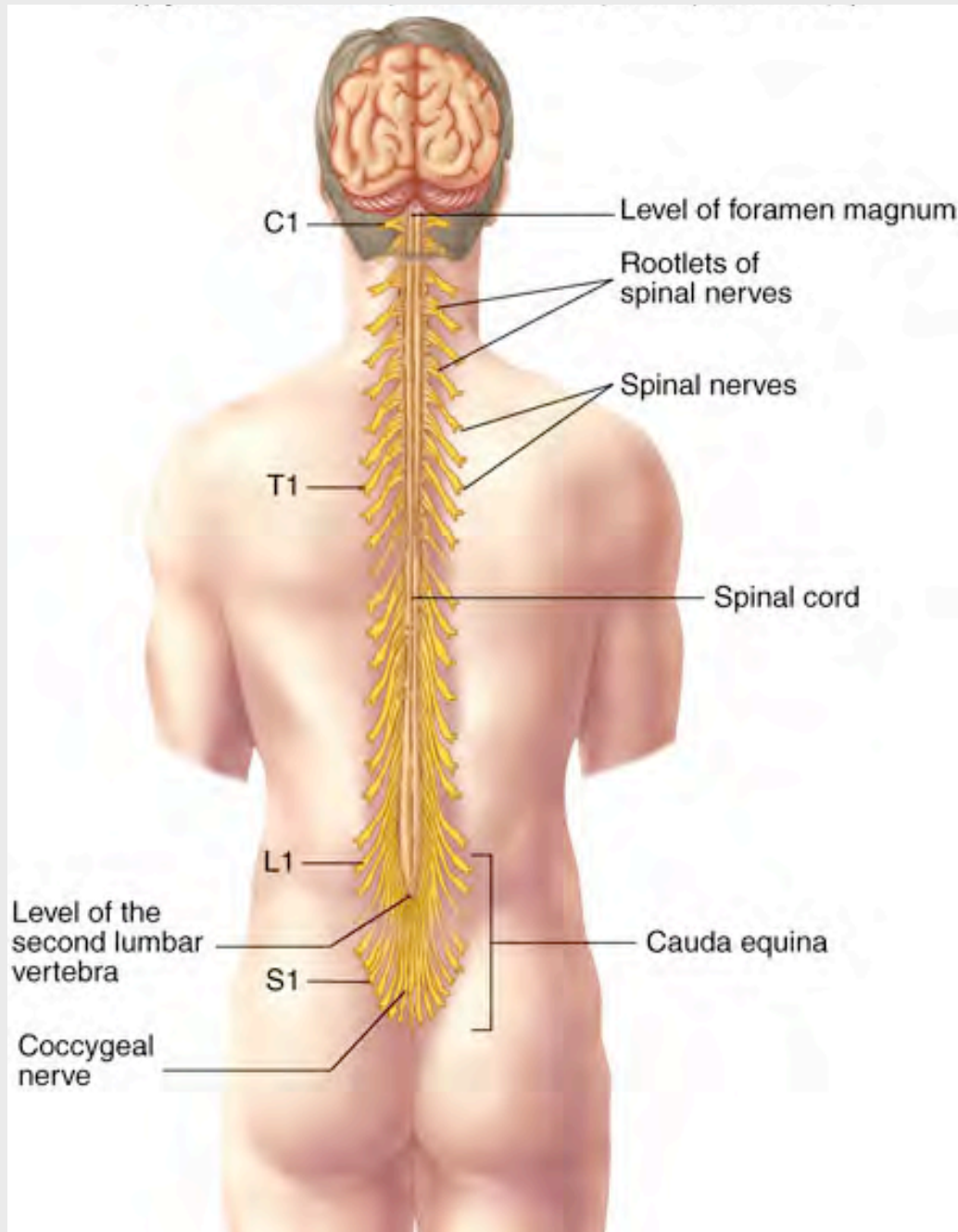


CNS & PNS

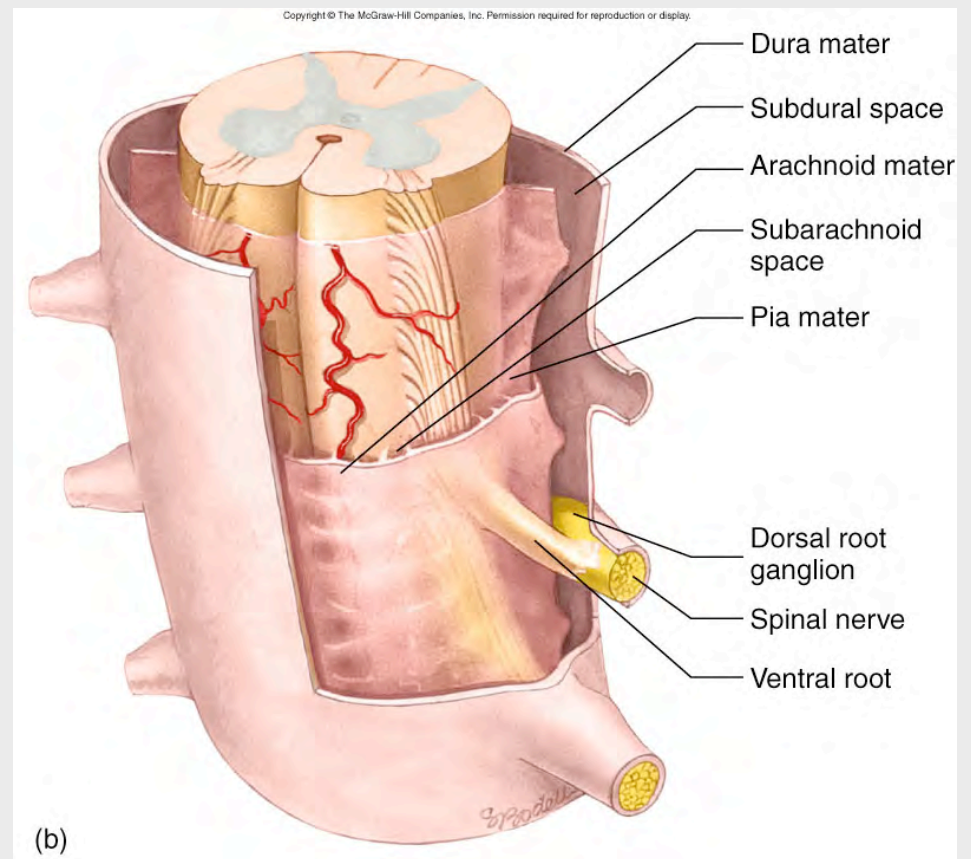
Nerves, pathways



- **CNS**
 - Brain, spinal cord
 - Processing center
 - **Nuclei**
- **PNS**
 - Spinal and cranial nerves
 - Information relay system
 - **ganglia**

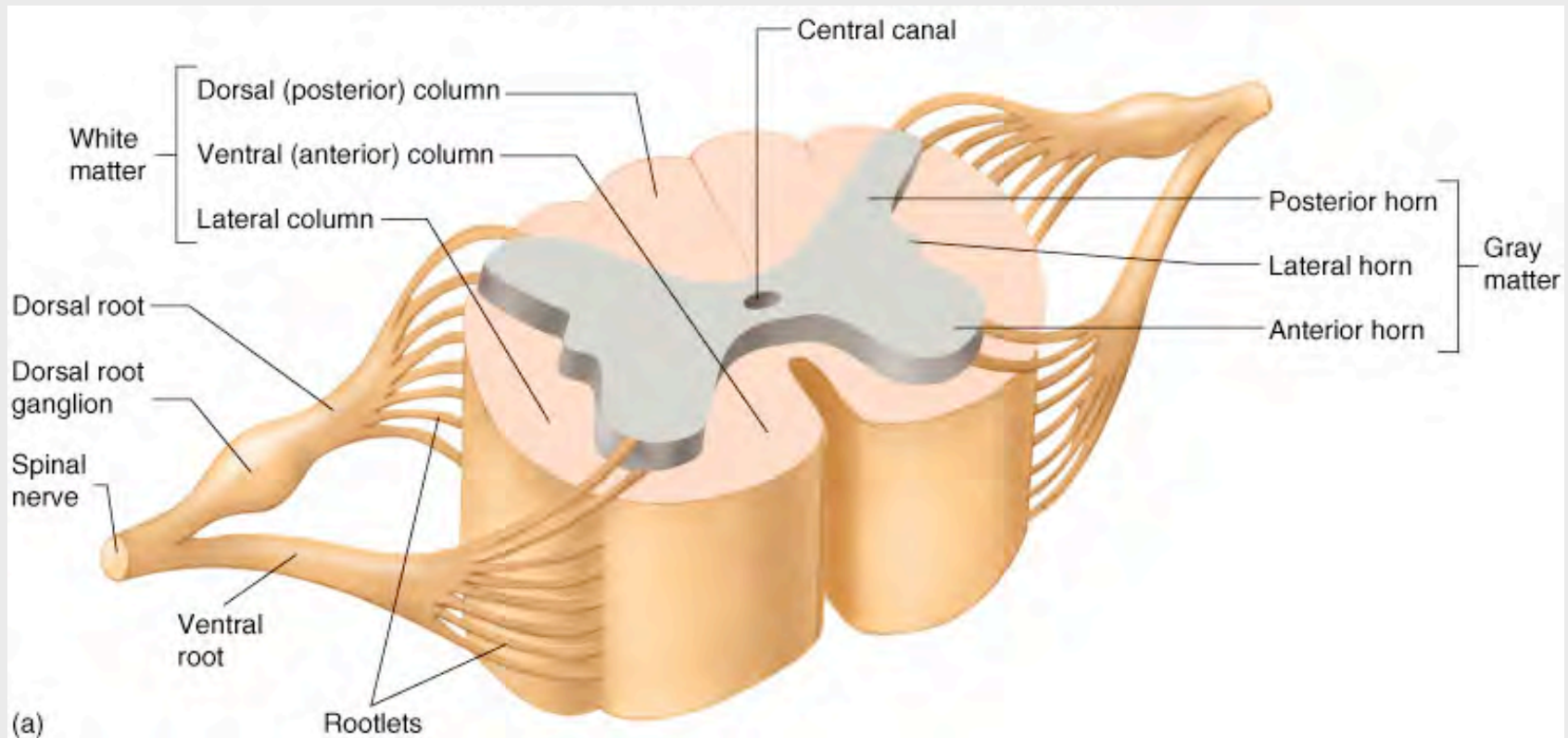
Meninges (spinal cord)

- Dura mater: outer layer
 - Subdural space; Serous fluid (lubricant)
- Arachnoid mater:
 - Subarachnoid space (between arachnoid and pia) filled with CSF & blood vessels
- Pia Mater: inner layer
 - Shrink wrapped to spinal cord & brain



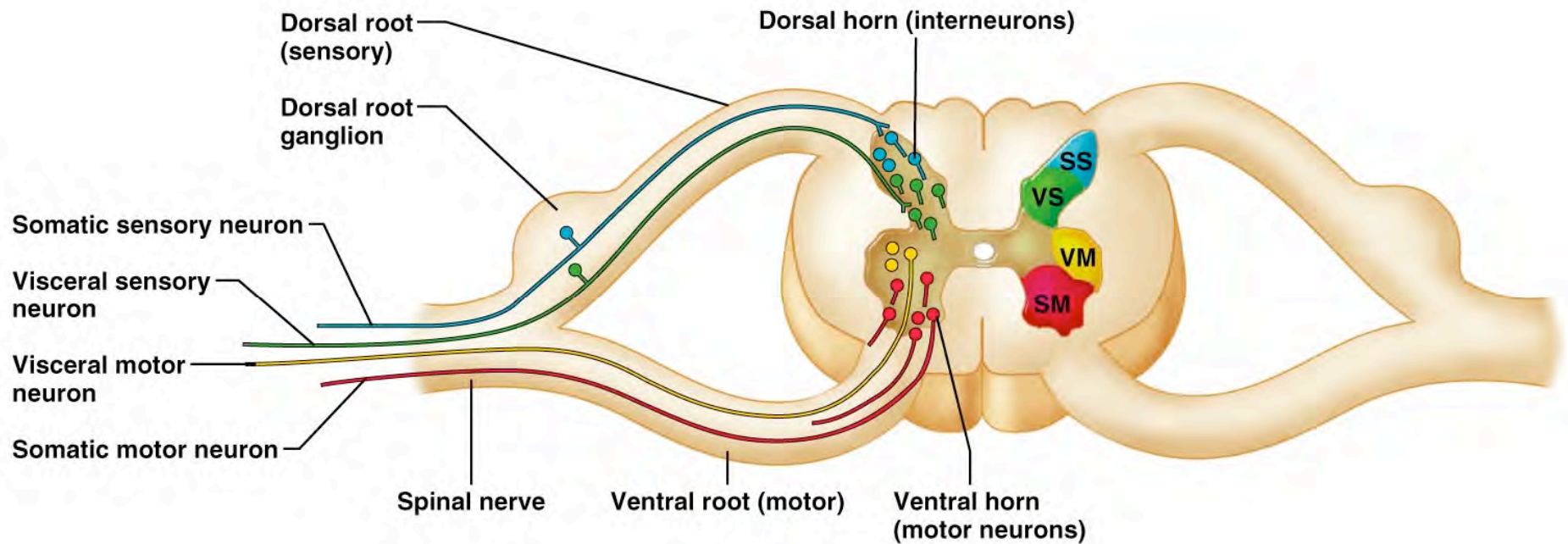
Spinal cord anatomy

- **Gray matter:** cell bodies & unmyelinated axons
- **White matter:** Myelinated axons



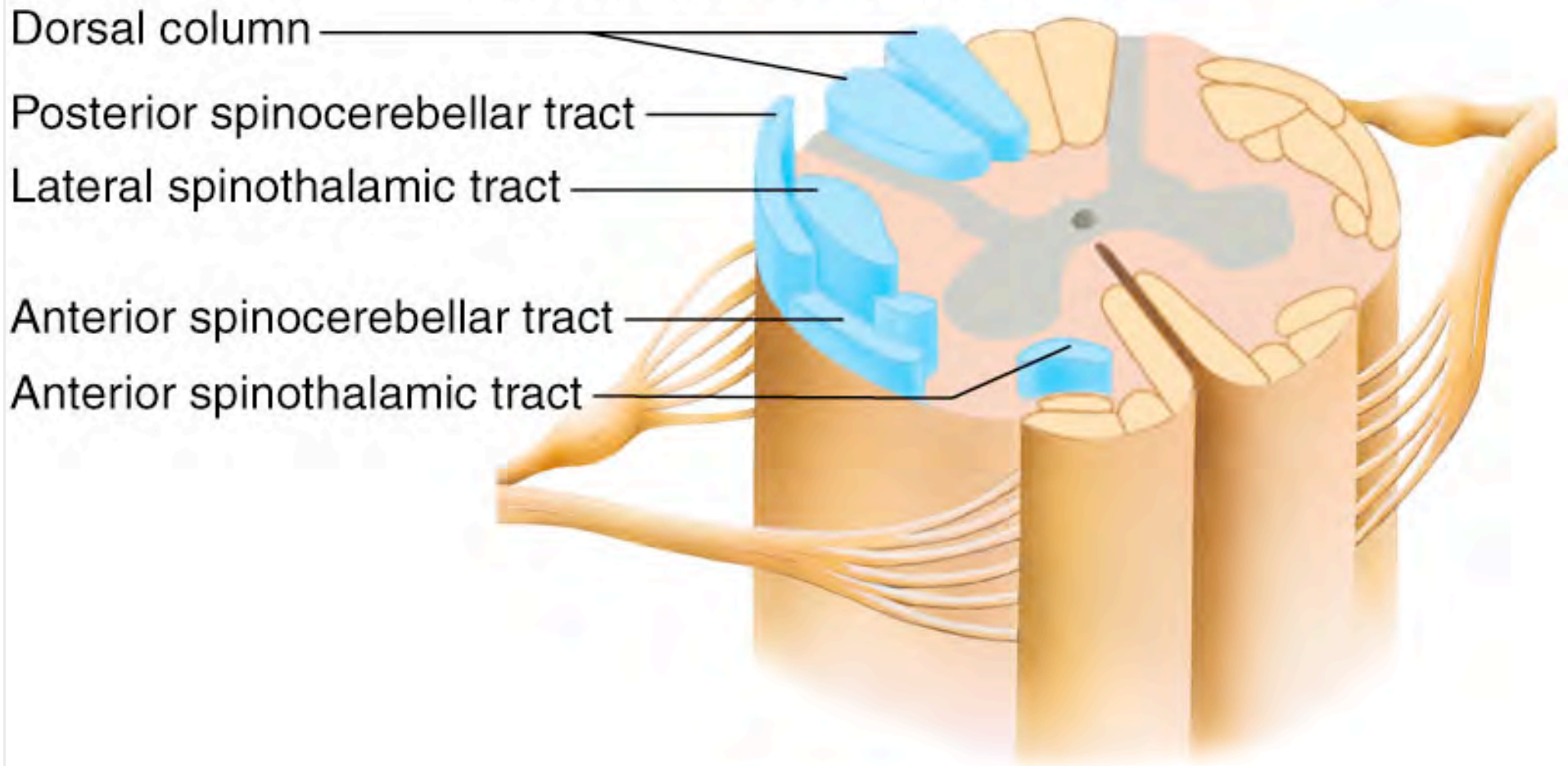
Organization

- Dorsal = Sensory
- Ventral = Motor



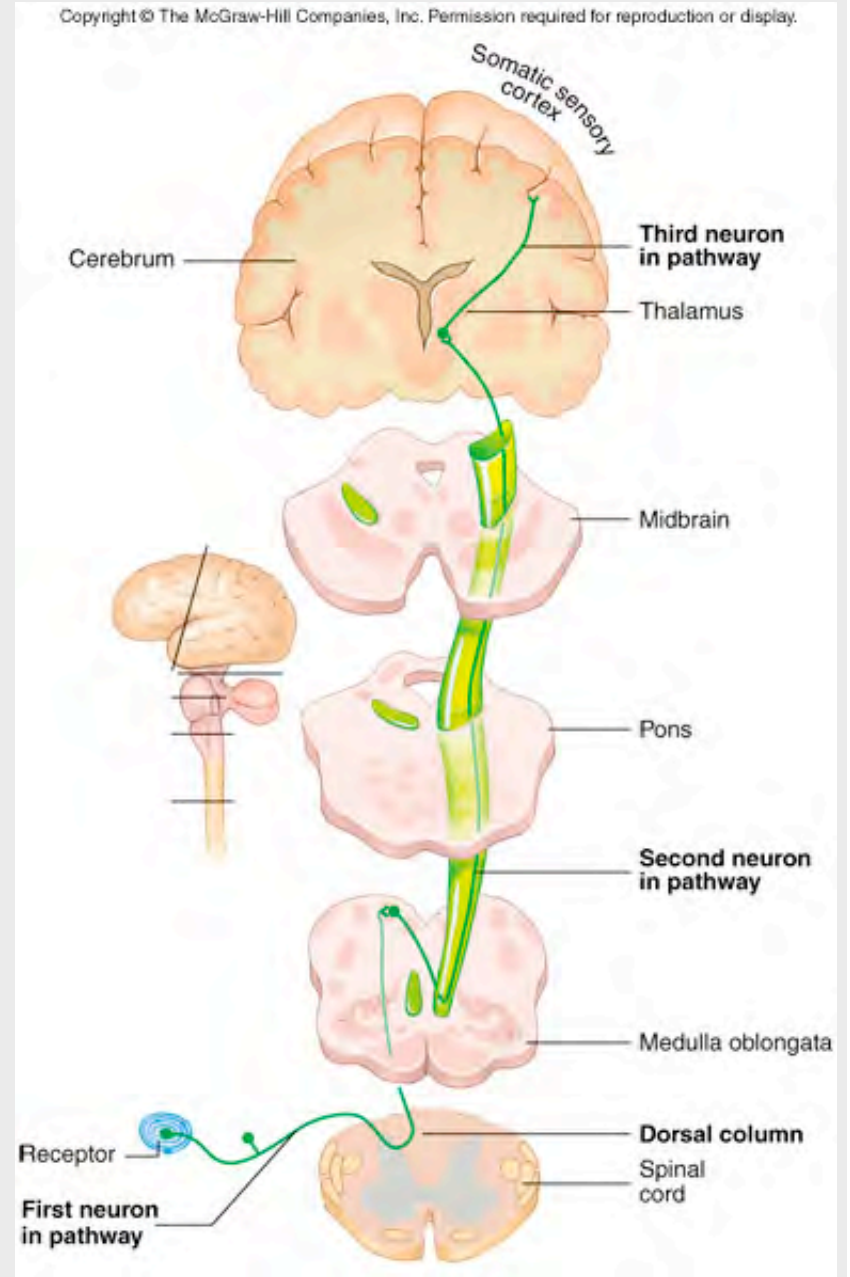
Ascending sensory tracts

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Ascending somatosensory pathway

- Crossover in MO, to opposite side of body
- Synapse in thalamus
- Projection to cerebral cortex



Sensory tracts

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

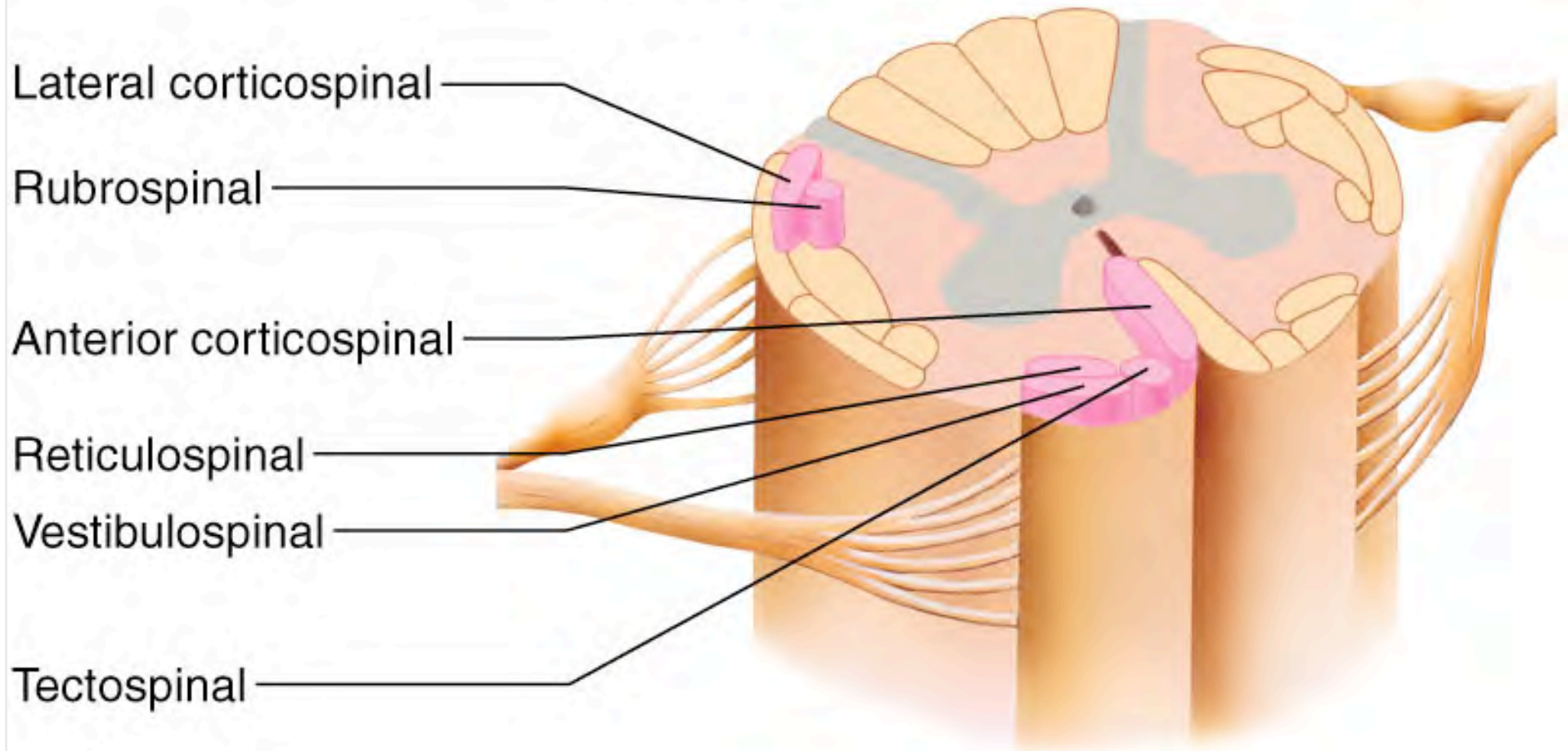
Table 8.4

Ascending Tracts (see figures 8.26 and 8.27)

Pathway	Function
Spinothalamic	Pain, temperature, light touch, pressure, tickle, and itch sensations
Dorsal column	Proprioception, touch, deep pressure, and vibration
Spinocerebellar	Proprioception to cerebellum

Descending motor tracts

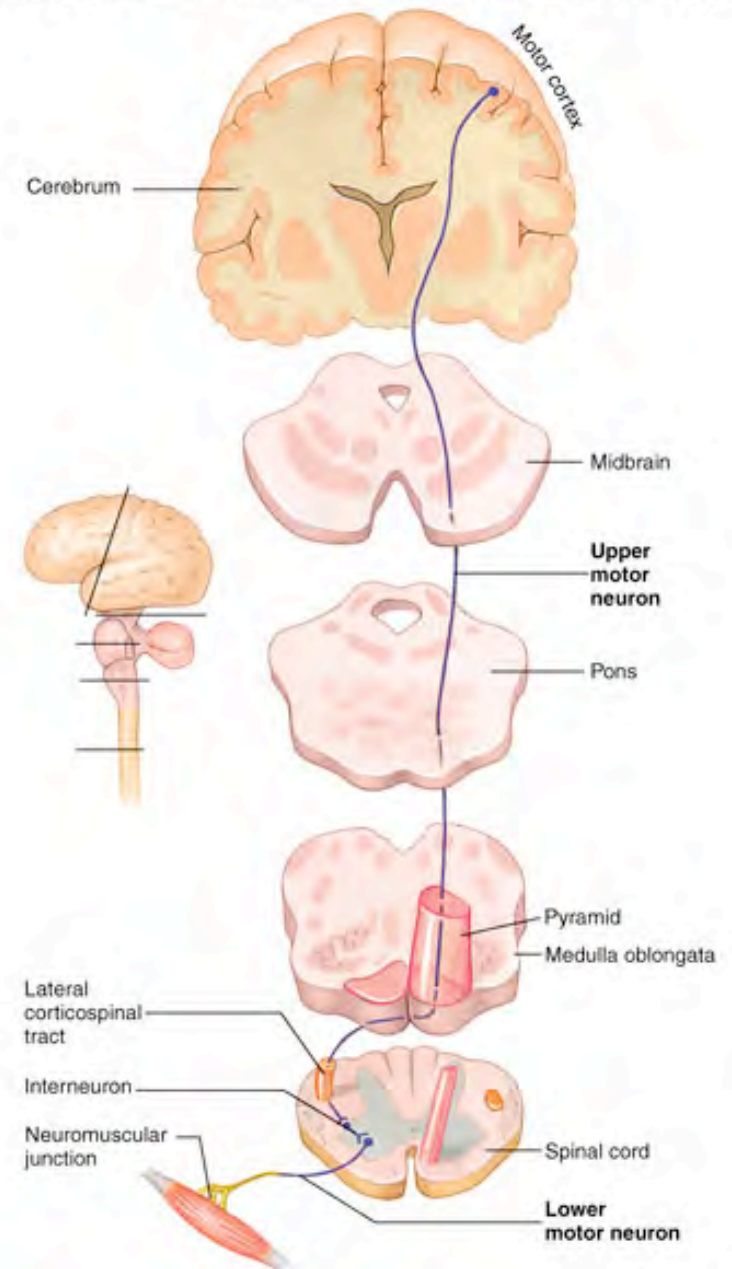
Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Descending Motor pathway

- Project from motor cortex
- Crossover @ lower MO
- Synapse in spinal cord
- Project to effector

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Motor tracts

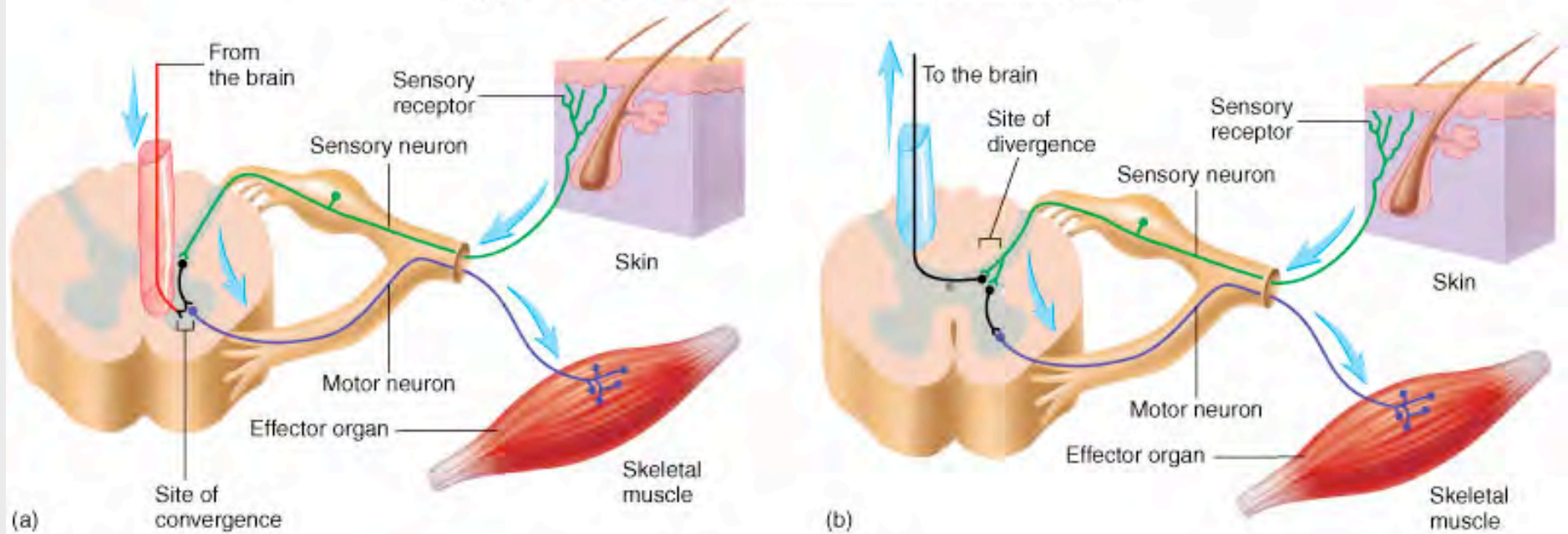
Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

Table 8.5 **Descending Tracts**
(see figures 8.29 and 8.30)

Pathway	Function
Direct	
Lateral corticospinal	Muscle tone and skilled movements, especially of the hands
Anterior corticospinal	Muscle tone and movement of trunk muscles
Indirect	
Rubrospinal	Movement coordination
Reticulospinal	Posture adjustment, especially during movement
Vestibulospinal	Posture, balance
Tectospinal	Movement in response to visual reflexes

Neural pathways

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

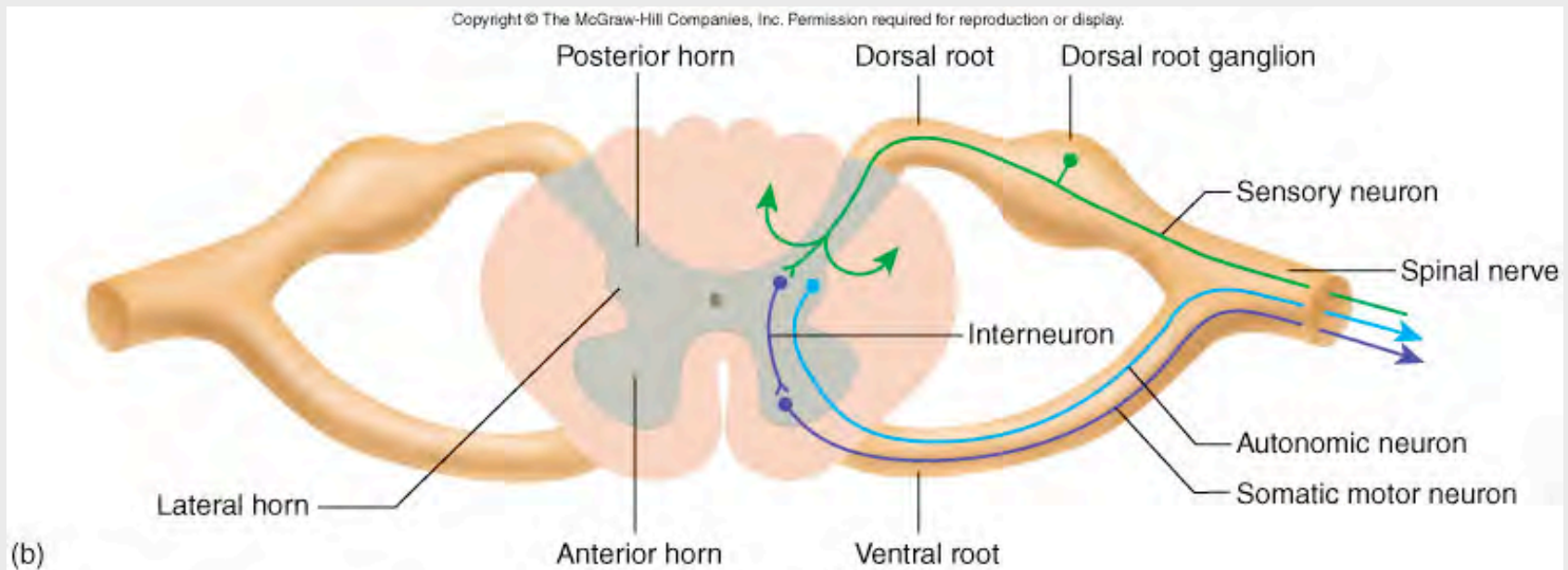


From brain

To brain

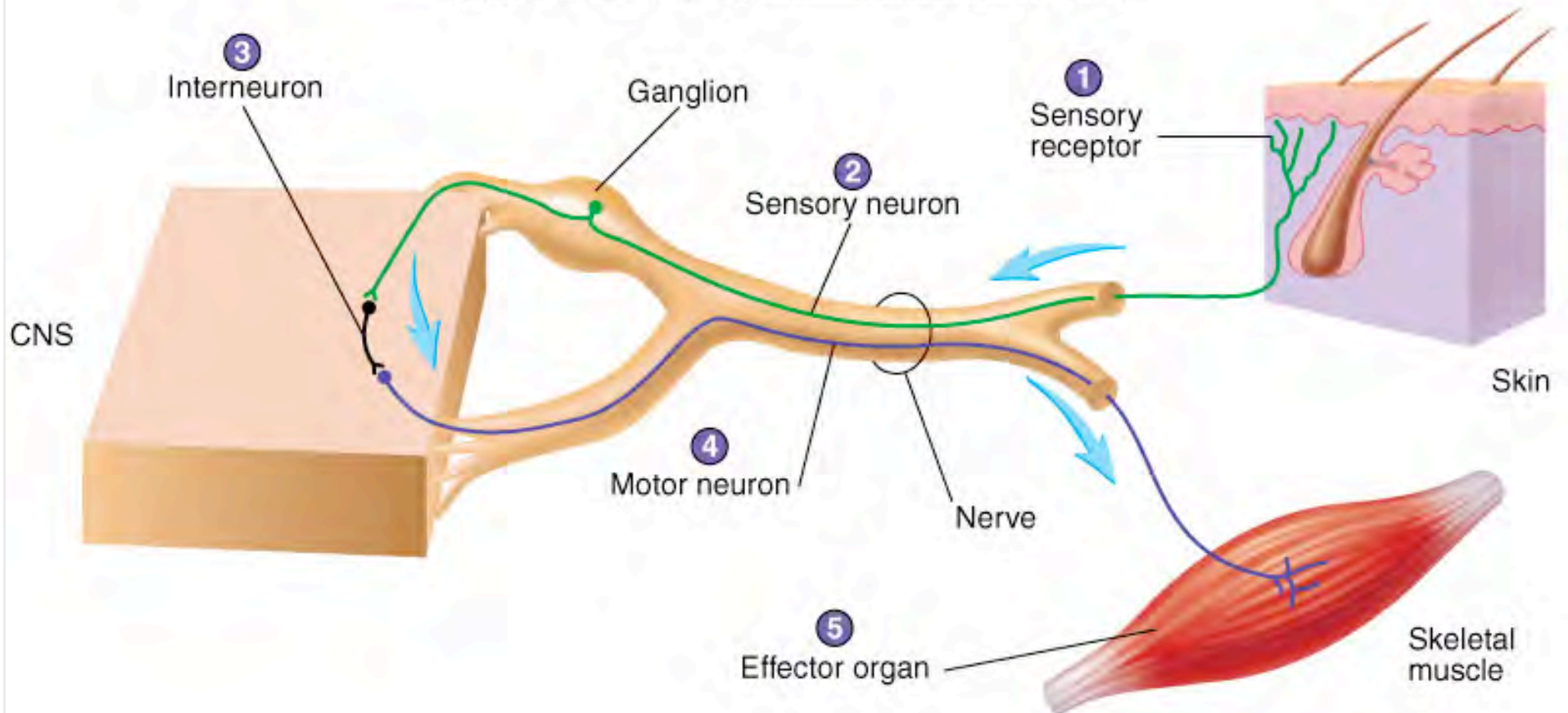
Spinal reflexes

- Sensory & motor nerves - where are they?
- Somatic - skeletal
- Visceral - smooth, cardiac, glands



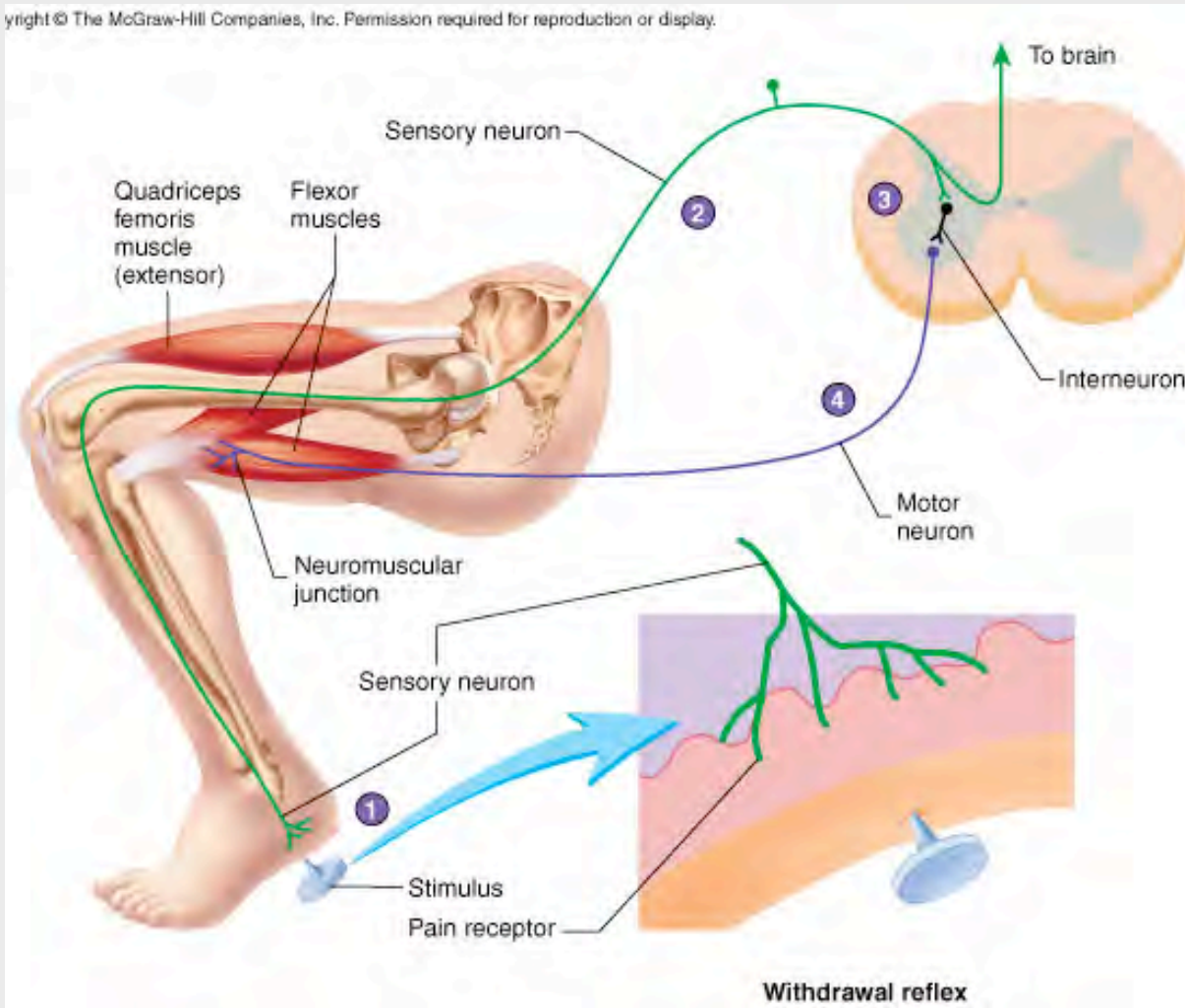
Reflex Arc

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Withdrawal reflex

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

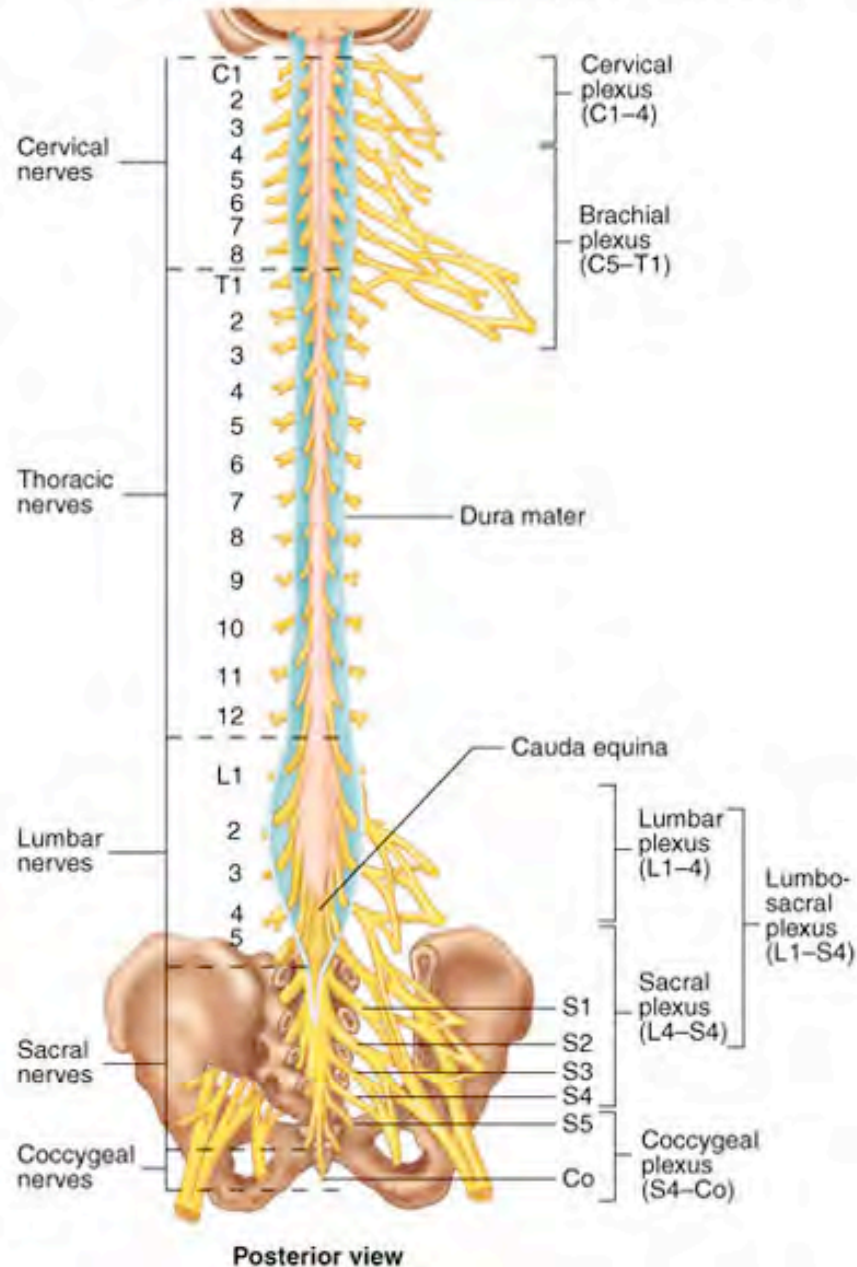


Disorders

- **Paralysis** - Some amount of loss of sensation or motor ability (long- or short-term); associated with spinal injury or infection
- **Neuritis** - Inflammation of a nerve, due to trauma or infection
 - Prolonged swellings leads to loss of sensory or motor function

Disorders

- **Sciatica** - Intense pain (neuralgia) along sciatic nerve
 - Often caused by herniated lumbar disc (fibrocartilage) putting pressure on lumbosacral spinal nerves
- **Herpes virus** - resides in ganglia of sensory nerves; produces lesions at nerve endings
 - Herpes zoster - chicken pox/shingles virus
 - Genital herpes

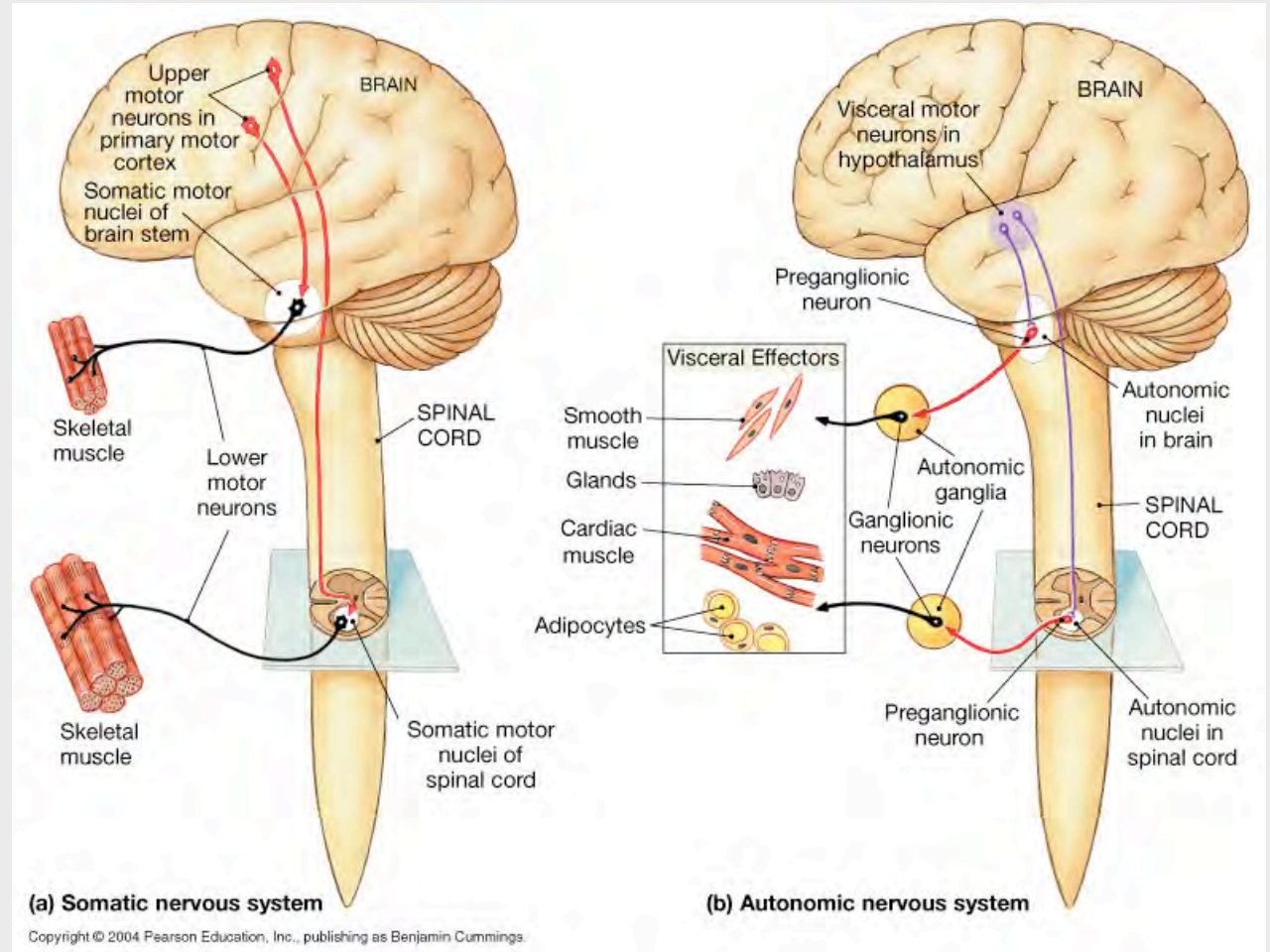


Nerves of PNS

- Cranial nerves: 12
- Spinal nerves: 31
- Collected in plexuses
 - Convergence & divergence of nerve tracts

Divisions of PNS

- Somatic
 - Voluntary
- Autonomic
 - Visceral (involuntary)



Autonomic division differences

