PNS – Sensory neurons

Conduct sensory information from the tissues of the body to the CNS (via dorsal roots)

Dorsal root = Posterior root

PNS – Motor neurons

Conduct motor information from the CNS to the tissues of the body (via ventral roots)

Ventral root = Anterior root
Spinal nerves are segmentally arranged.
Anterior rami

- Cervical plexus
- Brachial plexus
- Thoracic nn.
- Lumbar plexus
- Sacral plexus

Poliomyelitis is caused by infection with a member of the genus Enterovirus known as poliovirus. Poliovirus infects and causes disease in humans alone.
A patient has loss of sensation on the front of the 2-3 fingers. You suspect a herniated disc.

G03: PNS/ANS

Pg. 24

Dr. Morton
CNS
\rightarrow PNS
Sensory
\rightarrow Motor

CNS
\rightarrow PNS
Visceral Afferent
\downarrow
Return information (reflexes, pain) concerning hollow organs and blood vessels
Overview of the ANS

- **Sensory**: monitor changes in viscera
- **Motor**: innervate smooth and cardiac muscle/glands
Overview of the ANS

- **Sensory**: monitor changes in viscera
- **Motor**: innervate smooth and cardiac muscle/glands

- **Pre-ganglionic ANS neuron**: cell body in CNS
- **Post-ganglionic ANS neuron**: cell body in periph. gang.

<table>
<thead>
<tr>
<th>Organ, Tract or System</th>
<th>Sympathetic</th>
<th>Parasympathetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pupil</td>
<td>Dilation</td>
<td>Constriction</td>
</tr>
<tr>
<td>Skin</td>
<td>Arrector pil. m. contraction</td>
<td>No effect</td>
</tr>
<tr>
<td></td>
<td>Vasoconstriction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sweat and sebaceous gland secretion</td>
<td></td>
</tr>
<tr>
<td>Lacrimal and Salivary Glands</td>
<td>Decreases secretion</td>
<td>Increases secretion</td>
</tr>
<tr>
<td>Heart</td>
<td>Increase rate and strength of contraction</td>
<td>Decreases rate and strength of contraction</td>
</tr>
<tr>
<td></td>
<td>Dilates coronary vessels</td>
<td>Constricts coronary vessels</td>
</tr>
<tr>
<td>Lung</td>
<td>Bronchodilation</td>
<td>Bronchoconstriction</td>
</tr>
<tr>
<td>Digestive tract</td>
<td>Inhibits peristalsis</td>
<td>Stimulates peristalsis</td>
</tr>
<tr>
<td></td>
<td>Constricts blood vessels</td>
<td></td>
</tr>
<tr>
<td>Reproductive System</td>
<td>Ejaculation</td>
<td>Erection</td>
</tr>
<tr>
<td>Adrenal gland (medulla)</td>
<td>Release adrenaline</td>
<td>No effect</td>
</tr>
<tr>
<td><strong>Overview</strong></td>
<td>Fight or Flight</td>
<td>Rest and Digest</td>
</tr>
<tr>
<td>Features</td>
<td>Exercise, Excitement, Emergency</td>
<td>Digestion, Defecation, Diuresis</td>
</tr>
<tr>
<td>Neurotransmitters</td>
<td>Acetylcholine (ACh)</td>
<td>Pre-ganglionic: ACh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-ganglionic: ACh, Norepinephrine and Epinephrine</td>
</tr>
<tr>
<td>Origin</td>
<td>Lateral horn of gray matter of T1-L2 spinal cord segments</td>
<td>Brainstem (CN III, VII, IX, X) and spinal cord segments S2-S4</td>
</tr>
<tr>
<td>Location of Ganglia</td>
<td>Close to or inside the end organs</td>
<td>Ganglia are close to CNS (paravertebral and prevertebral ganglia)</td>
</tr>
<tr>
<td>Rami Communicantes</td>
<td>Gray and white rami communicantes</td>
<td>None</td>
</tr>
<tr>
<td>Relative length of pre and post ganglionic fibers</td>
<td>Short pre-ganglionic, long postganglionic</td>
<td>Long pre-ganglionic, short postganglionic</td>
</tr>
</tbody>
</table>
SYMPATHETICS

Pre-ganglionic sympathetic neuron
- Cell body in lateral horn of T1-L2 spinal cord gray mater

SYMPATHETICS

Motor: innervate smooth and cardiac muscle/glands
- Pre-ganglionic neuron: cell body lateral horn T1-L2
- Post-ganglionic neuron: cell body in periph. gang. (para and prevertebral ganglia)
Symp. Periph ganglia:
• **Paravertebral ganglia**
  (sympathetic trunk)

---

Symp. Periph ganglia:
• **Prevertebral ganglia**
  (Celiac trunk etc.)
The sun warms the skin along dermatome T4. Trace the sympathetics to the skin causing the sweat glands to function.
The sun warms the skin along dermatome C3. Trace the sympathetics to the skin causing the sweat glands to function.

The heart receives sympathetic innervation of the heart from spinal cord levels T1-T4 through both thoracic and cervical paravertebral ganglia. Trace the innervation.
Referred pain

Occurs when sensory information comes to the spinal cord from one location, but is interpreted by the CNS as coming from another location innervated by the same spinal cord level.

(GAFS pg. 88)
Referred pain

Occurs when sensory information comes to the spinal cord from one location, but is interpreted by the CNS as coming from another location innervated by the same spinal cord level. (GAFS pg. 88)

Parasympathetics: Origin CNS (Preganglionic neurons)

- Brain stem (CN III, VII, IX, X)
- Spinal cord segments S2-S4

pg. 28
Parasympathetics:

**Postganglionic Neurons**

- Cranial ganglia
- Intramural ganglia
The stomach receives parasympathetic innervation from the vagus nerve (CN X).
Trace the innervation.
THANK-YOU