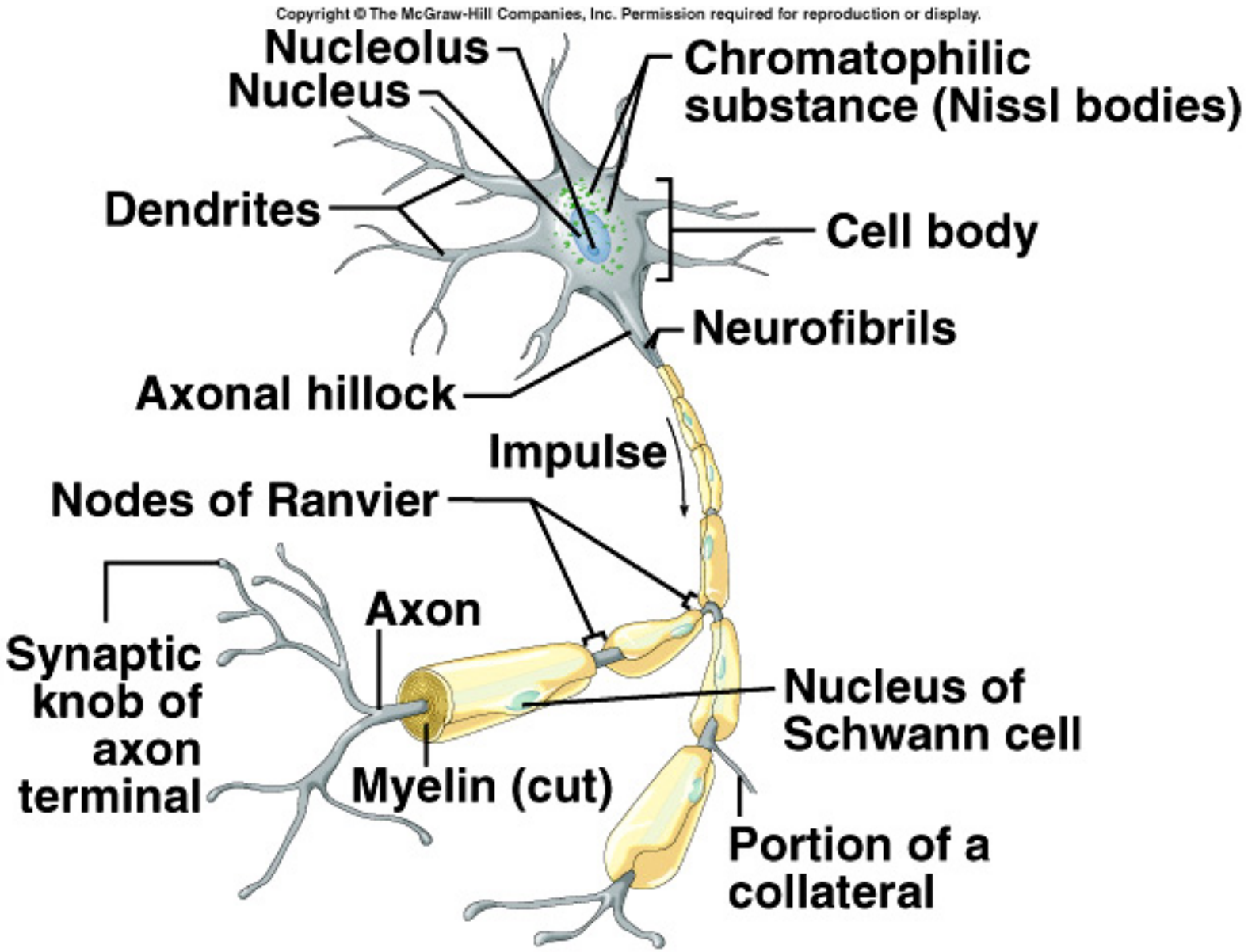
Lab 1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Nucleolus
Nucleus
Chromatophilic substance (Nissl bodies)
Dendrites
Cell body
Neurofibrils
Axonal hillock
Impulse
Nodes of Ranvier
Axon
Synaptic knob of axon terminal
Nucleus of Schwann cell
Myelin (cut)
Portion of a collateral

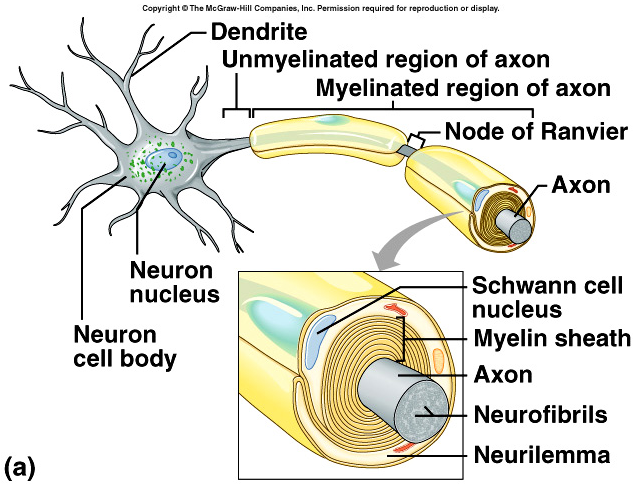
Myelination of Axons

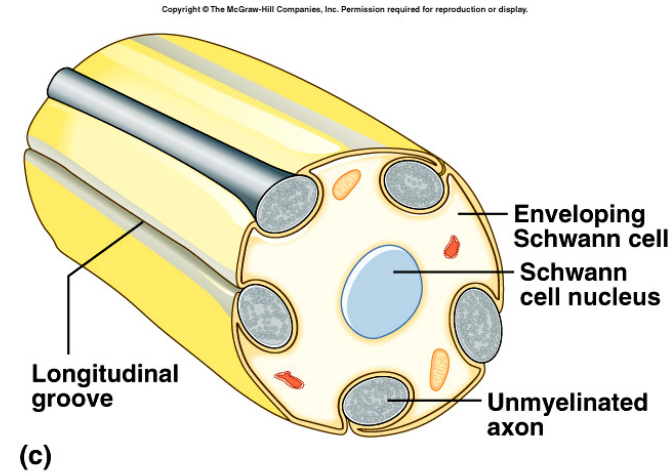
White Matter

- contains myelinated axons

Gray Matter

- contains unmyelinated structures
- cell bodies, dendrites



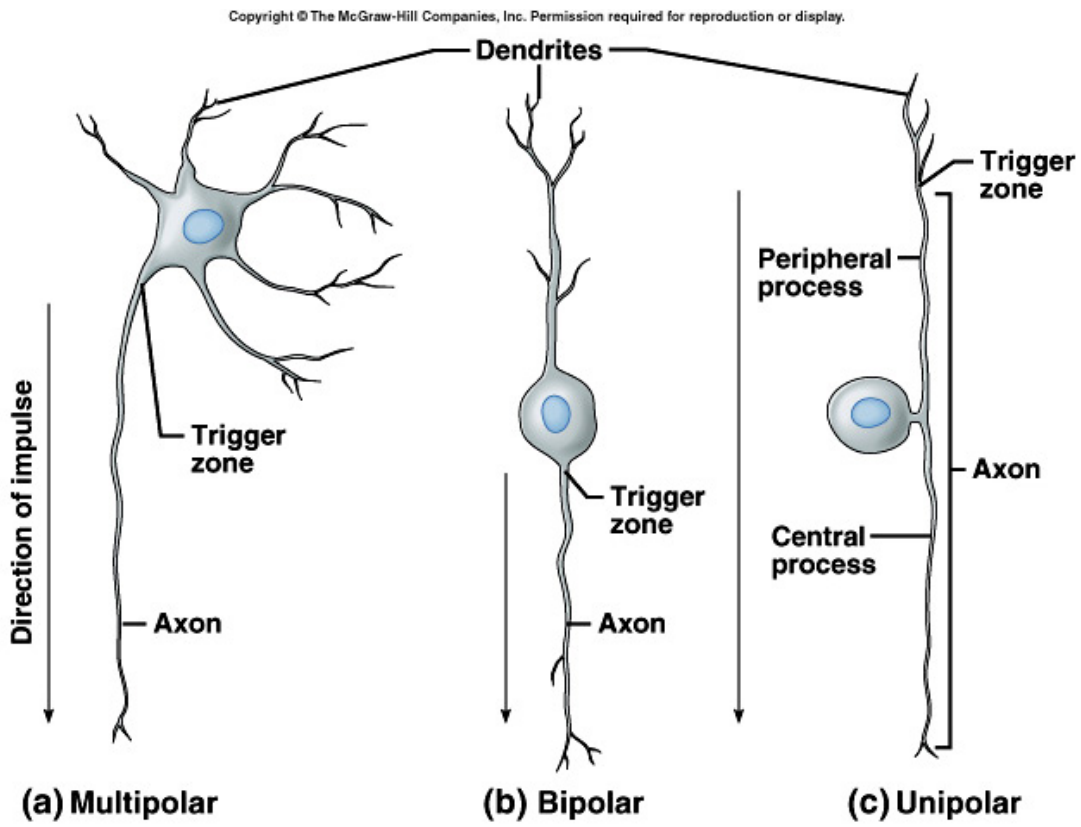


Classification of Neurons – Structural Differences

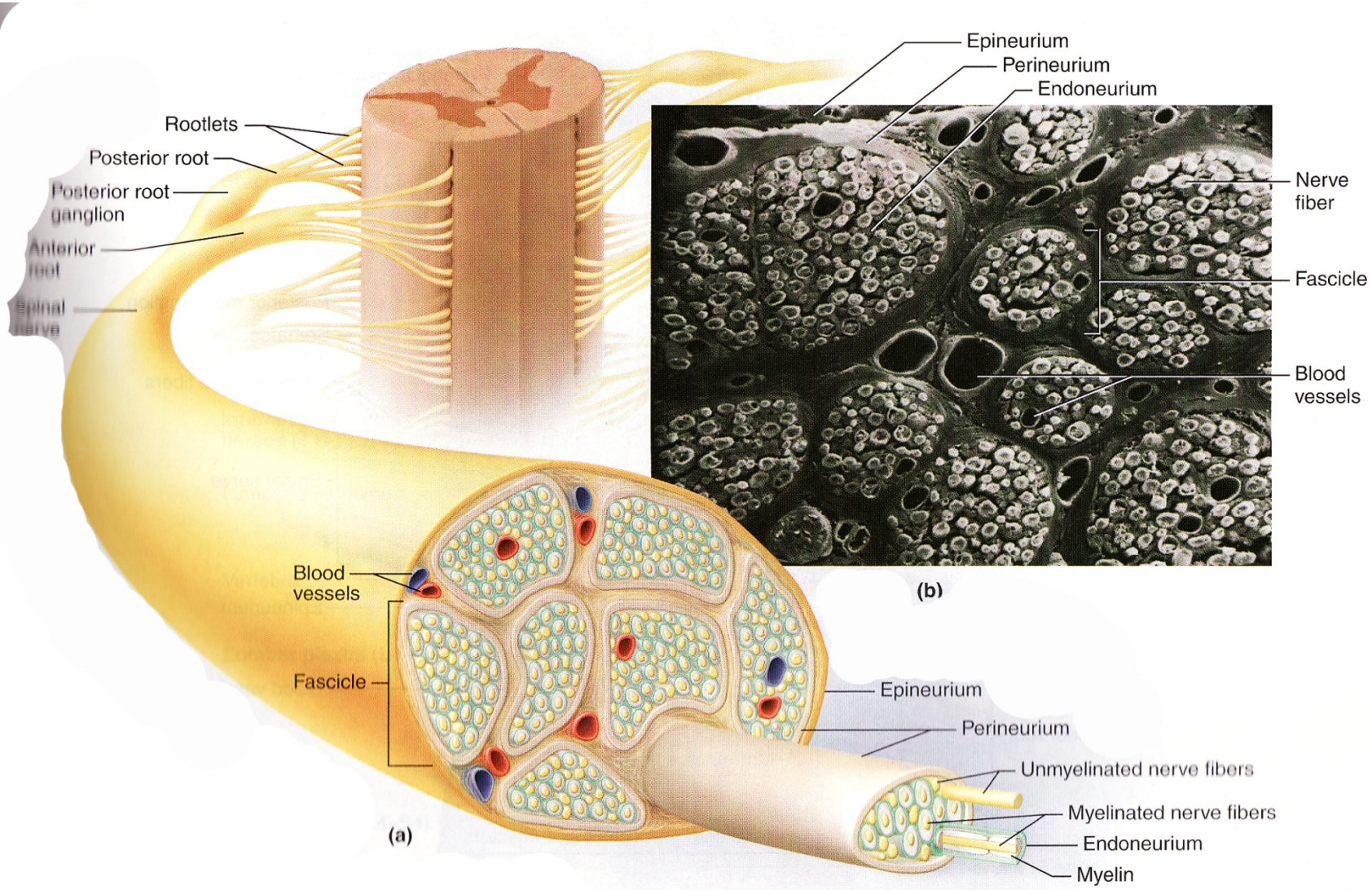
Bipolar
- two processes
- eyes, ears, nose

Unipolar
- one process
- ganglia

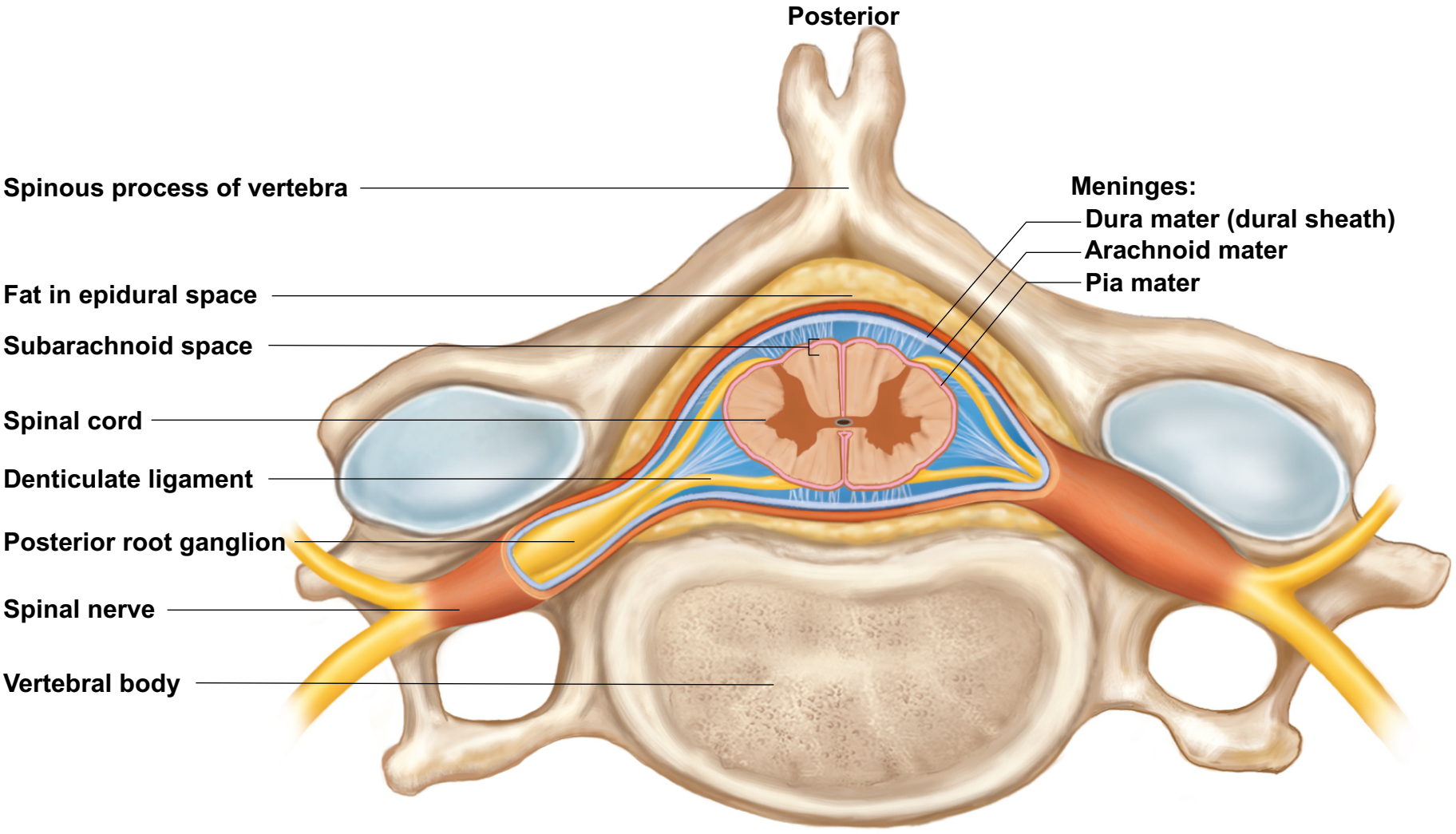
Multipolar
- many processes
- most neurons of CNS



- A nerve is a cordlike organ composed of numerous nerve fibers (axons) bound together by connective tissue.

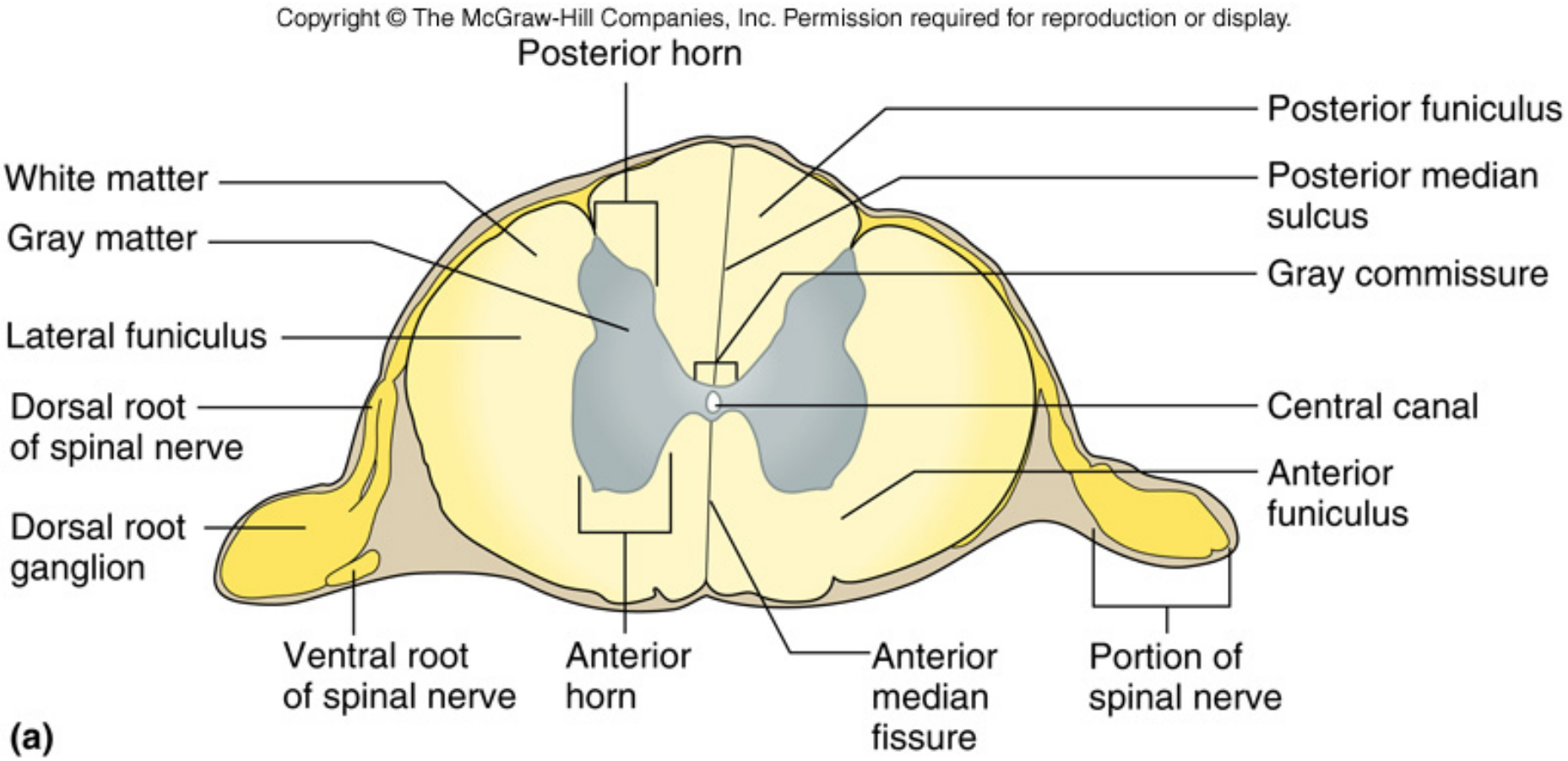


Meninges of the Spinal Cord

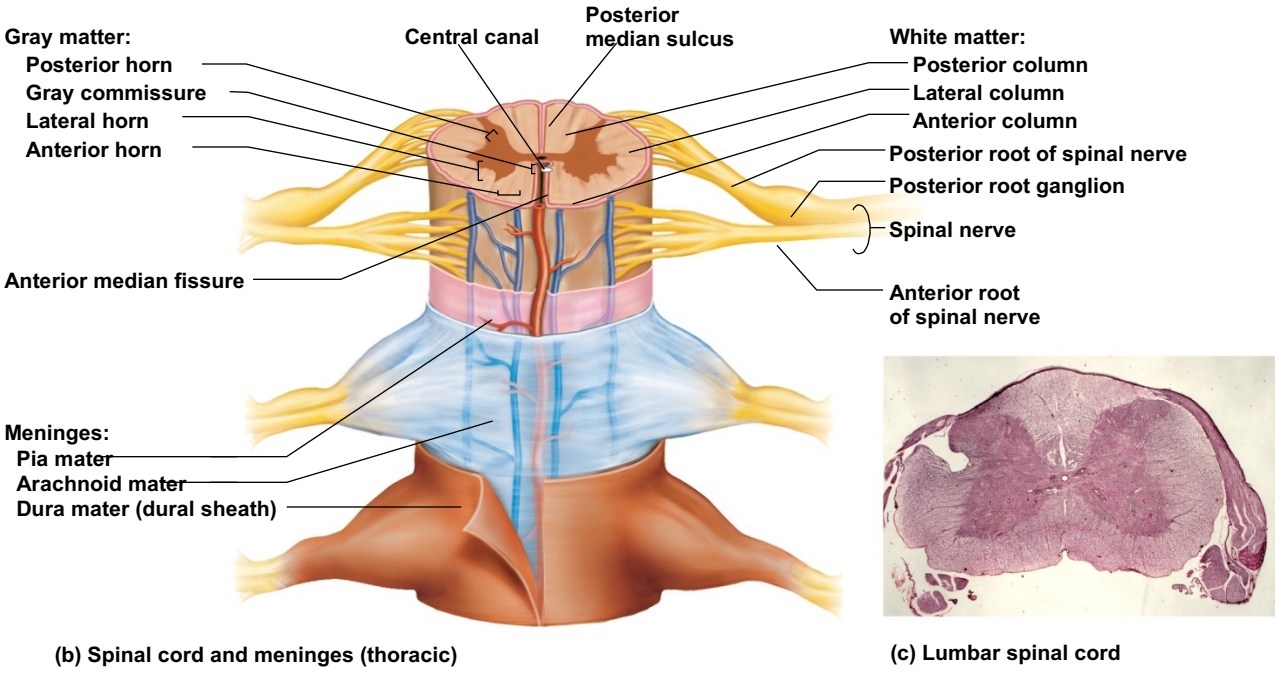


(a) Spinal cord and vertebra (cervical)

Cross Section of Spinal Cord



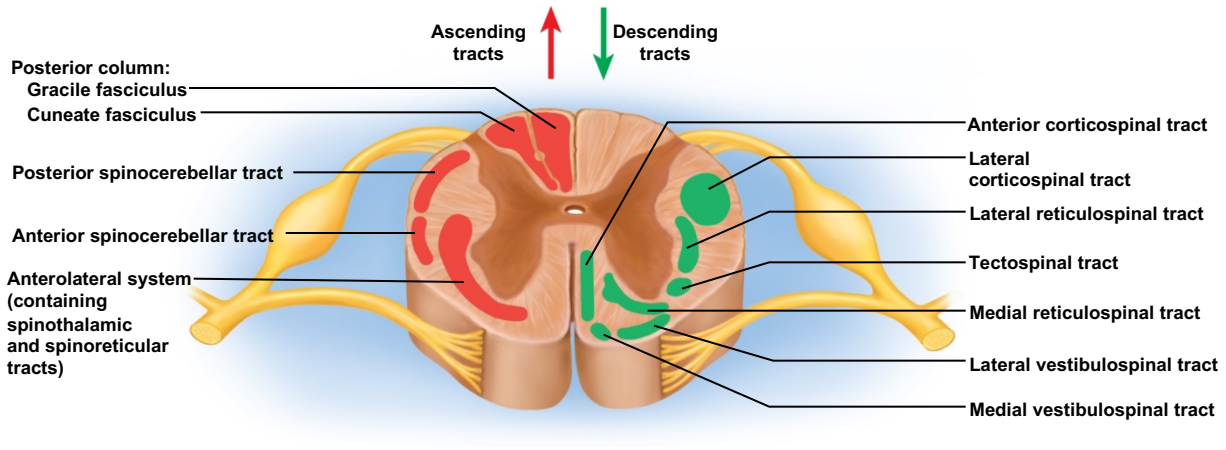
Cross-Sectional Anatomy



- Central area of gray matter shaped like a butterfly and surrounded by white matter in three columns
- Gray matter—neuron cell bodies with little myelin
  - Site of information processing, synaptic integration
- White matter—abundantly myelinated axons
  - Carry signals from one part of the CNS to another

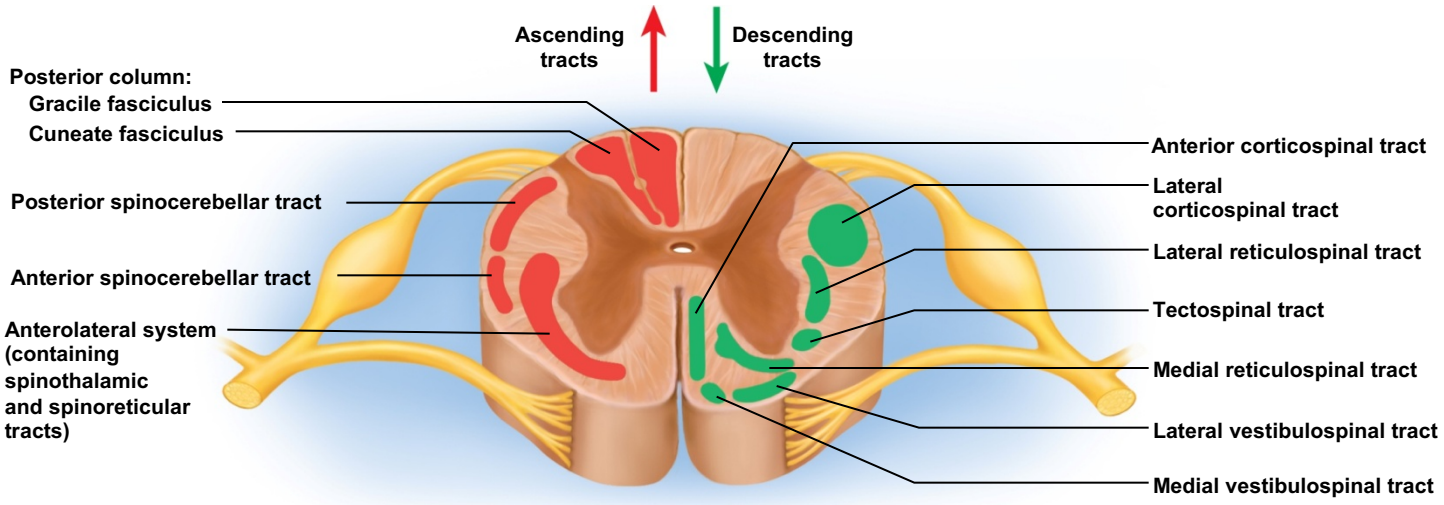
Gray Matter

- Spinal cord has a central core of gray matter that looks butterfly- or H-shaped in cross section
  - Pair of posterior (dorsal) horns
  - Posterior (dorsal) root of spinal nerve carries only sensory fibers
  - Pair of thicker anterior (ventral) horns
  - Anterior (ventral) root of spinal nerve carries only motor fibers
  - Gray commissure connects right and left sides
    - Punctured by central canal lined with ependymal cells and filled with CSF
  - Lateral horn: visible from T2 through L1
    - Contains neurons of sympathetic nervous system

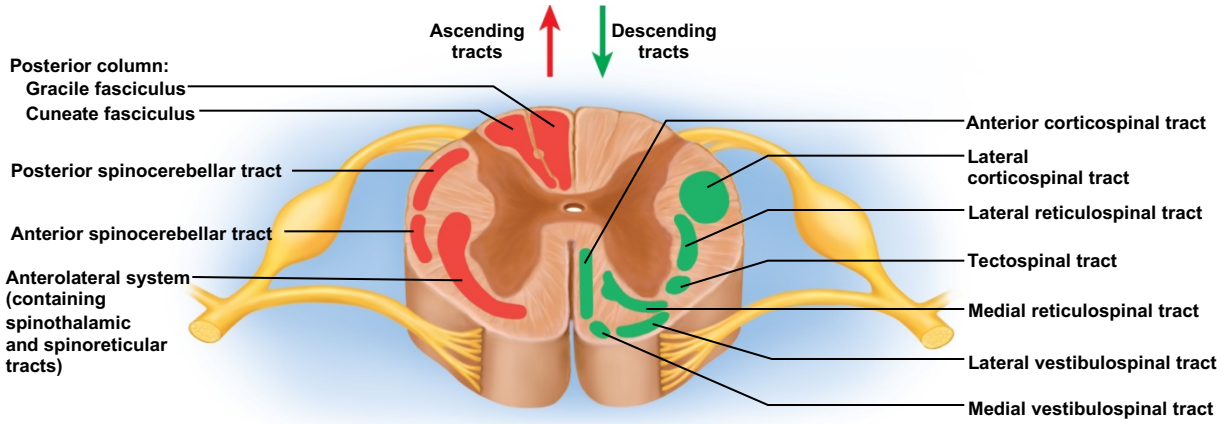


White Matter

- White matter of the spinal cord surrounds the gray matter
- Consists of bundles of axons that course up and down the cord
  - Provide avenues of communication between different levels of the CNS
- Columns or funiculi—three pairs of these white matter bundles
  - Posterior (dorsal), lateral, and anterior (ventral) columns on each side
- Tracts or fasciculi—subdivisions of each column



Spinal Tracts



- Ascending tracts—carry sensory information up the spinal cord
- Descending tracts—carry motor information down the spinal cord
  - All nerve fibers in a given tract have a similar origin, destination, and function
- Decussation—as the fibers pass up or down the brainstem and spinal cord they cross over from the left to the right side and vice versa
- Contralateral—when the origin and destination of a tract are on opposite sides of the body
- Ipsilateral—when the origin and destination of a tract are on the same side of the body; does not decussate

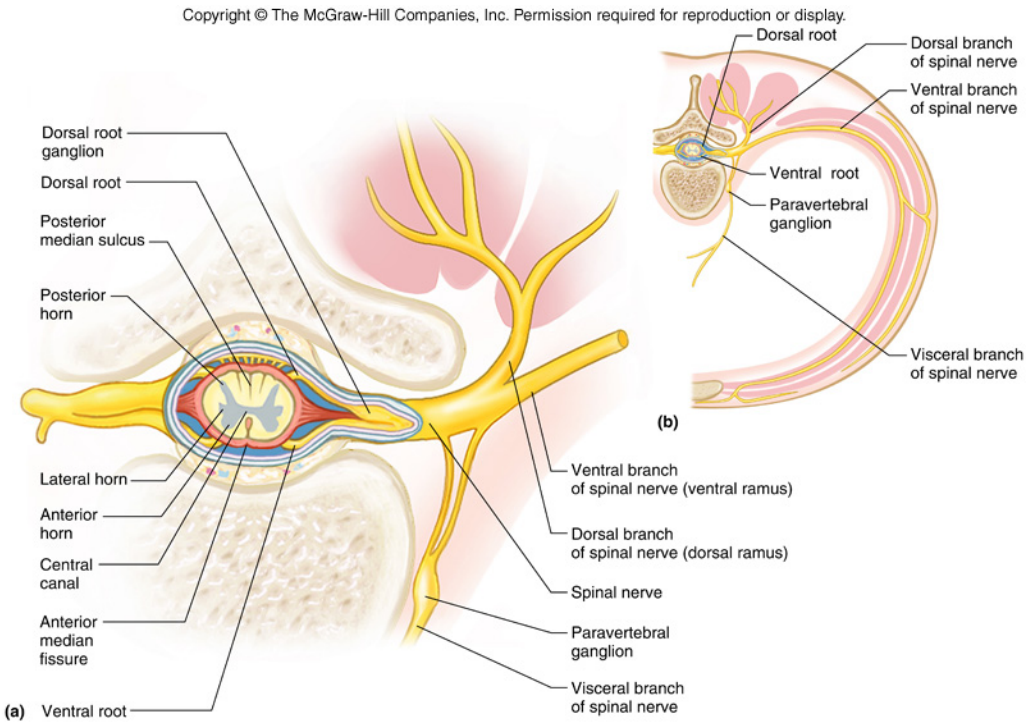
Spinal Nerves

Dorsal root (posterior or sensory root)

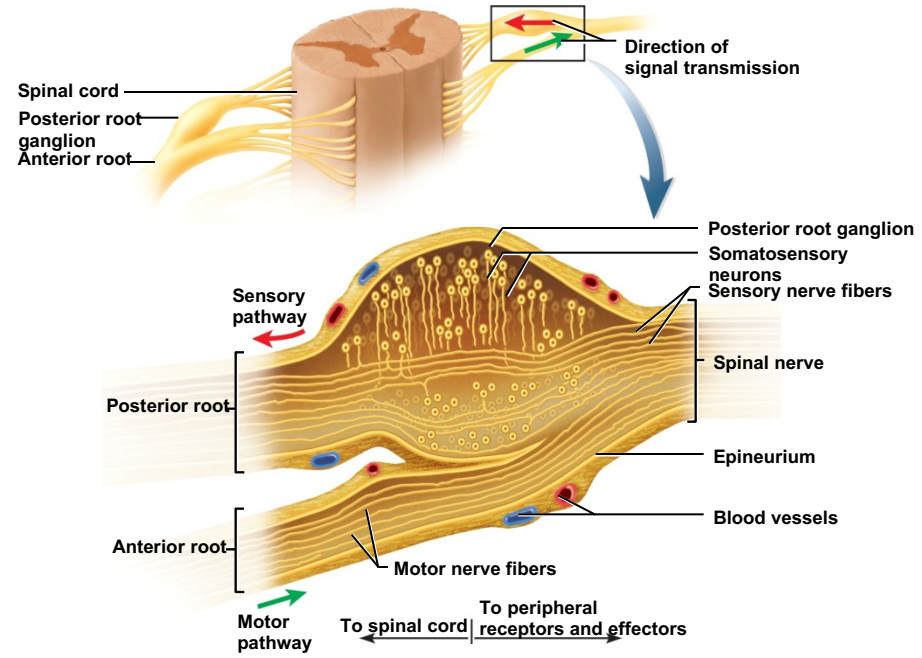
- axons of sensory neurons in the dorsal root ganglion

Dorsal root ganglion

- cell bodies of sensory neurons whose axons conduct impulses inward from peripheral body parts

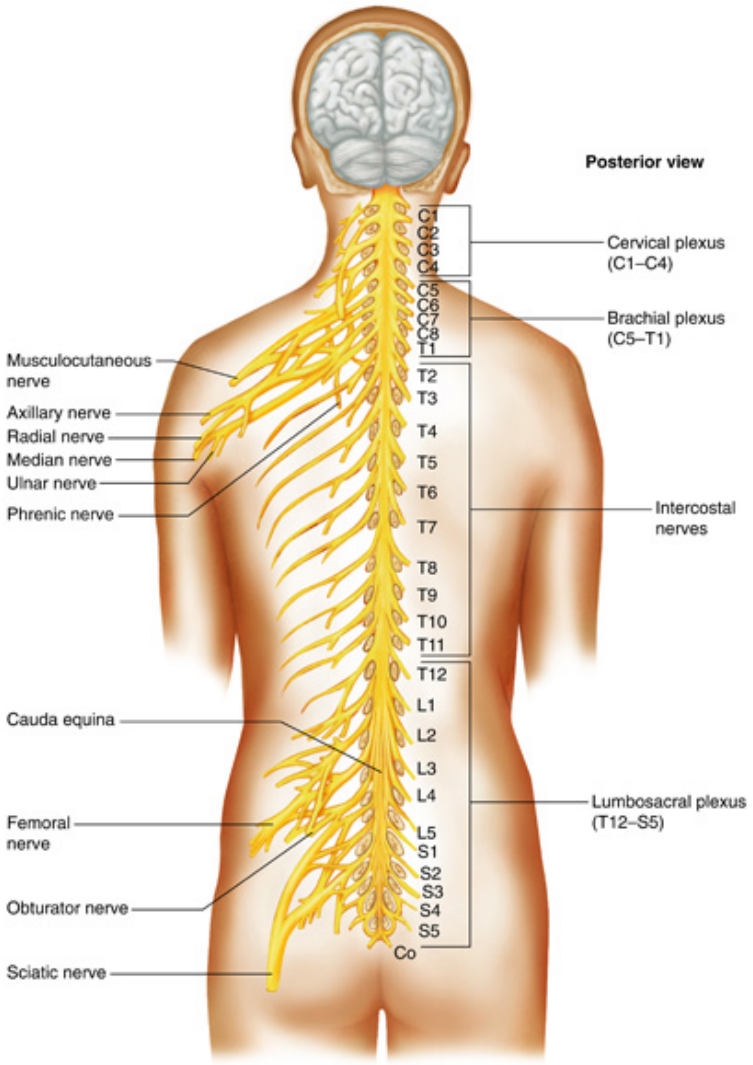


General Anatomy of Nerves and Ganglia



- Ganglion—cluster of neurosomas outside the CNS
  - Enveloped in an endoneurium continuous with that of the nerve
- Among neurosomas are bundles of nerve fibers leading into and out of the ganglion
- Posterior root ganglion associated with spinal nerves

Plexuses

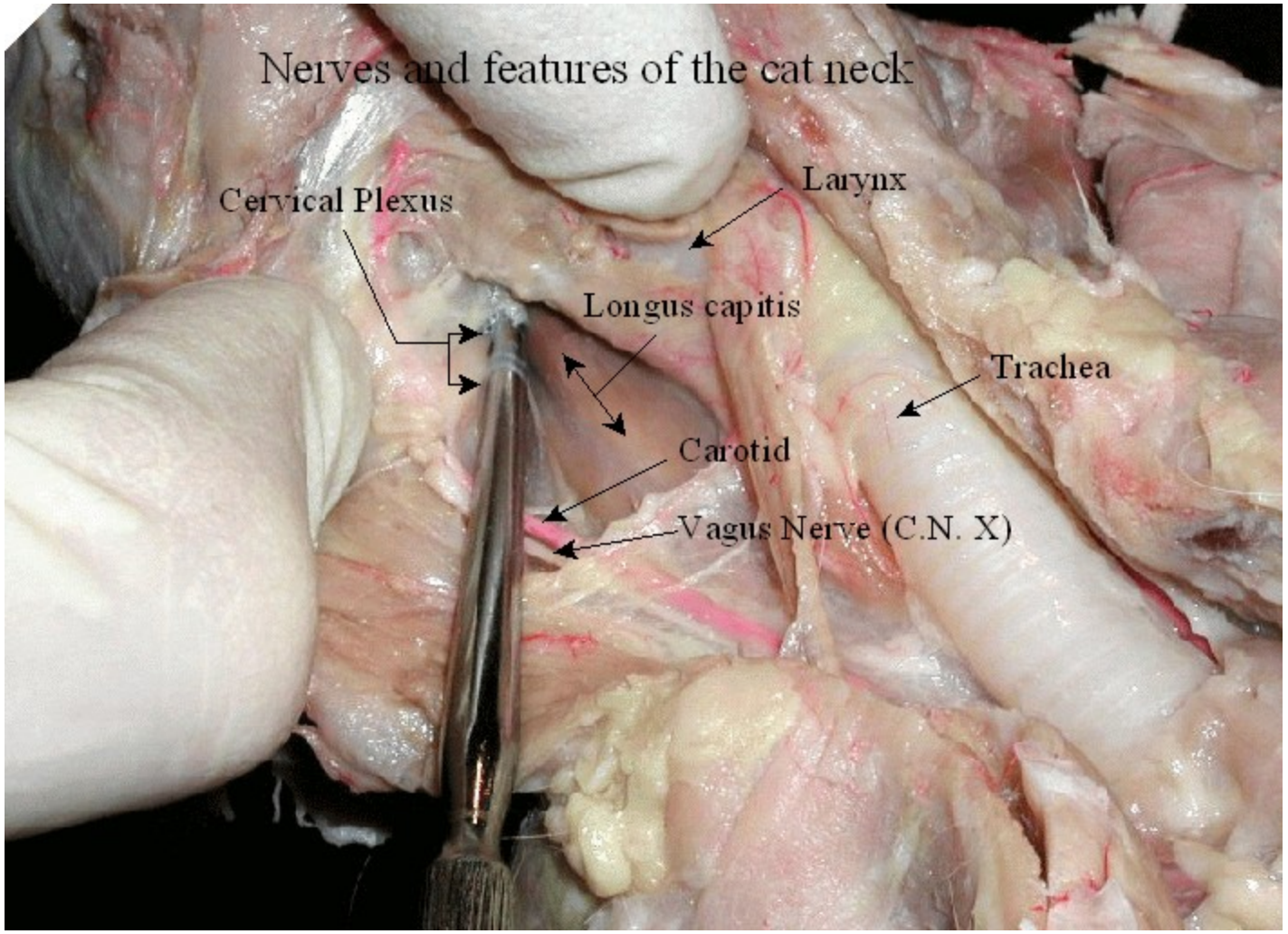


Cervical Plexuses

Nerve plexus – complex networks formed by anterior branches of spinal nerves; fibers of various spinal nerves are sorted and recombined

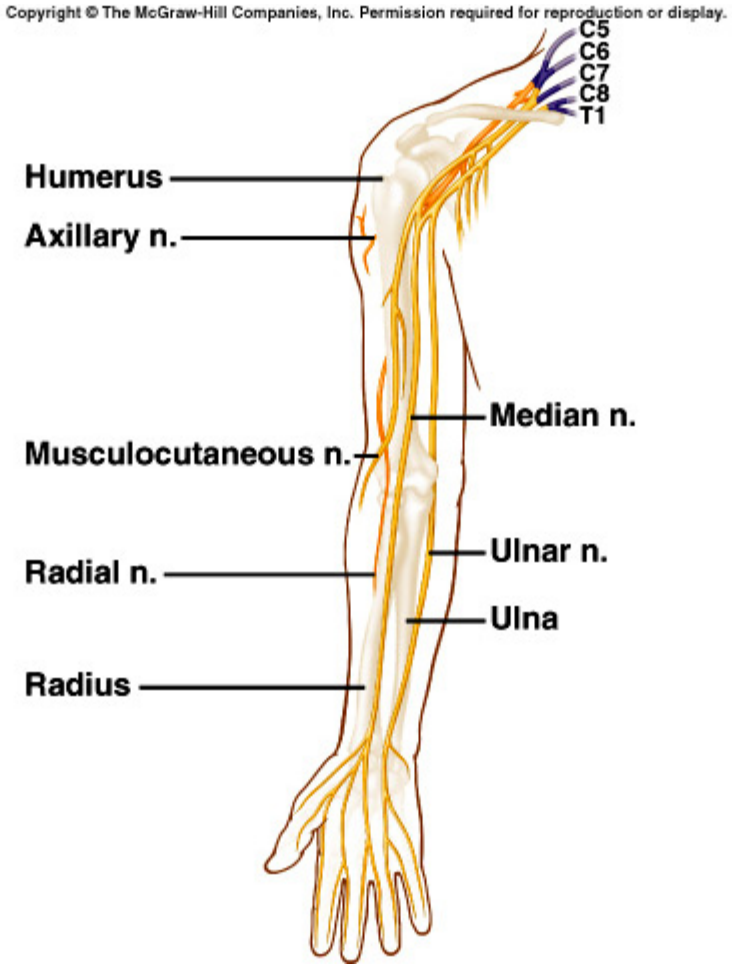
Cervical Plexus

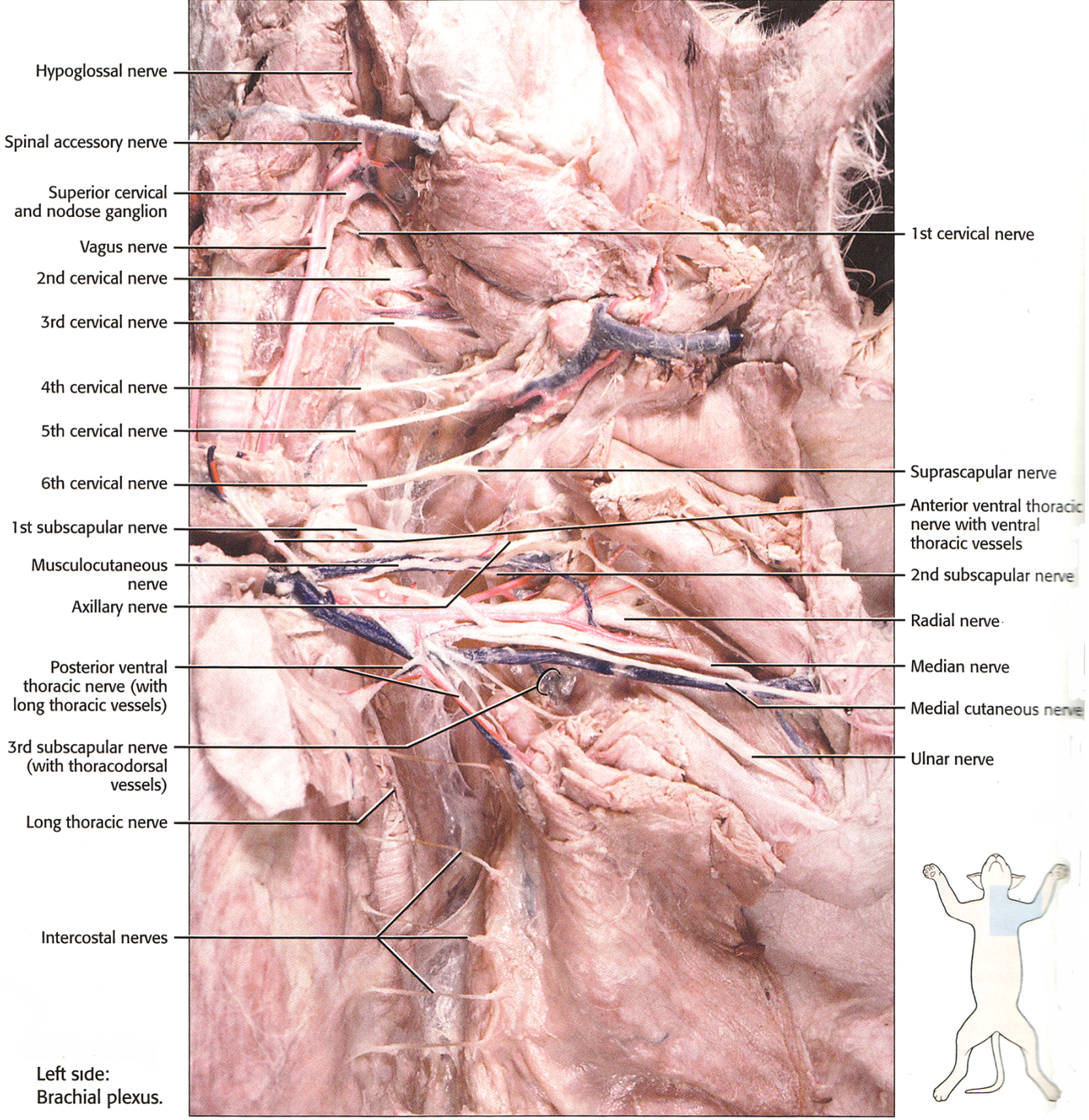
- formed by anterior branches of C1-C4
- lies deep in the neck
- supply muscles and skin of the neck
- C3 – C5 contribute to phrenic nerves


Nerves and features of the cat neck
Cervical Plexus
Larynx
Longus capitis
Trachea
Carotid
Vagus Nerve (C.N. X)

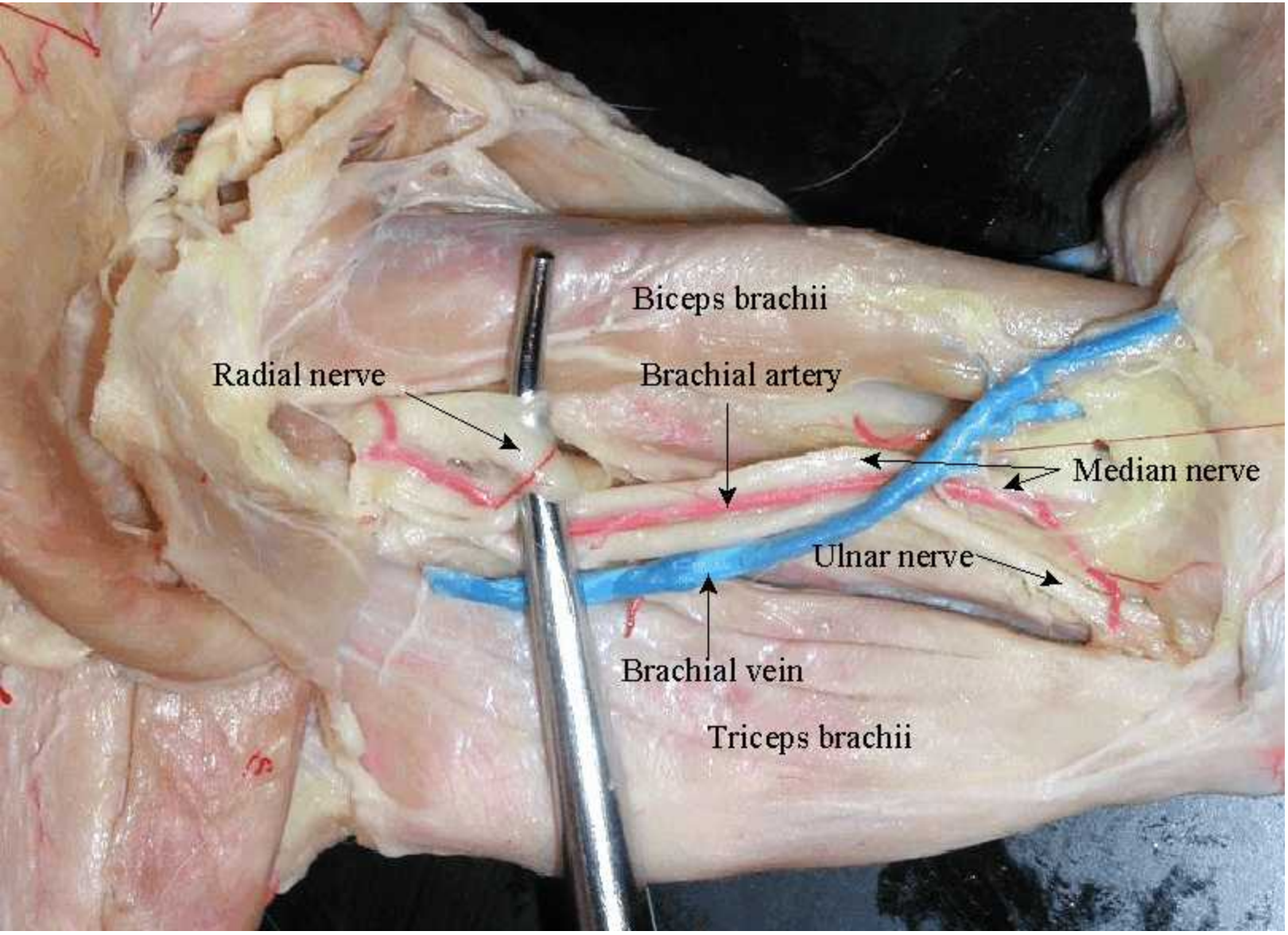
Brachial Plexuses

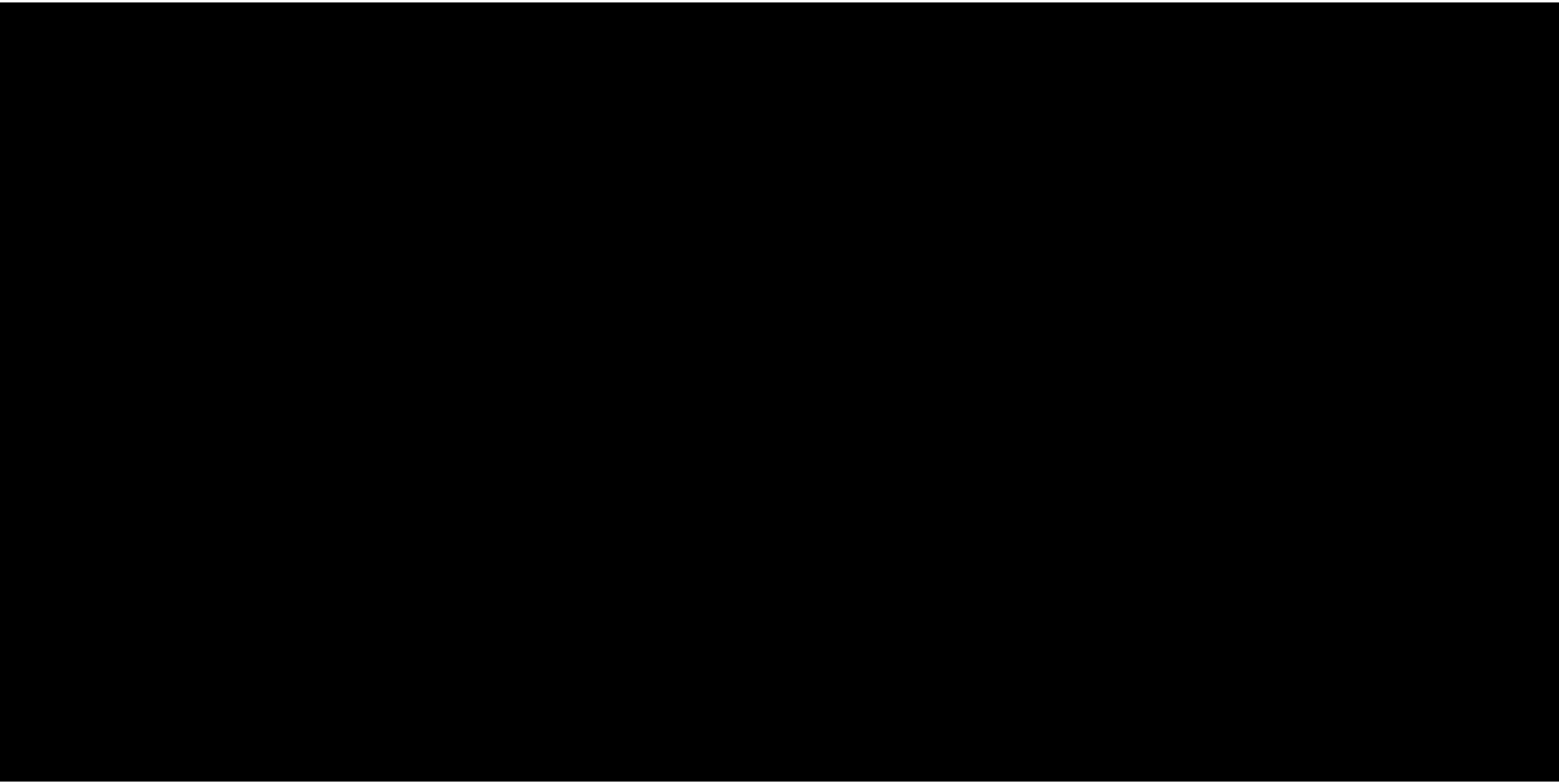
- C5-T1
- lies deep within shoulders
- musculocutaneous nerves
  - supply muscles of anterior arms and skin of forearms
- ulnar and median nerves
  - supply muscles of forearms and hands
  - supply skin of hands
- radial nerves
  - supply posterior muscles of arms and skin of forearms and hands
- axillary nerves
  - supply muscles and skin of anterior, lateral, and posterior arms





Left side:
Brachial plexus.


Biceps brachii
Radial nerve
Brachial artery
Median nerve
Ulnar nerve
Brachial vein
Triceps brachii

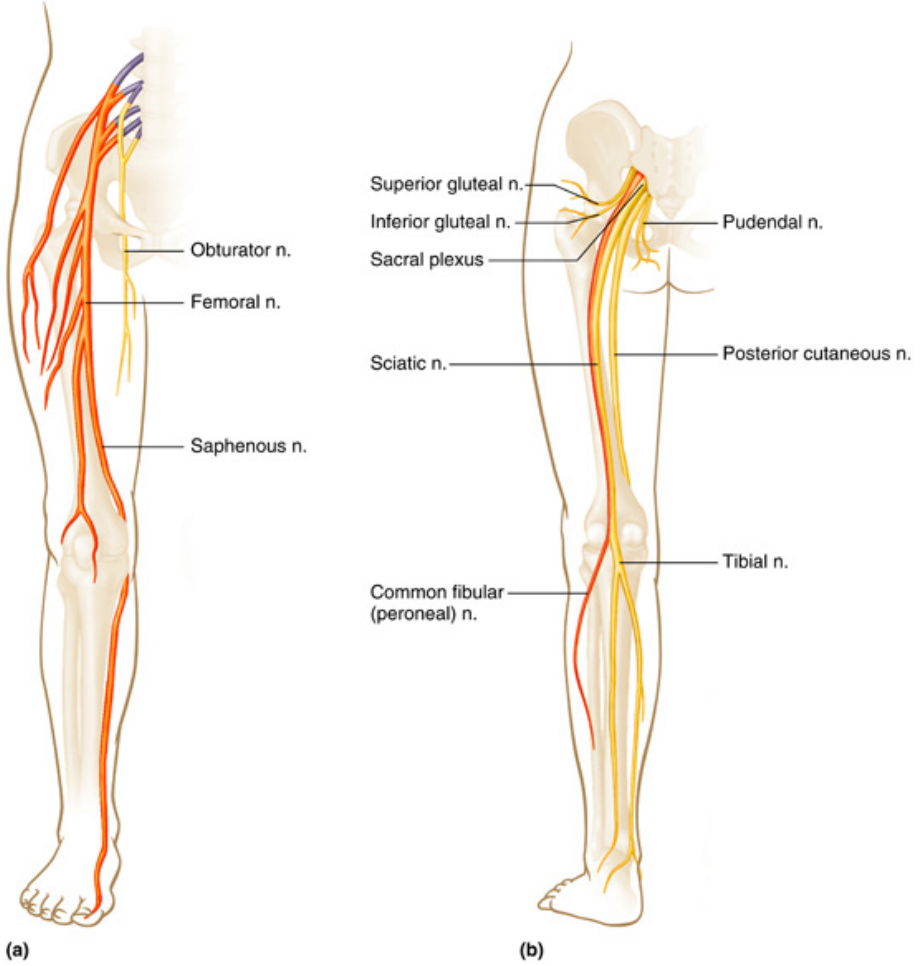


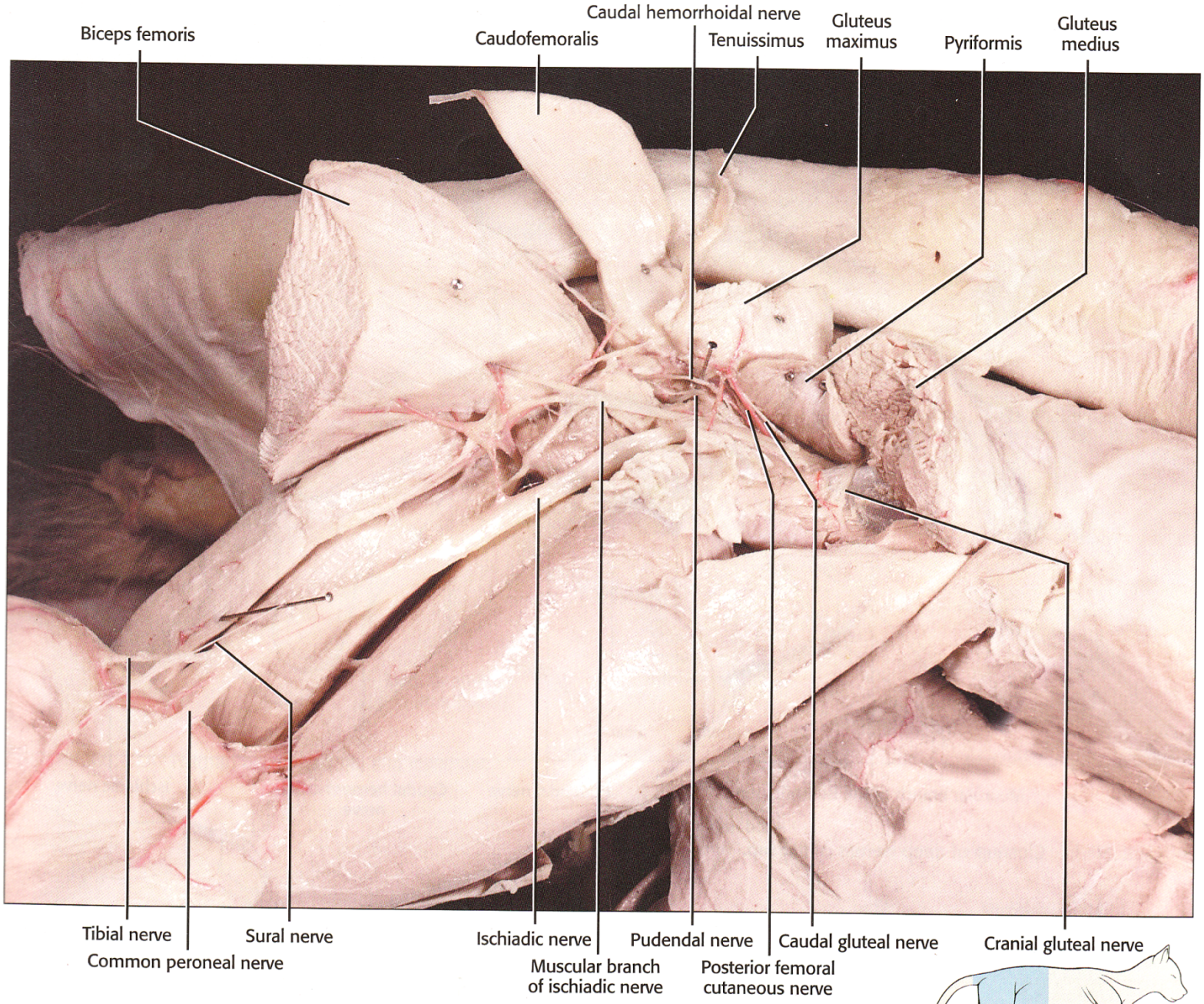
Lumbosacral Plexuses

- T12 – S5

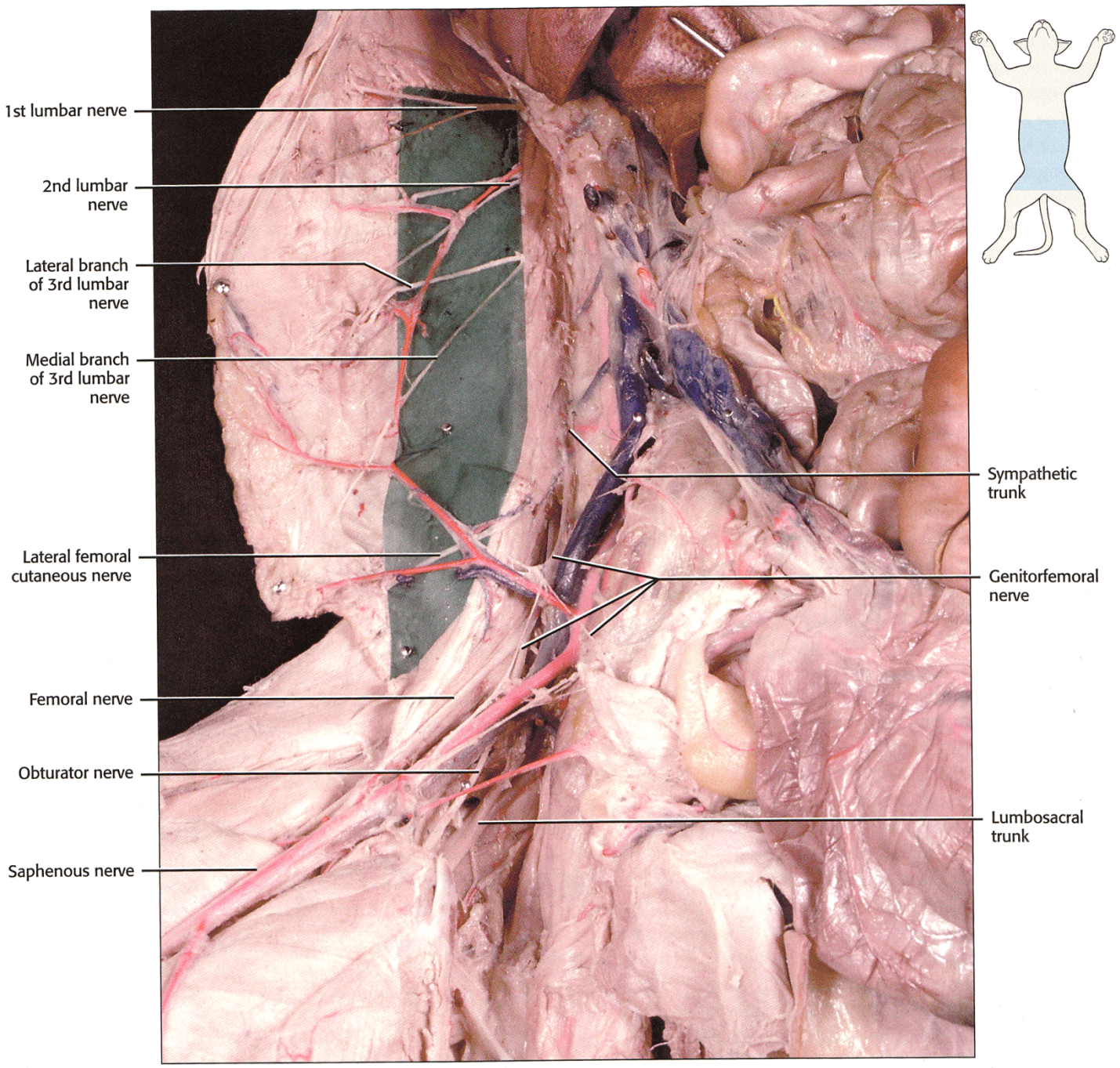
- extend from lumbar region into pelvic cavity

- obturator nerves
  - supply motor impulses to adductors of thighs
- femoral nerves
  - supply motor impulses to muscles of anterior thigh and sensory impulses from skin of thighs and legs
- sciatic nerves
  - supply muscles and skin of thighs, legs, and feet

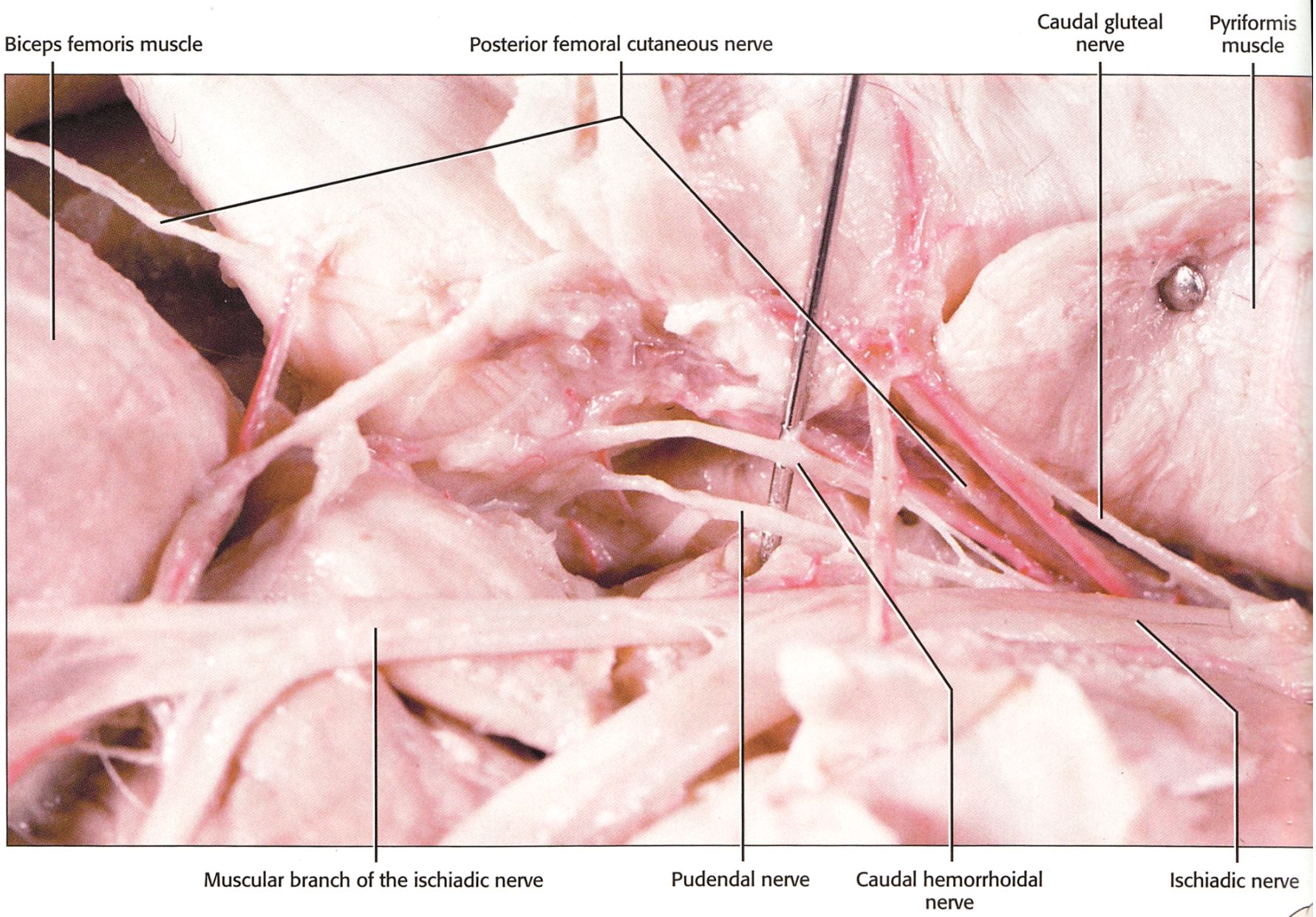




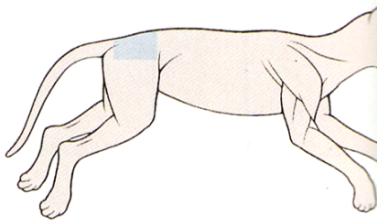
Lumbosacral plexus: Dorsal view.

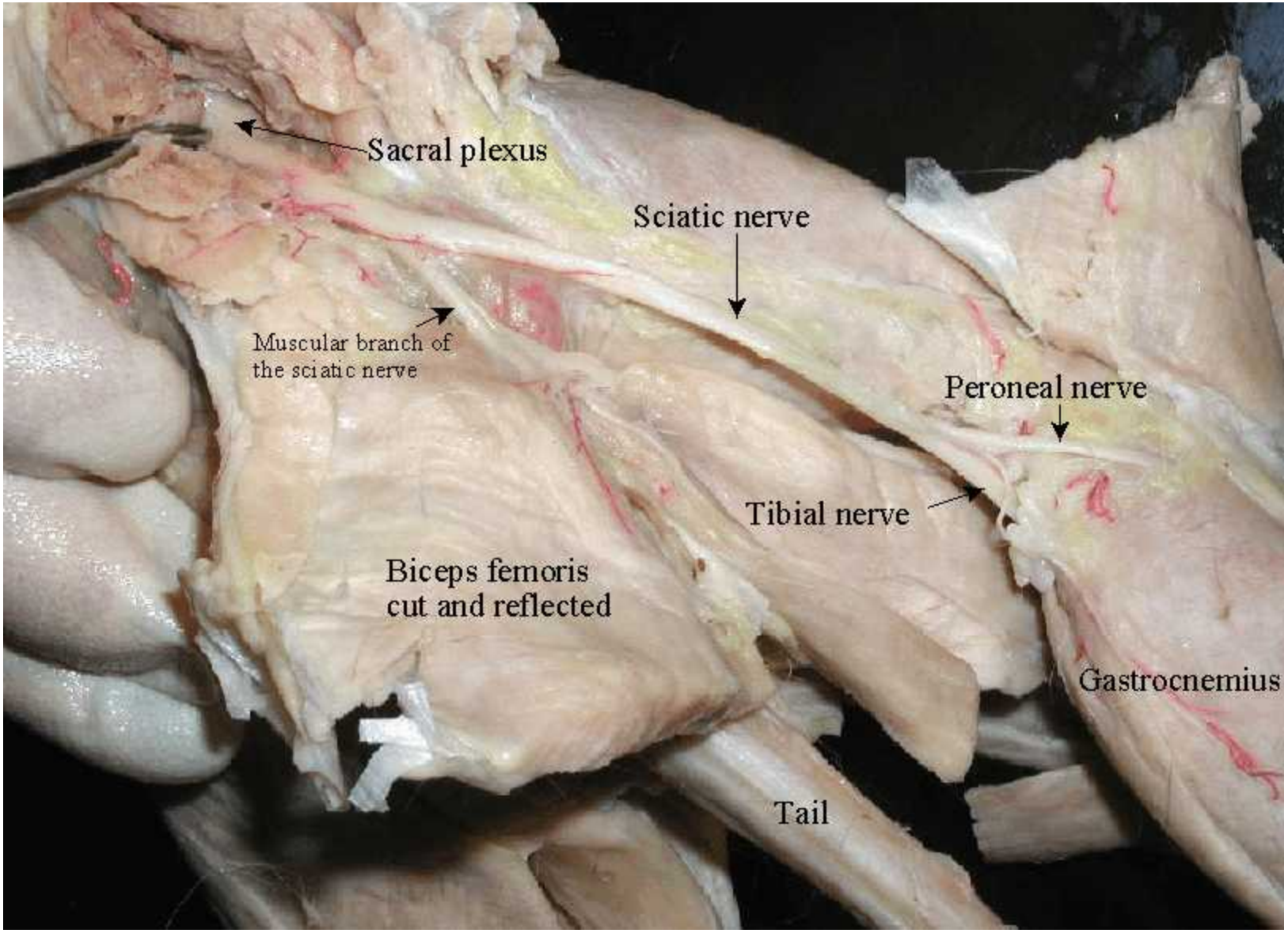


Lumbosacral plexus: Ventral view—enhanced to demonstrate the lumbar nerves.



Closeup of deep nerves of the hip.




Sacral plexus
Sciatic nerve
Muscular branch of
the sciatic nerve
Peroneal nerve
Tibial nerve
Biceps femoris
cut and reflected
Gastrocnemius
Tail