



BHARATHIDASAN
UNIVERSITY

Program: M.Sc., Biomedical Science

Course Title : Neurobiology

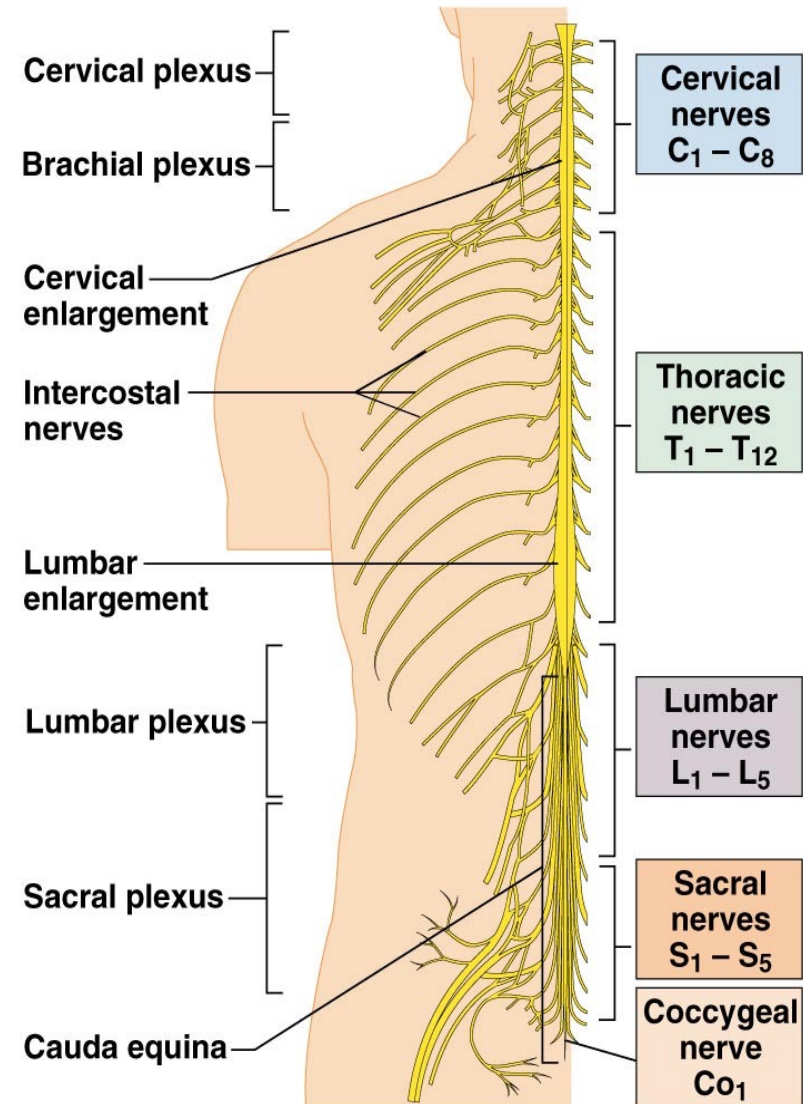
Spinal Nerves

Prof. Narkunaraja Shanmugam

Dept. of Biomedical Science

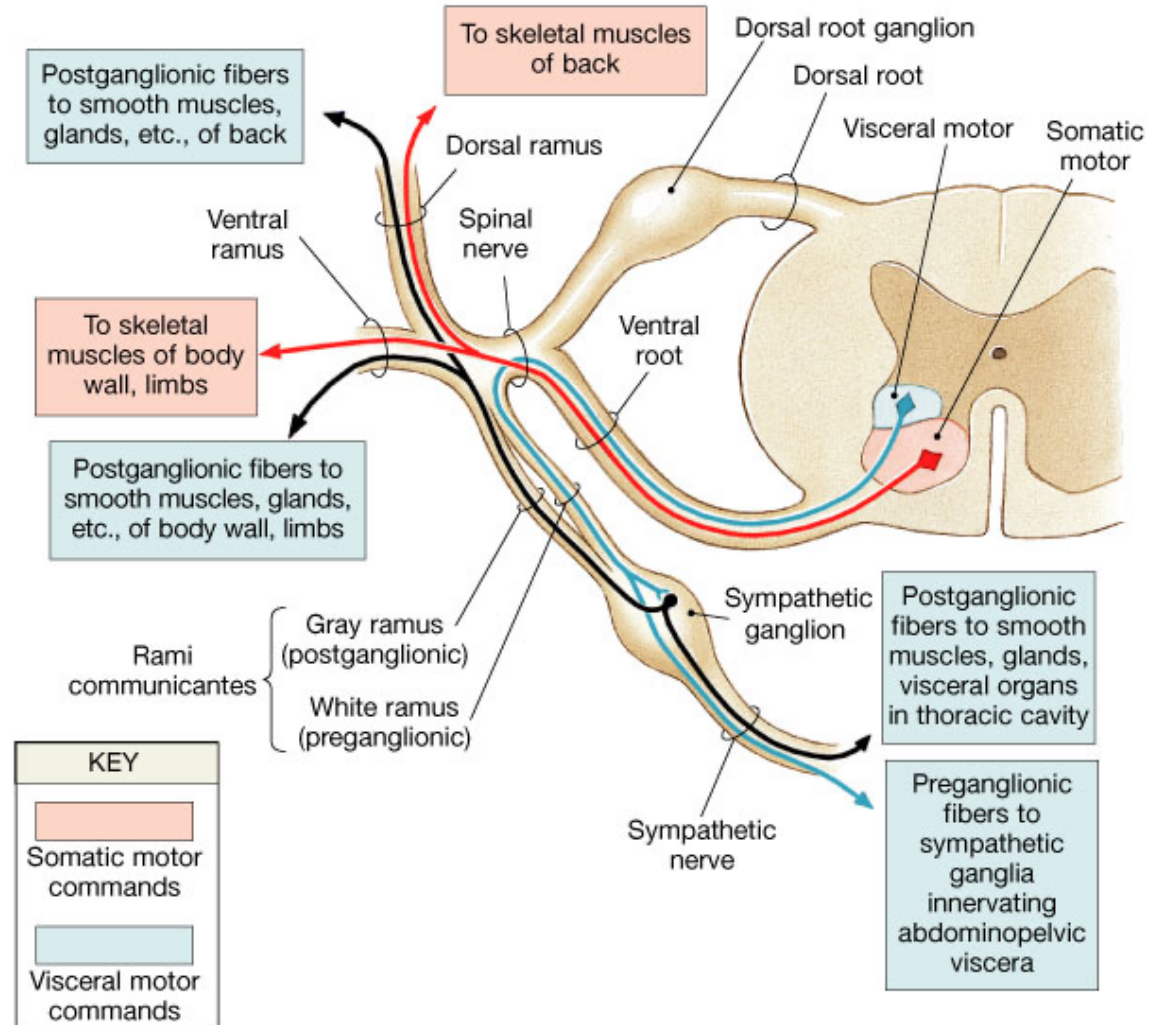
Spinal Nerves

- 31 pairs – contain thousands of nerve fibers
- Connect to the spinal cord
- Named for point of issue from the spinal cord
 - 8 pairs of cervical nerves (C₁–C₈)
 - 12 pairs of thoracic nerves (T₁–T₁₂)
 - 5 pairs of lumbar nerves (L₁–L₅)
 - 5 pairs of sacral nerves (S₁–S₅)
 - 1 pair of coccygeal nerves (Co₁)



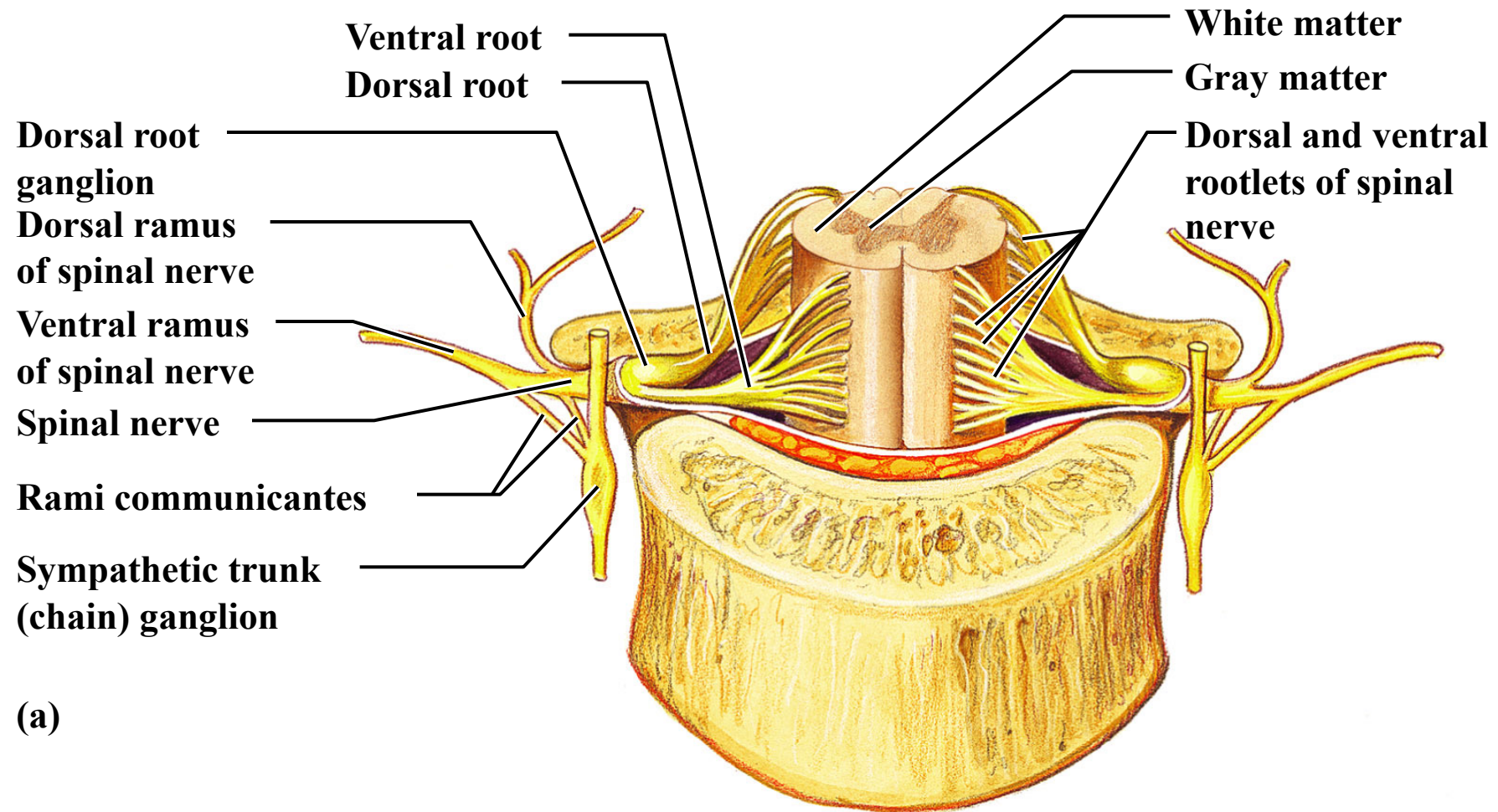
Spinal Nerves

- Connect to the spinal cord by the dorsal root and ventral root
 - **Dorsal root** – contains sensory fibers
 - Dorsal root ganglion – of afferent cell bodies
 - **Ventral root** – contains motor fibers arising from anterior gray column
- Branch into **dorsal ramus** and **ventral ramus** both contain sensory *and* motor fibers
- **Rami communicantes** connect to the base of the ventral ramus and lead to the **sympathetic chain ganglia**



(a) Motor fibers

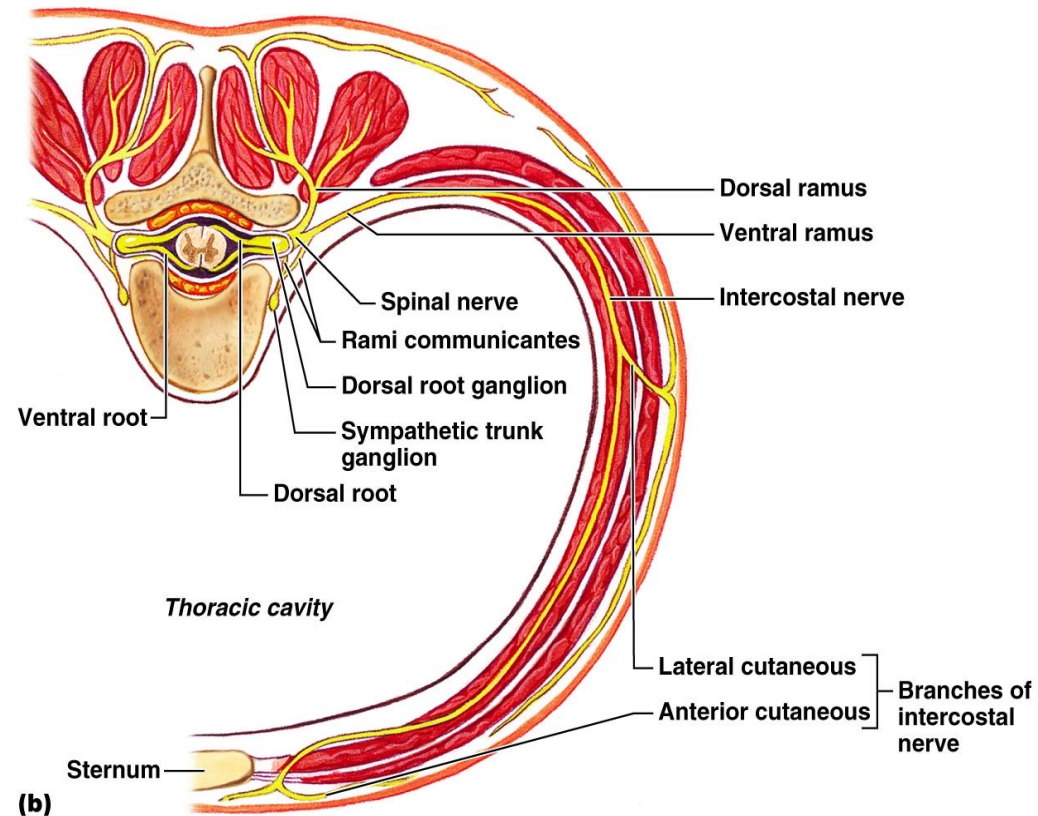
Spinal Nerves



Innervation of the Back

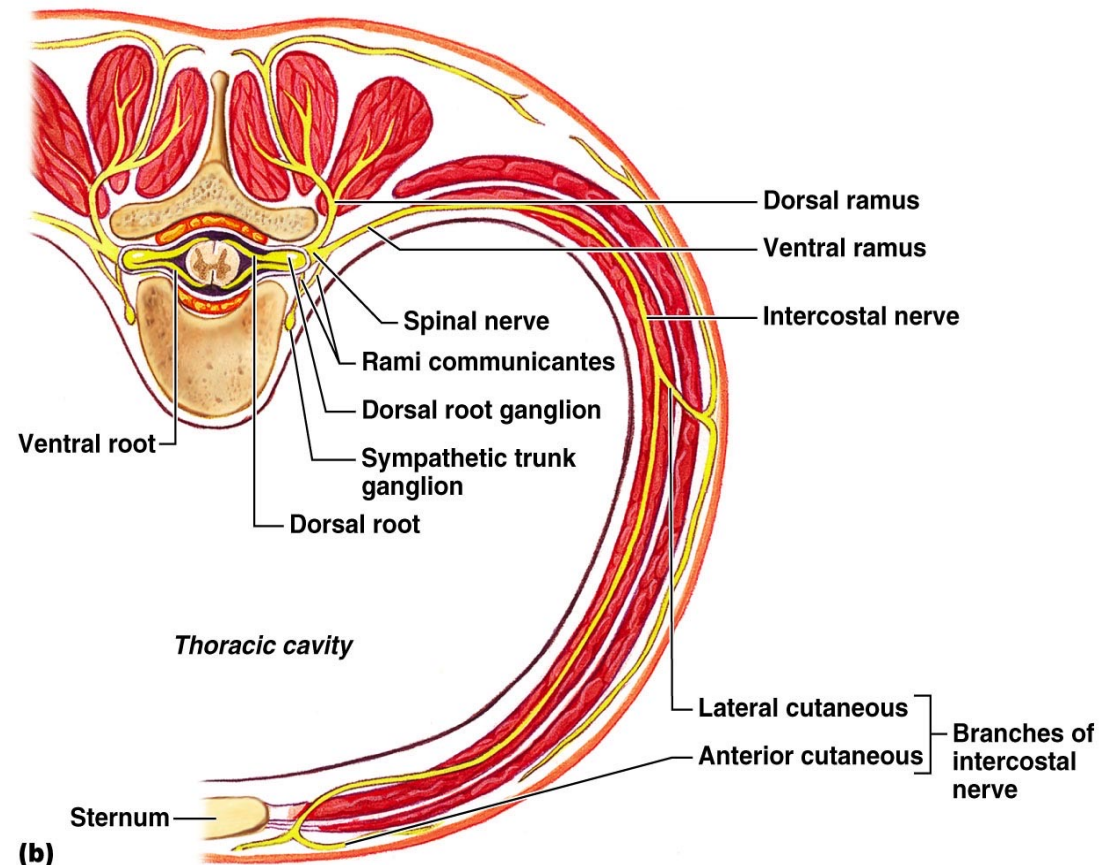
- **Dorsal rami**

- Innervate back muscles
- Follow a neat, segmented pattern
- Innervate a horizontal strip of muscle and skin
- In line with emergence point from the vertebral column



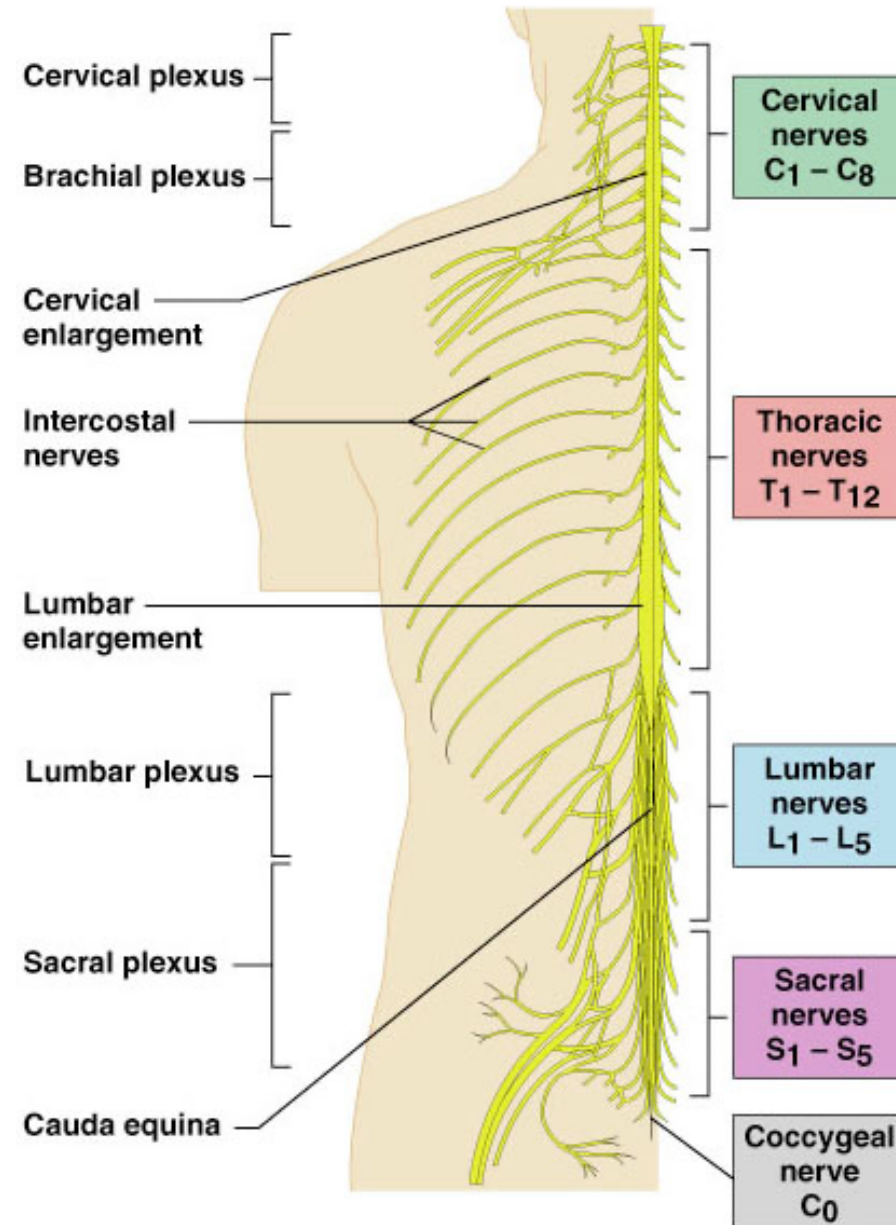
Innervation of the Thoracic region

- **Ventral rami** arranged in simple, segmented pattern
- **Intercostal** nerves – supply intercostal muscles, skin, and abdominal wall
 - Each gives off **lateral** and **anterior cutaneous branches**



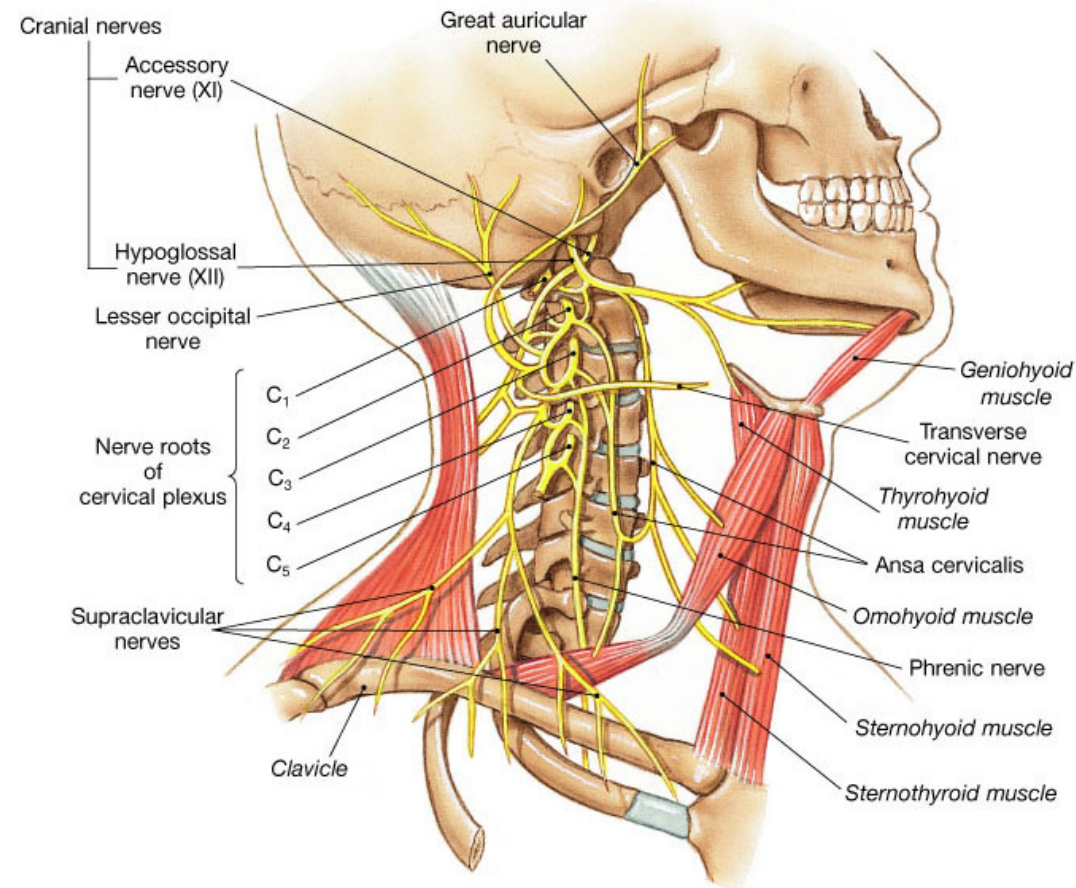
Introduction to Nerve Plexuses

- **Nerve plexus** – a network of nerves
- **Ventral rami** (except T₂ – T₁₂)
 - Branch and join with one another
 - Form nerve plexuses
 - Cervical
 - Brachial
 - Lumbar
 - Sacral
 - Primarily serve the limbs
 - Fibers from ventral rami crisscross



The Cervical Plexus

- Buried deep in the neck under the **sternocleidomastoid muscle**
- Formed by ventral rami of first four cervical nerves (C 1 – 4)
- Most are cutaneous nerves
- Some innervate muscles of the anterior neck



Brachial Plexus

- Brachial plexus lies in the neck and axilla
- Formed by ventral rami of C₅ – C₈ give rise to cords
- Cords give rise to main nerves of the upper limb

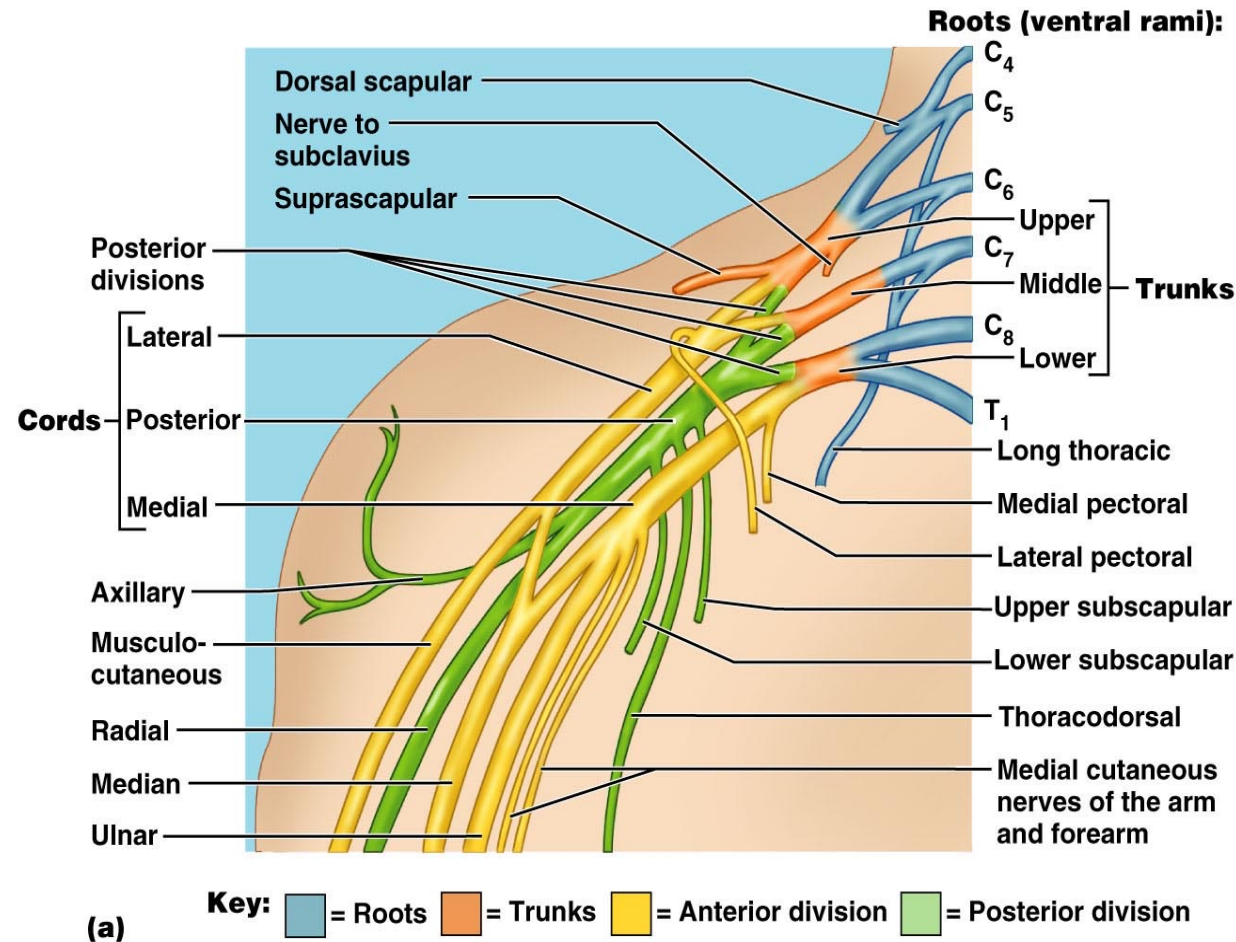
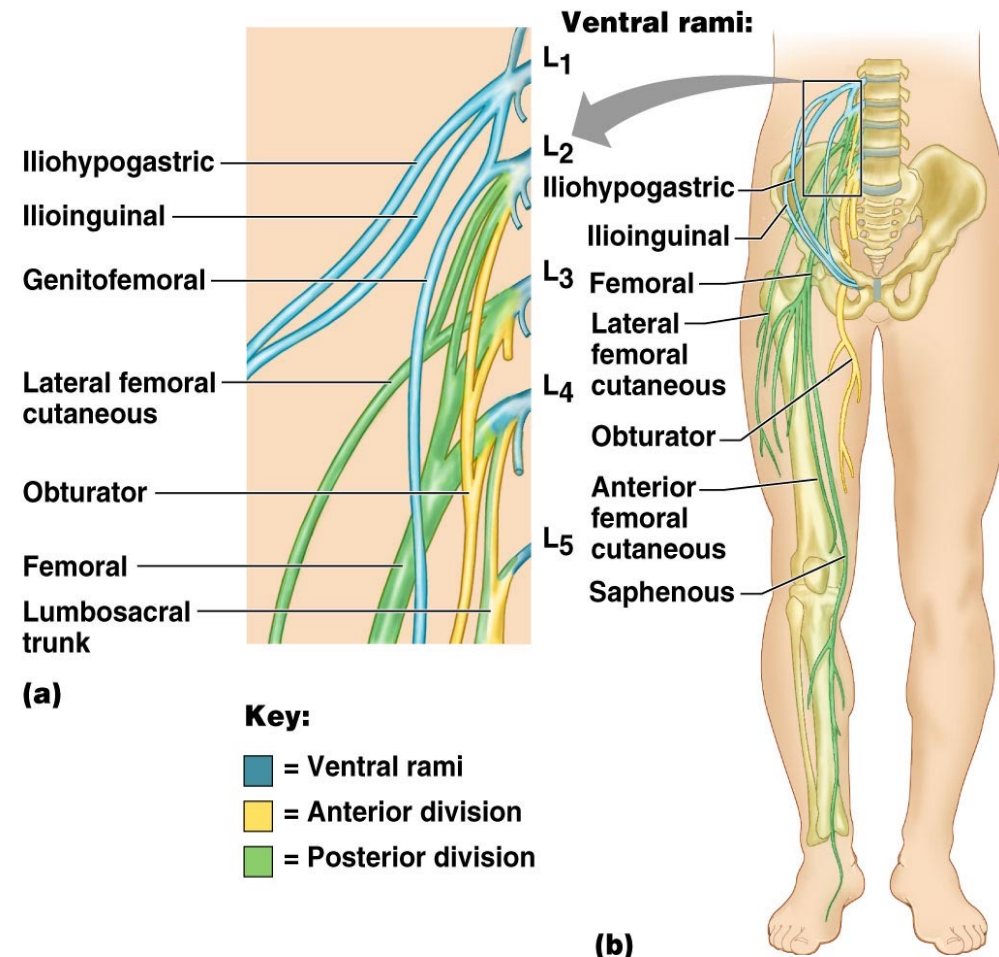


Figure 14.9d

Lumbar Plexus

- Arises from L₁–L₄
- Smaller branches innervate the posterior abdominal wall and psoas muscle
- Main branches innervate the anterior thigh



The Sacral Plexus

- Arises from spinal nerves L₄–S₄
- Often considered with the lumbar plexus referred to as the lumbosacral plexus
- **Sciatic nerve** – the largest nerve of the sacral plexus is actually two nerves in one sheath
 - Tibial nerve – innervates most of the posterior lower limb
 - Common fibular (peroneal) nerve – innervates muscles of the anterolateral leg

