

Peripheral nervous system quiz

The following tables are intended to help you revise and test your knowledge of anatomy relating to the examination of the peripheral nervous system.

Attempt to complete as many empty cells as possible before proceeding to view the completed table on the following page.

What can also help you visualise the various spinal tracts and pathways is to draw simple diagrams.



Descending spinal tracts quiz



(Complete the empty cells then check your answers with the completed table in the next section)

Tract	Upper motor neurone	Lower motor neurone	Decussating
Lateral corticospinal tract		Anterior gray horn – anterior nerve root – mixed spinal nerve – skeletal muscle	In Medulla Oblongata (MO)
Anterior corticospinal tract	Primary somatomotor cortex – internal capsule – mid-brain – pons – medulla – pyramids – anterior corticospinal tract – decussate to contralateral anterior grey horn – synapse		
Extra pyramidal tracts Rubro~spinal Tecto~ Vestibulo~ Reticulo~ Olivo~		Anterior gray horn – anterior nerve root – mixed spinal nerve – skeletal muscle	

Descending spinal tracts quiz

(Completed table)



Tract	Upper motor neurone	Lower motor neurone	Decussating
<p>Lateral corticospinal tract</p> <p>Somatic / voluntary / volitional movement)</p>	<p>Primary somatomotor cortex → internal capsule → mid-brain → pons → medulla → pyramids → decussate to contralateral side → lateral corticospinal tract → anterior grey horn → synapse</p>	<p>Anterior gray horn → anterior nerve root → mixed spinal nerve → skeletal muscle</p>	<p>In medulla oblongata (MO)</p>
<p>Anterior corticospinal tract</p> <p>Somatic / voluntary / volitional movement)</p>	<p>Primary somatomotor cortex → internal capsule → mid-brain → pons → medulla → pyramids → anterior corticospinal tract → decussate to contralateral anterior grey horn – synapse</p>	<p>Anterior gray horn → anterior nerve root → mixed spinal nerve → skeletal muscle</p>	<p>In segmental spinal cord</p>
<p>Extra pyramidal tracts</p> <ul style="list-style-type: none"> • Rubro~spinal • Tecto~ • Vestibulo~ • Reticulo~ • Olivo~ <p>✓ Involuntary reflexes</p> <p>✓ Involuntary movement</p> <p>✓ Modulation of movement (i.e. coordination).</p> <p>Muscle tone for posture and balance</p>	<p>In the midbrain, they originate from their respective nuclei → cross to the other side of the midbrain → descend in the lateral part of the brainstem tegmentum → In the spinal cord, they travel through the lateral funiculus of the spinal cord in the company of the lateral corticospinal tract → Synapse in anterior grey horn.</p>	<p>Anterior gray horn → anterior nerve root → mixed spinal nerve → skeletal muscle.</p>	<p>Mid brain (some ipsilateral)</p>

Ascending spinal tracts



(Complete the empty cells then check your answers with the completed table in the next section)



Sensory modalities	1 st order neurone	2 nd order neurone	3 rd order neurone	Decussating	Terminating
<ul style="list-style-type: none"> • 2-point discrimination • Tactile sense (fine discriminative touch) • Vibration • Kinesthetic • Muscle tension • Joint position sense 			Thalamus – primary somatosensory cortex		– primary somatosensory cortex
Pain Temperature Crude touch	Dendrons start from the sensory receptors – dorsal root ganglion (cell body) – dorsal grey horn – synapse		Thalamus - primary somatosensory cortex		– primary somatosensory cortex
Spinocerebellar tracts <ul style="list-style-type: none"> • Dorsal spinocerebellar • Cuneocerebellar • Ventral spinocerebellar • Rostral spinocerebellar 		Grey horn – ipsilateral cerebellar lobe and vermis			Cerebellum

Ascending spinal tracts

Completed table



Sensory modalities and tracts	1 st order neurone	2 nd order neurone	3 rd order neurone	Decussating	Terminating
Dorsal Columns <ul style="list-style-type: none"> ➤ 2-point discrimination ➤ Tactile sense (fine discriminative touch) ➤ Vibration ➤ Kinesthetic ➤ Muscle tension ➤ Joint position sense 	Dendrons start from the sensory receptors – dorsal root ganglion (cell body) – dorsal grey horn – dorsal column (fsciculus gracilis & cuneatus) – dorsal column nuclei in MO – synapse with 2 nd order neurone	Dorsal column nuclei in MO (Nucleus Gracilis / Cuneatus) – contralateral medial lemniscus – thalamus – synapse with 3 rd order neurone	Thalamus – primary somatosensory cortex	Medulla oblongata (MO)	Primary somatosensory cortex
Lateral spinothalamic tracts <ul style="list-style-type: none"> ➤ Pain ➤ Temperature 	Dendrons start from the sensory receptors – dorsal root ganglion (cell body) – dorsal grey horn – synapse with 2 nd order neurone	Dorsal grey horn – contralateral spinothalamic tract – thalamus – synapse with 3 rd order neurone	Thalamus - primary somatosensory cortex	Spinal cord near point of entry	Primary somatosensory cortex
Anterior spinothalamic tracts <ul style="list-style-type: none"> ➤ Crude touch ➤ Pressure 	Dendrons start from the sensory receptors – dorsal root ganglion (cell body) – dorsal grey horn – synapse with 2 nd order neurone	Dorsal grey horn – contralateral spinothalamic tract – thalamus – synapse with 3 rd order neurone	Thalamus - primary somatosensory cortex	Spinal cord near point of entry	Primary somatosensory cortex
Spinocerebellar tracts <ul style="list-style-type: none"> • Dorsal spinocerebellar • Cuneocerebellar • Ventral spinocerebellar • Rostral spinocerebellar ➤ Proprioception ➤ Muscle tone ➤ Equilibrium ➤ Integration of somatic motor functions (from cerebral motor cortex) 	Proprioceptors: muscle spindles and golgi tendon organs → dorsal root ganglion → dorsal grey horn → synapse with 2 nd order neurone	Grey horn – ipsilateral cerebellar lobe and vermis	No	No	Ipsilateral Cerebellum



Sensory receptors and pathways quiz



(Complete the empty cells then check your answers with the completed table in the next section)

Sensory receptors	Responding to what type of stimulus?	Location of receptors	Spinal pathways
Nociceptors:			
Pain and temperature (modified free nerve endings)	Tissue damage Extreme temperatures	Epidermis, dermis, cornea, muscles, joint capsules	ALS (anterior and lateral spinothalamic tracts)
Mechanoreceptors:			
	Touch and pressure		ALS (anterior and lateral spinothalamic tracts)
Merkel's tactile discs		Basal epidermis	
	2-point discrimination		DCML pathways (dorsal column-medial lemniscus)
Pacinian corpuscles			DCML pathways (dorsal column-medial lemniscus)
	Touch, hair movement	Base of hair follicle	
Rufini's organs	Pressure, stretching of skin	Joint capsules, dermis, hypodermis	DCML pathways (dorsal column-medial lemniscus)
Mechanoreceptors in muscles and tendons:			
Nuclear bags			
	Detects muscle stretch when in progress	Skeletal muscle	
	Stretching of tendon		DCML pathways (dorsal column-medial lemniscus)

Sensory receptors and pathways quiz
Completed table



Sensory receptors	Responding to what type of stimulus?	Location of receptors	Spinal pathways
Nociceptors:			
Pain and temperature	Tissue damage Extreme temperatures	Epidermis, dermis, cornea, muscles, joint capsules	ALS (anterior and lateral spinothalamic tracts)
Mechanoreceptors:			
Free nerve endings	Touch and pressure	Epidermis, dermis, cornea, detail pulp, muscles, joint capsules, tendons, ligaments, bones, mucus membranes	ALS (anterior and lateral spinothalamic tracts)
Merkel's tactile discs	Discriminative touch. Superficial pressure	Basal epidermis	DCML pathways (dorsal column-medial lemniscus)
Meissner's corpuscles	2-point discrimination	Dermis (papillae), hairless skin	DCML pathways (dorsal column-medial lemniscus)
Pacinian corpuscles	Deep pressure, vibration	Dermis, hipodermis, interosseous membranes, ligaments, external genitalia, joint capsules, peritoneum, pancreas	DCML pathways (dorsal column-medial lemniscus)
Peritrichial nerve plexus	Touch, hair movement	Base of hair follicle	DCML pathways (dorsal column-medial lemniscus)
Rufini's organs	Pressure, stretching of skin	Joint capsules, dermis, hypodermis	DCML pathways (dorsal column-medial lemniscus)
Mechanoreceptors in muscles and tendons:			
Nuclear bags	Detects onset of muscle stretch	Skeletal muscle	DCML pathways (dorsal column-medial lemniscus)
Nuclear chains	Detects muscle stretch when in progress	Skeletal muscle	DCML pathways (dorsal column-medial lemniscus)
Golgi tendon organs	Stretching of tendon	Skeletal muscle	DCML pathways (dorsal column-medial lemniscus)