

Spinal cord Tracts summary

Ascending tracts

Tract	Function	1st order neuron	Synapse	2nd order neuron	Course
Conscious sensation					
Spino-thalamic tract	Anterior: Pressure and Crude touch Lateral: Pain and Temperature	-Sensory nerve fibers (Aδ fibers and C fibers) have pseudounipolar cell bodies in the dorsal root ganglion. -Axon enters the spinal cord and ascends or descends several segments in the posterolateral tract (Lissauer tract). Located at tips of dorsal horns -Carries ascending sensory fibers one to two levels above before synapsing in the dorsal horn	Ipsilateral spinal cord in the substantia gelatinosa or nucleus proprius one to two segments below or above the 1st neuron	Axon decussates within the anterior white commissure and then ascends contralaterally. In the lateral spinothalamic tract, cervical segments are medial and sacral segments are lateral.	To the 3rd neuron in the ventral posterolateral nucleus of the thalamus → somatosensory cortex
Dorsal column	Proprioception Pressure Vibration Fine touch	-Sensory nerve fibers have a pseudounipolar cell body in the dorsal root ganglion. -Axon enters the spinal cord and ascends ipsilaterally #Gracile fasciculus (sensation from lower limbs, T6 and below): located medially #Cuneate fasciculus (sensation from upper limbs, T5 and above): located laterally	Ipsilateral medulla oblongata	-Axon decussates to the contralateral side within the medulla. -Ascends contralaterally in the medial lemniscus	To the 3rd neuron in the ventral posterolateral nucleus of the thalamus → somatosensory cortex
Unconscious sensation					
Spino-cerebellar tract	Proprioception	-Sensory nerve fibers -Cell body in the dorsal root ganglion	Ipsilateral posterior horn of the spinal cord	Axons arising from the posterior horn of the spinal cord to the cerebellum	Cerebellum (via inferior and superior cerebellar peduncles)
Spino-olivary tract	Proprioception	-Sensory nerve fibers -Cell body in the dorsal root ganglion	Ipsilateral posterior horn of the spinal cord	Axons arising from the posterior horn of the spinal cord to the olivary nuclei of the medulla	Third-order neurons to the cerebellum

Descending "motor" tract

Tract	Function	1st order neuron	Synapses	2nd order neuron	Course
Corticospinal tract (part of the pyramidal tract)	Voluntary movement of the contralateral side	-Upper motor neuron #Cell body in the motor cortex (precentral gyrus) #Descends ipsilaterally via the internal capsule (posterior limb) -Lateral corticospinal tract (~ 80% of fibers) #Crosses in the caudal medulla (pyramidal decussation) #Descends in the spinal cord contralaterally #Cervical segments are medial and sacral segments are lateral. -Anterior corticospinal tract (~ 20% of fibers): Crosses at the same level of the spine as it innervates (not at the level of the medulla oblongata).	Anterior horn cells: motor neurons in the anterior gray column of the spinal cord	Lower motor neurons of the upper or lower limbs	To the neuromuscular junction (NMJ) of respective muscles
Extra-pyramidal tracts	Regulate the action of motor neurons #Involuntary movement (e.g., equilibratory reflexes, visual and auditory reflexes) #Muscle tone #Musculature responsible for facial expressions	Multiple projections and pathways #Rubrospinal pathway #Reticulospinal tract #Vestibulospinal tract #Tectospinal tract	Anterior horn cells of the spinal cord	Lower motor neurons	Varies depending on the tract

