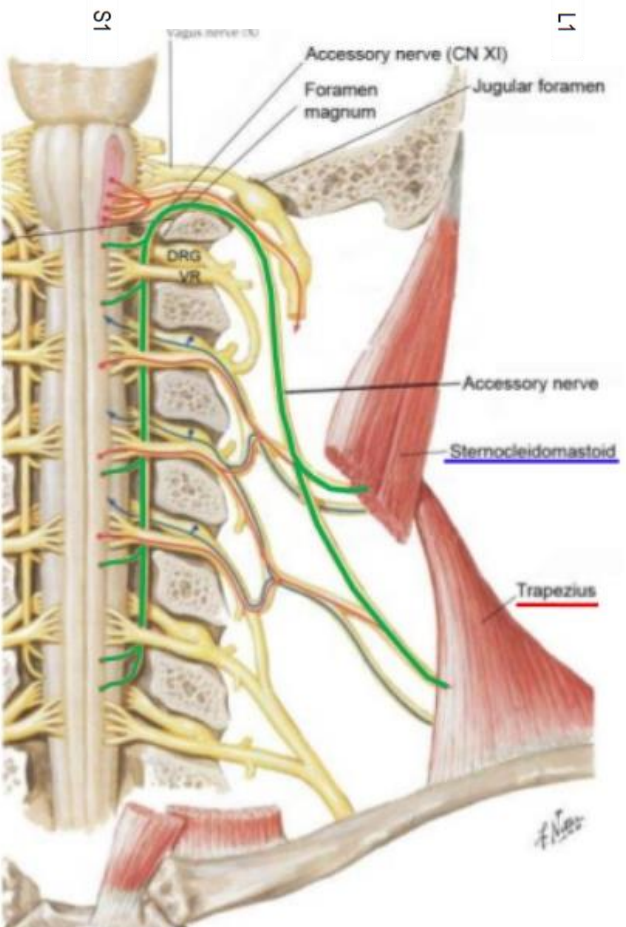
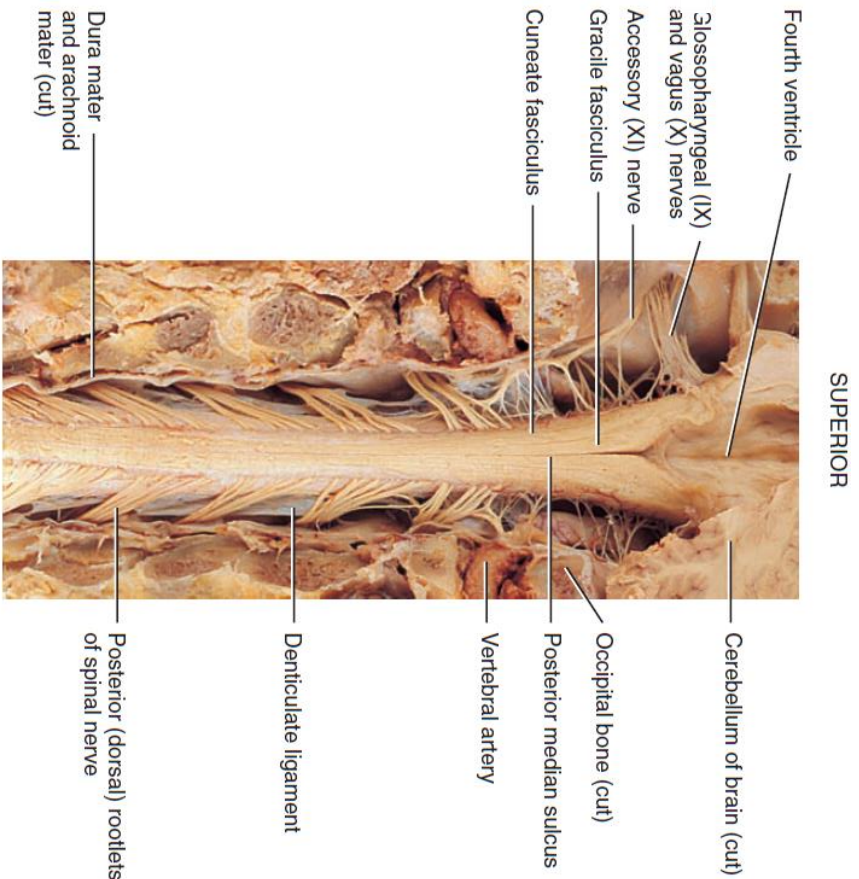
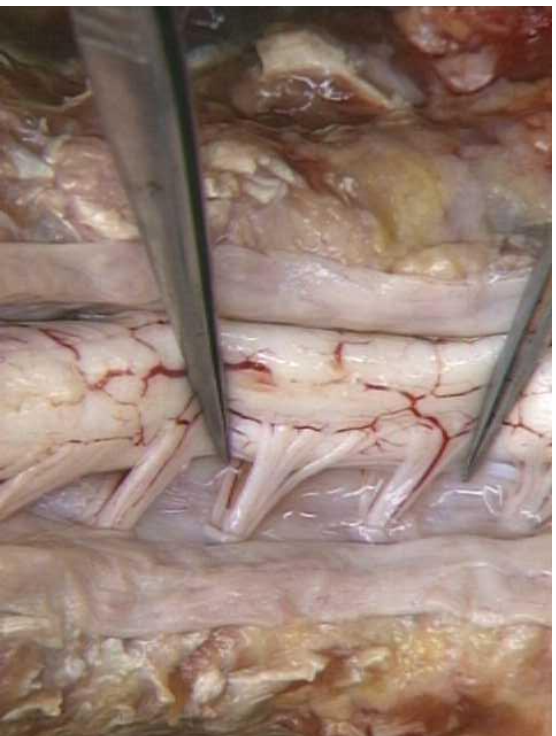
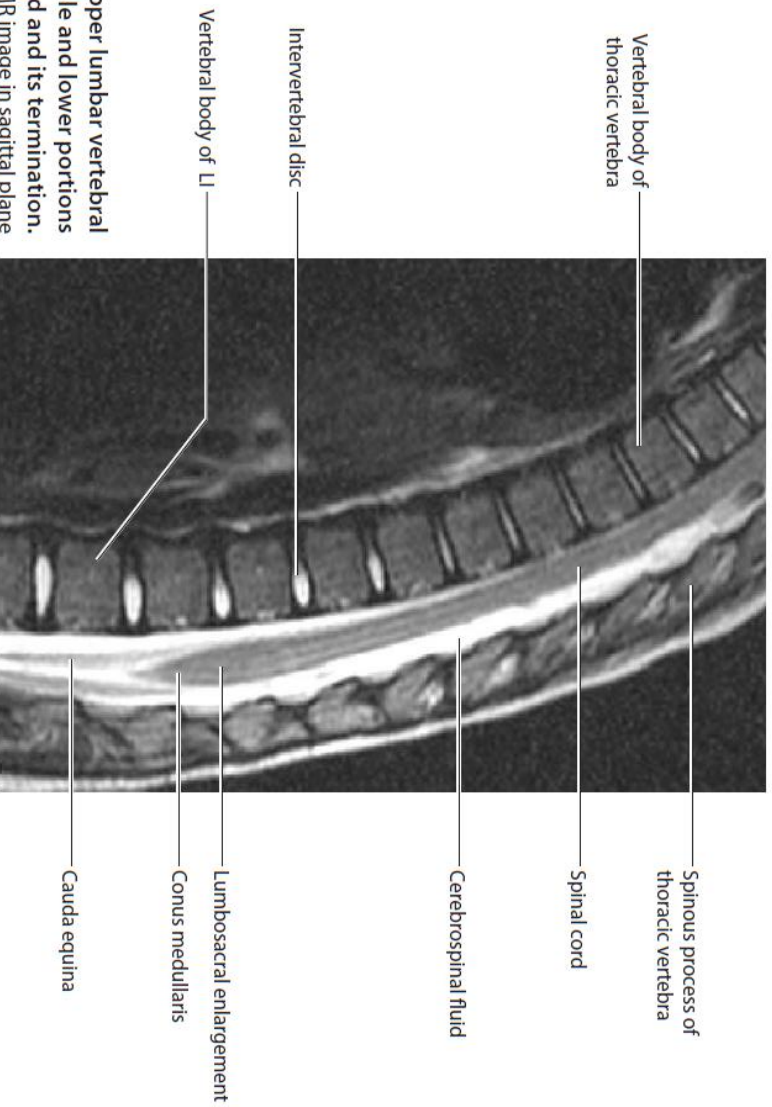
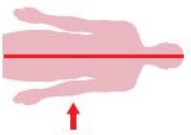
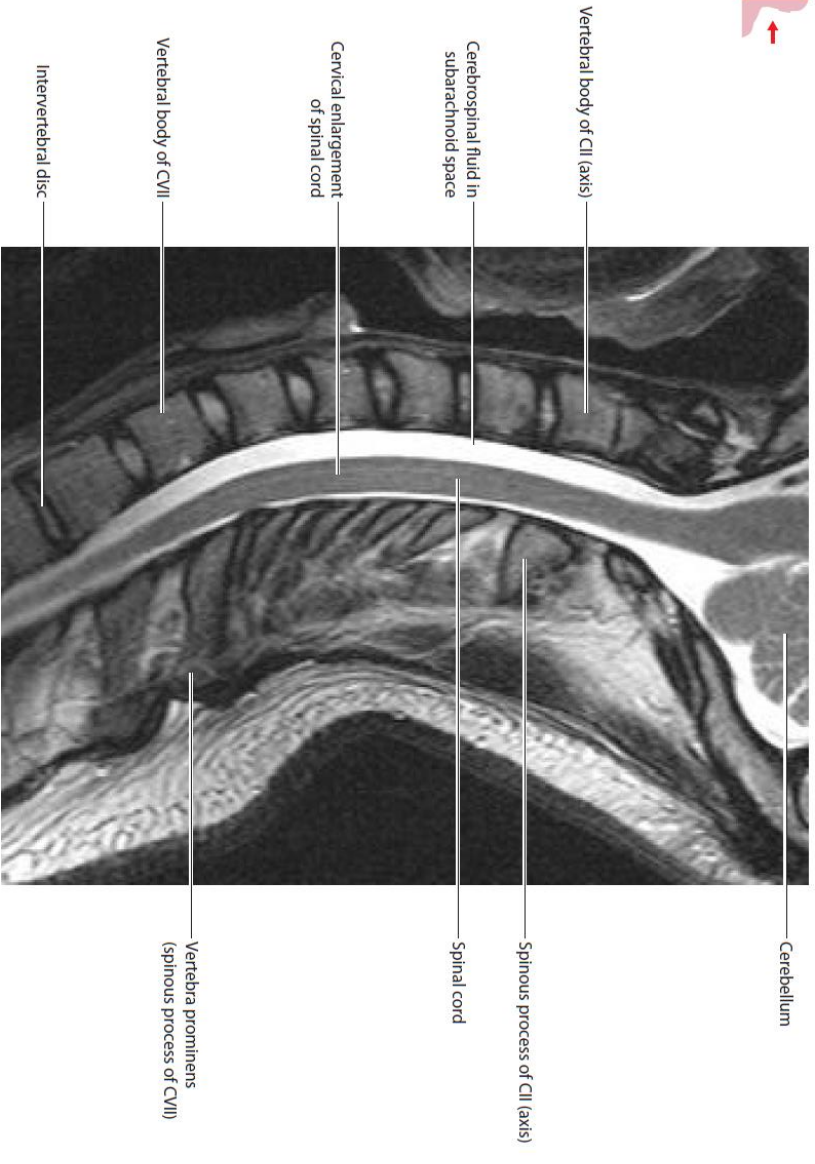


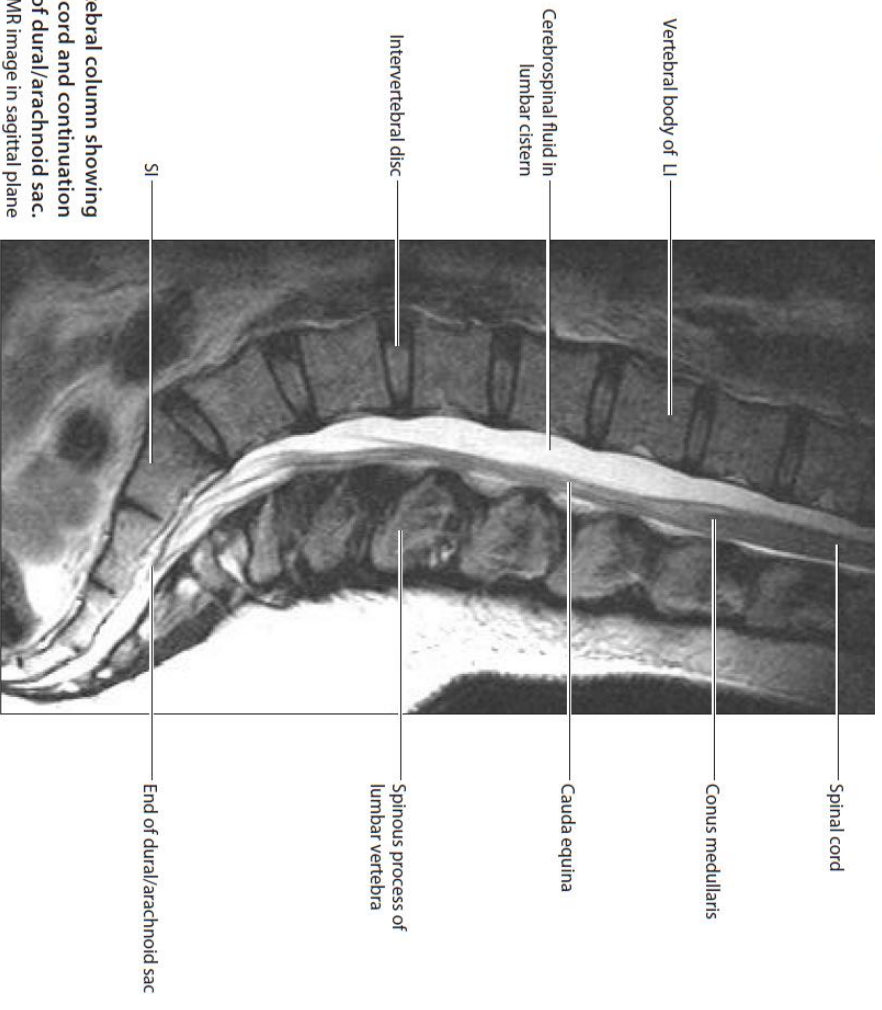
Neuroanatomy 3: Spinal Cord

Dr. Ali Mohsin





Thoracic and upper lumbar vertebral column showing middle and lower portions of spinal cord and its terminations. T2-weighted MR image in sagittal plane



Lumbar and sacral vertebral column showing termination of spinal cord and continuation and termination of dural/arachnoid sac. T2-weighted MR image in sagittal plane

Spinal Cord Interior

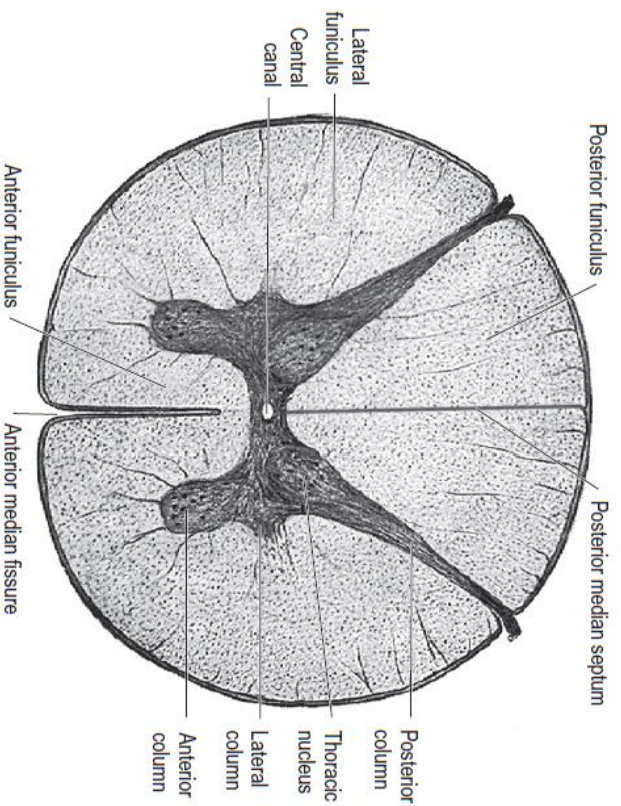
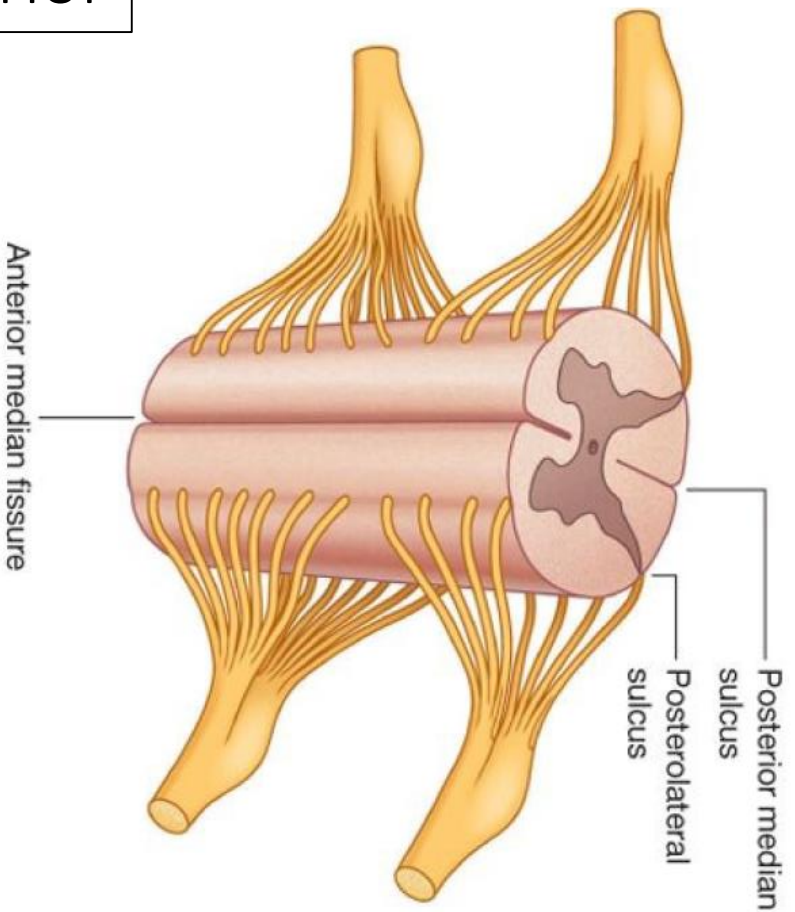
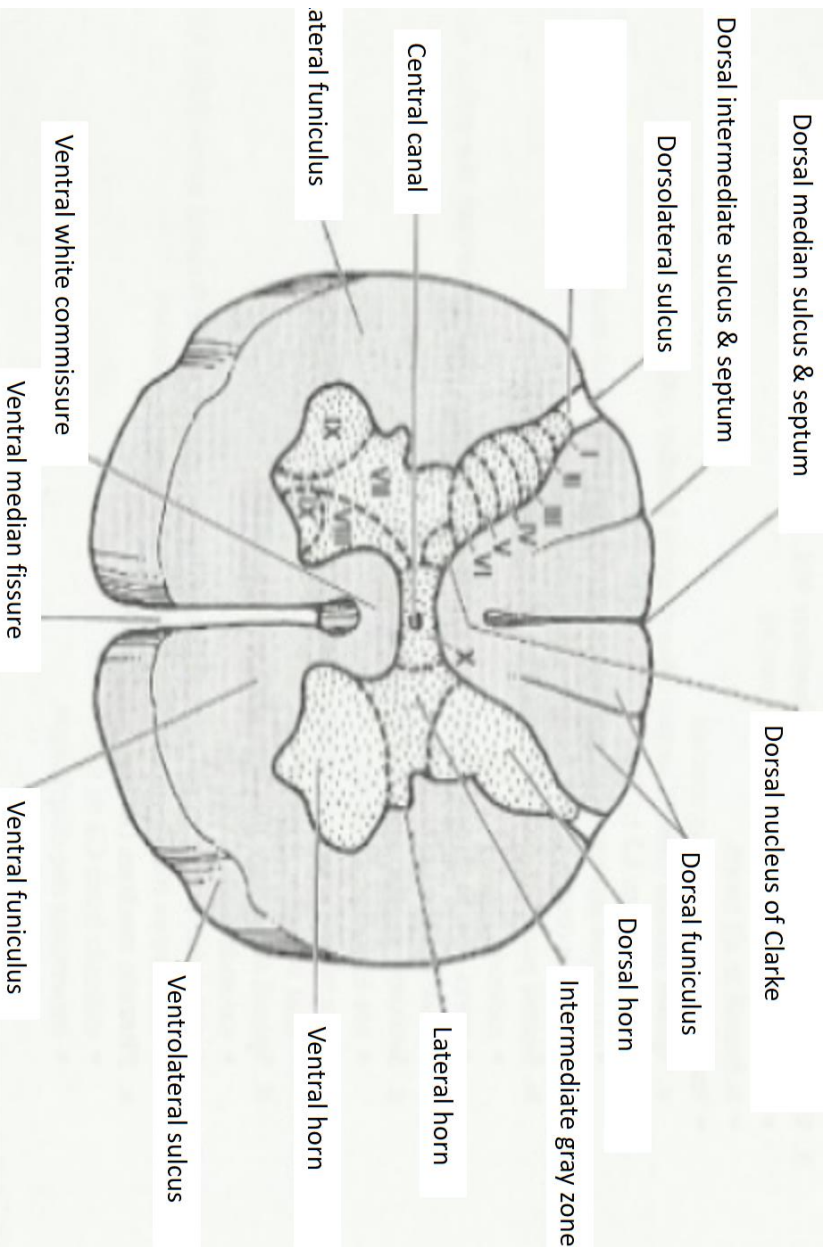
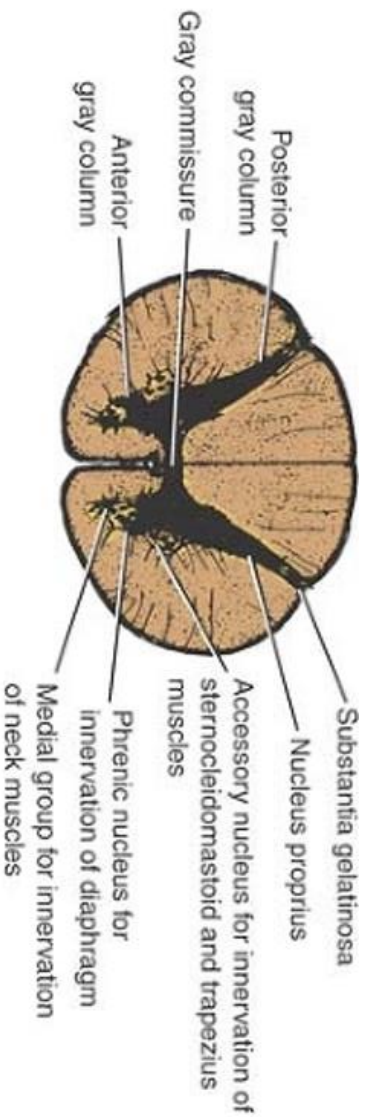


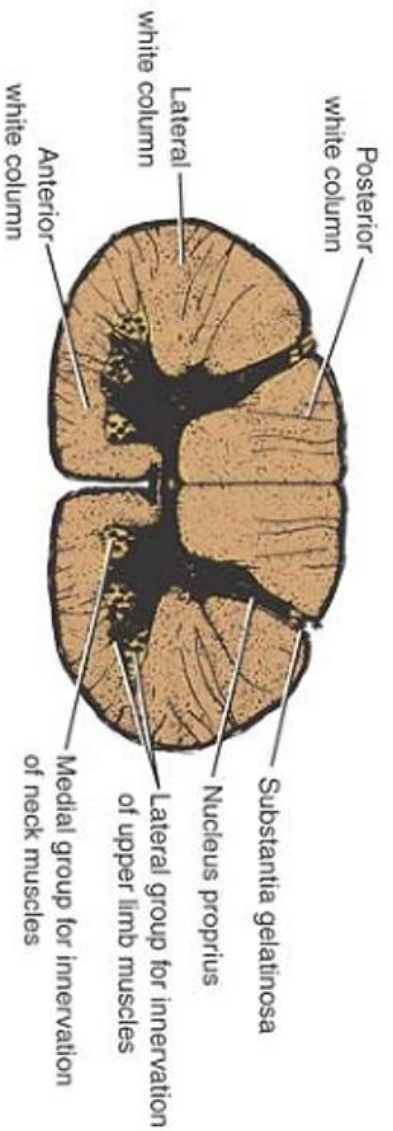
Fig. 8.5 Transverse section of the spinal cord at a midthoracic level.



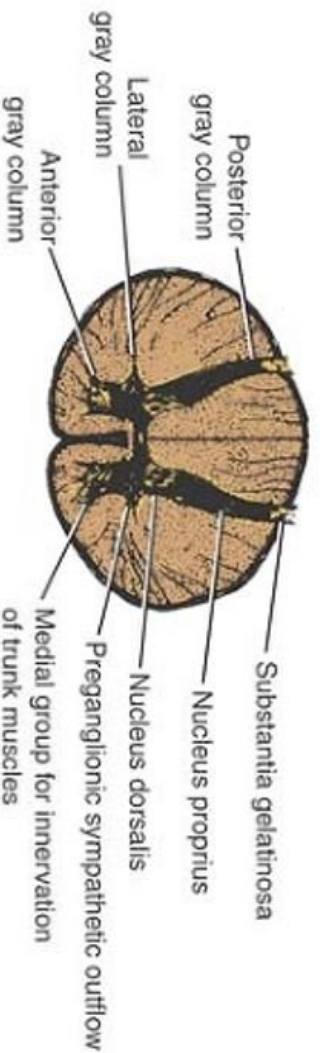
Third cervical segment



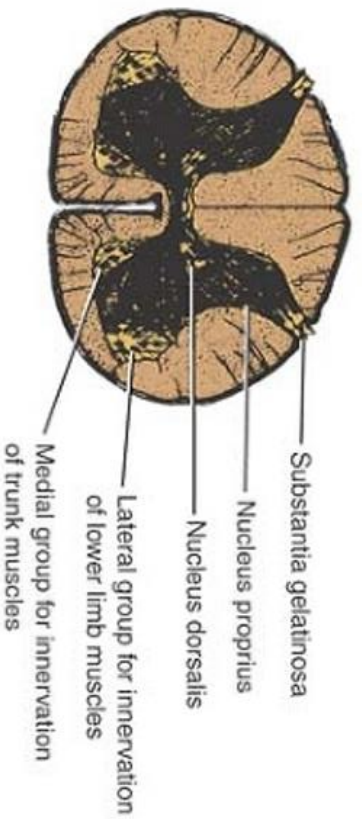
Sixth cervical segment



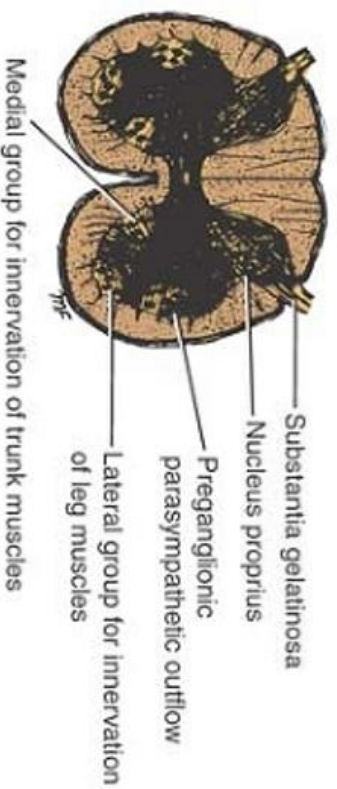
Sixth thoracic segment



Third lumbar segment



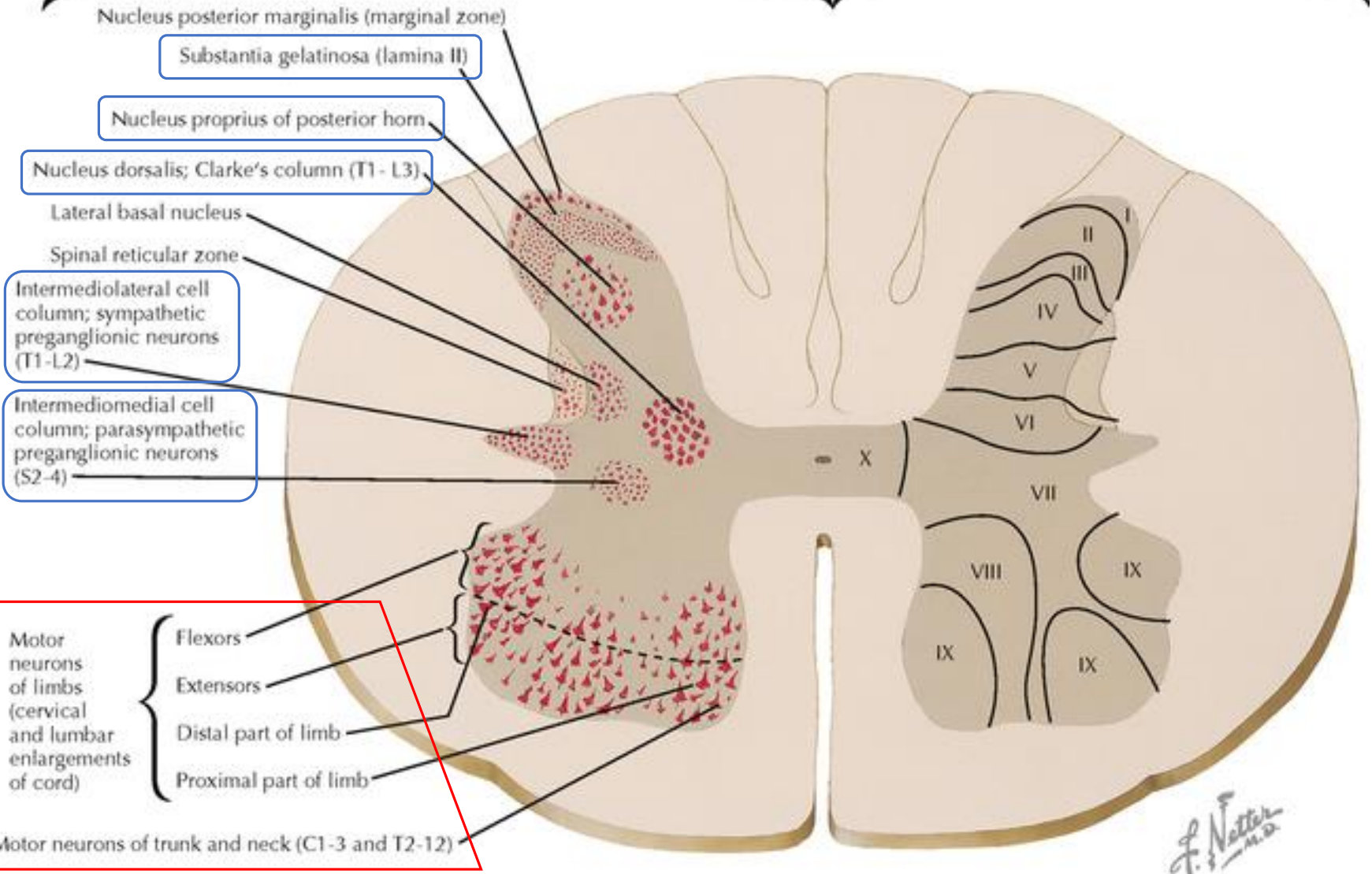
Third sacral segment



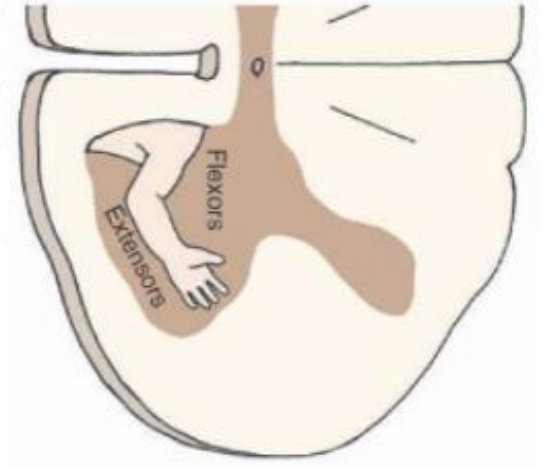
A. Cytoarchitecture of the spinal cord gray matter

Nuclear cell columns

Laminae of Rexed

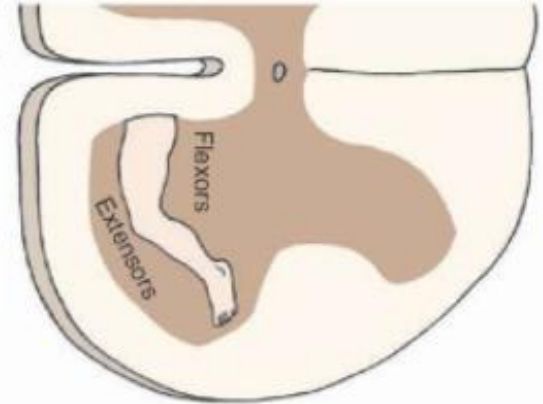


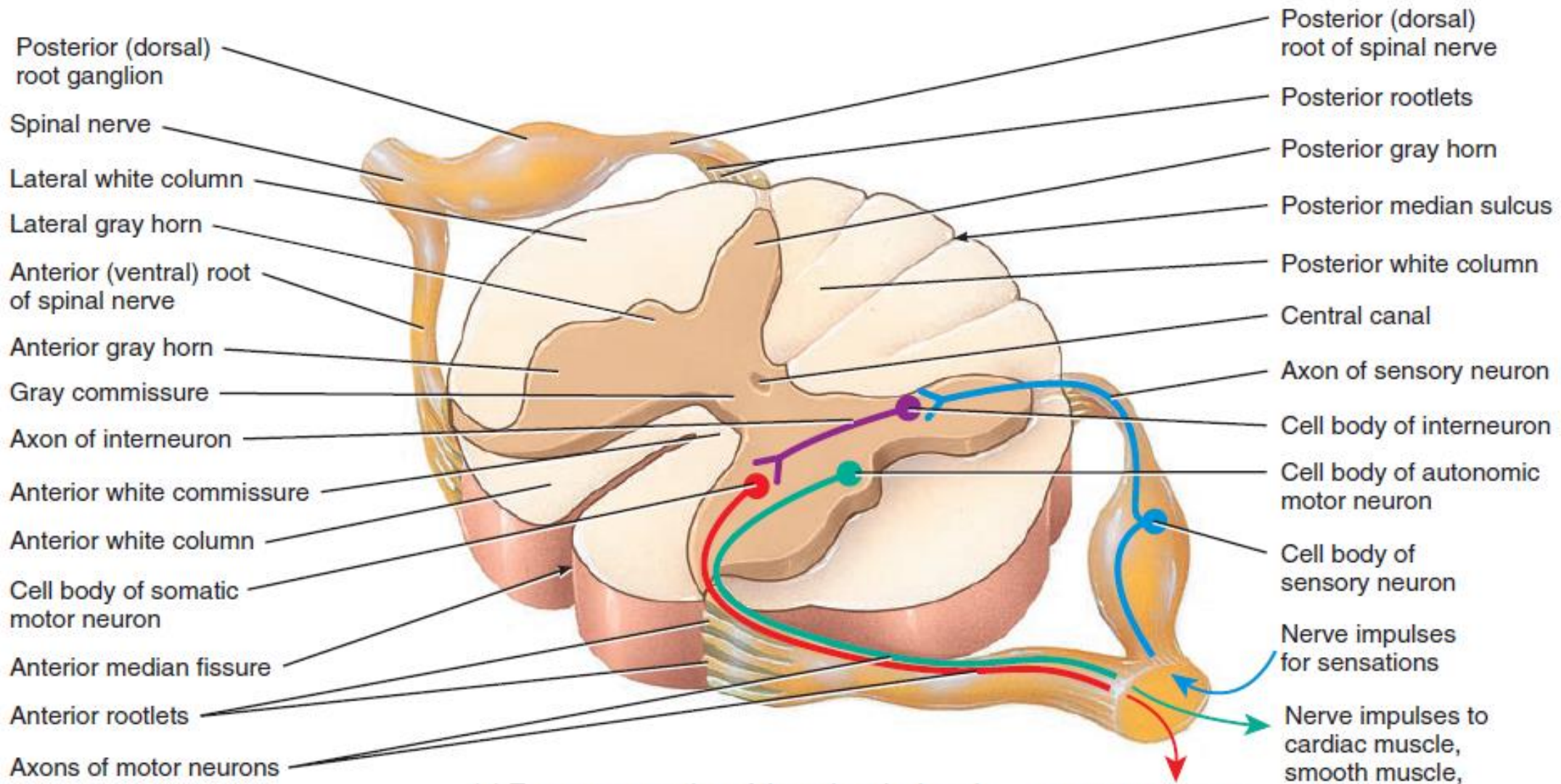
Cervical enlargement



D

Lumbar enlargement

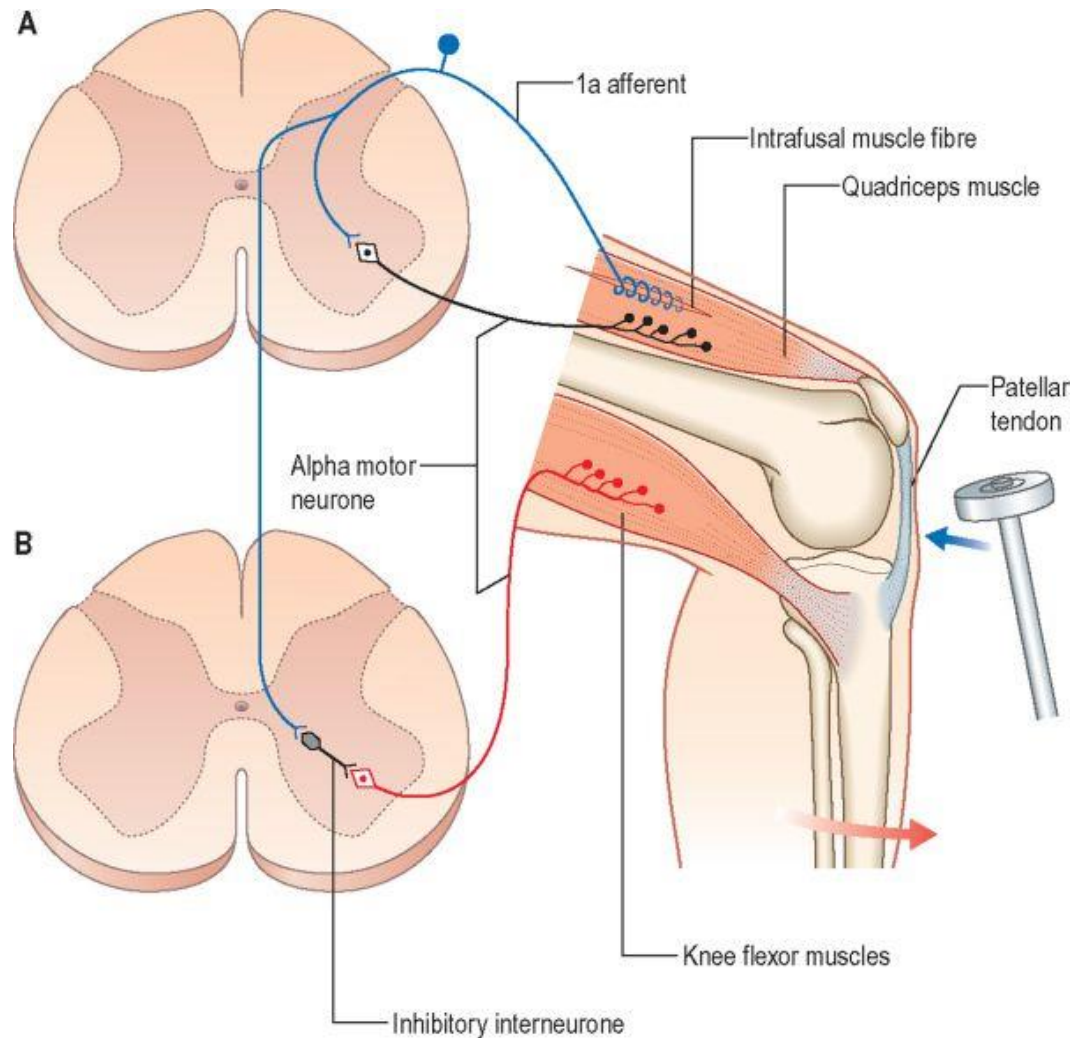




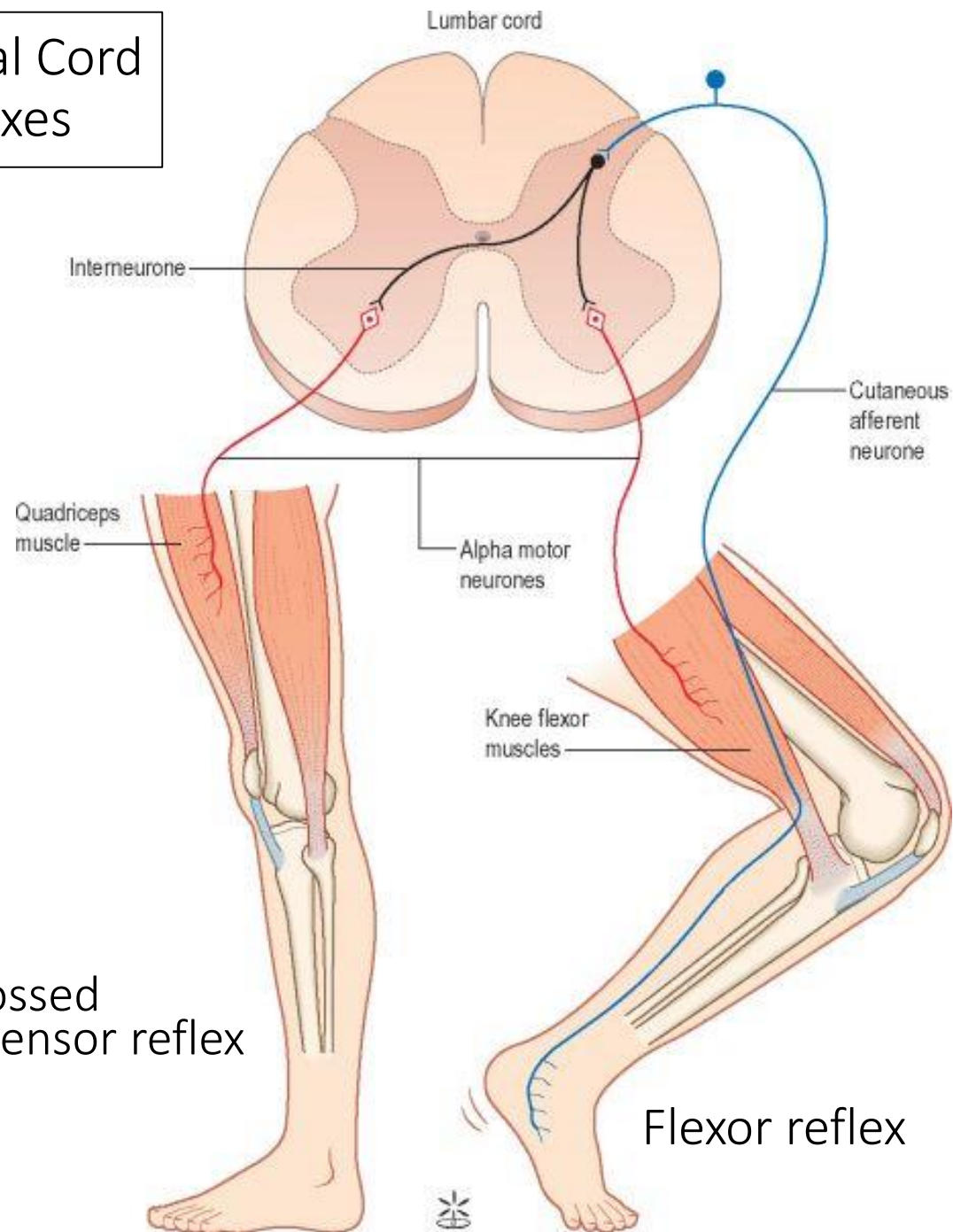
(a) Transverse section of thoracic spinal cord

Nerve impulses to skeletal muscles
 Nerve impulses to cardiac muscle, smooth muscle, and glands
 Nerve impulses for sensations

Spinal Cord Reflexes



Stretch reflex: knee jerk



Crossed extensor reflex

Flexor reflex

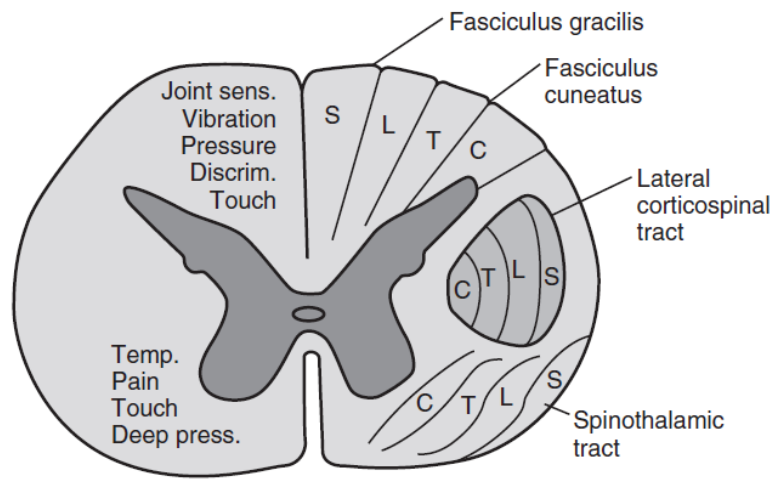
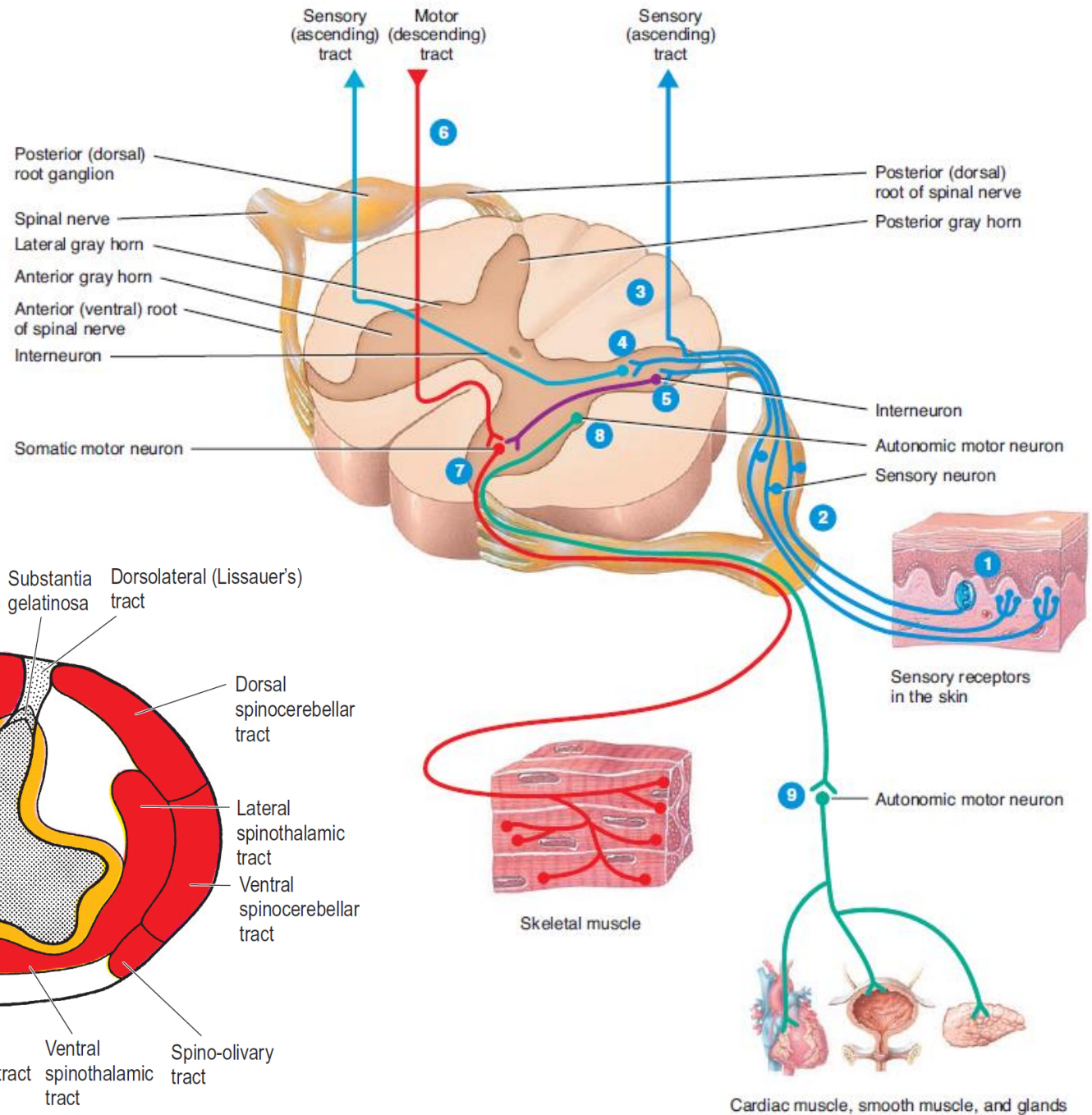
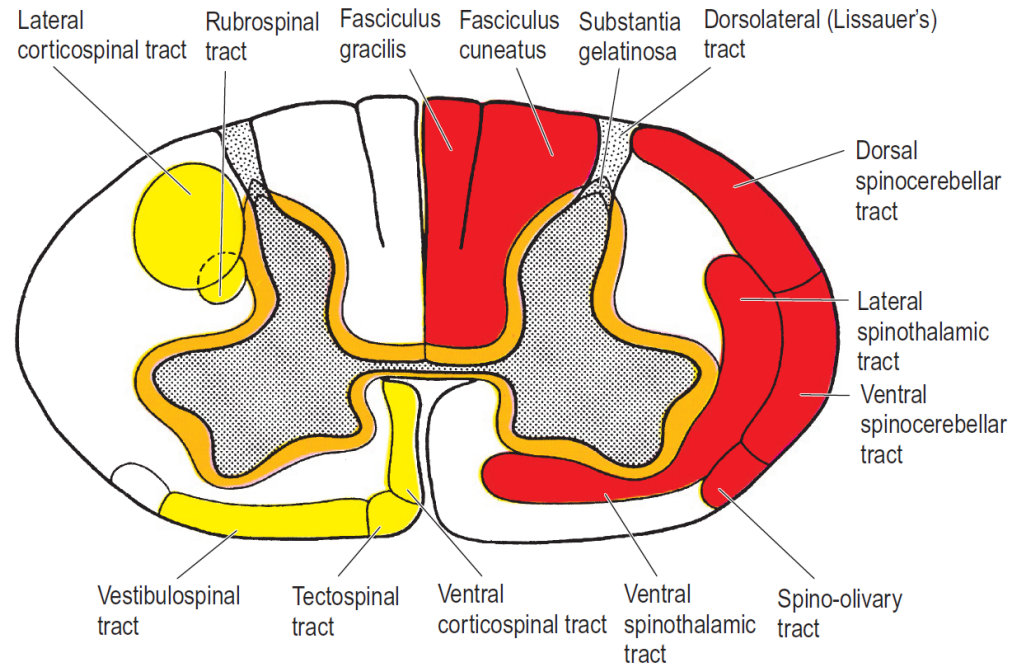


Fig. 8.37 Segmental arrangement of nerve fibers in major clinically relevant tracts within the spinal cord is demonstrated. Specific sensory modalities mediated respectively by the two principle ascending pathways (spinothalamic and posterior columns) are labeled, as is the segmental distribution of motor fibers within the descending lateral corticospinal (pyramidal) tract. C: cervical; T: thoracic; L: lumbar; S: sacral (Modified from Brodal A: Neurological Anatomy,

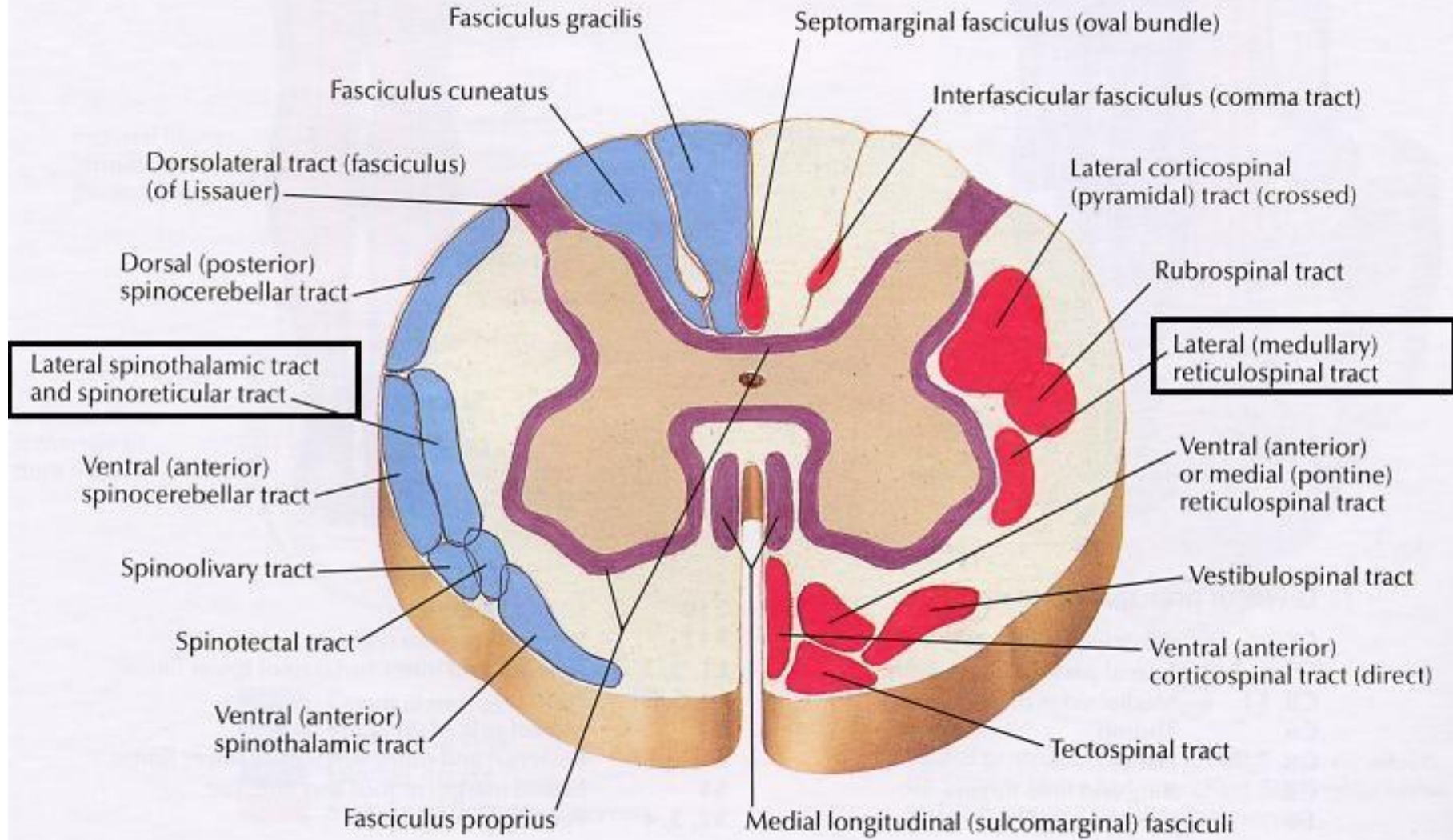


Spinal Cord Tracts



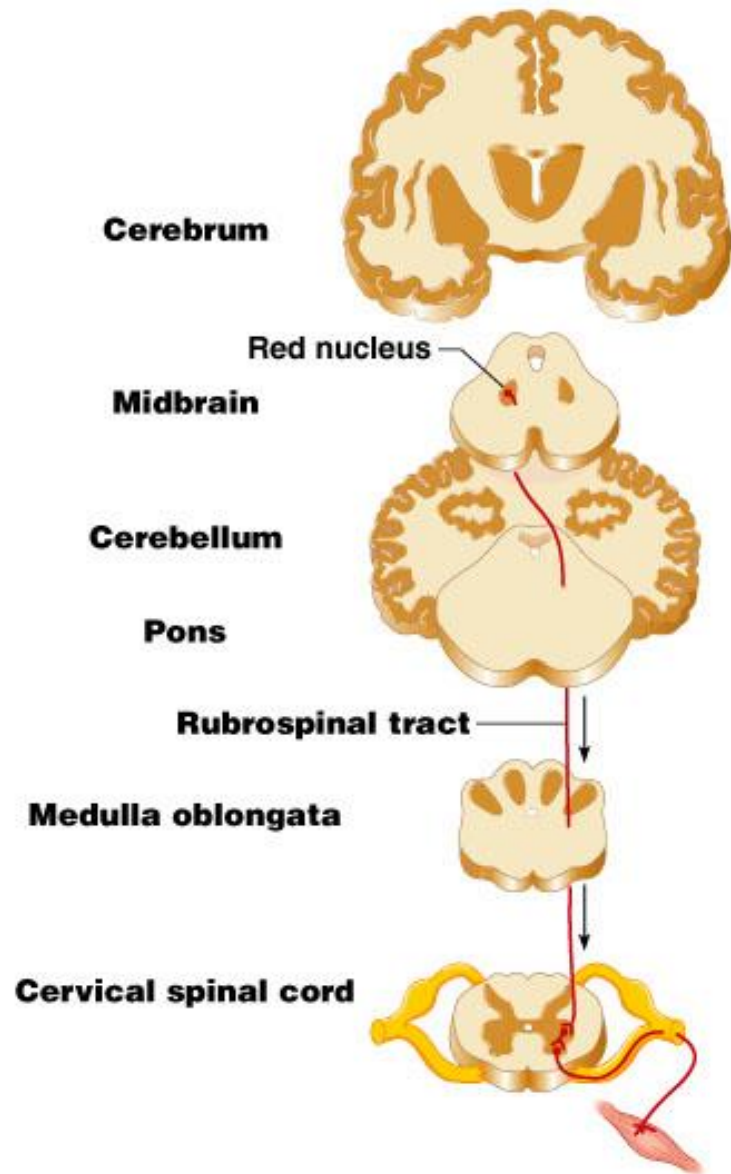
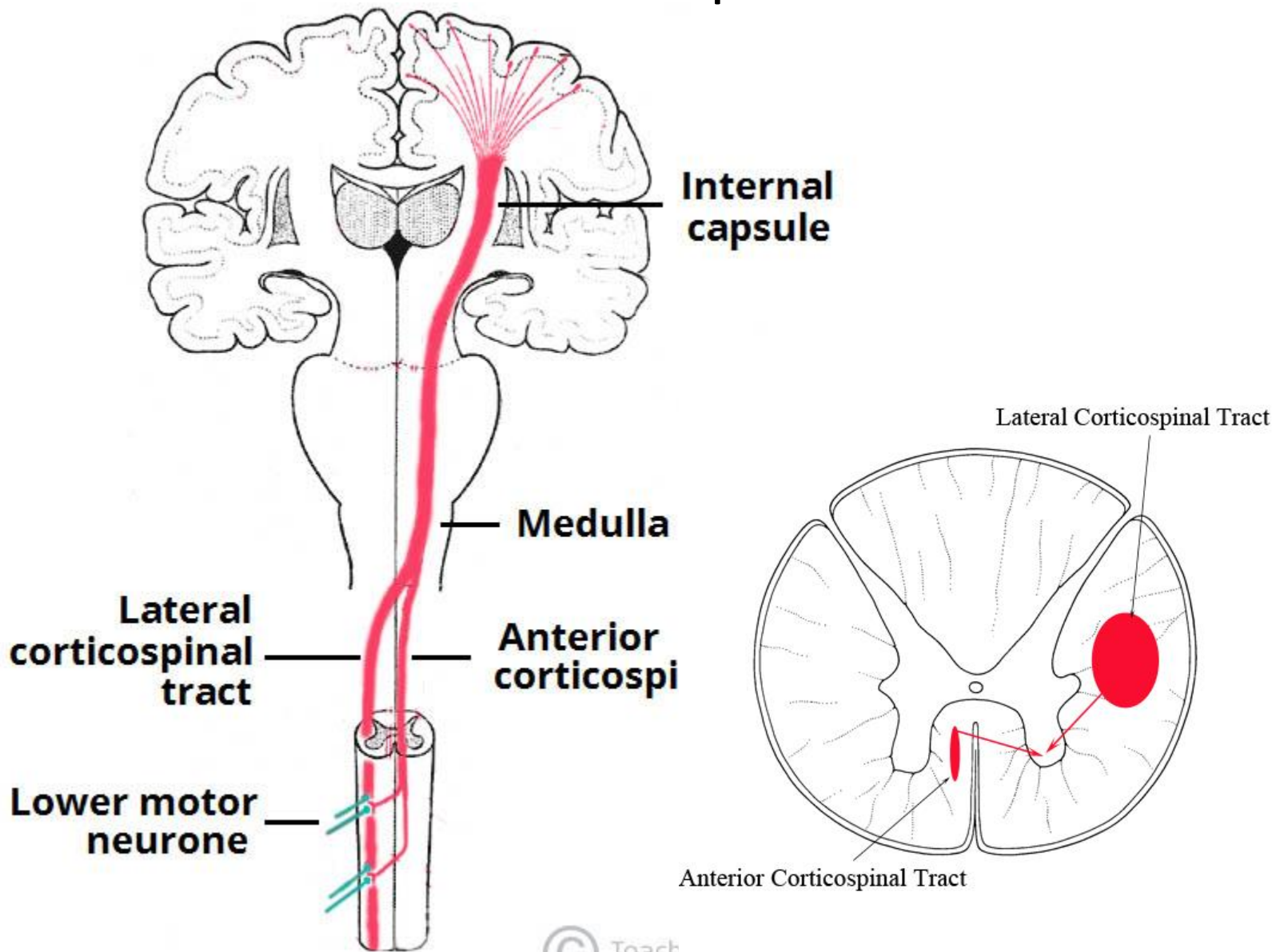
Principal fiber tracts of spinal cord

- Ascending pathways
- Descending pathways
- Fibers passing in both directions



Netter, 1989

Corticospinal Tract



(b) Rubrospinal tract (an extrapyramidal tract)

Spinothalamic Tract

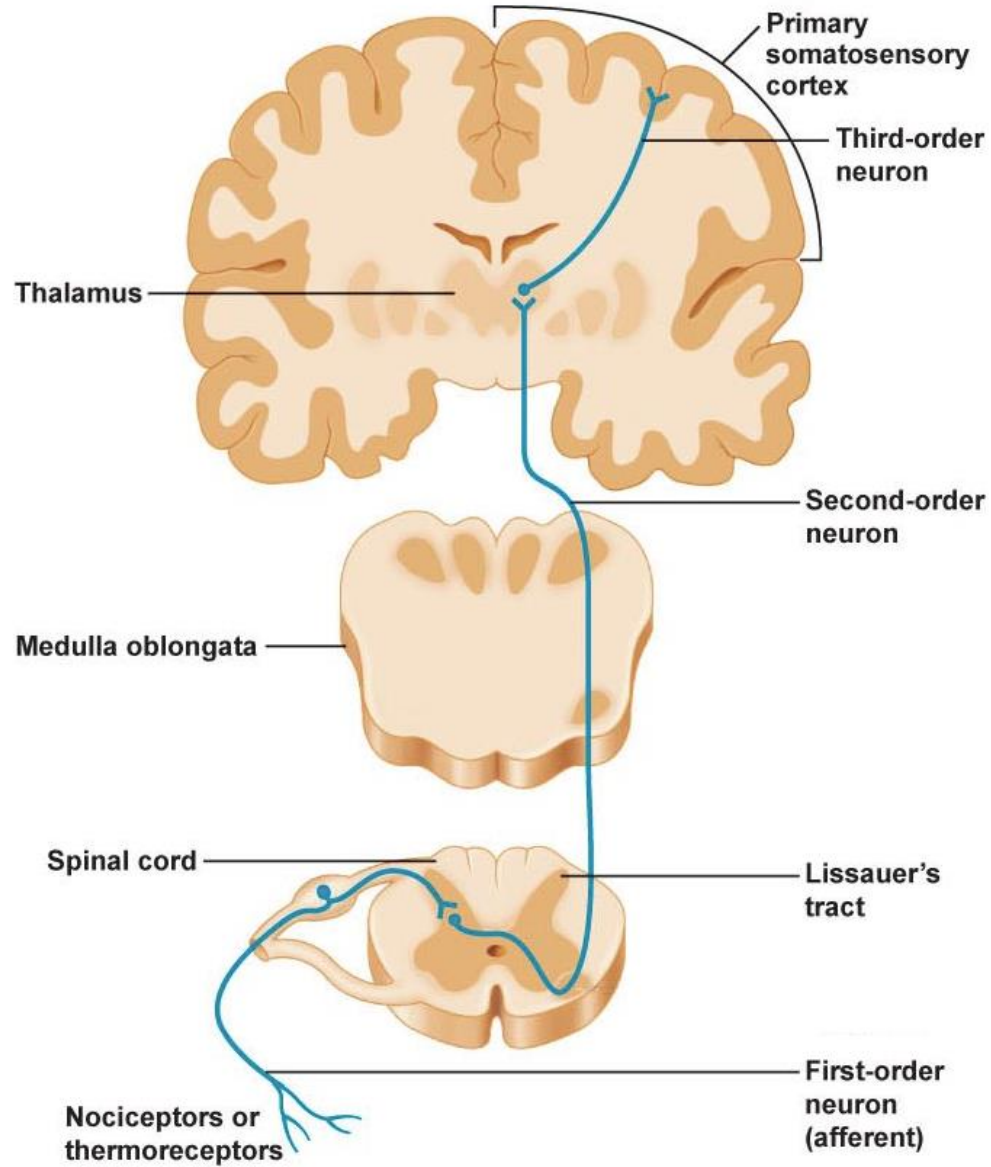
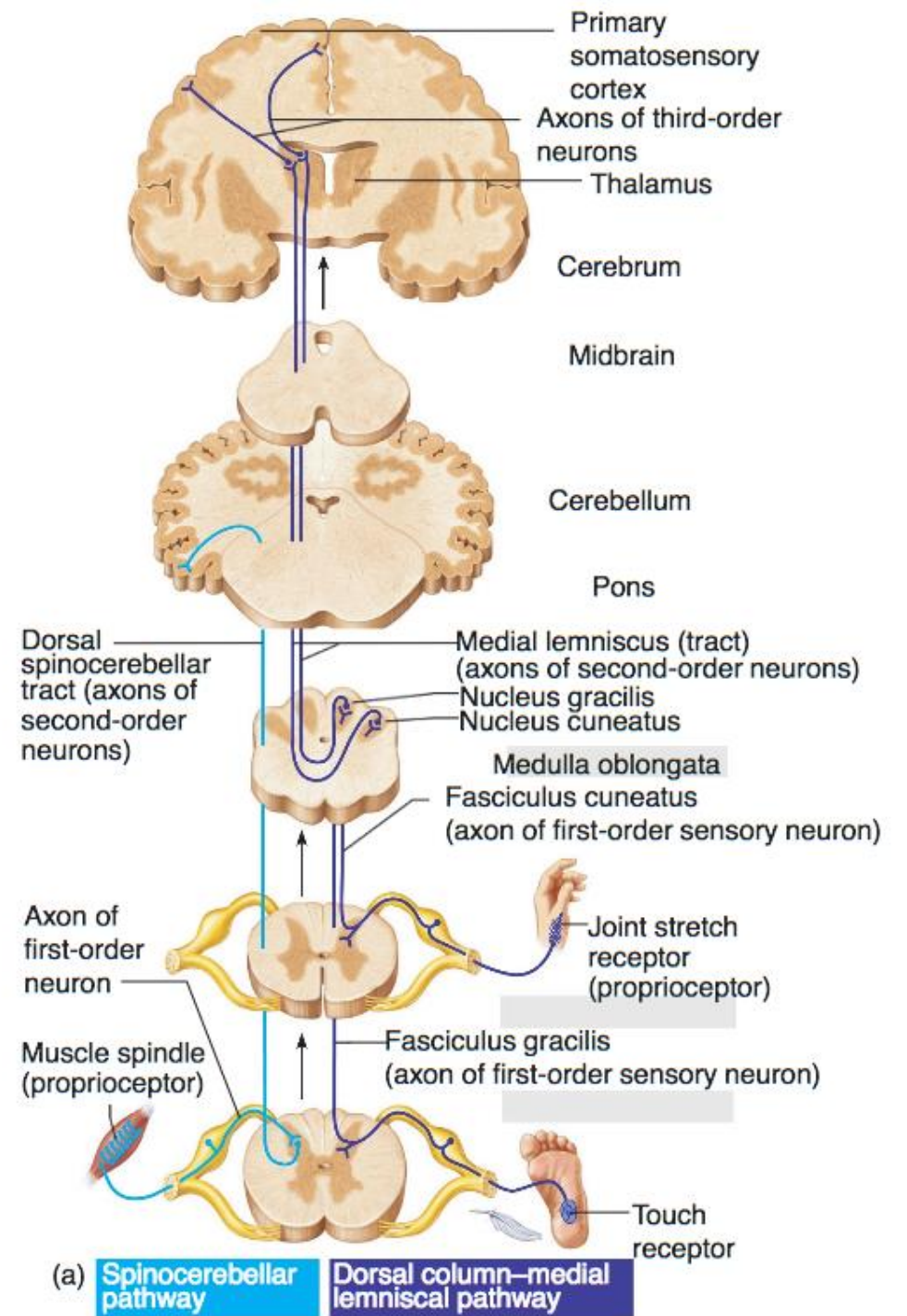
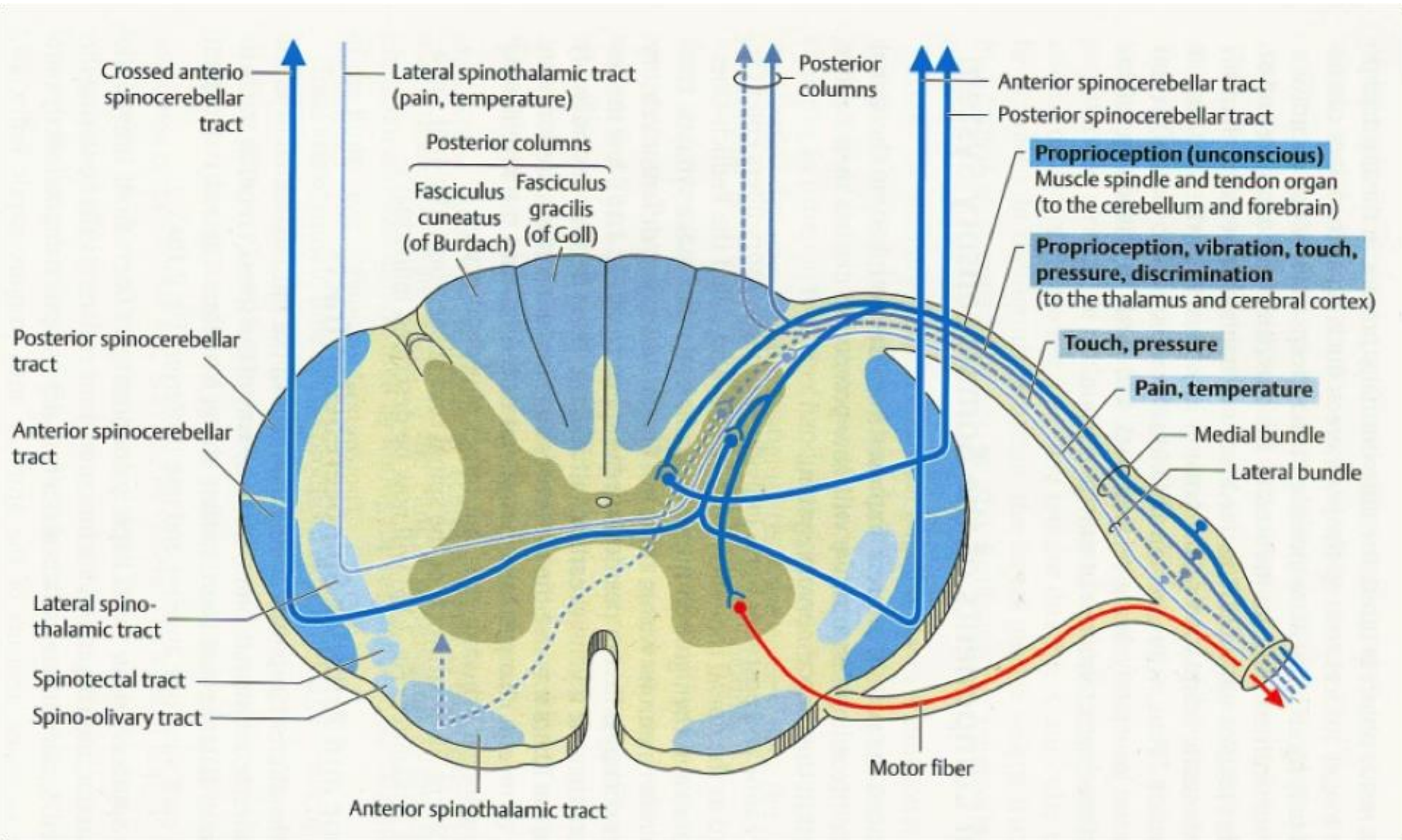


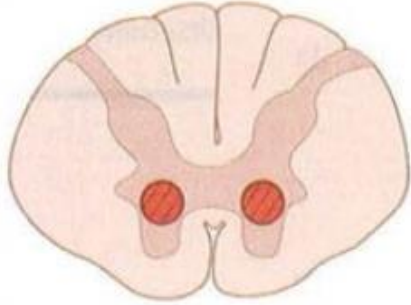
Image from: Pearson Education



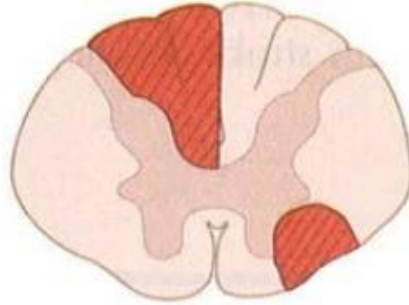


Spinal Cord Injuries

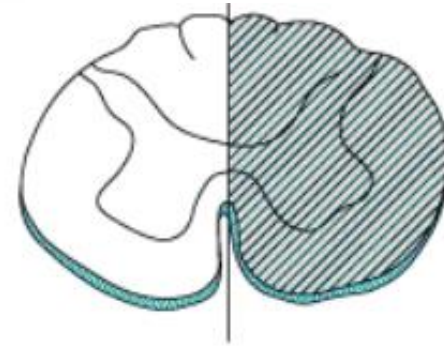
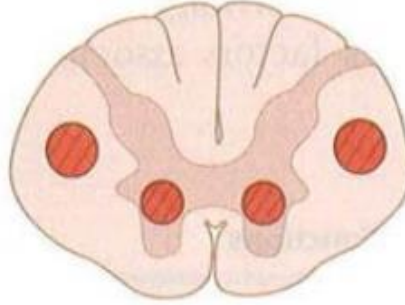
Poliomyelitis and Werdnig-Hoffmann disease: lower motor neuron lesions only, due to destruction of anterior horns; flaccid paralysis



Multiple sclerosis: mostly white matter of cervical region; random and asymmetric lesions, due to demyelination; scanning speech, intention tremor, nystagmus



ALS: combined upper and lower motor neuron deficits with no sensory deficit; both upper and lower motor neuron signs

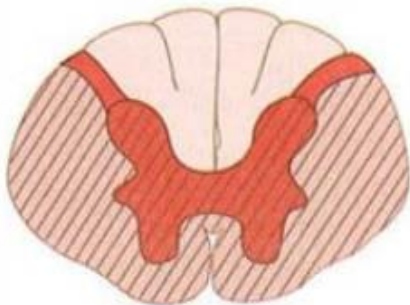


Hemisection
Brown-Séquard
Syndrome

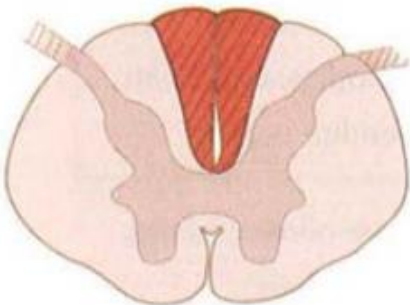


Complete
Transection

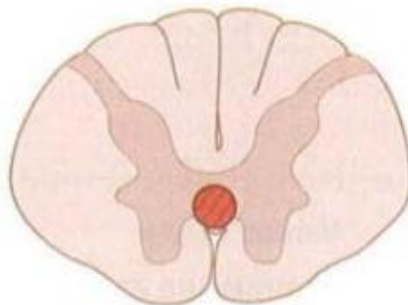
Complete occlusion of anterior spinal artery; spares dorsal columns and tract of Lissauer



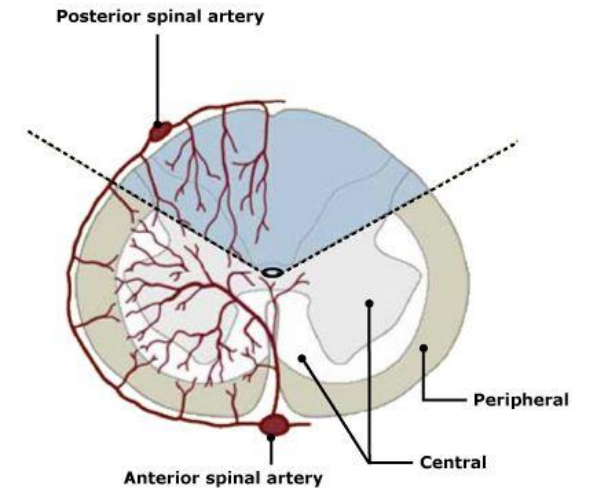
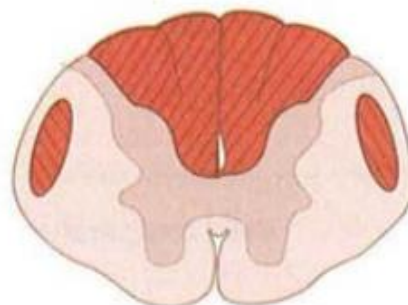
Tabes dorsalis (3° syphilis): degeneration of dorsal roots and dorsal columns; impaired proprioception, locomotor ataxia



Syringomyelia: crossing fibers of spinothalamic tract damaged; bilateral loss of pain and temperature sensation



Vitamin B₁₂ neuropathy and Friedreich's ataxia: demyelination of dorsal columns, lateral corticospinal tracts, and spinocerebellar tracts; ataxic gait, hyperreflexia, impaired position and vibration sense



Brown-Sequard syndrome

Syringomyelia

