

Friday, February 20, 2015

Somatosensory System

- Info = skin, muscles, bones, tendons, joints
- Provides information from the skin
- Gathers info from all of the above
 - How much they are working, what their temp is, etc.
- Type= free or modified afferent terminals
 - This set up provides us with the most speed
- Components:
 - Thermo-and mechanoreceptors
 - We get info on temp and pressure
 - We don't need the details, we just need to know the info as fast as possible (in case tissue is being burned/ ripped)
 - Nociceptors: detect products of damaged and immune cells
 - They pick up on signal from immune cells fighting pathogens
 - That is why all your muscles and joints ache, because the nociceptors are being activated by the huge amount of immune system communication going on
- Spatially-related positioning in brain
 - Figure 7-20
 - Huh?
 - Cortical projection
 - Aka homunculus
 - We have more afferent cells in our hands
 - We can make changes but they are limited – huh?

Auditory System

- Info = sound wave
- Type = stereocilia
 - Figure 7-41
 - Mechanoreceptors
 - Stereocilia → Aka cochlear hair cells
- Components:
 - Figure 7-37
 - Path for sound
 - External auditory canal
 - Tympanic membrane
 - Middle ear (air)
 - Cochlea (water) – aka inner ear
 - Structure that looks like a snail
 - Auditory nerve
 - CNS
- Cochlea encodes wave
 - Mechanical bending of stereocilia (the hair cells bend)
 - K^+ and Ca^{+2} key in process
 - Need to learn details of this process (Mechanically gated channels and voltage gated channels)

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- o What's coded?
 - Amplitude/ loudness
 - Whisper vs rock concert
 - Measured by the amount of bend of your stereocilia
 - Frequency/pitch
 - Deep voice vs. high pitch voice (mickey mouse)
 - Determines which specific stereocilia are bent
 - o High frequencies hit sooner than the low frequency
 - High= near base of cochlea
 - Low = near apex of cochlea
 - This sets up the limit of our hearing range
 - o As we age the high pitch starts to wear out the hair cells so we can't hear the high pitch as much any more
- o What's missing?
 - Location in space of source
 - Ally speaks up in the middle of the room and we can identify where she is in the room
 - Two detections allow for cerebral geometry
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