**NAME: BELEMA SUCCESS**

**MATRIC NO: 18/MHS02/054**

**ASSIGNMENT: DISCUSS SOMATOSENSORTY PATHWAYS**

**SOMATOSENSORY PATHWAYS**

The somatosensory system is a part of the sensory nervous system. The somatosensory system is a complex system of sensory neurons and neural pathways that responds to changes at the surface or inside the body. The axons (as afferent nerve fibers) of sensory neurons connect with, or respond to, various receptor cells. These sensory receptor cells are activated by different stimuli such as heat and nociception, giving a functional name to the responding sensory neuron, such as a thermoreceptor which carries information about temperature changes.

Each sensory pathway is constituted by two or three groups of neurons:

1. FIRST ORDER NEURONS

First order neurons receive sensory impluses from the receptors and send them to sensory neurons present in the posterior gray horn of spinal cord through their fibres. Nerve cell bodies of these neurons are located in the posterior nerve root ganglion.

ii. SECOND ORDER NEURONS

Second order neurons are the sensory neurons present in the posterior gray horn. Fibers from these neurons form the ascending tracts of spinal cord. These fibers carry sensory impulses from spinal cord to different brain areas below cerebral cotex (subcortical areas) such as thalamus.

All these ascending tracts are formed by second order neurons of the sensory pathway except the ascending tract in the posterior white funiculus, which are formed by the fibers of first order neurons.

iii. THIRD ORDER NEURONS

Thied order neurons are in the subcortical areas. Fibers of these neurons carry the sensory impulses from subcortical areas to cerebral cotex.

Pathways of some sensation like kinesthetic sensation have only first and second order neurons.



SENSORY PATHWAYS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sensation | Receptor | First order neuron in | Second order neuron in | Third order neuron in | center |
| Fine touch  Tactile localization  Tactile discrimination  vibratory sensation  stereognosis | Meissner corpuscles and Merkel disc | Posterior nerve root ganglion-Fibers form Faciculus gracilis and faciculus cuneatus | Nucleus gracilis and nucleus cuneatus-Fibers form internal arcuate fibers | Ventral posterolateral nucleus of thalamus | Sensory cotex |
| Pressure  Cride touch | Pacinian corpuscle | Posterior nerve root ganglion | Cheif sensory nucleus-Fibers form anterior spinothalamic tract | Venral posterolateral nucleus of thalamus | Sensory cotex |
| Temperature | Warmth-Ruffini end bulb  Cold- Krause end bulb | Posterior nerve root ganglion | Substantia gelatinosa-Fibers form lateral spinothalamic tract | Ventral posterolateral nucleus of thalamus | Sensory cotex |
| Conscious kinesthetic sensation | Proprioceptors\_Muscle spindle  Golgi tendon apparatus | Posterior nerve root ganglion-Fibers form Fasiculus gracilis and Fasiculus cuneatus | Nucleus gracilis and nucleus cuneatus-Fibers form internal arcuate fibers | Ventral posterolateral nucleus of thalamus | Sensory cotex |
| Subconscious kinethetic sensation | Proprioceptors\_Muscle spindle  Golgi tendon apparatus | Posterior nerve root ganglion | Nucleus of clarke and Marginal nucleus-Fibers form dorsal and ventral spinocerebella tract | \_ | Anterior lobe of cerebellum |
| Pain | Free nerve endings | Posterior nerve root ganglion  Fast pain-A fiber  Slow pain-C fiber | Fast pain -marginal nucleus in spinal cord  Slow pain-Substantia gelatinosa of Rolando Fibers form lateral spinothalamic tract | Ventral posterolateral nucleus of thalamus, reticular formation and midbrain | Sensory cotex |