2- ANATOMY OF SPINAL CORD

external anatomy of the spinal cord

Segmented
- 8 Cervical
- 12 Thoracic
- 5 Lumbar
- 5 Sacral
- 1 Coccygeal

Gives rise to 31 pairs of spinal nerves

Has two enlargements:
- Cervical Enlargement: supplies upper limbs
- Lumbosacral Enlargement: supplies lower limbs

connected to the coccyx by a non-neuronal cord called FilumTerminale

The tapered inferior end forms conus medullaris

Continuous above with the medulla oblongata

Extends from foramen magnum to second lumbar vertebra

It is elongated, cylindrical, suspended in the vertebral canal and protected by vertebrae Surrounded by the meninges and cerebrospinal fluid (CSF)

internal anatomy of the spinal cord

Grey matter

Has 3 types of neurones
1- Sensory neurons
2- Lower motor neurons
3- Interneurons

- 2 dorsal horns
- 2 ventral horns
- 2 lateral horns

Four main groups

1. Substantia Gelatinosa

Rexed Laminae II
- Located at the apex of the horn
- Composed of large neurons
- Extends throughout the length of spinal cord
- Afferents: dorsal root fibers concerned with pain, temperature and touch

2. Nucleus Proprius

Rexed Lamina IV
- Located anterior to substantia gelatinosa
- Composed of large neurons
- Extends throughout the length of spinal cord
- Afferents: dorsal root fibers concerned with senses of position & movement (proprioception)

3. Nucleus Dorsalis

Rexed Lamina VII
- Located at the base of dorsal horn
- Composed mostly of large neurons
- Extends from C8 to L3-4 segments
- Associated with proprioceptive endings
- Afferents: dorsal root fibers concerned with information from muscle spindles and tendon organs

4. Visceral Afferent Nucleus

Rexed Lamina VII
- Located lateral to nucleus dorsalis
- Composed mostly of medium size neurons
- Extends from T1 to L3 segments
- Afferents: Visceral afferents

MOTOR NEURONS IN VENTRAL HORN ORGANISED IN 3 GROUPS

Medial: Present in most segments, innervates muscles of neck and trunk (including intercostal and abdominal muscles)

Central: Smallest, present in some cervical (phrenic C3-5, spinal accessory C1-6) and lumbosacral segments (L2-S1)

Lateral: Present in cervical and lumbosacral segments, innervates muscles of the limbs

Small Columns composed of small neurons

Column extends from T1 to L2-3 segments Give rise to preganglionic sympathetic fibers

Column extends from S2-4 segments Give rise to preganglionic parasympathetic fibers

- White matter
- Grey Commissure
- White Commissure
- CENTRAL CANAL

REGIONAL DIFFERENCES

reflex and reflex arc

A reflex is a rapid, involuntary, stereotyped pattern of response brought by a sensory

Action potentials produced in Sensory receptor then travels to sensory neurone then to interneuron then to motor neurone then to effecor organ which responds with a reflex

meninges of the spinal cord

Connective tissue membranes surrounding spinal cord and brain

Spaces
- Epidural: Contains blood vessels, connective tissue and fat
- Subarachnoid: Contains CSF and blood vessels
- Subdural: Contains serous fluid

- Dura mater
- Arachnoid mater
- Pia mater
- Forms filum terminale

spinal nerves

Dorsal Ramus: innervate deep muscles of the trunk responsible for movements of the vertebral column and skin near the midline of the back

Ventral Ramus: what they innervate depends upon which part of the spinal cord is considered

Thoracic region: form intercostal nerves that innervate the intercostal muscles and the skin over the thorax

Remaining spinal nerve ventral rami form : five plexuses (intermingling of nerves).
o Ventral rami of C1-C4= cervical plexus
o Ventral rami of C5-T1= brachial plexus
o Ventralrami of L1-L5= lumbar plexus
o Ventral rami of L4-S4= sacral plexus
o Ventral rami of S4 & S5=coccygeal plexus

Done by: Hatim Alnaddah