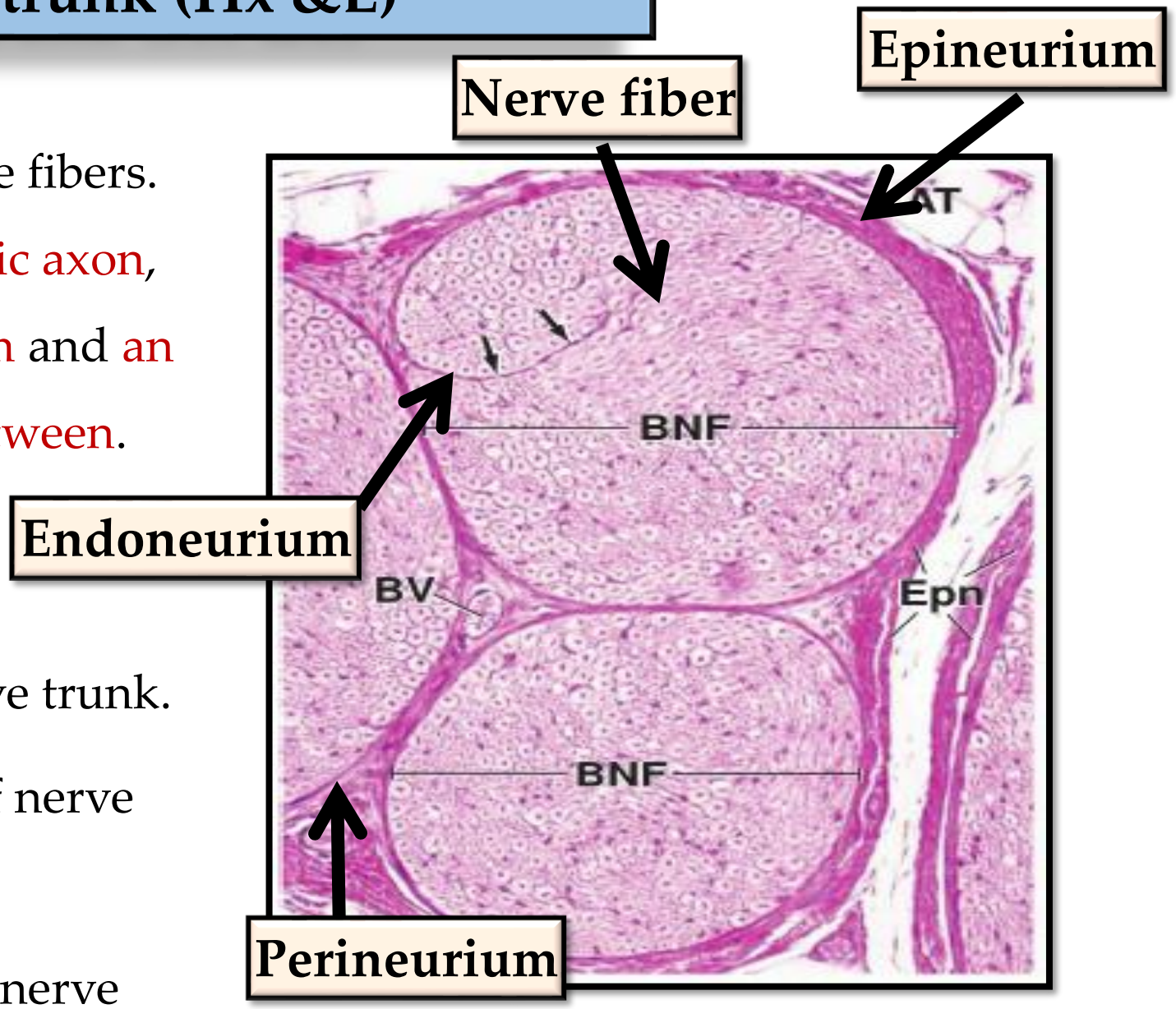
Histology Practical Revision

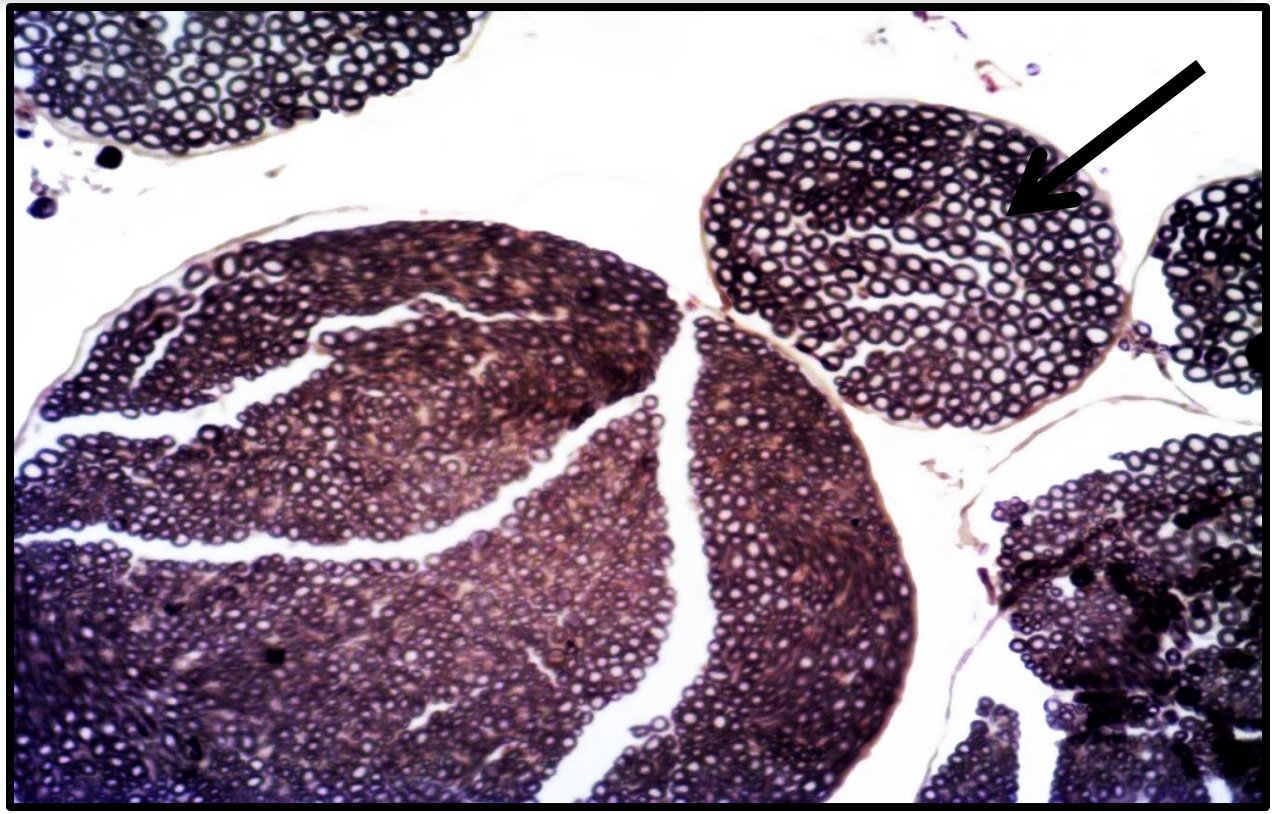
CNS Module

Nerve trunk (Hx &E)

- Formed of bundles of myelinated nerve fibers.
- Each fiber appears as central acidophilic axon, thin outer pink Schwann cell cytoplasm and an empty space of dissolved myelin in between.
- The nerve trunk has the following CT components:
- Epineurium: surrounds the whole nerve trunk.
- Perineurium: surrounds the bundles of nerve fibers.
- Endoneurium: between the individual nerve

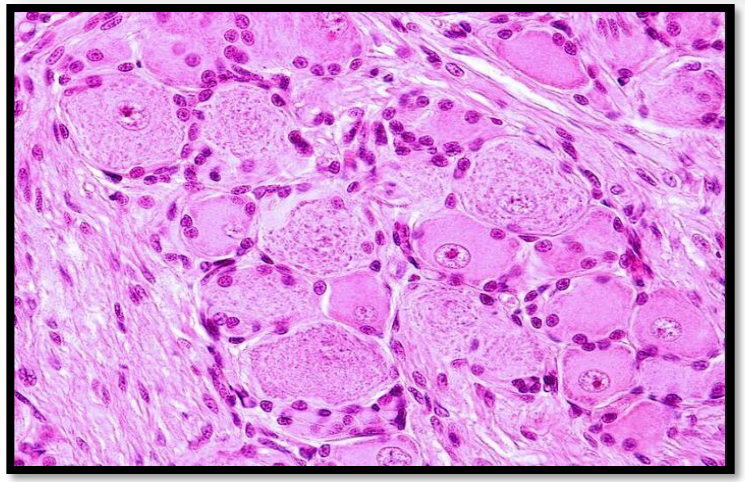


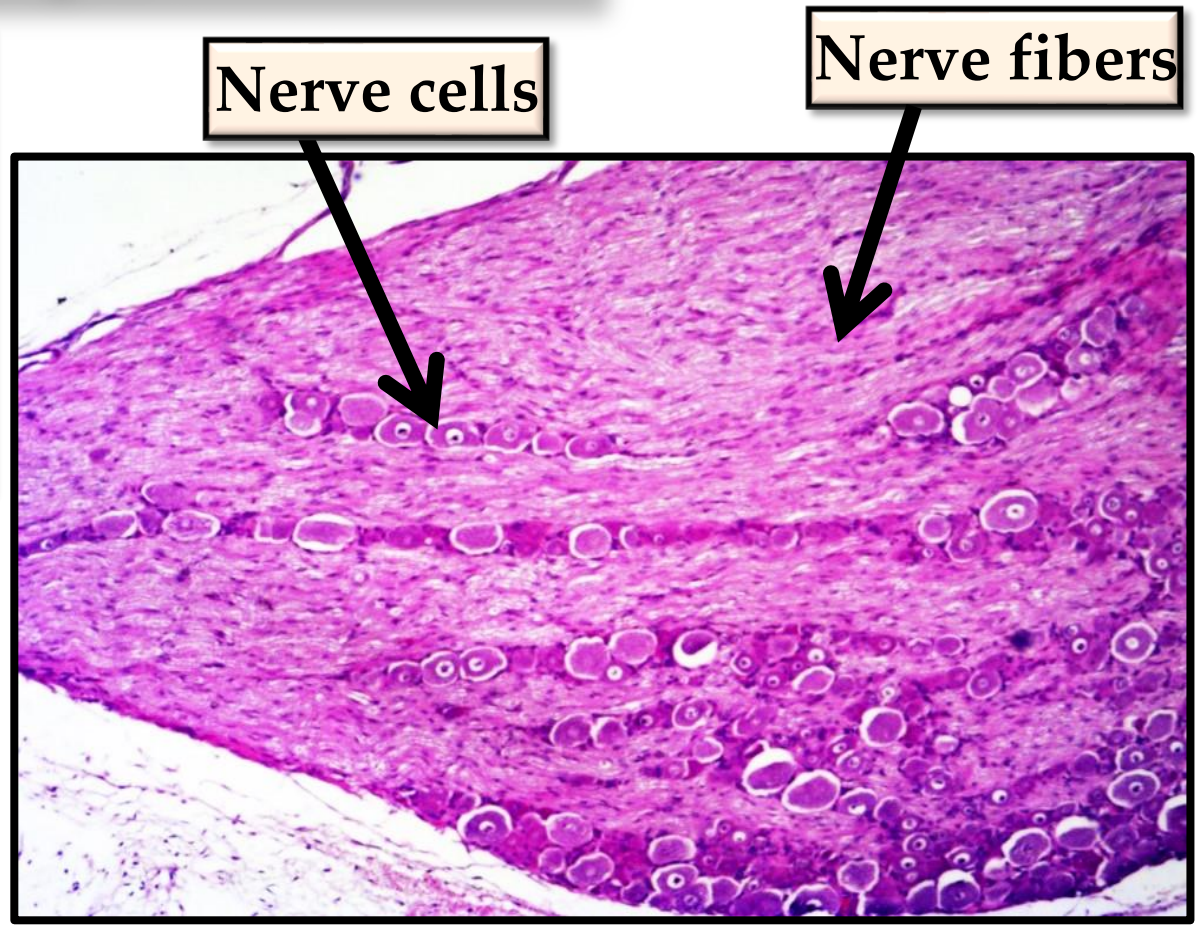
Nerve trunk (Osmic acid)



- Myelin sheathes are stained and appear as black circles.
- Axons and Schwann cells are not stained.

Spinal ganglia





❑ Nerve cells:

- Pseudounipolar nerve cells are arranged in rows or groups with some small and some large cells. The nuclei are central and rounded.

❑ Nerve fibers:

- Acidophilic thick myelinated nerve fibers are present in between the rows of cells.

Spinal cord, Cerebrum & Cerebellum

Spinal cord levels

Cervical level:

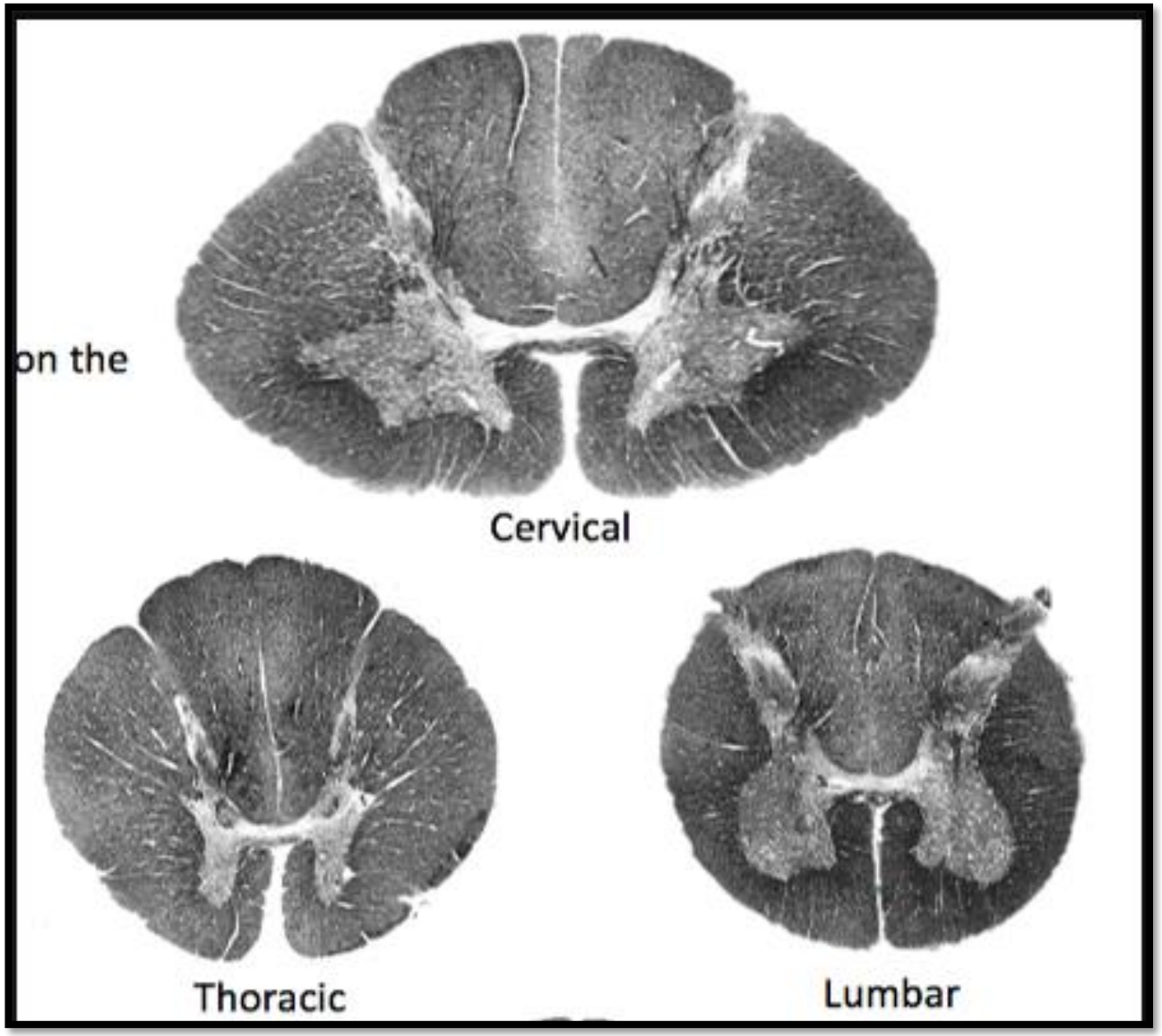
- Oval outline.
- Thick ventral horn.
- Thin diverging dorsal horn.

Thoracic level:

- Rounded outline.
- Thin ventral & dorsal horn.
- Two small lateral horns.

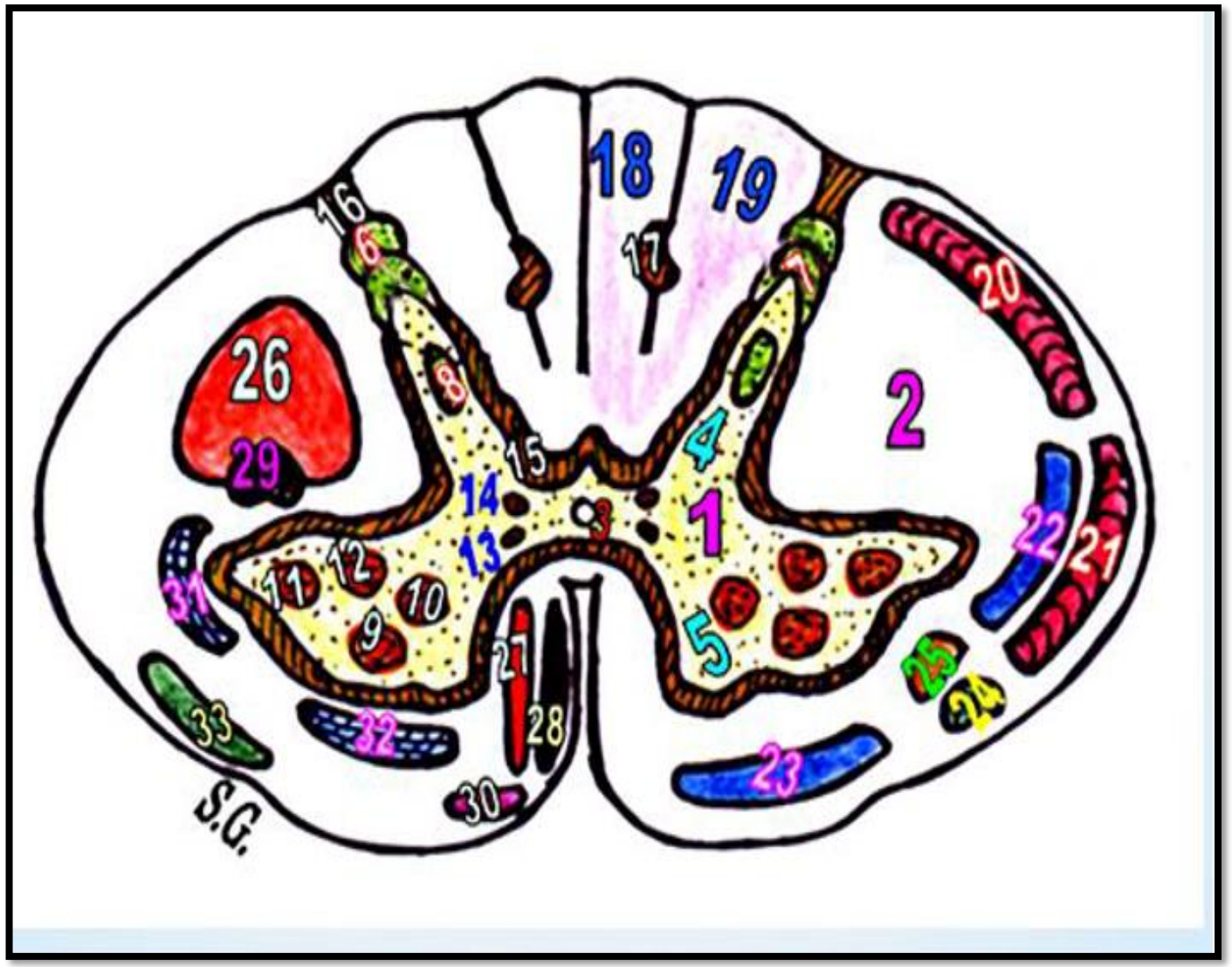
Lumbar level:

- Rounded outline.
- Thick ventral & dorsal horn.
- Two small lateral horns in the first 2 lumbar segments only.



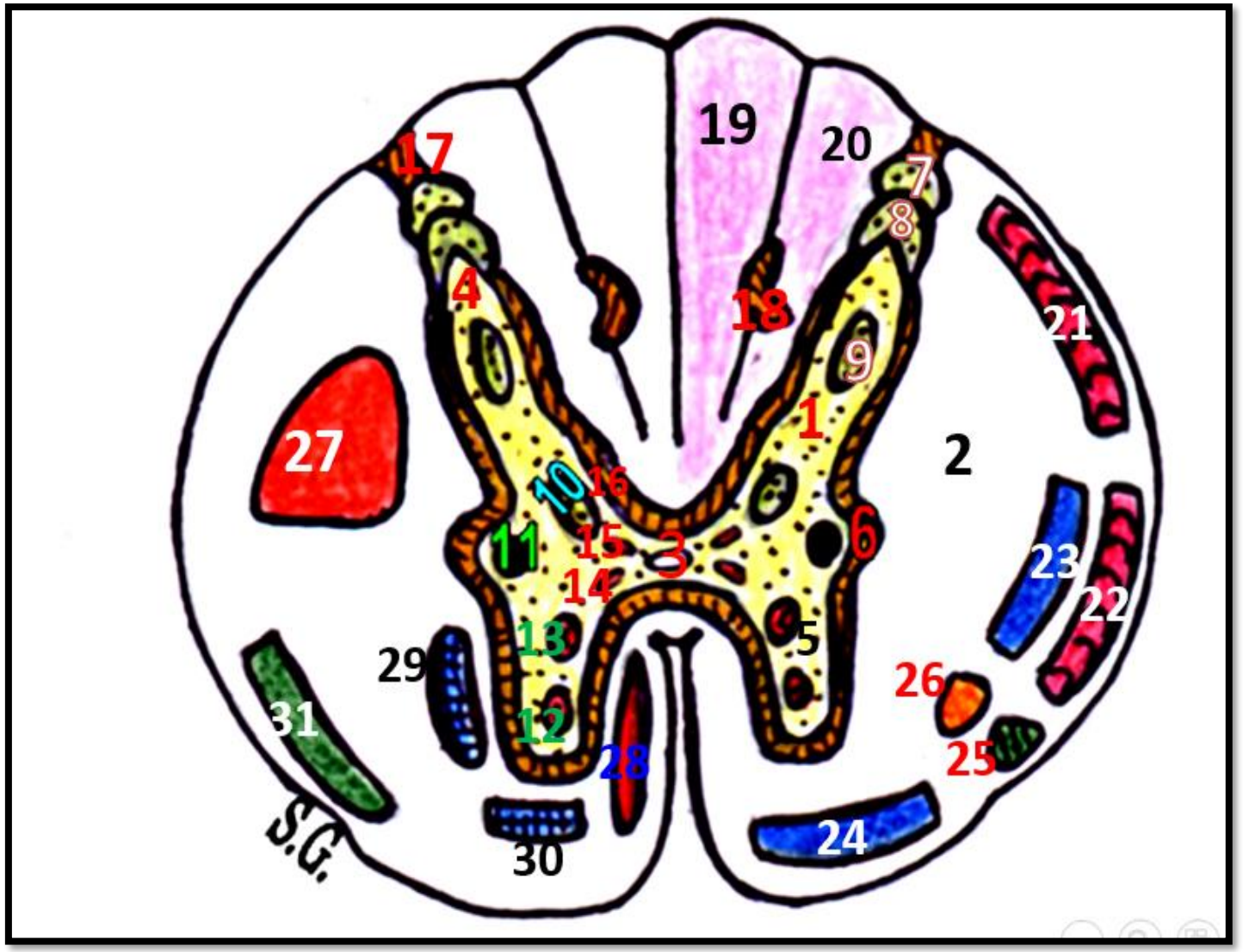
Spinal cord (Cervical level)

18. Gracile T.
19. Cuneate T.
20. Dorsal spinocerebellar T.
21. Ventral spinocerebellar T.
22. Lateral spinothalamic T.
23. Ventral spinothalamic T.



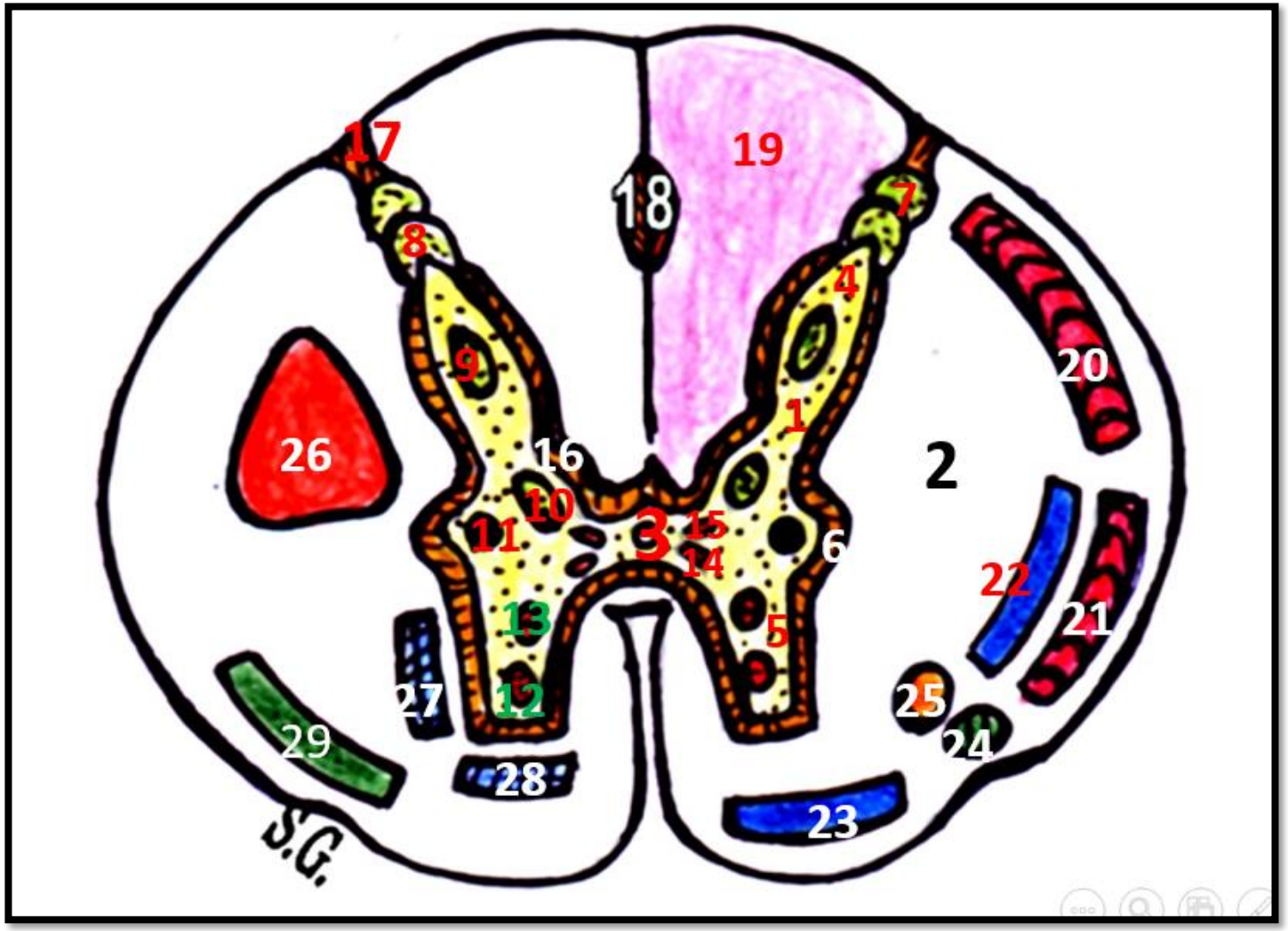
Spinal cord (upper thoracic level)

6. Lateral horn.
11. Sympathetic N.
18. Comma-shaped T.
19. Gracile T.
20. Cuneate T.
27. Crossed pyramidal T.
28. Direct pyramidal T.



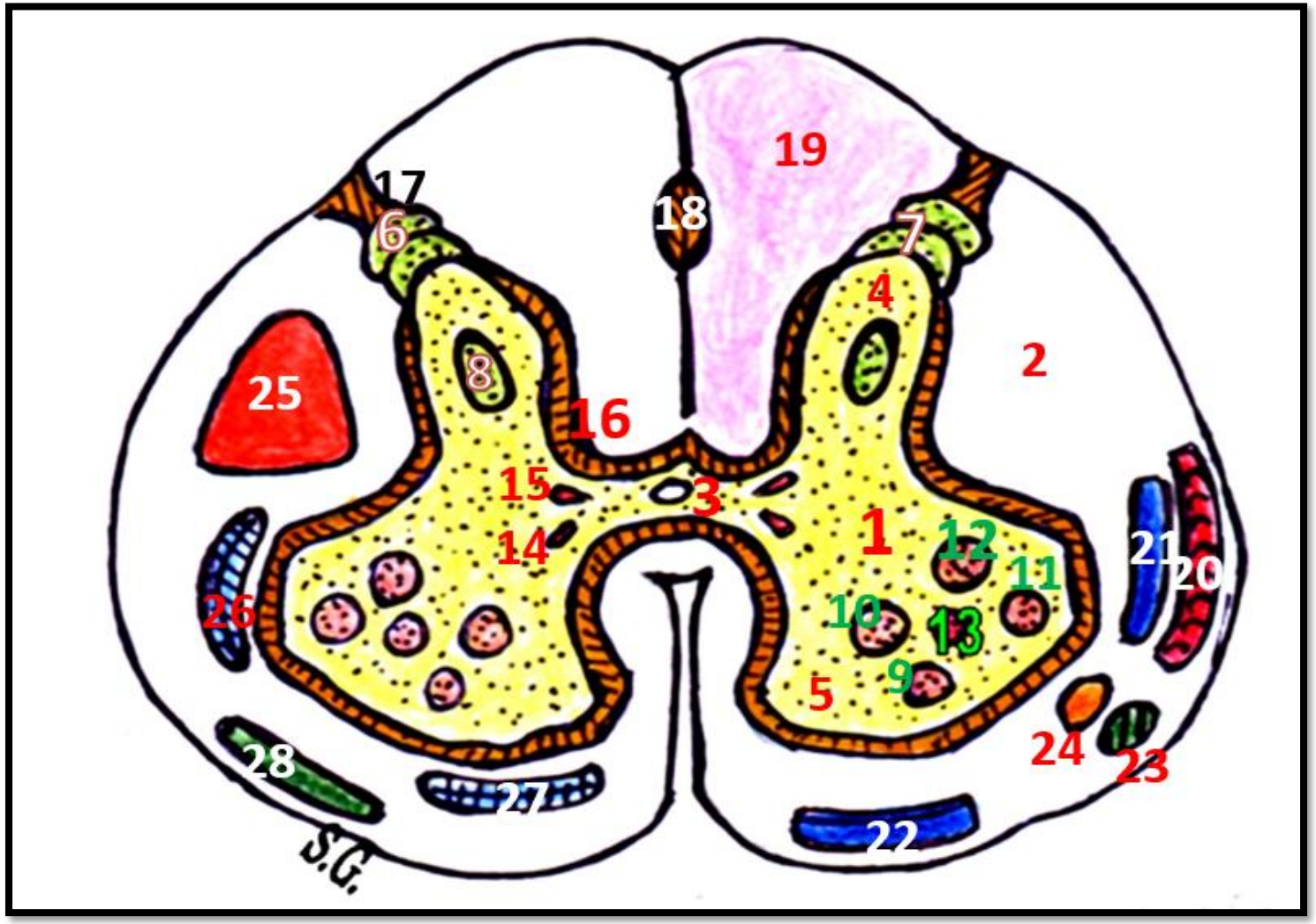
Spinal cord
(lower thoracic level)

7. Posteromarginal N.
8. Substantia gelatinosa of Rolandi.
9. Main sensory N.
10. Clark's N.
18. Septomarginal T.
19. Gracile T.



Spinal cord (lumbar level)

20. Ventral spinocerebellar T.
21. Lateral spinothalamic T.
22. Ventral spinothalamic T.
23. Spinoolivary T.
24. Spinotectal T.

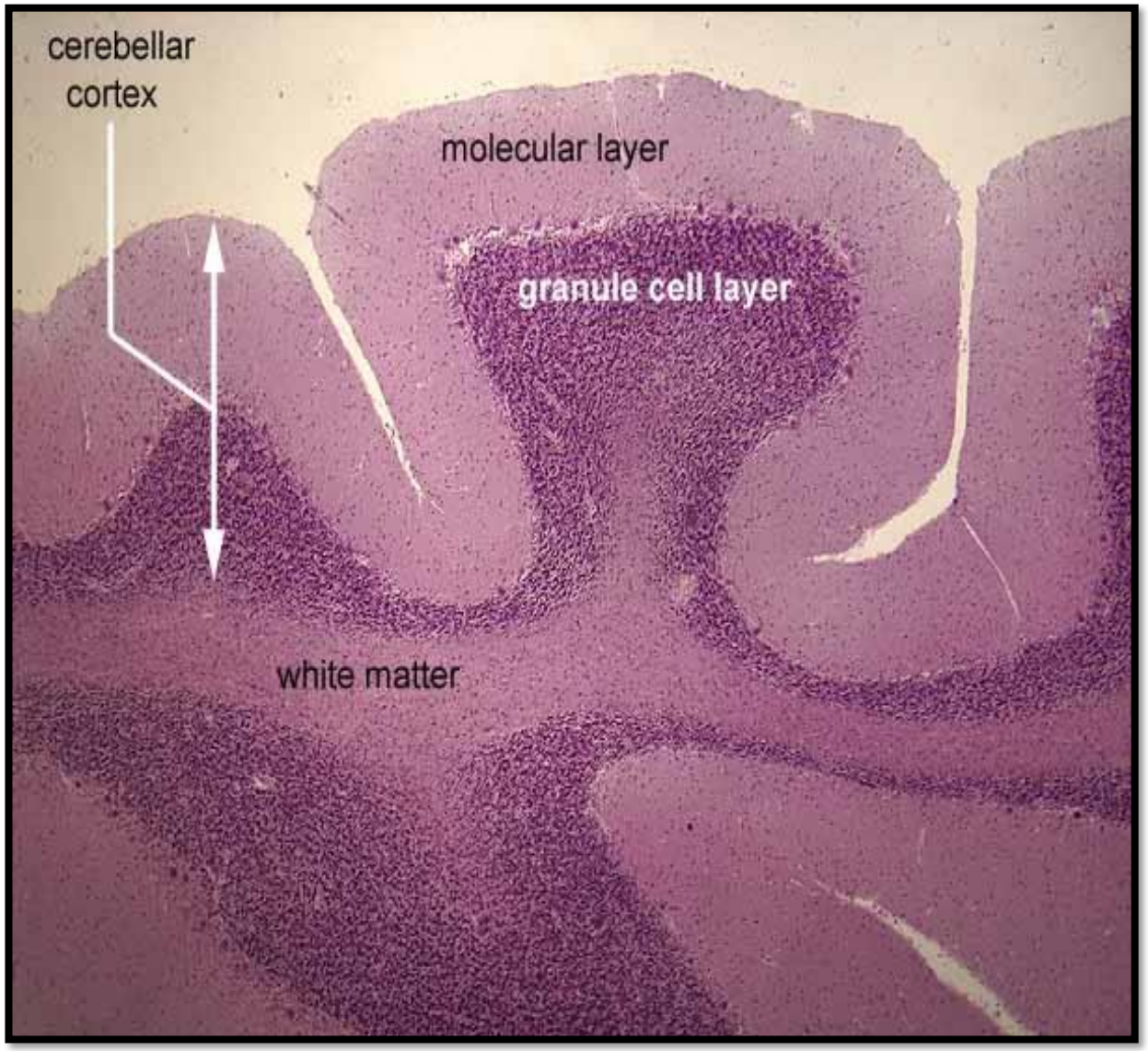


The Cerebellum

- It has arborizations like the leaves of a tree called folia.

- Each folium consists of

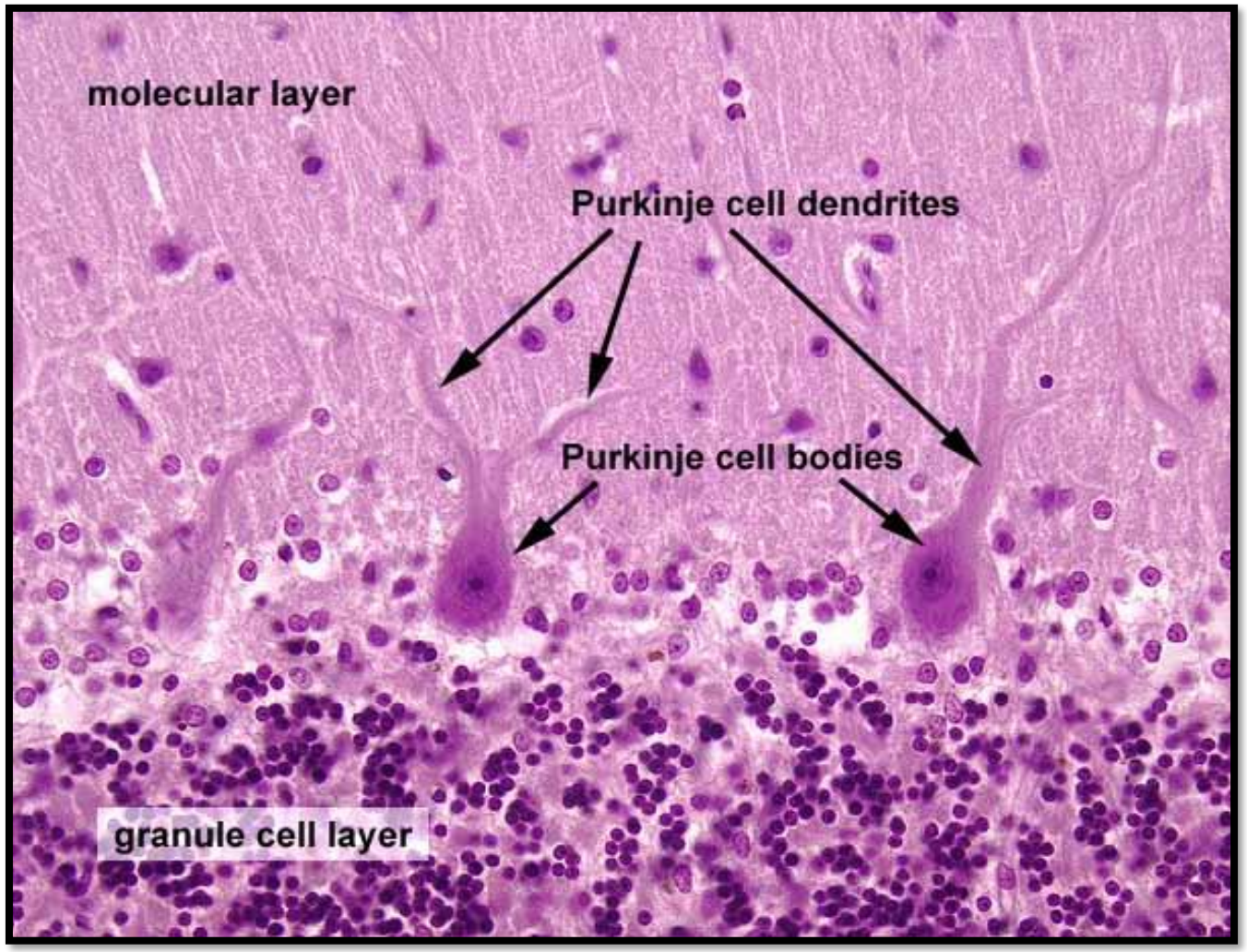
- Dark outer cortex of grey matter.
- Pale central core of white matter (inner medulla).



The Cerebellum

Cerebellar cortex consists of 3 layers from outside inward:

1. Molecular layer
2. Purkinje cell layer
3. Granular layer



(Purkinje cells are large pyriform arranged in one row away from each other).

Brain stem

Brain stem

The brain stem consists of:

1. The medulla oblongata
2. The pons
3. The midbrain

The medulla oblongata

1. Closed medulla
   a. Motor decussation
   b. Sensory decussation
2. Open medulla

The pons

1. Inferior pons
2. Middle pons
3. Superior pons

The midbrain

1. Inferior midbrain
2. Superior midbrain

Closed medulla
Level of motor decussation

1-Spinal N. of trigeminal nerve

2-Pyramidal decussation

3-Crossed pyramidal tract

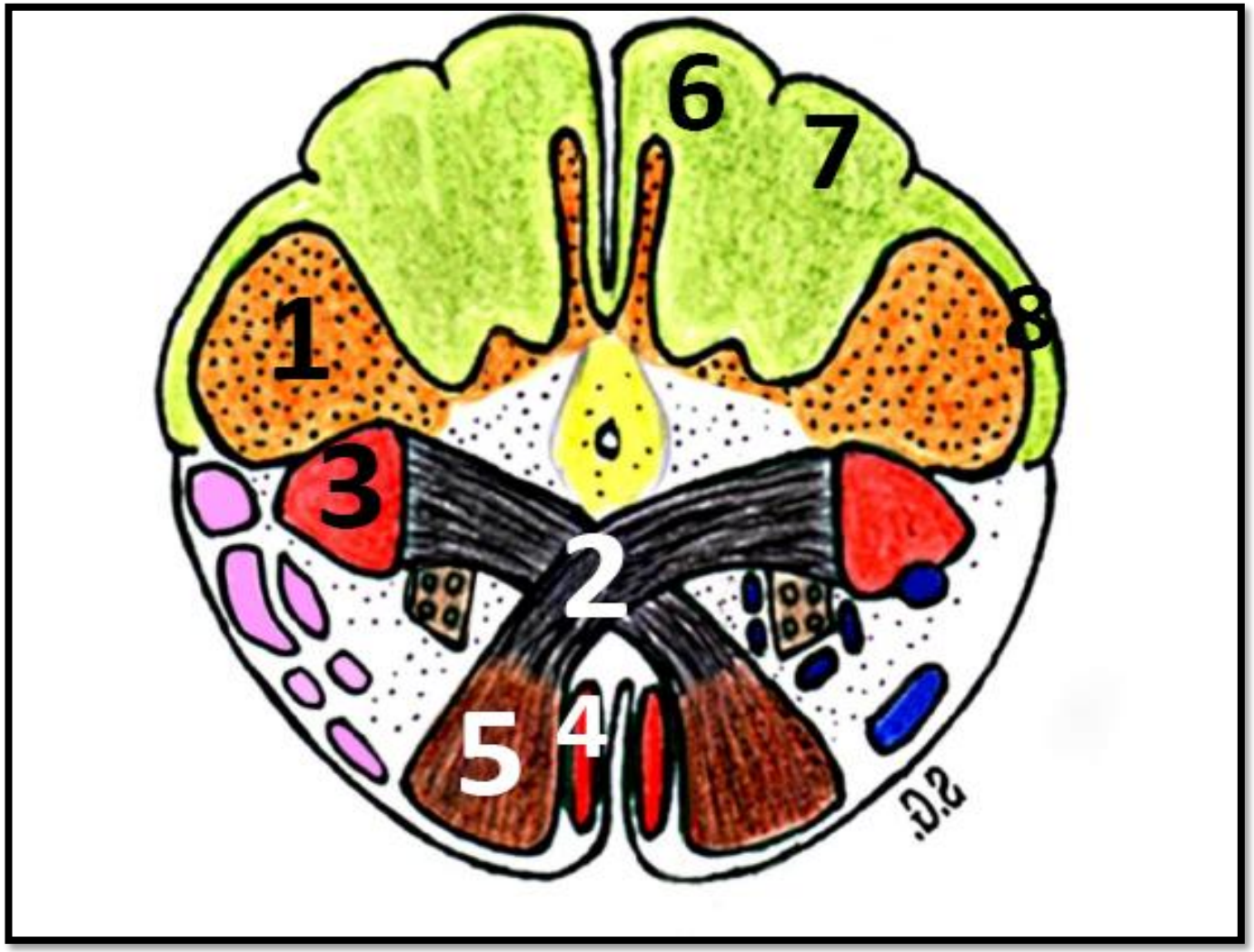
4-Direct pyramidal tract

5-Pyramid

6-Gracile tract

7-Cuneate tract

8-Tract of spinal N. of trigeminal nerve



Open medulla

1-Inferior cerebellar peduncle

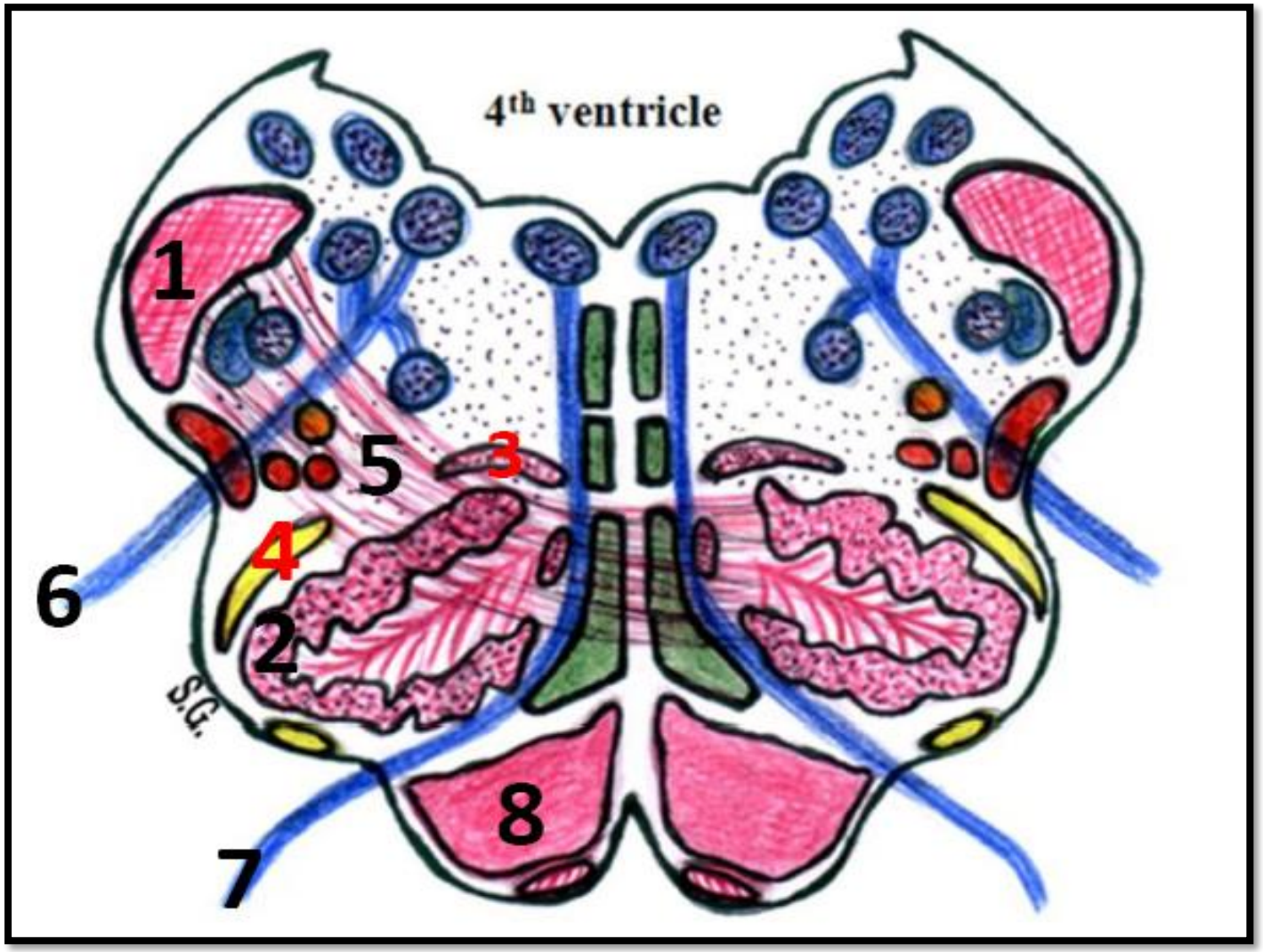
2-Main inferior olive

5-Olivocerebellarfibers

6-Vagal nerve fibers

7-Hypoglossal nerve fibers

8-Pyramid



Inferior pons
Level of facial colliculus

1-Middle cerebellar peduncle

2-Inferior cerebellar peduncle

3-Abducent nerve fibers

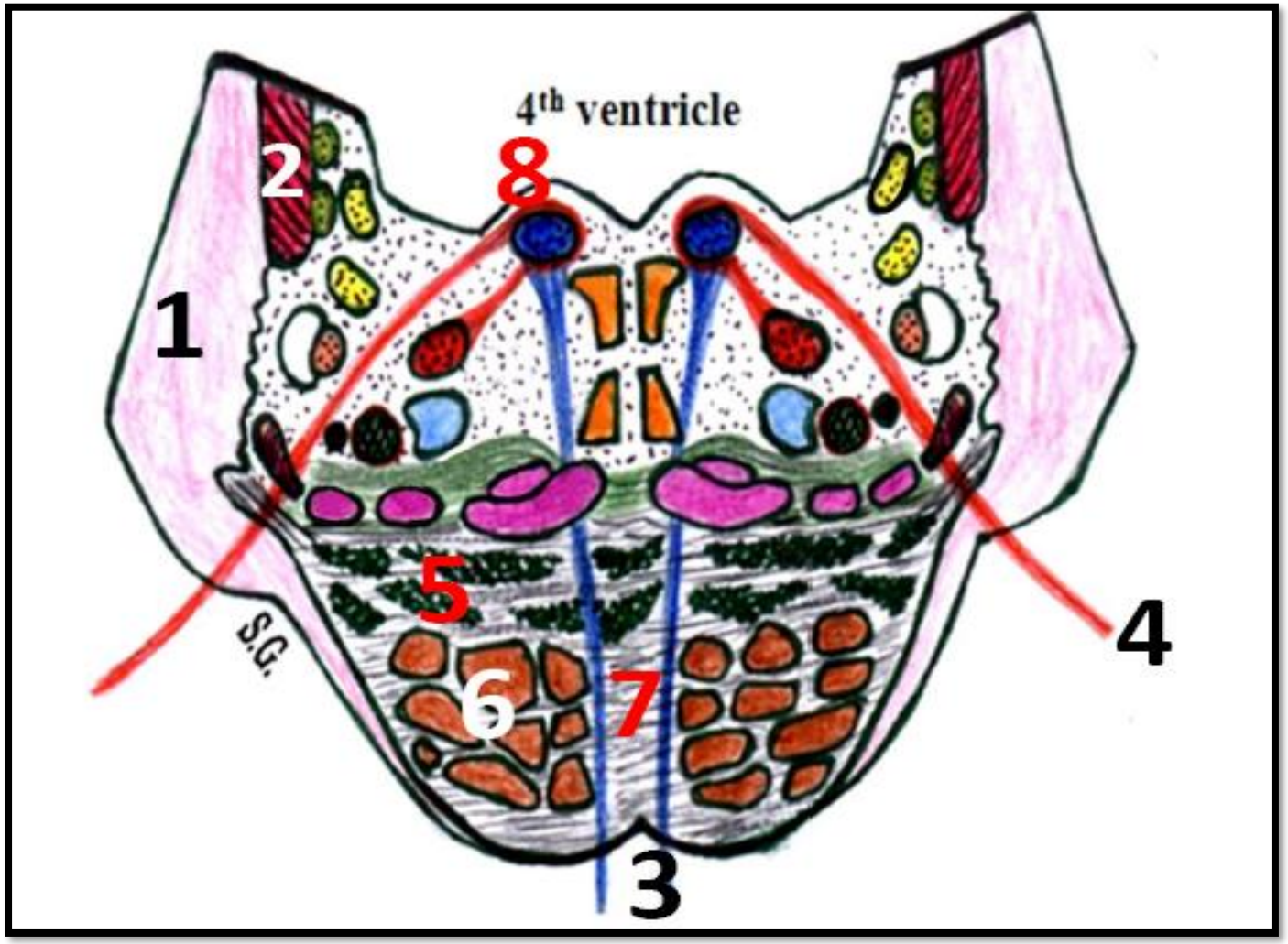
4-Facial nerve fibers

5-Pontine nuclei

6-Pyramidal tract bundles

7-Transverse pontine fibers

8-Facial colliculus



Superior midbrain
Level of superior colliculus
Level of oculomotor nerve nucleus
Level of red nucleus

1-Cerebral aqueduct

2-Superior colliculus

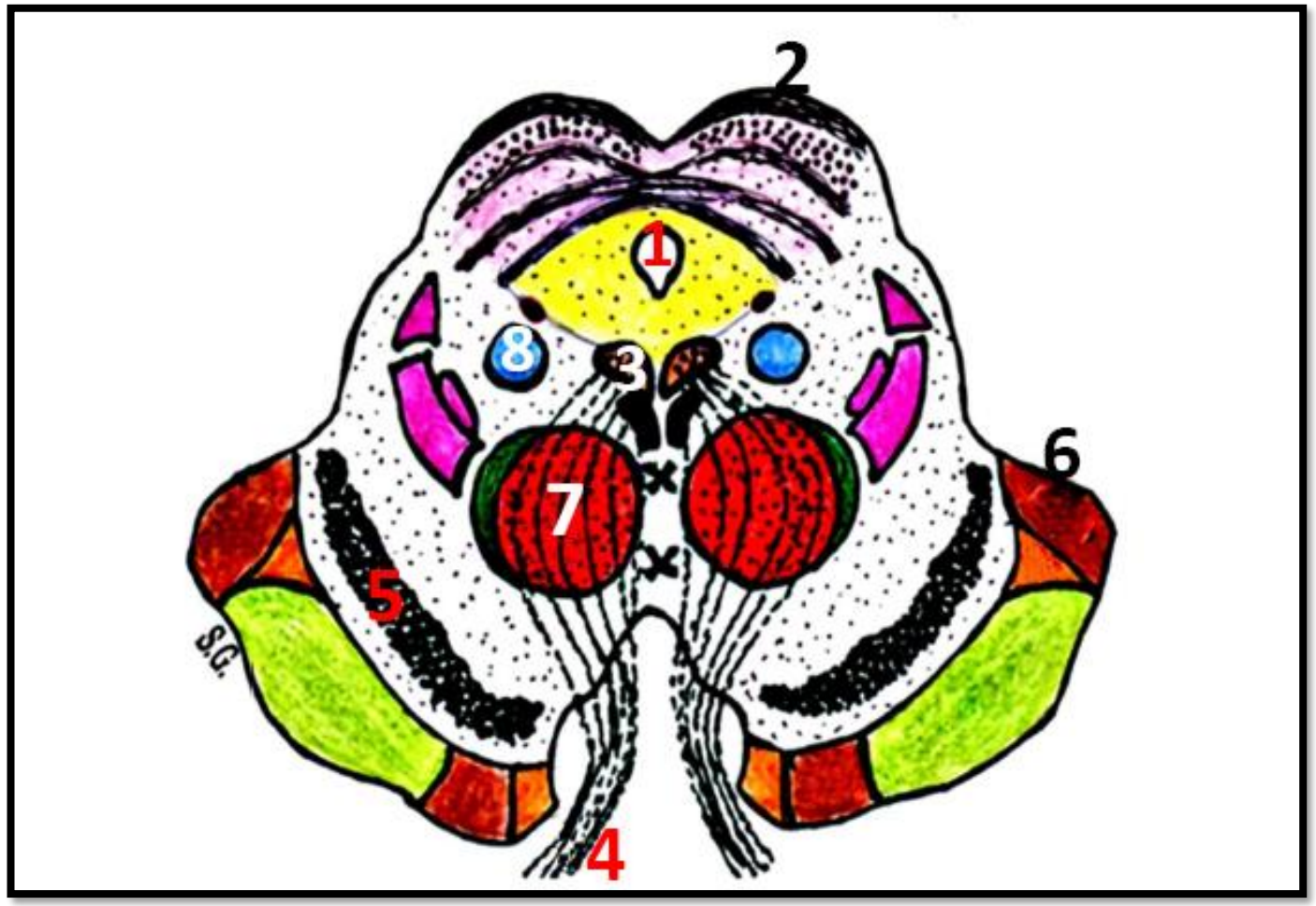
3-Oculomotor nerve N.

4-Oculomotor nerve fibers

5-Substantia nigra

6-Cerebral peduncles

7-Red nucleus

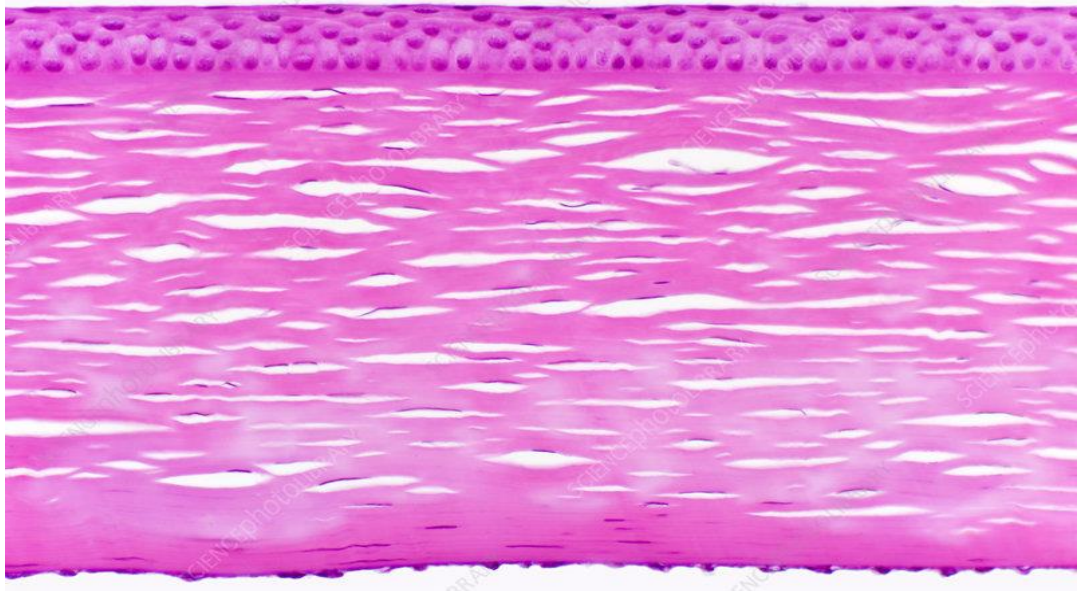


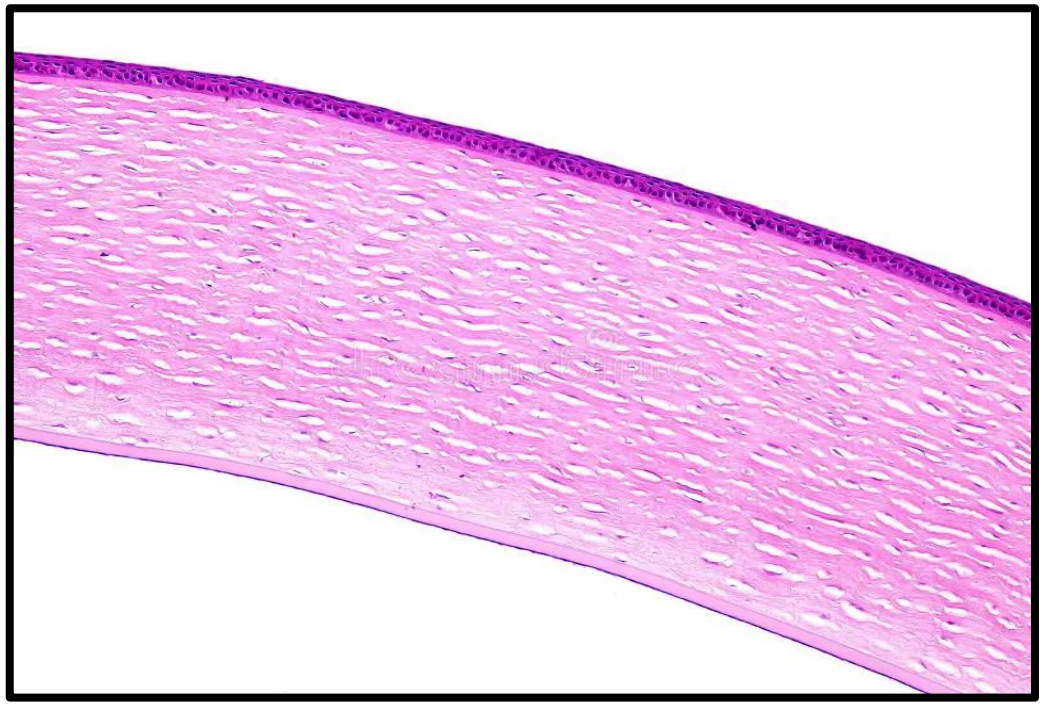
The Eye

The Cornea

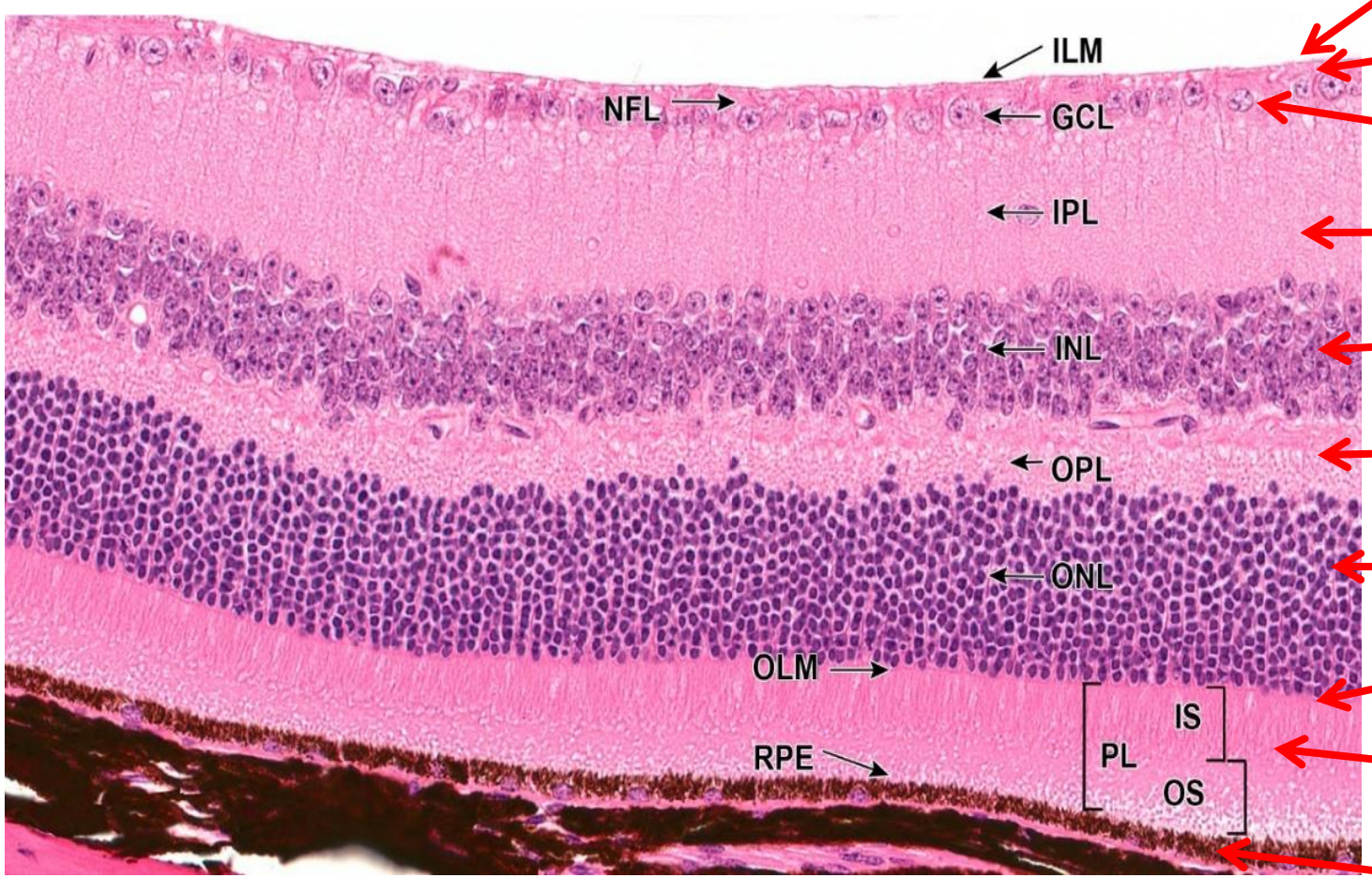
Cornea is formed of 5 layers:

1. **Corneal Epithelium: stratified squamous non keratinized**
2. **Bowman's membrane**
3. **Substantia propria (Stroma)**
   - **It comprises about 90% of the thickness of the cornea**
4. **Descemet's membrane**
5. **Descemet's endothelium**





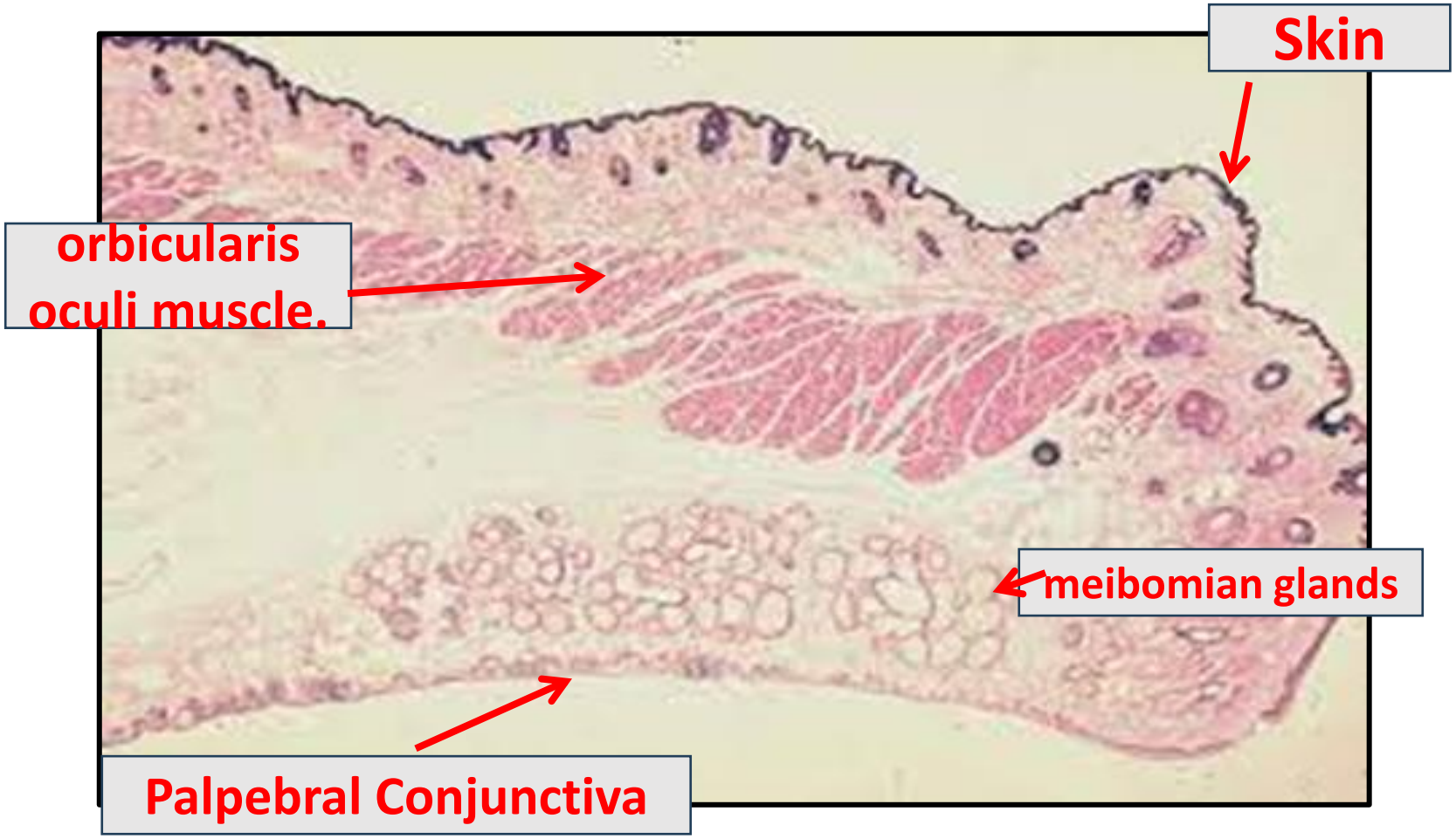
RETINA



- The inner limiting membrane
- The nerve fiber layer
- The ganglion cell layer
- The inner plexiform layer
- The inner nuclear layer
- The outer plexiform layer
- The outer nuclear layer
- The outer limiting membrane
- The rods and cones layer
- The pigmented epithelium

The Eyelids

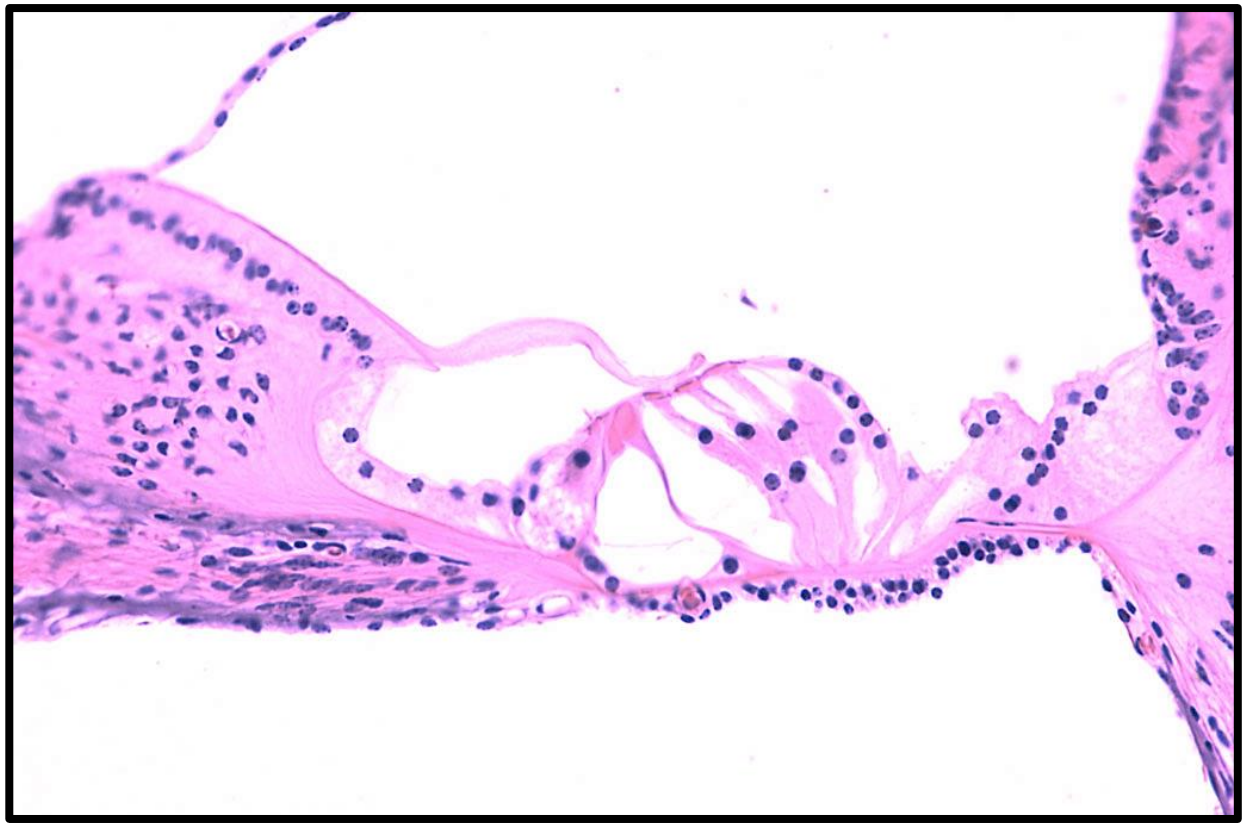
- External surface is covered with **thin Skin.**
- Bundles of the **orbicularis oculi muscle.**
- The **meibomian glands**: (sebaceous glands) in the tarsal plate.
- Internal surface is covered with **Palpebral Conjunctiva.**



The Ear

Organ of Corti

- Cells forming organ of corti lie on the basilar membrane inside the cochlear duct.
- Tectorial membrane covers the organ of corti.

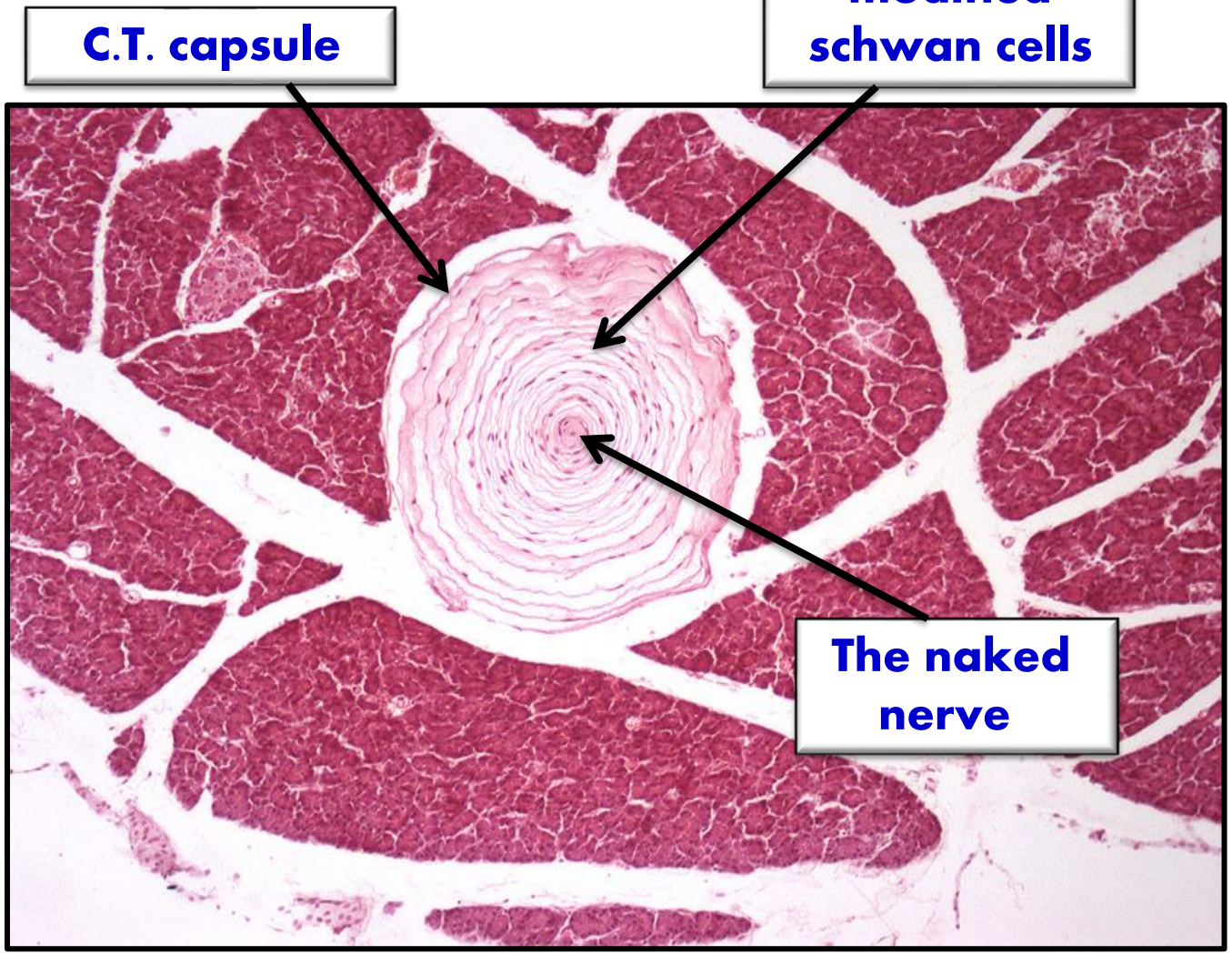


Name of cells ???

The receptors

Pacinian Corpuscle

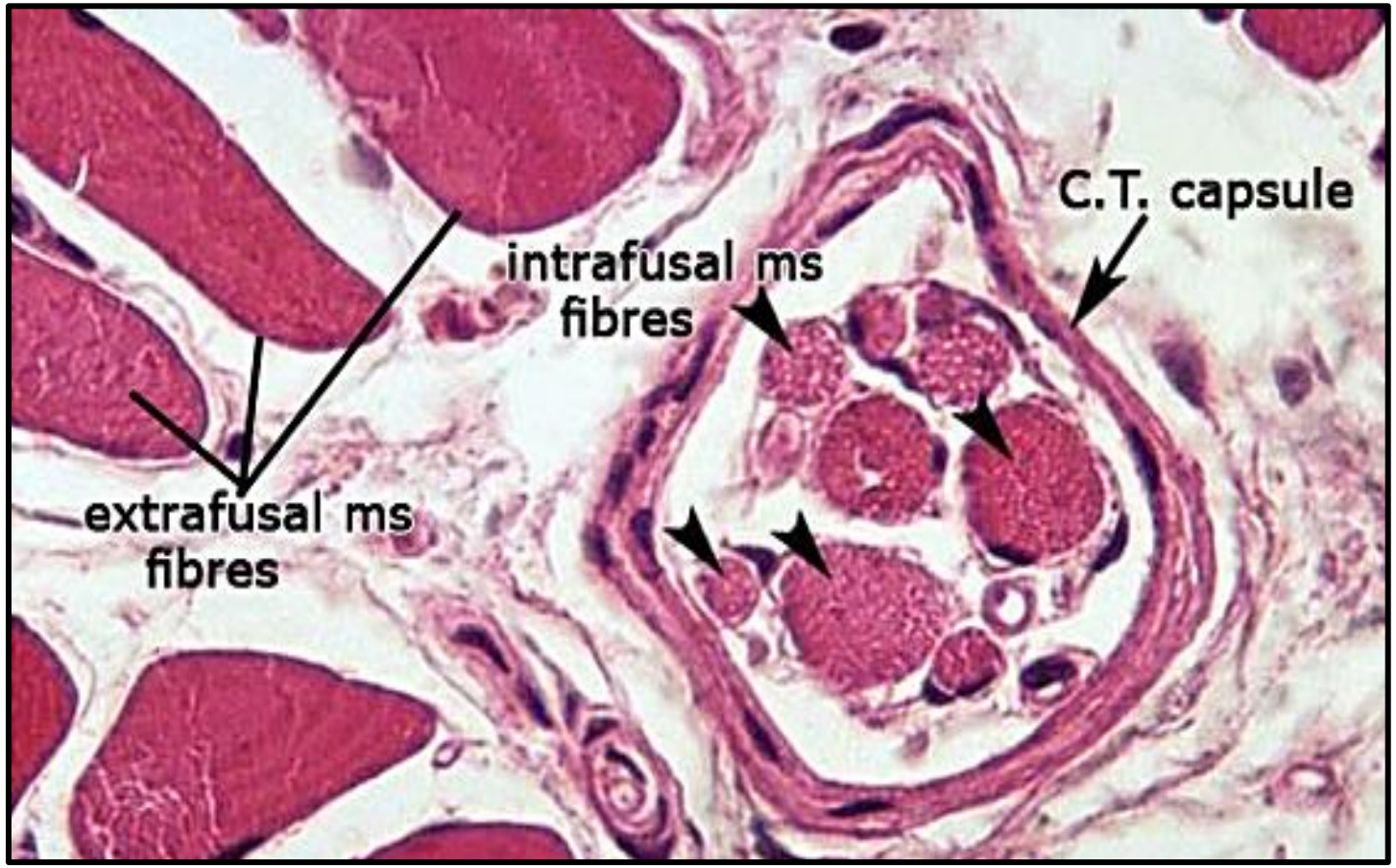
- Thin C.T. capsule.
- Concentric layers of modified schwan cells.
- The naked nerve (non-myelinated) is seen in the center of the corpuscle.



Sites???

Muscle Spindle

- Capsulated structure between the skeletal muscle fibers and is formed of:
  - Capsule
  - Sub-capsular space
  - Intrafusal muscle fibers



Sites???

Muscle Spindle