

## Peripheral Nervous System

The nerves of the PNS are classified as cranial nerves or spinal nerves depending on whether they arise from the brain or the spinal cord.

- Spinal nerves
  - 31 pair
  - Attached to spinal cord
- Cranial nerves
  - 12 pair
  - Attached to undersurface of brain

### Somatic Nervous System (voluntary)

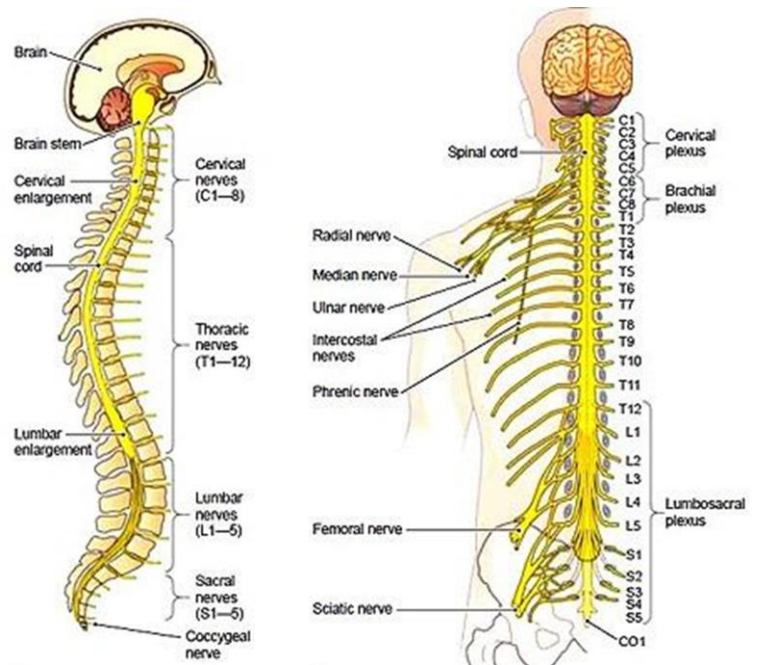
- Relays information from skin, sense organs & skeletal muscles to CNS
- Brings responses back to skeletal muscles for voluntary responses

### Autonomic Nervous System (involuntary)

- Regulates bodies involuntary responses
- Relays information to internal organs
- Two divisions
- Sympathetic nervous system – in times of stress
  - § Emergency response
  - § Fight or flight
- Parasympathetic nervous system – when body is at rest or with normal functions
  - § Normal everyday conditions
  - § Rest and digest

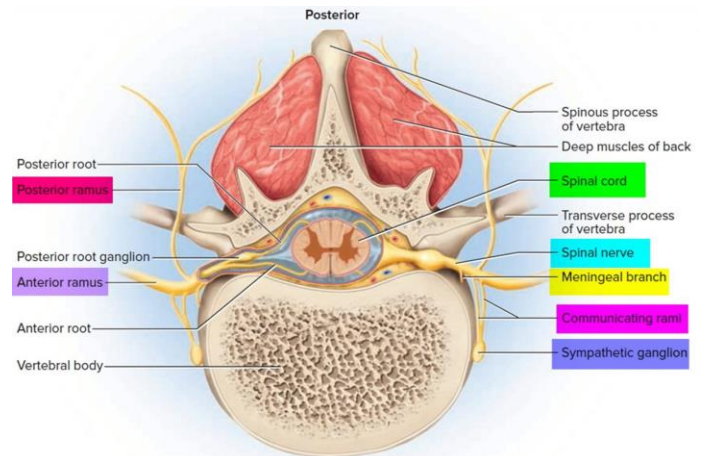
## Spinal nerves

- Thirty-one pairs of mixed nerves arise from the spinal cord and supply all parts of the body except the head
- They are named according to their point of issue
- 8 cervical (C1-C8)
- 12 thoracic (T1-T12)
- 5 Lumbar (L1-L5)
- 5 Sacral (S1-S5)
- 1 Coccygeal (C0)



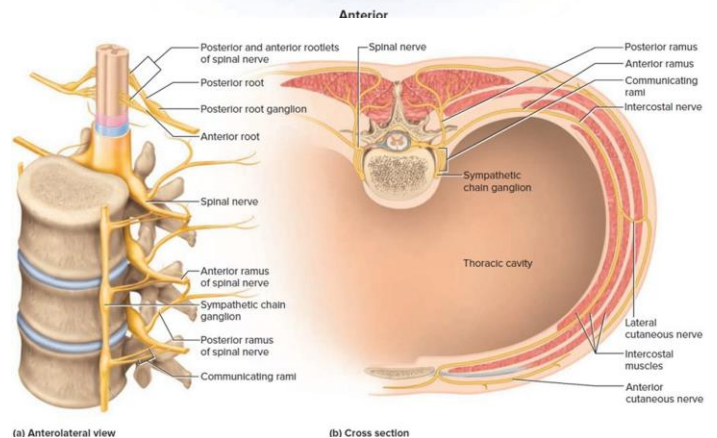
## Spinal nerves :roots

- Each spinal nerve connects to the spinal cord via two medial roots
- Each root forms a series of rootlets that attach to the spinal cord
- Ventral roots arise from the anterior horn and contain motor (efferent) fibers
- Dorsal roots arise from sensory neurons in the dorsal root ganglion and contain sensory (afferent) fibers



## Spinal Nerves: Rami

- The short spinal nerves branch into rami
- Small dorsal ramus
- Larger ventral ramus



## Nerve Plexuses

- All ventral rami except T2-T12 form nerve networks called plexuses
- Plexuses are found in the cervical, brachial, lumbar, and sacral regions

## Spinal Nerve Innervation: Back, Anterolateral Thorax, and Abdominal Wall

- The back is innervated by dorsal rami via several branches
- The thorax is innervated by ventral rami T1-T12 as intercostal nerves
- Intercostal nerves supply muscles of the ribs, anterolateral thorax, and abdominal wall

## Cervical Plexus

- The cervical plexus is formed by ventral rami of C1-C4
- Most branches are cutaneous nerves of the neck, ear, back of head, and shoulders
- The most important nerve of this plexus is the phrenic nerve
- The phrenic nerve is the major motor and sensory nerve of the diaphragm

## Brachial Plexus

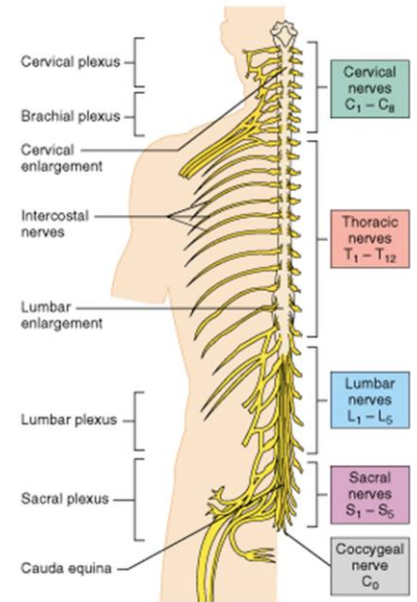
- Formed by C5-C8 and T1 (C4 and T2 may also contribute to this plexus)
- It gives rise to the nerves that innervate the upper limb

## Lumbar Plexus

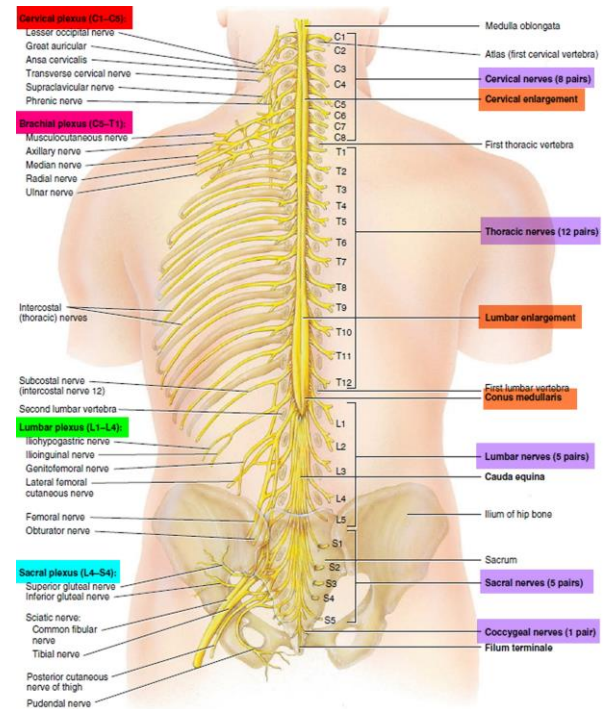
- Arises from L1-L4 and innervates the thigh, abdominal wall
- The major nerves are the femoral and the obturator

## Sacral Plexus

- Arises from L4-S4 and serves the buttock, lower limb, pelvic structures, and the perineum
- The major nerve is the sciatic, the longest and thickest nerve of the body
- The sciatic is actually composed of two nerves: the tibial and the common fibular (peroneal) nerves



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## CRANIAL NERVES

### Functional group of cranial nerves:

- I. Olfactory nerve: **Sensory**
- II. Optic nerve: **Sensory**
- III. Oculomotor nerve: **Motor**
- IV. Trochlear nerve: **Motor**
- V. Trigeminal nerve: **Mixed** (Sensory+Motor)
- VI. Abducent nerve: **Motor**
- VII. Facial nerve: **Mixed**
- VIII. Vestibulocochlear nerve: **Sensory**
- IX. Glossopharyngeal nerve: **Mixed**
- X. Vagus nerve: **Mixed**
- XI. Accessory nerve: **Motor**
- XII. Hypoglossal nerve: **Motor**

