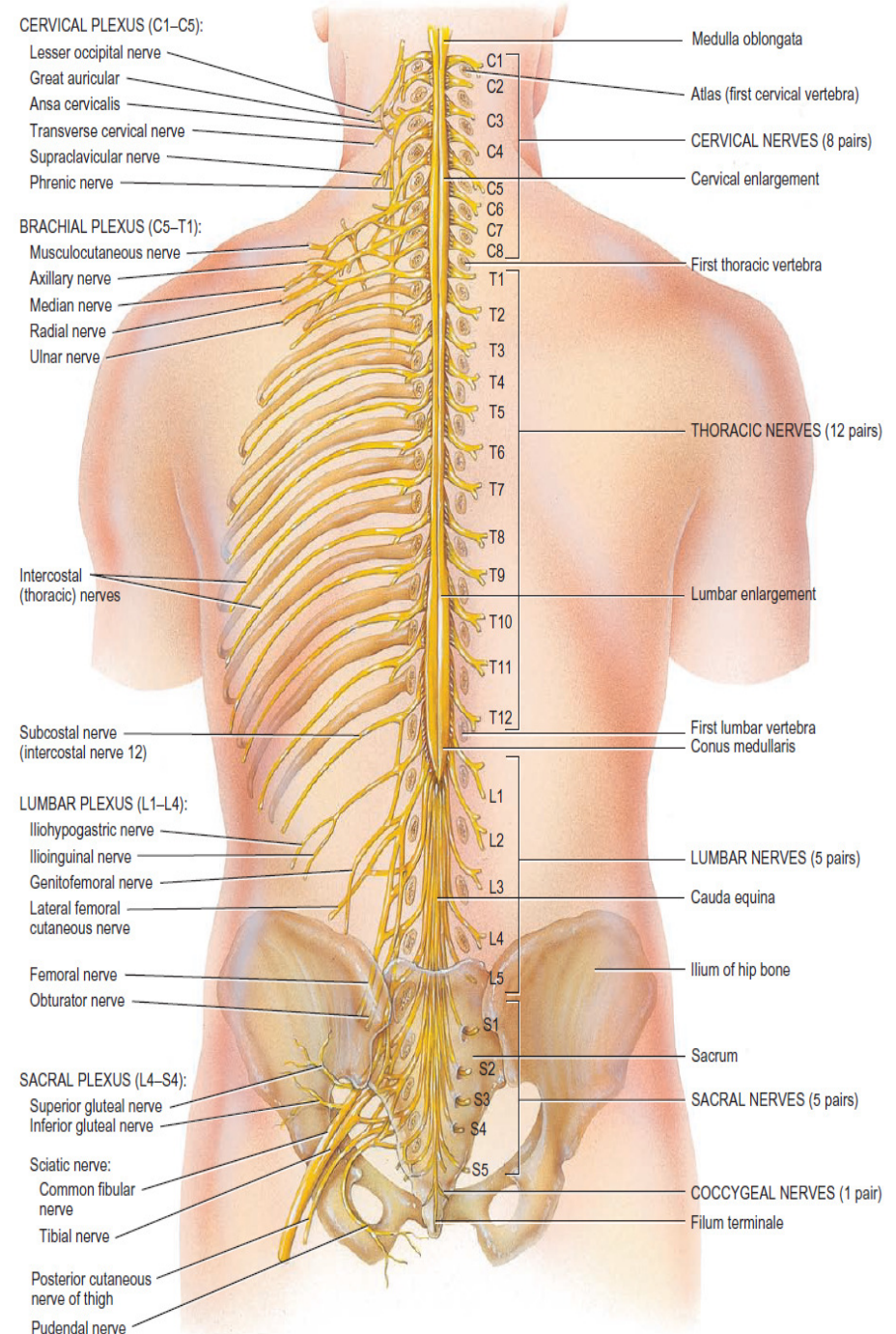
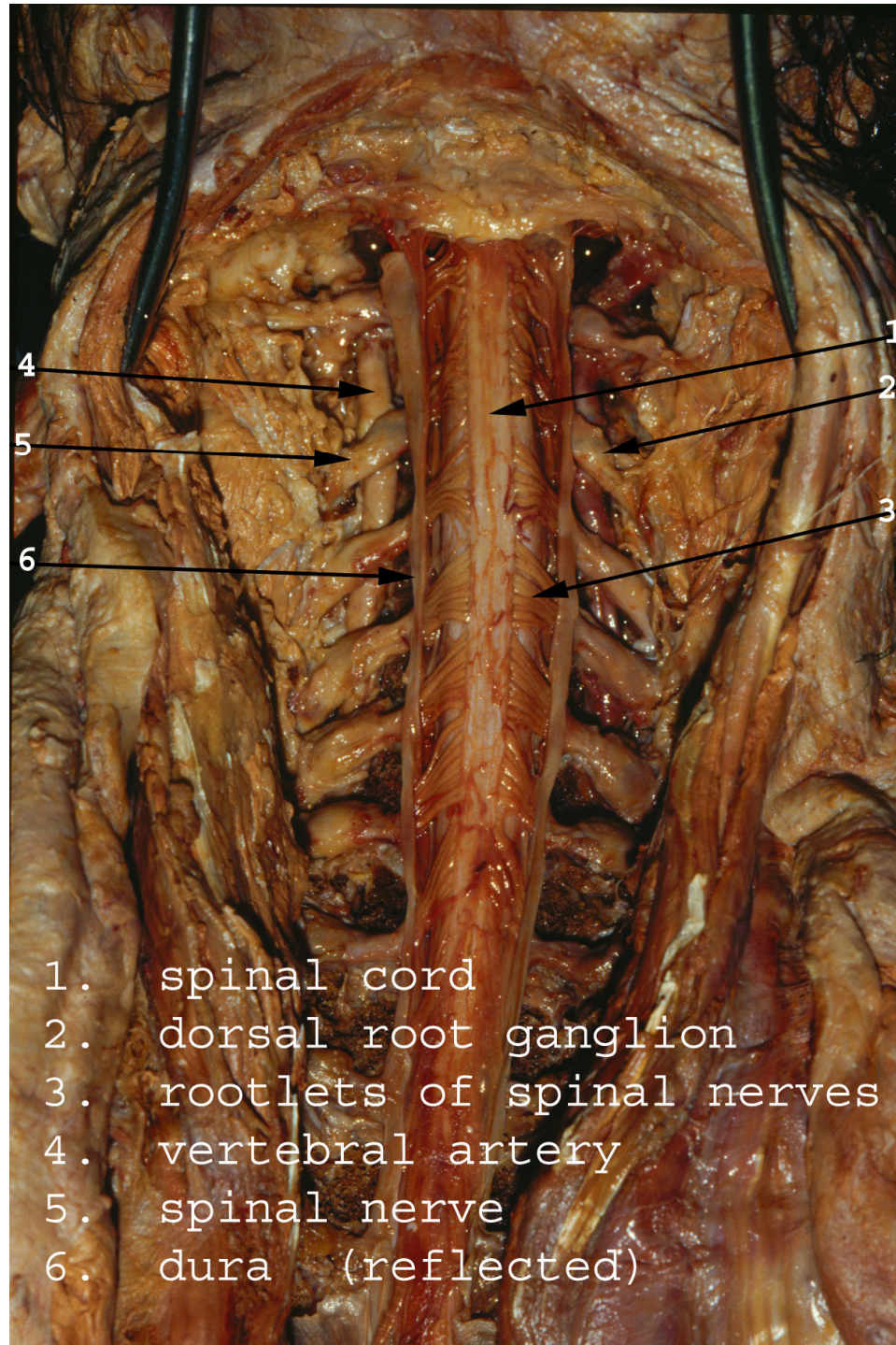
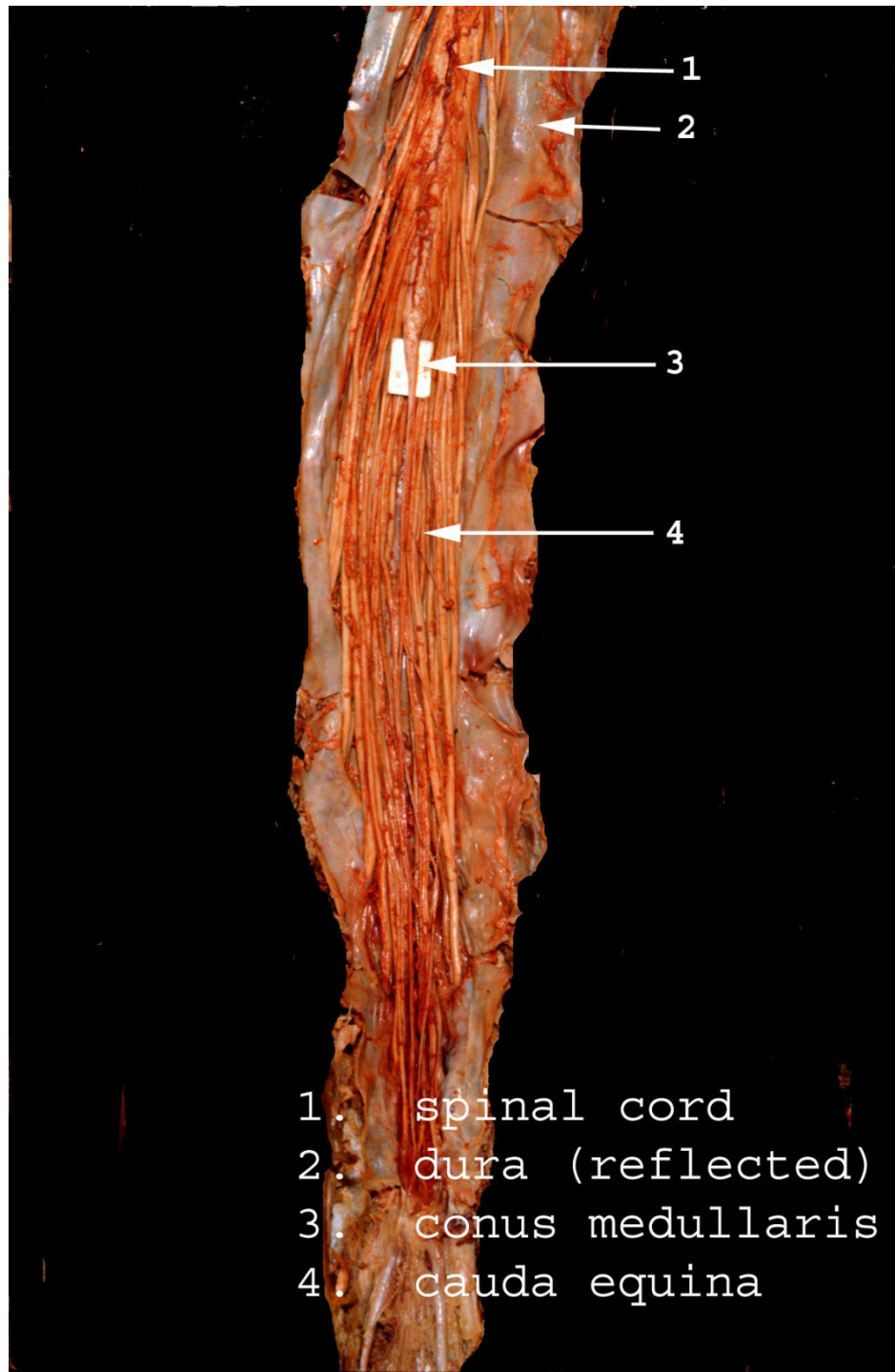


External anatomy of Spinal Cord

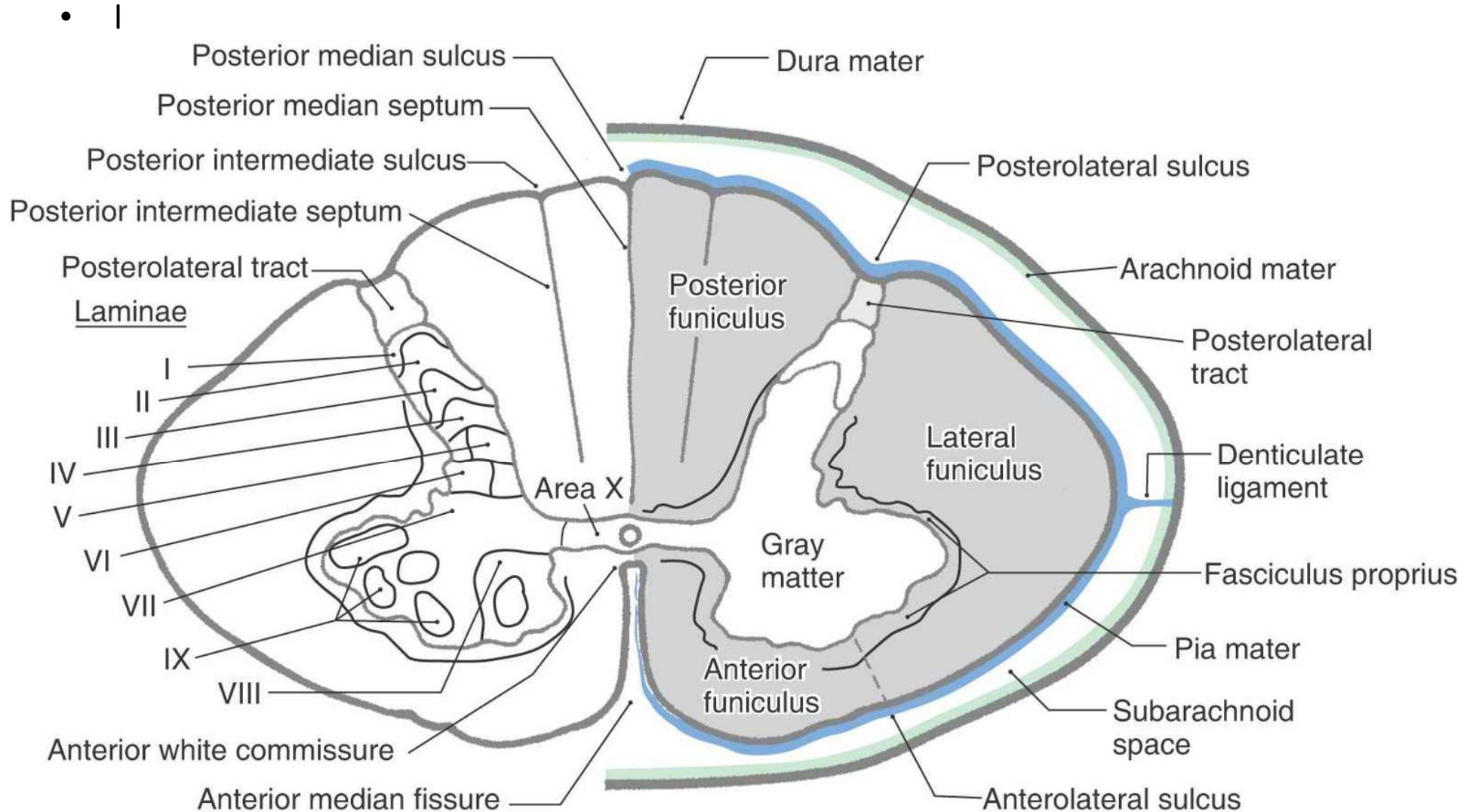
- Runs through the vertebral canal
- Extends from foramen magnum to second lumbar vertebra
- Regions
 - Cervical (8)
 - Thoracic (12)
 - Lumbar (5)
 - Sacral (5)
 - Coccygeal (1)
- Gives rise to (31) pairs of spinal nerves
 - All are *mixed* nerves
- Not uniform in diameter
 - Cervical enlargement: supplies upper limbs
 - Lumbar enlargement: supplies lower limbs







Cross Section of Spinal Cord



Rexed laminae

- **Lamina 1** relay information related to pain and temperature
- **Lamina 2:** relay information related to pain and temperature (**pain modulation**)
- **Lamina 3 and 4:** nucleus proprius; these laminae have many interneurons

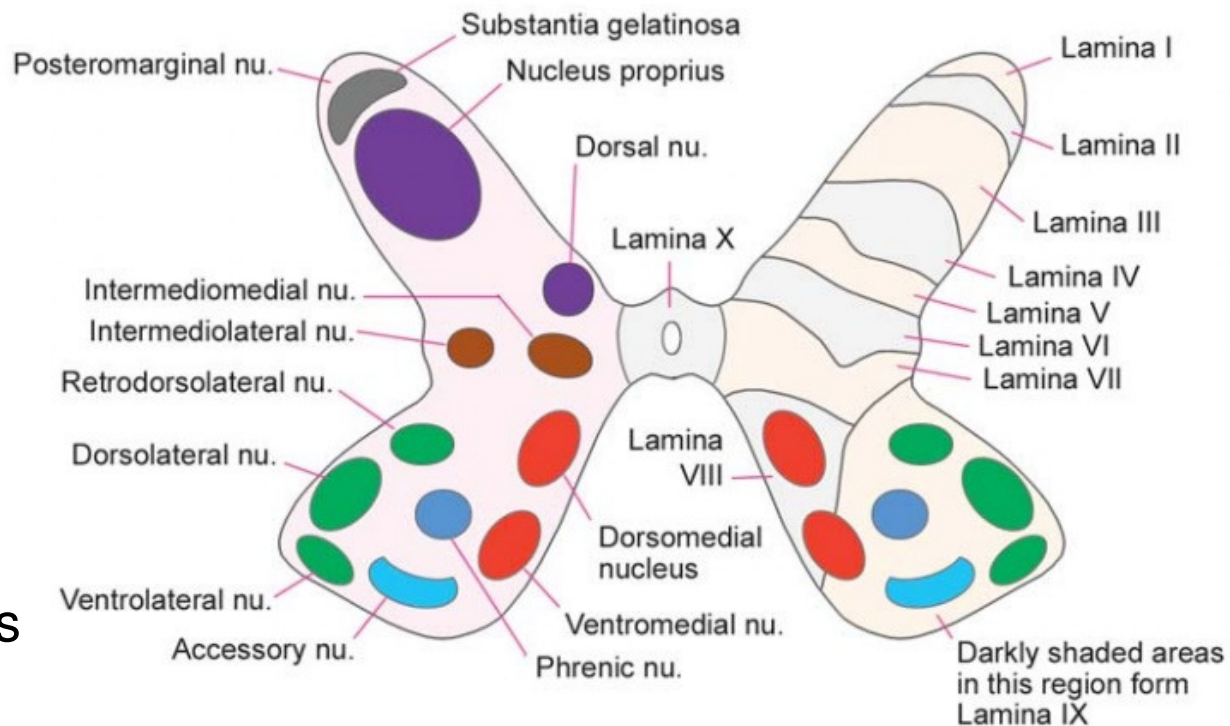


Fig. 5.2. Subdivisions of the grey matter of the spinal cord. The left half of the figure shows the cell groups usually described. The right half shows the newer concept of laminae.

- **Lamina 5:** relay information related to pain and temperature
- **Lamina 6:** presents only at the cervical and lumbar enlargements and receives proprioception
- **Lamina 7: Intermedio-lateral** nucleus, contains preganglionic fibers of sympathetic (T1 -L2). **Intermedio-medial nucleus**, all over the spinal cord, receive visceral pain. **Dorsal nucleus of Clark's** presents at (C8 – L2 or T1-L4), relay center for **unconscious proprioception**

Rexed laminae

- **Lamina 8:** motor interneurons, Commissural nucleus
- **Lamina 9:** ventral horn, LMN, divided into nuclei:
 - **Ventromedial:** all segments (extensors of vertebral column)
 - **Dorsomedial:** (T1-L2) intercostals and abdominal muscles
 - **Ventrolateral:** C5-C8 (arm) L2-S2 (thigh)
 - **Dorsolateral:** C5-C8 (Forearm), L3-S3 (Leg)
 - **Reterodorsolateral:** C8-T1 (Hand), S1-S2 (foot)
 - **Central:** Phrenic nerve (C3-C5)
- **Lamina X:** Surrounds the central canal – the grey commissure

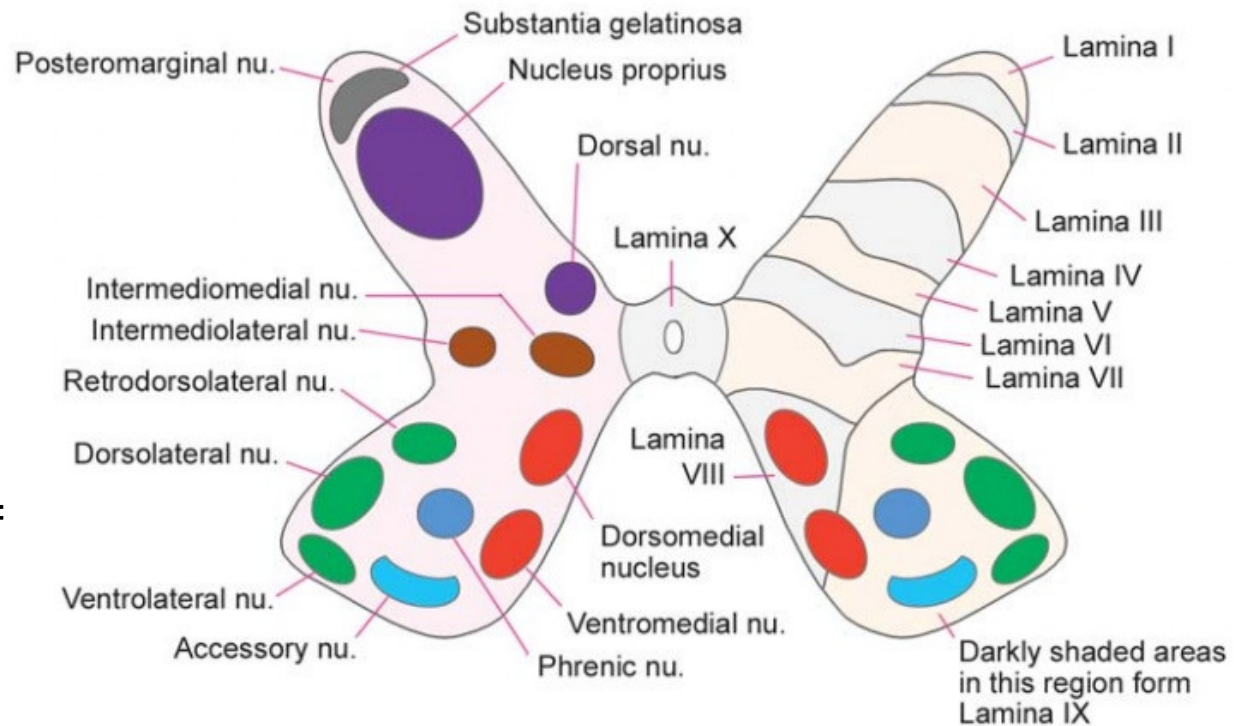
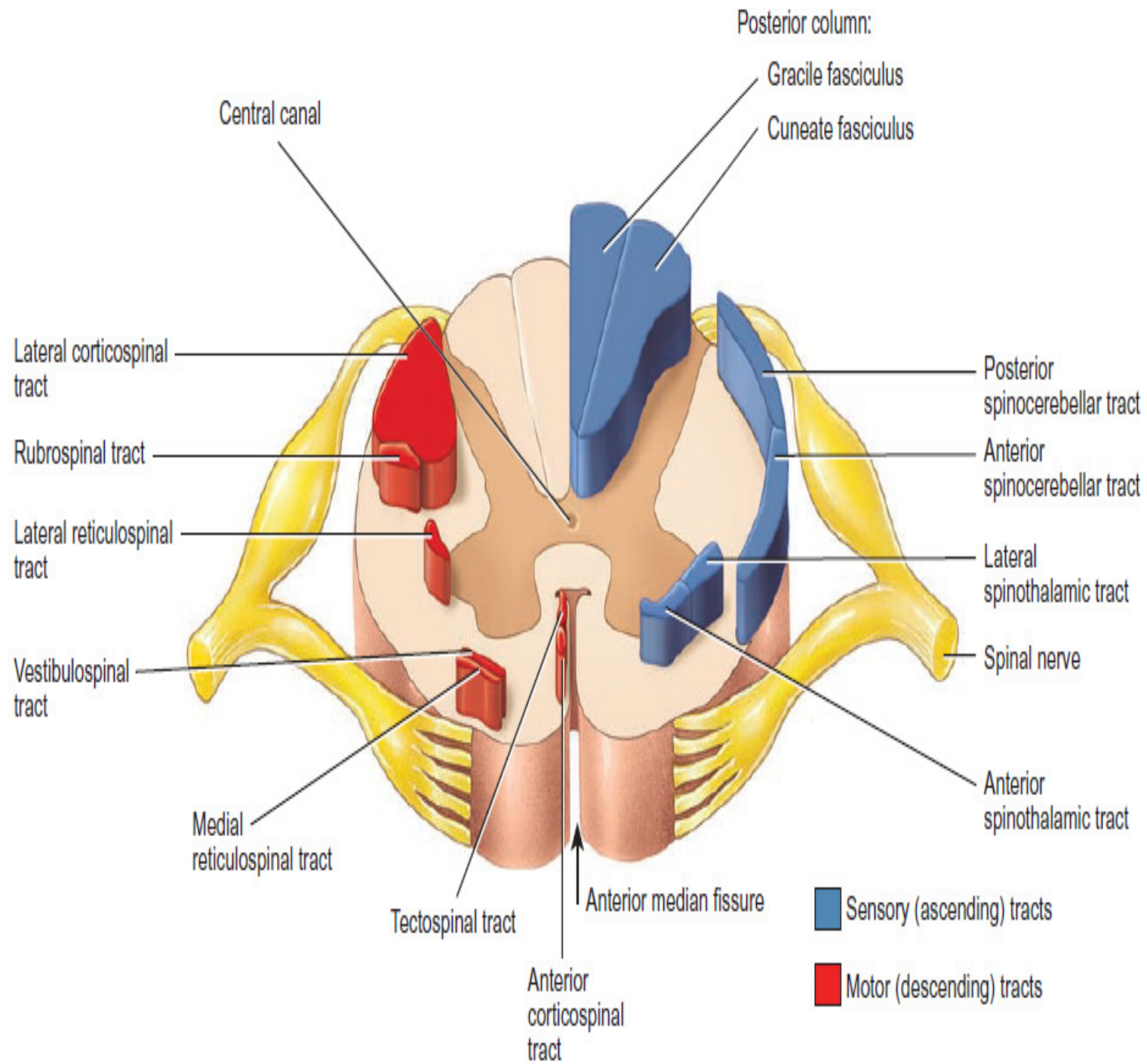


Fig. 5.2. Subdivisions of the grey matter of the spinal cord. The left half of the figure shows the cell groups usually described. The right half shows the newer concept of laminae.



cervical segment

- oval shape
- Large white matter funiculi
- prominent, broad anterior gray horns that contain the motor neurons that innervate the upper extremities

thoracic segment

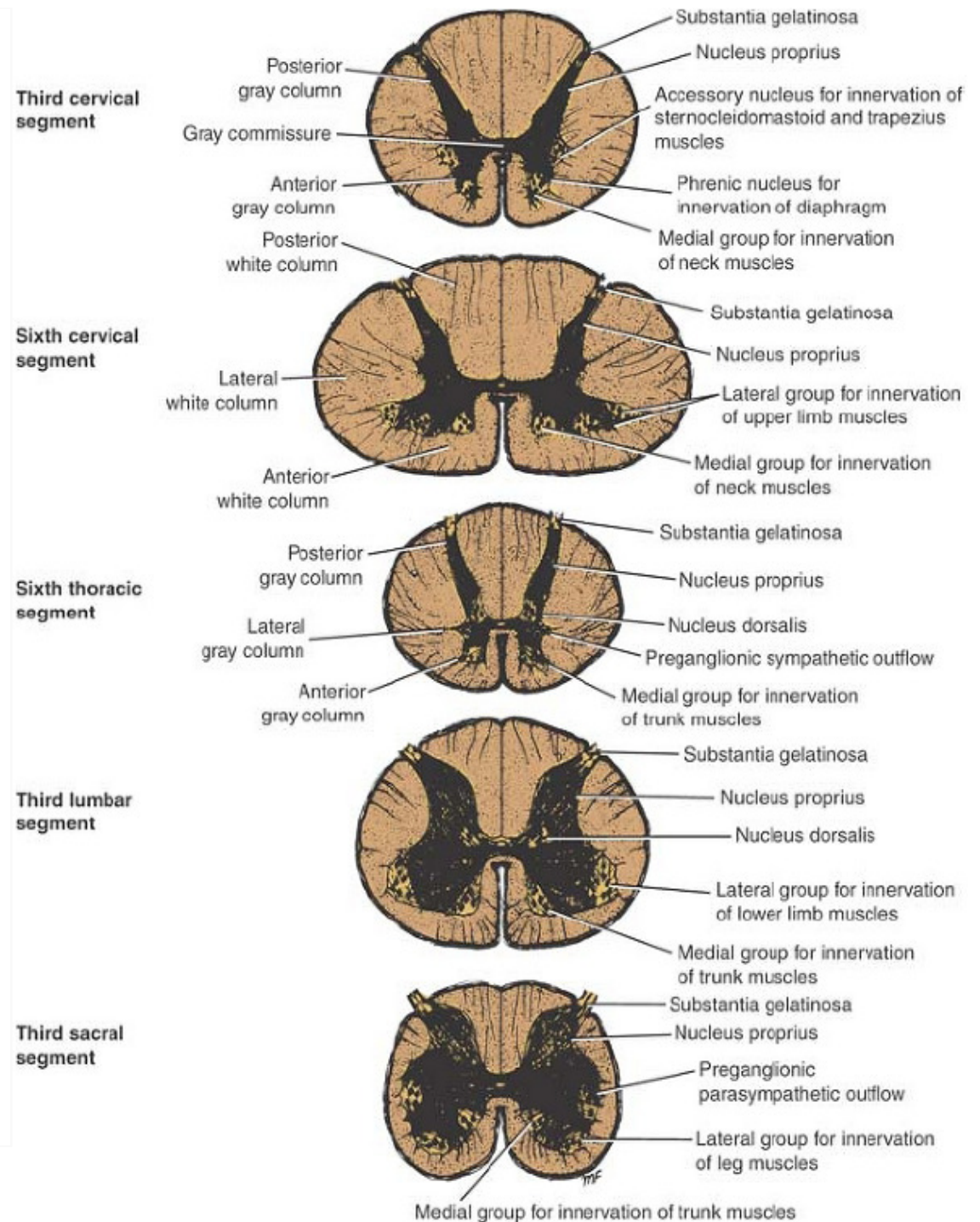
- rounded profile
- small, slender, peglike anterior gray horns
- lateral horns are unique to thoracic segments

Lumbar segment

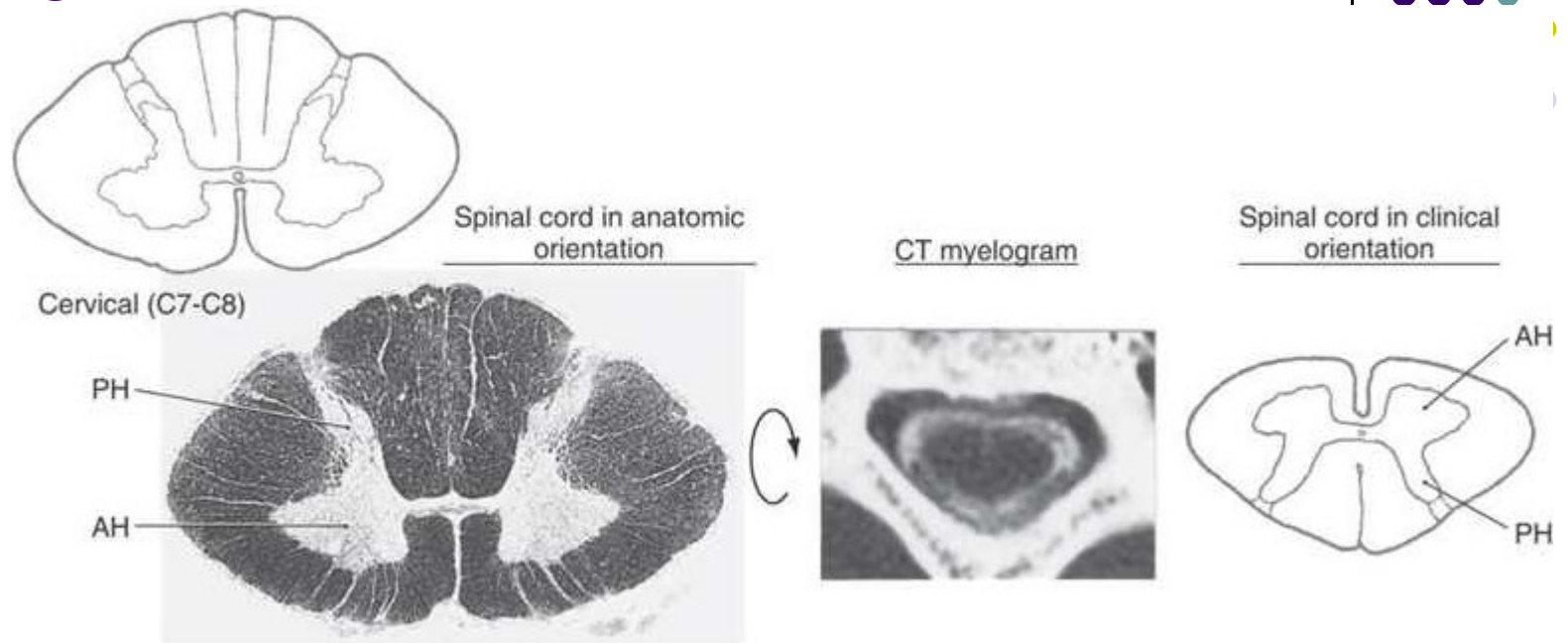
- Rounded to oval
- has very large anterior gray horns (motor supply to the lower extremities)
- only a very small surrounding of white matter

Sacral segment

- Rounded
- only a very small surrounding of white matter
- Parasympathatic outflow



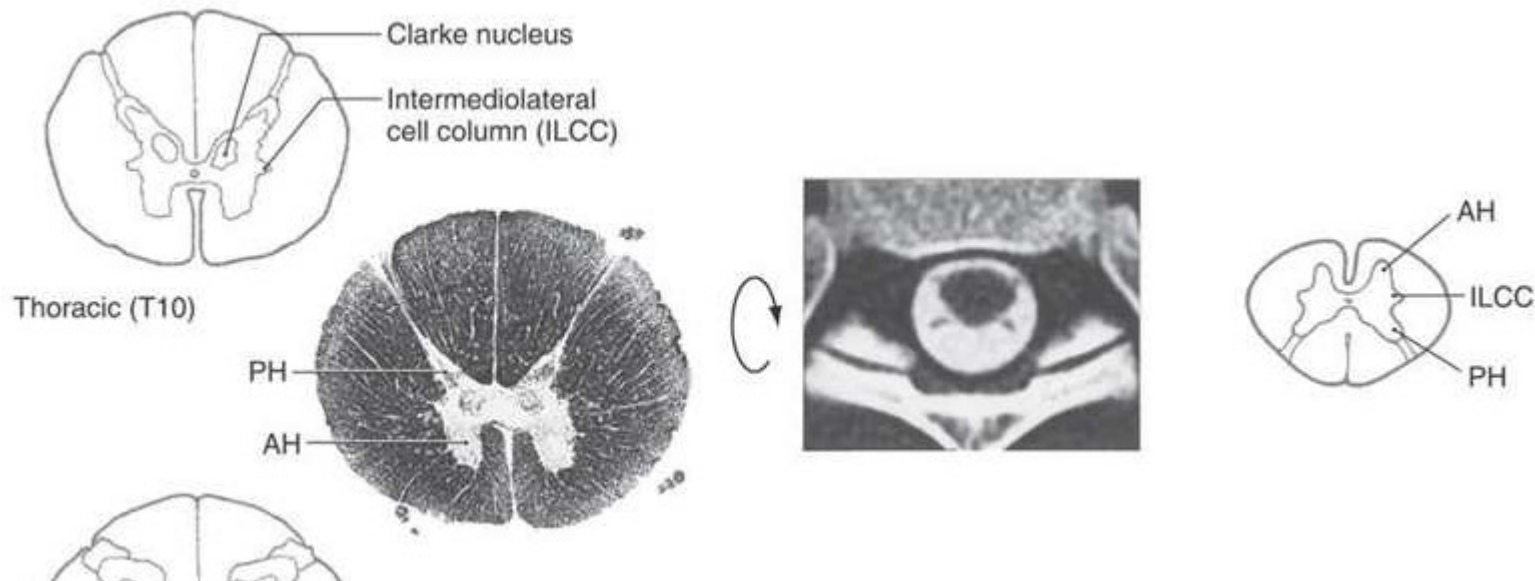
cervical segment



cervical segment

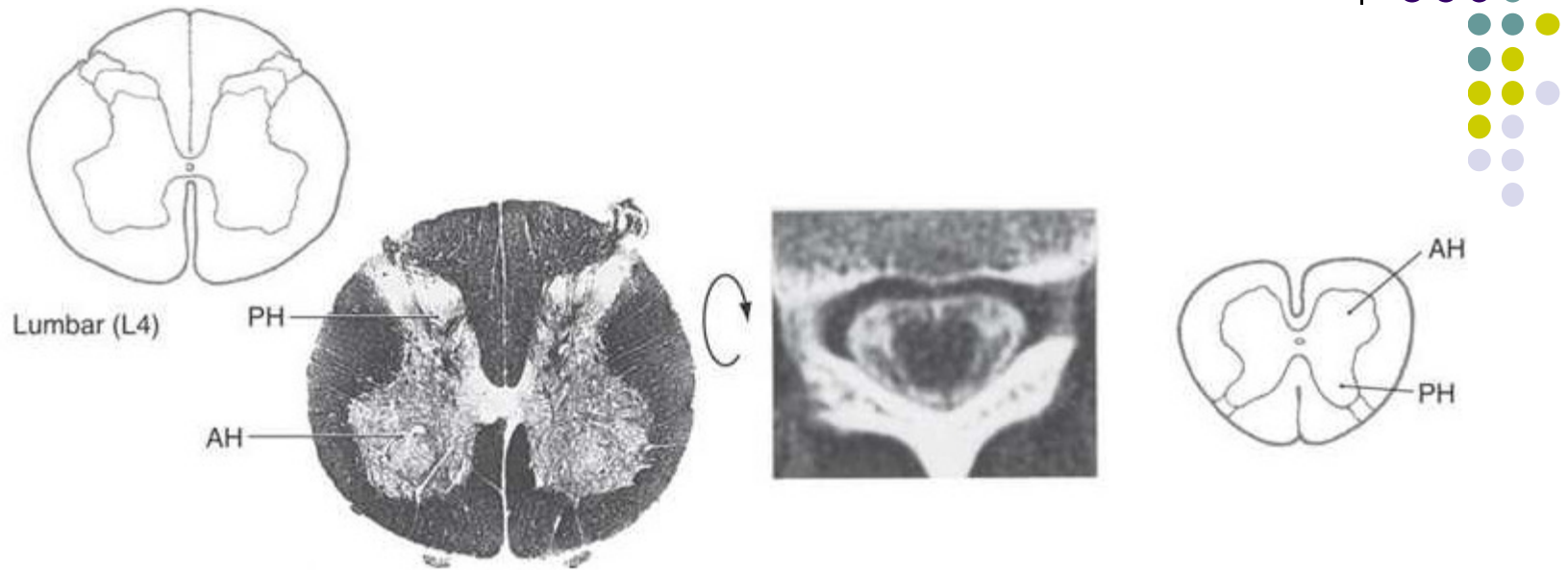
- oval shape (C4-C8)
- At cervical levels C1 to C3 (more rounded)
- Large white matter funiculi
- prominent, broad anterior gray horns that contain the motor neurons that innervate the upper extremities
-

Thoracic segment



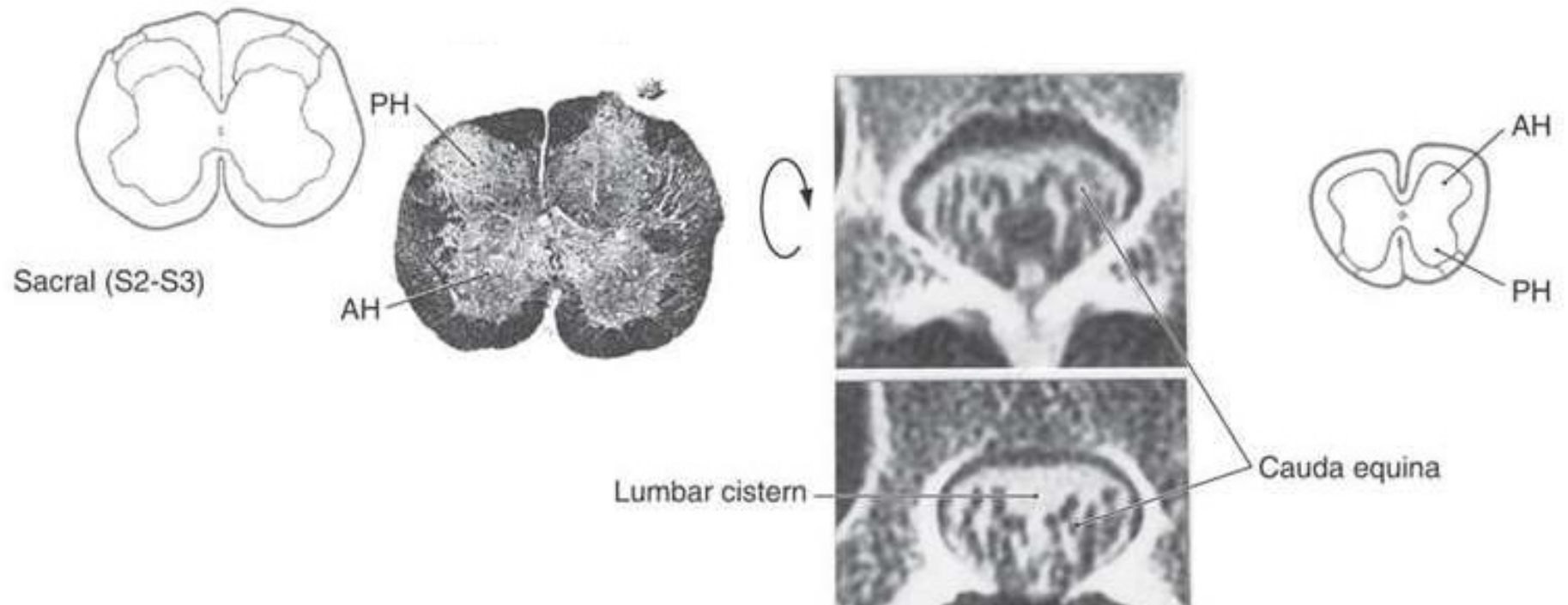
- Rounded profile
- Small, slender, peglike anterior gray horns
- Lateral horns are unique to thoracic segments
- only the gracile fasciculus is present at lower thoracic levels (below T6)

Lumbar segment



- Rounded to oval
- Has very large anterior gray horns (motor supply to the lower extremities)
- only a very small surrounding of white matter

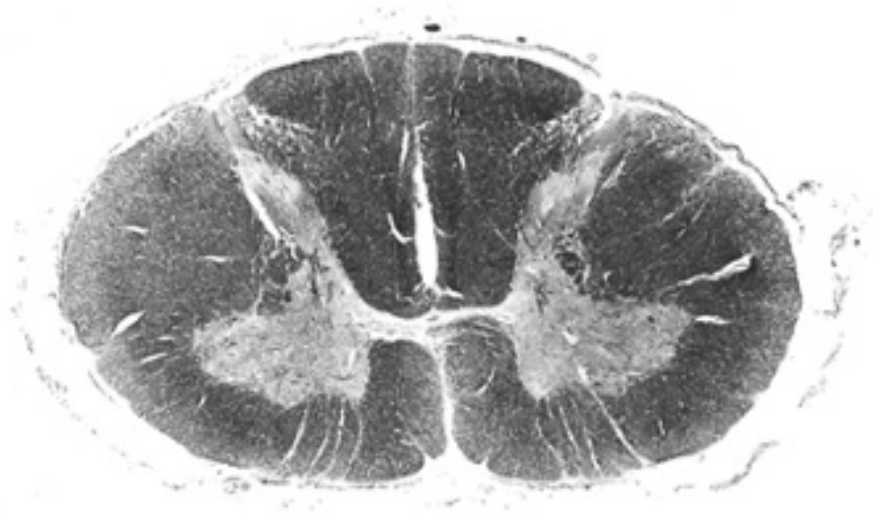
Sacral segment



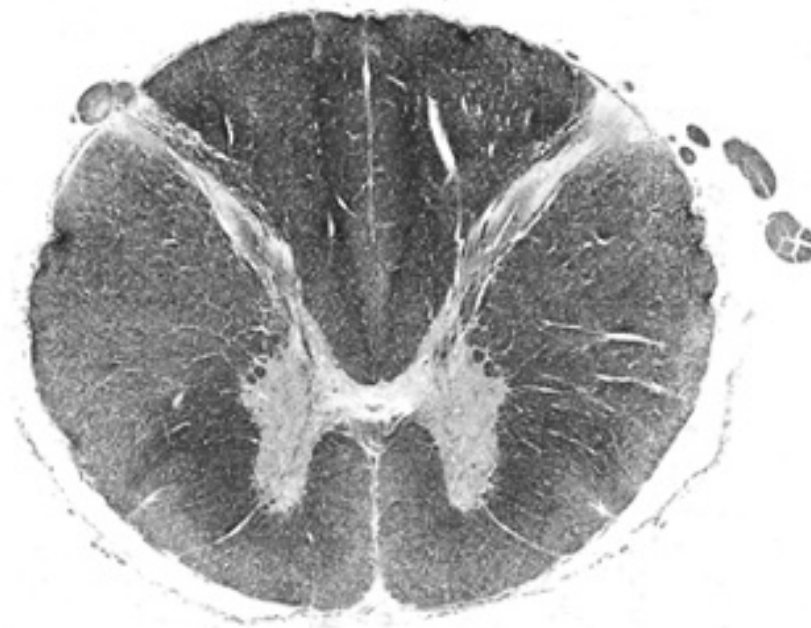
- Rounded
- Mainly gray matter (only a very small surrounding of white matter)
- Levels S2, S3, and S4 contains preganglionic parasympathetic cell bodies (the sacral visceromotor nucleus).



Regional variation of spinal cord structure
cross sections taken from the cervical enlargement (A), midthoracic cord (B), and lumbosacral enlargement (C)



A



B



C

Clinical significance of lamination of the ascending tracts

- Any external pressure exerted on the spinal cord in the region of the spinothalamic tracts will first experience a loss of pain and temperature sensations in the sacral dermatome of the body
- If pressure increases the other higher segmental dermatomes will be affected

❖ Remember that in the spinothalamic tracts the cervical to sacral segments are located medial to lateral

- **Intramedullary tumor:** affect the cervical fibers (Medial)
 - **Extramedullary tumor** would affect lower limb fibers (lateral).
- ☐ **Sacral sparing:** Occur at intramedullary tumor

