

Nerve tissue

Nerve tissue

Neurons

Classification by:

- size
- number of processes
- axon length
- mediators
- position in neuronal network
- function

Glial cells

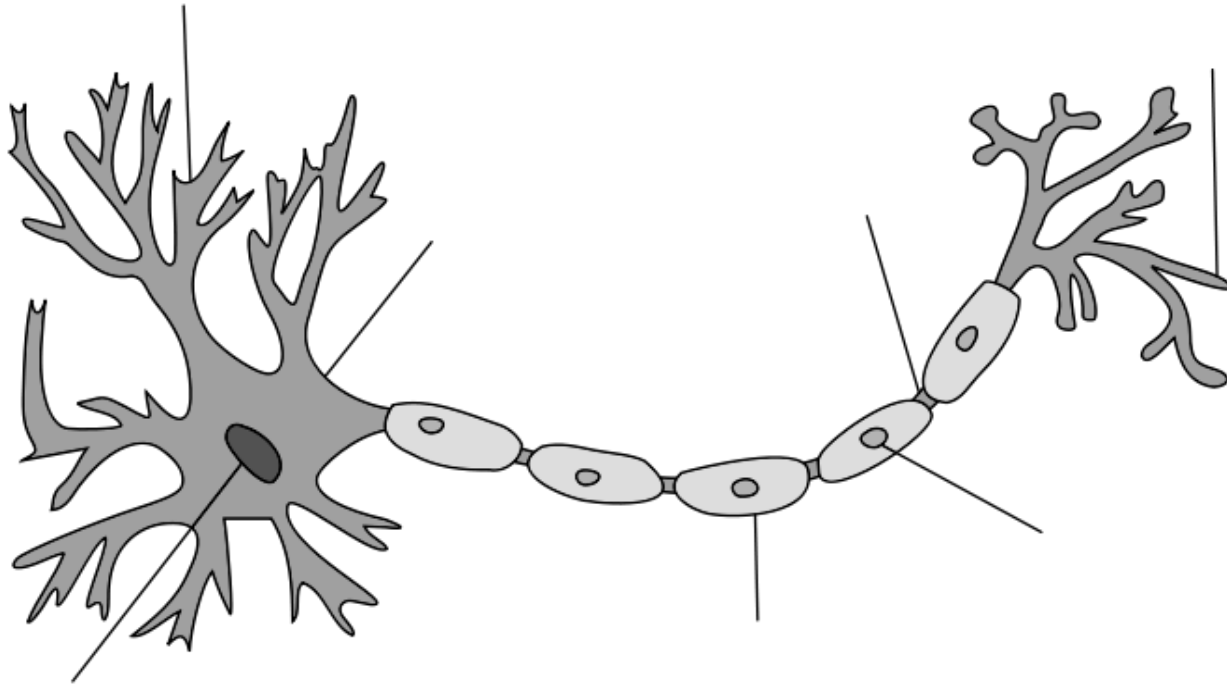
Central (CNS)

- oligodendrocytes
- astrocytes
- ependymal cells
- microglia

Peripheral (PNS)

- satellite cells
- Schwann cells

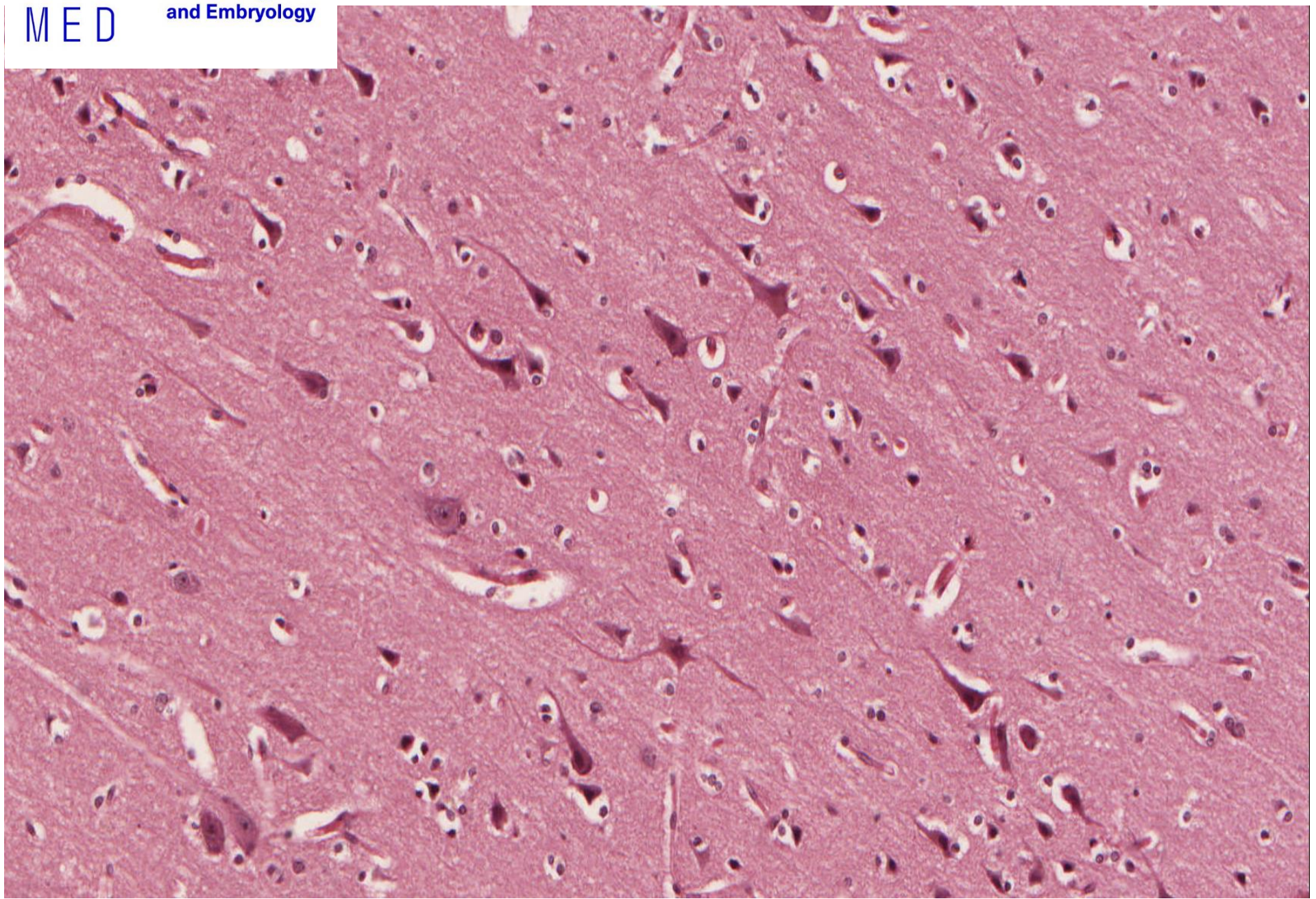
Neuron



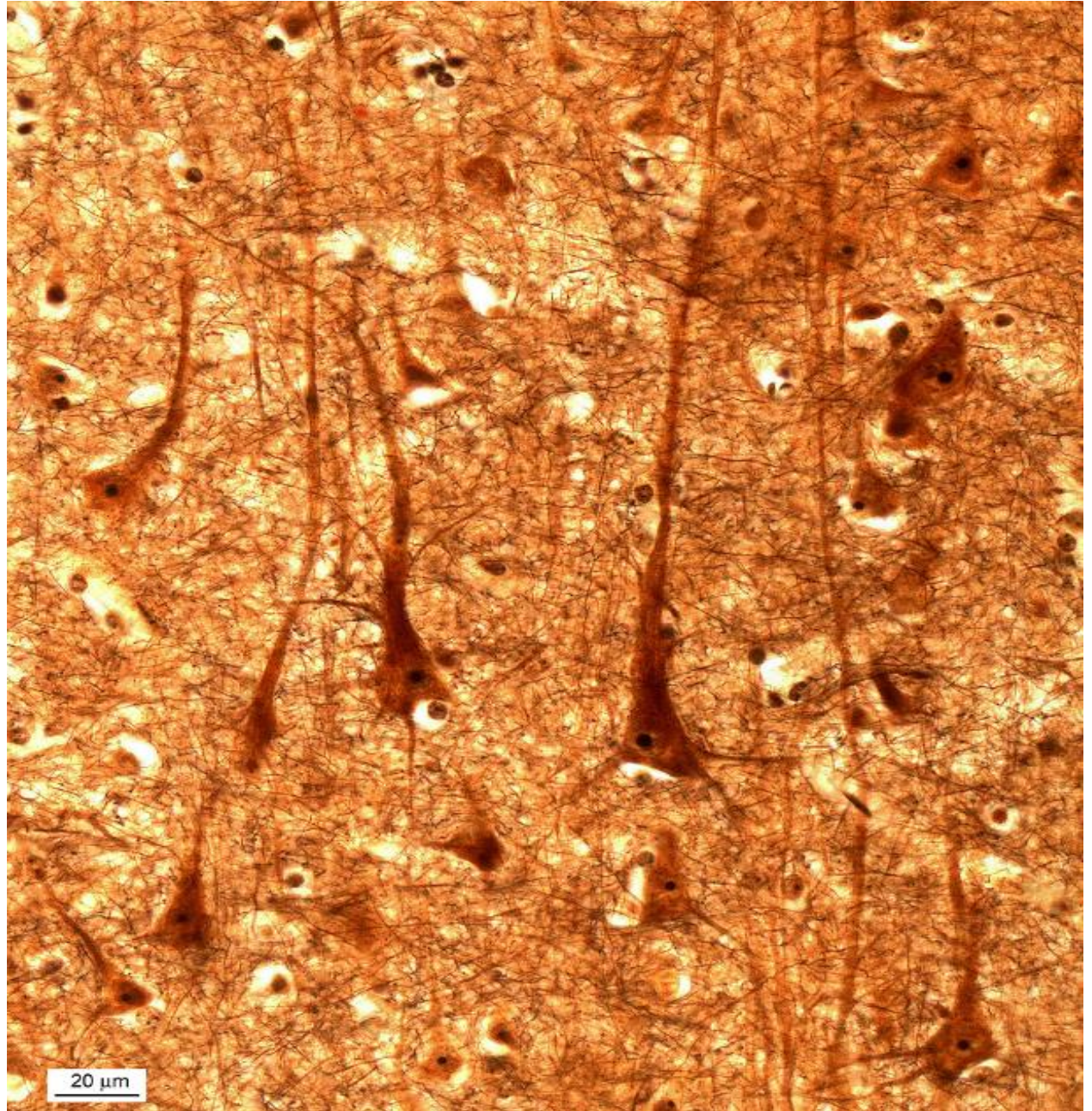
Cortex cerebri – overview



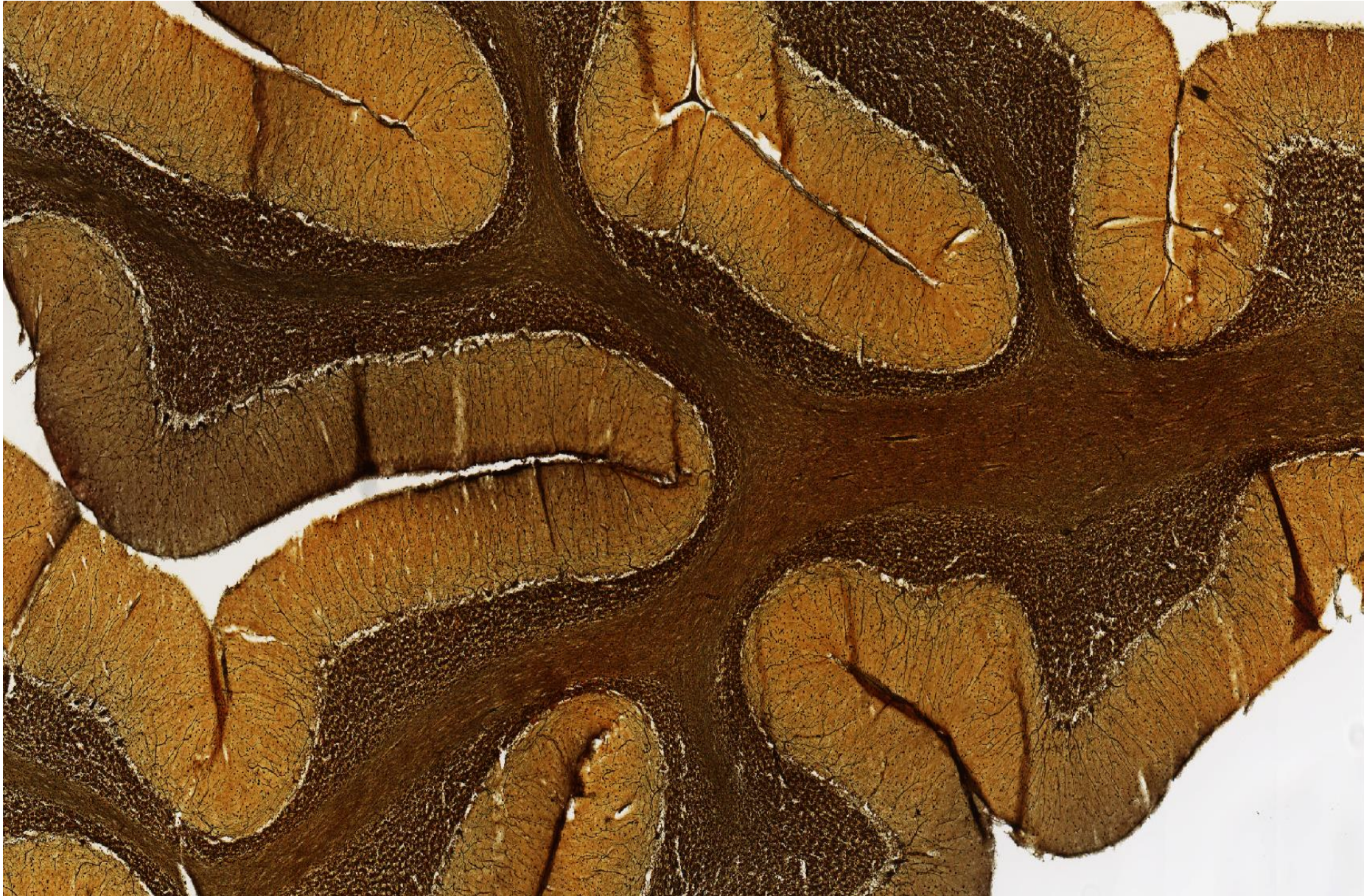
Cortex cerebri – Pyramidal cells – multipolar neurons



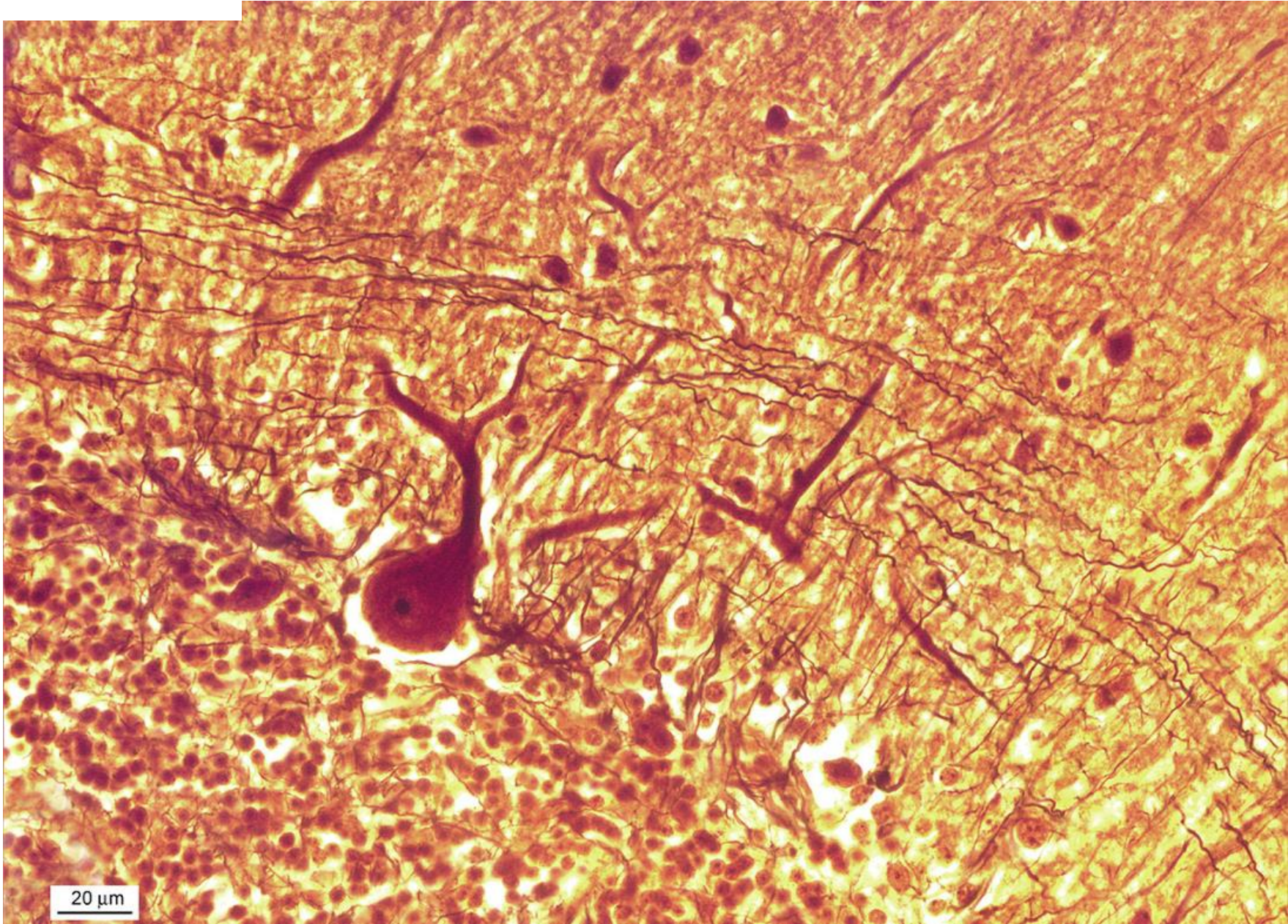
Cortex cerebri – Pyramidal cells – multipolar neurons



Cerebellum – overview

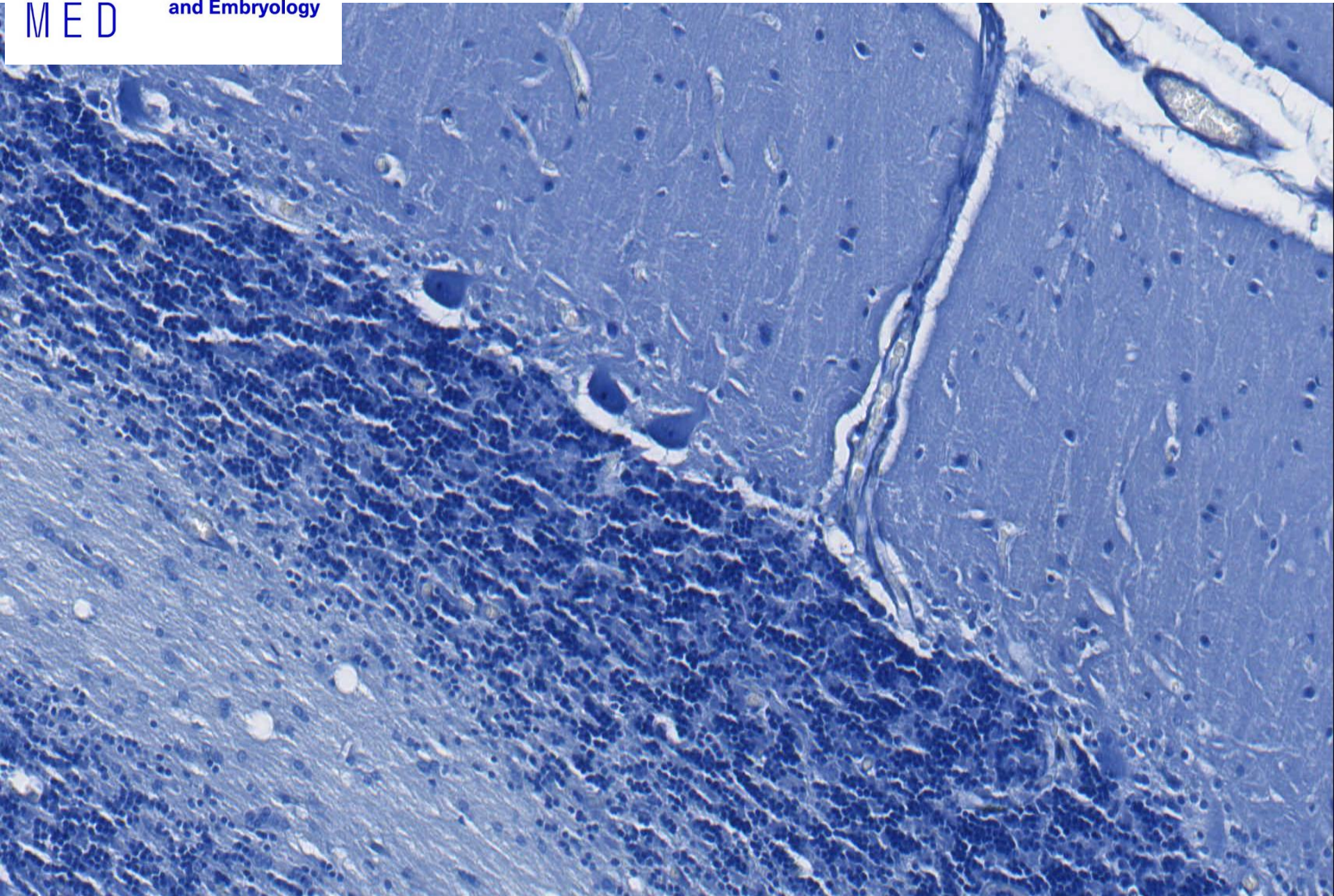


Cerebellum – Purkinje cell

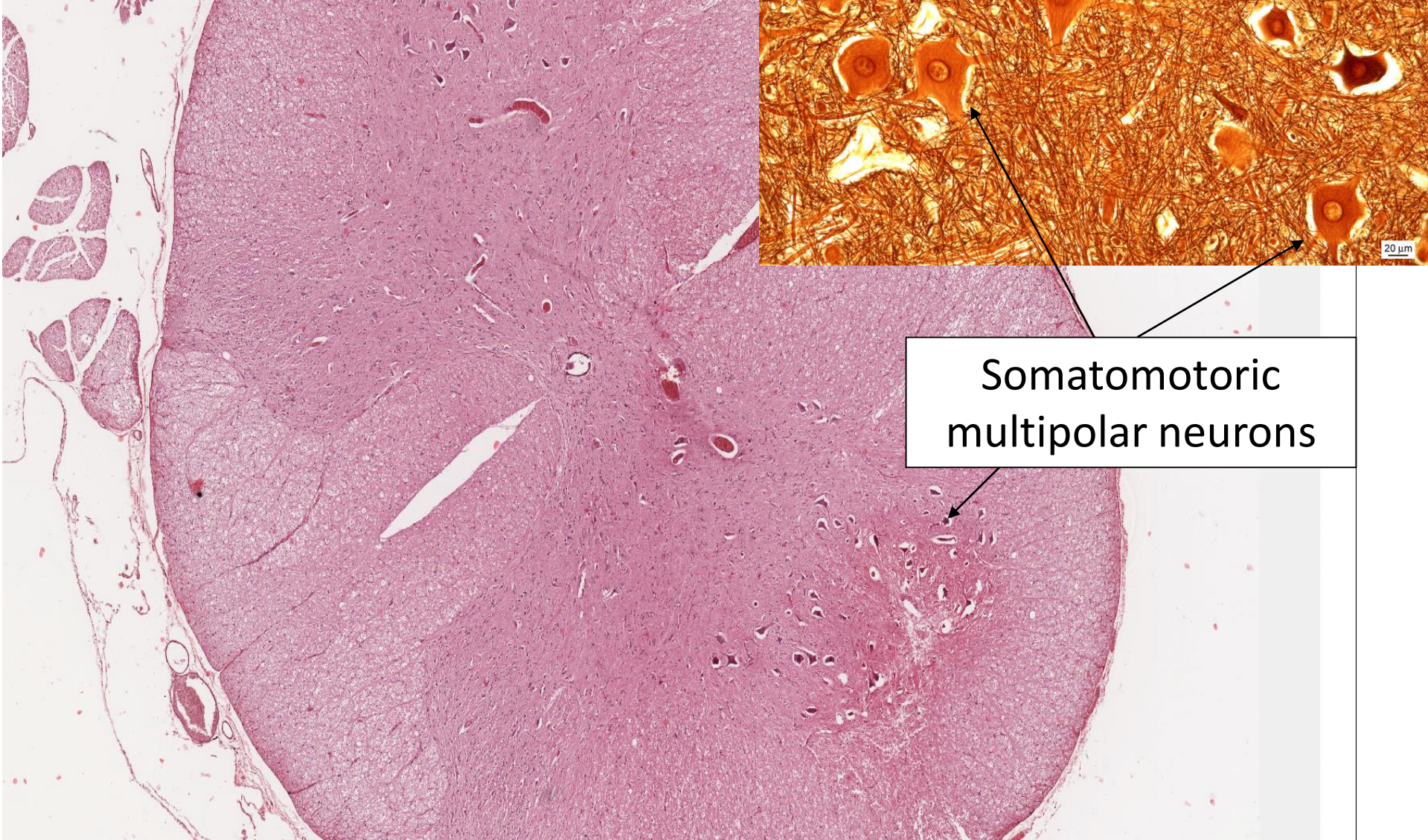


20 μ m

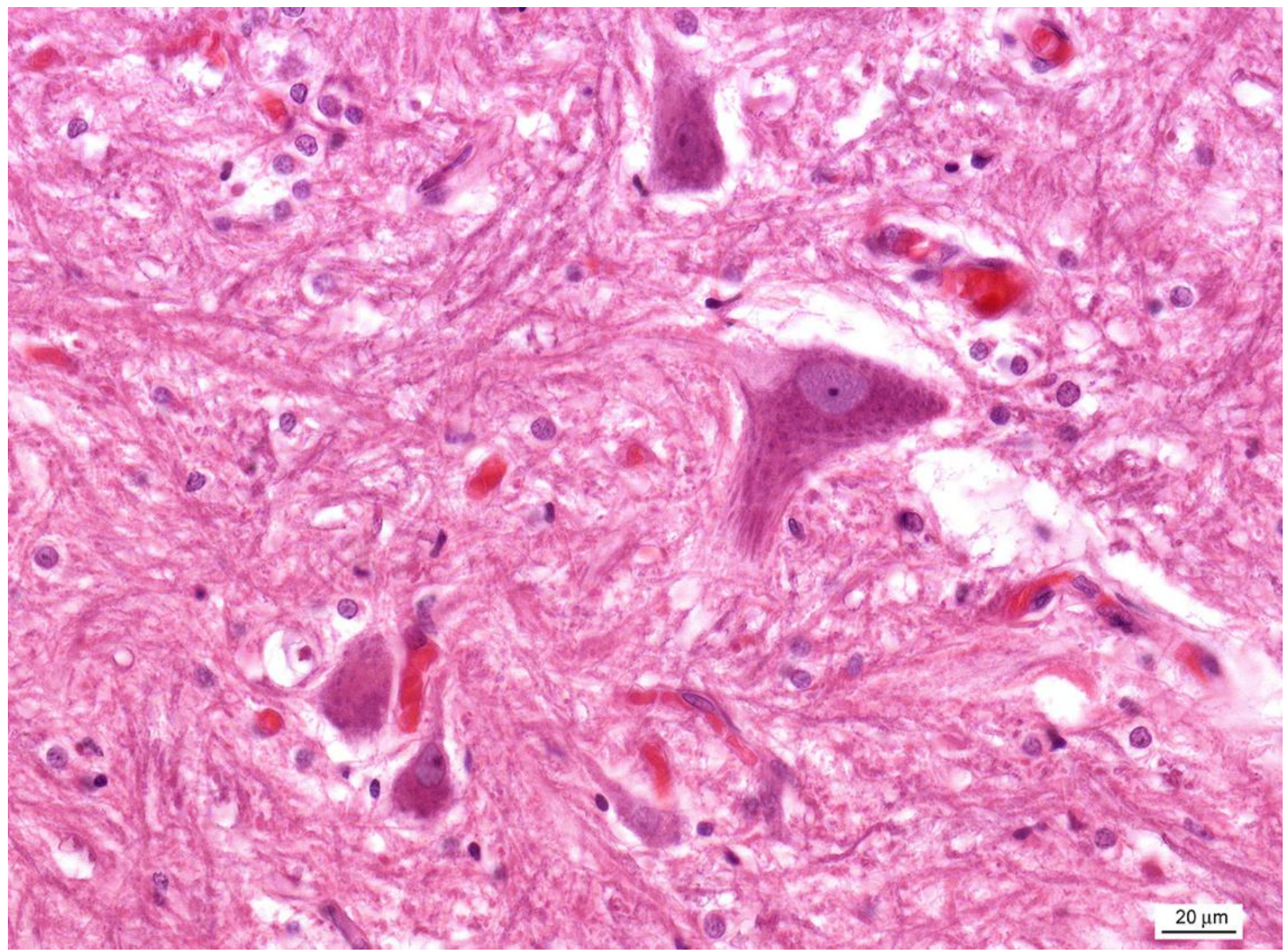
Cerebellum – Nissl substance



Medulla spinalis



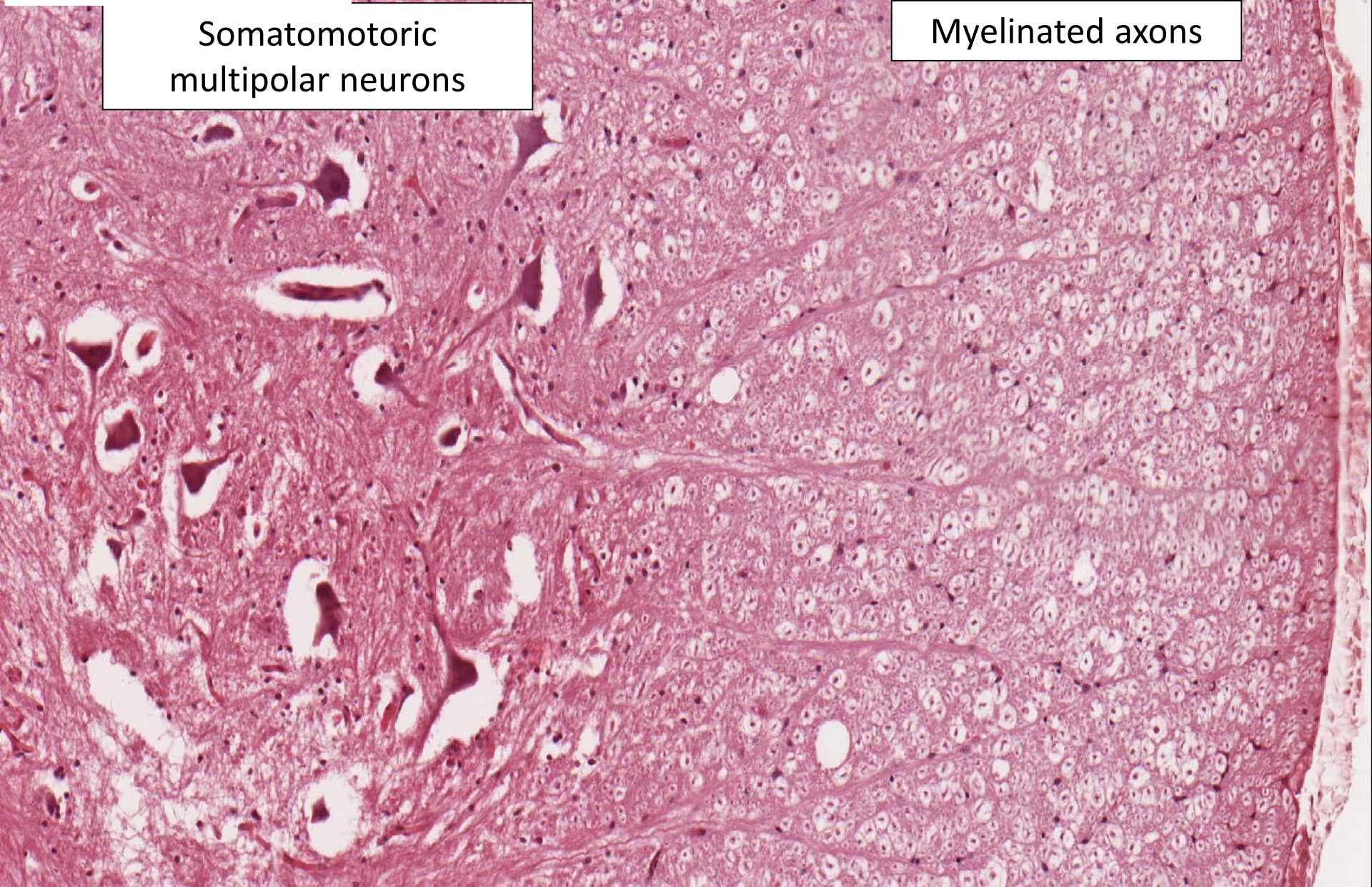
Medulla spinalis - somatomotoric multipolar neuron



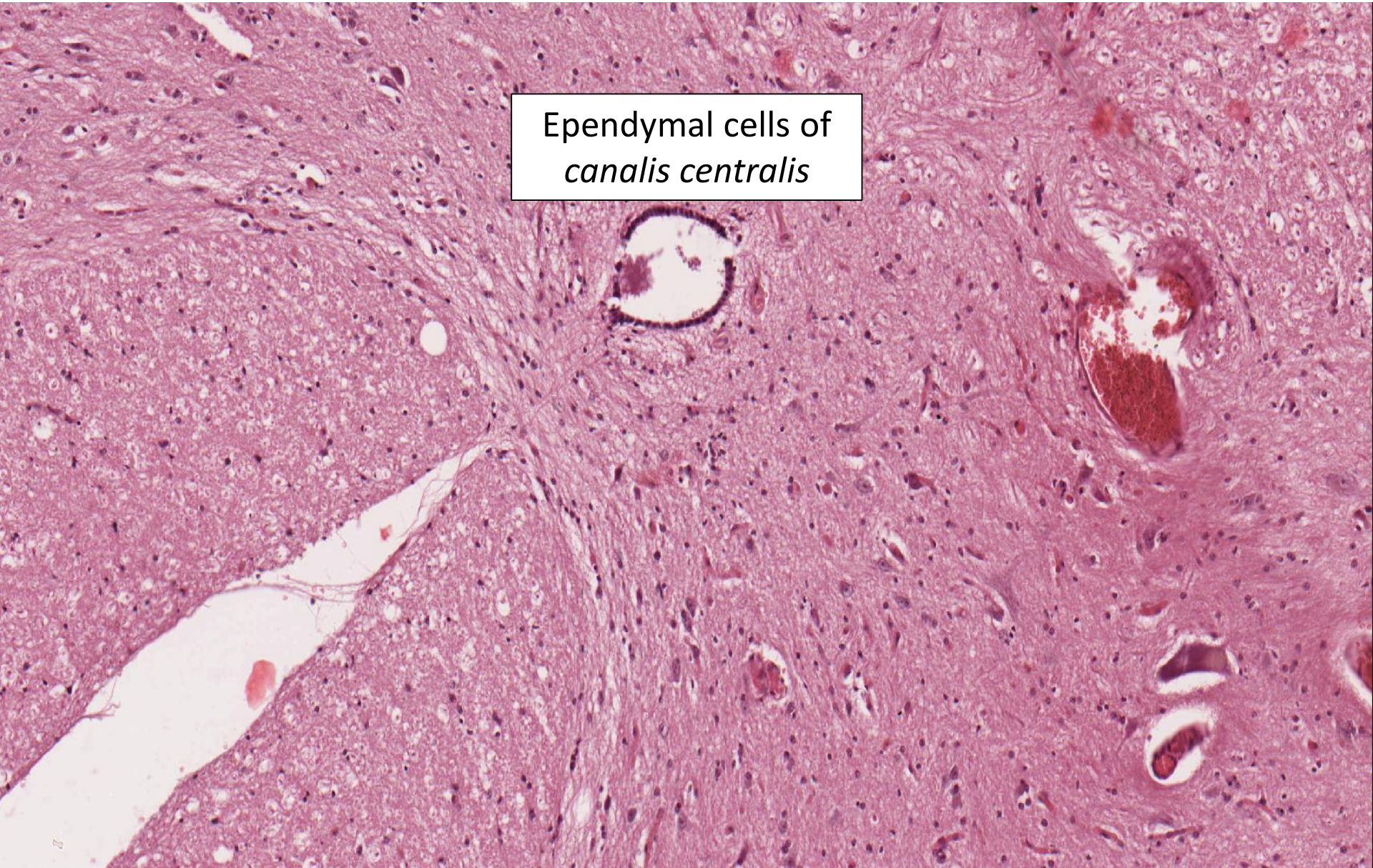
Medulla spinalis

Somatomotoric
multipolar neurons

Myelinated axons

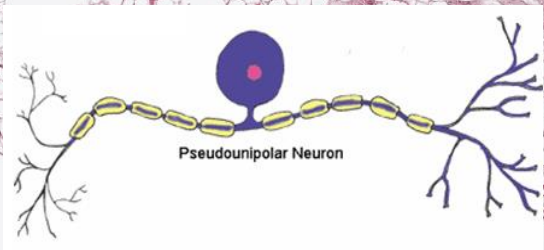
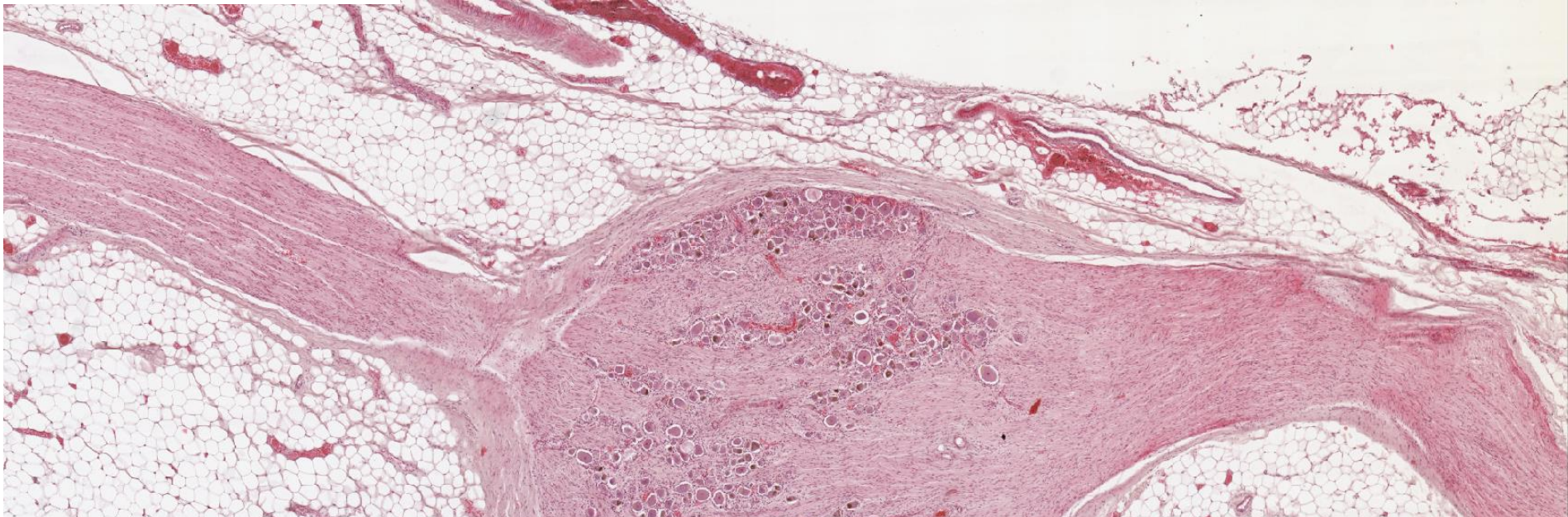


Medulla spinalis



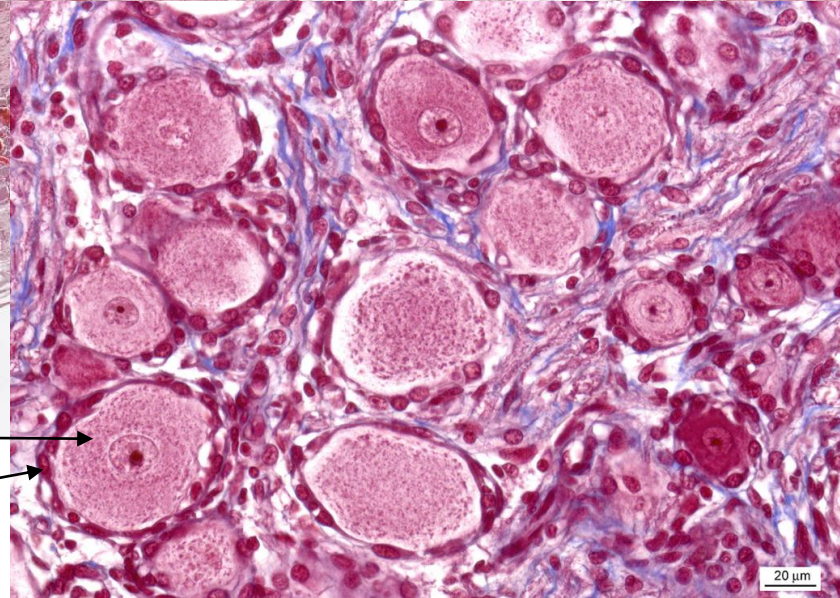
Ependymal cells of
canalis centralis

Ganglion spinale

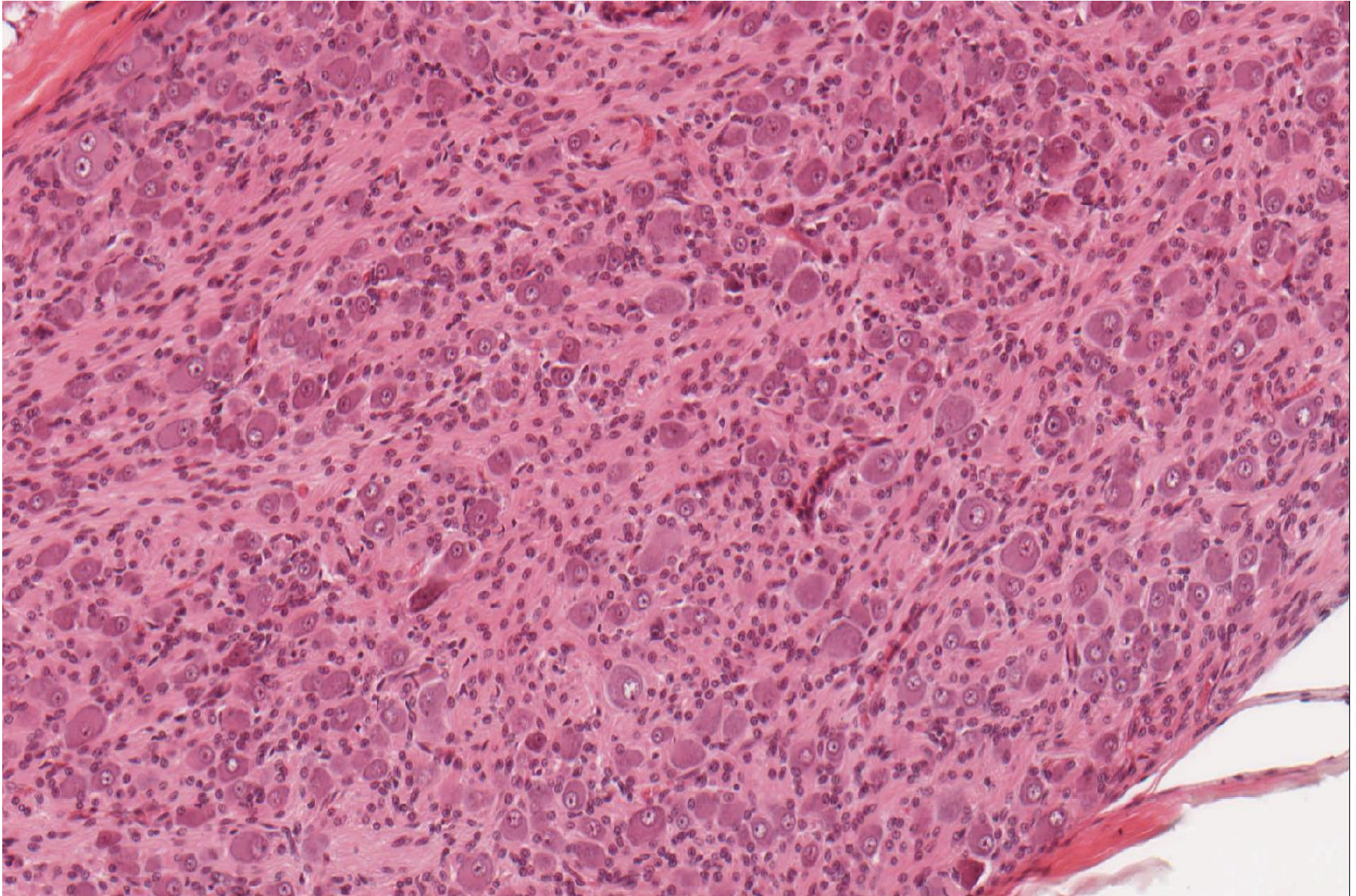


Pseudounipolar neurons

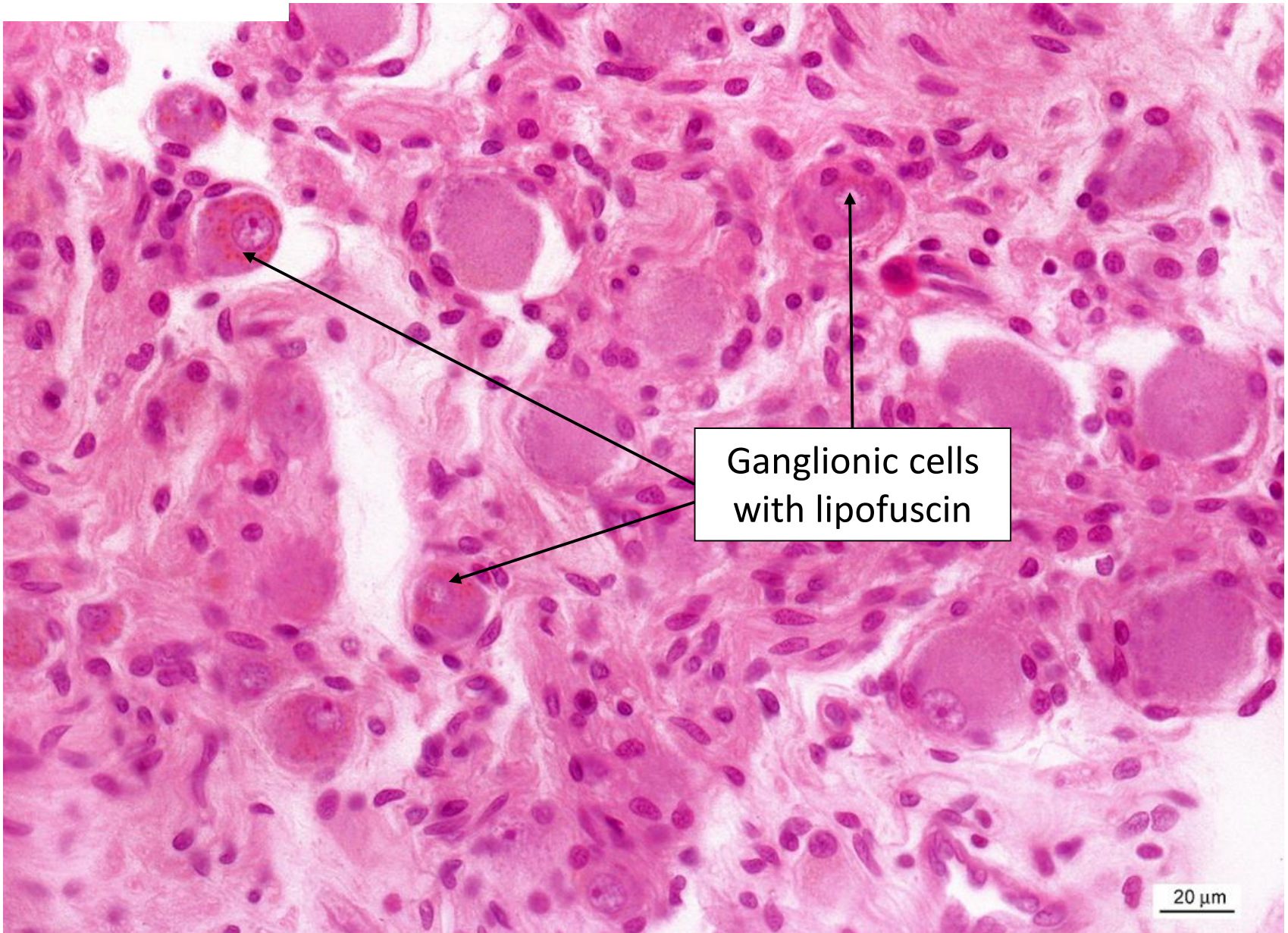
Satellite cells



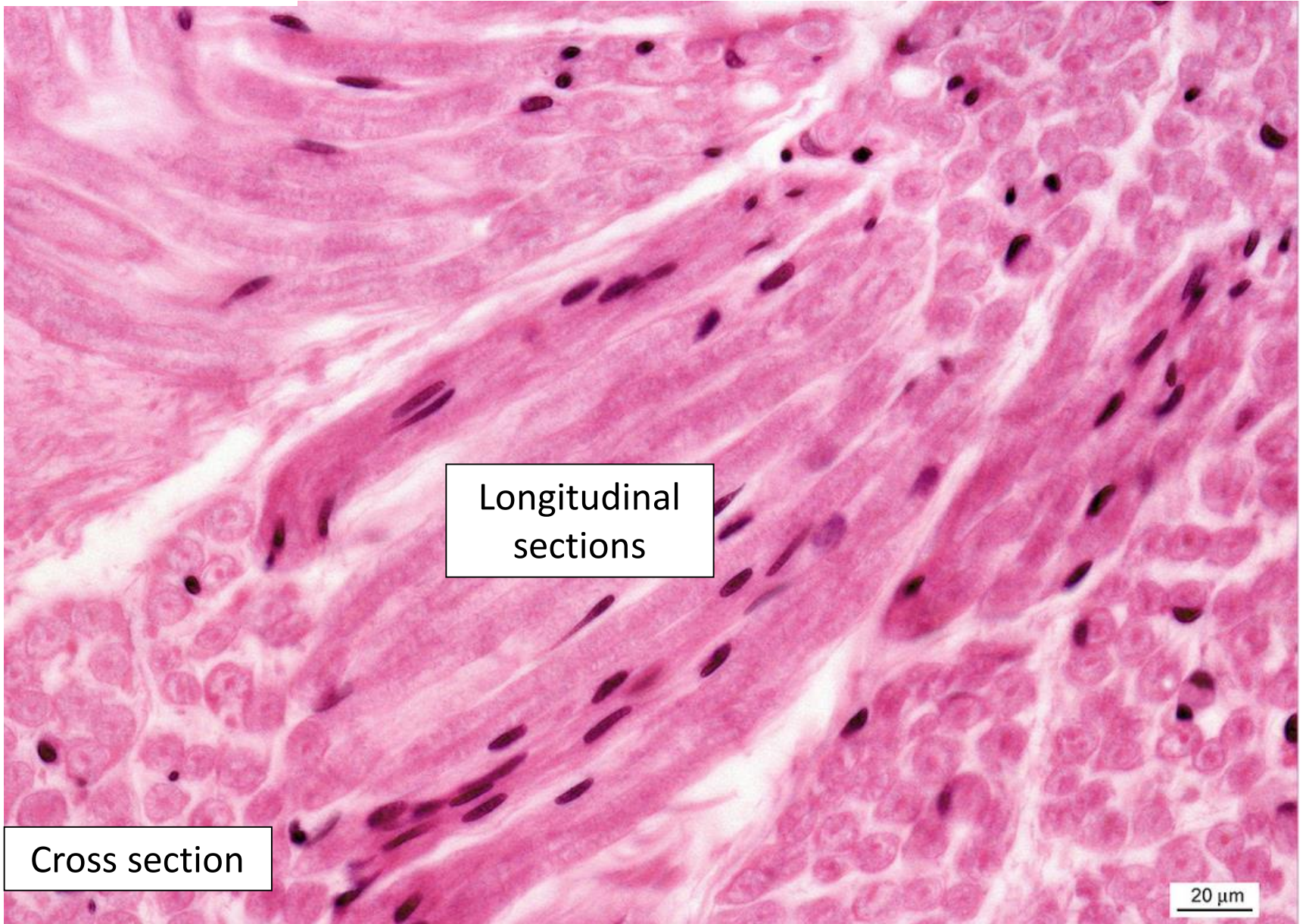
Vegetative ganglion – ganglionic cells (multipolar neurons), satellite cells



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



Peripheral nerve

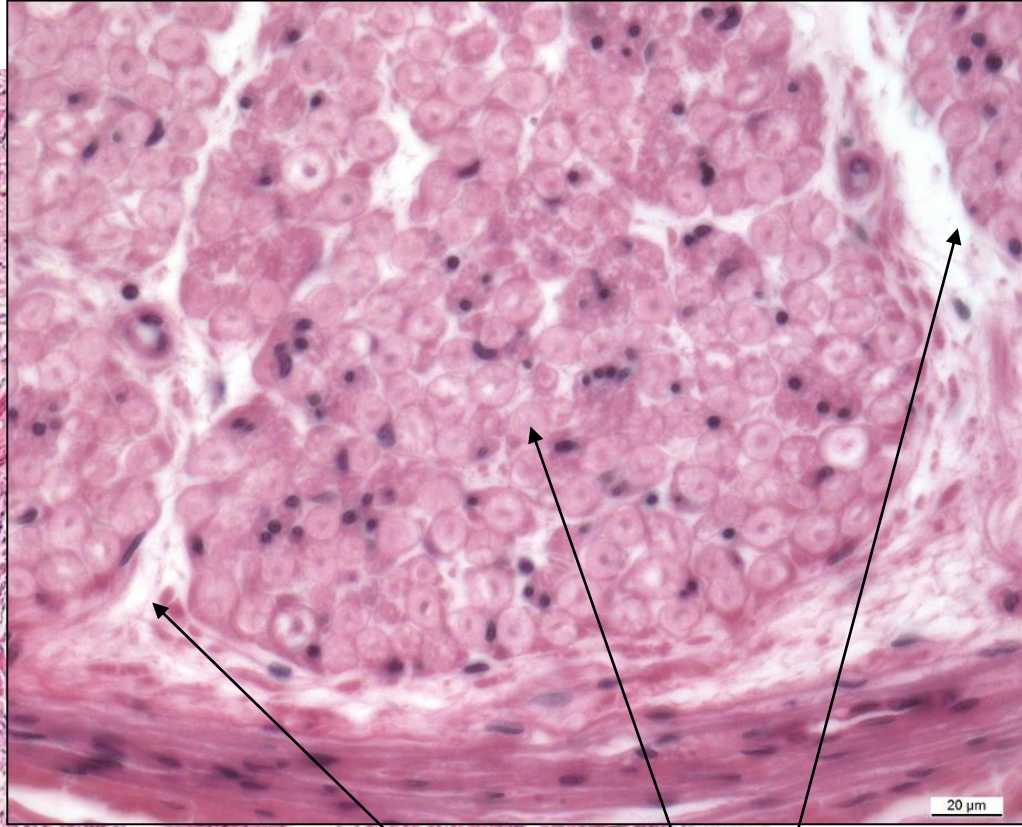
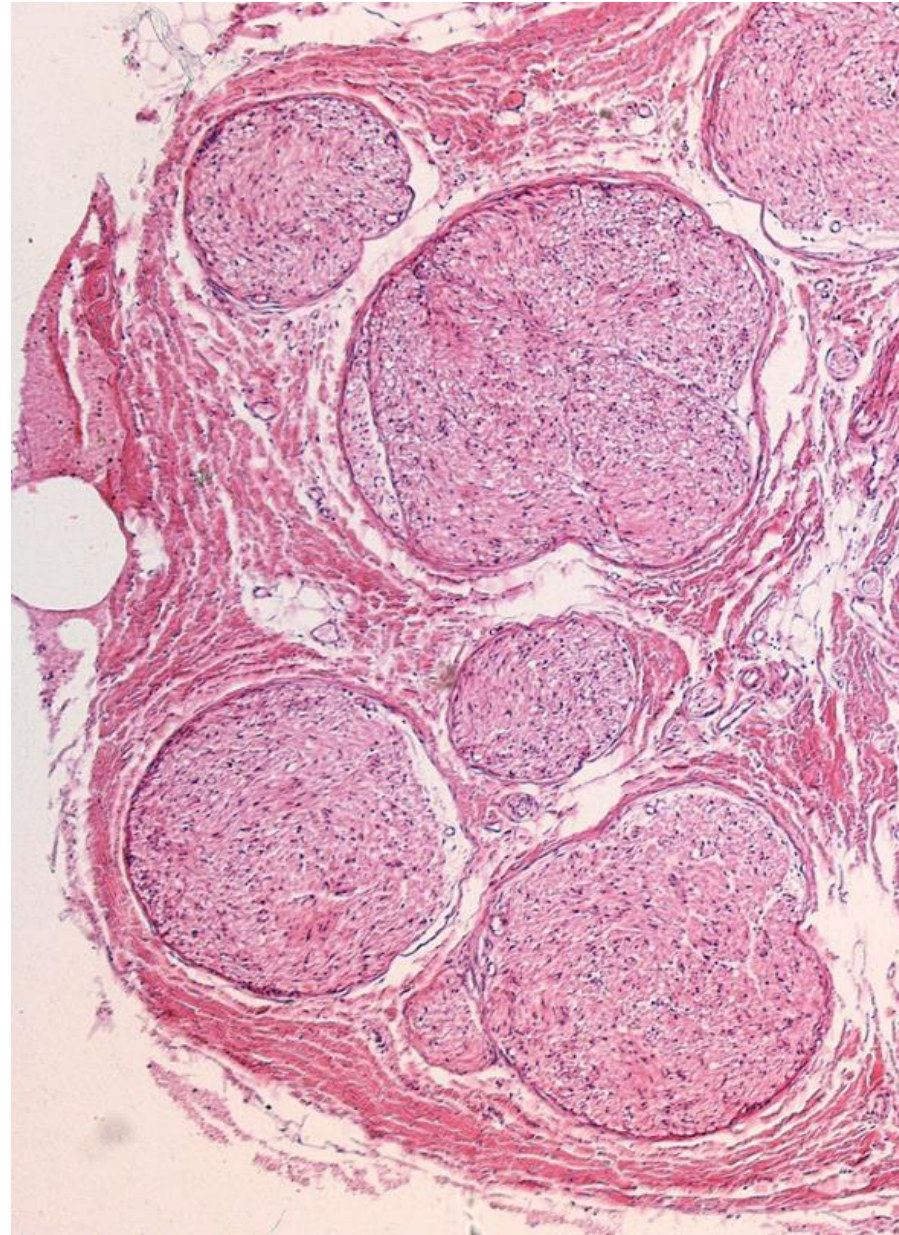


Longitudinal
sections

Cross section

20 μm

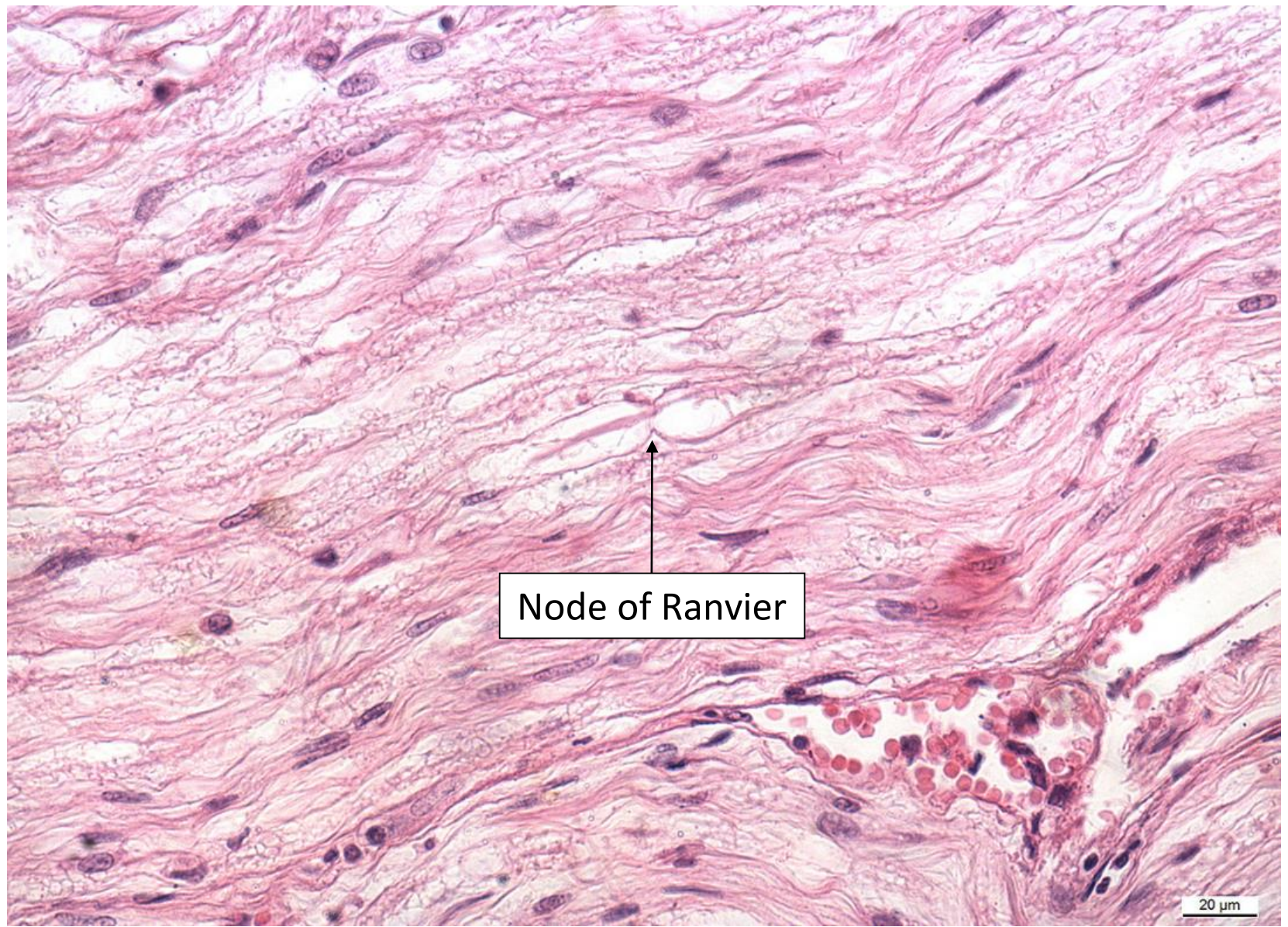
Peripheral nerve - connective tissue



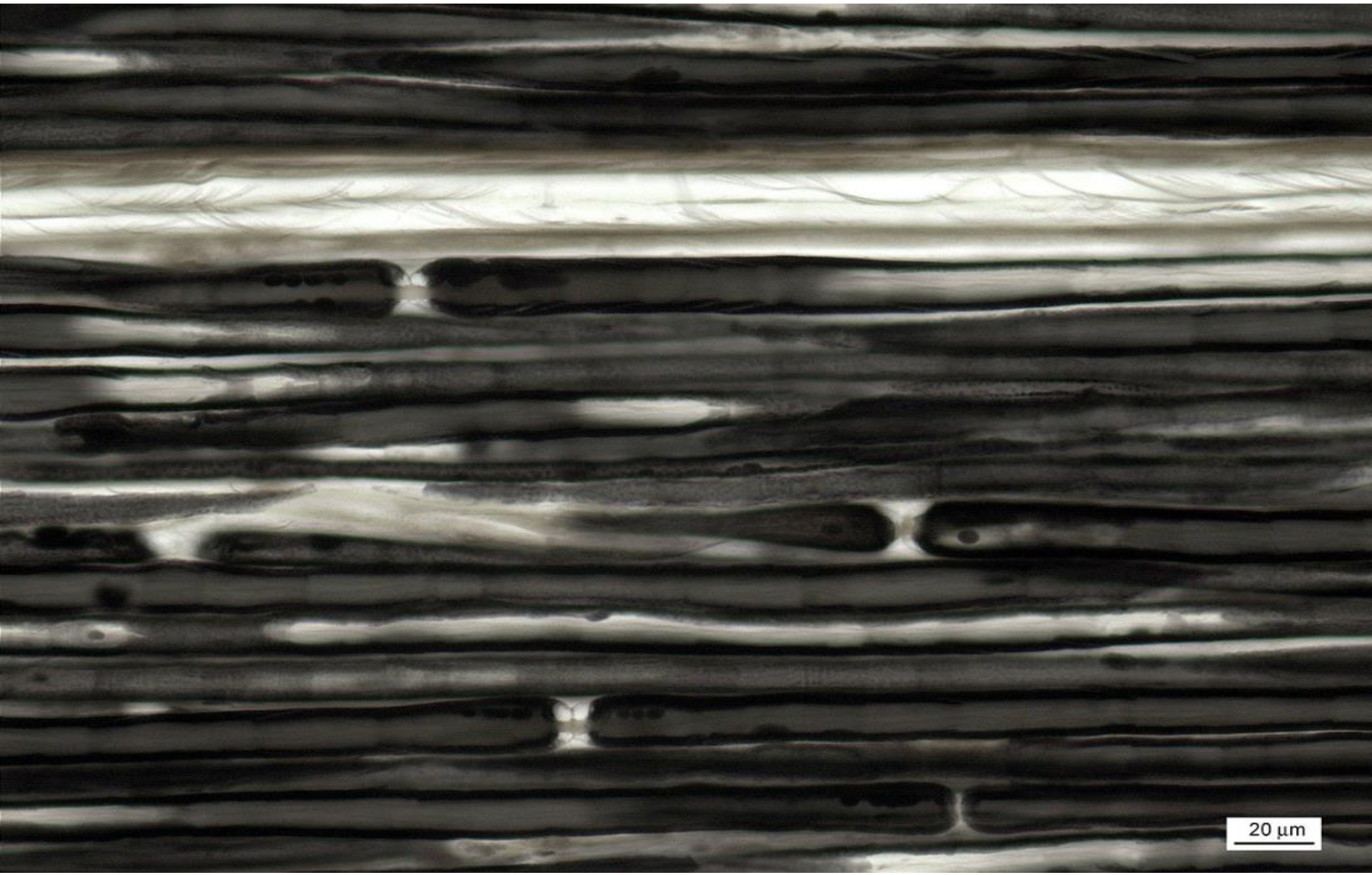
Endoneurium
Perineurium
Epineurium

20 μm

Peripheral nerve - node of Ranvier

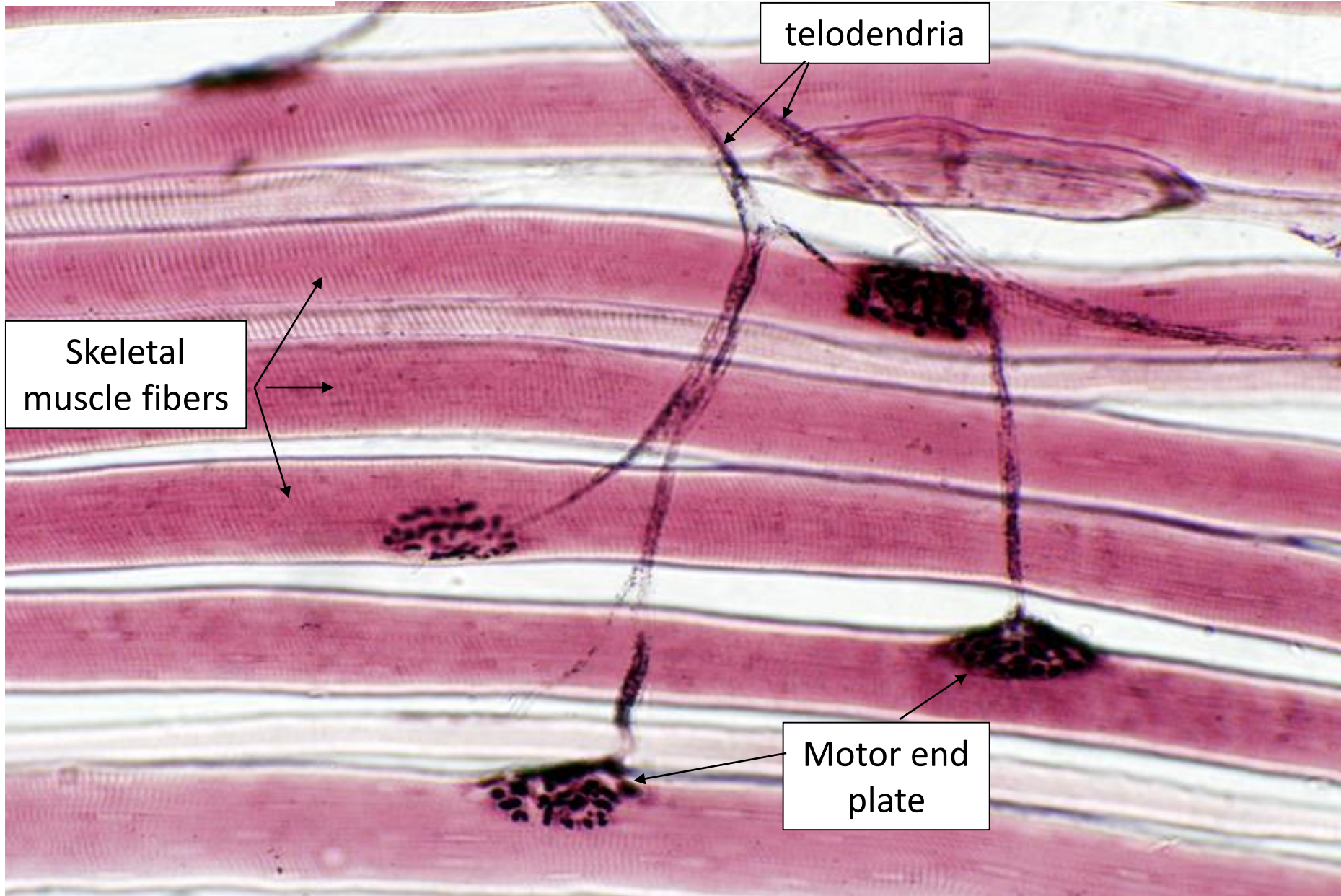


Peripheral nerve Myelin sheath with nodes of Ranvier (OsO₄)

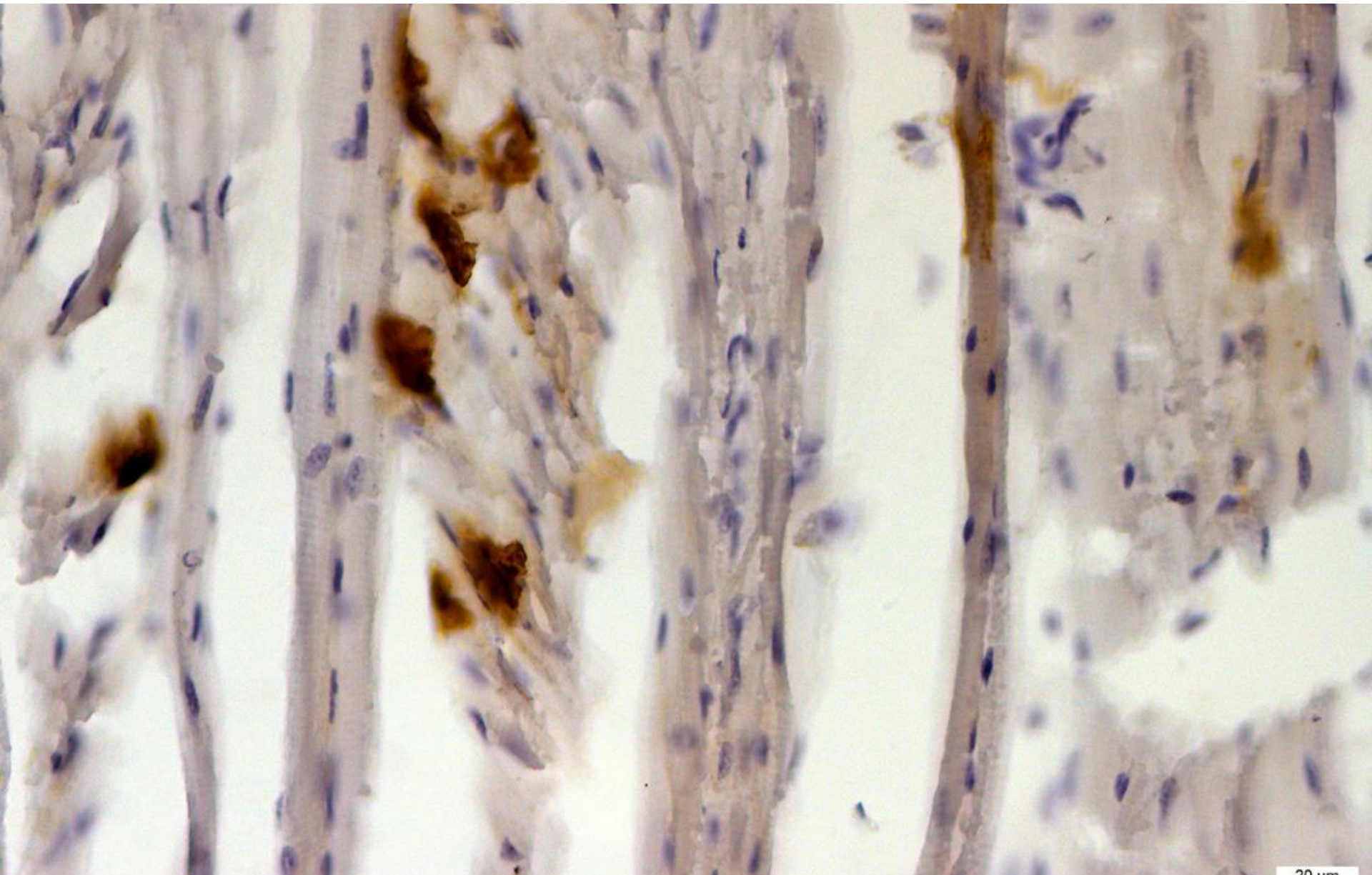


20 μm

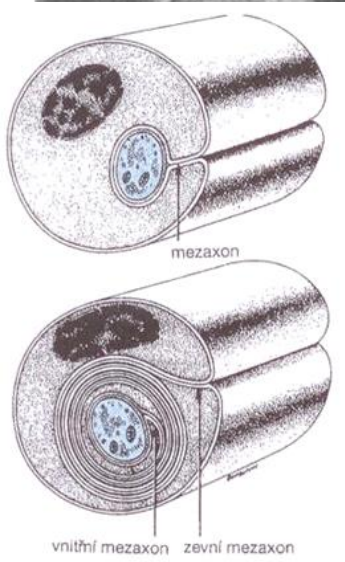
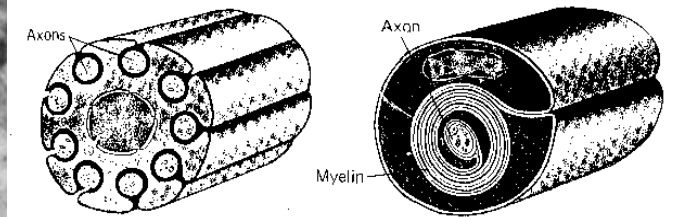
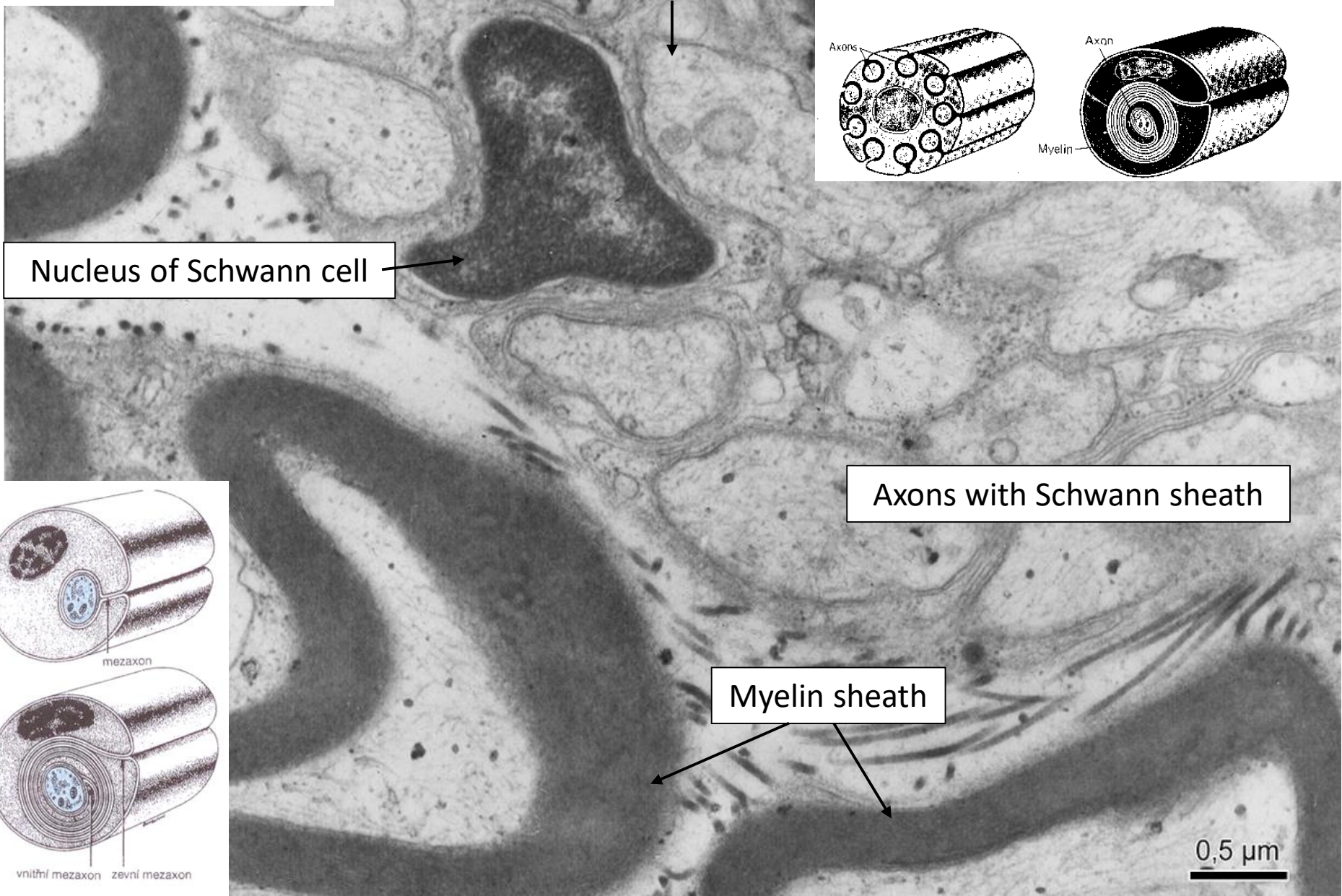
Motor end plates in motor unit



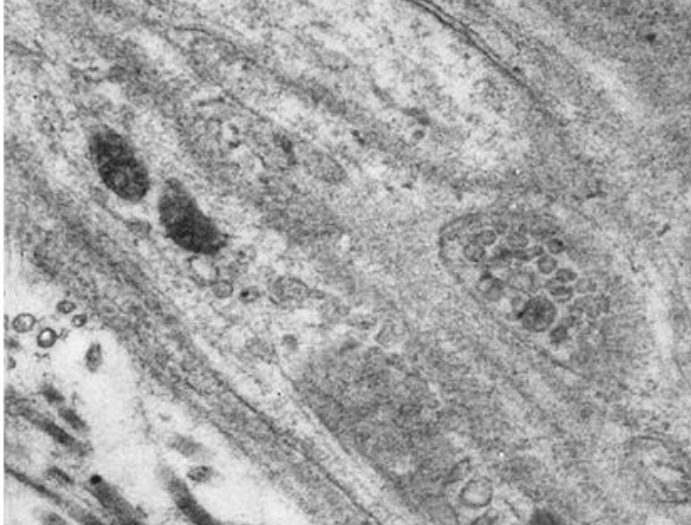
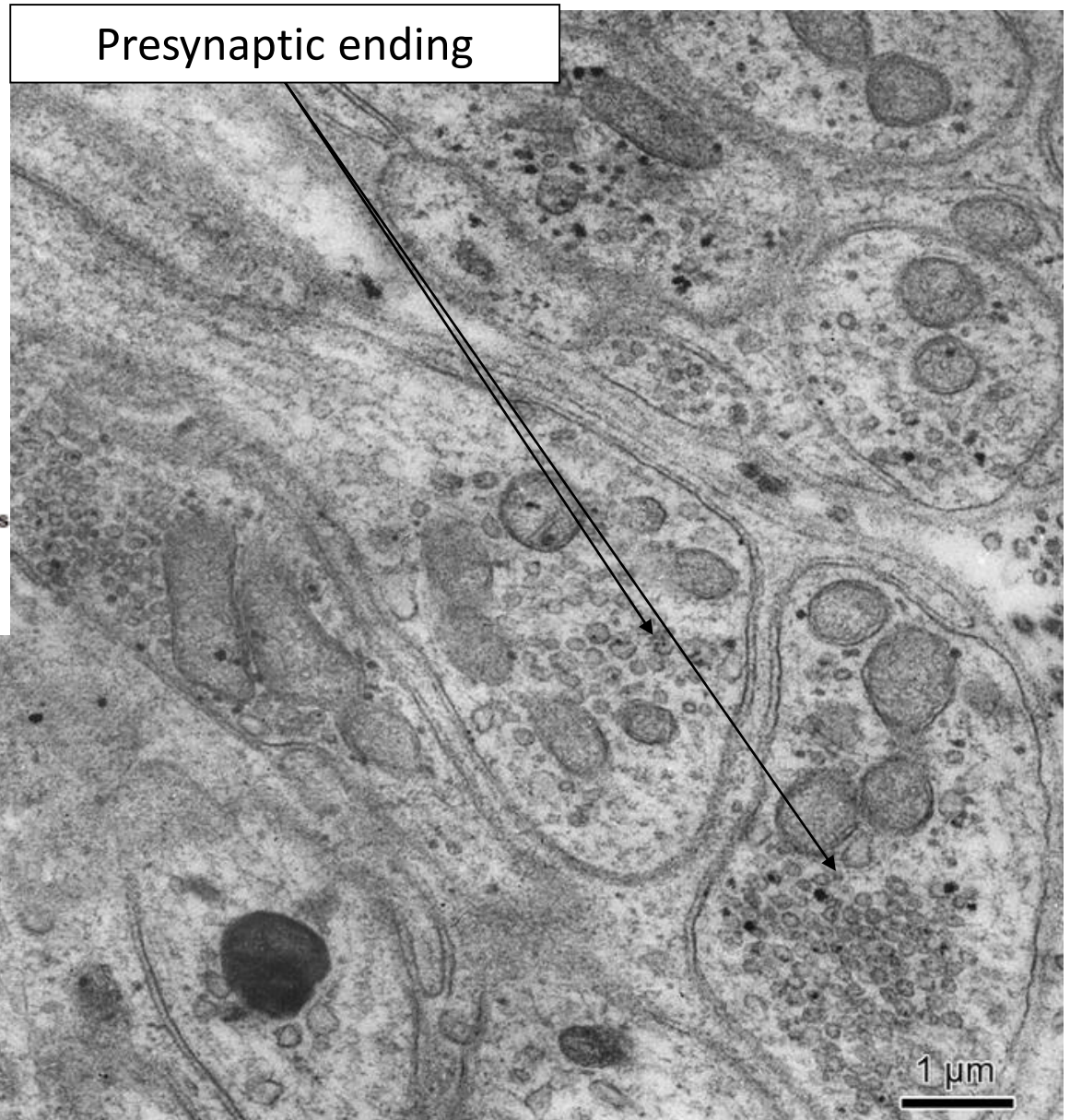
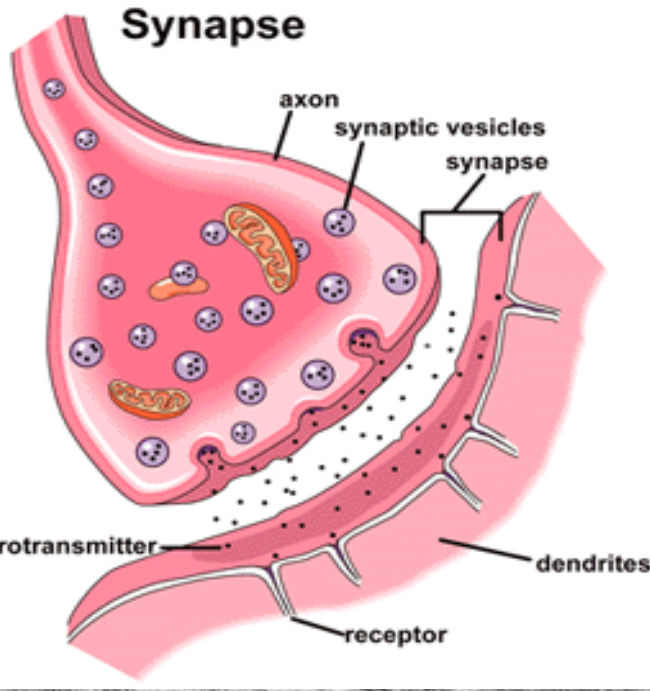
Motor end plates in motor unit (detection of acetylcholinesterase)



Myelin and Schwann sheath

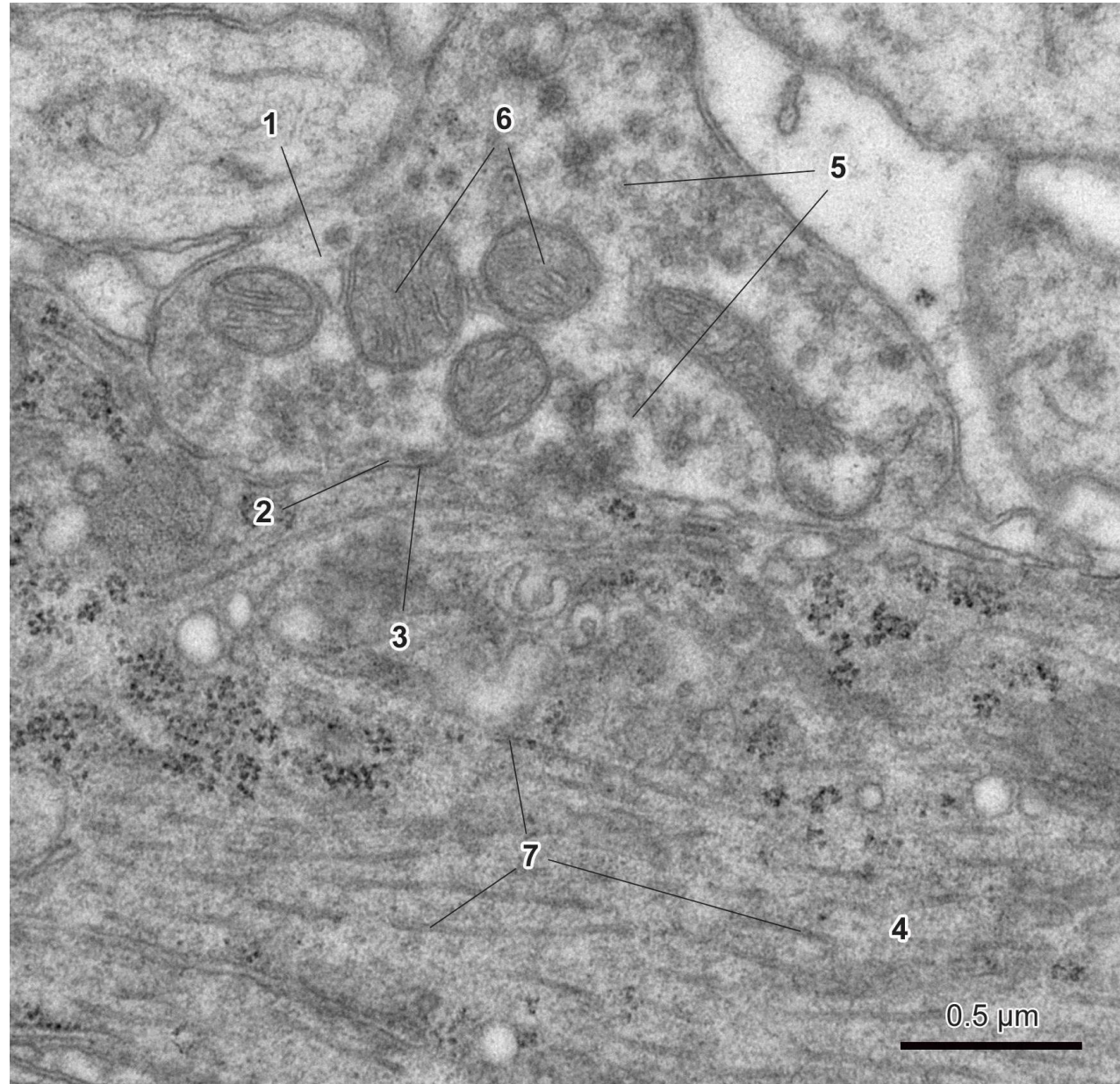


Synapsis



Synapsis

1. presynaptic ending
2. synaptic cleft
3. postsynaptic membrane
4. perikaryon
5. synaptic vesicles
6. mitochondria
7. microtubules



Neurotransmitters

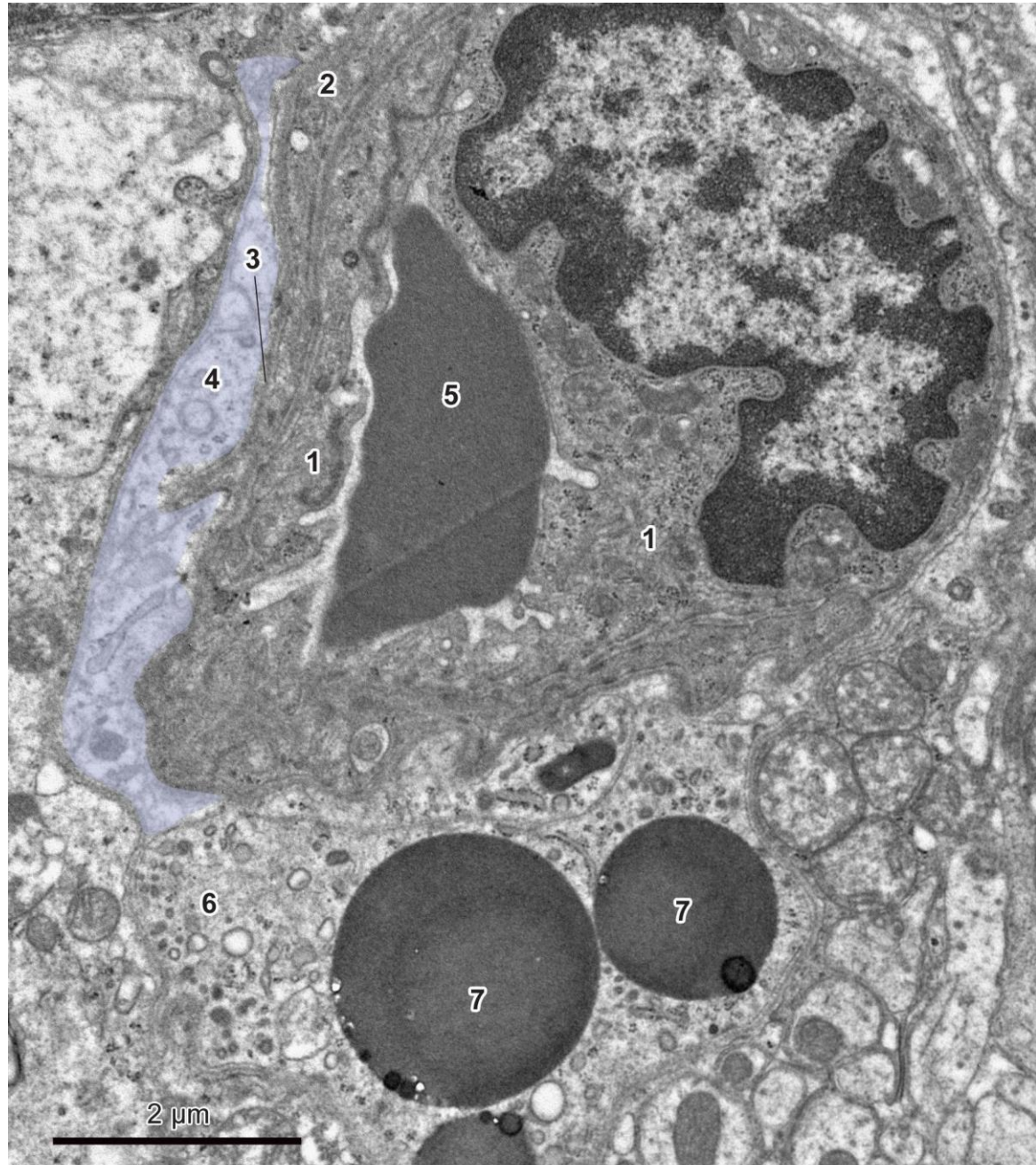
1. adrenaline
2. noradrenaline
3. dopamine
4. serotonin
5. GABA
6. acetylcholine
7. glutamate
8. endorphins

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

Hematoencephalic (blood-brain) barrier

1. endothelial cell
2. pericyte
3. *lamina basalis*
4. perivascular feet of the astrocyte
5. erythrocyte
6. microglia
7. phagosomes in microglia



Nerve tissue

Slides:

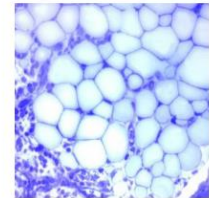
- Pyramidal cell (75, 76. *Cortex cerebri*)
- Purkinje cell (77. *Cerebellum*)
- Nissl substance (78. *Cerebellum*)
- Somatomotoric multipolar neuron (79. *Medulla spinalis*)
- Pseudounipolar neuron (81. *Ganglion spinale*)
- Myelin sheath (87. Peripheral nerve)
- Motor-end plate (Acetylcholinesterase)

Electronograms:

Atlas of Cytology and Embryology

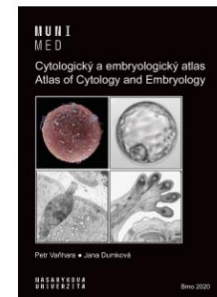
Histologický atlas

Doporučený studijní materiál



Cytologický a embryologický atlas

Doporučený studijní materiál



Numbers by the slides indicate their positions in sets in Microscopic Hall, not in online atlases. These numbers allow you to find the slides easily and study them using a microscope when the normal classes are opened.