

Lemniscus

- **1. Medial Lemniscus**

- Sensory modality: Fine touch, vibration, proprioception
- Origin: Gracile and Cuneate nuclei in the Medulla oblongata (Gracile = lower body, Cuneate = upper body)
- Pathway:
- Fibers cross (decussation) in the Medulla via the internal arcuate fibers
- Ascend through the Pons and Midbrain as the Medial Lemniscus
- Termination: Ventral Posterolateral (VPL) nucleus of the Thalamus
→ somatosensory cortex

- **2. Spinal Lemniscus**

- Sensory modality: Pain, temperature, crude touch
- Origin: Spinothalamic tract in the spinal cord
- Pathway:
- Fibers cross (decussation) at the same spinal level via the anterior white commissure
- Ascend in the contralateral lateral and ventral spinothalamic tracts through the brainstem
- Termination: Ventral Posterolateral (VPL) nucleus of the Thalamus
→ somatosensory cortex

- **3. Trigeminal Lemniscus**

- Sensory modality: Facial sensation (touch, pain, temperature)
- Origin: Trigeminal nerve nuclei (Chief sensory nucleus, Spinal nucleus, Mesencephalic nucleus)
- Pathway:
 - Fibers from the Chief sensory nucleus cross in the brainstem near the Medial Lemniscus
 - Ascend alongside the Medial Lemniscus as the Trigeminal Lemniscus
 - Termination: Ventral Posteromedial (VPM) nucleus of the Thalamus → somatosensory cortex

- **4. Lateral Lemniscus**

- Sensory modality: Auditory signals
- Origin: Cochlear nuclei in the Pons
- Pathway:
 - Fibers ascend through the Pons as the Lateral Lemniscus
 - Some fibers project to the Superior Olivary Complex and Inferior Colliculus for auditory processing
 - Termination: Inferior Colliculus → Medial Geniculate Body (Thalamus) → auditory cortex
 - Decussation: Partial; some fibers cross, some remain ipsilateral, allowing bilateral auditory representation