Spinal Cord, Spinal Nerves & Projection Tracts

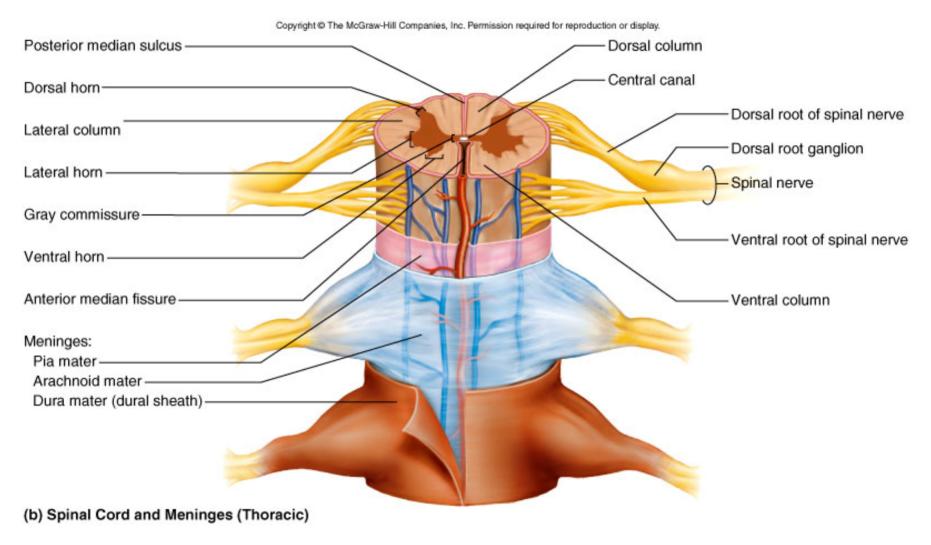
Gross Anatomy of Lower Spinal Cord

Copyright @ The McGraw-Hill Companies, Inc. Permission required for reproduction or display Cervical Cervical enlargement spinal nerves Dural sheath Subarachnoid space Thoracic spinal nerves Spinal cord Vertebra (cut) Lumbar enlargement Spinal nerve Medullary-Spinal nerve rootlets cone Dorsal median sulcus Subarachnoid space Lumba Epidural space Cauda equina spinal nerves Dorsal root ganglion Arachnoid mater Dura mater Terminal -Sacral filum spinal (b) nerves

Meninges of Vertebra and Spinal Cord

Copyright @ The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Posterior Spinous process of vertebra-Meninges: - Dura mater (dural sheath) Arachnoid mater Pia mater Fat in epidural space Subarachnoid space -Spinal cord Denticulate ligament Dorsal root ganglion Spinal nerve Vertebral body Anterior (a) Spinal Cord and Vertebra (Cervical)

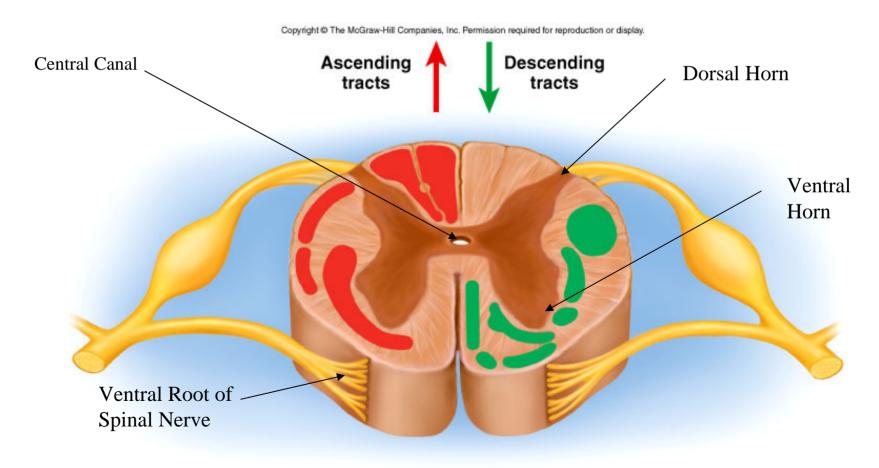
Cross-Sectional Anatomy of the Spinal Cord

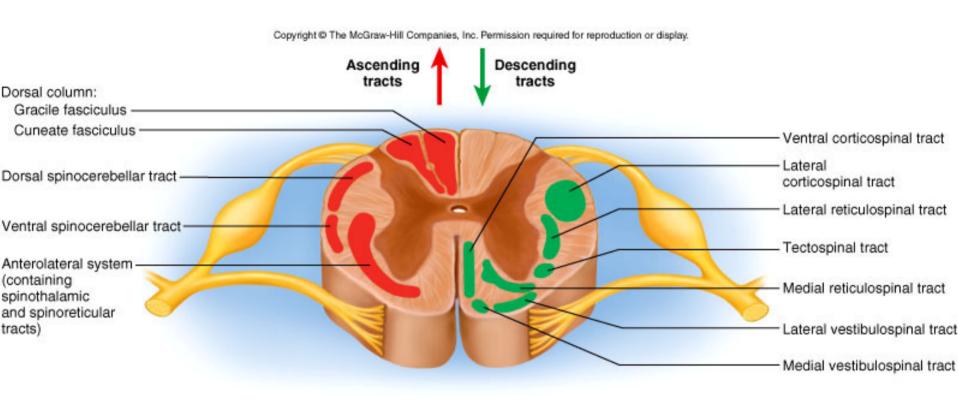


- Central area of gray matter shaped like a butterfly and surrounded by white matter in 3 columns
- Gray matter = neuron cell bodies with little myelin
- White matter = myelinated axons

Gray Matter in the Spinal Cord

- Pair of dorsal or posterior horns
 - dorsal root of spinal nerve is totally sensory fibers
- Pair of ventral or anterior horns
 - ventral root of spinal nerve is totally motor fibers
- Connected by gray commissure punctured by a central canal continuous above with 4th ventricle

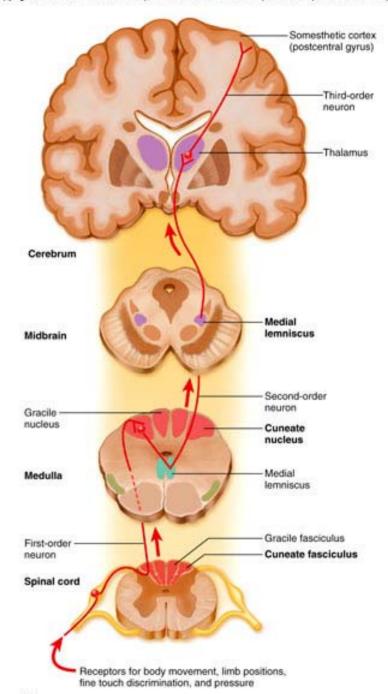




- Ascending and descending tract head up or down while decussation means that the fibers cross sides
- Contralateral means origin and destination are on opposite sides while ipsilateral means on same side

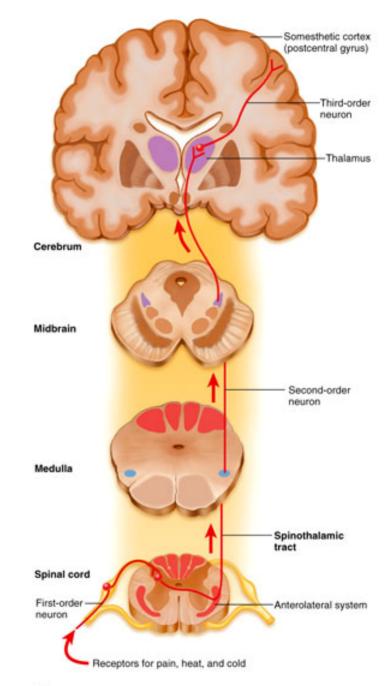
Dorsal Column Ascending Pathway

- Deep touch, visceral pain, vibration, and proprioception
- Fasciculus gracilis and cuneatus carry signals from arm and leg
- Decussation of 2nd order neuron in medulla
- 3rd order neuron in thalamus carries signal to cerebral cortex



Spinothalamic Pathway

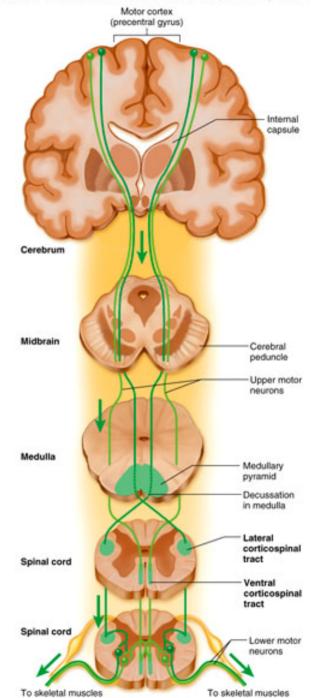
- Pain, pressure, temperature, light touch, tickle and itch
- Decussation of the second order neuron occurs in spinal cord
- Third order neurons arise in thalamus and continue to cerebral cortex

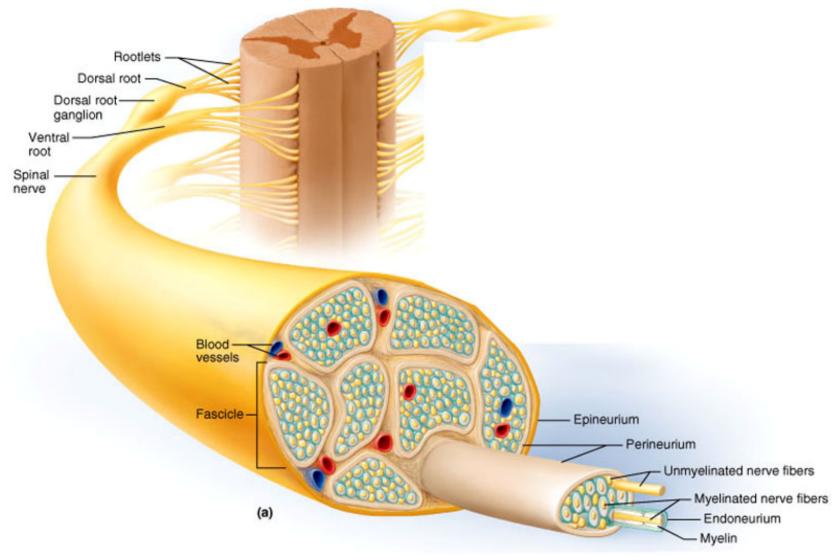


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Corticospinal Tract

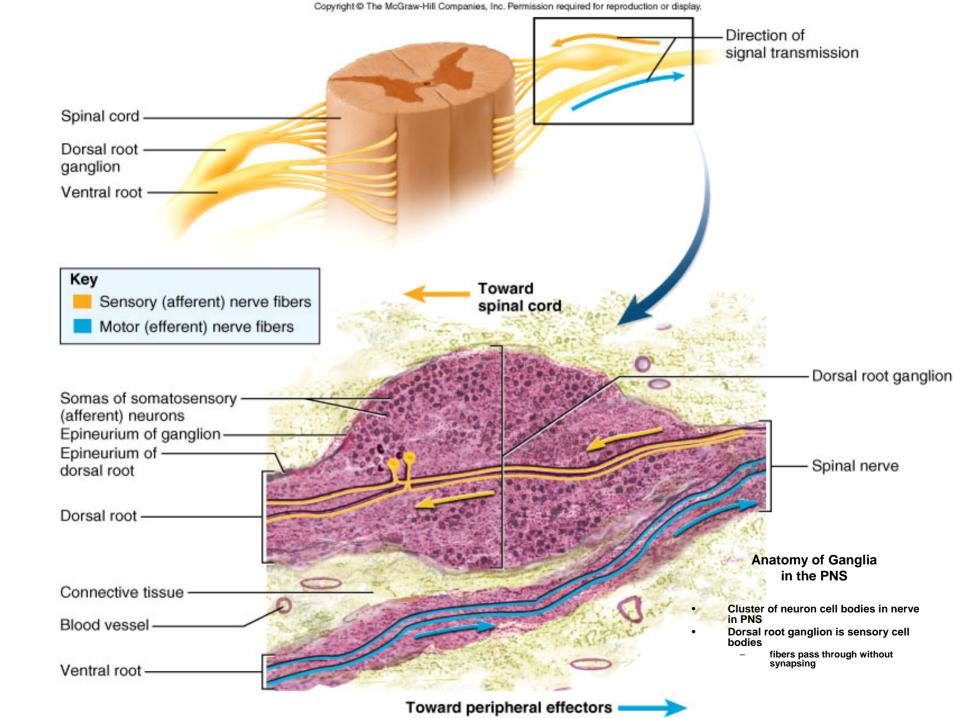
- Precise, coordinated limb movements
- Two neuron pathway
 - upper motor
 neuron in
 cerebral cortex
 - lower motor
 neuron in spinal
 cord
- Decussation in medulla



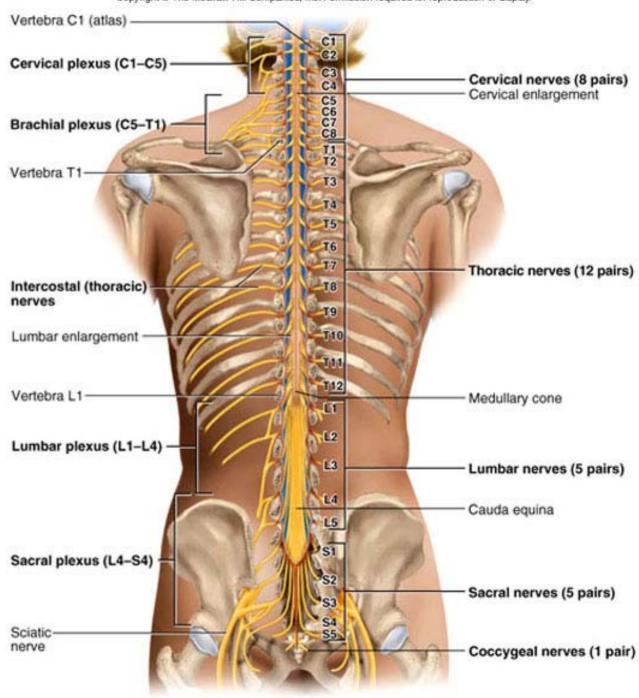


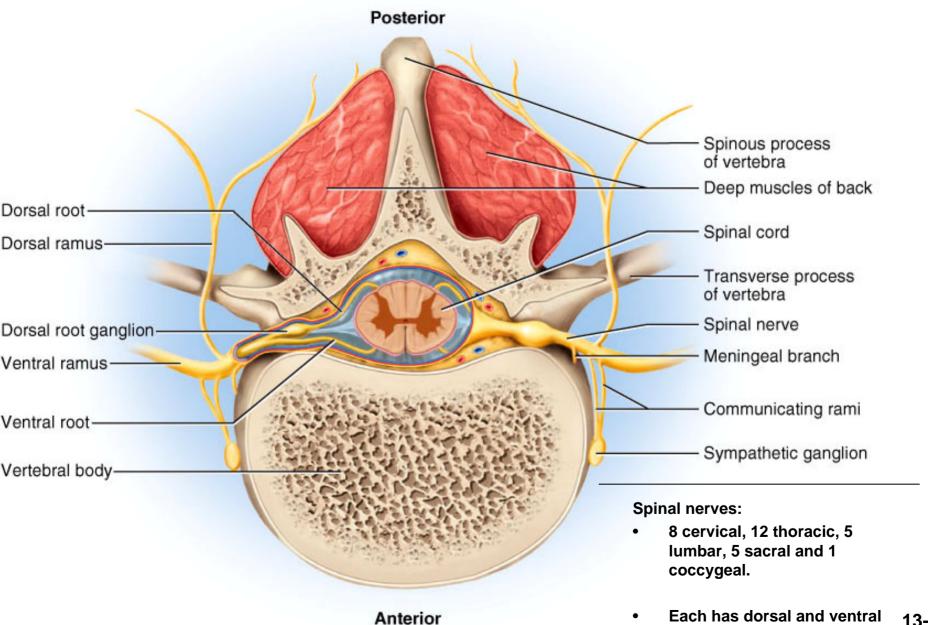
Anatomy of a Nerve

- A nerve is a bundle of nerve fibers (axons)
- Epineurium covers nerves, perineurium surrounds a fascicle and endoneurium separates individual nerve fibers
- Blood vessels penetrate only to the perineurium



Spinal Nerve Roots and Plexuses

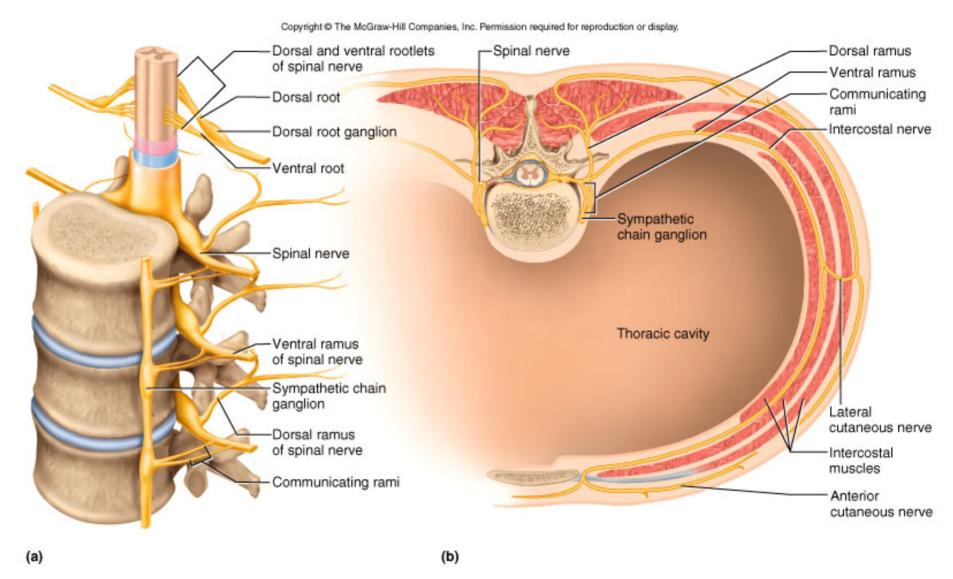




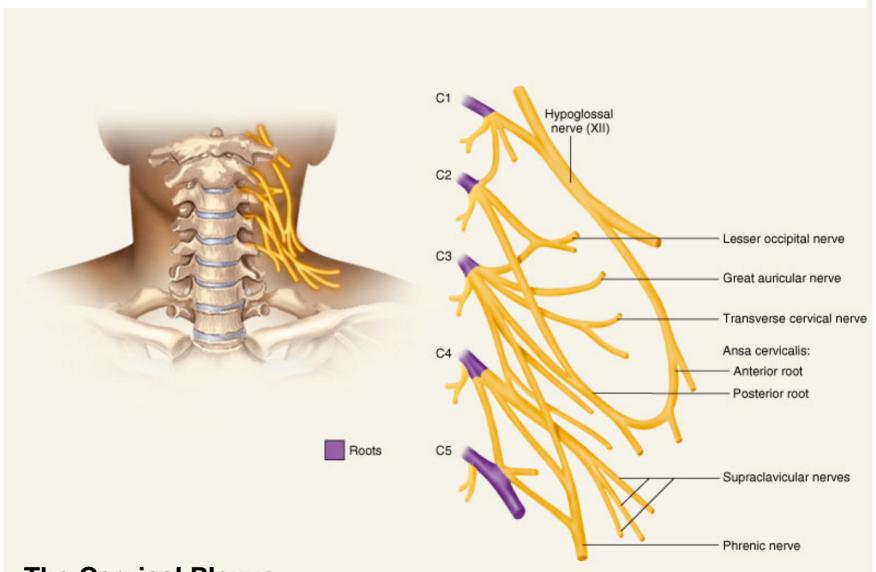
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ramus.

Rami of Spinal Nerves



Notice the branching and merging of nerves in this example of a plexus

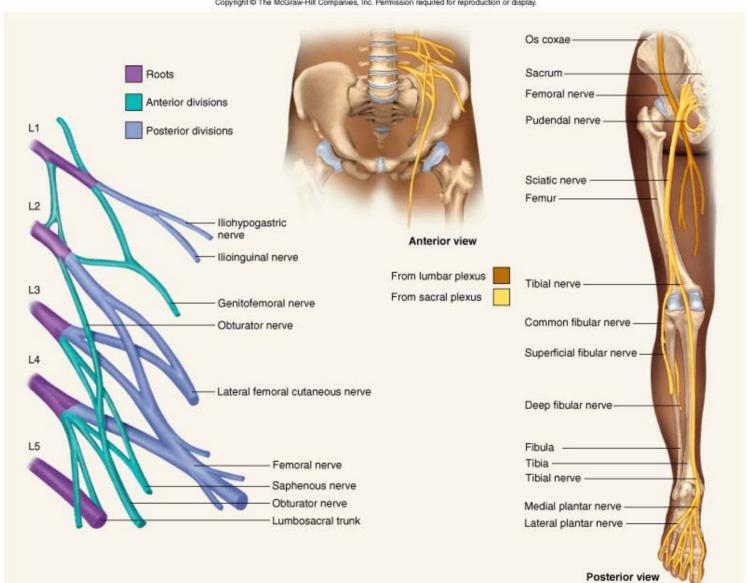


The Brachial Plexus

Copyright @ The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Roots Trunks Clavicle Anterior divisions Lateral cord Posterior divisions Posterior cord Medial cord Dorsal scapular Axillary nerve nerve Musculocutaneous Long thoracic nerve nerve Suprascapular Median nerve nerve Humerus Radial nerve Posterior cord Ulna **Axillary nerve** Ulnar nerve Median nerve Lateral cord Radial nerve Radial nerve Radius -Musculocutaneous nerve Superficial branchof ulnar nerve Digital branch Medial of ulnar nerve Median nerve cord Digital branch -Ulnar nerve of median nerve

The Lumbar **Plexus**

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The Sacral and Coccygeal Plexuses

Copyright @ The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Roots Lumbosacral trunk Anterior divisions Posterior divisions Superior gluteal nerve S2 Inferior gluteal nerve Sciatic nerve: Common fibular nerve -Tibial nerve Posterior cutaneous nerve Pudendal nerve