

Anatomical Substrates of Somatic Sensation

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Dorsal Column-Medial Lemniscal System

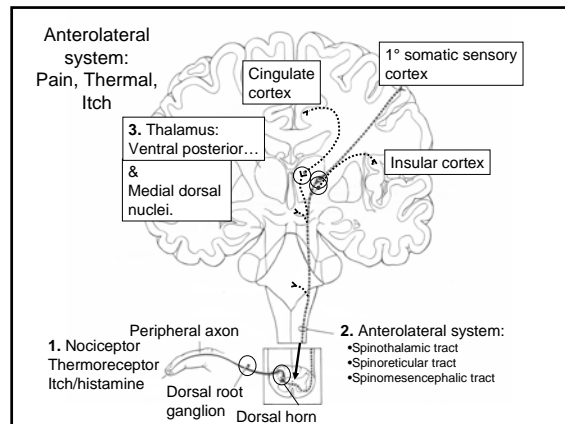
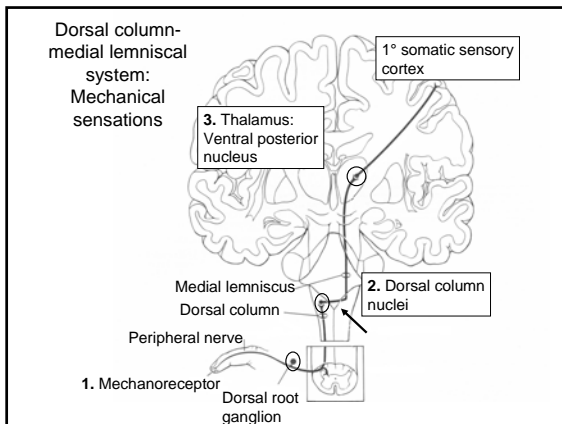
- Mediates mechanical sensations
 - touch, limb position sense, vibration sense
- Well established; clinical & experimental

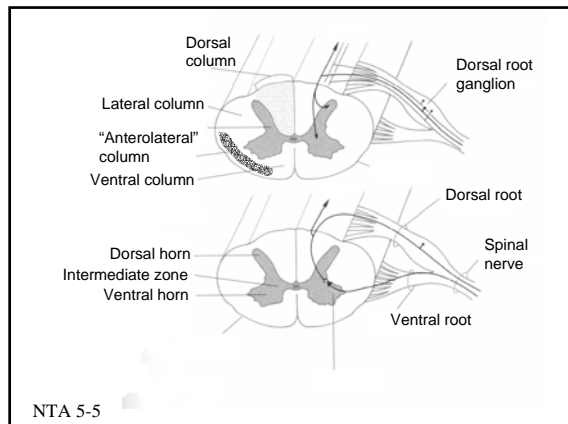
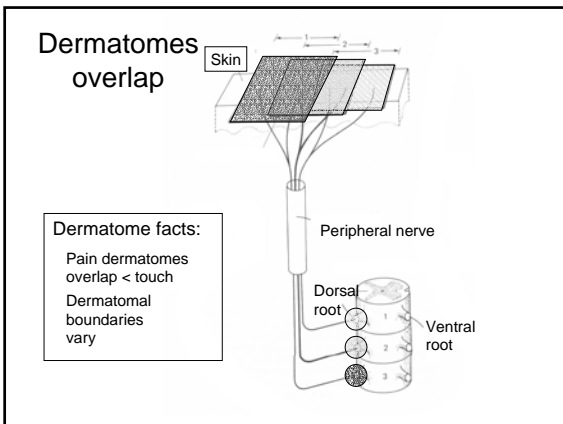
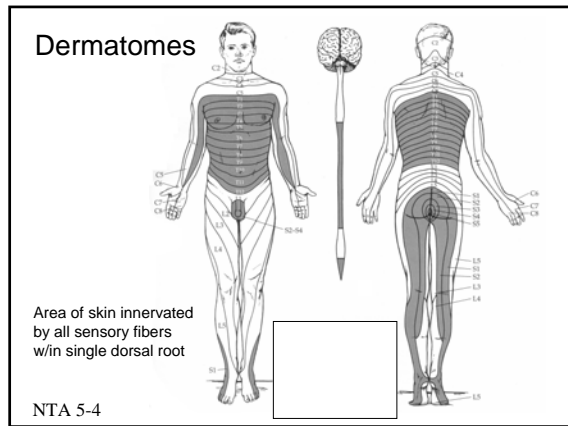
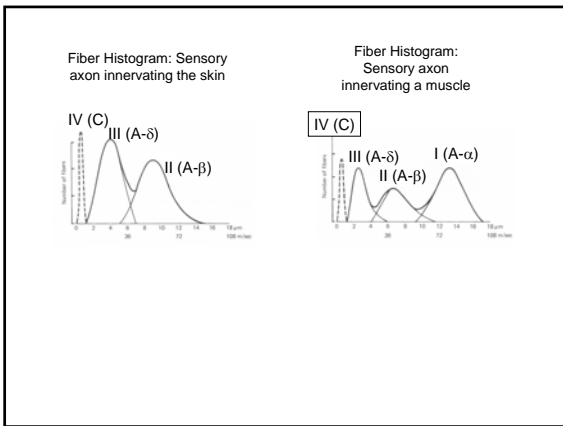
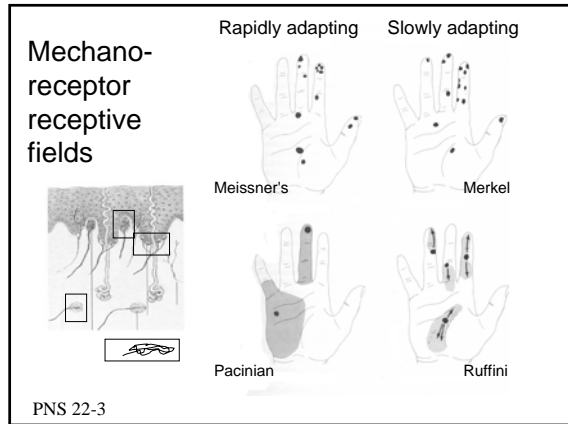
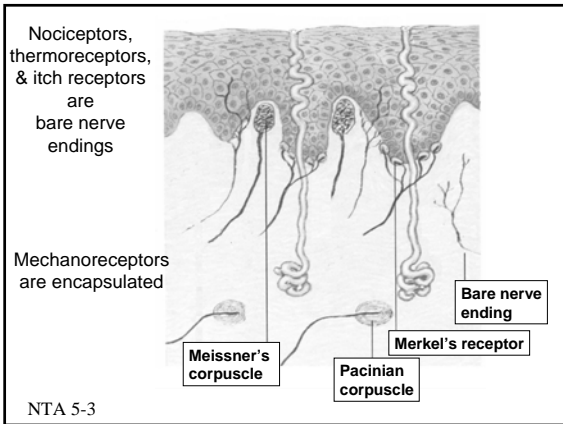
Anterolateral System

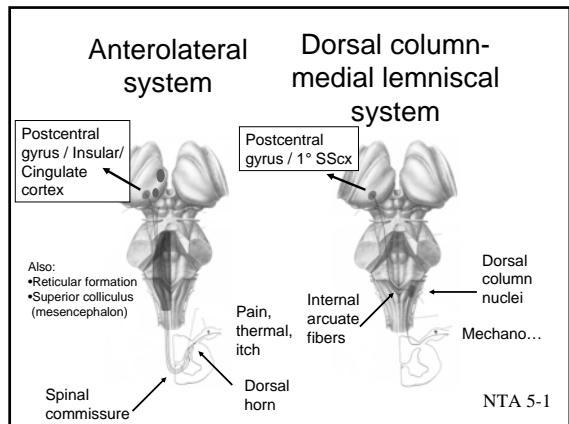
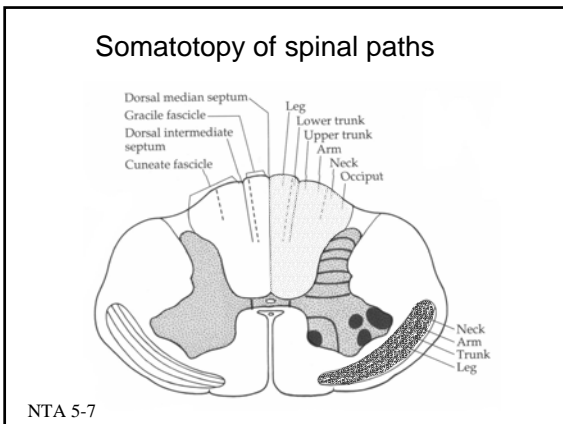
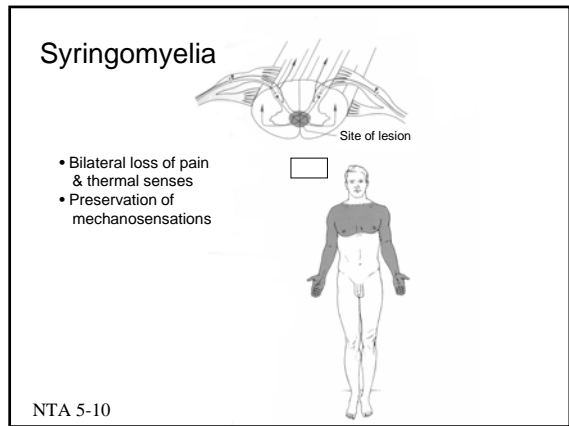
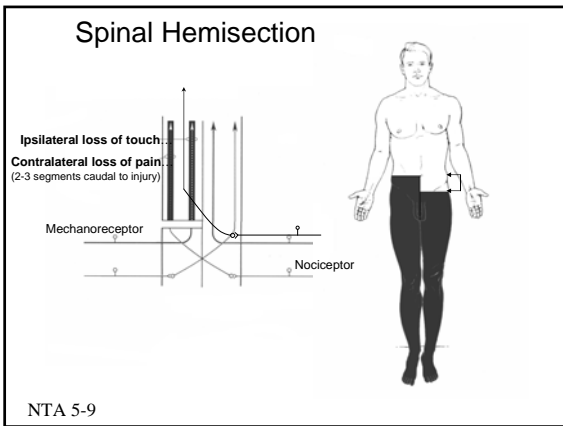
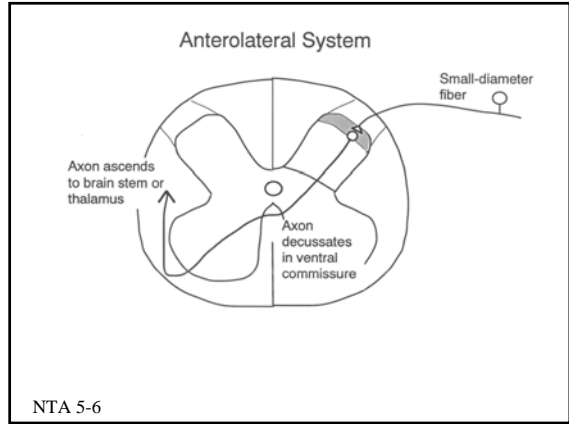
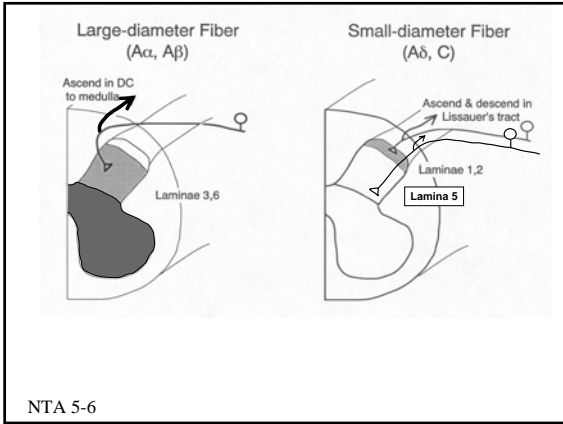
- Mediates protective sensations
 - Pain
 - Temperature (cold & warmth)
 - Itch
- Not as definitively established as is the DC-ML system for touch
- Why?
 - Pain w/o tissue trauma
 - Trauma w/o pain
 - Cultural; pathological

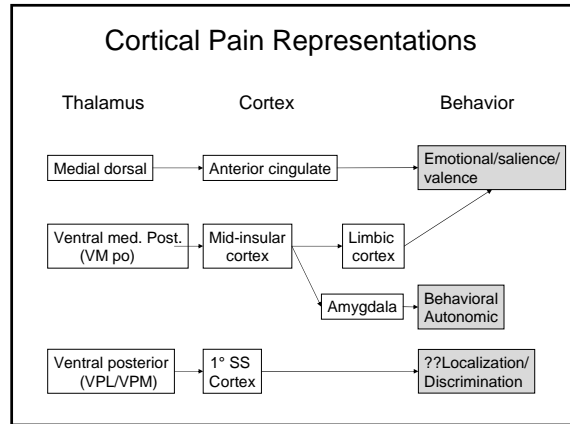
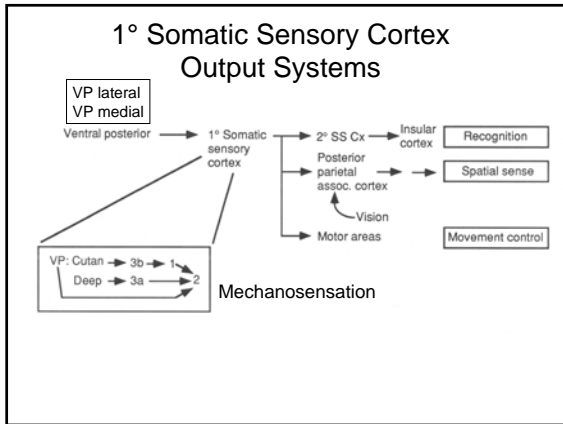
Perspective:

- Peripheral somatic sensory receptors are sensitive to different stimulus qualities
 - Mechanical
 - Thermal (warm, cold)
 - Noxious (mechanical, thermal, polymodal)
- Different receptor classes provide input to different somatic sensory pathways
- Differential thalamic and cortical localization









- ### Summary
- Early morphological specialization of DRG neurons sets stage for separate mechanosensory and pain/temp/itch systems
 - Different ascending pathways to distinct subcortical and cortical sites
 - Single thalamic mechanosensory nucleus and 1° ctx
 - Multiple thalamic pain nuclei and cortical areas
 - Parietal lobe projections may play role in stimulus localization, esp. for touch
 - Cortical pain representations closely tied to emotions