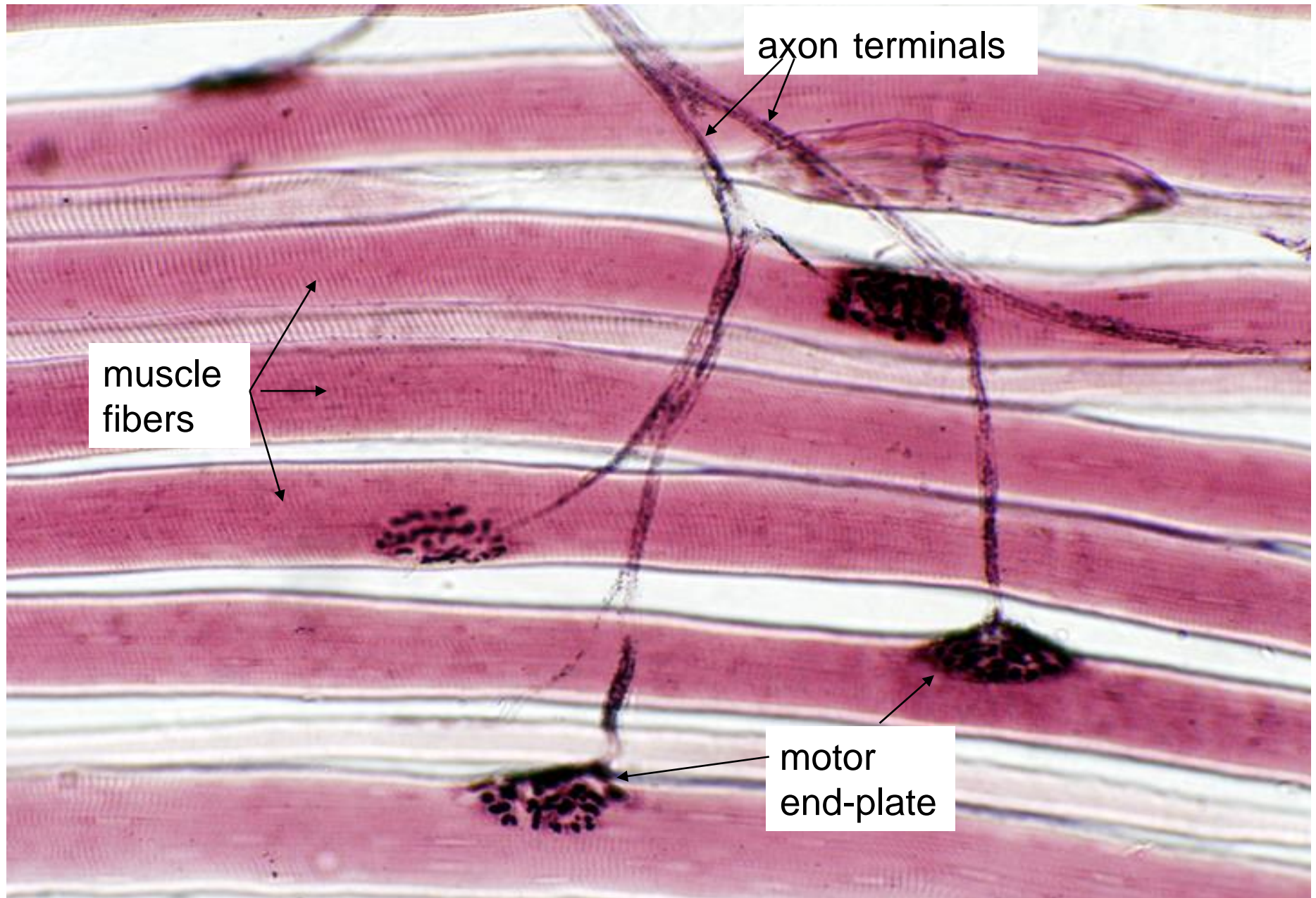
SEROTONIN mood

contributes to well-being and happiness. Helps sleep cycle and digestive system regulation. Affected by exercise and light exposure.

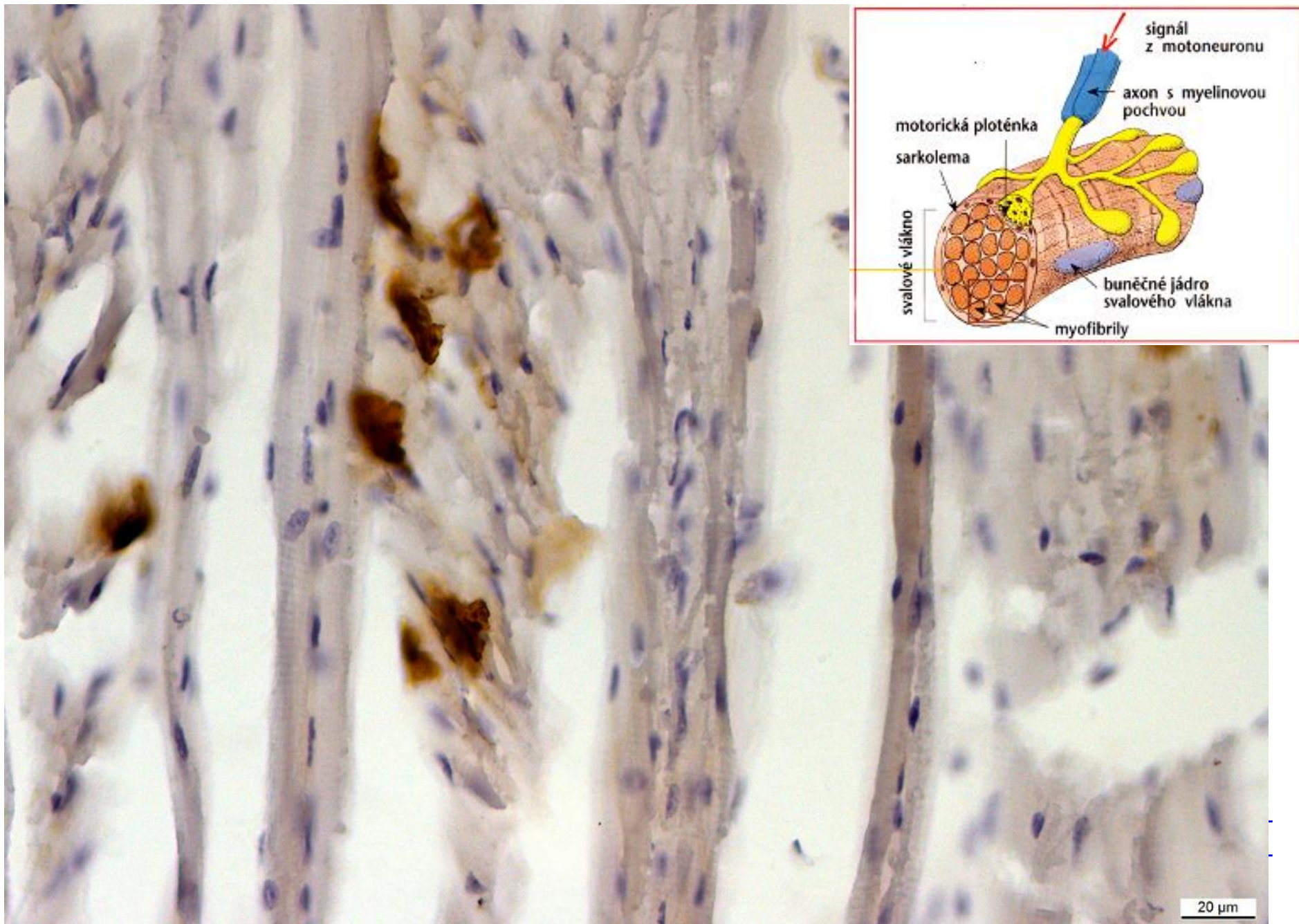
ENDORPHINS euphoria

Released during exercise, excitement and sex, producing well-being and euphoria, reducing pain

Motor end-plates in motor unit



Motor end-plates (localization of acetylcholinesterase)



NERVE TISSUE

Slides:

Pyramidal cell (75, 76. Cortex cerebri)

Purkinje cell (77. Cerebellum)

Nissl substance (78. Cerebellum or 79. Medulla spinalis)

Somatomotoric multipolar neuron (79. Medulla spinalis)

Pseudounipolar neuron (81. Ganglion spinale)

Peripheral nerve (84, 85. Peripheral nerve – cross section)

Peripheral nerve (86, 87. Peripheral nerve – longitudinal section)

Atlas EM:

Neuron – cortex cerebri (3, 48), Purkinje neuron (49)

Oligodendrocyte (50)

Synapse (51)

Peripheral nerves (53, 54)