THE SKIN SENSES
The cutaneous sensations are served by the somatosensory system
It also includes proprioception and kinesthesia
We’ll focus on the sense of touch here, but don’t forget these other two

1) The Skin and Receptors
   a) Skin
      i) Largest, heaviest organ
      ii) Role in thermoregulation
      iii) Keeps some things in, some things out
      iv) Two primary layers
         (1) Epidermis
         (2) Dermis
      v) In these layers, there are sensors
         (1) Mechanoreceptors
         (2) Thermoreceptors
b) Mechanoreceptors

i) Merkel receptor/disk

ii) Meissner corpuscle

iii) Ruffini corpuscle

iv) Pacinian corpuscle

v) Respond to different frequencies

vi) Some are temperature-sensitive as well, or their frequency dependence is moderated by temperature

c) Fibers from receptors – Adapting Rate

i) SA – slow adapting fibers

ii) RA – rapidly adapting fibers
d) Receptive field size
   i) SA1 & RA1
      (1) Near skin surface; Merkel & Meissner
      (2) Small receptive fields
      (3) Responsible for “acuity” or perception of detail

   ii) SA2 & RA2
      (1) Deeper in skin; Ruffini & Pacinian
      (2) Larger receptive fields

e) Thermoreceptors
   i) Not clear which receptors are responsible
   ii) Separate hot and cold receptors
   iii) At different levels/depths in skin and work independently (Bazett et al, 1932)

   iv) “Paradoxical heat”
2) Neural pathways for touch

a) Starts at receptors

b) Goes through 4 types of fibers

c) Two separate pathways up spinal cord

i) Medial lemniscal pathway

ii) Spinothalamic pathway

d) Fibers cross over to contralateral side of the brain

e) Synapse in the thalamus

f) Somatosensory cortex (S1) and then S2

g) Disproportionate topographical map

h) Homunculus
3) Tactile feature detectors

a) Thalamic nuclei

b) Cortical neurons

c) Separation thresholds for detectors

4) Tactile object recognition

a) Passive vs. active touch

b) Haptic perception

c) Notes: