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Question: Discuss the somatosensory pathway

The somatosensory system is composed of the neurons that make sensing touch, temperature, and position in space possible. It is responsible for sensing touch, temperature, posture, limb position, and more. It includes both sensory receptor neurons in the periphery (e.g., skin, muscle, and organs) and deeper neurons within the central nervous system.

Somatosensory pathway consists of three neurons: primary, secondary, and tertiary.

1. Primary neuron is the sensory receptor that detects sensory stimuli like touch or temperature. The cell body of the primary neuron is housed in the dorsal root ganglion of a spinal nerve or, if sensation is in the head or neck, the ganglia of the trigeminal or cranial nerves.
2. Secondary neuron acts as a relay and is located in either the spinal cord or the brainstem. This neuron's ascending axons will cross, or decussate, to the opposite side of the spinal cord or brainstem and travel up the spinal cord to the brain, where most will terminate in either the thalamus or the cerebellum.
3. Tertiary neurons have cell bodies in the thalamus and project to the postcentral gyrus of the parietal lobe, forming a sensory homunculus in the case of touch. Regarding posture, the tertiary neuron is located in the cerebellum.

The somatosensory system functions in the body's periphery, spinal cord, and the brain.

Periphery: Sensory receptors (i.e., thermoreceptors, mechanoreceptors, etc.) detect the various stimuli.

Spinal cord: Afferent pathways in the spinal cord serve to pass information from the periphery and the rest of the body to the brain.

Brain: The postcentral gyrus contains Brodmann areas (BA) 3a, 3b, 1, and 2 that make up the somatosensory cortex. BA3a is involved with the sense of relative position of neighboring body parts and the amount of effort being used during movement. BA3b is responsible for distributing somatosensory information to BA1 and shape and size information to BA2.