**Hearing, Balance, Smell and Taste Study Guide**

[Textbook pages: Ear 284-291, Taste and Smell 291-295]

1. The Ear: Hearing and Balance
   1. Be able to label an ear diagram with the following terms: (handout)
      1. Outer, middle, and inner ear sections.
      2. Pinna, auditory canal, eardrum, ossicles (hammer, anvil, stirrup), Eustachian tube, vestibule, semicircular canals, cochlea, and vestibulocochlear nerve.
   2. Know the following functions of the inner ear: (handout)
      1. Cochlea = hearing (pitch/frequency and volume)
      2. Vestibule = “What direction is gravity?”
      3. Semicircular canals = “What direction is my head moving?”
      4. Note: hair cells in the inner ear are *mechanoreceptors*; i.e. they send a signal when they are bent.
2. The Nose: Smell (Olfaction)
   1. Be able to label a nose diagram with the following terms: (handout)
      1. Nostril, nasal cavity, olfactory hairs with receptors, olfactory cells, olfactory bulb, and olfactory nerve.
   2. Know the following aspects of smell function:
      1. Thousands of different olfactory receptors that can bind different odor chemicals. So we can experience thousands of different smells.
      2. Note: olfactory hair cells are *chemoreceptors*; i.e. they respond to different chemicals in the air.
      3. Smell is a huge component of a food’s flavor.
      4. The olfactory nerve makes significant connections with parts of the brain in the temporal lobe that are responsible for emotions and memory.
      5. Olfactory adaptation = we “get used to” an odor rather quickly and after a short period of time our brain will ignore it.
3. The Tongue: Taste (Gustation)
   1. Be able to label a tongue diagram with the following terms: (handout)
      1. Tongue, taste hairs with receptors, taste cells, taste buds
   2. Know the following aspects of taste function:
      1. We only have 5 different tastes.
      2. Sweet = sugars = carbohydrate intake
      3. Sour = acidic substances = vitamin C intake
      4. Salty = minerals = salt and mineral intake
      5. Umami (meats/savory) = amino acids = protein intake
      6. Bitter = a taste we don’t like = avoid natural poisons and spoiled foods
      7. Note: taste cells are also *chemoreceptors*; i.e. they respond to different chemicals that we put in our mouth.