Spinal Cord

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Dr Avinash Bharadwaj

Extent and Gross Features
- Foramen magnum – L1/L2 (Adult)
- Ventral median fissure
- Dorsal median sulcus
- Ventrolateral and dorsolateral sulci

Spinal Segments
A Spinal Segment: A “slice” of the spinal cord that gives out one spinal nerve (R+L pair!)

Typical Spinal Nerve
Roots
- Posterior (dorsal) root: Sensory
- Dorsal root ganglion
- Anterior (ventral) root: Motor

Rami
- Posterior (dorsal) ramus: Mixed
- Anterior (ventral) ramus: Mixed

Note: “Rootlets”

Spinal Cord - General Features
- White and Grey Matter
- Anterior Median Fissure

Dorsal Root Fibres
Continued…
Dorsal Root Fibres

- “Central” processes of DR ganglion cells
- Ascend without synapse
- OR
- Synapse – intermediate neurones – “Tract” cells (long axons)

Ventral Root Fibres

- Axons of neurone bodies in grey matter

Spinal Grey Matter

- Functionally discrete neurone groups
  
  Nuclear columns
  
  Laminae

The Laminae

II – Substantia Gelatinosa
IV, V, VI – “Nucleus proprius”
VII – Interneurones, Autonomic neurones, Nucleus thoracicus
VIII – Termination of some descending fibres.
IX – Includes motor neurones (distinct columns…)

Tracts…

MB  Pons  MO  SC

Tracts…

MB  Pons  MO  SC
Tracts…
- Functionally related fibres
- Similar origin and termination
- May begin or end at various levels in the cord.
- No distinct anatomical boundaries

Dorsal Root Fibres
- “Central” processes of DR ganglion cells
- Ascend without synapse
  OR
- Synapse – intermediate neurones – “Tract” cells (long axons)

Examples of ascending tracts:
- Crossed and uncrossed

White Matter - Tracts
- Not all tracts are coextensive with the entire cord
- Long ascending / descending tracts
- Fasciculus proprius (intersegmental)

Major Descending Tracts
- Corticospinal – Lateral and Ventral
- Rubrospinal
- Tectospinal, Vestibulospinal
- Reticulospinal and others…
- Motor control [somatic (voluntary movements and their fine control) and visceral]
- Modulation of ascending input.

Ascending Tracts
- Conscious sensory perception
- Input to cerebellum
- Other inputs to higher centres

General principles presented here…
More with “somatosensory system”
To Thalamus and Cerebral Cortex
(Conscious Sensory Perception)

- General rules
  (But... there's more than what meets the eye!)
- Three long neurones
- 1st neurone – body in DRG
- Second neurone crosses, ends in the thalamus

Dorsal Column (Lemniscal System)

- Central processes of DRG cells...
- Uncrossed
- Modalities...
- Fasciculus gracilis and fasc. cuneatus
- Extent...

Spinothalamic (Anteolateral) System

- Light touch, pain, temperature
- “Second order” neurones – axons of tract cells
- Crossed

Somatotopism

Spinal Cord – Editing Input

- “Sensory Gate” Mechanism
- Different sensory modalities and preferential transmission
  Evolution of the concept...discussed further with “somatosensory system”.

Spinal Cord and Reflex Activity

- Types of reflexes
- Synapses and segments
- Neurones involved