Histology — tissues · Lab 6

Nervous tissue

When Monday 7 December 2026, 12:15–14:30

Room A5/018

Teacher dr hab. prof. UR Agata Wawrzyniak

Group Lab group 2

Same day Lecture 9, 08:00–09:30, A5/4: The circulatory system

What the lab covers

Nervous tissue: its structure and functions; neurons and their classification; neuroglia; the choroid plexus.

How it is graded

- Recognising histological slides
- Attendance
- Two tests (at least 15 single- or multiple-choice questions each, one resit) and a practical in the winter semester
- A correctly completed exercise notebook
- Activity

The final practical exam: 15 slides under the microscope, a minute each, 60% to pass.

Bring: the exercise notebook (it is graded)

In this pack

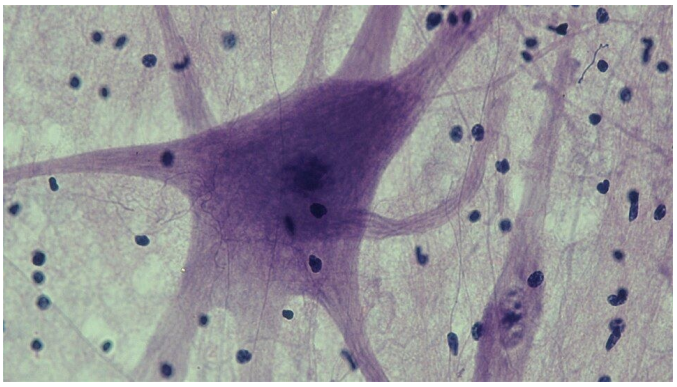
1	Recognising the slides (3)	page 2
2	Practice figures: name each numbered structure (4)	page 4
3	Key points	page 8
4	Light-microscope checklist	page 9
5	Self-test: 9 single-choice questions	page 10
	Answers: practice figures	page 11
	Answers: self-test	page 11

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1 · Recognising the slides

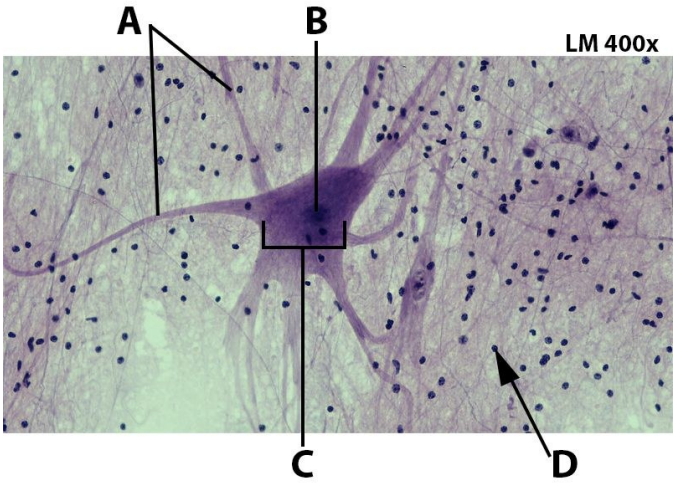
Each tissue as the Slide Box shows it: its slides, how to recognise it, and what not to confuse it with. Test yourself online: medicine.kazimiri.com/semester-1/slides/?lab=6&m=test

Multipolar neuron (spinal cord) · neuron wielobiegunowy (rdzeń kręgowy)



A multipolar motor neuron from the spinal cord (smear, 400x): a large cell body, a central nucleus and many processes.

Berkshire Community College Bioscience Image Library · CC0 · commons.wikimedia.org/wiki/File:Nervous_Tissue_Spinal_Cord_Motor_Neuron_(41850850692).jpg



Real slide (400x): a multipolar neuron from a spinal cord smear, its processes spreading among glial cells.

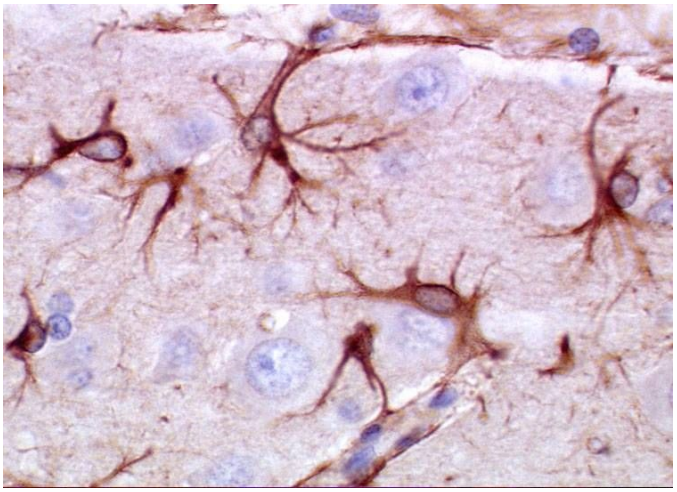
Jennifer Lange; micrograph: Berkshire Community College Bioscience Image Library (public domain) · CC BY-NC-SA 4.0 · med.libretexts.org/Bookshelves/Anatomy_and_Physiology/Human_Anatomy_(Lange_et_al.)/10%3A_Nervous_System_and_Nervous_Tissue/10.06%3A_Anatomical_Atlas_-_Nervous_Tissue

How to recognise it

- A large cell body with several processes leaving it.
- A big, round, pale nucleus with a prominent nucleolus (an "owl's eye").
- Nissl bodies: basophilic clumps (rough ER) in the cell body and dendrites, absent from the axon hillock.

Don't confuse with: Glial cells: much smaller, with no Nissl bodies.

Neuroglia (astrocytes) · neuroglej (astrocyty)



Astrocytes stained brown for GFAP, in mouse cerebral cortex: star-shaped cells with many processes.

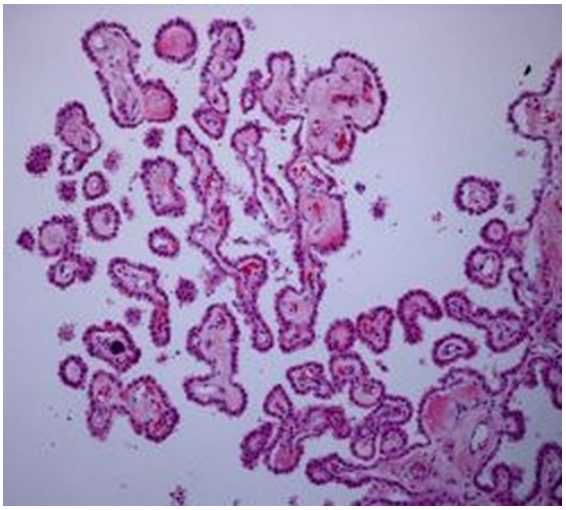
Dantecat · Public domain · commons.wikimedia.org/wiki/File:Active_Astrocytes1.jpg

How to recognise it

- Astrocytes: star-shaped cells with many processes, some ending on capillaries (end-feet); silver or GFAP stains show them.
- Oligodendrocytes: small round dark nuclei, often with a clear halo.
- Microglia: small, elongated, dark nuclei.

Don't confuse with: Neurons: much larger cell bodies with Nissl bodies.

Choroid plexus · splot naczyniówkowy



Choroid plexus (H&E): fronds of vascular connective tissue covered by a cuboidal epithelium; it makes the cerebrospinal fluid.

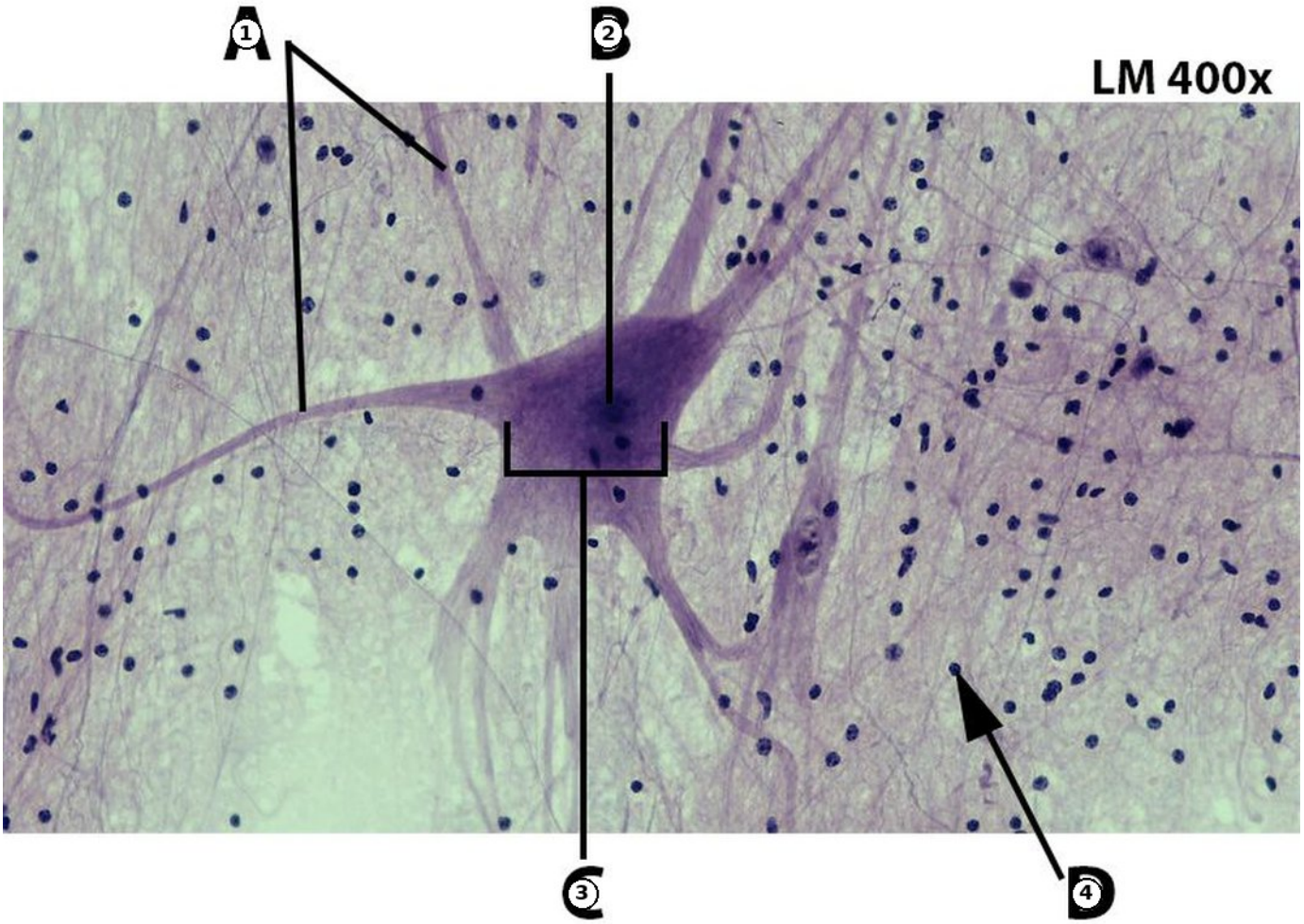
Marvin_101 · CC BY-SA 3.0 · commons.wikimedia.org/wiki/File:Choroid_Plexus_Histology_40x.png

How to recognise it

- Fronds of highly vascular connective tissue hanging into a ventricle.
- Covered by a single layer of cuboidal epithelium (modified ependyma).
- Often small calcified bodies in the stroma.

Don't confuse with: Kidney glomeruli or thyroid: they have no fronds floating free in a cavity.

A large nerve cell from the spinal cord, on a real slide



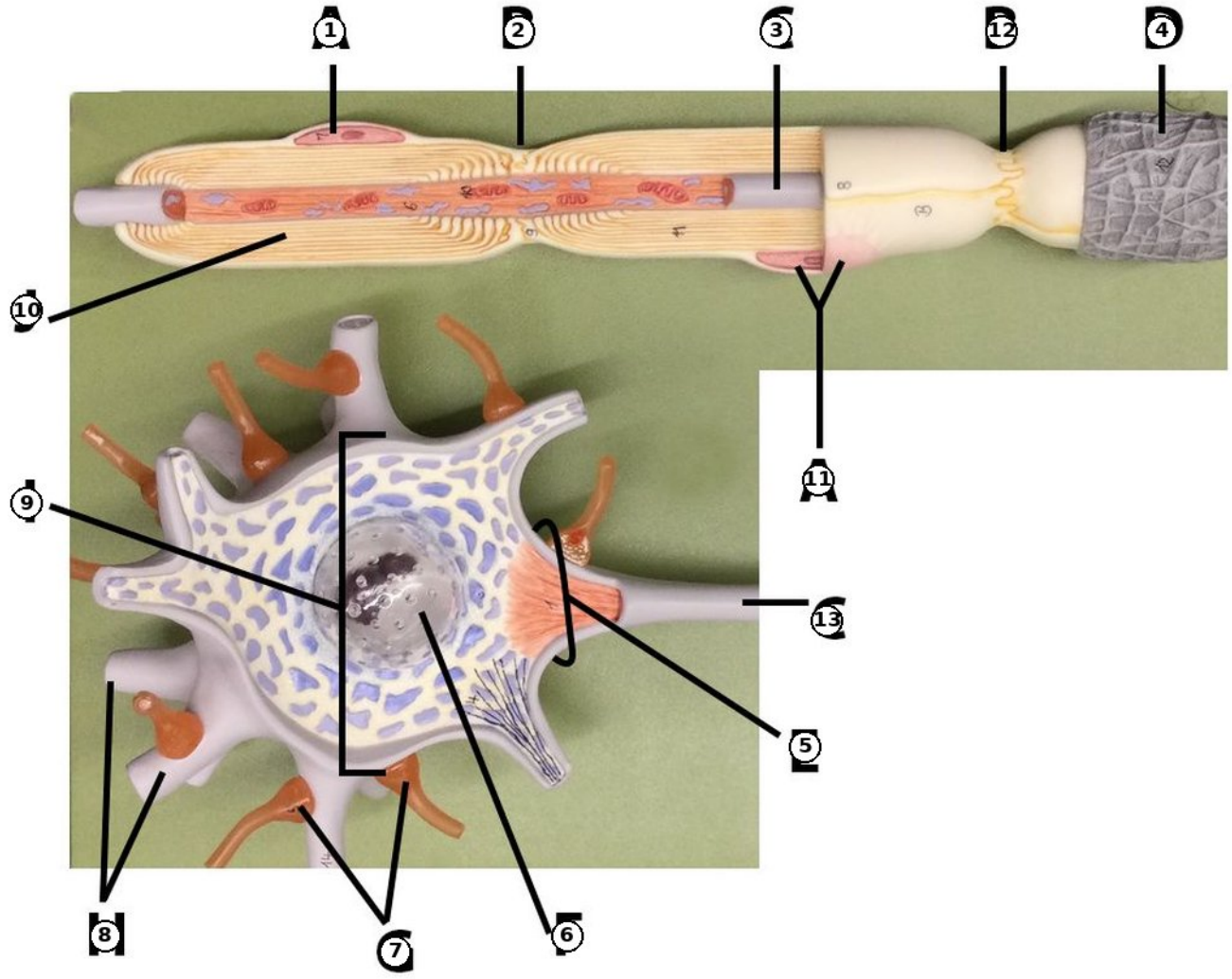
1 _____ **2** _____

3 _____ **4** _____

Practise online: medicine.kazimiri.com/semester-1/label/?map=subj-histology-6bdef55fc6

Credit: Jennifer Lange; micrograph: Berkshire Community College Bioscience Image Library (public domain) · CC BY-NC-SA 4.0 · med.libretexts.org/Bookshelves/Anatomy_and_Physiology/Human_Anatomy_(Lange_et_al.)/10%3A_Nervous_System_and_Nervous_Tissue/10.06%3A_Anatomic

A model of a nerve cell and its fibre



1 _____ **2** _____

3 _____ **4** _____

5 _____ **6** _____

7 _____ **8** _____

9 _____ **10** _____

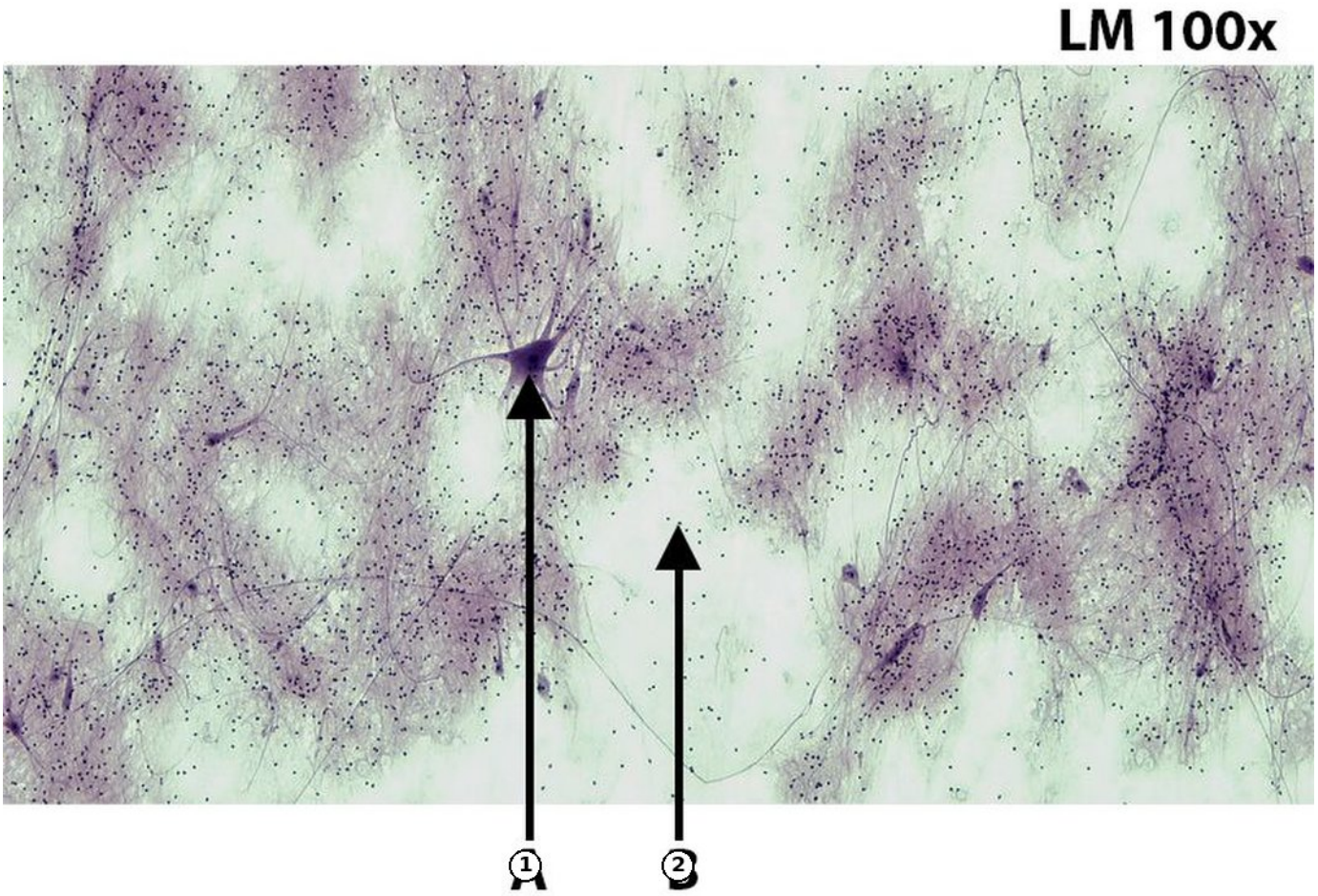
11 _____ **12** _____

13 _____

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A smear of spinal cord, on a real slide

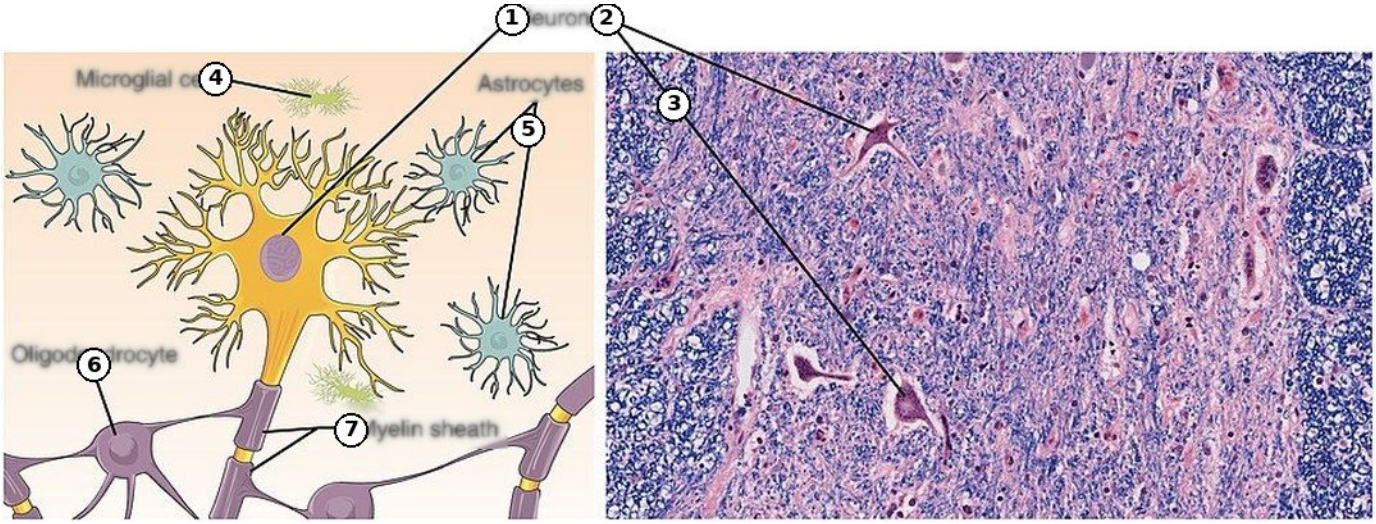


1 _____ **2** _____

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med.libretexts.org/Bookshelves/Anatomy_and_Physiology/Human_Anatomy_(Lange_et_al.)/03%3A_Tissue_Level_of_Organization/3.08%3A_Anatomical_Atlas_-

Nerve cells and their helpers, drawn and on a real slide



1 _____ **2** _____

3 _____ **4** _____

5 _____ **6** _____

7 _____

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Credit: OpenStax College · CC BY 3.0 · commons.wikimedia.org/wiki/File:416_Nervous_Tissue-new.jpg

3 · Key points

The site's key points for these classes, word for word.

Lab 6 · Nervous tissue

Nervous tissue

- Neuron: cell body with Nissl bodies (RER), dendrites, axon. Multipolar (motor), bipolar (retina), pseudounipolar (dorsal root ganglion).
- CNS glia: astrocytes, oligodendrocytes (myelin for many axons), microglia (macrophages), ependymal cells. PNS: Schwann cells (myelin for one internode), satellite cells.
- Nodes of Ranvier allow saltatory conduction. Synapses are chemical (vesicles, cleft) or electrical (gap junctions).
- The axon starts at the axon hillock, which lacks Nissl bodies; microtubules carry cargo along it (kinesin away from the cell body, dynein back).
- Myelin is a spiral of glial membrane, rich in lipid, that speeds conduction. Thick myelinated A fibres conduct fastest; thin unmyelinated C fibres (pain, autonomic) slowest.
- A chemical synapse: the presynaptic ending releases a transmitter (acetylcholine, glutamate, GABA) from vesicles into a cleft of about 20-30 nm, onto receptors of the postsynaptic membrane. By contact: axodendritic, axosomatic, axoaxonic.
- Astrocytes support neurons, clear transmitters and, with the tight junctions of the endothelium, maintain the blood-brain barrier. Ependymal cells line the ventricles; in the choroid plexus, ependyma covering folds of vascular pia mater secretes cerebrospinal fluid.
- A peripheral nerve: endoneurium around each fibre, perineurium around each fascicle, epineurium around the whole nerve. Cut axons in the PNS can regrow along the Schwann cell tube; in the CNS they hardly do.
- Sensory (dorsal root) ganglia hold pseudounipolar neurons ringed by satellite cells; autonomic ganglia hold multipolar neurons.

4 · Using the light microscope: checklist

- ☐ Carry the microscope with both hands, one on the arm and one under the base. Lamp at minimum before switching on.
- ☐ Start with the lowest-power objective (4× or 10×) clicked into place. Slide coverslip up, label to the side, held in the mechanical stage.
- ☐ Centre the section over the light with the naked eye first.
- ☐ Watching from the side, raise the stage close to the objective with the coarse focus. Then, looking through the eyepieces, focus by moving the stage AWAY from the objective. Set the eyepiece distance for your eyes.
- ☐ Light: lamp brightness and the condenser's aperture diaphragm. Close the diaphragm for more contrast, open it for more resolution.
- ☐ Higher power: turn the nosepiece; at 40× use the fine focus only.
- ☐ Oil immersion (100×), only when the teacher allows it: a drop of oil on the coverslip, swing in the 100× objective, fine focus only. Never let the 40× objective touch the oil. Wipe oil off the lens and the slide with lens paper afterwards.
- ☐ Total magnification = objective × eyepiece (40 × 10 = 400×). The light microscope resolves about 0.2 µm.
- ☐ At the end: lowest objective in place, stage down, slide out, lamp at minimum and off, dust cover on.

5 · Self-test: 9 single-choice questions

From the site's Histology — tissues quiz (Nervous tissue). One answer is right in each; circle it. Give yourself about a minute a question. The answers are on the last page.

1. Nissl bodies are:

A lysosomes
B rough endoplasmic reticulum
C neurofilaments
D lipofuscin

2. Schwann cells myelinate:

A many axons in the CNS
B one internode of one axon in the PNS
C dendrites
D the spinal cord

3. Myelin in the central nervous system is made by:

A oligodendrocytes
B Schwann cells
C astrocytes
D microglia

4. Nodes of Ranvier are:

A the axon hillocks
B synaptic boutons
C gaps in the myelin sheath between internodes
D clumps of rough ER

5. Astrocytes:

A myelinate axons in the CNS
B are the brain's resident macrophages
C line the ventricles
D support neurons, their end-feet wrapping capillaries

6. Microglia are:

A myelinating cells of the CNS
B cells lining the ventricles
C the resident macrophages of the CNS
D support cells of ganglia

7. Ependymal cells line the:

A meninges
B peripheral nerves
C ventricles of the brain and the central canal
D capillaries of the brain

8. The perineurium wraps:

A a single axon
B the whole nerve
C one Schwann cell
D a fascicle of nerve fibres

9. Pseudounipolar neurons are found in the:

A dorsal root (spinal) ganglia
B anterior horn of the spinal cord
C motor cortex
D retina

Answers · practice figures

Figure 1 · A large nerve cell from the spinal cord, on a real slide

1 Neuron processes (axon, dendrites) **2** Nucleus **3** Cell body (soma)
4 Glial cell

Figure 2 · A model of a nerve cell and its fibre

1 Schwann cell nucleus **2** Node of Ranvier **3** Axon
4 Endoneurium **5** Axon hillock **6** Nucleus
7 Synaptic terminals **8** Dendrites **9** Cell body (soma)
10 Myelin sheath **11** Schwann cell nucleus **12** Node of Ranvier
13 Axon

Figure 3 · A smear of spinal cord, on a real slide

1 Neuron **2** Glial cell

Figure 4 · Nerve cells and their helpers, drawn and on a real slide

1 Neurons **2** Neurons **3** Neurons
4 Microglial cell **5** Astrocytes **6** Oligodendrocyte
7 Myelin sheath

Answers · self-test

1 B rough endoplasmic reticulum — Stacks of RER in the neuron's cell body.

2 B one internode of one axon in the PNS — Oligodendrocytes myelinate many CNS axons each.

3 A oligodendrocytes — One oligodendrocyte myelinates many axons; a Schwann cell, one internode of one axon.

4 C gaps in the myelin sheath between internodes — Sodium channels crowd at the nodes, so the impulse jumps from node to node (saltatory conduction).

5 D support neurons, their end-feet wrapping capillaries — Astrocytes buffer ions, recycle transmitters and help the endothelium form the blood-brain barrier.

6 C the resident macrophages of the CNS — Microglia patrol the CNS and clear debris; they come from the macrophage line, not from neural tube.

7 C ventricles of the brain and the central canal — A cuboidal-columnar, often ciliated layer; in the choroid plexus it is modified to make cerebrospinal fluid.

8 D a fascicle of nerve fibres — Endoneurium round each fibre, perineurium round each fascicle (a diffusion barrier), epineurium round the nerve.

9 A dorsal root (spinal) ganglia — Sensory neurons of spinal ganglia have one process that splits into a peripheral and a central branch.